Economic Affairs, Vol. **69**(03), pp. 1215-1220, September 2024
DOI: 10.46852/0424-2513.4.2024.4

AESSRA

RESEARCH PAPER

Production and Marketing Constraints Faced by Spring Maize Growers in Haryana

Mandeep Kumar[1*], R.S. Pannu[2], D.P. Malik[3] and Ankit Mahapatra[4]

[1]Division of Dairy Economics, Statistics and Management, ICAR-National Dairy Research Institute, Karnal, Haryana, India
[2]Department of Agricultural Economics, MMDU, Mullana, Ambala, Haryana, India
[3]Department of Agricultural Economics, CCS HAU, Hisar, Haryana, India
[4]Department of Dairy Extension, ICAR-National Dairy Research Institute, Karnal, Haryana, India

*Corresponding author: mbedwal527@gmail.com (**ORCID ID:** 0000-0002-0942-7508)

Received: 14-06-2024 **Revised:** 12-08-2024 **Accepted:** 30-08-2024

ABSTRACT

The present study analyzed production and marketing constraints confronted by spring maize growers in irrigated tract of Haryana in 2020-21. The data was collected from 80 farmers through face to face approach to ascertain constraints in spring maize cultivation and three point Likert type scale was used and Friedman's test was employed. The findings exposed that, among the production constraints, high wage rate of human labour was the major constraint tracked by damage to standing crop by birds/wild animals, non-availability of maize dryer, higher cost of seed and incidence of insect-pests and diseases. The prominent marketing restraints were non-procurement of produce by public agencies, low market price of produce offered due to higher moisture content, delay in payment, low value of by-product etc. Arrangement of assured procurement of produce at MSP, mechanization of farm operations through custom hiring centres to curtail cost of cultivation, incentivizing the farmers for wired fencing, access to maize dryer, adequate storage facilities and market intelligence are essential for promotion of spring maize cultivation in study area.

HIGHLIGHTS

- A Likert type scale and Friedman's test was employed for the analysis.
- Among the various constraints, high wage rate of human labour was considered as a major production constraint and non-procurement of produce by public agencies was a prominent marketing constraint faced by the spring maize growers in the study area.

Keywords: Constraints, Friedman test, Maize dryer, Marketing, Production, Spring maize

Agriculture sector helps in ensuring food security, lowering poverty and sustaining economic growth. It provides income to more than 60 per cent of rural household (Surapaka *et al.* 2022). The food grains production in India has increased from 50.83 million tonnes in 1950-51 to 310.74 million tonnes in 2020-21 showing an increase of about 511 per cent over a span of 70 years. Due to this quick growth in agricultural production, Indian agriculture has marked its existence at the global level. Maize is one of the world's most vital food crops grown over an area of 197 million ha covering more than 130 nations with a total production of 1148 million tonnes globally (FAO, 2020). India contributed about 4.8 per cent to total maize area and 2.5 per cent to total production in the world in 2020-21.

Maize (*Zea mays* L.) is one of the most versatile crops which can thrive well in a myriad of agro-climatic environments (Ram *et al.* 2021). Maize is recognized

How to cite this article: Kumar, M., Pannu, R.S., Malik, D.P. and Mahapatra, A. (2024). Production and Marketing Constraints Faced by Spring Maize Growers in Haryana. *Econ. Aff.*, **69**(03): 1215-1220.

Source of Support: None; **Conflict of Interest:** None

as the "queen of cereals" around the world because it has the greatest genetic yield potential among all the cereals. Maize is also called as "miracle crop" because of its versatility in cultivation across varied agro-climatic regions including tropical, sub-tropical and temperate regions. It is largely utilized for three purposes i.e. as a human staple meal, livestock feed and industrial raw material (Devi and Suhasini, 2016). Maize is cultivated in all seasons *viz. kharif, rabi and spring* in India (Parkash and Peshin, 2020). The maximum area of maize is under *kharif season* (7.75 million ha) followed by *rabi season* (2.13 million ha) and least under *spring season* in India.

