

Growers' Knowledge of Improved Maize Production Technologies in Jammu Region of J&K

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ABSTRACT

Knowledge is one of the important components of behaviour as such it plays an important role in the covert and overt behaviour of an individual. Knowledge as defined in present study included those behaviours and test situations which emphasised the remembering either by recognition or recall of ideas, material or phenomena about maize production technology. The study was conducted in five districts namely Doda, Kathua, Poonch, Rajouri and Udhampur of Jammu region of Jammu and Kashmir. A sample of 220 maize growers was selected by multi-stage random sampling from 22 villages of 11 tehsils of 5 selected districts. Data were collected by personal interview method. A knowledge test was developed with items related to different maize production technologies. It was measured with the scores obtained by the maize growers in the test. 47 per cent of the respondents had medium level of knowledge whereas 38 per cent had low level of knowledge. There was significant difference in mean knowledge score between farmers of districts Udhampur -Doda, Poonch -Doda, Doda -Kathua and Rajouri - Kathua. More awareness programmes should be organized to increase knowledge level of maize growers regarding maize cultivation practices which may help to enhance the production of maize in the region.

Keywords: Knowledge level, Production technologies, Maize

INTRODUCTION

Maize (*Zea mays* L.) is one of the most important crops in world agricultural economy grown over an area of 177 million hectares with a production of 967 million tonnes (KPMG, 2014). India ranks fourth in area and sixth in production of maize. As maize has yield potential far higher than any other cereal, it is referred to as the miracle crop or the 'Queen of Cereal' (Anonymous, 2011). Maize is the third most important food grain in India after wheat and rice. It is grown throughout the country, but the main producing states are Andhra Pradesh, Karnataka, Maharashtra, Bihar, and Madhya Pradesh (MoA, 2015). The area under maize crop is 9.2 million hectares with a production of 24.17 million tonnes

(AICRP on Maize, 2016). Maize is grown in all the seasons namely *kharif*, *rabi* and spring. Of these three seasons, nearly 90 per cent of the production is in kharif season, 7 to 8 per cent during rabi season and 1-2 per cent during spring season (Dass, 2009). Since 1950, there is slight increase in area of maize crop but production increased by eight times and productivity increased by three and half times (MoA, 2015).

Maize is the major crop of hilly districts of J&K and plays an important role in the livelihood of the people. In J&K, maize is predominantly grown as rainfed crop during kharif season and forms a staple food of vast majority of rural households, beside its use as livestock feed and fodder. In J&K, future increases in maize production to

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meet domestic demand will have to rely on improvements in yields rather than the expansion of maize production area. In the Jammu region 75 per cent cultivated area is rainfed (DES, 2011). The productivity of maize at the national level for 2014-15 was 2.56 t/ha whereas for the same period it was 1.49 t/ha in J&K (AICRP on Maize, 2016). With this background the present study was conducted to find out the knowledge level of maize growers in the Jammu region of J&K state.

MATERIAL AND METHODS

The study was conducted in five districts namely Doda, Kathua, Poonch, Rajouri and Udhampur of the Jammu region of J&K. A sample of 220 maize growers was selected by multi-stage random sampling from 22 villages of 11 tehsils falling in 5 selected districts. Non-experimental diagnostic research design was employed for the study. The study was aimed to find out the knowledge level of the maize growers about maize production technologies. For this purpose a knowledge test was developed consisting of forty four (44) test items which contained four (4) objective type, two (2) close ended, five (5) identification of objects from photographs and thirty three (33) open response items. Personal interview technique was used for data collection. All the maize cultivation practices recommended by Sher-e-Kashmir University of Agricultural Science and Technology of Jammu formed the content area of the knowledge test. The correct response was given a score of 'one' and incorrect responses as 'zero'. The total score for each respondent was computed by summing up the scores on all knowledge items. Based on the score obtained, the respondents were categorized into three categories viz low, medium and high on the basis of Singh's

cube root method (1975). Percentage was used to find out the knowledge level of the farmers.

