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Factors Influencing the Buying Behavior of Hybrid Paddy Seed Growers

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Authors' contributions

This work was carried out in collaboration among all authors. Author RP designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SV and MK managed the analyses of the study. Author KA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

This study was on factors influencing buying behavior of the hybrid paddy seed growers among selected districts of Bihar with following objectives source and level of awareness, buying behavior of farmers and promotion of sales at retail level. The 155 farmers were selected from 27 blocks of six sample districts of Bihar state which includes Banka, Bhagalpur, Katihar, Munger, Purnea and Samastipur. Structured interview schedule was used for collection of data. The Ex-post facto research design was used in this study. By using frequencies, percentages, garrets ranking and factor analysis, the results was carried. Majority of the farmers were aware of hybrid paddy seeds due to promotion of dealers/retailers. Promotional events and trainings were conducted by the company personnel to spread awareness among farmers about hybrid seeds. Plant height, grain size, water logging tolerance are the important factors to influence the farmers for purchase of hybrid paddy seeds. Due to loyalty of dealers they purchase from same outlet and the farmers expect provision of credit facility from the companies. '6444' brand was chosen by the farmers due to better grain quality among all the brands from same outlet.

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1. INTRODUCTION

Before the green revolution period, farm-saved seed (saved, exchanged or purchased from fellow farmers) was the main source of seed for farmers. India remain its own public and private seed companies to produce the obligatory quantities of hybrid seed and an enormous share of the hybrid seed market is dominated by a handful of firms. Hybridization embodied the market power in the hands of a limited companies that are able to breed and souk superior hybrid seeds. This disquiet fosters the notion of "seed security," national dependence on market forces to supply seed towards increase in smallholders' and other predatory practices by multinational seed companies [1,2,3].

Seed is the pivotal input for sustained agricultural production. Producing quality seeds and making them accessible at right time i.e., seed security has a positive correlation to food security needs of the country. However, over a period of time, there has been a gradual shift from using farm hoarded seeds to procurement of High Yielding Varieties (HYVs) and hybrid seeds from different sources, outside of their farm and community [3,4,5]. The farmers facing several challenges in procuring and using quality seeds from different sources [3]. Private sector is playing its part in engendering vigorous rivalry, which will ultimately benefit the farmers [4]. Once the private sector is convinced that there is a demand for hybrid seed, the willingness to invest in commercial seed production as it is moderately profitable [6]. The private dealers, extension officials and advertisements in mass media were the major source of information for farmers, which guided them in selection of brands [7]. The large percentage of farming households purchase rice seed from private sources [2]. At present, there remains a dearth of private dealers providing farmers with access to hybrid seeds [8]. There are different factors which play a major role in influencing the hybrid seed growers. The factors affecting the purchase of hybrid paddy seeds are subjective norm, attitude and perceived behavior control. According to respondents the perceived behavior control is the first important factor to affect purchasing behavior [9]. The buying motive of rural consumers towards purchase of seeds. They identified the brand loyalty of farmers as dealer's advice, quality product and fellow farmer's advice [10].

A number of research studies have been steered on the different aspects of seed marketing in India. More than 75 % of the total hybrid market (by value) was netted by just five firms in 2008–09 viz., Bayer Cropscience (43 %), Pioneer Hi-Bred International (13 %), Nath Seeds (11 %), Advanta (5 %), and Ganga Kaveri (5 %). However, in eastern states such as Jharkhand, West Bengal, and Bihar, the high cost of seed and lack of awareness are major constraints [2]. Majority of the studies were persuaded towards production and distribution issues. A small attempt has been made here to study the buying behavior of hybrid paddy seed growers and sales promotion of retailers in Bihar with the following objectives:

1. To study source and level of awareness about hybrid paddy seed
2. To study buying behavior of farmers towards hybrid paddy seed
3. To study the factors influencing promotion of brands at the retail level

