

Original Research Article

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Constraint Analysis in Production and Marketing of *Katarni* Rice in Bihar, India

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ABSTRACT

Bhagalpur district of Bihar has been a traditional aromatic rice growing area, where the varieties, like *Katarni*, *Tulsi Manjari*, *Badshahbhog*, *Br-9* and *Br-10* are most common. This variety has been given Geographical Indication (GI) due to its unique and special quality trait which develops only in its GI territory area. Despite its uniqueness *katarni* rice is facing the threat of extinction, mainly due to declining irrigation facility, adoption of other high yielding rice varieties and adulteration by traders of non- aromatic rice grains with *katarni* with the profit motto. In the light of above context the present investigation was undertaken to study the constraints in production and marketing of this precious rice variety. The Garrett's Ranking Technique was used for constraints analysis. Agro-biological constraints included low rainfall (Garrett Score = 65.48), for poor soil condition and high infestation of pest was expressed. Whereas technological constraints included non availability of improved seeds of *katarni* rice (Garrett score = 54.27) followed by poor quality of seed. Non availability fertilizer in the market in time was another aspect of technological constraint. It was found that irrigation was major economic constraints faced by sample farmers in production of *katarni* rice followed by its availability and charges on the basis of Garrett score of 55.70, 53.80 and 40.50 respectively. The marketing constraints included place of marketing, mode of transport, market agency and mode of sale of *katarni* paddy/rice. Among place of marketing village market was the most important constrain on all category of farms. The majority of sample farmer sold their produce in village market (Ranked 1st with Garrett score 66.67) followed by at farm (Ranked 2nd with G. score 33.33). The cash as well as credit both mode of sale was followed by the farmers in marketing of *katarni* rice in study area. The study suggests there is need for intensification of transfer of production technology particularly assured availability of quality seed and remunerative price to the produces. This will not only help in protection of *katarni* rice, pride of Bihar and enhancing the income of the farmers. The *katarni* rice growers may be encouraged to form a Producer Company to harvest the benefits of various Government programmes.

Keywords

Aromatic, *Katarni*,
Malbhog, Agro-
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Introduction

Rice is one of the major food crops of Bihar, which plays a critical role in the food security. It is cultivated in an area of 3.3 m. ha with production of 8.09 m.t. (2017-18). The average yield of rice in Bihar is 2447 kg/ha which is lower than the national average of 2550 kg/ha. Though a number of local aromatic rice varieties are also grown all over

the state, they are mainly concentrated in Bhagalpur and Magadh divisions. Bhagalpur has been a traditional aromatic rice growing area, where the varieties, like *Katarni*, *Tulsi Manjari*, *Badshahbhog*, *Br-9* and *Br-10* are most common. In Magadh region of state varieties like *Karibank*, *Marueya*, *Mehijawain*, *Shyamjira*, *Tulsiphoool*, *Sonachur* and *Shah Pasand* are cultivated. Their yield vary from 2.0 to 2.5 t/ha. In general the aromatic local

rice varieties which have yield potential from 20-25 q/ha, are tall and have characteristic short grain. Many of them are highly susceptible to various insect-pests and diseases like stem borer, bacterial blight and blast. Since they have excellent cooking quality and aroma, they are mostly grown by farmers on small scale. All land race of aromatic type grown in Bihar have fine but short grains and consequently fetch low price and export values. It has led to constant declines in their area.

“*Katarni* Rice” is the ceremonial fine rice of Bihar. It is famous for its aromatic flavour, taste, palatability and chura (beaten rice) making qualities. It is being produced in districts of Bhagalpur, Banka and Munger. The unique aroma in the *Katarni* grain comes only when it is grown in few blocks namely Jagdishpur, Sultanganj in Bhagalpur, Amarpur, Rajaun, Barahat in Bnka and Tarapur and Asharganj in Munger. Recently *Katarni* Rice has been given Geographical Indication (GI) tag by the Geographical Indications Registry Office, Chennai due to its unique and special quality traits which develops only in its GI territory area. Despite its uniqueness *katarni* rice is facing the threat of extinction. Since 1991–92, there has been significant decrease in the area of *katarni* rice cultivation, mainly due to declining irrigation facility, adoption of other high yielding rice varieties and adulteration by traders of non-aromatic rice grains with *katarni* with the profit motto.

In view of the lower yield and other techno-economic constraints there is an urgent need to protect this precious rice variety from extinction and safeguard various stakeholders associated with this crop. In the light of above context the present investigation was undertaken to study the constraints in production and marketing of this precious rice variety. This study has been planned with

main aimed to identifying the major constraints faced by the farmers.

