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# A Garrett ranking analysis: Constraints in the cultivation of sugarcane production in Ghazipur district of Uttar Pradesh

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**Abstract**

The present study was conducted in the Ghazipur district of Uttar Pradesh to identify the constraints in the cultivation of sugarcane production, as perceived by the sugarcane growers Garrett ranking technique was employed. A random sample method was used to pick respondents for this investigation. Two blocks were chosen for the current study to generate the study's inferences. The survey covered ten communities and 100 farmers in the chosen villages. Data acquired for the study covering the years 2022-23. Primary data was collected from selected sugarcane growers through personal interview method with the help of a pretested schedule. The main production constraints noticed were Labour shortage during peak time followed by Increasing wage rate of Human Labour, Unavailability of HYV's, High cost input & Lack of understanding about setts and fertilizers, wild animal and rodent attack, Insufficient and delayed irrigation water supply from canals, and Difficult in getting loan, scoring 50.49 (rank VII).

**Keywords:** Garrett, constraints, sugarcane, production

## Introduction

Sugarcane is a highly significant cash crop on a global scale. There are almost 100 countries that engage in the production of sugar. Brazil, Cuba, Mexico, and Thailand are the primary sugarcane-growing nations, collectively responsible for producing 80% of the world's sugar derived from cane. Approximately 59.3% of the global sugar consumption is attributed to the country in question. It is projected that the worldwide sugar consumption will reach an unprecedented level of 176.3 million tonnes in the 2022-23 year (Directorate of Sugar & Vegetable Oils, Ministry of Consumer Affairs, Food & Public Distribution, 2023) [2]

Globally, the majority of sugar production around 87 percent, produced from sugarcane with the remaining sources from sugar beet, which is cultivated in over 100 countries worldwide (Fairtrade and Sugar, 2013) [3]. According to Food and Agriculture Organization (FAO, 2022) [4], sugarcane production in 2020 was 1869.70 million tons marking a 4.4 percent decrease from the previous year. Brazil, Historically has been the world's biggest producer of sugarcane. Between 2000 and 2020, its share increased from 26.5 percent to 40.6 percent, with a minor fall to 39.2 percent. China is the world's second-largest producer of sugarcane, with a production share of 20.1 percent in 2020 compared to 23.4 percent in 2000. Thailand (5.9%), China (5.7%), Pakistan (3.7%), and Mexico (4.0%) have all been major producers of sugarcane in recent years. It's interesting to note that Thailand rose over China to become the world's third-largest producer of sugarcane from 2010 to 2020.

Over 50 million farmers in India depend on their crops, and a significant portion of agricultural laborers—roughly 7.5% of the rural population—work in sugarcane production, harvesting, and related operations. Many more workers are indirectly employed in processing. The primary byproduct of the sugar business, molasses serves as the primary raw material for the manufacturing of alcohol and other alcohol-related industries in India (Verma and Solanki, 2020) [5]. The data from the 1970s (1970–73) can be used to determine the crop's importance in the nation. At that time, sugarcane covered 2480 thousand hectares, rising to 4550 thousand hectares in 2008–11—a 1.83-fold increase over the previous period. In 2022–2023, sugarcane will occupy 5464 thousand hectares, with a yield of 85000 kg per hectare and a production of 465049 thousand tons (Agricultural Statistics at a Glance, 2023) [1].

In India the crop is predominantly cultivated in Uttar Pradesh, Maharashtra, Karanataka, Tamil Nadu, Andhra Pradesh, Gujarat, Punjab, Haryana, Uttaranchal and Bihar. Uttar Pradesh and Maharashtra together alone accounted for nearly 65.68% of the total sugarcane area, which contribute of about 66.17% of total sugarcane production in India.

In Uttar Pradesh sugarcane was cultivated in an area of 2.17 thousand hectares which produce total yield of 176706 thousand tonnes having the yield of 83900 kg per hectare during the year 2022-23 (Agricultural Statistics at glance, 2023) [1].

With the ideal agroclimatic conditions for sugarcane growth, District Ghazipur accounts for a sizeable portion of the state's sugarcane production and area. A total of 425741 tonnes of sugarcane were produced on 7924 hectares of land, with a yield of 53.73 tonnes per hectare (District Statistical Bulletin, Ghazipur 2020-21). With this

background the study was conducted to identify the constraints faced by sugarcane grower in Ghazipur district.

## Materials and Methods

The present study pertains to Ghazipur district of Uttar Pradesh. Out of 16 blocks of Ghazipur district, Birno and Mardah blocks were selected on the basis of maximum area brought under cultivation of sugarcane. A list of the entire villages was obtained from the block headquarters of each selected block and five villages from each block was selected randomly,

Devkathia, Baghol, Bhikharpur, Dandi Khurd, and Taranpur village from Birno block and Bijwanpur, Singera, Mardah, Boeri and Palahipur village from Mardah block were randomly selected for the study.

From the list of all the sugarcane cultivators of each selected village was prepared and arranged in ascending order under three categories i.e. Marginal (below 1 ha.) Small (1-2 ha.) Medium (2-4 ha. and above). Following proportionate random sampling technique a sample of 100 farmers viz. marginal-59, small-31 and medium-10 were selected for the purpose of the study. The primary data were collected for the year 2022-2023.

