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A CASE STUDY

Constraints in the production and marketing of maize in Punjab

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ABSTRACT

The present study was undertaken to examine constraints in the production and marketing of maize in Punjab. A representative sample of 300 maize growers was drawn from the three districts of Punjab by using multi-stage random sampling technique on the basis of concentration of area under maize. The findings of the study reveled that the selected maize growers faced constraints as the maize crop specific technology adoption was concerned. The institutional, marketing and socio-economic constraints were found to be impediments in the production of maize. More specifically the sample farmers suffered on account of non-availability of credit, poor marketing facilities, lack of storage facilities, non-availability of seed suitable to the local needs, late sowing of crop etc. The detailed analysis of the constraints impediment to production and marketing of maize reflect the urgent need for overhauling of the entire marketing system. This in turn helps in the allocation of resources to maize crop in the state like Punjab where groundwater is depleting very fast, needs to be diversified in favour of less water requiring crops like maize.

Key words :
Credit, Marketing, Constraints, Adoption, Institutional, Socio-economic status

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INTRODUCTION

In India, maize has traditionally been grown as a staple food primarily for home consumption. However, in recent years, as a result of the increasing commercial orientation of the agricultural economy and rising demand for maize on account of diversification in its end uses, maize production scenario has undergone myriad changes. The demand for maize, as a feed resource, has been increasingly realized because of the structural changes in consumption pattern, as a consequence of rising per capita income, which has boosted up the demand for livestock and poultry products. In India, at present, about 35 per cent of the maize produced in the country is used for human consumption, 25 per cent each in poultry feed and cattle feed and 15 per cent in food processing (corn flakes, popcorns etc.) and other industries (mainly starch, dextrose, corn syrup, corn oil, etc.). With agriculture getting more and more commercialized, there have been drastic shifts in cropping pattern of the country. The crops like pulses, oilseeds, maize, etc. have per force taken the back seat in the agricultural production scenario of the country. Even the crop like maize, which used to be the important cereal crop of the country, has lost its ground and more so, the growth rate of production has not been uniform in different states. It has been estimated that the demand for maize in the developing countries will overtake the demand for wheat and rice by 2020 A.D. Asian maize demand will rise from 138 million tonnes in 1993 to 243 million tonnes, accounting for 60 per cent of the global increase in maize consumption by 2020 A.D. (Kumar and Singh, 2003). Under the circumstances, there are two feasible options to increase agricultural production. One is to raise production per unit of area on cultivated normal soil through optimal allocation of available resources by utilizing the full potential of existing technology. The other possibility is through external land augmentation without shrinking the area and productivity of any other activity (Datta and Joshi, 1992). In order to meet the challenges of increased demand of maize in the future, efforts have been made to evolve the technology that could bring break through in production front. As a result of these efforts, the yield of maize has increased from 547 kg/ha in 1950-51 to 1723 kg/ha by the year 2002-03 (*www.agricoop.nic.in*) in India.

Looking at the commendable overall performance of the Indian agriculture in general and Punjab agriculture in particular, the challenge of meeting the increased demand for maize successfully, should not look like a distant dream. But the lopsided growth of agriculture, in the sense that there has been substantial inter crop and inter regional inequality, seems to be a major hurdle in the way of realization

of the goal of increasing maize production in consonance with increasing demand. Under the current situation, the issue is whether pinning the hopes on Punjab will solve the dual purpose of meeting the increased demand at the same time realizing the much sought after goal of diversification from wheat- paddy, envisaged for Punjab.