2. MATERIALS AND METHODS

One hundred fifty-five farmers were selected from 27 blocks from six sample districts of Bihar state viz., Banka, Bhagalpur, Katihar, Munger, Purnea and Samastipur by using non probability sampling. The present study was undertaken due to the research gap identified i.e., no study was available on buying behavior of paddy hybrid seed growers in selected districts of Bihar state with the proposed hypothesis on 'there is a scope for identifying market potential on hybrid seeds'. In view of this, the present study was undertaken by collecting data from both primary and secondary sources. The Ex-post facto research design was used in this study. Using a structured interview schedule, data was collected on source of awareness, level of awareness, reasons and factors influencing the buying behavior of farmers and sales promotion of retailers. Source and level of awareness was calculated by using frequencies and percentages [11]. Factors (Viz., Plant Height, Grain size, Water logging tolerant, Early Variety, Drought tolerant, Disease tolerant) influencing the buying behavior of farmers was scrutinized by using factor analysis. Factor analysis is a method for determining the number and nature of the variables among large number of measures. More succinctly, it is a method for determining 'k' being less than 'n'. It may also be

called a method for extracting common factor variiances from sets of measures. It helps the scientists to locate and identify unities or fundamental properties underlying tests and measures. The factor analysis was done using rotated component matrix method with Kiser Normalization [12,13,14]. Buying behavior of farmers towards various hybrid paddy seeds was calculated by using Garrets ranking technique [15,16]. In this method, the farmers were asked to rank the given factors according to the magnitude of its severity. The orders of merit given by the respondents were converted into ranks by using the following formula.

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

Where,

R_{ij} : rank given for the i th factor ($i = 1, 2, \dots, 7$) by the j th individual ($j = 1, 2, \dots, 36$)

N_j : number of factors ranked by j th individual

The per cent position of each rank thus obtained was converted into scores by referring to the

Table given by Henry Garrett. Then for each factor the scores of individual responses were added together and divided by the total number of respondents for whom the scores were added. Then mean scores for all the factors were arranged in the order of their ranks and inferences were drawn [17]. The Fig. 1. gives the area in which the study was conducted.

3. RESULTS AND DISCUSSION

This study analysed the source and level of awareness, buying behavior of farmers and promotion of brands at retail level.

3.1 Level of Awareness

Awareness offers a great deal of potential value. It is an important stage on technology adoption. Based on the percentage out of six districts, four districts viz., Baghalpur, Munger, Purnea, Samastipur of the farmers were fully aware (100%) of hybrid paddy seeds (Fig. 2).