Materials and Methods

Sampling Procedure

The Multi Stage Sampling Technique was used in selection of sample farmers. The Bhagalpur district, being the major *katarni* rice growing district in the state was selected purposively. At 2nd stage, Jagdishpur block was selected on the basis of highest area under *katarni* rice in the district. Further at 3rd stage six *katarni* rice growing villages, 3 from each of two clusters of villages of Jagdishpur block were selected randomly. Finally a sample of 90 *katarni* rice growers (15 from each village) was selected. The sample consisted of farmers; i.e. 15 Marginal (< 1ha), 40 Small (1-2 ha.), 35 Medium (> 2 ha) were selected randomly by simple random sampling without replacement (SRSWOR) technique. The primary data were collected from sample *katarni* rice growers for the agriculture year 2017- 2018 through personal interview. The operational land holding size ranged between 0.75, 1.31, and 2.78 ha among three categories of sample farms with overall mean as 1.79 ha.

Analytical Technique

Initially production and marketing constraints were listed separately. Further the Garrett's Ranking Technique was used for constraints analysis. In this method, respondents were asked to rank the specific problems faced by them according to their own perception. The assigned rank was converted into percentage position which is subsequently transferred into Garrett score using Garrett's table given by Garret and Wood worth (1969). For each constraint, scores of individual respondents were added together and then divided by total number of respondent from whom scores were gathered. Thus, mean score for each constraint

was Ranked by arranging them in descending order.

$$\text{Percentage position} = \frac{100(R_{ij} - 0.50)}{N_j}$$

Where, R_{ij} = Rank given for the i th item by the j th individual and
 N_j = Number of items Ranked by the j th individual

Results and Discussion

Constraints in production of *Katarni* rice

Agro-Biological constraints

Agro-biological constraints faced by different categories of sample *katarni* rice growers are presented in table 1. It was found that majority of the farmers considered low rainfall; i.e. Ranked 1st (65.48 score) most important constraints followed by Ranked 2nd (51.82 score) for poor soil condition, high infestation of pest was expressed Ranked 3rd with Garrett score (46.62) and Natural calamities was considered Ranked 4th (35.81 score) respectively.

Technological Constraints

The constraints on uses of technology faced by sample *Katarni* rice growers are presented in table 2. Non availability of improved seeds of *katarni* rice was considered as major technological constraints (Ranked 1st with Garrett score of 54.27) followed by poor quality of seed (Ranked 2nd with 52.91 score), high price (Ranked 3rd with 44.39 score) by the sample farmers. Non availability fertilizer in the market in time was another aspect of technological constraint and it was found that availability of urea Ranked 1st (55.63 score) followed by DAP (Ranked 2nd with 52.71 score), mix fertilizer (Ranked 3rd (52.43 score)

and MoP (Ranked 4th with 40.22 score). Among plant protection constraints incidences of diseases & pest, availability of chemicals and their prices were studied. The results showed that sample farmers considered incidences of pests & diseases as most important constraint (Ranked 1st with 62.52 score) followed by high price of chemicals (Ranked 2nd with 53.17 score), non-availability of chemical Ranked 3rd (47.17 score) while other constraints faced by the farmers was least important (Ranked 4th with 41.89 score). The same trend was observed under different categories of farmers also.

Economic Constrains

Under the post Green Revolution era the crop production became irrigation and labour responsive. Therefore these two were studied and the results are presented in table 3 and 4 respectively.

It was found that source of irrigation was major economic constraints faced by sample farmers in production of *katarni* rice followed by availability of water and charges on the basis of Garrett score of 55.70, 53.80 and 40.50 respectively (table3).

The results pertaining to labour constraints faced sample farmers in production of *katarni* rice has been presented in table 4. The table reveals that high cost of labour charges at the time of transplanting and harvesting was considered as most important constraints followed by not availability of labour by the sample farmers.

In terms of category –wise scenario, the marginal farmers considered availability of labour as more important constraint as compared to its availability, which is obvious because they perform most of the farming activities by themselves except transplanting and harvesting.

Table.1 Agro-Biological constraints faced by sample farmers in production of *Katarni* rice

Agro-Biological constraints	Category of sample farmer						Overall (n=90)	
	Marginal (n1=15)		Small (n2=40)		Medium (n3=35)		Garrett score	Rank
	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank		
Rainfall	69.00	I	66.95	I	62.29	I	65.48	I
Soil	51.53	II	53.33	II	50.23	II	51.82	II
Infestation of pest & disease	42.47	III	45.35	III	49.86	III	46.62	III
Natural Calamities	31.93	IV	33.83	IV	39.74	IV	35.81	IV

Table.2 Technological Constraints faced by sample farmers in production of *Katarni* rice

S.N.	Technological constraints	Category of farmer							
		Marginal(n1=15)		Small(n2=40)		Medium (n3=35)		Overall(n=90)	
		Garrett score	Rank	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank
A.	Seed								
i.	Quantity	51.27	II	54.10	II	55.74	I	54.27	I
ii.	Quality	54.07	I	54.50	I	51.06	II	52.91	II
iii.	Price	45.87	IV	44.53	IV	43.60	III	44.39	IV
iv.	Other	49.80	III	47.88	III	50.60	IV	49.43	III
B.	Fertilizer: Non- availability								
i.	Urea	55.73	II	53.80	II	57.69	I	55.63	I
ii.	Di Ammonium Phosphate	62.27	I	52.68	III	48.66	III	52.71	II
iii.	Murate of Potash	41.53	IV	40.43	IV	39.43	IV	40.22	IV
iv.	Mix-fertilizer	42.33	III	54.10	I	54.86	II	52.43	III
C.	Plant Protection								
i.	Diseases & Pest	61.00	I	65.63	I	59.57	I	62.50	I
ii.	Availability of chemical	43.00	IV	45.75	III	50.57	III	47.17	III
iii.	Price	54.33	II	51.75	II	54.29	II	53.17	II
iv.	Any others	46.67	III	39.38	IV	42.71	IV	41.89	IV

