International Journal of Plant & Soil Science

Volume 35, Issue 6, Page 144-149, 2023; Article no.IJPSS.96541
ISSN: 2320-7035

Performance of Different Maize Varieties under Front Line Demonstrations in District Kupwara

Raies A. Bhat [a*], Kaiser M. Malik [a], Firdous A. Raina [a], Shahid A. Hakeem [a], Faisal N. Bhat [a], R. Nissar [a], Nazir A. Bumla [a], A. G. Bhat [a] and Z. A. Dar [b]

[a] *Krishi Vigyan Kendra Kupwara, Sher-e-Kashmir University of Agriculture Sciences & Technology – Kashmir, India.*
[b] *Dryland Agriculture Research Station Budgam, Sher-e-Kashmir University of Agriculture Sciences & Technology –Kashmir, India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJPSS/2023/v35i62848

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/96541

Original Research Article

Received: 12/12/2022
Accepted: 16/02/2023
Published: 21/03/2023

ABSTRACT

To improve the seed replacement rate and adoption rate of maize technologies front line demonstration on different high yielding region specific maize varieties were carried out in Kupwara. 120 Front Line Demonstrations on Maize Varieties were conducted at Farmers Field in District Kupwara in the current investigation to show the impact of high yielding varieties of Maize viz. Shalimar Composite-4, Shalimar Maize Composite-3, KG-2, Shalimar QPMH-1 and LQMH-1 with recommended Package of Practices and compared with local check during the Kharif seasons of 2020 and 2021.The improved high yielding varieties Shalimar omposite-4 , Shalimar Maize Composite-3,KG-2, Shalimar QPMH-1 and LQMH-1 recorded yield of 48, 58 45 68 and 85 qs/ha respectively as compared to local varieties with yield of 16.00, 18.00, 13.00, 25.00 and 25.00q /ha. Respectively. The technology gap of, SMC-4, SMC-3, KG-2, Shalimar QPMH-1 and LQMH-1 was

**Corresponding author: E-mail: drraies1980@gmail.com;*

recorded as 2,8,5,2 and 5 q/ha respectively and extension gap was recorded as 40,31,32,43,60q/ha respectively. The technology index with respect to, SMC-4, SMC-3, KG-2 Shalimar QPMH-1 and LQMH-1 was recorded as 3.3,14.54,10.00,2.85 and 5.55-% respectively.

Keywords: Maize varieties; front line demonstration; extension gap; yield; technology.

1. INTRODUCTION

Due to the fact that it is a C4 plant, maize (*Zea mays* L) has a production potential that is significantly greater than that of any other cereal. For this reason, it is frequently referred to as the "wonder crop" or "queen of cereals." One of the main cereal crops, maize is highly adaptable to a variety of agroclimatic conditions worldwide.It is the third most important crop of India after rice and wheat that occupies 8.67 m ha area with an average productivity of 25.7 q/ha compared to world average of 49.40 q/ha. Maize is one of the important major cereal crops grown in *Kharif* season in the district kupwara on an area of 17000 ha with the average productivity of 18.5 q/ha which is far below average national productivity (25.7 q/ha). Due to variable rainfall, rain-fed farming, limited land holdings, adoption of indigenous cultivars, poor and uneven fertiliser usage, lack of plant protection measures, and weed control techniques, new technologies have the potential to be beneficial. With the implementation of new technology, such as improved cultivars, prescribed fertiliser doses, and pest control measures, maize crop output may be increased by at least 26.7% [1,2,3,4]. Fertilizer and plant protection are the most important inputs for improving production, and they may increase maize crop output by at least 26.7% with the use of new technologies such improved cultivars, recommended fertiliser doses, and pest management [1]. As a result of the scenario, front-line demonstrations of maize production technology were organised and carried out to demonstrate the production potential and financial advantages of enhanced technologies under actual farmer-specific circumstances [5,6].

Through front-line demonstrations held in farmer's fields during the Kharif seasons of 2014 and 2015, the effectiveness of enhanced maize technologies against local check was assessed in the current study.