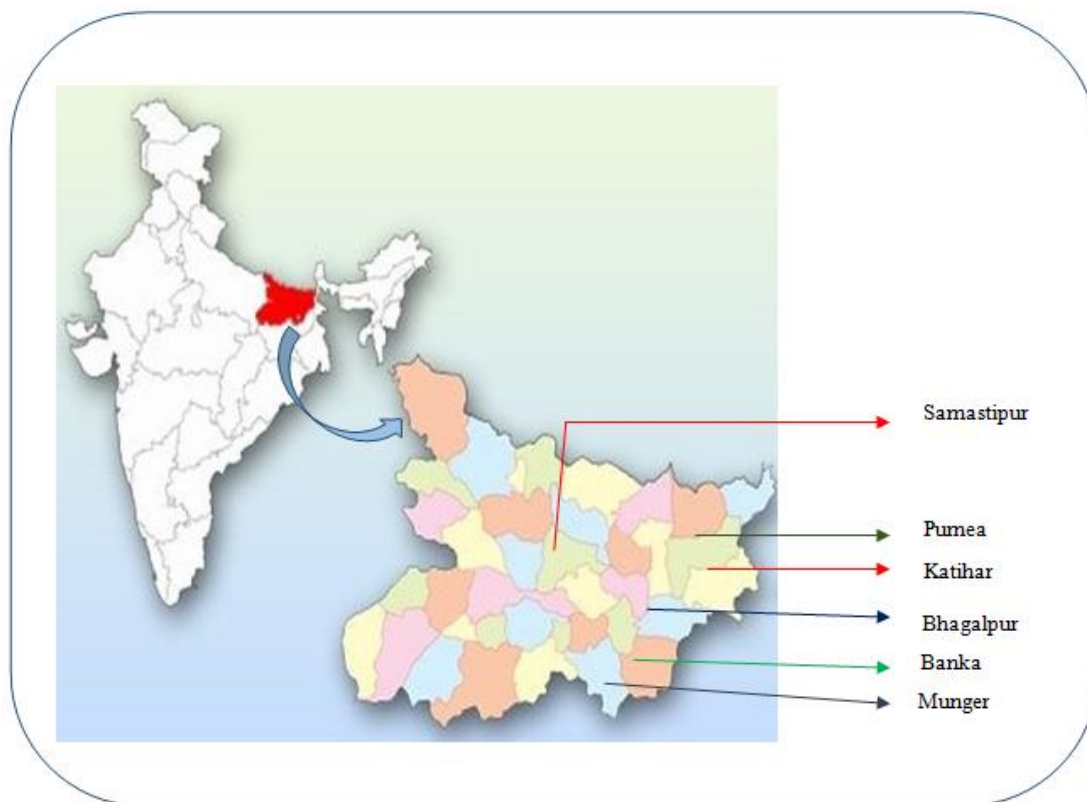


Fig. 1. Area of study in Bihar, India

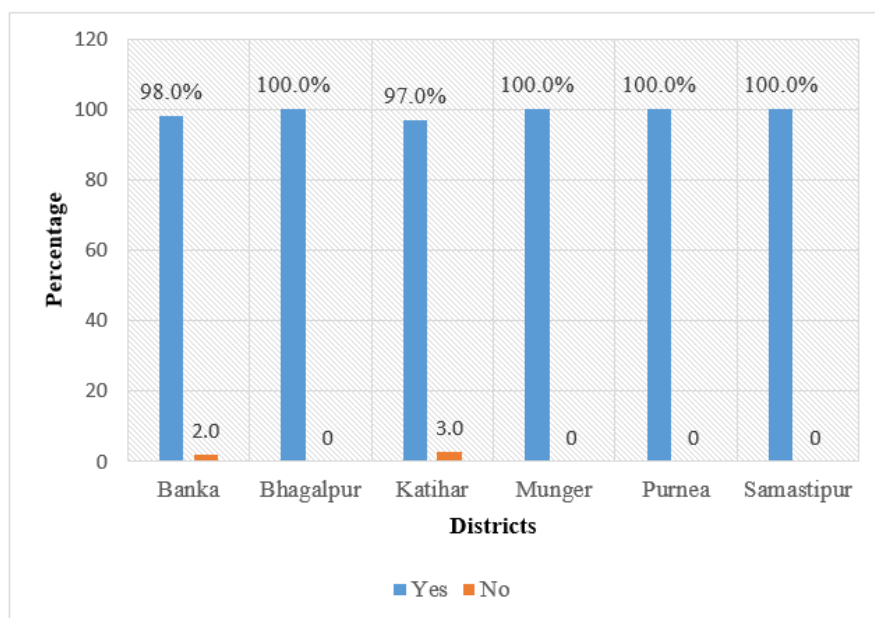


Fig. 2. Level of awareness among farmers about hybrid paddy seeds

3.2 Source of Awareness

According to Fig. 3 that the majority of the farmers aware of hybrid paddy seeds due to dealers/retailers (37%) followed by fellow farmers, company personnel and others like NGO's. The majority of the farmers prefer dealers as a main source for purchase of hybrid paddy seeds followed by commission agents [18,19]. Other sources of information accounted for 1-2% from fellow farmers, relatives and friends, village shopkeeper, state agriculture department, etc.

3.3 Factors Influencing the Buying Behavior of Farmers

The factor analysis was used to know which factors were more influential to buy paddy hybrid seeds. It was used to reduce the number of variables to few factors that determines the share of each factor in the respondent's point of view about the buying behavior of farmers to purchase hybrid seeds. The results presented in Table 1 showed that the internal consistency of data was suitable (KMO=0.560) and Bartlett statistic [19] was significant at a 1% level. Regarding the Kaiser criterion [14,19,20] three factors with a more than 0.8 Eigenvalue was extracted. Variables were divided into three factors after the factor rotation by varimax method.

