

## **KNOWLEDGE AND ADOPTION OF FARMERS ABOUT SCIENTIFIC CULTIVATION OF MAIZE IN PANCHMAHAL DISTRICT**

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### **ABSTRACT**

*The study was conducted in Panchmahal districts of middle Gujarat Agro climatic Zone-III All talukas of Panchmahals district viz, Morva Hadaf, Godhra, Halol, Kalol, Ghoghamba Shahera and Jambughoda were selected. In these talukas are growing maize as main crop in kharif season. Fourteen villages were selected from these seven talukas by simple random sampling techniques. A list of 140 maize growers was prepared from the selected villages. 10 respondents were selected from each village by random sampling technique. Thus, total number of respondents was 140. The data were tabulated, analyzed and interpreted in the light of the objectives. Majority of the respondents were in middle age group having illiterate to secondary education, marginal land holding, had annual income up to ₹2500-50000/-, were engaged in Farming + Animal Husbandry work as main occupation possessed and medium levels of knowledge on maize production technology and adoption level. Great majority of the maize farmers had knowledge regarding land preparation before sowing (95%), time of interculturing after sowing (95%) was applied, and appropriate time of sowing (87.14%). Knowledge regarding appropriate depth of sowing and stage of harvesting knowledge was 85% and 84.28%, respectively. Nearly half of the maize farmers had knowledge regarding recommended space between plant to plant (52.14%). Nearly half of the maize growers had knowledge of recommended dose of FYM/ha (47.14%). Nearly two fifth (42.14%) of the maize growers had knowledge of seed rate. Nearly one fourth (26.42%) of the maize growers had knowledge of recommended space between two line of plant (row to row). Nearly one fifth (17.85%) of the maize growers had knowledge about major insect-pest and their control measure. Very few maize growers (10.71%) exhibited knowledge about variety they had sown. Only 4.28% maize growers had knowledge and grew GM-2 variety. Only 3.57% farmers had knowledge and grew GAWMH-2 variety. Only 2.85% farmers had knowledge and grew GM-6 variety. Only 0.71% farmers had knowledge and grew GM-3, GAYMI and Amber variety. A few (11.42 per cent) maize growers have adopted SAU's Gujarat recommended variety. More than half maize growers have adopted private company's variety. Majority of farmers have adopted local variety. More than one third maize growers (37.14%) have fully adopted recommended seed rate and nearly one fifth (22.14 per cent) have partially adopted recommended seed rate. More than half (60.71 per cent) maize growers have fully adopted sowing time, Nearly one fifth (17.14 per cent) maize growers have fully adopted spacing, Majority (93.57 per cent) of the maize growers have fully adopted inter culturing, Majority (86.43 per cent) maize growers have fully adopted thinning practices. Two fifth (40 per cent) maize growers have fully adopted FYM recommendation, No maize grower has fully adopted chemical fertilizer recommendation, No maize growers have fully adopted disease recommendation. Only one farmer (0.71 per cent) maize growers have fully adopted insect pest control recommendation.*

**Keywords:** adoption, maize growers, scientific cultivation

### **INTRODUCTION**

Maize is grown as main crop in Panchmahals districts of Gujarat state and it is cultivated in approximately 2.70 lakh hectare area in *kharif* season. Research scientists, extension workers and farmers have responsibilities to maximize the production and productivity of maize in per unit area. The productivity of maize in the state at present is 1300 kg ha<sup>-1</sup>.

It is less than the national Average (2300 kg/ha) and world average (5500 kg/ha), respectively. The low productivity in maize was due to lack of scientific cultivation knowledge, poor nutrient management and lack of knowledge on insect pests and disease management. Keeping all these views, the research study "Knowledge and Adoption of farmers about scientific cultivation of maize in Panchmahal" was taken.