Punjab, contributed 0.67 per cent to the country's maize acreage and 1.85 per cent to production of the country in 2001-02(*www.agricoop.nic.in*). A number of efforts were made to bring about technological breakthrough in this crop, in spite of this the area under maize showed a continuous decline during the post-green revolution period. The area under maize during the TE 1952-53 was 2544 thousand hectares, which increased to 399.7 thousand hectares during the TE 1966-67 and thereafter declined to as low as 164 thousand hectares in TE 2001-02. The decline in maize acreage was mainly caused by the advent of HYVs of its competing crop, rice, in spite of the fact that yield of maize has increased substantially during the last 20 years. The current scenario of paddy replacing maize gives a clear evidence of the fact that maize growers in the state are facing certain constraints that proved detrimental to the growth of maize crop in Punjab. It is against this backdrop, that the present study was initiated to measure the extent of adoption of new maize technology over different farm size groups and impact on the crop yield. An attempt has also been made to identify the constraints *viz.*, technological, institution and marketing which hinder the growth of maize crop in the state.

METHODOLOGY

The formulations of the study are based on the primary data collected from a cross section of 300 maize growers in Punjab. A multistage random sampling technique was employed to draw a representative sample. At first stage, three districts were chosen representing high, medium and low concentration of maize. The districts so selected were Jalandhar, Hoshiarpur and Patiala. At the next stage, two blocks each were selected randomly from the sample districts, the detail of which is given below:

District	Block
Jalandhar	Adampur and Bhogpur
Hoshiarpur	Hoshiarpur I and Hoshiarpur II
Patiala	Dera Bassi and Rajpura

At the next stage, a cluster of 2 to 3 villages was selected in order to obtain ultimate sampling units (maize growers). A complete enumeration of maize growers was done in the sample villages in order to draw a representative sample. A total of 300 maize growers, with 50 maize growers from each block were selected. The selected maize growers were then categorized into three categories based on the size of their operational holdings. The small farmers (with operational holdings of less than 2 hectares), medium (having operational holding between 2 to 4 hectares), and large farmers (with operational holdings of more than 4 hectares) were 118, 92 and 90, respectively. The primary data from the selected maize growers were collected on the interview schedule especially designed for the purpose. Technological, infra structural, marketing, socio-economic informations etc. were also collected. In order to ascertain the extent of technology adoption, the technology adoption index (Anonymous, 2003) was computed by using the following formula:

$$TAI_i = \frac{1}{5}\left[\frac{AH_i}{CA_i} + \frac{NA_i}{NR_I} + \frac{PA_i}{PR_i} + \frac{KA_i}{KR_i} + \frac{IA_i}{IR_i}\right] \times 100$$

where,

i = 1, 2… n (farmers)

TAIi =Technology adoption index of i^{th} farmer

AHi =Area under modern maize varieties (ha)

NAi = Quantity of nitrogen applied for maize (kg/ha)

NRi = Recommended dose of nitrogen of maize crop (kg/ha)

PAi = Quantity of phosphorus applied for maize (kg/ha)

PRi= Recommended dose of phosphorus of maize crop (kg/ha)

KAi= Quantity of potash applied for maize (kg/ha)

KRi= Recommended dose of potash of maize crop (kg/ha)

IAi= Actual number of irrigation applied

IRi = Recommended number of irrigations

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

General farming profile:

The information pertaining to the farm size with respect to different farm size categories and the irrigation status thereof have been presented in Table 1.The average size of the holding in case of small, medium and large farm size category happened to be 1.21, 2.71, and 9.69 hectares per farm, respectively.

The results of Table 1 clearly show that as much as 98.97 per cent of the cropped area was irrigated. It was

Table 1 : Farm size of the selected maize growers (ha/farm)

Particulars	Farm size category			Overall
	Small (118)	Medium (92)	Large (90)	
Irrigated	1.21	2.70	9.55	4.17
area	(100.0)	(99.6)	(98.5)	(98.97)
Un-irrigated	0	0.01	0.14	0.04
		(0.4)	(1.5)	(1.03)
Total	1.21	2.71	9.69	4.21
	(100)	(100.00)	(100)	(100.00)

Figures in the parentheses are percentage to the total

noticed that in the case of small farm category, entire land holding was irrigated. A look at these results clearly indicates that the present land holdings are too small to sustain the peasantry. It lands them to the state of under employment and hence, lower income leading to poor standard of living, causing frustration among them. The major source of irrigation with the sample farmers was tube well. In the case of small and medium farmers, tube well was the only source of irrigation, whereas in the case of large farmers, tube well catered to the irrigation needs of 98.6 per cent of the cropped areas. Canal and well were other, though insignificant, sources of irrigation.

