

Original Research Article

Economic performance of zero tillage technology in maize under agency tracts of Andhra Pradesh

ABSTRACT

The research work mainly concentrated on economic performance of zero tillage in maize under agency tracts of Andhra Pradesh during five continuous years from 2011 to 2016 at different farmer's field locations of Andhra Pradesh. The improved research variety DHM-117 with improved technology like zero tillage, spacing, recommended dose of fertilizers etc, revealed that mean grain yield (84.4 q/ha) and increased yield over control (39.80%) which recorded Rs: 60,446/ha (rupees sixty thousand four hundred and forty four) and a B:C Ratio of 3.53 when compared to local check.

INTRODUCTION

Maize crop has been cultivated in Andhra Pradesh since 1999. Since then acreage over a decade period from 1999 to 2009 had increased from 3.60 lakh acres to 5.30 lakh acres in *kharif*, 0.92 lakh acres to 3.58 lakh acres in *Rabi*. The productivity of the crop varied between 2205 kgs per ha to 4581 kgs per ha depending on the availability of moisture and favorable conditions during *kharif*. In *Rabi crop*, maize crop cultivated under irrigated conditions produced yield ranging between 2996 kgs per ha to 4930 kgs per ha.

MATERIALS AND METHODS

The demonstrations were laid out in 11 agency mandals of East Godavari District of Andhra Pradesh from 2011-12 to 2015-16. In demonstration field they strictly followed zero tillage practice to minimize the cost of cultivation, effective utilization of residual moisture and nutrients.

As these demonstrations were laid out in rice fallows of red soils, sowings were taken up during first week of December using seed marker possessing pegs at distance of 30 cms. Women family labour worked on seed marker for placing seed and fertilizers in adjacent holes made by

drill. Pre-emergence weedicides were sprayed to control weeds that might arise from rice stubbles. Other regular management practices such as top dressing, plant protection were similar as in conventionally tilled crop. A field day was conducted to upscale the technology and gather feedback from farmers before the harvest of crop. Farmers perceptions were drawn on different factors such as tillage cost, yields, Nett returns, weed management and nutrient and pest.

Table 1. Comparison between demonstrated package and existing farmer's practice of maize production			
Sr. No.	Intervention	Demonstrated package	Farmers' practice
1	Farming situation	Rainfed, red loamy soils, agency area,	Rainfed , red loamy soils, agency area,
2	Cropping system	Paddy fallows	Pulses
3	Variety	DHM 117	Local
3	Seed treatment	Seed treated with thiram 75% WP@3g/kg	Nil
4	Time of Sowing	15 th to 30 th October	1 st to 10 th November
5	Method of Sowing	Line sowing with proper crop geometry. Paddy fallows with zero tillage	Broadcasting
6	Seed rate	18 to 20 kg/ha	20-25kg/ha
7	Fertilizer dose	100:50:40 (NPK kg/ha)	100:40:0
8	Plant protection	Need based application of carbofuran 3G@ 10 kg/ha to protect against stemborer	Nil
9	Weed management	Atrazine @2.5kg/ha as pre-emergence, Paraquat 2.5l/ha as post-emergence followed by one hand weeding at 30 days after sowing	One hand weeding at 30-35 days after sowing

RESULTS AND DISCUSSION

Improved practice resulted the better performance when compared to the farmers practice in number of cob/plant and 1000 grain weight (221- 250 g) under demonstration compared to the

farmer's practice (186-211.5g) (table-2) which ultimately resulted in higher grain yield of 84.4 q/ha.(table-3)

Table 2: Yield attributes obtained under demonstration versus farmers practices

Sl no	Parameters	Demonstration	Farmers practice
1	No. of cobs/ plants	2	1
2	No. of kernals rows	20-25	16-18
3	Length of cob (cm)	18-21	15-19
4	Thousand grain weight (g)	221-250	180-211.5

On an average, maize grain yield under front line demonstration was higher by 40.66 per cent as compared to farmer's practices (60.4 q/ha) (Table 3). The results indicated that the demonstration has given good impact in terms of yield and income. Similar yield enhancement in different crops in front line demonstration has amply been documented by Haque (2000), Tiwari and Saxena (2001), Tiwari *et al.* (2003), Nazrul Islam *et al.* (2004) and Mishra *et al.* (2009).

Economical impact of the technology revealed that The net returns un (Rs. 60,446 /ha) increased by 55.86 per cent over the farmer's practice (Rs. 38780 /ha). During the years, 2011-12, 2012-13 2013-14, 2014-15 and 2015-16 the benefit cost ratios were recorded from 3.12:1 to 3.81:1 where as in farmers practice it was ranged from 2.29:1 to 2.99:1.(Ranjbar *etall* 2014)

However ,Zero tillage rabi maize resulted higher Nett returns when compared to Conventional tillage grown *rabi* maize. Studies reported variability in Nett returns from high to low depending to cost of inputs and variations in crop yields (Khakbazan and Hamilton, 2012).

Farmers find significant change in yield levels and this technology has demonstrated much yield increase by gains in Nett returns by reduction of tillage cost to the tune of Rs 10,000 to 6000 form attractive proposition to adopt this technology in future. (Jeengar *etall* 2006).

Farmers assessed savings on cost of tillage operations in comparison to conventional practice, as rice fallows possess hard sub surface soil on account of flooding of previous season crop. Minimum of 6 ploughings required to break hard clods amounting to cost escalation to the tune of Rs 6000 to 10,000 per acre in conventional tillage. This was found to have reduced in

zero till crop. In this technology the field usually not ploughed and soil is opened up for sowing with seed drill and fertilizer is placed in adjacent slot made with same seed drill. A seed drill specially designed for the purpose actually facilitated in sowing which to a large extent constituted the success factor of technology adoption. (Singh P *etall* 2001).

Table 3: Economics of Maize cultivation under FLD and Farmers practice

Sl no	Year	Cost of cultivation (Rs/ha)		Gross returns (Rs/ha)		Net returns (Rs/ha)		BC Ratio		Grain yield (q/ha)	
		IP	FP	IP	FP	IP	FP	IP	FP	IP	FP
1	2011-12	22,300	20,100	85,000	60,000	62,700	39,900	3.81:1	2.99:1	85.0	60.0
2	2012-13	23,220	21,540	85,500	62,500	62,280	40,960	3.68:1	2.90:1	85.5	62.5
3	2013-14	24,500	22,350	76,500	53,500	52,000	31,150	3.12:1	2.39:1	76.5	53.5
4	2014-15	24,800	21,650	88,000	64,000	63,200	42,350	3.55:1	2.96:1	88.0	64.0
5	2015-16	24,950	22,460	87,000	62,000	62,050	39,540	3.49:1	2.76:1	87.0	62.0
	Mean	23705	21620	84400	60400	60446	38780	3.53	2.80	84.4	60.4

Only family labour was utilized throughout all farm operations and incurred less of labour cost compared to conventional tillage method. weedicides mainly to control weeds and prevent rice stubbles emergence.

CONCLUSION

Technological interventions like demonstration of maize cultivation in agency area of Rampachodavaram under the operational area of KVK, Panadirimamidi, noted drastic improvement in the cropping pattern by zero tillage maize production in paddy fallows in *Rabi* season. The continuous demonstrations on maize shown better production and productivity and farm income also increased. Farmer attitude was changed. The trend may be followed in future. Now the technology came to the pipeline of Dept. of Agriculture and other line departments.

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