



# Study of paddy seeds supply chain analysis by private sector in Madhubani district of Bihar, India

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## ABSTRACT

The study was undertaken for analysis the challenges and opportunities associated for paddy seed supply chain of private seed sector in Madhubani district of Bihar. Supply chain management of paddy seed by six seed companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds were analysed. The study is based on the primary and secondary data. The 25 seed vendors and 100 farmers from different locations of Madhubani, district of Bihar were selected in randomized manner. The 12 factors concerned with seed vendors and 31 factors associated with farmers regarding seed supply chain management were considered. The very competitive marketing situation for all seed companies was observed. The farmers of Madhubani district are aware about importance of hybrid seeds, but they are less aware about different varieties of rice. More emphasis should be provided to seed vendors regarding availability and distribution of paddy seeds, because most of the farmers of Madhubani district are dependent on local seed vendors to purchase paddy seeds and advertisement of paddy varieties through newspapers and farmers groups. In Madhubani district there is a need for establishment of seed production centre, storage facility for seeds and development of proper transportation facility for timely availability of paddy seeds in this district. The subsidization of cost for paddy seed and availability of paddy varieties as per requirement of soil and providing the good consultancy service to farmers will enhance the seed sell rate in Madhubani district. The farmers of Madhubani district prefer to cultivate paddy varieties, Arize 6444 of Bayer seed company, Suruchi MRP-5569 of Mahyco, NK5251 of Syngenta, JKRH 2609 of JK Agri

Genetics, NP 360 Moti of Nuziveedu Seeds and Prabhat of Messina Beej Private Limited. It indicates the good market opportunities of these varieties in this district.

**Key words:** Bihar, Company, Management, Madhubani, Seed, Supply

## INTRODUCTION

Paddy (*Oryza Sativa* L.) ( $2n=24$ ), belonging to the family Graminae and subfamily Orazoidea, is the principle staple food for more than 50% of the world's population and occupies one-fifth of the total land area covered under cereals (Shamim *et al.*, 2016). India ranks second (21.6%) worldwide, next to China (28.8%) (Shravanthi and Sahoo, 2022). Scope of paddy crop production to meet the demand for paddy to feed the burgeoning population basically depends on effective and sustainable utilization of genetic resources, cultivation of selected improved varieties and hybrid varieties according to climatic conditions and availability of cultivation facilities. Seed is the critical determinant of agricultural production on which depends the performance and efficacy of other inputs. Quality seeds appropriate to different agro-climatic conditions and in sufficient quantity at affordable paddy, on time availability are required to raise productivity.

Bihar is the state of India, with its beautiful natural resources of fertile soil, abundant water, varied climate and rich cultural and historical heritage is one of the most fascinating states of India. Principal food crops of Bihar are paddy, wheat, maize and pulses. Though endowed with good soil, adequate rainfall and good ground water availability, but Bihar has not get realized its full agricultural potential. Due to high consumption, Bihar has become a net borrower to meet the seed demands. Seeds like Paddy and Wheat are sourced from other states such as Uttarakhand, Telangana and West Bengal. So, it is need for private seed sector for improvement of supply chain of paddy seeds in Bihar for production of more amount of paddy. In order to increase the sale & expand the market, it is necessary to analyze the socio-economic background of farmers in the area and pinpoint consumer preference among different brands & attributes to make the experience beneficial for the company as well as the annual growth of paddy yield.

It is also necessary to know the loop- whole related with supply chain of paddy seeds in Bihar. The Madhubani, district of north Bihar are important paddy cultivation area due to its Agro-climatic conditions and soil fertility as well as availability of water resources. Keeping all above into consideration, the present investigation was

performed to know the challenges and opportunities of paddy seed supply chain of private seed company in Madhubani district of Bihar, India.

## **MATERIALS AND METHODS**

The study was conducted in Madhubani district of Bihar for a view of supply chain management of paddy seed by six seed companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds.

The study is based on the primary and secondary data. Primary data were collected in year 2023 from the seed vendors and farmers using questionnaire in close interaction. The primary data were collected in randomized manner from selected sample of seed vendors & farmers through personal interviews. The 25 seed vendors and 100 farmers from different locations of Madhubani, district of Bihar were selected in randomized manner. The 12 factors concerned with seed vendors and 31 factors associated with farmers regarding seed supply chain management were considered.

Secondary data were collected from the literature available with the public and private seed producers and distributors. The primary data were tabulated, classified, quantified and statistically analyzed.