The cropping pattern in the farms of the selected maize growers has been presented in Table 2.

The results presented in Table 2 clearly show that the sample farmers allocated the highest area to wheat (34 per cent). The next favorite crop among the sample farmers was maize (16.23 per cent), which was followed by rice (15.43 per cent). The preference for maize over rice, as indicated by the area apportioned to these two crops, can be due to deliberate selection of the maize growers as respondents of the study. It needs a special mention here that in the cropping pattern of the state at large, paddy has more area apportioned to it as compared to maize. The percentage of area allocated to *Rabi* and *Kharif* oilseeds turned out to 0.18 and 0.03, respectively. The per cent of gross cropped area allocated to wheat turned out to be 36.61, 37.89 and 32.46 per cent in three farm categories arranged in ascending order of magnitude of their farm size, respectively. Given the trade off between maize and paddy, the small farmers, supposedly the resource poor farmers gave preference to maize because of comparatively lower input requirements in the case of maize crop. The large farmers had gone in for rice cultivation at 17 per cent of their cropped area as compared to only 7 per cent in the case of small farmers. The perusal of farm category wise cropping pattern revealed that the proportion of GCA put to maize cultivation was the highest in the case of small farmers (27.35 % of GCA), followed by medium (19.64 % of GCA) and large farmers (13.45 % of GCA).

Table 2 : Cropping pattern followed by the selected maize growers in Punjab (Per cent)

Crop	Farm size category			Overall
	Small (118)	Medium (92)	Large (90)	
Maize	27.35	19.64	13.45	16.23
Rice	7.12	15.18	16.86	15.43
Sorghum	0.0	0.0	0.07	0.05
Kharif pulses	0.14	0.0	0.12	0.10
Kharif oilseeds	0.0	0.0	0.05	0.03
Other *Kharif* crops	12.46	11.01	10.01	10.48
Wheat	36.61	37.89	32.46	34.0
Rabi pulses	0.0	0.04	0.12	0.09
Pearl millets	0.0	0.0	0.02	0.02
Rabi oilseed	0.28	0.0	0.21	0.18
Other *Rabi* crops	10.61	8.22	7.54	8.02
Sugarcane	5.42	7.94	19.10	15.36
Total	100	100	100	100
GCA (ha)	(2.41)	(5.43)	(19.40)	(8.43)

Maize cultivation details:

The information pertaining specifically to maize crop has been presented in this section. The perusal of Table 3 revealed that the area under maize was 0.66, 1.07 and 2.61 hectares in the case of small, medium and large farm category, respectively. Out of 300 maize growers selected for the study, three quarters (*i.e.* 225 farmers) had gone in for hybrid varieties of maize cultivars. Rest of the respondents had gone in for either traditional (17.30 per cent) or composite varieties (7.70 per cent). Out of the total area allocated to maize by the small farm holders, hybrid maize varieties accounted for 73.30 per cent of the maize area. The corresponding figures for medium and large categories were found to be 82.60 and 94.40 per cent, respectively. The area allocated to the traditional varieties was 17.1, 10.6 and 3.4 per cent in the case of small, medium and large farm size category, respectively. The results further reveal that small, medium and large farmers allocated 9.6, 6.8 and 2.2 per cent of maize area to the improved maize varieties, respectively. Considering, the maize growing farms in totality, as high as 88 per cent of the maize area was sown with hybrid seed varieties.

