Integrated Crop Management Practices in Ridge gourd hybrid COH 1 for increasing yield and income under Cuddalore District of Tamil Nadu, India

Abstract

Front line demonstration on integrated crop management practice in ridge gourd (*Luffa acutangula* Roxb.) hybrid COH – 1was conducted at Cuddalore District of Tamil Nadu during 2021-2022 to increase the yield and income of the farming community. Totally ten progressive farmers were selected at Vridhachalam, Kammapuram and Panruti blocks of Cuddalore District, Tamil Nadu with an acreage of one acre per farmer. Bottlenecks of ridge gourd cultivation were identified through participatory approach preferential ranking techniques. The selected farmers were trained through skill development programme and the beneficiaries were taught with improved scientific production techniques of ridge gourd hybrid COH -1, seed treatment, plant growth regulators, integrated nutrient management, integrated pest and disease management. Results of the present study revealed that demonstrated plot recorded higher number of fruits per plant, fruit length, fruit girth, fruit weight, yield per plant and yield per hectare as compared to farmers practice. The demonstrated plot also recorded high gross income, net income and benefit cost ratio than farmers practice. Low technology gap and technology index observed in the present study revealed the effectiveness of technical interventions.

Key Words: Ridge gourd-COH-1-Yield-BC ratio-Technology gap-Technology index

Introduction

"Ridge gourd or ribbed gourd (*Luffa acutangula* Roxb.) is known as Luffa gourd or Angled Luffa in most parts of the world. Ridge gourd is one of important cucurbitaceous vegetable crops in India and it is also popular in Southeast Asia and China. Ridge gourd is cultivating in 24,500 acres approximately in India with production of 3,16,925 tonnes (farmnest.com). Ridge gourd is delicious vegetable and its tender fruits can be cooked to prepare various curries and it is also used in making chutneys in South India. Ridge gourd fruits become more fibrous if fruit pickings are delayed and become unfit for culinary purposes. Ridge gourd is

rich in dietary fibre and enriched with all the vital elements that include Vitamin-C, zinc, iron, riboflavin, magnesium, thiamine and traces of other minerals. It is low in saturated fat, cholesterol and calories that aids in weight loss. The nutritional value of gourd makes it suitable for maintaining optimum health and weight lose. It has excellent cooling properties. Ridge gourd contains a gelatinous compound called luffein" (Thamburaj and Singh, 2013). Ridge gourd contains good amount of cellulose and high in water content that helps to relieve from constipation. It is quite rich in vitamins and minerals. A few of the health advantages are an excellent blood purifier, possessing laxative properties, a cure for jaundice, beneficial for diabetes, aiding weight loss, anti-inflammatory and anti-biotic, fortifying the immune system, Skincare, good for the stomach. Ridge gourd is a versatile crop can be grown in almost all type of soil with little management. In Cuddalore District ridge gourd is cultivated in an area of 72-ha. However the productivity of ridge gourd is lower due to unawareness of improved high yielding variety/hybrids and integrated crop management practices. Productivity of ridge gourd can be increased sustain the income by adopting improved production technologies *viz*., improved high yielding varieties/hybrids, use of plant growth regulators, integrated nutrient management and integrated pest and disease management. Frontline demonstration is the new concept of field demonstrated evolved by the Indian Council of Agriculture Research (ICAR) with main objective of demonstrate newly released crop production technologies and its management practices in the farmer, under different agro climatic region of the country under the farming situations. With this above ideas front line demonstrations were conducted in ridge gourd at Vridhachalam, Kammapuram and Panruti blocks of Cuddalore District of Tamil Nadu, India.

Materials and Methods

Front line demonstrations were conducted in ten farmer's field at Vridhachalam, Kammapuram and Panruti blocks of Cuddalore District of Tamil Nadu by ICAR-Krishi Vigyan Kendra, Tamil Nadu Agricultural University, Vridhachalam, Cuddalore District of Tamil Nadu. The study was conducted in 10 acres with acreage of 1 acre per farmer. Bottle necks of ridge gourd cultivation were identified though participatory approach preferential ranking technique. The farmers were used to cultivate local variety or private hybrids without any improved scientific production technologies. Hence the farmers getting low yield of 12-15 tonnes per hectare and low income. Before conducting the front line demonstration skill development

