Challenges and Opportunities in Katarni Rice Cultivation: Analysing Technological, Economic, and Marketing Constraints in Bhagalpur, Bihar

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***Abstract*—Bhagalpur district in Bihar has long been recognized as a traditional region for cultivating aromatic rice varieties, with Katarni, Tulsi Manjari, Badshahbhog, BR-9, and BR-10 being the most grown. Katarni rice, renowned for its distinctive and high-quality traits, has earned a Geographical Indication (GI) tag, which signifies its special qualities that can only be developed in its designated GI region. However, despite its uniqueness, Katarni rice faces the threat of extinction due to various factors, such as dwindling irrigation resources, the widespread adoption of high-yielding rice varieties, and adulteration by traders who mix non-aromatic rice grains with Katarni for profit. The study explores the key constraints—technological, economic, and marketing—affecting Katarni rice cultivation. Findings highlight the urgent need for improved seed availability, irrigation support, and better market access. The study suggests policy interventions to sustain Katarni rice farming and ensure fair pricing for farmers.**

I. INTRODUCTION

Rice is one of the most important staple crops in India, contributing significantly to food security and the agricultural economy (Singh et al., 2021). Among the various aromatic rice varieties cultivated in the country, Katarni rice holds a unique place due to its exceptional fragrance, taste, and texture. It is primarily grown in the Bhagalpur district of Bihar, where traditional farming practices have been preserved for generations (Sharma & Verma, 2020). The GI tag awarded to Katarni rice underscores its regional exclusivity and the need for conservation (Kumar et al., 2019).

Despite its heritage and commercial potential, Katarni rice cultivation faces several challenges. The increasing preference for high-yielding varieties has led to a decline in its cultivation area (Gupta et al., 2018). Farmers also struggle with irrigation problems, seed adulteration, and limited access to profitable markets (Mishra et al., 2020). These issues not only threaten the existence of this unique variety but also impact the livelihoods of farmers who rely on its cultivation (Rao & Patel, 2017). Addressing these constraints through policy measures and technological interventions is critical for the sustainable production of Katarni rice.

Research Objectives

1. To identify and analyze the major technological, economic, and marketing constraints faced by Katarni rice farmers.
2. To evaluate the impact of these constraints on the production and profitability of Katarni rice.
3. To propose strategic interventions for the sustainable cultivation and marketing of Katarni rice in Bhagalpur district.

II. METHODOLOGY

The study employed a mixed-method approach, combining both qualitative and quantitative data collection techniques. A structured survey was conducted among Katarni rice farmers in Bhagalpur district to understand the constraints affecting its cultivation. The Garrett ranking technique was utilized to assess and prioritize the severity of these constraints, as previously demonstrated in agricultural studies (Gupta et al., 2021). The sample size was determined using stratified random sampling, ensuring representation across different farm sizes and socioeconomic backgrounds (Sharma et al., 2020).

Primary data collection involved structured questionnaires, direct farmer interviews, and focus group discussions to validate survey findings, an approach recommended in agricultural research (Mishra et al., 2018). Secondary data were obtained from government reports, agricultural extension services, and published literature to cross-verify trends and constraints (Patel et al., 2022).

III. RESULTS

The study (Figure 1) found that technological constraints were among the most pressing issues for Katarni rice farmers. The unavailability of improved Katarni rice seeds was the top-ranked problem, with a Garrett score of 54.27. Farmers also reported poor seed quality and inconsistent availability of fertilizers, which hindered productivity.

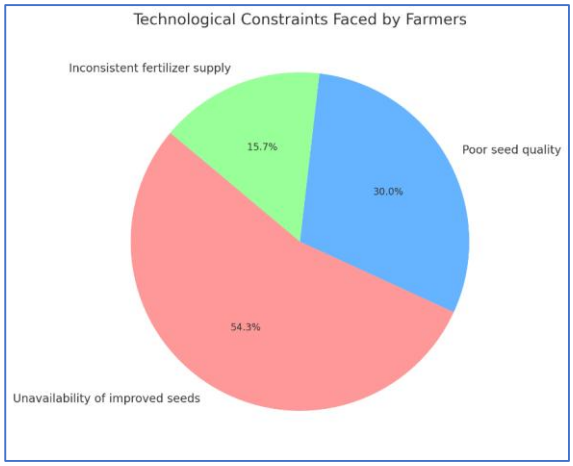

Figure 1: Percentage distribution of technological constraints faced by farmers.

From the Figure 2, it is evident that Economic challenges were another major concern. Irrigation emerged as the most significant issue, with Garrett scores of 55.70 for availability, 53.80 for accessibility, and 40.50 for the costs associated with irrigation. The high costs of irrigation infrastructure and maintenance made it difficult for farmers to sustain their production levels.