Traditional and composite maize varieties accounted for 7.6 and 4.8 per cent of the maize acreage, respectively. These results clearly show that the sample farmers were having preference for hybrid maize varieties. It could be due to their higher yielding potentials and resistance to

Table 3: Distribution of farmers according to maize cultivars sown

Particulars	Farm holding category						Overall (300)	
	Small (118)		Medium (92)		Large (90)			
	% of farmers	% of area	% of farmers	% of area	% of farmers	% of area	% of farmers	% of area
Traditional	22.0	17.1	17.4	10.6	11.1	3.4	17.3	7.6
Composite	11.9	9.6	6.5	6.8	3.3	2.2	7.7	4.8
Hybrid	66.1	73.3	76.1	82.6	85.6	94.4	75.0	87.6
	(0.66)		(1.07)		(2.61)		(1.37)	

Figures in parentheses are maize acreage (ha/farm)

insect-pest and disease attack. The easy access to hybrid seeds could be another reason.

The acreage and productivity details of various maize cultivars *i.e.* traditional, composite and hybrid for different land holding categories have been presented in Table 4.As regards traditional maize varieties, 52 respondents had gone in for it.

Maize area per farm has been recorded at 0.51, 0.65 and 0.79 ha for small, medium and large farm holding category. The application of ANOVA technique to test the significance of difference between the maize areas for three farm holding categories revealed non-significant difference ($P \leq 0.05$). It can be clearly seen from the Table 4 that in the case of small farms, maize accounted for as high as 58 per cent of the net sown area, which was significantly higher than medium and large farm size categories, revealing the compulsion on the part of small holders on account of poor resource base and subsistence nature of their farming practices. In case of both composite and hybrid varieties, maize acreage in large category was found to be significantly ($P \leq 0.05$) higher than the small and medium farm size category, but the proportion of maize area to net sown area was the highest in case of small farmers and this proportion varied inversely with the farm size (Table 4). Coming to the productivity potential, hybrid varieties, needless to emphasize, have the highest yield. The in depth analysis revealed that the yield potential over different land holding categories didn't vary in case of both traditional and hybrid varieties. However, in case of composite maize varieties, large farmers reaped significantly higher ($P \leq 0.05$) yield levels as compared to small and medium landholders.

In order to ascertain the level of adoption of technical know-how in the cultivation of maize, and in order to bring it to a common denomination for the purpose of meaningful comparison, Technology Adoption Index (TAI) has been worked out for each selected maize grower (Table 5). The Technology Adoption Index is a catchall measure of technology adoption practices of the farmers. The technology adoption practices include area under hybrid varieties, appropriateness of irrigation level and dosages of fertilizers.

Considering the sample farmers on the whole, there were 7.7 per cent of the farmers (securing the index value

Table 4 : Acreage and productivity details of different maize cultivars

Particulars	Unit	Farm holding category			Overall (300)
		Small (118)	Medium (92)	Large (90)	
Traditional					
No. of growers	No	26	16	10	52
Maize area per farm	Ha	0.51[a]	0.65[a]	0.79[a]	0.60
Maize area as % of NSA	%	44.3[a]	23.9[b]	15.6[b]	32.5
Yield	kg/ha	1947.5[a]	1952.8[a]	2050.1[a]	1968.9
Composite					
No. of growers	No	14	6	3	23
Maize area per farm	Ha	0.53[c]	1.11[b]	1.75[a]	0.85
Maize area as % of NSA	%	51.12[a]	45.8[a]	23.3[a]	46.1
Yield	kg/ha	3122.1[b]	3314.7[b]	3746.2[a]	3254.0
Hybrid					
No. of growers	No	78	70	77	225
Maize area per farm	Ha	0.73[c]	1.16[b]	2.88[a]	1.60
Maize area as % of NSA	%	58.0[a]	44.3[b]	31.5[c]	44.7
Yield	kg/ha	3621.0[a]	3663.0[a]	3601.3[a]	3626.0

[a, b, c] Figures with different superscripts in a row differ significantly ($P \leq 0.05$)