The six statements were rotated by using Varimax with Kaiser Normalization under three components. The rotation value above 0.400 has been considered under each component. Hence first component has the value of 0.869, 0.863 and 0.657. The second component has the value of 0.995 and the third component bears the value of 0.479, 0.511 and 0.954 as per the [Table 1(b)]. The highest Eigenvalue of the first factor was 2.46. The other factors namely second factor and third factor determined 27.160 and 83.925 percent of variance respectively.

According to scree plot technique [12,14] the results revealed that based on Eigenvalue of three factors such as plant height, grain size and water logging tolerance were more influential for the farmers to purchase hybrid paddy seeds (Fig. 4).

From the above Table 1(a), 1(b) and Fig. 4., it can be deduced that major factors that influence the farmers to purchase of hybrid paddy seeds were plant height, grain size, water logging tolerance. The factors which affect the purchase of hybrid paddy seeds helped in determining the success of marketing hybrid seeds to consumers/farmers [9].

3.4 Reasons to Buy Hybrid Paddy Seeds by Farmers

Based on Garrett's ranking, the first reason to buy hybrid seed by the majority farmers was due

to better grain quality followed by higher yield, number of maturity days, low seed price, storage capacity of grains and germination percentage (Table 2). Similar results also observed that

availability of quality seeds to the farmers was one of the important reason to gain higher yield [18].

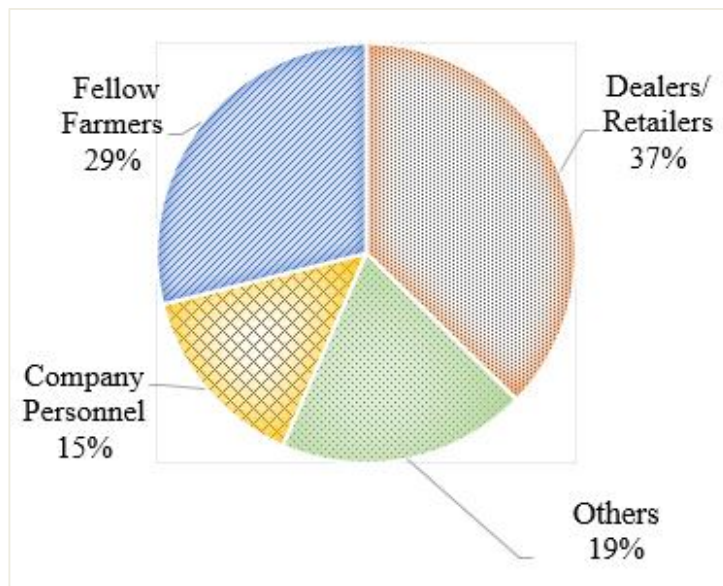


Fig. 3. Source of awareness among farmers about hybrid paddy seeds

Table 1(a). Rotated component matrix based on the factors influencing the buying behavior of farmers

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.461	41.009	41.009	2.015	33.590	33.590
2	1.630	27.160	68.169	1.564	27.160	59.651
3	.945	15.756	83.925	1.456	24.275	83.925
4	.491	8.175	92.101			
5	.405	6.752	98.852			
6	.069	1.148	100.000			

Extraction method: Principal component analysis

Table 1(b). Rotation through varimax with Kaiser normalization

Factors	Rotated Component Matrix		
	1	2	3
Plant Height	.869	.111	.113
Grain size	-.164	.955	-.063
Water logging tolerant	.863	.085	.199
Early Variety	.657	-.298	.479
Drought tolerant	-.191	-.736	.511
Disease tolerant	-.140	.041	.954

Rotation Method : Varimax with Kaiser Normalization
Rotations converged in 5 iterations

