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Populerization of maize among the small farmers of Ernakulam district of Kerala through front line demonstration

Vijendra Kumar Meena*, Shinoj Subramannian, Pushraj Anjelo and Dipti N.V.

Krishi Vigyan Kendra,
ICAR- Central Marine Fisheries Research Institute, Narakkal-682 505, India.
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ABSTRACT

To popularise maize crop (*Zea maize*) among small farmers of Ernakulam district of Kerala, Krishi Vigyan Kendra, ICAR-Central Marine Fisheries Research Institute organised 25 demonstrations during 2012-13 to 2014-15 on traditional farmer's field. Maize cultivars Pratap-4 and Pratap-5 were used for demonstration during January to May and September to December season. Farmers were motivated and trained for maize seed multiplication and cultivation aspects. Results of demonstration revealed that Pratap-4, Pratap-5 and local variety produced 33.70, 30.7 and 23.4 q/ha, respectively. Average income generated by the crop range from Rs. 40440/- to Rs. 36840/- and local variety Rs. 30240/-. Cost benefit ratio was 2.18, 1.99 and 1.77. for Pratap-4 , Pratp-5 and local variety, respectively. Technology index was reduced in the 2nd and 3rd year showed the feasibility of maize crop in the area. Thereafter, 500 farmers initiated the small scale farming of maize in the district with the technical guidance provided from KVK.

Key words: Demonstration, Maize.

INTRODUCTION

Maize (*Zea mays* L.) is the most important cereal crop, which can be grown in diverse seasons, ecologies and it is used in industry and feed for animal and poultry. It is known queen of cereal due to unparallel productivity among cereal crops. Globally, it is cultivated on more than 160 m ha area across 166 countries having wider diversity of soil climate biodiversity and management practices.

In India, maize occupies third position both in area and production followed by rice and wheat (Anonymous, 2011). At present it is being cultivated on 8.6 m ha with the production of 21.7 million tonnes with an average productivity of 24.35 t/ha. The productivity of India is just half than the world productivity. Lack of awareness about the multifarious uses of maize and availability of production technology *viz* suitable high yielding verities as well as poor knowledge about production practices are ascribed as main reason for low popularity and productivity of maize in Kerala. The productivity of maize per unit area could be increased by adopting recommended scientific and sustainable management production practices using suitable high yielding varieties through demonstration. 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. While demonstrating the technologies in the farmer's field the scientist are required to study the factors contributing higher crop production. Field constraint of production and thereby generate production data and farmers feedback information. Taking into account the consideration s, frontline demonstration (FLD ,s) were carried out in a systematic manner on farmer, field to show the worth of a new variety and convincing farmer to adopt improved production management practices of maize for enhancing productivity of maize (*Zea mays* L.)

MATERIALS AND METHODS

The demonstration were conducted in 25 farmers field by the Krishi Vigyan Kendra, to know the production and economic benefits of scientific maize production technology technology in Ernakulum district of south zone VIII a of Kerala state during month of January to May and September to December season of 2012-13 and 2014-15 (three consecutive Year) in the farmer field in different village viz Mooknoor, Angamali and Prembhuoor panchyat. During these three year of study, an area 5 ha was covered, each farmer with 50 cent area (0.5 Acre) under front line demonstration with active participation of farmers in selected village panchayat were conduct. Before conducting FLDs, the group meeting and skill training was imparted to the selected farmers regarding different aspect of maize cultivation. To popularize the scientific maize production technology, constrains in maize production were identified though participatory approach preferential ranking technique was utilized to identify the constraints faced by the responded to participating farmers in maize cultivation.

*Corresponding author's e-mail: kumar.ladla@gmail.com.

The package of practices included were improved varieties, seed treatment, maintenance of optimum plant stand, recommended fertilizer dose. The spacing followed was at 0.60 m x0.25 m sown with the seeds rate of 25 kg/ha. The all participating farmer were trained on all aspects of maize production system. To study the of front line demonstration out of 25 participating farmer, total of 100 farmer were selected as respondent through proportionate sampling. Production and economic data for FLDs and local practices were collected and analyzed. The extension gap, technology gap and technology index were calculated using the formula as suggested by Samui *et al*. (2000).

Extension gap (qha^{1}) =

Demonstration yield (qha-^{1}) – yield of local check (qha-^{1})

Technology gap (qha^{1}) =

Potential yield (qha-^{1}) - Demonstration yield (qha-^{1})

Technology index (%) =

Potential yield (qha-^{1})- Demonstration yield/ Potential yield x100

RESULTS AND DISCUSSION

Constraints in maize production: Farmer's field maize cultivation problems were documented in this study. Preferential ranking scientific techniques were utilized to identify the constraints faced by the respondent farmer in maize production. The ranking given by the different farmers are given in Table 1. A perusal of table indicates that lack of suitable high yielding variety (HYV) (85.00%) was given the top most rank followed by low technical knowledge (85.00%). Based on the ranks given by the respondent farmer for the different constraint revelled that lack of suitable HYV, low technical knowledge and other constraint such low or erratic rainfall, labour cost high, post harvest management were found to reduce maize production. Among all the constraints, low soil fertility got least concerns. Other studies (Dhaka *et al*., 2010; Ranawat *et al*., 2011; Sreelakshmi *et al*., 2012;) have reported similar problem in maize production.

