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Performance of Location Specific Composite Maize (*Zea mays* L.) Variety in North Eastern Hilly Region of Mizoram

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ABSTRACT

Krishi Vigyan Kendra, Lunglei conducted twenty five demonstrations across five selected villages to disseminate the production technology of high yielding maize composite RCM 75. The improved technologies consisted of location specific improved high yielding composite variety, use of pre-emergence weedicides, use of fungicide as seed treatment, fertilizers, insect-pest management etc. The results indicate that with the transfer of improved technology, the grain yield of demonstration plots was considerably higher over farmers' plot yield. The highest grain yield was obtained in demonstrated plot (50.73 q/ha) compared to 35.82 q/ha under farmers' practice. The average increase in yield over farmers' practice was 41.60 per cent. There was an average technology gap of 14.28 q/ha, average extension gap (14.91 q/ha) and average technology index (21.96 %). The decreased value of technology index reflected the feasibility of the variety in farmers' field. By conducting front line demonstration of proven technologies, yield potential of maize cultivation can be enhanced to a great extent with increased income of the rural farming community.

Key Words: Extension gap, Demonstration, RCM 75, Technology index,

INTRODUCTION

Maize (*Zea mays* L.) is one of the most versatile crops grown across the globe, including tropical, subtropical and temperate regions. It has the highest genetic yield potential among the food grain crops. The world maize production is about 790 million tonnes and serves as staple food for more than one-third of the proteins and calories in some countries. In India, maize is the third most important cereal crop after rice and wheat. Maize is cultivated throughout the year in most of states for grain, forage, processed industrial products. It is grown in all the three seasons- *Kharif*, *Rabi* and *Zaid*. Spring maize (February- April/May) is also grown in some of the regions. Maize is the second most important crop of North Eastern Hill Region and primarily grown in shifting cultivation in the region. In Mizoram, it is grown in 6,353 ha area with annual production of 11,568 mt (Directorate of Agriculture, 2020). Majority of the farmers in the district are going for cultivation of traditional local maize cultivars. Mimban dum, mimban eng are popular maize cultivars mainly grown within the district. Maize is usually sown during March/ April and harvested in July/August. The crop has the potential to increase the farmer's income. As the farmers mainly grow this crop in traditional system in jhum land and no other nutrient application strategies/pest management are followed. These factors lead to low productivity. Moreover, lack of knowledge of quality planting material is another important factor attributing to low productivity in the region. Manan *et al* (2016) reported that farmers were using inputs like DAP and irrigation at higher levels as compared to recommended levels which resulted in lower net returns and also exhausted precious natural resources. In case of urea application, farmers used recommended quantity of fertilizer but at inappropriate stages of growth in spring maize. The adoption of insecticide and herbicide is also very less, as 12% were not adding both and only 2% were adding herbicide

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Table 1. Gap in adoption of improved maize production technology under rainfed upland farming situation of Lunglei district.

Sr. No	Technological intervention	Recommended package of practice	Existing practice	Gap in adoption (F/P/N)*
1.	Sowing time	March/April	March/April	N
2.	Sowing method	Line sowing (60 cmX 25cm)	Not practiced	F
3.	Varieties	RCM 75	Local strain	F
4.	Seed rate/ha	20-25 kg/ha	25-30 kg/ha	P
5.	Seed treatment	Carbendazim 50 WP @ 2.5 g/ kg seed	Not practiced	F
6.	Organic manures	10 t /ha	Not practiced	F
7.	Fertilizers	400:500:150 (NPK kg/ha)	Not practiced	F
8.	Weed management	Atrazine 50 WP @2-2.5 kg/ha	Not practiced	F
9.	Pest management	Thiamethoxam 12.6% + lambda cyhalothrin 9.5% @ 0.25 ml/l of water	Thiamethoxam 12.6% + lambda cyhalothrin 9.5% @ 0.25 ml/l of water	F

**F=Full gap; P=Partial gap; N=No gap*

and using insecticide more than once. So overall, farmers were changing recommendations based on their own assumptions and needs to be educated for precise input use. With the precise use of inputs, the yield levels and gross returns may be further increased. Hence, there remains a scope to introduce location specific high yielding composite maize in the existing farming system in the region.

The composite variety RCM 75 was developed from ICAR (Research Complex) for NEH Region, Umiam, Meghalaya using local germplasm with good adoptability and suitable to North Eastern hill regions. Conducting of front line demonstrations at farmers' plot help to identify the major constraints and potential of maize in specific location as well as helps in enhancing the economic and social status of the rural farming community. With the rapid raising population and emerging production vulnerabilities spell out an urgent need for increasing and sustaining productivity of land through cereal food production systems (Choudhary *et al*, 2013; Pooniya *et al*, 2015). Under such circumstances, maize (*Zea mays* L.) appears to be potential cereals crop due to its high genetic yield potential over other cereals crop and suitability to diverse climates and management practices (Kumar *et al*, 2015). The participatory approaches are followed here to pick out the actual problem associated with the maize cultivation during pick growing season, it has been noticed that the farmers are in factual need of a location specific high yielding maize variety. Keeping in view, the present study was undertaken to enhanced the maize productivity by conducting front line demonstration on maize composite variety RCM 75 in the operational area of KVK Lunglei.

MATERIALS AND METHODS

Krishi Vigyan Kendra, Lunglei conducted maize production programme in five selected villages *viz.,* South Vanlaiphai, Darzo, Tuipui-D, Hnahthial and

Table 2. Package of practices followed for demonstration and farmers' practice.

