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A Study on Constraint Analysis of Rice Cultivation in Korba District of Chhattisgarh, India

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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

Rice is a vital staple food in Chhattisgarh, making it essential to address the challenges faced by rice farmers in the Korba District. This study focuses on issues related to rice cultivation and marketing in the region. The research was conducted in the Korba district, which comprises five blocks: Pali, Korba, Katghora, Kartala, and Podi-Uproda. Among these, the Katghora block was

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selected purposefully due to its significant paddy cultivation and associated challenges. Within this block, Vijaypur village was chosen as the study area. A total of 50 respondents, representing 22% of the farmers in the area, were selected for the study.Data were collected and analyzed using content analysis, incorporating qualitative methods such as in-depth interviews, group discussions, and observation techniques. The findings revealed that the primary challenges in rice cultivation included a lack of knowledge about the recommended package of practices (Rank I), high costs of fertilizers and plant protection chemicals (Rank II), and insufficient irrigation water (Rank III).On the marketing side, the major constraints identified were inadequate transportation facilities (Rank I), farmers being compelled to sell their produce locally due to low production volumes (Rank II), and issues arising from small quantities of produce (Rank III). Additional challenges discussed include crop diseases, insect pests, limited knowledge of improved, high-yielding, and disease-resistant varieties, and insufficient institutional support during both production and marketing.

Keywords: Rice; constraints; cereal crops; rank.

1. INTRODUCTION

Rice, often called the "king of cereals," is one of the most essential cereal crops globally, serving as the staple food for over 50% of the world's population. In 2021, rice was cultivated on approximately 165.25 million hectares worldwide. In India, rice is grown on 43.86 million hectares, with a production level of 104.80 million tonnes and an average productivity of 2,390 kg/ha (Agricultural Statistics at a Glance, 2015). India has the largest area under rice cultivation in Asia, accounting for 29.40% of the global rice area. Of the total harvested area, 46% is irrigated, 28% rainfed lowland, 12% rainfed upland, and 14% flood-prone. Globally, rice is one of the most traded commodities, with a trade volume reaching 16.40 million tonnes, and Southeast Asian countries contribute approximately 40% of this trade. India is a significant exporter of rice in the international market.

Rice cultivation occurs in all Indian states, with West Bengal, Uttar Pradesh, Punjab, Tamil Nadu, Andhra Pradesh, and Bihar being the leading producers (Parte J. *et al*., 2019). Chhattisgarh, often referred to as the "Rice Bowl of India," has about 3.64 million hectares under rice cultivation, producing 7.65 million tonnes with an average productivity of 1,517 kg/ha (Shukla S., 2016; Sarita *et al*., 2018). The state grows a variety of rice types, including Mahamaya, Rajeswari, HMT, Kalimooch, MTU-1010, Swarna, IR-36, and IR-64, adapted to its diverse agro-climatic zones.

The motivation for this study arises from a lack of focused research on the challenges of paddy cultivation in rural areas, particularly in the Korba District of Chhattisgarh. Rapid urbanization and industrialization in the region have significantly impacted agricultural activities (Prakash, 2017). Similar to trends observed in developed nations, agricultural land is increasingly being converted for industrial and urban use (Echoh *et al*., 2017). This transition has also led to labor migration from agriculture to industrial sectors, driven by the prospects of higher wages and an improved quality of life.

In Korba District, especially in Katghora, paddy farmers face numerous challenges, including those related to land use and labor availability. The study seeks to address the gaps in understanding the constraints faced by rural paddy farmers and provide insights into mitigating these challenges in the context of ongoing socio-economic transformations.

2. MATERIALS AND METHODS

This study was conducted in the Korba district of Chhattisgarh, which comprises five blocks: Pali, Korba, Katghora, Kartala, and Podi-Uproda. Among these, the Katghora block was purposefully selected due to its prevalence of paddy cultivation and associated challenges. Vijaypur village within this block was also chosen deliberately for the study. A total of 50 respondents, representing 22% of the total farming population, were included in the research.

The study employed qualitative research methods, including in-depth interviews with farmers, group discussions, and direct observation of farming practices. The selection of the village was based on its community's continued engagement in traditional paddy cultivation.

To identify the most critical factors influencing the respondents, Garrett’s ranking technique was utilized as the analytical tool (Garret and Woodworth, 1969).