**OBJECTIVES**

- (i) To study the selected characteristics of farmers
- (ii) To study the knowledge of different scientific cultivation method of maize of farmers of Panchmahals district
- (iii) To study the adoption of different scientific cultivation method of maize by farmers of Panchmahals district.

**METHODOLOGY**

The study was conducted in tribal areas of Panchmahal district of the Gujarat state. All(seven) tribal talukas were selected and Total 20 village were selected randomly from these talukas. Ten tribal farmers were selected from each village. This constituted total sample of 140 tribal farmers. The data were collected by personal interview technique and analysed with number & percentage.

**RESULTS AND DISCUSSION**

**Selected characteristics of farmers**

**(i) Age**

**Table 1: Distribution of maize growers according to their age** n=140

Age	Frequency	Per cent
Young Age(up to 35 years)	34	24.29
Middle Age(35 to 50)	61	43.57
Old Age(above 50)	45	32.14

From the data presented in Table 1 shows that majority (43.57 percent) of the respondents was in middleage group followed by 32.14 percent of the respondents belonging old age group and only 24.29 percent were under age group.

**(ii) Education**

**Table 2: Distribution of maize growers according to their level of education** n=140

Education	Frequency	Per cent
Illiterate	16	11.42
Read and write	02	01.42
Primary	25	17.85
Secondary	45	32.14
Higher Secondary	39	27.85
College	13	07.85

A perusal of data presented in Table-2 reveal that majority (32.14 percent) of the respondents were secondary followed by 27.85, 17.85, 11.42, 7.85 and 1.42 percent were higher secondary level, primary school level, illiterate college level education and read and write only , respectively.

**(iii) Land holding**

**Table 3: Distribution of soybean growers according to their size of land holding** n =140

Land holding	Frequency	Per cent
Marginal(up to 1 ha.)	64	45.71
Small(1.1 to 2 ha.)	43	30.71
Medium(2.1 to 3 ha.)	14	10.00
Big farmers(Above 3 ha.)	19	13.57

It is evident from the data in Table-3 revealed that 45.71 percent farmers possessed up to 1 ha of land followed by 30.71 percent having 1.1 to 2.00 ha of land and 13.57 percent having land up to above 3 ha. of land. While only 10.00 percent having above 2.1 to 3 ha of land.

**(iv) Occupation**

**Table 4: Distribution of maize growers according to their occupation** n=140

Occupation	Frequency	Per cent
Farming only	08	05.71
Farming + Animal Husbandry	55	39.28
Farming + Animal Husbandry+Labour	43	30.71
Farming + Animal Husbandry+Service	07	05.00
Farming + Animal Husbandry+Business	11	07.86
Farming + Animal Husbandry+Pension	03	02.14
Farming + Labour	09	06.43
Farming+Service	00	00.00
Farming + Business	04	02.85

A perusal of data presented in Table-4 reveal that Slightly less than two-fifth (39.28 %) of maize growers have farming and animal husbandry occupation. 30.71 per cent of maize growers have Farming + Animal Husbandry+Labour occupation. 07.86 per cent of maize growers have Farming

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+ Animal Husbandry+Business occupation. 06.43 per cent of maize growers have Farming + Labour occupation. Only 05.71 per cent farmers have maize growing as a single occupation. 02.85 per cent of maize growers have Farming + Business occupation. 2.14 per cent of maize growers have Farming + Animal Husbandry+Pension occupation/income source.

**Table 5: Distribution of maize growers according to their Annual Income** n=140

Annual Income (₹)	Frequency	Per cent
0-25000	39	27.86
25000-50,000	44	31.43
50,000-75,000	11	07.86
75,000-1,00,000	15	10.71
100001-200000	19	13.57
200001-300000	07	05.00
300001-400000	01	00.71
Above 400000	04	02.86

From the data presented in Table 5 shows that 31.43 per cent of maize growers have ₹ 25000-50,000 income. 27.86 cent of maize growers have up to ₹ 25000 income. 13.57 per cent maize growers have ₹ 1,00,001-2,00,000 annual income. 10.71 per cent of maize growers have ₹ 75,000-1,00,000 income. 7.86 per cent of maize growers have 50,000-75,000 annual income. 5.00 per cent of maize growers have ₹ 2,00,000-3,00,000 annual income. 2.86 per cent of maize growers have above ₹ 4,00,000 annual income. 0.71 per cent of maize growers have ₹ 3,00,001-4,00,000 annual income.