In Haryana, maize is grown over an area of 0.07 lakh ha with production of 0.20 lakh tonnes having productivity of 3026 kg ha^{-1}in 2020-21 (GoH, 2022). Traditionally, maize is cultivated in *kharif* season in Haryana but in recent years, the area under *spring* maize is also picking up in eastern part of the state owing to assured irrigation facilities. Still, the area expansion under the *spring* maize crop is feeble because farmers encounter plethora of problems in its production and marketing. Hence, an attempt has been made to critically investigate the production and marketing constraints confronted by spring maize growers in the study area. The detailed investigation will certainly open up the avenues for enhancing cultivation of spring maize in the area and suggest appropriate measures to overcome the restraints.

MATERIALS AND METHODS

Multi-stage purposive sampling technique was employed for selection of the sampled farmers. The selection of two districts, namely Karnal and Kurukshetra on the basis of area under spring maize cultivation, was the first stage and selection of two blocks from each district and two villages from each block was second and third stage of sampling adopting the same criterion. At last stage of sampling, 10 farmers from each village were selected purposively cultivating spring maize on large area. Finally, 80 farmers (10 from each village) were interacted to extract the relevant information during 2020-21 to address objectives of the study.

With respect to various production and marketing constraints faced by spring maize growers, three point Likert type scale was used. Initially, a comprehensive list of major constraints in the production and marketing of spring maize was prepared in consultation with the researchers of CCS Haryana Agricultural University, development officials of state Department of Agriculture& Farmers Welfare, Govt. of Haryana, progressive farmers, other stake holders and based on previous studies. Later on, sampled respondents were asked to provide a number to each production constraint having three scenarios i.e. 1 for normal, 2 for moderate and 3 for severe problem. At last, these scores specified by sampled farmers for each constraint were analyzed using statistical techniques namely mean score, mean per cent score and finally, mean rank was obtained by Friedman's test using the following formulae:

1. $$\text{Mean Score} = \frac{\text{Sum of score (constraints) for all responses}}{\text{Total number of respondents}}$$

2. $$\text{Mean percent score} = \frac{\text{Mean score (constraints) for all responses}}{\text{Maximum score of the constraint}} * 100$$

3. $$\text{Mean rank} = \frac{12}{n_r k(k+1)} \sum R_i^2 - 3n_r(k+1)$$

Where, k = Number of columns (treatments); n_r = Number of rows (blocks); R_i = Sum of the ranks.

The constraints faced by sampled farmers in the cultivation of spring maize were ranked according to the value of mean per cent score and mean rank. The constraint having highest percentage and highest mean rank was considered as the most vital constraint.

RESULTS AND DISCUSSION

Maize crop is gaining momentum since 2015-16 in terms of area, production and productivity in Haryana. By adopting various spring maize based cropping systems (paddy-potato-spring maize, paddy-toria-spring maize etc.), farmers are able to cultivate more than two crops in one agricultural year and fetch greater returns from their farms. Despite this fact, farmers in the state are reluctant to take up the cultivation of spring maize because of various complications faced in its production and marketing. There are various production constraints (Table 1) which hampers the growth of spring maize cultivation in the state. In addition

Table 1: Constraints in the production of spring maize

Sl. No.	Production Constraints	Total Score	Mean	Mean %	Friedman Mean Rank	Overall Rank
1	Non-availability of quality seed (hybrid)	83	1.03	34.58	3.39	19
2	Higher cost of seed	174	2.17	72.50	12.31	05
3	Non-availability of credit in time	119	1.48	49.58	7.05	15
4	Weed infestation	118	1.47	49.17	6.93	16
5	Incidence of insect-pests and diseases	160	2.00	66.67	11.14	08
6	Difficulty in spraying of pesticides	149	1.86	62.08	10.08	11
7	Damage by birds/wild animals	190	2.37	79.17	13.88	02
8	High number of irrigations required	113	1.41	47.08	6.36	17
9	Untimely rain at maturity stage	137	1.71	57.08	8.73	14
10	Difficulty in harvesting	146	1.82	60.84	9.74	12
11	Non-accessibility to maize harvester	158	1.97	65.84	10.71	09
12	Non-availability of maize sheller	167	2.08	69.58	11.53	06
13	Higher cost of maize harvester and sheller	161	2.01	67.08	11.16	07
14	High wage rate of human labour	218	2.72	90.84	16.31	01
15	Non-availability of maize dryer	181	2.26	75.42	12.82	03
16	Higher cost of maize dryer	175	2.19	72.92	12.56	04
17	Difficulty in storage of grain	156	1.95	65.00	10.58	10
18	Delayed paddy transplanting	102	1.27	42.50	5.24	18
19	Lack of training for spring maize cultivation	143	1.78	59.58	9.49	13

to production, effective marketing has truly been a pre-requisite for the development and expansion of any crop enterprise because a poorly functioning supply chain renders production meaningless. So, the problems encountered by sampled farmers in marketing of spring maize are also listed. Finally, the potential constraints as expressed by the sampled farmers in both the districts were clubbed together and the results so obtained were categorized into production constraints and marketing constraints.