Table 1. Ranking of various constraints faced by farmers in production of rice

SN	Constraints	Total Score	Percent	Total mean	Rank
1	Lack of latest technical Knows-how about the crop	2337	84	46.74	VII
2	Poor knowledge of improved and high yieldingand disease resistant Varieties	2800	73	56	V
3	Lack of knowledge about recommended package and Practices	3964	66	79.28	I
4	Problem of Disease, Insect pest of Crop	2504	61	50.08	VI
5	Problem of high cost of Fertilizer and plant protection chemicals	2080	56	41.6	VIII
6	Lack of knowledge about recommended dose of fertilizers and Plant protection chemicals	1816	52	36.32	IX
7	Problem about Lack of Micronutrient / NPK in the Soil	1700	48	34	X
8	Lack of Labours during Cultivation Process	2937	44	58.74	IV
9	Lack of Irrigation water	3180	39	63.6	III
10	Financial problem in Production such ashigh cost of inputs like Seed, Fertilizers, plant protection chemical etc	3496	34	69.92	II
11	Lack of proper Knowledge about Crop Insurance	1250	27	25	XI
12	Lacking of Institutional Support during Production and Marketing	900	17	18	XII

3. RESULTS AND DISCUSSION

3.1 Challenges Encountered by Farmers in Rice Cultivation

The challenges encountered by farmers during rice cultivation were identified and are presented in Table 1. Farmers were asked to rank the constraints based on their severity. The input-output ratio was noted to be 1:2.24, primarily due to high labor costs, expenses for hybrid seeds, and the use of chemicals (Ram, *et al*., 2023).

The rankings provided by farmers were converted into average percentage positions and subsequently into scores. These scores were then transformed into ranks using Garrett's ranking method, as shown in Table 2. The analysis in Table 1 reveals that the most critical constraint faced by farmers at the overall level was a lack of knowledge about the recommended package of practices (Rank I) with a Garrett score of 79.28. This was followed by the high cost of fertilizers and plant protection chemicals (Rank II) with a score of 69.92. These findings align with Kwaghe *et al*., (2000), who noted that the high cost of essential farm inputs hinders efficient farming. The results are further supported by studies conducted by Bhavani *et al*., 2021, Zalkuwi, (2012), and Sharma *et al*. (2020). Other significant challenges included problems with diseases and lack of irrigation water (Rank III, score 63.6) and labor shortages during cultivation (Rank IV, score 58.74).

Table 2. Prioritization of the challenges encountered by farmers in rice marketing

SN	Constraints	Total Score	Percent	Total mean	Rank
1	Reason for selling of produce to a particular agency	2728	73	54.56	2
2	Problem facing by Farmers because the Quantity of Produce is small	1860	56	37.2	3
3	Problem of Means of Transportation	3582	44	71.64	1
4	Lack of awareness about Market NEWS and intelligence	1571	27	31.42	4

Table 3. The conversion of merit rankings into numerical scores, as applied in Garrett's ranking method. (Source:)

Percent	Score	Percent	Score	Percent	Score	Percent	Score
0.09	99	11.03	74	52.02	49	90.88	24
0.2	98	12.04	73	54.03	48	91.67	23
0.32	97	13.14	72	55.03	47	92.45	22
0.45	96	14.25	71	58.03	46	93.19	21
0.61	95	15.44	70	59.99	45	93.86	20
0.76	94	16.65	69	61.94	44	94.03	19
0.97	93	19.01	68	63.85	43	95.08	18
1.2	92	19.2	67	65.75	42	95.62	17
1.42	91	20.33	66	67.43	41	96.11	16
1.63	90	22.32	65	69.39	40	96.57	15
1.9	89	23.63	64	71.14	39	96.99	14
2.03	88	26.43	63	72.85	38	97.37	13
2.63	87	27.16	62	74.52	37	97.72	12
3.01	86	28.66	61	76.12	36	98.04	11
3.43	85	30.61	60	77.68	35	98.32	10
3.89	84	32.42	59	79.17	34	98.68	9
4.38	83	34.25	58	80.61	33	98.82	8
4.92	82	35.15	57	81.99	32	99.03	7
5.51	81	38.06	56	83.31	31	99.22	6
6.14	80	40.01	55	84.56	30	99.39	5
6.81	79	41.97	54	85.75	29	99.55	4
7.55	78	42.97	53	86.89	28	99.68	3
8.33	77	42.97	52	87.95	27	99.8	2
9.17	76	45.97	51	88.97	26	99.91	1
10.6	75	50	50	89.94	25	100	0

3.2 Constraints Faced by Farmers in Rice Marketing

Table 2 highlights the major challenges faced by farmers in marketing paddy. The most significant issue was inadequate transportation facilities (Rank I) with a Garrett score of 71.64. This was followed by farmers being compelled to sell their produce to local markets due to low production volumes (Rank II, score 54.56), difficulties arising from the small quantity of produce (Rank III, score 37.2), and a lack of awareness regarding market news and intelligence (Rank IV, score 31.42).

4. CONCLUSION

The findings suggest that off-season paddy cultivation serves as a viable alternative livelihood for migratory communities, offering a source of income and sustenance. However, the practice requires significant technical expertise. Farmers face diverse challenges based on their ability to identify and address issues effectively. To mitigate economic losses arising from these challenges, stakeholders must implement targeted measures to address the identified constraints. Emphasizing the need for enhanced extension services, capacity-building initiatives, awareness campaigns, and the integration of ICT tools and mass media can play a pivotal role in overcoming these barriers.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The Author(s) hereby declares that NO generative AI technologies, such as Large Language Models (e.g., ChatGPT, Copilot) or text-to-image generators, have been used in the writing, editing, or preparation of this manuscript. All content presented is original and solely the result of the authors' own intellectual work.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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