**Table 6: Distribution of maize growers according to their Utilization of Source of Information of Maize Technology** n= 140

Sr. No.	Category	Frequency	Per cent
1	Low utilization of Source	35	25.00
2	Medium utilization of Source	86	61.42
3	High utilization of Source	19	13.57

Table 6 expressed that slightly more than three-fifth (61.42 %) of maize growers was medium level of utilization information sources followed by 35 per cent low utilization of information sources and high level of utilization of information source was 13.57 per cent. The probable reason might be due to that maize growers are educated that tends to acquire more information when they need.

**Table 7: Distribution of maize growers according to their Practices wise knowledge of variety exhibited by maize growers** n=140

Sr. No.	Particulars	Frequency	Percent *
1	variety of maize sowing farmer sowing	15	10.71
<b>Variety wise knowledge*</b>			
<b>University released Variety</b>			
	GM 4	02	1.42
	GM 2	06	4.28
	GM 3	01	0.71
	GM 6	04	2.85
	GAYMH 1	01	0.71
	GAWMH 2	05	3.57
	Amber	01	0.71
<b>Notified National variety</b>			
	Ganga safed 2 (National variety)	13	9.28
	Ganga safed 1 (National variety)	01	0.71
<b>Private company Variety</b>			
	Pioneer	12	8.57
	Advanta	10	7.14
	Bioseed	02	1.42
	Proagro	05	3.57
	302092	03	2.14
	Kargil	01	0.71
	Mhyco	01	0.71
	Kanak	02	1.42
	Vikram 303	01	0.71
	Ujala	04	2.85
	Sury	01	0.71
	Kanan	01	0.71
	Sanat 51	01	0.71
	Sona	01	0.71
	Chandan Nani	02	1.42
	Chandan moti	04	2.85
	Soneri	01	0.71
	Nirmal	01	0.71
	90M90	01	0.71
	848	01	0.71
	6240	01	0.71
	Vaghchhap	01	0.71
	Cp 838	01	0.71
	Rashi	02	1.42
	Hp 8383	01	0.71

Tiger 4734	01	0.71
Kamal	01	0.71
Ganga 6	01	0.71
Ganga Kaveri	08	5.71
Sanem 72	01	0.71
Trupti	01	0.71
Kaveri	04	2.85
MH 496	01	0.71
Chandan	05	3.57
<b>Local</b>	34	24.28
Types of recommended variety of maize knows he had ever sown or not	13	9.28

GM 4	02	1.42
GM 2	03	2.14
GM 3	02	1.42
GM 6	02	1.42
GAYMH 1	0	0
GAWMH 2	1	0.71
Amber	1	0.71
Narmada Moti	1	0.71
Madhuri	1	0.71
HQPM 1	1	0.71

\* Farmers knows and adopt more than one varieties .so, frequency may be more than 140 and percentage may be more than 100.

**Table 8 : Distribution of maize growers according to their Practices wise knowledge other than variety exhibited by maize growers n=140**