Production constraints faced by spring maize farmers

Among the production constraints, high wage rate of human labour was ranked at first position as opined by more than 90 per cent of sampled farmers in the study area (Table 1). This might be due to non-availability of human labour for various farm operations especially during harvesting of maize. Further, 79.17 per cent of the maize growers felt damage to their standing crop by wild animals especially *nil-gai* and ranked this problem at 2nd position. Furthermore, non-availability (75.42%) and higher cost of maize dryer (72.92%) was ranked at 3rd and 4th position, respectively. Placing 5th rank, higher cost of seed (72.50%) by growers as hybrid seed was sold at higher price by private firms and seed availability by public agencies was very meagre. Non-availability of maize sheller (69.58%), higher cost of maize harvester and sheller (67.08%), followed by insects-pests incidence (66.67%) such as jassids, thrips, maize shoot fly and diseases like seed rot, seedling blight, stalk rot and rust were also reported as serious bottlenecks in cultivation of spring maize. Non-accessibility to maize harvester (65.84%) followed by difficulty in storage of grains (65%) were also considered as grave constraints. Insufficient storage facilities, as reported by sampled farmers, forced them to sell their produce in post-harvest period at a price much lower than MSP. Further, difficulty in spraying pesticides (62.08%) to the standing crop and difficulty in harvesting of crop (60.84%) trailed by lack of training to farmers regarding cultivation of spring maize (59.58%) were perceived as moderate constraints. Furthermore, untimely rain at maturity stage (57.08%) tracked by non-availability of credit in time (49.58%), weed infestation (49.17%), high number of irrigations required (47.08%), delayed paddy transplanting

(42.50%) due to spring maize cultivation and non-availability of quality seeds (34.58%) were noticed as somewhat normal constraints in the study area.

Krishna *et al.* (2018) have also reported similar kind of outcomes in their study in Karimnagar district of Telangana where farmers reported that crop damage by wild animals (84.22%) was perceived as the major constraint in maize cultivation followed by higher wage rate of human labour (70.83%), higher inputs cost (58.33%), abnormal weather conditions (50%), high weed prevalence (29.16%) and non-availability of inputs in time (22.5%). Similarly, Singh *et al.* (2017) also detected damage to maize crop by *nil-gai* and higher seed cost levied by private dealers as the major constraints in Haryana. However, Kumar *et al.* (2011) reported that weed infestation, technological adoption gaps and lack of institutional and infrastructural facilities were the major constraints in Punjab. Also, Olusola *et al.* (2014) in Nigeria and Mukherjee *et al.* (2015) in Chhattisgarh narrated somewhat different results when compared to the results of present study because they reported lack of storage, processing and mechanical facilities as the major constraints in the cultivation of maize.

In order to detect pattern in the data, Friedman test has been applied. Simply comparing the rankings provided by the sampled farmers based on mean rank may not be accurate criterion because there might not be any discernible pattern in their rankings (Muthuprasad *et al.* 2021). Here, each production constraint is given a score (out of 3) by each sampled farmer depending upon their severity and Friedman test was performed to know whether there is a significant difference in the mean ranking or not. The test statistics showed that production constraints mean ranking were significant (p-value < 0.05) as observed from table 2. The perusal of table 3 depicts the response of spring maize growers towards the severity of each production constraint.

