

KNOWLEDGE AND ADOPTION OF IMPROVED PRODUCTION TECHNOLOGY OF MAIZE BY THE FARMERS OF PANCHMAHAL DISTRICT IN GUJARAT

A. K. Rai¹, Shakti Khajuria² and Raj kumar³

1, 2 & 3 ICAR-Krishi Vigyan Kendra- Panchmahals, (ICAR-CIAH)
Godhra-Vadodara High way Vejalpur, Gujarat 389 340
Email : ajayrai74@gmail.com

ABSTRACT

Maize (Zea mays L) is as one of the most important crops of tribal dominated district Panchmahal of Gujarat. It is main sources of livelihood for most of the dwellers of Panchmahal district and grown throughout the year. However, the productivity of maize is very low. Attempts are made to improve productivity and also to enhance area under single cross hybrid (SCH), a total of 150 farmers (75 adopted and 75 non adopted) were selected for study to know the adoption and knowledge of improved production technology of maize cultivation. Result of study revealed that the yield in local check was recorded 3300 kg/ha in local whereas 4108 kg/ha in technology demonstrated field. Similarly, the cost benefit ratio was also observed highest (1.99) in demonstrated field than traditional maize cultivation practices (1.65). Results clearly indicated that the farmers who adopted the cultivation practices advised by KVK experts possessed better knowledge and adoption level than the farmers cultivating maize traditionally and not adopting the improved technologies suggested by the KVK. Results showed that the intervention of KVK have great impact on knowledge and adoption of maize cultivation in Panchmahal district of Gujarat.

Keywords: Maize, production technology, frontline demonstration

INTRODUCTION

Maize is the third most important cereal crop, of the country after paddy and wheat, as per the data of the maize cultivation in country for the year 2009-2010. India ranks third in productivity (2024 kg/ha) of maize, fourth in total production (16.72 m. ton) and fifth in total area (8.26 m. ha) (Anonymous 2002 and 2010-11). In India, 35% of the total produce is directly consumed as human food, while rest is used in industry and as poultry feed. In Gujarat, it is grown on 0.497 m ha area with production 0.80 m ton and productivity of 1356 kg/ha. Knowledge reflects an array of information possessed by an individual which enthused to adopt technology. It plays a pivotal role in understanding the intricacies involved in any given phenomena. The Krishi Vigyan Kendra (KVK) are rendering a great help to the farmers in increasing the level of knowledge on various crops, these institutions conducting different programmes to enlighten the farmers on various crop production technologies.

OBJECTIVES

(1) To know the knowledge of improved production technology of maize by the farmers of Panchmahal district in Gujarat

(2) To know the adoption of improved production technology of maize by the farmers of Panchmahal district in Gujarat

METHODOLOGY

An extensive survey was made to select the maize growing farmers of Panchmahal districts along with KVK adopted villages for study to find out knowledge and adoption gap between farmers of KVK adopted village and others 75 farmers each from, KVK adopted villages and non adopted villages of Panchmahal district were selected for study. A questionnaire containing 10 questions were prepared to assess the knowledge level of the maize growing farmers which were measured on 2-point continuum *i.e.* yes and no, with the scores of 2 and 1, respectively. Accordingly, the respondents were grouped on the basis of frequency and percentage. Preferential ranking technique was utilized to identify the constraints faced by the respondent farmers in maize production. Farmers were also asked to rank the constraints they perceived by there as limiting maize protection in order of preference.

The technology gap and technology index were calculated using the formulas as given by Samui et al. (2000).

The selected respondents were interviewed

personally with the help of a pre-tested and well structured interview schedule. Client Satisfaction Index was calculated as developed by Kumaran and Vijayaragavan (2005).

RESULTS AND DISCUSSION

Performance of Production technology

A comparison of productivity levels between demonstrated variety and local checks is shown in table 1. During the period under study, it was observed that in front line demonstrations, the improved maize variety HQPM-1 recorded the higher yield (4108 kg ha⁻¹) when compared to local check (3300 kg ha⁻¹). The percentage increase in the yield over local check was 26.6. Similar yield enhancement in different crops in front line demonstration has amply been documented by Kumar *et al.* (2010) and Rai *et al.* (2012). From these results it is evident that the performance of improved variety was found better than the local check under

same edephoclimatic conditions. Farmers were motivated by results of agro technologies applied in the FLDs and yield of the front demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index. The technology gap showed the gap in the demonstration yield over potential yield and it was 892 kg ha⁻¹. The observed technology gap may be attributed to dissimilarities in soil fertility, salinity and erratic rainfall and other vagaries of weather conditions in the area. Hence, to narrow down the gap between the yields of different varieties, location specific recommendation appears to be necessary. Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index, more is the feasibility. Result- of study depicted in table 3 revealed that the technology index values were 17.84. These results are in consonance with the findings of Hiremath and Nagaraju (2009) and Rai *et al.* (2015).