TABLE 1: Ranks given by farmers for different constraints (n=100)

Constraints	Percentage	ranks
Lack of suitable HYV	85.00	I
Labour problem	80.00	III
Low soil fertility	30.00	VII
Marketing	75.00	IV
Low technical knowledge	85.00	II
Wild animals	60.10	V
Vagaries of weather (Delay onset of monsoon, Early withdrawn of monsoon)	50.57	VI

Performance of FLD: A comparison of productivity levels between demonstrated varieties and local crop variety is shown in Table 2. During the period under study it was observed the productivity of maize in Ernakulum district under improved production technologies ranged18.50 to 21.00 q/ha herewith 18.66 mean yield of 21.85q/ha for the varieties Pratap-4 and Pratp-5 and local. Yield of the front line demonstration trial and potential yield of the different varieties of crop was compared to estimate the yield gaps which were further categorized into technology index. The technology gap show the gap in the demonstration yield over potential yield (60 q/ha). Technology index show the feasibility of the variety at the farmers field. The lower the value of technology index more is the feasibility. Reduced technology index over the years of technology demonstration was also observed by several workers at different agro climatic conditions in different crops (Sawardekar *et al.* 2003, Dhaka *et al.*, 2010, Kumar, 2012, Kumar, 2013, Kumar, 2014a and Kumar, 2014b).

The extension gap showed in decreasing trend in both varieties 4.60 to 3.40 and 4.80 to 3.85. The technology gap ranging between 34.72 to 31.4 and 36.5 to 33.75 q/ha during the study period emphasizes the need to educate the farmers through various mean for adoption of improved agricultural production technologies to reverse the trend. The trend of technology gap reflect the farmer corporation in carry out such demonstration with encouraging result subsequent year. The technology gap observed might be attributing to the dissimilarity in soil fertility status and whether condition. Mukharji (2003) have also opined that depending on identification and use of farming situation, specific intervention may have more implication in enhancing system productivity. Similar finding were also recording by Mitra *et al.* (2010) and Katare *et al.* (2011) The wider gap in technology index both the variety (ranging between 57.86

TABLE 2: Yield of maize as influenced by improved production technologies and high yielding varieties over local practices in farmer's field (2012-14)

Year	Variety	Area ha	Demo. No.	Potential Yield (qha^{-1})	Yield (q/ha) improved technology				Extension gap (q/ha)	Tech. gap(q/ha)	Tech. Index (%)
					Max.	Min.	Av.	local			
2012	Pratap-4	3	15	60.00	30.00	20.56	25.28	20.60	4.60	34.72	57.86
2012	Pratap-5	2	10	60.00	28.00	19.00	23.50	18.70	4.80	36.50	60.83
2013	Pratap-4	3	15	60.00	32.56	22.76	27.66	23.85	3.81	32.34	53.90
2013	Pratap-5	2	10	60.00	29.50	21.06	25.55	21.30	4.25	34.75	57.91
2014	Pratap-4	3	15	60.00	33.70	23.50	28.60	25.20	3.40	31.40	52.33
2014	Pratap-5	2	10	60.00	30.70	21.80	26.25	22.50	3.85	33.75	56.25

TABLE 3: cost of cultivation (Rs.ha^{-1}), net returns (Rs.ha^{-1}) and Benefit: Cost ratio of maize as affected by improved production technology over local practise

Year	Variety	Total cost of cultivation (Rs.ha^{-1})		Gross return(Rs.ha^{-1})		Net return(Rs.ha^{-1})		Benefit :cost ratio		Add. Cost of cultivation (Rs.ha^{-1})	Add. Net returns (Rs.ha^{-1})
		Improved	Localtechnology check	Improved	Local technology check	Improved	Local technology check	Improved	Local technology check		
2012	Pratap-4	17500	15000	36000	24720	18500	9720	2.05	1.64	11280	8780
2012	Pratap-5	17500	15000	33600	22440	16100	7440	1.92	1.49	11160	8660
2013	Pratap-4	18000	16500	39072	28620	21072	12120	2.17	1.73	10452	8952
2013	Pratap-5	18000	16500	35400	25560	17400	9060	1.92	1.54	9840	8340
2014	Pratap-4	18500	17000	40440	30240	21940	13240	2.18	1.77	10200	8700
2014	Pratap-5	18500	17000	36840	27000	18340	10000	1.99	1.58	9840	8340
	Average	18000	16166	36892	26430	18892	10263	2.04	1.62	10462	8628

to 52.33and 60.83 to 56.25) during the study period in certain region may be attributed to the difference in soil fertility status, weather condition, non availability of irrigation water and insect- pest attack in the crop (Singh *et al.* 1995).

The economic feasibility of improved technology over traditional farmers practices was calculated depending on the prevailing prices of inputs and output cost (Table 3) it was found that cost of production of maize under improve technology varied from Rs.17500 to 18500 ha^{-1} in case of pratap 4, pratap 5 and local variety cost of production. Rs 15000 to 17000 in same years the addition cost incurred in the improved technology was mainly due to more cost involved in the cost of improved seed only. Front line demonstration recorded higher means net return (Rs.18892 and 10263/ha) with higher benefit cost ratio both improved variety and local variety (2.18, 1.99 and 1.77) under improved technology of different improved variety.

The yield gap between conventional practices and improved production technology was perceptibly higher; there is urgent need to make stronger extension services for educating the cultivation in the implementation of improved maize production technology. However, the yield level under FLD was better than the local varieties and performance of these varieties could be further improved by adopting recommended production technology. Hence, it can be observed that increased yield was due to adoption of high yielding varieties and condition frontline demonstration of proven technology. Yield potential of crop can be increased to greater extent. This will subsequently increase the income as well as the livelihood of the farming community. From the above research finding it can be also conclude that the maximum number of the respondents had medium level of knowledge and extent of adoption regarding recommended maize production technology. The study reported lack of suitable HYV as major constraint by the beneficiaries and is ranked first followed by low technical knowledge.

CONCLUSION

On the basis of the results obtained in present study it can be concluded that new crops and technologies can be popularised in new area with front line demonstrations. Further this will help in reducing yield gaps (both extension and technology gaps).

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