Table 2: Test statistics for Friedman rank test (Production constraints)

Test Statistics	
N	80
Chi-Square	604.44
df	18
Asymp. Sig.	.00

Table 3: Farmers response towards severity of production constraints

Sl. No.	Production Constraints	Normal (%)	Moderate (%)	Severe (%)
1	Non-availability of quality seed (hybrids)	96.25	3.75	0
2	Higher cost of seed	2.50	77.50	20.00
3	Non-availability of credit in time	52.50	46.25	1.25
4	Weed infestation	52.50	47.50	0
5	Incidence of insect-pests and diseases	18.75	62.50	18.75
6	Difficulty in spraying of pesticides	17.50	78.75	3.75
7	Damage by birds/wild animals	5.00	52.50	42.50
8	High number of irrigations required	60.00	38.75	1.25
9	Untimely rain at maturity stage	40.00	48.75	11.25
10	Difficulty in harvesting	18.75	80.00	1.25
11	Non-accessibility to maize harvester	18.75	65.00	16.25
12	Non-availability of maize sheller	10.00	71.25	18.75
13	Higher cost of maize harvester and sheller	6.25	86.25	7.50
14	High wage rate of human labour	1.25	25.00	73.75
15	Non-availability of maize dryer	3.75	66.25	30.00
16	Higher cost of maize dryer	8.75	63.75	27.50
17	Difficulty in storage of grain	15.00	75.00	10.00
18	Delayed paddy transplanting	72.50	27.50	0
19	Lack of training for spring maize cultivation	27.50	66.25	6.25

Marketing constraints faced by spring maize farmers

As far as marketing of produce was concerned, the sampled farmers sell their produce to the regulated markets established in the spring maize production area. Moreover, they sell the main produce to wholesalers at prevailing market prices. In doing so, they faced some constraints in sale of surplus produce. So, six prominent marketing constraints were identified by the sampled farmers in the study area (Table 4).

Among the marketing constraints, non-procurement of produce by public agencies was identified as the major constraint as reported by more than 98 per cent of sampled farmers (Table 4). The public agencies were not participating in procurement of spring maize. Further, procurement of produce was totally done by private traders and offering ₹ 250 to ₹ 350 per quintal less than MSP owing to high moisture content in maize grains as reported by the farmers. Further, 59.17 per cent of the farmers opined that higher cost was incurred in transportation of produce to the regulated markets because they are distant located from production areas. Furthermore, 54.17 per cent of the farmers faced the problem of delay in payments because of presence of complex payment settlement method. Apart from these, low value of by-product (51.25%) and high commission of traders (50.84%) were some of other marketing constraints as revealed by farmers in the study area. Hasan (2008) in Bangladesh; Kumar *et al.* (2011) and Sharma *et al.* (2014) in their respective studies in Punjab also reported lower market price for maize produce as the major marketing constraint. The results of present study were in conformity with the findings of Gopala *et al.* (2012) in Karnataka, Abdulaleem *et al.* (2017) in Nigeria and Saeed *et al.* (2018) in Punjab. However, Mukherjee *et al.* (2015) in their study in Sarguja district of Chhattisgarh reported different results as inadequate transportation facilities, lack of regulated markets and market information were found as the major marketing constraints.

The perusal of table 5 showed the test statistics for marketing constraints and differences were highly significant based on its level of significance. Table 6 depicts the response of spring maize growers towards the severity of each marketing constraint.

Table 4: Constraints in the marketing of spring maize

Sl. No.	Marketing Constraints	Total Score	Mean	Mean %	Friedman Mean Rank	Overall Rank
1	Higher cost of transportation	142	1.77	59.17	3.11	3
2	Non-procurement by public agencies	237	2.96	98.75	5.59	1
3	Low market price due to higher moisture content	202	2.52	84.17	4.65	2
4	Low value of by-product	123	1.54	51.25	2.54	5
5	Higher amount of commission of traders	122	1.52	50.84	2.44	6
6	Delay in payments	130	1.62	54.17	2.68	4

Table 5: Test statistics for Friedman rank test (Marketing constraints)

Test Statistics	
N	80
Chi-Square	240.01
df	5
Asymp. Sig.	.00

Table 6: Farmers response towards severity of marketing constraints

Sl. No.	Marketing Constraints	Normal (%)	Moderate (%)	Severe (%)
1	Higher cost of transportation	37.50	47.50	15.00
2	Non-procurement by public agencies	0	3.75	96.25
3	Low market price due to higher moisture content	2.50	42.50	55.00
4	Low value of by-product	50.00	46.25	3.75
5	Higher amount of commission of traders	47.50	52.50	0
6	Delay in payments	37.50	62.50	0

CONCLUSION

From the present study, it can be concluded that high wage rate of human labour, damage to crop by wild animals, higher cost of hybrid seed, non-availability along with higher cost of maize dryer, harvester and sheller was found to be the major production constraints. The non-procurement of produce at MSP due to high moisture content, higher cost of transportation were key marketing constraints perceived by spring maize growers in the study area. Hence, it is suggested that necessary arrangement for procurement of maize at minimum support price and availability of machinery equipments in time at an affordable prices through establishment of custom hiring centres should be ensured. Farmers should be incentivized for wired fencing on community basis for protecting the crop from wild animals under various crop development programs/schemes. Sufficient storage facilities should be created in production areas and market intelligence should be disseminated timely to the farmers for better access to price discovery. Further, farmers should be encouraged to form farmer producer organizations (FPOs) for better production, procurement, storage and selling of produce at a remunerative price through negotiations.