Table 5 : Technology Adoption Index for the selected maize growers

Adoption index	Farm holding category			Overall
	Small	Medium	Large	(300)
	(118)	(92)	(90)	
Up to 33%	13	6	2	21
	(11.0)	(6.5)	(2.2)	(7.7)
33-66%	22	2	15	39
	(18.6)	(2.2)	(16.7)	(13.0)
66% and above	83	84	73	240
	(70.3)	(91.3)	(81.1)	(80.0)

Figures in parentheses indicate percentages

less than 33) who can be deemed as low adopters of technology. Thirteen per cent farmers can be put into the category of moderate adopters. The results indicated that as high as, 80 per cent of the sample farmers were making utmost use of technology adoption in the field of agriculture. No discerning pattern could be observed between the farm size and technology adoption (Table 5).

Maize utilization and disposal pattern:

The results pertaining to utilization of maize produce presented in Table 6 indicate that as much as 86 per cent of the produce at the overall level has been offered for sale after meeting the personal consumption needs of the sample farmers. The results at the overall level indicate that 4.67, 4.86, 4.02 and 0.10 per cent of the produce was used as food, feed, wages in kind and loss, respectively. It was found that the small category maize growers consumed the highest proportion (8.53 per cent) of their maize production as a food. The figures for the medium and large categories were found to be 6.07 and 2.90 per cent, respectively.

The results further revealed that 7.53, 6.64 and 3.31 per cent of the produce was used as a feed by the above said categories of maize growers, respectively. The small farmers paid 5.25 per cent of the produce for wages in kind, whereas the figures for medium and large categories were 5.02 and 3.24 per cent, respectively. The transit losses accounted for 0.1 per cent of the produce.

The perusal of Table 7 shows that the highest share (40.8 per cent) of marketable surplus was sold in the regulated markets. It was found that more than 38.4 per cent of the produce was sold to the village traders. Similarly 3.6 per cent of the marketable surplus was sold to the feed manufacturers directly. The results further reveal that 0.2 per cent of the marketable surplus was sold to seed companies. It can be seen from Table 7 that the small, medium and large maize growers sold 9.1, 15.5 and 19.7 per cent of the produce to neighbours and other farmers at the farm gate itself. The figures for village traders turned out to be 29.5, 48.2 and 37 per cent for the above said categories of the maize growers, respectively.

It was startling to note that none of the selected farmers sold his produce to the government agencies in the regulated markets. This happened due to the reason that food procurement agencies are not buying maize in the regulated markets and this, in turn resulted into lower prices for maize in the regulated market as compared to the MSP for maize.

Constraints in the production and marketing of maize:

In this section, an attempt has been made to study the constraints hampering the production and affecting

Table 6 : Maize utilization of the selected maize growers in Punjab (q / farm)

Particulars	Farm holding category			Overall
	Small	Medium	Large	(300)
	(118)	(92)	(90)	
Production	21.92	37.08	93.32	47.99
	(100)	(100)	(100)	(100)
Food	1.87	2.25	2.71	2.24
	(8.53)	(6.07)	(2.90)	(4.67)
Feed	1.65	2.46	3.09	2.33
	(7.53)	(6.64)	(3.31)	(4.86)
Wages in	1.15	1.86	3.02	1.93
kind	(5.25)	(5.02)	(3.24)	(4.02)
Loss	0.03	0.03	0.12	0.05
	(0.13)	(0.08)	(0.13)	(0.10)
Sale	17.22	30.47	84.38	41.43
	(78.56)	(82.19)	(90.42)	(86.35)

Figures in parentheses are the percentages to the total production

Table 7: Disposal pattern of maize in Punjab (q / farm)

