



Constraint Analysis of Maize Production in Telangana State Using Garrett's Ranking Technique

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Maize is a major crop in Telangana, and this study examined the key constraints faced by farmers in its production. The study was conducted in the top three maize-producing districts of Telangana - Warangal Rural, Siddipet, and Kamareddy. Data was gathered through personal interviews with 240 sample farmers using pre-tested, structured questionnaires for the 2021-22 agricultural year. An opinion survey was used to identify the top challenges, which were then ranked using the Garrett's technique. The most significant constraints were uncertain rainfall (Garrett score of 83.13) and labor shortages (79.95). Other major issues included pest/disease outbreaks (75.07), high labor costs (72.32), lack of irrigation (68.76), elevated fertilizer prices (64.2), and limited fertilizer availability. Farmers also grappled with high seed costs, machinery/input shortages, and inadequate technical knowledge. Additionally, they faced problems like wildlife damage, lack of credit access, and high interest rates, though these were considered less severe. Overall, the study provides valuable insights into the challenges impacting maize production in the region.

Keywords: Maize; production; rainfall; labor; incidence; constraints.

1. INTRODUCTION

"Maize, often called the "Queen of Cereals," is a vital crop in India, ranking as the third-highest cash crop after wheat and rice. With 16 million Indian farmers engaged in maize cultivation, major maize-producing states like Karnataka, Rajasthan, Madhya Pradesh, and Telangana contribute significantly to the country's overall maize production, according to the Indian Institute of Millets Research" (IIMR, 2023-24).

In Telangana, maize is the third-highest ranking crop, covering 12.74 lakh acres. During the 2022-23 season, the state's maize production reached 28.65 lakh tonnes [1]. "The leading maize-growing districts in Telangana include Warangal Rural, Khammam, Nirmal, Siddipet, Kamareddy, Mahabubabad, Nizamabad, Warangal Urban, Jagityal, and Karimnagar. Over the past decade, both the cultivated area and production of maize have witnessed significant growth in the state" [2].

"Price instability, exploitation of farmers by middlemen in marketing activities and lack of market integration system, etc. are a few of the pressing problems faced by the farmers cultivating maize. Keeping this in view, Telangana Government has urged the farmers not to go for maize cultivation during *kharif* 2020-21 under the Regulated farming policy. Accordingly, maize acreage has reduced from 6.50 lakh hectares to 2.61 lakh hectares in Telangana State even though the agro-climatic conditions are favourable for its cultivation" [3].

Under these circumstances, it is felt that there is need to formulate appropriate ways and means

for sustenance of the crop in the state and reduce price fluctuations, such that both producer's profit and consumer's benefits will increase and lead for overall economic development of the state.

2. MATERIALS AND METHODS

2.1 Data source

Selection of study area and sample farmers: Maize, one of the major crops grown in Telangana State, covered 9.78% of the total cultivated area during 2019-20. This crop will be the focus of the present study. The study will select the top three districts leading in maize cultivation as the study area. Within each of these districts, the top two mandals and the top two villages with the highest maize production will be purposively chosen. A random sample of 20 farmers will be interviewed from each of the 12 selected villages, across the 6 mandals and 3 districts, resulting in a total sample size of 240 farmers. A structured pre-tested interview schedule will be used to collect primary data from these sample farmers.

Hejase et al. [4] contend that informed objective decisions are based on facts and numbers, real, realistic, and timely information. Furthermore, according to Hejase and Hejase [5], "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data" (p. 272). Therefore, this study analyzed data collected with descriptive statistics such as percentages in the form of percent

position (Garrett's ranks) supported with tables for clarity.

Garrett's ranking technique: The Garrett ranking technique [6] was used to assess the constraints in maize production. Farmers were asked to rank the potential problems they faced, and their responses were collected. Garrett's method then converted these ranked orders into numerical scores. Compared to a basic frequency distribution, this technique has the key advantage of ranking the limitations according to the respondents' priorities. The algorithm for translating ranks into percentages is provided below [7,8].

$$\text{Per cent position} = 100 (R_{ij} - 0.5) / N_j$$

Where,

R_{ij} = Rank given for i^{th} factor (constraint) by j^{th} individual

N_j = Number of factors (constraints) ranked by j^{th} individual

The relative position of each rank, obtained from the formula provided by Garrett, was converted into scores. For each factor, the scores of all individuals were added, and then divided by the total number of respondents to calculate the mean scores. These mean scores were then ranked in descending order [9,10].

3. RESULTS AND DISCUSSION

The study used an opinion survey method to identify the key constraints in maize production. The Garrett ranking technique was then employed to rank the challenges faced by farmers in maize cultivation, with the results presented in Table 1.

The data reveal that uncertain rainfall (Garrett score of 83.13) and labor shortages (79.95) were the major constraints faced by farmers. Other significant challenges included the incidence of pests and diseases (75.07), high labor wages (72.32), lack of irrigation facilities (68.76), high fertilizer costs (64.2), and untimely availability of fertilizers [11,12].