Categorization of knowledge score

Knowledge score was categorized in to three groups by 'Singh's cube root method' as given below:

$$S_1 = L_1 + \frac{\frac{N}{3} - C_{i-1} \times h}{f_1}$$

Where, i = indicated category number (i=1, 2, 3.....n), S₁= segment (e.g. I, II, III), L₁= Lower limit of the quartile class, C₁-1=Cumulative frequency of the class preceding to the quartile class, f = frequency, h= width of the quartile class, N= Total cumulative cube root of frequencies

RESULT AND DISCUSSION

The maize growers were categorized into three levels of knowledge namely low (15-22), medium (23-29) and high (30-39) by employing Singh's cube root method (1975). Table 1 reveals that majority (47%) of the respondents had medium level of knowledge, followed by 38 percent had low level of knowledge and only 15 percent had high level of knowledge. Overall mean knowledge score was 24.31 with a standard deviation of 4.48. The mean knowledge score of district Kathua was the highest (26.62) and it was lowest in district Doda (22.02).

Knowledge about maize cultivation practices

Data presented in Table 2 shows that overall majority (94%) of maize growers were having the correct knowledge about recommended sowing time and 71 per

Table 1: Overall Knowledge score of maize growers

Knowledge score	District					Overall (n=220)
	Doda (n=40)	Kathua (n=40)	Poonch (n=40)	Rajouri (n=60)	Udhampur (n=40)	
Low (12-22)	68	17	28	47	30	38
Medium (23-29)	20	60	62	42	52	47
High (30-39)	12	23	10	11	18	15
Mean knowledge score	22.02	26.62	24.92	23.48	24.92	24.31
Standard deviation (±)	4.05	4.31	3.79	4.37	4.05	4.48

Decimals are rounded up to nearest whole number

Table 2: Knowledge about maize production technologies (% farmers)

Crop production technologies	District					Overall (n=220)
	Doda (n=40)	Kathua (n=40)	Poonch (n=40)	Rajouri (n=60)	Udhampur (n=40)	
Sowing Time and Land preparation						
Sowing time	93	95	95	97	90	94
Land preparation	78	85	73	70	50	71
Seed rate and Method of sowing						
Seed rate and method of sowing						
i) Hybrid	20	93	70	75	90	77
ii) Composite	15	5	15	3	25	13
iii) Local	15	53	33	33	75	41
Spacing between lines and plants	53	50	58	28	35	43
Depth of placing seed	20	23	10	17	0	14
Improved Varieties						
i) Hybrid	78	98	93	82	68	83
ii) Composite	0	3	3	2	0	1
Seed treatment						
Seed treatment chemicals	3	8	3	3	5	4
Recommended dose	0	8	3	3	5	4
Benefits	53	88	93	57	78	70
Weed management						
Keeping crop weed free till 45 days DAS	58	65	65	37	60	55
Methods of weed control	63	95	80	85	90	83
Chemicals of weed control	8	40	0	17	13	15
Dose of herbicide	8	40	0	7	15	13
Benefits of weed control	70	93	95	85	98	88
Fertilizer management						
Recommended dose of						
i) Urea	38	70	38	62	28	48
ii) DAP	50	60	38	58	18	46
iii) MOP	48	63	43	43	30	45
Number of urea splits	40	25	15	20	18	23
Application time of						
i) Urea (Basal, knee height and tasseling stage)	40	43	20	45	28	36
ii) DAP (Basal dose)	98	88	88	93	95	92
iii) MOP (Basal dose)	93	90	95	92	100	94
Water management and mixed cropping						
Effect of stagnant water on the maize crop	93	100	88	97	98	95
Mixed cropping						
Mixed cropping of maize	100	98	90	82	70	87
Benefits of inter cropping	100	98	90	82	78	89

Table 2 contd...

Crop production technologies	District					Overall (n=220)
	Doda (n=40)	Kathua (n=40)	Poonch (n=40)	Rajouri (n=60)	Udhampur (n=40)	
Seed replacement and Harvesting						
Replacement of hybrid seeds every year	90	100	100	78	100	92
Replacement of composite seeds not required	98	98	93	93	98	95
Benefits of seed replacement	95	95	98	87	100	94
Stage of harvesting of maize crop	93	95	90	80	100	90

Decimals are rounded up to nearest whole number

cent had correct knowledge about land preparation. Rajouri district had the highest percentage of respondents (97%) having correct knowledge about sowing time of maize crop followed by farmers of Kathua and Poonch (95%), Doda (93%) and Udhampur (90%) respectively. Regarding knowledge about land preparation, a minimum of three ploughings was the highest in district Kathua where 85 per cent maize growers know about it followed by Doda (78%), Poonch (73%), Rajouri (70%) and Udhampur (50%).