2. MATERIALS AND METHODS

To demonstrate the impact of high yielding maize varieties such as Shalimar Composite-4, Shalimar Maize Composite-3, Shalimar KG-2, Shalimar QPMH-1, and LQMH-1 with recommended Package of Practices and compared with local check during the kharif seasons of 2020 and 2021, 120 Front line Demonstrations on Maize Varieties were conducted by KVK-Kupwara at Farmers Field in District Kupwara. The majority of the research area's soils have a sandy to clay loam texture and have low nitrogen, medium phosphorus, and high potassium availability. After getting enough rain, the crop was seeded between the second and last weeks of May with a crop geometry of 60x20 cm and a seed rate of 20 kg/ha. Half of the nitrogen dosage and the complete quantity of phosphorus and potassium were applied as a base dose, and the remaining nitrogen dose was top-dressed in two equal portions at 30 and 60 days following sowing. A single hand weeding was done 20–30 days following seeding. One hundred twenty farms were involved in the initiative overall. Each farmer's 0.2 hectare of land was used for the demonstrations of new technology. Each presentation included a control plot where farmers' usual procedures were used. Regular visits by the KVK experts to the demonstration field helped to guarantee that the farmers adopted new technologies and received instruction. To provide other farmers the chance to witness the value of the technologies that were being displayed, field days and group meetings were held at the demonstration site. The farmers' comments were taken into consideration to strengthen the research and extension programme. In October's first and second weeks, the crop was harvested. To assess the effectiveness of farmers' fields, data was gathered from FLD farmers and examined using statistical methods [7]. To raise the crop, all crop management procedures as outlined in SKUAST-Kashmir’s package of practices field crops were used. All FLDs and regional customs were taken into account when collecting and analysing the production and economic data.

Using the formula proposed by Samui et al. [8], the extension gap, technology gap, and technology index were computed:

1. The extension gap is calculated as follows: demonstration yield (q/ha) - farmer practice yield (q/ha).

2. The technology gap (q/ha) is calculated as Potential yield -Demonstration yield.
3. Technology index (%) equals Potential yield -Demonstration yield / Potential yield multiplied by 100.
4. Using a paired t-test with a significance threshold of 5%, the knowledge of the farmers regarding better maize production techniques before and after frontline demonstration deployment was assessed.

3. FINDINGS AND DISCUSSION

3.1 Performance of Front Line Demonstrations

The data for yield was recorded for observing the performance of the varieties in front line demonstration.

Yield:

It was observed from the frontline demonstrations that Shalimar composite-4, Shalimar composite-3, Shalimar KG-2, Shalimar QPMH-1 and LQMH-1 recorded a yield of 58.00,47.00, 45.00,68.00and 85.00 quintals per hectare respectively as compared to 18.00,16.00,13.00 25.00 and 25.00 quitals of local maize cultivated by the farmers (Table 2). The per cent increase in yield of 68.96, 65.95, 71.11, 172.00 and 240 was observed for Shalimar composite-4, Shalimar composite-3, Shalimar KG-2, Shalimar QPMH-1 and LQMH-1 respectively over the farmers practice .The variation in the productivity was due to the low yield potential of local varieties cultivated by the farmers and by not following the scientific lines of cultivation. The results of the FLDs done in the current inquiry are consistent with those of Tiwari et al. (2003), Sreelakshmi et al. [9], Meena et al. [10], Kumar et al. [11], and Sharma et al. [12], who have all documented improvements in agricultural productivity by front line demonstration. The outcomes showed that the performance of improved varieties was superior to that of local cultivars, and farmers were encouraged to embrace HYVs and enhanced technologies by seeing them in action in FLDs.

The percentage increase in FLD yield on Shalimar maize composite-4.Shalimar maize composite-3, Shalimar KG-2, Shalimar QPMH-1 and LQMH-1 with respect to farmers practice was recorded as 68.96, 65.95, 71.11, 172.00 and 240 percent respectively.

Table 1. The use of technology to enhance farming methods

S. No	Technology	Farmers Practice	Improved Practice
1	Variety/Selection	Local	SMC-3, SMC-4, and SKG-2 Both the Shalimar QPMH-1 and LQMH-1
2	Spacing	Seed broadcasting	Using a line sowing technique, plants are spaced 25 cm apart and rows are 45 cm apart.
3	Sowing rate	30-35 kg/ha	20 kg/ha
5	Line sowing	Sowing with broadcasting method	Sowing in rows.
6	Earthing up	Due to a shortage of labour or lack of understanding, the majority of farmers avoid performing this task.	After approximately a month of sowing, earthing up is done at the knee-height stage because it supports the plant and protects it from lodging.
7	Additional crop management and protection techniques	These crops are being grown by farmers without the use of any advanced technologies.	The crop was raised using all the crop management techniques outlined in the Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir's package of practises for maize crop.