REFERENCES

Abdulaleem, M.A., Oluwatusin, F.M. and Kolawole, A.O. 2017. Analysis of costs and returns on maize production among small-scale farmers in Osun state Nigeria. *Report and Opinion*, **9**(5): 89-92.

Devi, I.S. and Suhasini, K. 2016. Economics and constraint analysis of non-traditional maize farmers in Mahbubnagar district under tank irrigation of Andhra Pradesh, *International Research Journal of Agricultural Economics and Statistics*, **7**(1): 86-90.

FAO. 2020. Production-Crops. Data. Food and Agriculture Organization of the United Nations. Retrieved from: http://www.fao.org/faostat/en/#data/QC

Gopala, Y.M., Krishnamurthy, B. and Bharathkumar, T.P. 2012. Production, marketing and storage constraints of maize growers in district Chikaballapur, Karnataka. *Research Journal of Agricultural Sciences*, **3**(4): 873-875.

Government of Haryana. 2022. Statistical Abstract of Haryana 2020-21. Department of Economic and Statistical Analysis, Haryana.

Krishna, M., Deshmukh, K.V., Chavan, R.V. and Chand, R.A. 2018. Constraints in the production and marketing of maize in Karimnagar district of Telangana, India. *International Journal of Current Microbiology and Applied Sciences*, **7**(9): 1786-1788.

Kumar, R., Chahal, S.S., Singh, J.M. and Singh, R. 2011. Production and marketing problems of maize in Punjab. *International Research J Agricultural Economics and Statistics*, **2**(2): 282-287.

Mukherjee, A., Prusty, S.R. and Tripathy, S. 2015. Production and marketing of hybrid maize in Sarguja district of Chhattisgarh. *Indian Journal of Agricultural Marketing*, **29**(1): 81-90.

Muthuprasad, T., Aiswarya, S., Aditya, K.S.and Jha, G.K. 2021. Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences & Humanities Open*, **3**(1): 100101.

Olusola, O., Oluwakemi, O. and Adenike, D. 2014. Technical efficiency and constraints among medium scale maize production in Oyo state, Nigeria. *Journal of Biology, Agriculture and Healthcare*, **4**(24): 91-96.

Parkash, S.and Peshin, R. 2020. Growers' Knowledge of Improved Maize Production Technologies in Jammu Region of J&K.*Indian Journal of Extension Education*,**56**(3): 41-47.

Ram, S., Singh, P., Kumari, N., Mehla, V. and Kumar, V. 2021. Constraints in Production and Marketing of Baby Corn: A Case Study in Sonipat District, Haryana. *Indian Journal of Extension Education*,**57**(2): 203-207.

Saeed, R., Bashir, A., Sohail, M., Qasim, M. and Mahmood, M.A. 2018. Profitablity, production efficiency and marketing of spring maize in Punjab, Pakistan. *Pakistan Journal of Agriculture, Agricultural Engineering and Veterinary Sciences*, **34**(1): 78-86.

Sharma, M., Singh, O., Singh, G. and Kaur, G. 2014. A snap shot of spring maize cultivation in Kapurthala and Jalandhar districts under central plain zone of Punjab. *Journal of Krishi Vigyan*, **3**(1): 1-4.

Singh, N., Sharma, P. and Kamboj, M.C. 2017. Maize scenario in Haryana: a brief review. *International Journal of Pure & Applied Bioscience*, **5**(6): 1616-1623.

Surapaka, P., Khan, M.A., Tanguturi, H., Marlabeedu, S., Tejavath, B. and Mekala, S. 2022. Impact of COVID-19 Lock down on Farmers of Nalgonda District, Telangana State. *Indian Journal of Extension Education*, **58**(4): 10-14.