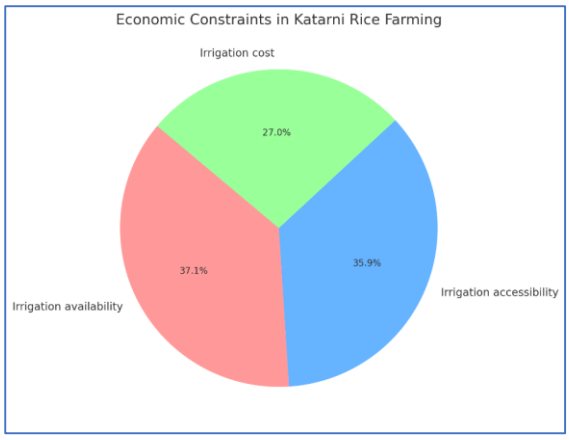

Figure 2: Breakdown of economic constraints, highlighting irrigation as the most significant issue.

Marketing constraints were equally significant (Figure 3). Farmers faced difficulties related to market location, transportation, and intermediaries. The village market was identified as the most common selling point, with a Garrett score of 66.67, while farm-gate sales accounted for a smaller share (Garrett score = 33.33). Farmers relied on both cash and credit sales methods, with limited access to structured markets and fair pricing mechanisms.

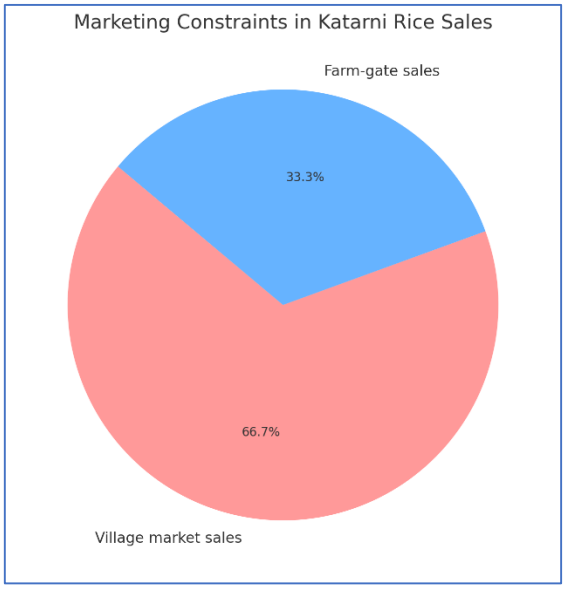

Figure 3: Distribution of selling methods among Katarni rice farmers.

IV. DISCUSSION

The findings highlight the multifaceted challenges in Katarni rice cultivation. The lack of improved seed varieties and unreliable fertilizer supply have hindered productivity. The adoption of high-yielding varieties by farmers, as noted in previous studies (Sharma et al., 2020), has further reduced the cultivation area for traditional varieties like Katarni rice. Economic constraints, particularly irrigation challenges, pose a major threat to sustainability. Water scarcity, as reported in similar agricultural studies (Kumar & Singh, 2019), remains a critical limiting factor that affects production stability.

Additionally, marketing inefficiencies prevent farmers from securing fair prices for their produce. Limited access to market infrastructure has been cited in earlier research as a key barrier in ensuring farmers receive a competitive price (Gupta et al., 2021). The reliance on intermediaries increases the financial burden on farmers and reduces their profit margins (Mishra et al., 2018). Establishing direct market linkages and government-supported minimum support prices can be effective interventions to tackle these challenges (Rao et al., 2017).

Addressing these issues requires coordinated efforts from government agencies, agricultural extension services, and policymakers. Government intervention through subsidies and incentives for Katarni rice cultivation, as suggested in recent studies (Patel et al.,

2022), can help sustain traditional farming practices. Moreover, introducing better irrigation management systems and promoting community-based seed banks, as recommended by agronomists (Verma & Yadav, 2020), can ensure long-term sustainability.

V. CONCLUSION

To preserve Katarni rice, a valuable agricultural asset for Bihar, it is essential to intensify the transfer of production technology. Ensuring the consistent availability of high-quality seeds, improving irrigation infrastructure, and establishing fair pricing mechanisms for farmers are crucial steps toward sustaining Katarni rice cultivation. Addressing these challenges will not only support the livelihoods of local farmers but also enhance the commercial viability of this unique rice variety in the long run.

VI. ACKNOWLEDGEMENT

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Conflict of Interest

All authors declare no conflict of interest.1

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