Particulars	Farm holding category			Overall
	Small	Medium	Large	
Other farmers	1.57*	4.72	16.65	7.06
	(9.1)	(15.5)	(19.7)	(17.0)
Village	5.08	14.68	31.34	15.91
traders	(29.5)	(48.2)	(37.0)	(38.4)
Feed	0.32	0.34	4.24	1.50
manufacturers	(1.9)	(1.1)	(5.0)	(3.6)
Seed company	-	-	0.26	0.08
			(0.3)	(0.2)
Regulated	10.24	10.74	32.11	16.95
markets	(59.5)	(35.2)	(38.0)	(40.8)
Total	17.21	30.48	84.38	41.43
	(100.00)	(100.00)	(100.00)	(100.00)

Figures in the parentheses are percentages to the total

the marketing of maize in Punjab. The information pertaining to technological constraints has been presented in Table 8. Here the aim has been to ascertain the reasons that lead to non-application of seed treatment, late sowing and non-application of recommended dosage of fertilizer.

The perusal of Table 8 revealed that nearly 12 per cent of the maize growers had not applied the seed treatment. Therefore, this might not be considered as a major constraint in the way of attaining optimal level of productivity out of those who had not applied the seed treatment. Forty per cent were not aware of the treatment and 23 per cent had refrained form seed treatment due to the cost involved therein. Late sowing was reported by nearly one fifth of the respondents. Major reason put forth by 44 per cent of those who had sown late, was that land was not free in time. This constraint was found to be more common in case of large farmers. Here the disadvantage of late sowing might be assumed to be outweighed by the advantage of higher cropping intensity.

Insufficient moisture and dearth of assured irrigation

Table 8: Technological constraints in cultivation of maize in Punjab

Particulars	Farm holding category			Overall
	Small (118)	Medium (92)	Large (90)	
Non application of seed treatment before sowing	11	14	10	35
	(9.3)	(15.2)	(11.1)	(11.7)
Reasons for not applying the seed treatment				
i. Lack of knowledge	4	6	4	14
	(36.4)	(42.8)	(40.0)	(40.0)
ii. Non-availability of material	-	-	2	2
			(20.0)	(5.70
iii. Ignorance	5	4	2	11
	(45.4)	(28.6)	(20.0)	(31.4)
iv. High cost	2	4	2	8
	(18.2)	(28.6)	(20.0)	(22.9)
Sowing after the recommended time	21	10	26	57
	(17.8)	(10.9)	(28.3)	(19.0)
Reasons for late sowing				
i. Land not free	7	3	15	25
	(33.3)	(30.0)	(57.7)	(43.8)
ii. Insufficient moisture	5	3	8	16
	(23.8)	(30.0)	(30.8)	(28.1)
iii. Assured irrigation lacking	9	40	3	16
	(42.9)	(40.0)	(11.5)	(28.1)
Use of less than recommended dosage of fertilizers	81	76	73	230
	(68.6)	(82.6)	(81.1)	(76.6)
Reasons for using less than recommended dosage of fertilizers				
i. Not aware of recommendations	38	32	33	103
	(46.9)	(42.1)	(45.2)	(44.8)
ii. Unsatisfactory recommendations	23	26	23	72
	(28.4)	(34.2)	(31.5)	(31.3)
iii. Non-availability of fertilizers	21	19	16	59
	(25.9)	(25.0)	(26.0)	(25.6)
Use of over dosage of fertilizers	32	12	17	61
	(27.1)	(13.0)	(18.9)	(20.3)
Reasons for using more than recommended dosage of fertilizers				
i. Not aware of recommendations	12	6	4	22
	(37.5)	(50.0)	(23.5)	(36.1)
ii. Unsatisfactory recommendations	11	2	7	20
	(34.4)	(16.7)	(41.2)	(32.8)

Figures in the parentheses are percentages to the total. * Multiple responses

were other reasons put forth by 28 per cent of the respondents.None of the large category selected farmers used recommended dosages of fertilizer.