Table 1: Yield, technology gap and technology index of demonstration

Variables	Yield (kg ha ⁻¹)	Increase(%) over Local check	Technology gap- (kg ha ⁻¹)	Technology index (%)
Local check	3300	-	-	-
Demonstration (HQPM-1)	4108	26.6	892	17.84

The economics of maize production under front line demonstrations were estimated and the results have been presented in Table 2. Economic analysis of the yield performance revealed that front line demonstrations recorded higher gross returns (₹ 45980 ha⁻¹) and net return (₹ 17880 ha⁻¹) with higher benefit cast ratio (1.99) as compared to local checks. These results are in accordance with the findings of Dhaka *et al.* (2010), Damor *et al.* (2017) and Patil *et al.* (2017).

Table 2: Economics of frontline demonstrations

Variables	Cost of cultivation (₹ ha ⁻¹)	Gross return (₹ ha ⁻¹)	Net return (₹ ha ⁻¹)	Benefit cast ratio
Local check	21900	36300	14400	1.65
Demonstration	23100	45980	22880	1.99

Farmers' Satisfaction

As far level of knowledge of maize production technologies by the farmers, it was observed that the majority (48%) of the KVK adopted maize farmers had high level whereas medium and low level of knowledge 29.3% and 22.6% respectively. However, majority (54.6%) of the non adopted farmers had medium level of knowledge followed by low (30.6%) and high (14.6%). Results clearly shows wide gap between the farmers of both the group with respect to know\ledge level. These findings were in line with the findings of Sharma and Sharma (1999) and Preethi *et al.* (2015).

Comparison between KVK adopted and non-adopted maize farmers in terms of level of knowledge of maize production technologies

Table 3 : Distribution of respondents according to their level of knowledge of Maize production technologies

n=150

Category	KVK adopted maize farmers (n=75)			KVK non adopted maize farmers (n=75)		
	Low (16 -26)	Medium (27 – 36)	High (37- 45)	Low (16 – 26)	Medium (27 – 36)	High (37- 45)
Frequency	17	22	36	23	41	11
Percentage	22.6	29.3	48	30.6	54.6	14.6

Particulars technological intervention analysis of the level of knowledge of maize production technologies by the farmers of Panchmahal district has been depicted in table 4. A peep of table 4 clearly indicates that the ranks were assigned to all the technologies based on the total score obtained on each technology. The technologies on which the respondents had high knowledge of optimum seed rate, weed management with herbicides, are ranked 1st followed by selection

of suitable Irrigation at critical stages (2nd), insect pest management (3rd), timely sowing for achieving higher yields (4th), application of zinc sulphate (5th), wilt management (6th), soil test based fertilizer application (7th), use of HYVs and SCH (8th) respectively, whereas adopted farmers had lowest level of knowledge on Hybrid seed production increases the net returns per acre compared to normal maize cultivation.

Table 4 : Knowledge level of adopted farmers about maize production technologies in Panchmahal district. n=75

Sr. No.	Maize production technologies	Level of knowledge				Total score	Mean score	Rank
		Yes		No				
		f	%	f	%			
1	Soil test based fertilizer application	65	86.6	10	13.3	140	1.86	VII
2	Use of HYVs and SCH	64	85.3	11	14.6	139	1.85	VIII
3	Optimum seed rate is important for achieving higher yields	75	100	0	00	150	2.00	I
4	Timely sowing for achieving higher yields	71	94.6	04	05.3	146	1.94	IV
5	Hybrid seed production increases the net returns per acre compared to normal maize cultivation	49	65.3	26	34.6	124	1.65	IX
6	Irrigation at critical stages	74	98.6	01	01.3	149	1.98	II
7	Weed Management	75	100	00	00	150	2.0	I
8	Insect pest management	73	97.3	02	02.6	148	1.97	III
9	Wilt management	68	90.6	07	09.3	143	1.90	VI
10	Application of zinc sulphate	70	93.3	05	06.6	145	1.93	V

The knowledge levels among the farmer's of non adopted villages were low with respect to all the improved production technologies whereas it was quite high among the farmers of KVK adopted villages. The non-adopted farmers had high knowledge on the practices like weed Management ranked 1st followed by insect pest management (2nd), wilt management (3rd), timely sowing for achieving higher yields

(4th), irrigation at critical stages (5th), use of HYVs and SCH (6th) optimum seed rate is important for achieving higher yields (7th) soil test based fertilizer application (8th) hybrid seed production increases the net returns per acre compared to normal maize cultivation (9th) respectively, whereas non adopted farmers had lowest level of knowledge on application of zinc sulphate.

