Evaluation and performance of integrated crop management inChilliinRainfed tracts of Prakasam district

Abstract:

Chilli is an important high value spice crop, its Integrated crop management is an important area for the welfare andlivelihood security of farmers. Most of the farmers of Prakasam district of Andhra Pradesh are growing wide varietiesand cultivars of chilli but so far the research findings on chilliintegrated crop management were less aware.To know the yieldpotential of integrated crop management and its economic impact,evaluation on integrated crop management was conducted at Chandhaluru and NallaguntlaGuedmvillages. The adoptedpackage of practices was seed rate @1kg/ha, spacing 60x45cm, FYM 15t/ha, Urea, single super and muriate of potash256:150:80 kg/acre. Therewas wide variation between integrated crop management and farmers practice in fruit yield and economic returns.The results on yield andeconomic returns indicated that chilliintegrated crop management was found superior to farmerspractice. Integrated crop management could obtain 124 fruits per plantandyield of 47.00q/ha, thirpsincidence (24.3%), whitefly incidence (9.67 %) and fruit rotinfestation(6.0%). Whereas,in farmers practicefruits obtained were99per plant and yield of 43.00q/ha, thripsincidence (44.67 %),whiteflyincidence (28.33) and fruit rot(18 %) with a netincome of Rs220000/- and B:C ratio 1: 1.88 compared to farmers practice with a net income of Rs113333/-with B:C ratio 1:1.36. The integrated crop management percent yieldincreased over farmers practices8.5 per cent. Itwas 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 highvalue spice crop of India. It is a self-pollinated cropwhich bears a pod like fruit and has a predominantposition among the spices grown all over India. InIndia, chilli is considered as an essential ingredientof diet for rich and poor families. Its fruits areused for its

pungency spicy taste in diet and alsoa 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 AndhraPradesh, it was grown in an area of 1.77 lakh ha with the production of 7.97 lakh ton by contributingto19.86 % of area and 34.23 % of production of the country. However, the yield levels were lower AndhraPradesh (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 ofhorticultural crops. Vegetablegrowing could help to increase the income of thefarmers. Keeping the importance of chilli crop and its economic benefits, the study was conducted to find outgreen fruit yield/ha, Dry yield/ha, economic returns of the chilli

Materials and methods:

The present experiment was conducted atfive farmers' fields at Chandaluru and Nallaguntalgudemvillages of Darsi and Dornalamandals during Rabi season of 2021 to 2022. ArkaMeghanaseeds were purchasedfromIndian Institute of Horticulture Research, Bangalore.Thefield was thoroughly ploughed, well decomposedfarmyard manure was applied at the rate of 25t/ha and formed ridges and furrows. The seeds weresown in portrays during 2nd week of Augustand seedlings were transplanted on 3rd week ofSeptember2021 to 2022. KrishiVigyanKendra recommended integrated crop management of chilliand local farmers practiceswereused for this study. The chilli seedlings were produced in shed net KVK, Darsi anddistributed to the five identified farmers of Chandhaluru, Nallaguntlagudemandseedlings were transplanted at a spacingof 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 practiceswere followed as per the integrated crop management. Recommended dose of 30tof FYM,500 kg neem cake and NPK 200:60:120 kg/ha wasapplied.Basal application of entire P. Whereas, N, K top dressing of 4 equal splitsapplied on 30, 60, 90 and 120days after planting. Formula -4 were purchasedand applied as foliar application during 45th, 75thand 90 days after transplanting. Soil application ofNeem cake @ 200 kg/acre at the timeof last ploughing.Yellow and blue stickytraps

@ 30numbers per acre were placed in differentdirections of the plot. Neem oil also purchased anddistributed to the farmers to control the insect pest.Before conductance of the experiment, impartedtrainings to the farmers on protray nursery raising,nursery management, transplanting of seedlingsto the main field, application of growth regulatorsand harvesting methods etc. In addition to tricontanol booster were alsogiven for foliar spraying to increase the fruit setand quality (Mehraj *et al.,* 2014). The observationon plant height (cm), days to 50 per cent flowering(days), number of fruits per plant, average fruitweight (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.The data were analysed with appropriate statisticalmethod was suggested by Panse and Sukhatme(1967).

Results and Discussion:

The results revealed (Table 1) that amongtheintegrated crop management and farmers practice of chilli cultivation, integrated crop management recorded the highest values in growth, yield andcost economics characters compared tofarmers practice. Highest plant height of 174.33 cm was recorded in integrated crop management, whereasinfarmers practice it was149.67 cm. Days to first flowering and day to first harvest, integrated crop management recorded the earliestdays taken for flowering (49.67) and days taken for first harvest (78.33), whereas longer days were observedfor flowering (54 days) and days taken for first harvest (84 days) was noticed infarmers 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) whereasthefarmers practice registered the lowest number offruits per plant of 99.67. Similar trend wasnoticed 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 noticedthe lowest values in fruit length (9.22 cm) andfruit 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 perha of 47.00 q /ha which was higher than the othercrop management practices, whereas the farmers practiceregistered the lowest yield of 43.00q/ha. The sametrend 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 plantof710 g. Demonstrated varietyrecorded the

higher yield than farmers practice inFrench bean and clusterbean (Muthuramu, 2015;Rajamanickam, 2019). The yield variations wereoccurred amongst the genotypes, varieties andhybrids under varying field conditions have beenreported by Mishra *et al* (2017).

Economics:

The Integrated crop management of chilli(Table 2) could obtain a net return of Rs.220000/- withbenefit cost ratio 1:1.88 whereas the farmers practice could obtain only Rs113333 /- as net incomewith benefit cost ratio1:1.36. The wide variationin net return and benefit cost ratio was due to variation in the yield.

Conclusion:

Chilliintegrated crop management was found to be better than farmers practice.Daystaken for flowering (49.67),number of fruits per plant (124), yield per ha of 47.00q /ha low incidence of thirps (24.3 %),white fly (9.67 %) and fruit rot(6.0%) when compared with farmers practicedays 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 AndhraPradeshwhich will help in the economy up liftment 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