For collecting relevant data, a pre-tested structured schedule was used. The data gathered from respondents includes general information, holding size, intercropping, inputs used, cultivation costs, and comments on various production restrictions experienced by sugarcane growers. The respondents were interviewed at their houses, as well as at a common location in the town. The goal of the study was also stated to the participants. The restrictions encountered during sugarcane production were estimated using Garrett's ranking technique.

### Analytical Tools Garrett's Ranking Technique

The ranks given by the respondents were then converted into percentage position with the help of formula given by Garrett. Garrett's formula for converting ranks into percent is:

$$\text{Percent position} = \frac{100\ (R_{ij} - 0.5)}{N}$$

Where, Rij is the rank given to ith item by the jth individual and N is the number of item ranked by the jth individual. The per cent position of each rank thus obtained was converted into scores using Garrett's table. Then for each reason the scores of individual respondents were added and divided by the total number of respondents. Thus the mean score for each constraints was ranked by arranging them in a descending order.

## Results and Discussion

Production constraints include factors that have implemented the production of sugarcane in the field The various production problem experienced by growers in the area shown in Table 1. The major constraints were Labour shortage during peak time with Garrett score 53.27 followed by Increasing wage rate of Human Labour (overall Garrett score 53.10), Unavailability of HYV's, scoring 52.58 (rank III), High cost input and Lack of understanding about setts and fertilizers, scoring 51.36 (rank IV), wild animal and rodent attack, scoring 50.89 (rank V), Insufficient and delayed irrigation water supply from canals, scoring 50.73 (rank VI), and Difficult in getting loan, scoring 50.49 (rank VII). In addition to the above problems, the minor problems faced by the sugarcane growers were the Unavailability of good pesticides (VIII), Insufficient knowledge of scientific crop production (IX), lack of expertise in seed care and weed management (rank X), Lack of good pesticides available (XI), Delayed labour Wages (XII), impact of weather (XIII) and Natural disasters (XIV) in the study area.

Almost all sample respondents found that the main problem was the labour shortage during peak period in the study area. This problem can be solved to restrict the employment guarantee programme in rural area (MGNREGA) at peak season of agricultural operations so that unemployed labour will move towards in agriculture or merging the MGNREGA labour towards in agriculture sector. The II rank has high wage rates of human labour was one of the fundamental factors without which it was impossible to produce at all. Agriculture labours, small and marginal farmers migrating to nearby cities to meet their basic requirements for other works such as carpentry and factory, trained youth have a negative attitude towards agriculture creating scarcity of labour in agriculture and increasing wage rates.

The III rank has the Unavailability of HYV's, the constraint of limited access to HYVs can be addressed by promoting research and development in the production of improved sugarcane varieties. Collaborations between agricultural research institutions and sugarcane farmers can facilitate the dissemination of high-yielding and disease-resistant varieties. Additionally, government support through subsidies and incentives for the adoption of HYVs can encourage farmers to transition to these improved varieties, enhancing productivity and profitability in sugarcane cultivation.

Moving on to the IV rank, which involves the High Cost of Inputs and Lack of Understanding about Setts and Fertilizers, these challenges can be mitigated through various strategies. Firstly, providing training and extension services to farmers on proper sett selection, planting techniques, and fertilizer application can enhance their knowledge and skills in sugarcane cultivation. Moreover, facilitating access to affordable credit and subsidies for agricultural inputs can help reduce the financial burden on farmers. Collaborative efforts between agricultural experts, government agencies, and farmers can play a crucial role in addressing these constraints and improving the overall efficiency and sustainability of sugarcane production.

Overall addressing these production constraints through a multi-faceted approach involving policy interventions, research collaborations, and capacity-building initiatives can lead to a more resilient and productive sugarcane farming sector. By empowering growers with the necessary resources and knowledge, the industry can overcome these challenges and thrive in the long run.

**Table 1:** Constraints faced by sugarcane grower on different size of farm

| S. No. | Particulars | Percent Position | Garrett Value | Garrett Score | Rank |
|---|---|---|---|---|---|
| 1. | Unavailability of HYV | 3.57 | 85 | 52.58 | III |
| 2. | Delayed Labour Wages | 10.71 | 75 | 48.68 | XII |
| 3. | Labour shortage during peak time | 17.86 | 69 | 53.27 | I |
| 4. | Lack of expertise in seed care and weed management | 25.00 | 64 | 49.62 | X |
| 5. | Insufficient and delayed irrigation water supply from canals | 32.14 | 60 | 50.73 | VI |
| 6. | Unavailability of good pesticides | 39.29 | 56 | 50.47 | VIII |
| 7. | Increasing wage rate of Human Labour | 46.43 | 52 | 53.10 | II |
| 8. | Difficult in getting loan | 53.57 | 49 | 50.49 | VII |
| 9. | Natural disasters | 60.71 | 45 | 46.58 | XIV |
| 10. | Wild animal and rodent attack | 67.86 | 41 | 50.89 | V |
| 11. | High cost input and Lack of understanding about setts and fertilizers | 75.00 | 37 | 51.36 | IV |
| 12 | Lack of good pesticides available | 82.14 | 32 | 49.37 | XI |
| 13 | Insufficient knowledge of scientific crop production | 89.29 | 26 | 50.33 | IX |
| 14 | Impact of weather | 96.43 | 15 | 48.53 | XIII |

## Conclusion

From the above discussion highlights the facts that the major common production faced by sugarcane grower i.e., Labour shortage during peak time, Increasing wage rate of Human Labour, Unavailability of HYV's, High cost input & Lack of understanding about setts and fertilizers and wild animal and rodent attack, etc in the study area.

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