Table 5 : Knowledge level of non-adopted farmers about maize production technologies in Panchmahal district

n=75

Sr. No.	Maize production technologies	Level of knowledge				Total score	Mean score	Rank
		Yes		No				
		f	%	f	%			
1	Soil test based fertilizer application	38	50.6	37	49.3	113	1.50	VIII
2	Use of HYVs and SCH	47	62.6	28	37.3	122	1.62	VI
3	Optimum seed rate is important for achieving higher yields	41	54.6	34	45.3	116	1.54	VII
4	Timely sowing for achieving higher yields	56	74.6	19	25.3	131	1.74	IV
5	Hybrid seed production increases the net returns per acre compared to normal maize cultivation	27	36.0	48	64.0	102	1.36	IX
6	Irrigation at critical stages	49	65.3	26	34.6	126	1.68	V
7	Weed Management	67	89.3	08	10.6	142	1.89	I
8	Insect pest management	60	80	15	20.0	135	1.80	II
9	Wilt management	58	77.3	17	22.6	133	1.77	III
10	Application of zinc sulphate	22	29.3	53	70.6	97	1.29	X

It is visible from the table 3 that the majority of the adopted maize farmers had high level of knowledge, whereas non-adopted farmers had medium level of knowledge. The particulars wise analysis on level of knowledge of adopted maize farmers indicates that a majority of them had high knowledge on optimum seed rate, weed management with herbicides, irrigation at critical stages, insect pest management, timely sowing for achieving higher yields, application of zinc sulphate etc. The reasons for high level of knowledge among the farmer of adopted villages are owing to the impact of technological intervention introduced by expert of KVK through series of training, OFT, demonstration on various improved technologies of maize. It could be witnessed from the table 4 that non adopted farmers had high level of knowledge related to traditional cultivation practice whereas adopted farmers had about advance cultivation practices. Results of study clearly reflected showed that the improved technological intervention had great impact among the farmers after seeing difference with respect to productivity between demonstrated FLDs and traditional maize cultivation knowledge. Now the farmers were inspired to adopt the technologies exhibited in demonstrated FLDs.

CONCLUSION

Result of study divulged that the improved maize production technology adopted farmers showed higher level of knowledge owing to intervention of KVK Panchmahalos compared to farmers adopted traditional maize cultivation practices. Advance technology not only improved the maize growers but also provided economic gain in the adjoining farmers.

REFERENCES

- Anonymous (2010-11). Economic Survey 2010-11, Ministry of Agriculture, Govt. of India (13153) & (ON.116), Indiastat.com.
- Anonymous, 2002. Comparison of cost and returns per hectare moong, gram, maize, wheat, mustard and cotton. *Agricultural Situation in India*, 24(2), 73-78.
- Damor, V.A., Patel, J.K. and Chaudhari, M.K. (2017) Knowledge and adoption of papaya growers about recommended papaya cultivation technology. *Guj. J. Ext. Edu.* 28(1):132-135.
- Dhaka, B. L., Meena, B S and Suwalka R L., (2010). Popularization of Improved Maize Production Technology through Frontline Demonstrations in South-eastern Rajasthan *Journal of Agriculture Science*, 1(1): 39-42.
- Hiremath S M and Nagaraju M V.2009. Evaluation of front line demonstration trials on onion in Haveri district of Karnataka. *Karnataka Journal of Agriculture Science*, 22(5): 1092-1093.
- Kumar A, Kumar R, Yadav V P S and Kumar R. 2010. Impact Assessment of Frontline Demonstrations of Bajra in Haryana State. *Indian Research Journal of Extension Education*, 10(1): 105-108.
- Kumaran M and Vijayaragavan K. 2005. Farmers' satisfaction of agricultural extension services in an irrigation command area. *Indian Journal of Extension Education*, 41(3&4): 8-12.
- Patil, S.D., Kharde, P.B. and Gaikwad, A.B. (2017) Profile of sorghum growers and its relationship with knowledge and adoption of Panchsutri technology. *Guj. J. Ext. Edu.* 28(2):402-407.
- Preethi, Yashodhara. B., Vinaya Kumar, H. M. and Chandrashekar, S. Vaster (2015). Personal and socio-psychological factors influencing the knowledge level of Agro-met Advisory Service (AAS) farmers. *Annals of Plant and Soil Research*. 17: 106-109.
- Rai, A. K., Khajuria, S, Lata ,K, Jadav, J K., kumar, Raj and Khadda B. S.(2015), Popularization of vegetable pigeonpea (*Cajanus cajan*) in central Gujarat through demonstration in farmers field. *Indian Journal of Agricultural Sciences* 85 (3): 349-53.
- Rai, A. K., Khajuria, S., Lata ,K., Jadav, J K., Khadda B. S. and kumar, Raj (2012) Impact of Front line demonstration on sesame production in Panchmahal District of Gujarat. *Indian Journal of Extension Education* Vol.48 No 3&5, 45-48.
- Samui S. K, Maitra S, Roy D K, Mondal A K and Saha D, 2000. Evaluation of front line demonstration on groundnut (*Arachis hypogea* L.) in Sundarbans. *Journal Indian Soc Coastal Agric Res*, 18(2): 180-183.
- Sharma, A. and Sharma, B.M. 1999. Association between knowledge of farmers about important extension programme of KVK and selected independent variable. *Rural India*, 279-281.