The results reveal that 4.2 and 4.3 per cent of the small and medium farmers used recommended dosage of fertilizer. The results further revealed that nearly 76.6 per cent of the sample farmers used less than recommended dose of fertilizer. The percentage was the highest in the case of medium farmers (82.6 per cent), followed by large farmers (81.1 per cent) and small farmers (68.6 per cent). The reasons for using less than the recommended dosage of fertilizer are unsatisfactory recommendations, not aware of the recommendations and non-availability of fertilizers. Similar reasons were reported for the over use of the fertilizers. The results revealed that 44.8 per cent of the selected maize growers were not aware of the recommended dosage. Nearly 26 per cent of the farmers reported that they did not use recommended dose of fertilizer due to non-availability.

None of the large category selected farmers used recommended dosage of fertiliser. The results further revealed that 20.3 per cent of the selected farmers have been using more than recommended dosages of fertilizer in the maize crop. It was found that 37.5, 50 and 23.5 per cent of the selected small, medium and large category farmers were not aware of the recommended dose of fertilizers. The overall figure turned out to 36.1 per cent. Similarly 32.8 per cent of the selected maize growers opined that the recommendations were not satisfactory (Table 8). The lack of knowledge on the technological aspects of crop production can well be deemed as major hindrance in the way of realizing optimum yield levels.

In Table 9, some of the infrastructural and institutional constraints faced by the framers have been brought forward. Since, Punjab has fully developed and vast network of roads, the connectivity of villages to the nearby markets is no longer a constraint. As far as electricity is concerned, its insufficiency has been reported as a problem for 60.3 per cent of the respondents. A total of 67 per cent of the respondents reported non-availability of timely supply of electricity as a major hurdle in carrying out agricultural operations.

The results further show that there was problem of inadequate credit facility. However, this problem was not of serious as only 10 per cent of the farmers reported to have faced this constraint. Similarly credit was not available on time. This was reported by 9.3, 9.8 and 11.1 per cent of small, medium and large category farmers, respectively. In the modern times the use of credit especially the Kisan Cards has increased tremendously. In spite of this, 31 per cent of the selected maize growers were not aware of it. Similarly some small farmers (20 per cent) reported that the formal agencies are not approachable due to lack of resources. The ignorance on the part of the maize farmers on this ground was more pronounced in the case of small farmers. The results further revealed that 60 per cent of the respondents were not having the Kisan credit card.

Table 9 : Institutional constraints in cultivation of maize in Punjab

Particulars	Farm holding category			Overall
	Small (118)	Medium (92)	Large (90)	
Poor connectivity of village to market	-	-	-	-
Electricity problem				
Insufficient	66	61	54	181
	(55.9)	(66.3)	(60.0)	(60.3)
Untimely	74	67	59	200
	(62.7)	(72.8)	(58.9)	(66.7)
Unsatisfactory irrigation facilities	59 (50.0)	62 (67.4)	53 (58.9)	174 (58.0)
Availability of credit				
Inadequacy	13	11	6	30
	(11.0)	(11.9)	(6.7)	(10.0)
Untimely	11	9	10	30
	(9.3)	(9.8)	(11.1)	(10.0)
No knowledge of Kisan credit card	48 (40.7)	26 (28.3)	19 (21.1)	93 (31.0)

It is well testified that the marketing facilities could not keep pace with the modern day requirement of marketing of farm produce and the maize is not an exception. The information pertaining to the marketing constraints has been presented in Table 10.

It is evident from Table 10 that more than 66 per cent of the selected maize growers reported that they faced marketing constraint due to poor marketing facilities. This problem was more acute with small farmers as compared to medium and large farmers. It was interesting to note that none of the selected maize growers graded produce before marketing. The main reason for not grading the produce was a little difference in prices of graded and non-graded and lack of grading facilities. The per cent of the selected maize growers who faced constraints on account of the price difference in small, medium and large farmers was 36.4, 40.2 and 40, respectively. The corresponding figures for the lack of grading facilities were 25.4, 28.3 and 28.9 per cent, respectively. All the selected farmers reported that there was no proper facility for the storage of produce (Table 10). This calls for revamping of the entire marketing