Particular	Demonstration	Farmers' practice
Farming situation	Rainfed upland	Rainfed upland
Variety	RCM 75	Local strain
Seed rate	20-25 kg/ha	30-35 kg/ha
Seed treatment	Carbendazim 50 WP @ 2.5 g/kg seed	Not practiced
Sowing time	March/April	March/April
Method of sowing	60 cm between rows and 25 cm between plants	Not practiced
Fertilizer application	Balance fertilizer use 400:500:150 kg/ha	Not practiced
Weed management	Atrazine 50 WP @2-2.5 kg/ha	Hand weeding
Plant protection	Thiamethoxam 12.6% + lambda cyhalothrin 9.5% @ 0.25 ml/l of water	Not practiced
Harvesting	100-110 days	110-120 days

Table 3. Yield performance of RCM 75.

Year	Area (ha)	No. of farmers involved	Yield (q/ha)			% YIOFP***
			Potential Yield	DP*	FP**	
2020-21	11.50	10	65.00	49.30	35.38	39.34
2021-22	13.50	15	65.00	52.15	36.25	43.86
Average				50.73	35.82	41.60

*DP-Demonstration Plot, **FP- Farmers' practice, ***YIOP-Yield increase over farmers' practice.

Thiltlang of Lunglei district and tried to disseminate the improved technology to the farming community. A total of 25 FLDs were conducted at farmers' field in different villages of Lunglei district during 2020-21 and 2021-22 involving 25 farmers in an area of one hectare per demonstration having 0.50 ha each for improved technology and farmers' practices. The demonstration was carried out under rainfed upland situation. The seed rate was differed from farmers' practice (30-35 kg/ha) and improved practice (20-25 kg/ha). Before conducting FLDs, selection of farmers, training was imparted to selected farmers. The available technology should reach the farmers, the ultimate users through KVK activities and adoption of the technology by the farmers will reflect the feasibility of the applied technology (Mazumder *et al*, 2012). The required inputs were supplied and timely visits to demonstration plots by the KVK scientists ensured with proper guidance to the farmers. The sowing was done during March/April. Field days, diagnostic visits and group meetings were also organized to provide the opportunities for others farmers of the adopted village as well as neighbouring villages witness the benefits of demonstrated technologies. The data were recorded from both the demonstration plots and farmers' practice were analysed and cost of cultivation, net returns and benefit cost ratio were

Table 4. Technology gap, extension gap and technology index in maize (RCM-75) under demonstration.

Year	Technology gap (q/ha)	Extension gap (q/ha)	Technology index (%)
2020-21	15.70	13.92	24.15
2021-22	12.85	15.90	19.77
Average	14.28	14.91	21.96

worked out. The yield increase in demonstrations plots over farmers' practice was worked out using the formula (Choudhary *et al*, 2009). Technology gap, extension gap and technology index were worked out using the formulae given by Samui *et al* (2000).

RESULTS AND DISCUSSION

Gap in Adoption

Critical gaps worked out through PRA method has been shown in Table 1. It is apparent that full gap was observed in practices such as sowing methods, improved varieties, seed treatments, organic manure and fertilizer application, weed and pest management. The data also showed partial gap in seed rate. The cause for non- adoption of recommended practices might be due to lack of awareness and few exposures to information sources (Yadav *et al*, 2012, 2013).

Yield

The yield of maize under demonstration plot ranged between 52.15 q/ha to 49.30 q/ha with mean yields of 50.73 q/ha (Table 2). The productivity under demonstration plot was 49.30 q/ha and 52.15 q/ha during 2020 and 2021, respectively as against a yield range between 36.25 q/ha to 39.34 qt/ha under farmers' practice. In comparison to farmers' practice, there was an enhancement of 39.34 and 43.86 per cent in productivity of maize under demonstration plot in 2020 and 2021, respectively. The enhanced grain yield with demonstration plot was mainly because of line sowing use of seed treatment with fungicides, nutrient management, weed management, pest management. The findings of this study were in conformity with Meena *et al* (2012), Patel *et al* (2013) and Raj *et al* (2013). The results revealed that the composite RCM 75 was found suitable for the villages in both the years.

Technology Gap

The yield gap in present study were worked out in terms of extension gap and technology gaps. The data (Table 4) illustrated the technology demonstration yield against potential yield which varied from 12.85 to 15.70 during 2021 and 2020 of the study and reflects' cooperation in carrying out such demonstration with emerging results in successive year. The results clearly revealed the positive effect of FLDs over the existing practices towards increasing the yield of maize variety RCM 75 in Lunglei district due to use of high yielding variety, line sowing, seed treatment, balance dose of fertilizer, weed management, need based plant protection measure.

Extension Gap

Correspondingly, the study (Table 4) revealed an extension gap of 13.92 to 15.90 t/ha was recorded between demonstration plot and farmers' practice and on an average basis the extension gap was 14.91 t/ha. The extension gap was highest (15.90 t/ha) during 2021 and lowest (13.92 t/ha) during 2020. The results clearly emphasizes the need educating the farmers through various methods for adoption of improved production technologies to alleviate the extension gap.

Technology Index

The technology index shows the feasibility of the technology at farmers' field and lower the value of technology index was more the feasibility of the technology (Jeengar *et al*, 2006). Based on consecutive two years data, average 21.96 per cent technical index was recorded.

CONCLUSION

Overall, it can be concluded from the findings that use of improved technologies can minimized the technology gap to a considerable extent resulting in enhanced productivity of maize in the district. There was 41.60 per cent increased in yield observed in demonstrated plot over farmers' practice. Both the extension and farmers' efforts are needed to enhanced adoption level of location and crop specific technologies among practicing farmers for cross over these gaps. From the study it can be concluded that Frontline Demonstration can be considered as an effective tool for promotion of improved high yielding maize variety RCM 75 in Lunglei distict of Mizoram.

Pic 1: Demonstration plot of RCM-75

Pic 2: Cob of RCM-75

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