Table 2. Performance of the varieties in front line demonstration

Variety	Yield (q ha^{-1})		Potential Yield of demonstration (q/ha)	Percent increase over farmers practice	Extension Gap (q ha^{-1})	Technology Gap (q ha^{-1})	Technology Index (%)
	Farmers Practice (q/ha)	Demonstration (q/ha)					
Shalimar Composite-4	18.00	58.00	60.00	68.96	40.00	2.00	3.30
Shalimar Composite-3	16.00	47.00	55.00	65.95	31.00	8.00	14.54
KG-2	13.00	45.00	50.00	71.11	32.00	5.00	10.00
Shalimar QPMH-1	25.00	68.00	70.00	172.00	43.00	2.00	2.85
LQMH-1	25.00	85.00	90.00	240.00	60.00	5.00	5.55

Extension gap:

Extension gap is the difference in the yield of the demonstration and farmers practices. The extension gap value for the Shalimar maize composite-4. Shalimar maize composite-3, Shalimar KG-2, Shalimar QPMH-1, and LQMH-1 were reported as 40.00, 31.00, 32.00, 43.00, and 60.00 respectively. This may be because improved high yielding maize seed and inputs are not readily available, and farmers lack expertise in scientific cultivation of maize. As a result, farmers' attempts to use FLDs to take advantage of the potential of enhanced production and protection technologies should be intensified. It demonstrates the need for the various extension organisations to work extremely hard to support one another technologically so that the recommended technology may be quickly transferred to the fields of the farmers. The aforementioned extension gap further highlighted the necessity for farmers to be educated via a variety of channels in order to embrace better agricultural production technology and close the extension gap. Increased adoption of cutting-edge production techniques combined with high yielding varieties would subsequently alter extension gap patterns, resulting in increased productivity, farmer income, and prosperity.

Technology Gap:

The gap of demonstration yield over potential yield and the observed values for different varieties of maize with respect to technology gap were 2.00, 8.00, 5.00,2.00 and 5.00. The production potential, soil fertility level, weather, and management approaches may differ, which might account for the observed technological disparity (Tiwari et al., 2014 and Sharma et al. [12]). Thus, to reduce the technological gap for yield level in various scenarios, variety-wise location-specific recommendations with the whole package of practices and other prerequisites appear to be required. These actions would increase productivity and increase the wealth of the farming community.

Technology Index:

Shalimar maize composite-4, Shalimar maize composite-3, Shalimar KG-2, Shalimar QPMH-1, and LQMH-1, respectively, revealed the viability of the varieties together with scientific way of cultivation at the farmer's field with technology indexes of 3.30, 14.54, 10.00, 2.85, and 5.50percent. The greater the practicality of new technology in the farmer's field, the lower the value of the technology index indicates that the technology is appropriate for that location. Different climatic conditions, prevalent microclimates, and variations in the yield potential of the varieties may all be used to explain the differences in yield from different FLDs. The results of this study's analysis of the extension gap, technology gap, and technology index (%) are consistent with those of Dhaka et al. [1], Meena et al. [10], and Sharma et al. [12].

Table 3. Economic analysis of improved technologies over traditional farmer's practices

Technology	Cost of Cultivation (Rs.)		Gross returns (Rs.)		Net returns (Rs.)		BCR (Rs.)	
	FP	Demo	FP	Demo	FP	Demo	FP	Demo
Shalimar composite -4	22583	33989	45341	85767	23758	51778	1.00	1.52
Shalimar composite -3	22487	31445	40232	81342	17745	49897	0.78	1.58
KG-2	21871	32841	37119	78534	15248	45693	0.69	1.39
Shalimar QPMH-1	24745	35334	48974	95451	24229	60117	0.97	1.70
LQMH-1	23995	36544	47655	105441	23660	68897	0.98	1.88

Economics:

Based on the current market pricing for inputs and outputs, an economic study comparing new technology to conventional farming methods was conducted (Table 3). In comparison to the average cost of production of Rs. 22583,22487,21871,24745 and 23995 for local varieties of maize grown by farmers, the cost of producing maize with high yielding varieties under improved technologies ranged from Rs. 33989, 31445,32841,35334 and 36544 for varieties: Shalimar maize composite-4, Shalimar maize composite-3, KG-2, Shalimar QPMH-1 and LQMH-1 The increased cost of enhanced seed and cultural procedures used in the development of the varieties was the major cause of the increased cost of the upgraded technology.