Table.3 Constraints faced in irrigation by sample farmers in production of *Katarni* rice

Variable	Category of farmer						overall (n=90)	
	Marginal (n1=15)		Small (n2=40)		Medium (n3=35)		Garrett score	Rank
	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank		
Source (Govt./Pvt/Co-Op)	57.70	I	57.13	I	53.26	I	55.70	I
Availability	57.60	II	53.80	II	52.17	II	53.80	II
Charges	34.80	III	39.08	III	44.57	III	40.50	III

Table.4 Constraints faced on labour by sample farmers in production of *Katarni* rice

Variable	Category of farmer						overall (n=90)	
	Marginal (n ₁ =15)		Small (n ₂ =40)		Medium (n ₃ =35)		Garrett score	Rank
	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank		
Availability of labour	50.87	I	44.80	II	41.46	II	44.51	II
High labour wages	49.13	II	55.20	I	58.54	I	55.49	I

Table.5 Constraints faced by sample farmers in marketing of *Katarni* rice

Variable	Category of farmer						Overall (n=90)	
	Marginal (n ₁ =15)		Small (n ₂ =40)		Medium (n ₃ =35)		Garrett score	Rank
	Garrett score	Rank	Garrett score	Rank	Garrett score	Rank		
A. Place of marketing								
Farm	33.33	II	22.50	II	42.86	II	32.22	II
Village Market	66.67	I	75.00	I	51.43	I	64.44	I
District Market	0.00	III	0.00	IV	0.00	IV	0.00	IV
Other, specify	0.00	IV	2.50	III	5.71	III	3.33	III
B. Mode of transport								
Pickup	21.00	III	22.50	II	20.00	III	24.44	III
Tractor(trolley)	40.00	I	32.50	I	45.71	I	35.56	I
truck	23.00	II	17.50	IV	8.57	IV	14.44	IV
others	17.00	IV	27.50	III	25.71	II	25.56	II
C. Market agency								
Village Traders	40.00	I	47.50	I	37.14	I	42.22	I
Commission agents	26.67	II	7.50	IV	17.14	III	14.44	IV
Wholesalers	13.33	IV	35.00	II	11.43	V	22.22	II
Retailers	20.00	III	10.00	III	34.29	II	21.11	III
D. Mode of sale								
Cash	40.00	II	17.50	III	15.29	IV	20.00	II
Credit	7.67	IV	18.50	II	21.86	III	17.78	III
Cash & credit both	41.00	I	50.00	I	34.29	I	42.22	I
Forward trade	12.33	III	11.50	IV	22.86	II	16.67	IV

Constraints in marketing of *Katarni* rice grower

The major constraints faced by sample farmers in the marketing of *Katarni* rice were identified, and Garrett score based Ranked has been presented in the Table 5. The constrains included place of marketing, mode of transport, market agency and mode of sale of *katarni* paddy/rice. Among place of marketing village market was the most important constrain on all category of farms. The majority of sample farmers sold their produce in village market (Ranked 1st with Garrett score 66.67) followed by at farm (Ranked 2nd with G. score 33.33). The mode of transportation constraints were in the ascending order as tractor (Ranked 1st, 35.55) followed by truck (25.56) and pickup (21.00). The most important constraints related to marketing agency was Village Traders contractors (42.22) followed by Wholesaler (22.22) on overall basis. The cash as well as credit both mode of sale was followed by the farmers in marketing of *katarni* rice in study area.

It can be concluded from the foregoing investigation that major constraints faced by the farmers in production of *katarni* paddy/rice were low & erratic rainfall, not available quality of seed, availability & high price of fertilizers, high infestation of pest and disease. Availability of irrigation and labor availability at the time of transplanting and harvesting, the majority of the farmers were selling their produce in village market through Village Traders, to high transportation cost and long distance of market.

Suggestion

The findings suggests that there is need for intensification of transfer of production technology particularly assured availability of

quality seed and remunerative price to the produces. This will not only help in protection of *katarni* rice, pride of Bihar and enhancing the income of the farmers. The *katarni* rice growers may be encouraged to form a Producer Company to harvest the benefits of various Government programmes.

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Abbreviations

M.T. - Million Tonnes
GI - Geographical Indication
G. Score - Garrett score
M. ha - Million Hectare
Kg/ha - Kilogram per hectare
T/ha - Tonnes per hectare
Q/ha - Quintal per hectare
Ha - Hectare
SRSWOR - Simple Random Sampling without Replacement Technique
DAP - Di-Ammonium Phosphate
MOP - Murate of Potash

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