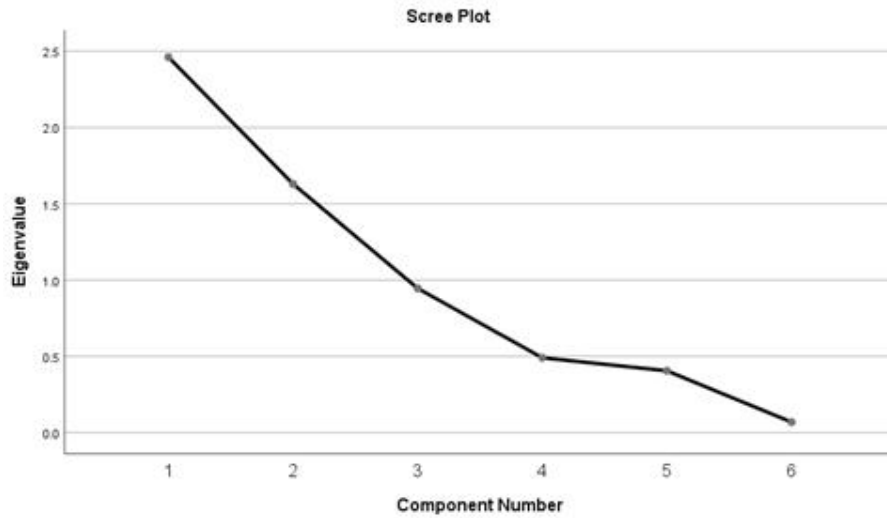


Fig. 4. Scree plot on factors influencing the buying behavior of farmers

Table 2. Garrett’s ranking - Reasons to grow hybrid paddy by farmers (N=155)

Sl. no.	Reasons	Mean score	Garrett’s rank
1	Better grain quality	55	I
2	Higher yield	23	II
3	Number of maturity days	23	II
4	Germination percentage	5	III
5	Low seed price	23	II
6	Storage capacity of grains	23	II

3.5 Buying Behavior of Farmers based on Brands

The data of Table 3 divulges that ‘6444’ (brand) was chosen by the farmers due to provision of better quality and helped in decision for purchase of hybrid paddy seeds. But in case of selection of NP-950 Sourabh, Shweta, 6292 brands, they mainly focuses on taking a certain decision to purchase hybrid paddy seeds was due to the influence of company personnel. Most of the brands were preferred by the farmers based on better quality seeds. Most of the farmers desire to purchase 6444 brand among all the brands due to the influence of company personnel based on the following factors i.e., better quality, decision making, comparison at field level, provision of credit service, basic guidelines and free samples of hybrid paddy seeds.

3.6 Village Level Meetings

Regular meetings, promotional events and trainings were conducted by the company personnel to spread awareness among farmers

about hybrid seeds in all these six districts viz., Munger, Bhagalpur, Samastipur, Purnea, Katihar and Banka. Further these promotional activities give an opportunity to maximize their sales. Participation of farmers have been observed in Katihar district was considerable. It was felt that more focus should be concerted on Munger district as it has enough potential for further exploitation.

3.7 Reasons for Purchase from Same Outlet

The farmers tend to patternize the same retail outlet topmost purchase hybrid paddy seeds because retailers tend to give them the maximum benefits like discounts, freebies. Conversely the retailers also maintain friendly relations with the farmers consistently (27.7%) in order to push their products. Availability of credit and discounts are incentives that keep the farmers loyal to particular sales outlet. Due to timely availability of required brand seeds, good relationship with the store owner, credit availability are major reasons to purchase hybrid seeds from the same outlet by the farmers [15].