Front Line Demonstrations on Shalimar maize composite -4. Shalimar maize composite-3,Shalimar KG-2, Shalimar QPMH-1 and LQMH-1 recorded higher net returns ofRs.51778,49897,45693,60117 and 68897per ha respectively with the B:C ratio of 1.52,1.58,1.39,1.70 and 1.88 for Shalimar maize composite -4. Shalimar maize composite-3, Shalimar KG-2, Shalimar QPMH-1 and LQMH-1 respectively with improved cultural practices. The findings of Hiremath and Nagaraju [13], Sreelakshmi et al. [9], and Kumar et al. [14], who also observed better net returns and B:C ratio in the FLDs compared to farmers' practices, are consistent with our findings. The findings of this study made it abundantly evident how high yielding varieties and more advanced production techniques have the potential to increase maize output and economic profits.

4. CONCLUSION

Front Line Demonstrations conducted at the farmers fields revealed that the adoption of high yielding varieties of maize with improved production technologies significantly increased the yield as well as the net returns and BCR. It can be observed that increased yield was due to adoption of high yielding varieties and recomended production technologies. So, there is need to disseminate the high yielding maize varieties alongwith improved production technologies among the farmers with effective extension methods like training and demonstrations. The farmers should be encouraged to adopt the recommended package of practices for the crop for higher returns. Hence, farmers should be encouraged to adopt the high yielding maize varieties alongwith recommended package of practices for the crop for higher returns.

ACKNOWLEDGEMENT

Role of farmers on whose fields frontline demonstrations were conducted and support provided by, Directorate of Extension SKUAST-Kashmir, ATARI Zone-1 Ludhiana and All India Coordinated Research Project for Maize DARS Budgam is duly acknowledged.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dhaka BL, Meena BS, Suwalka RL. Popularization of improved maize production technology through frontline demonstrations in south-eastern Rajasthan. J. Agril. Sci. 2010;1(1):39-42.
2. Dhruw KS, Sengar RS, Yadav KN. Level of knowledge and adoption about recommended maize production technology. Agril. Update. 2012;7(3&4): 311-315.

3. FAO. FAO Agricultural Production Statistics; 2013. Available:http://faostat3.fao.org/ as Accessed on 17 April 2015.
4. Ranawat Y, Ram H, Sisodiya SS, Punjabi NK. Adoption of improved maize cultivation practic-es by trained and untrained farmers of KVK, Udaipur. Rajasthan J. Ext. Edu. 2011;19:144-147.
5. Malik RS, Sherawat RS, Sube S, Loveraj S. Relationship of farmers' trait with knowledge of rape-seed-mustard production technology. J. Oilseeds Res. 2005;22(1):159-161.
6. Singh N, Sharma FL. Impact of front line demonstration on gain in knowledge about mustard production technology among farmers. 2nd National Extension Education Congress, May 22-24, 2004. Society of Extension Education, Agra & MPUAT, Udaipur. 2004;56.
7. Anonymous. Statistical Abstracts of Punjab; 2013. Available:http://www.esopb.gov.in/static/PDF/Statistical-Abstract-2013.pdf
8. Samui SK, Maitra S, Roy DK, Mondal AK, Saha D. Evaluation of front line demonstration on groundnut (*Arachis hypogea* L.) in Sundarbans. J. Indi-an Soc. Coastal Agril. Res. 2000;18(2):180-183.
9. Sreelakshmi CH, Sameer Kumar CV, Shivani D. Productivity enhancement of pigeon pea (*Cajanus cajan* L.) through improved production tech-nology. Madras Agril. J. 2012;99(4-6):248-250.
10. Meena BL, Meena RP, Meena RR, Bhim Singh. Popularization of improved maize (*Zea mays* L.) production technology through frontline demonstrations in semi arid zone IVA of Rajasthan. J. Appl. Nat. Sci. 2014;6(2): 763-769.
11. Kumar V, Sharma V, Sharma SC. Impact of improved technologies on productivity enhancement of sesame (*Sesamum indicum* L.). Indian J. Dryland Agril. Res. & Dev. 2014;29(2):41-44.
12. Sharma V, Kumar V, Sharma SC, Singh S. Productivity enhancement and popularization of improved production technologies in Wheat through front-line demonstrations. J. Appl. Nat. Sci. 2016;8 (1):423-428.
13. Hiremath SM, Nagaraju MV. Evaluation of front line demonstration trials on onion in Haveri district of Karnataka. Karnataka J. Agril. Sci. 2009;22(5):1092-1093.
14. Kumar V, Sharma V, Sharma SC, Singh S, Sharma RK. Productivity enhancement in sesame (*Sesamum indicum* L.) as influenced by different improved production technologies. J. Oilseed Res. 2015;32(1): 87-90.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/96541