trainings were imparted and the beneficiaries were taught with improved scientific production techniques of ridge gourd. Front line demonstration was conducted with ridge gourd hybrid COH 1 a newly released high yielding hybrid from Tamil Nadu Agricultural University, Coimbatore. Ridge gourd hybrid COH 1 was released from Tamil Nadu Agricultural University during 2020. It is a cross between IC 410147 x IC 373361. The hybrid is very early (days to first harvest is 30-35 days) and a prolific bearer with high yield and produce 33.7 tonnes of fruits per hectare. The fruits are attractive green with soft pulp, less seed content, long (40-45 cm) ridged with an average fruit weight of 370-380 g. a single plant yields 25-30 fruits with an average yield of 10.57 kg per plant. Package of practices conducted were ridge gourd hybrid COH 1, seed treatment, plant growth regulators, integrated nutrient management practices and integrated pest and disease management practices. Treated seeds were sown in pits at a spacing of 2.5x2 m. three seedlings per pits were maintained. Azospirillum and Phosphobacteria @2 kg/ha and Pseudomonas 2.5 kg/ha along with FYM 50 kg/ha and neem cake @ 100 kg/ha were applied at last ploughing. Pandal is erected at a height of 2 m for spreading of vine. Plants were Sprayed ethrel at a concentration of 250 ppm (2.5 ml/10 lit. of water) four times commencing from 15th day of sowing at weekly interval to increase the female flower and yield. Biometrical observation on number of fruits per vine, fruit length (cm), fruit girth (cm), fruit weight (g), yield per plant (kg), yield per hectare and benefit cost ratio were recorded and subjected to statistical analysis as per the procedure of Panse and Sukhatme (1985). Cost of economics was worked out to arrive the benefit cost ratio. Percentage of yield increase over farmers variety, technology gap, extension gap and technology index were worked out by using the formula as suggested by Samui *et al.*, (2000).

Result and discussion

Demonstrated package of practices and farmers practices were given in the table 1. The results of yield attributing traits and yield were presented in the table 2. From the results it was observed that the demonstrated showed significant influence on yield attributing traits, yield and economics in ridge gourd. From the table 2 it was noticed that the improved crop management practice significantly increased the yield over farmers practice. The yield attributing traits viz., number of fruits per vine (25.23), fruit length (37.62 cm), fruit girth (11.69 cm), and yield per vine (340.77 g) were significantly higher in demonstrated plots. Whereas comparatively, lower number of fruits per vine (19.38), fruit length (33.10 cm), fruit girth (10.34 cm) and fruit weight

(287.69g) were recorded in farmers practiced plot. Higher values of yield attributing traits observed in demonstrated plot might be due to high yielding F1 hybrid seeds, growth regulator, bio fertilizers and bio inocuolants, integrated nutrient management and integrated pest and disease management.

"Higher per plant yield (8.77 kg) and yield per hectare (29.11 t) was observed by the plot which received integrated crop management practices. Whereas the farmers practice plot recorded a per plant yield of 5.79 kg and yield per hectare of 18.51 t. The integrated crop management plot recorded higher yield might be due to higher number of fruits per vine, fruit length, fruit girth and fruit weight. Fruit weight is strongly associated with fruit length, fruit weight and total yield as reported by Lokesha and Shivsankara (1990) in cluster bean. Yield is a complex and dependant traits which one is determined by the fruit weight and number of fruits per plant and their inheritance any change in these would reflect on total yield" (Premalakshmi *et al*, 2017). "Varietal evaluation and screening of variety is very important necessary process to obtain most suitable and economical variety for farmer's cultivation. Each variety/hybrid having its own specific genetical behaviour which are inherent. The variation in yield parameters observed in the present study for different varieties due to its genetic behaviours. This results are in agreement with the results of" Lingaiah *et al*., (1993) and Jaiswal *et al.*, (1995) in bitter gourd, Ahmed *et al.,* (2004) in cucumber, Narayan *et al*., (2006), Raja *et al*., (2007) and Nalawade *et al*., (2011) in bitter gourd, More (2012) in water melon, Haque *et al*., (2014) in snake gourd as well as Jamal Uddin *et al*., (2014) in bottle gourd.

Economic indicators *i.e.* gross expenditure; gross returns, net returns and BC ratio of Front Line Demonstration are presented in Table 3. The data clearly indicated that net returns from the demonstration plot were significantly higher than control plot, i.e. farmers practice. Higher net returns of Rs.. 3,15,325.00 /ha. was obtained from demonstration plot compared to farmers practice (Rs.1,77,100.00 /ha) . The average gross expenditure incurred from the demonstration plot was recorded as Rs. 1,47,125.00. Whereas in farmers practice the average gross expenditure incurred per ha was Rs. 1.37,750.00. The average gross returns from the demonstration plot were Rs. 4,62,450.00 /ha compared to Rs. 3,14,850.00 /ha in control plots. Regarding benefit cost ratio it was observed that the demonstration plot recorded significantly higher benefit cost ratio of 2.14 as compared to farmers practice (1.28). this might be due to the integrated crop management practice recorded the highest for all the yield parameters. Regarding

variety the ridge gourd hybrid COH-1 recorded higher number of fruits, fruit weight, per plant yield and yield per hectare thus resulted in increased gross returns, net returns and benefit cost ratio. These findings were similar to Bhagat (2012) in bitter gourd and Shinde (2014) in bottle gourd.