Sr. No.	Particular	Adoption as per recommendation Knowledge Yes/No	Fequency	Per cent
1	Land preparation before sowing	Yes	133	95.00
		No	07	05.00
2	Appropriate time of sowing	Yes	122	87.14
		No	18	12.86
3	Appropriate depth of sowing	Yes	119	85.00
		No	21	15.00
4	Recommended dose of seed rate	Yes	59	42.14
		No	81	57.86
5	Recommended space between two line of plant(row to row)	Yes	37	26.42
		No	103	73.58
6	Recommended space between plant to plant	Yes	73	52.14
		No	67	47.86
7	Recommended dose of FYM /ha	Yes	66	47.14
		No	74	52.86
8	Recommended dose of inorganic fertilizer	Yes	10	07.14
		No	130	92.86
9	Times of nitrogen should be applied	Yes	07	05.00
		No	133	95.00
10	Days after sowing the second dose of nitrogen should be applied	Yes	07	05.00
		No	133	95.00
11	Days after sowing interculturing should be applied	Yes	133	95.00
		No	07	05.00
12	Main insects - pest of maize name and their control measure.	Yes	25	17.85
		No	115	82.15
13	Main disease in maize and their control measure	Yes	01	00.71
		No	139	99.29
14	stage the harvesting	Yes	118	84.29
		No	22	15.71

## Extension Strategies for Doubling the Farmers' Income for Livelyhood Security

The present studies on practices wise knowledge of maize cultivators in the villages of Panchmahals district exhibited by maize growers are shown in Table 8. Great majority of the maize farmers had knowledge regarding land preparation before sowing(95 %), time of interculturing after sowing (95 %) was applied. and appropriate time of sowing(87.14 %). Knowledge regarding appropriate depth of sowing and stage of harvesting knowledge was 85% and 84.28%, respectively. Nearly half of the maize farmers had knowledge regarding recommended space between plant to plant(52.14%).Nearly half of the maize growers had knowledge of recommended dose of FYM/ha (47.14%).Nearly two fifth(42.14 %) of the maize growers had knowledge of seed rate .Nearly one fourth(26.42%) of the maize growers had knowledge of recommended space between two line of plant(row to row).Nearly one fifth(17.85 %) of the maize growers had knowledge about major insect-pest and their control measure. Very few maize growers (10.71 %) exhibited knowledge about variety they had sown.

Only 4.28% maize growers had knowledge and grew GM- 2 variety. Only 3.57 % farmers had knowledge and grew GAWMH-2 variety. Only 2.85 % farmers had knowledge and grew GM-6 variety. Only 0.71% farmers had knowledge and grew GM-3,GAYM1 and Amber variety.

Only 9.28 % maize growers had knowledge and grew Gujarat Safed-2 2(Notified National variety) while 0.71% maize growers had knowledge and grew Ganga safed-1 (Notified National variety)

Only 8.57 % maize growers had knowledge and

grew Pioneer company variety followed by 7.14% and 24.28% maize growers Advanta company variety and Local variety, respectively.

Maize growing farmers have very least per cent knowledge i.e. 2.14% about GM-2 variety; however, the similar 1.42% had knowledge about GM-3 and GM-6 variety, in case of GAWMH-2, Amber, Narmada moti, Madhuri, HQPM-1 variety and their disease control measure have only 0.71% knowledge which was recommended by SAU's of Gujarat. Whereas, the knowledge about scientific crop production technology practices i.e. only 7.14% had knowledge about inorganic fertilizer application, however, the similar 5% had knowledge about no. of times of nitrogen application and second dose of nitrogen application after sowing by maize growers had only 5%.

**Table 9: Distribution of maize growers according to their knowledge level of maize growers** n= 140

Sr. No.	Category	Frequency	Per cent
1	Low	26	18.57
2	Medium	94	67.14
3	High	20	14.29

Table 9 shows that slightly more than two-third (67.14 %) of maize growers have medium level of knowledge. Maize grower have low level of knowledge (18.57 %). The probable reason might be due to most of the maize growers are school level education and most of the maize growers was medium level in utilizing the source of information