Farmers in the study area also grappled with high seed costs, and limited access to machinery, farm yard manure, and plant protection chemicals. Low yields, inadequate technical knowledge, wildlife damage, lack of credit, and high interest rates were identified as minor constraints [13].

Input availability and labor shortages during peak operational times like harvesting and threshing were major problems for these small-scale, capital-constrained maize farmers. Drought was also a key factor limiting maize production in the study area.

Table 1. Farmers encounter numerous challenges in maize cultivation

Particulars	Garrett score	Rank
High cost of seed materials	46.72	XII
Non-availability of good quality seeds/ high yielding varieties	45.98	XIII
Severe incidence of pest and diseases	75.07	III
High cost of plant protection chemicals	51.07	X
Non-availability of plant protection chemicals	49.15	XI
High cost of fertilizers	64.23	VI
Non-availability of fertilizers	60.66	VII
High cost of farm yard manure	43.46	XIV
Non-availability of farm yard manure	55.25	IX
Uncertain rainfall/ low/ scanty rainfall/ drought condition	83.13	I
Higher labour wages	72.32	IV
Non-availability/ shortage of labour	79.95	II
Low/ poor irrigation facilities	68.76	V
Lack of suitable farm machinery	57.95	VIII
Higher hire charges for farm machinery	39.80	XV
Low yield	37.99	XVI
Lack of technical knowledge/ new technologies/ Extra services	33.23	XVII
Crop damage by monkeys/ wild animals	28.83	XVIII
Non-availability of credit on time	24.43	XIX
Higher rate of interest	17.80	XX

4. SUMMARY

The farmers in the study area faced several significant constraints in maize production. The primary constraints were uncertain rainfall and labor shortages, as indicated by their higher Garrett scores. Additionally, severe pest and disease infestations, high labor costs, inadequate irrigation facilities, and the high cost and untimely availability of fertilizers posed major obstacles to maize cultivation. Farmers also struggled with the high cost and scarcity of seeds, machinery, farmyard manure, and plant protection chemicals.

Furthermore, other issues such as low yields, lack of technical expertise, crop damage by wild animals, unavailability of credit facilities, and high interest rates contributed to the challenges faced by farmers, though to a lesser degree. Addressing this multitude of constraints is crucial for improving overall maize production and supporting the farmers in the region.

5. CONCLUSION

Maize farmers face a multitude of challenges that significantly impact cultivation. Uncertain rainfall and labor shortages emerge as primary concerns. Farmers also struggle with severe pest and disease outbreaks, high labor costs, inadequate irrigation, and expensive fertilizers - all of which pose substantial barriers to efficient maize production. Additionally, the high costs of seeds, machinery, and plant protection chemicals further hinder optimal crop growth.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. DES. Directorate of Economics and Statistics. Government of Telangana; 2021-22. Available:<https://des.telangana.gov.in/>
2. TS Agriculture. Government of Telangana State; 2022. Available:<https://agri.telangana.gov.in/>
3. DES. Directorate of Economics and Statistics. Government of Telangana; 2022-23. Available:<https://des.telangana.gov.in/>
4. Hejase HJ, Hejase AJ, Hejase HANJ. Quantitative Methods for Decision Makers: Management Approach. Beirut, Dar Sader Publishers; 2012.
5. Hejase AJ, Hejase HJ. Research methods: A practical approach for business students (2nd edition). Philadelphia, PA, USA: Masadir Incorporated; 2013.
6. Ao W, Jamir BK. Application of garret ranking technique in studying the problems of bamboo cultivation: A case study of Mokokchung district, Nagaland. Indian Journal of Hill Farming. 2020;33(2):311-315.
7. Devi DA, Uma Reddy R, Sadvi P. Constraint analysis in maize production in Karimnagar district of Telangana. Indian Journal of Social Research. 2019;60(6): 843-846.
8. Krishna M, Deshmukh KV, Chavan RV, Ritesh AC. Constraints in the production and marketing of Maize in Karimnagar district of Telangana, India. International Journal of Current Microbiology & Applied Sciences. 2018; 7(9):1786-1788.
9. Kumari M, Lokesh KM, Ravi GS. Problems and prospects of maize crop in eastern zone of Bihar. International Journal of Agricultural Science and Research. 2015; 5(2):137-146.
10. Rajalakshmi N, Unnamalai T, Gopinath R. Problems and prospects in Maize cultivation with reference to Perambalur district – A case study. International Journal of Management. 2020;11(11): 3044-3053.
11. Ramarao I. Efficiency, yield gap and constraint analysis in irrigated vis-à-vis rainfed sugarcane in North Coastal Zone of Andhra Pradesh. Agricultural Economics Research Review. 2012; 25(1):167-171.
12. Vadivelu A, Kiran BR. Problems and prospects of agricultural marketing in India: An overview. International Journal of Agricultural and Food Science. 2013;3(3): 108-118.

13. Yadav S, Godara AK, Nain MS, Singh R. Perceived constraints in production of Bt cotton by growers in Harayana. Journal of Community Mobilization and Sustainable Development. 2021;13(1):133-136.

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