The technology gap, the difference between potential yield and yield of demonstration plots was 4.59 per hectare. This might be due to the soil fertility, management skill and prevailing climate of a particular location. Hence, location specific recommendations are necessary to bridge these gaps. These findings are similar to Mishra et al. (2009), Kansara and Sabalpara (2015) and Babu and Rao (2018). Extension gap under FLD programme was 10.6 t/ha. This emphasized the need to educate the farmers through various techniques for the adoption of improved horticultural production technologies to reverse this trend of wide extension gap. More and more use of latest production technologies along with high yielding variety/hybrid will subsequently change this alarming trend of extension gap. Technology index show the feasibility of the variety at the farmers field. The lower the value of technology index is ideally favourable. Decreased value of technology

"index over the years of technology demonstration was also observed by many scientists at different agro climatic conditions in different crops" (Sawardekar *et al.,* 2003, Dhaka *et al.,* 2010, Kumar, 2012, Kumar, 2013 and Kumar, 2014). A technology index of 13.60 percent was observed in the present study which shows the effectiveness of technical interventions. This accelerates the adoption of demonstrated technical interventions to increase the yield performance of ridge gourd.

Conclusion

The present study concludes that the integrated crop management practice including new high yielding hybrids, improved production technologies and location specific techniques has to be popularized through various extension tools to increase the yield, income and livelihood of the farming community. Further it will certainly decrease the extension gap and technology index.

Table 1. Demonstrated package of practices and farmers' practices in ridge gourd.

Components	ICM practices	Farmers practice
Selection of high yielding variety/hybrids	High yielding hybrid COH 1 @ 1 kg/ha.	Local variety/private hybrids @ 2.5 kg/ha.
Seed treatment	Seeds treated with Trichoderma viride @ 4 g or Pseudomonas fluorescens @ 10g/kg of seeds	Not practiced.
Spacing	2.5 x 2 m.	3 x 0.6 m.
Sowing	Pit method. Pits of 45 x 45 x 45 cm size were dug out. Three seeds were sown @ 3 /pit.	Channel method. In the channel seeds were sown @ one seed/hill.
Fertilizer application	At the time of last ploughing Azospirillum and Phosphobacteria @ 2 kg/ha and Pseudomonas 2.5 kg/ha along with FYM 5 t/ha and neem cake @ 100 kg/ha were applied and incorporated in the soil.	FYM @ 2 t/ha.
	10 kg of FYM, 100 g of NPK 6:12:12 mixture as basal per pit and N @ 10 g per pit 30 days after sowing.	Indiscriminate use of complex fertilizers as top dressing.
Growth regulator	Ethrel @ 250 ppm at 15 days after sowing and repeated three times at 15 days interval.	Not practiced.
Weeding	As and when required.	As and when required.
Plant protection	Need based chemicals used.	Indiscriminate use of plant protection chemuicals.

Table 2. Effect of ICM Practices on yield and yield attributing traits in ridge gourd

Treatments	No. of	Fruit	Fruit	Fruit	Yield /	Yield /	BC

	fruits	length (cm)	girth (cm)	weight (g)	plant (kg)	hectare (t)	
ICM practice (COH – 1)	25.23	37.62	11.69	340.77	8.77	29.11	2.14
Farmers practice (Local variety)	19.38	33.10	10.34	287.69	5.79	18.51	1.28
SEd	**0.66**	**4.50**	**0.16**	**6.13**	**5.31**	**1.07**	**0.10**
CD (0.05)	**1.45**	**9.81**	**0.35**	**13.37**	**11.58**	**2.34**	**0.23**

Table 3. Cost economics of ICM practices vs Farmers practice

S.No.	Treatment	Gross Expenditure	Gross Income	Net Income	BC ratio
1.	**ICM practice (COH – 1)**	147125	462450	315325	2.14
2.	**Farmers practice (Local variety)**	137750	314850	177100	1.28

Table 4. Percentage increase, technology gap, extension gap and technology index

Treatment	Yield (t)	Percentage increase over FP	Technology gap	Extension gap	Technology index
ICM practice (COH – 1)	29.11	57.27	4.59	10.60	13.62
Farmers practice (Local variety)	18.51				

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Fig 1: Survey study