**Table 10: Distribution of maize growers according to their adoption of improved scientific technology of maize crop**

n=140

Sr. No.	Practices	Particular	No. of respondents	Per cent
1	Variety Adopted	University recommended	16	11.42
		Private variety adopted	79	56.42
		Local variety	101	72.14
* Farmers knows and adopt more than one varieties .so, percentage may be more than 100.				
2	Seed rate (20 kg/ha) (As per recommendation)	Fully adopted	52	37.14
		Partial adopted	31	22.14
		Not adopted	57	40.72
3	Sowing time (As per recommendation)	Fully adopted	85	60.71
		Partial adopted	38	27.14
		Not adopted	17	12.15
4	Spacing (60x20) (As per recommendation)	Fully adopted	24	17.14
		Partial adopted	80	57.14
		Not adopted	36	25.72

Sr. No.	Practices	Particular	No. of respondents	Per cent
5	Interculturing	Fully adopted	131	93.57
		Partial adopted	07	05.00
		Not adopted	02	01.43
6	Thining practices	Fully adopted	121	86.43
		Partial adopted	16	11.43
		Not adopted	03	02.14
7	FYM (As per recommendation)	Fully adopted	56	40.00
		Partial adopted	41	29.29
		Not adopted	43	30.71
8	Inorganic fertilizers (As per recommendation) (i) Basal dose (ii) Top dressing	Fully adopted	0	0
		Partial adopted	0	0
		Not adopted	140	100
9	Plant protection Measures (As per recommendation) (i) Disease (ii) Insect	Fully adopted	(i) 0 (ii) 1	0 0.71
		Partial adopted	(i) 1 (ii) 4	0.71 2.85
		Not adopted	(i) 139 (ii) 135	99.28 96.42

Farmers knows and adopt more than one varieties .so, percentage may be more than 100.

The adoption of improved scientific technology of maize crop by farmers of Panchmahals district is given in Table 10.

A few (11.42 per cent) maize growers have adopted SAU;s Gujarat recommended variety. More than half maize growers have adopted private company’s variety. Majority of farmers have adopted local variety. More than one third maize growers (37.14%) have fully adopted recommended seed rate and nearly one fifth(22.14 per cent) have partially adopted recommended seed rate where as nearly two fifth(40.71 per cent) growers have not adopted recommended seed rate. More than half (60.71 per cent) maize growers have fully adopted sowing time and nearly one forth(27.14 peer cent) have partially adopted sowing time where as a few(12.14 per cent) have not adopted sowing time. Nearly one fifth (17.14 per cent) maize growers have fully adopted spacing and more than half(57.14 per cent) have partially adopted spacing. Whereas nearly one forth (25.71 per cent) have not adopted spacing Majority(93.57 per cent) of the maize growers have fully adopted inter culturing .A few (5 per cent) have partially adopted inter culturing. A few (only 1.43 per cent) have not adopted inter culturing. Majority (86.43 per cent) maize growers have fully adopted thinning practices. A few (11.43 per cent) maize growers have partially adopted

thinning practices. A few (2.14 per cent) growers have not adopted thinning practices. Two fifth (40 per cent) maize growers have fully adopted FYM recommendation. Nearly one forth (28.57 per cent) have partially adopted FYM recommendation. Nearly one third (30.71 per cent) have not adopted FYM recommendation. No maize grower has fully adopted chemical fertilizer recommendation. No maize grower has partially adopted chemical fertilizer recommendation. It is worth noting that all maize growers have not adopted chemical fertilizer recommendation. No maize growers have fully adopted disease recommendation. Only one farmer (0.71 per cent) maize growers have fully adopted insect pest control recommendation. It is worth noting that only one farmer (0.71 per cent) have partially adopted disease recommendation. A few farmer (2.85 per cent) have partially adopted insect pest control recommendation. Majority (99.28 per cent) maize growers have not adopted disease control recommendation. Majority (96.42 per cent) maize growers have not adopted insect pest control recommendation.