Table 10 : Marketing constraints in cultivation of maize in Punjab

Particulars	Farm holding category			Overall
	Small (118)	Medium (92)	Large (90)	
Supply of farm inputs				
i. Not timely	-	-	-	-
ii. Inadequate	-	-	-	-
Poor marketing facilities	76 (64.4)	61 (66.3)	61 (66.3)	198 (66.01)
Non availability of storage facility	118 (100)	92 (100)	90 (100)	300 (100)
Problem of grains grading	118 (100)	92 (100)	90 (100)	300 (100)
Reasons for not grading				
i. Not much price difference	43 (36.4)	37 (40.2)	36 (40.0)	116 (38.7)
ii. Lack of grading facilities	30 (25.4)	26 (28.3)	26 (28.9)	82 (27.3)
iii. Non-availability of labour	2 (1.7)	-	-	2 (0.7)
iv. Not aware of grading standards	43 (36.4)	29 (31.5)	28 (31.1)	100 (33.3)

Figures in the parentheses are percentages to the total

system for orderly marketing of the produce in the regulated markets

The socio-economic constraints faced by the maize growers has been presented in Table 11.

The results revealed that 84.3 per cent of the selected maize growers were of the opinion that the price (MSP) was not remunerative one. The figures for the small, medium and large farm size category were 83.9, 90.2 and 78.9 per cent, respectively. More than 83 per cent of the selected maize growers reported that cultivation of maize was not providing enough profit margins after meeting the cost of production. Another problem being faced by the selected maize growers was that of labour availability. However, this problem did not seem to be of serious nature as small proportion of the selected maize growers reported this problem. A vast majority of the sample farmers reported the absence of any government agency to buy their produce in the local regulated markets. The intensity of problem was more acute with the large and medium farmers compared to the small farmers. This could be attributed to higher marketable surplus in the case of medium and large farmers. This resulted into lower prices for the produce and hence lower returns to their investment (Table 11).

Table 11 : Socio-economic constraints in cultivation of maize in Punjab

Particulars	Farm holding category			Overall
	Small (118)	Medium (92)	Large (90)	
Price of maize not remunerative	83.9	90.2	78.9	84.3
Profit margin not enough	80.5	86.9	83.3	83.3
Labour not available when required	15.2	19.6	21.1	18.3
Govt. Agency not available to procure at MSP	96.3	100.0	100.0	98.7

Faced with quite many constraints in marketing of the maize produce, the maize growers have their own perceptions, based on their experience, regarding enhancement of the profitability of maize crop. These perceptions are recorded in the Table 12. The results showed that as high as 86 per cent of the maize growers opined that selling during the lean period can let them attain the profit maximization. But this has more of theoretical underpinning than practical applicability. Some of the farmers (7.3 per cent) suggested that higher prices could be realized if the produce is sold in the distant consuming markets or directly to the processors (7 per cent).

Table 12 : Perceptions of the respondents regarding the profitability of maize crop

Particulars	Farm holding category			Overall
	Small (118)	Medium (92)	Large (90)	
Higher price can be realised by:				
i. Selling in distant market	11 (9.3)	7 (7.6)	4 (4.4)	22 (7.3)
ii. Selling during lean season	101 (85.6)	78 (84.8)	78 (86.7)	257 (85.7)
iii. Selling directly to the processors	6 (5.1)	7 (7.6)	8 (8.9)	21 (7.0)

Conclusion:

The upshot of the study is that the selected respondents face quite well as far as the maize crop specific technology adoption is concerned. The detailed analysis of the constraints in the way production and marketing of maize reflects the urgent need for overhauling of the entire maize marketing system in the state. This in turn would help in the allocation of more resources to maize crop. This will go a long way to squeeze out some areas from rice that would provide impetus to much publicized diversification programme of government and also attain the increase in maize production.

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