Table 3. Garrett's ranking - Buying behavior of farmers based on Brands

Sl. no	Company personnel influencing the buying behavior of farmers	Brands															
		6444		NP-950 Sourabh		Shweta		6292		1001		Ankur		Sudha		27P31	
		Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank	Mean Score	Rank
1	Help in decision making for purchase of hybrid seed	37	I	46	I	55	I	55	I	46	III	37	II	37	III	46	II
2	Help in comparison at field level	23	II	46	I	46	II	46	II	55	II	46	I	46	II	37	III
3	Inherent higher quality	37	I	23	III	23	IV	23	IV	64	I	37	II	64	I	77	I
4	Credit Facility	23	II	23	III	23	IV	23	IV	23	V	23	III	23	IV	23	IV
5	Basic guidelines	23	II	37	II	37	III	37	III	37	IV	37	II	37	III	37	III
6	Free samples	23	II	23	III	23	IV	23	IV	23	V	23	III	37	III	23	IV

Table 4. Participation of farmers in village level meetings (N=155)

Sl. no.	Districts	Regularly		Occasionally		Never	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Banka	20	41.0	22	45.0	7	14.0
2	Bhagalpur	7	54.0	5	38.0	1	8.0
3	Katihar	20	59.0	9	26.0	5	15.0
4	Munger	7	58.0	5	42.0	0	0
5	Purnea	6	27.0	7	32.0	9	41.0
6	Samastipur	5	22.0	8	35.0	10	43.0

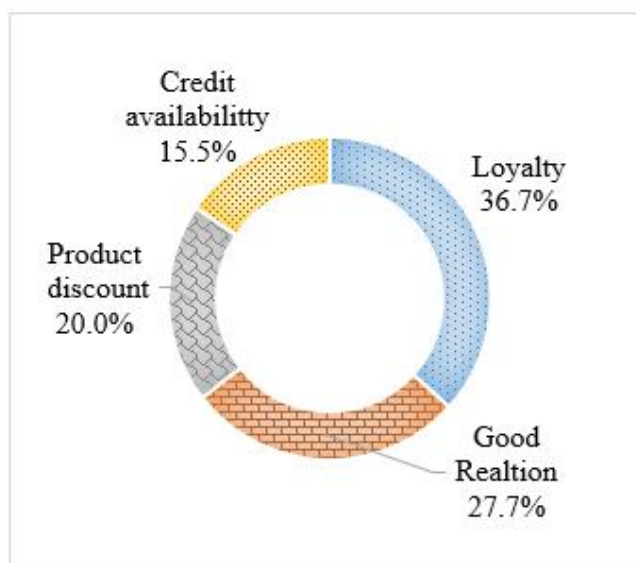


Fig. 5. Reasons for buying hybrid paddy seeds from the same shop

Table 5. Farmer’s expectation from seed companies (N=155)

Sl. No.	Expectations	Mean score	Rank
1	Provide technical support	37	III
2	Price discount	46	II
3	Credit facility	55	I
4	Organise sales promotion schemes	23	IV

3.8 Farmers Expectation from Seed Companies

Owing to lack of information from other sources the farmers tends to purchase hybrid paddy seeds from a particular outlet and they also make repeat purchases of the same brand. Insufficiency of credit and lack of technical information plays an important role in farmer's decision to remain loyal to particular outlet and brand. Factors such as credit accessibility, price discount, and technical support are often the anticipations of the farmers from the sales outlet. Often times these outlets also organize multiple schemes like providing freebies, extension trips, supporting the local schools during festivals etc.

4. CONCLUSION

The study publicised about source and level of awareness, buying behaviour of farmers and sales promotion of retailers. It can be deduced that majority of the farmers were aware of hybrid paddy seeds and dealers/retailers play an important role in rural marketing for creating demand among hybrid paddy seeds. Among six factors only three were influencing the farmers to purchase hybrid paddy seeds viz., plant height, grain size, water logging tolerance. '6444' (brand) elite by the farmers among all brands due to provision of better quality and helped in decision for purchase of hybrid paddy seeds. Among all the reasons, the first reason to buy

hybrid seed by the majority farmers was due to better grain quality. It was felt that more focus should be concerted on Munger district as it has ample prospective for further exploitation. Timely accessibility of required brand seeds, good liaison with the store owner, credit accessibility are major reasons to purchase hybrid seeds from the same outlet. The companies needs to emphasize on the promotional activities to maximize their sales.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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