**Table 11: Distribution of maize growers according to their Adoption Level of Maize Growers**

n= 140

Sr. No.	Category	Frequency	Per cent
1	Low	16	11.42
2	Medium	102	72.85
3	High	22	15.71

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Table 11 shows that majority (72.85 %) of maize growers was medium level of adoption followed by high and low with 15.71 and 11.42 per cent respectively. Probable reason might be due to most of the maize growers belongs to middle age group. They are educated and having ability to read, understand and concretize the ideas leads to unique power of decision making which is reflected in to medium to high adoption level. The present finding is similar to finding reported by Pise (2006), Parmar (2006), Rabari (2006) and Patel (2009).

### **CONCLUSION**

From the above discussion, it could be concluded majority of the maize growers belonged to middle age group and having primary to Secondary level of education, having marginal to small size of land holding, farming + Animal husbandry, Farming + Animal Husbandry + Labour as their main occupation and up to 25000-50000 of Annual income, medium utilization of information sources, medium level of knowledge and adoption level. Great majority of the maize farmers had knowledge regarding land preparation before sowing(95 %), time of interculturing after sowing (95 %) was applied. and appropriate time of sowing(87.14 %). Knowledge regarding appropriate depth of sowing and stage of harvesting knowledge was 85% and 84.28%, respectively. Nearly half of the maize farmers had knowledge regarding recommended space between plant to plant(52.14%). Nearly half of the maize growers had knowledge of recommended dose of FYM/ha (47.14%). Nearly two fifth(42.14 %) of the maize growers had knowledge of seed rate. Nearly one fourth(26.42%) of the maize growers had knowledge of recommended space between two line of plant(row to row). Nearly one fifth(17.85 %) of the maize growers had knowledge about major insect-pest and their control measure. Very few maize growers (10.71 %) exhibited knowledge about variety they had sown. Only 4.28% maize growers had knowledge and grew GM- 2 variety. Only 3.57 % farmers had knowledge and grew GAWMH-2 variety. Only 2.85 % farmers had knowledge and grew GM-6 variety. Only 0.71% farmers had knowledge and grew GM-3, GAYM1 and Amber variety. A few (11.42 per cent) maize growers have adopted SAU;s Gujarat recommended variety. More

than half maize growers have adopted private company's variety. Majority of farmers have adopted local variety. More than one third maize growers (37.14%) have fully adopted recommended seed rate and nearly one fifth(22.14 per cent) have partially adopted recommended seed rate. More than half (60.71 per cent) maize growers have fully adopted sowing time, Nearly one fifth (17.14 per cent) maize growers have fully adopted spacing, Majority(93.57 per cent) of the maize growers have fully adopted inter culturing, Majority (86.43 per cent) maize growers have fully adopted thinning practices. Two fifth (40 per cent) maize growers have fully adopted FYM recommendation, No maize grower has fully adopted chemical fertilizer recommendation, No maize growers have fully adopted disease recommendation. Only one farmer (0.71 per cent) maize growers have fully adopted insect pest control recommendation.

### **REFERENCES**

- Parmar P.B. (2006) A Study on knowledge and extent of adoption of recommended paddy production technology by the paddy growers in Khambhat taluka of Anand district. M.Sc (Agri) thesis(Unpub.) A.A.U., Anand
- Patel K.B. (2009) A Study on extent of adoption recommended anola production technology by anola growers of Kheda district of Gujarat State. Ph.D. thesis (Unpub.), A.A.U., Anand
- Pise M.P. (2006) A Study on attitude of banana growers towards banana cultivation technology. M.Sc (Agri) thesis (Unpub.) A.A.U., Anand
- Rabari S.N. (2006) A Study on adoption of tomato recommended technology by tomato growers in Anand district of Guj. State. M.Sc (Agri) thesis (Unpub.) A.A.U., Anand
- Thakker, B.N., Patel, K.H. and Khanorkar, S.M. (2017) Evaluation of front line demonstration of azospirillum + psb biofertilizer + atrazine + carbofuron treatment programme of maize hybrid GAYMH-1 in Gujarat. *Guj. J. Ext. Edu.* 28(2):221-223