It was found that majority (77%) of maize growers had the correct knowledge about seed rate of hybrids, 41 per cent had correct knowledge about seed rate of local varieties and only 13 per cent had correct knowledge about seed rate of composite varieties. As for as knowledge regarding spacing between the lines and plants was concerned, 44 per cent maize growers had the correct knowledge about spacing. Only 14 per cent maize growers had the knowledge about depth of placing seed in the soil. In respect to varieties of maize crop, majority (77%) of the maize growers had the knowledge about the different hybrids of maize whereas only one per cent had the knowledge about composite varieties. Only four percent of the maize growers had the knowledge about seed treating chemical and its recommended dose 2 g/kg seed.

It is clear from the data that 55 per cent of the maize growers had the knowledge to keep the crop weed free up to 45 days after sowing (DAS) and 83 per cent knew about the different methods of weed control in maize crop. Only 15 per cent maize growers knew about the herbicide (Atrazine) for weed control and only 13 per

cent had the knowledge about correct dose of herbicide (1 kg/ha in 800-1000 litre of water). As for as benefits of weed control, 88 per cent respondents knew about the benefits of the weed control in maize crop and the benefits reported by the maize growers were: high production, ease in intercultural operations, less insect pest and disease attack and crop getting proper light, moisture, and nutrients for growth.

Fertilizer management includes various aspects namely recommended dose, number of urea splits and application time. The recommended dose of urea, diammonium phosphate (DAP) and murate of potash (MOP) per hectare is 145 kg, 132 kg and 50 kg for irrigated plain areas and 100 kg, 90 kg and 33 kg for unirrigated plain and hilly areas. It is clear from the data that 48 per cent of the maize growers had the correct knowledge about the recommended dose of urea, 46 per cent had the correct knowledge about the recommended dose of DAP and 45 percent had the correct knowledge about the recommended dose of MOP (Table 2). In maize urea is recommended to be applied in three splits at different stages of crop. But only 23 per cent of the maize growers possessed the knowledge of applying the urea in three splits. Thirty six percent maize growers possessed correct knowledge of applying the urea at right time whereas the percentage of respondents who had possessed correct knowledge of application time of DAP and MOP were 94 and 92, respectively.

Maize is a rainy season crop in the study area and does not withstand water logging condition. Proper water management practices should be followed for getting higher yield. It is evident that 95 per cent maize growers

possessed the knowledge about the adverse effect of stagnant water on the maize crop. Pulses are generally recommended for mixed cropping in maize crop. Beside pulses, maize growers sow cucumber in maize crop. Eighty seven percent respondents had the knowledge about mixed cropping in maize and 89 per cent possessed the knowledge regarding benefits of mixed cropping. 92 per cent respondents had the knowledge of replacing hybrid seeds every year and 95 per cent had the knowledge that composite seeds are not replaced every year. Moreover, 90 per cent respondents had the knowledge of harvesting of maize crop at right stage i.e. when cob cover and leaves of the plants get dry.

Knowledge about insect pest and disease management

Majority of the farmers reported that in maize crop stem borer (*Chilo partellus*), cut worm (*Agrotis ipsilon*) and blisterbeetle (*Mylabris postulata*) are some of the

major insect pests and head smut (*Sphacelotheca reiliana*) and common smut (*Ustilago maydis*) are the major diseases that mostly harm the crop. The maize growers' knowledge with respect to these insect pests and diseases was measured by identification of these insect pests and diseases from photographs. The percentage of maize growers identifying blister beetle, stem borer and cut worm was 97, 88 and 80, respectively (Table 3). A very less percentage of maize growers were having the knowledge about chemical control of these insect pests. Similar results were reported by Nain *et al.* (2007) in case of adoption. The percentage of respondents identifying head smut and common smut was 90 and 78 respectively. Only less than 0.50 per cent maize growers were having the knowledge about chemical control of these diseases. Eighty five percent of respondents possessed knowledge about harmful effect of pesticides and 55 per cent possessed the knowledge about first aid in case of pesticide poisoning (Table 3).

Table 3: Knowledge about insect pest and disease management (% farmers)

Insect and disease management	District					Overall (n=220)
	Doda (n=40)	Kathua (n=40)	Poonch (n=40)	Rajouri (n=60)	Udhampur (n=40)	
Identification of insect pests						
i) Blister beetle (<i>Mylabris postulata</i>)	98	95	98	95	100	97
ii) Stem borer (<i>Chilo partellus</i>)	85	73	88	95	98	88
iii) Cut worm (<i>Agrotis ipsilon</i>)	68	68	93	77	95	80
Chemical control of						
i) Blister beetle	0	0	0	2	0	0
ii) Stem borer	0	0	0	2	0	<0.50
iii) Cut worm	0	0	0	3	5	2
Identification of diseases						
i) Head smut (<i>Sphacelotheca reiliana</i>)	90	78	98	87	100	90
ii) Common smut (<i>Ustilago maydis</i>)	75	55	95	73	95	78
Chemical control of						
i) Head smut	3	0	0	2	0	<0.50
ii) Common smut	0	0	0	3	0	<0.50
Precautions taken during pesticide spraying	73	85	90	85	98	85
Harmful effect of insecticides	45	85	70	73	78	75
First aid for insecticide poisoning	93	68	50	45	75	55

Table 4: Multiple comparison of districts in case of mean knowledge score of maize growers

District (i)	District (j)	Mean difference (i-j)	Std. error	Sig.
Udhampur	Poonch	0	0.95392	1
	Doda	2.90000*	0.95392	0.003
	Rajouri	1.44167	0.87081	0.099
	Kathua	-1.7	0.95392	0.076
Poonch	Udhampur	0	0.95392	1
	Doda	2.90000*	0.95392	0.003
	Rajouri	1.44167	0.87081	0.099
	Kathua	-1.7	0.95392	0.076
Doda	Udhampur	-2.90000*	0.95392	0.003
	Poonch	-2.90000*	0.95392	0.003
	Rajouri	-1.45833	0.87081	0.095
	Kathua	-4.60000*	0.95392	0
Rajouri	Udhampur	-1.44167	0.87081	0.099
	Poonch	-1.44167	0.87081	0.099
	Doda	1.45833	0.87081	0.095
	Kathua	-3.14167*	0.87081	0
Kathua	Udhampur	1.7	0.95392	0.076
	Poonch	1.7	0.95392	0.076
	Doda	4.60000*	0.95392	0
	Rajouri	3.14167*	0.87081	0

Multiple comparison of districts in case of mean knowledge score of maize growers

The mean knowledge score difference among the five sampled districts is given in Table 4. Test of mean difference using one way ANOVA shows that there was significant difference in mean knowledge score between farmers of districts Udhampur and Doda, Poonch and Doda, Doda and Kathua, and Rajouri and Kathua.

CONCLUSION

Overall mean knowledge score was 24.31 with a standard deviation of 4.48. The mean knowledge of district Kathua was the highest and it was lowest in district Doda. A high percentage of maize growers were having good knowledge about sowing time, land preparation, hybrid varieties, seed rate, identification of insect pests and disease, water management, mixed cropping, seed replacement and stage of harvesting. Only 4 per cent maize growers had knowledge about seed treatment and

less than 1 per cent had knowledge about management of insect pests and diseases. There was significant difference in mean knowledge score among the districts: Udhampur-Doda, Poonch-Doda, Kathua-Doda and Kathua-Rajouri. There is need of widespread training and demonstration of package of practices for scientific maize cultivation. Extension agencies should demonstrate to the farmers the process of seed treatment, balanced use of fertilizers, insect pest and disease management. So there is need of widespread trainings, awareness camps, front line demonstrations of package of practices for scientific maize cultivation.

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