## **RESULTS**

### **Seed vendors response**

The seed vendors response about twelve different factors associated with seed marketing and storage of Madhubani district is mentioned in Table 1. The 40% seed vendors have storage facility for seeds, but remaining 60% farmers have no storage facility of seeds. The 48% seed vendors has proper transportation facility for seeds and remaining 52% seed vendors face troubles related with transportation facility of seeds. The 40% seed vendors of this district have problems for timely supply of seeds from seed company whereas the 60% seed vendors get timely delivery of paddy seeds from seeds company. The 44% seed vendors suffers the delay delivery of seeds and storage problems due to climatic constrains but 56% seed vendors has no effect of climatic constrains.

The majority of farmers (80%) has supply chain problem due to much distant location of seed production centre, which take a lot of time for delivery of seeds and enhances the cost of seeds due to more expenditure in transportation of seeds. The 84% of seed vendors transports there seeds by trucks which also enhance the cost of seeds. The only 16% seed vendors able to carries its seeds by train.

## Farmers response

The farmers response about thirty-one different factors associated with farmers for supply chain of paddy seed of Madhubani district is mentioned in Table 2. The 14% marginal farmer, 37% small farmer, 26% semi-medium farmer, 16% medium farmer and 7% large farmers of Madhubani district were participated in this survey. This district farmers uses paddy seeds of Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds by 19.29%, 16.79%, 17.86%, 16.07%, 15.36% and 14.64% respectively. The 37% farmers of this district obtain information about seed variety of paddy from news papers, 45% from friends, 8% by TV channels and 10% from online platforms. The 26% farmers has constrains related with timely supply of seeds, 45% farmers has problem to use good seeds due to its high cost, 19% farmers has issues related with seed quality, 10% farmers has no choice to select the seeds as per requirement of their soil in Madhubani district. The 87% farmers of this district are aware about benefits of hybrid paddy seeds, whereas the 13% farmers have no proper knowledge about hybrid paddy varieties. The only 26% farmers of this district have knowledge about different paddy varieties, but 74% farmers are not aware about different paddy varieties. The 94% farmers of this district purchase paddy seeds from local vendors and only 6% farmers purchase paddy seeds by online marketing. The 54% farmers are needed training for hybrid paddy cultivation, but 46% farmers has no need of such training. In this district only 14% farmers are trained for paddy cultivation by Seed Company, whereas 86% farmers are untouched by such training programme. Only 6.0% farmers field are regularly visited by company persons of seed company and get required suggestions from seed company persons, but 94% farmers field are not monitored by seed company persons in this district.

## Market share of seed companies

The seeds of six seeds companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds is marketed in Madhubani district. The highest sell of Messina Beej Private Limited paddy seeds (19.29%) was observed followed by Bayer (17.89%), Mahyco (16.77%), Syngenta (16.11%), JK Agri Genetics (15.35%) and Nuziveedu Seeds (14.64%). The highest market share (11.10%) for paddy variety Arize 6444 of Bayer seed company was observed in this district (Table: 4.3). The paddy variety Suruchi MRP-5569 of Mahyco, NK5251 of Syngenta, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu Seeds and Prabhat of Messina Beej Private Limited has important market share in this district (Table: 3).

## DISCUSSION AND CONCLUSION

The more than 50% of seed vendors of Madhubani district suffer with problems of distant location of seed production centre, storage facility for seeds, proper transportation facility. So to start the seed production centre of seed companies nearby this district will help for easy and timely availability of paddy seeds in this district. The enhancement of seed storage facility and to provide proper transportation facility to seed vendors will enhance the opportunities for timely availability of seeds to farmers in this district. There are very few seed vendors of this district are able to utilize the transportation of seeds by trains, which causes the delay delivery of seeds and increase in the seed cost, because most of the seed vendors uses trucks for seed transportation. So it is needed to provide more train facility in this district for timely delivery of paddy seeds.

The penetration of all six seed companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds in seed market of Madhubani district is almost similar, whereas highest seed market share was reported for Messina Beej Private Limited. The report of this investigation indicates about highly competitive marketing situation for all seed companies. The nearby location of Messina Beej Private Limited and preference of its seeds in Madhubani district provide its opportunities to spread its seed marketing in this district. Most of the farmers of this district get information regarding paddy seed varieties by friends and newspapers. So it is needed for seed companies to more advertise the varieties of paddy seeds by news papers and in farmers groups. The cost of seed and availability of paddy varieties as per requirement of soil are important issues related with farmers in this district. The seed companies should reduce the cost of seeds or to provide subsidiary on seeds. The seed companies should also distribute its paddy seeds in this district according to soil and choice of farmers requirements. The most of the farmers of this district are aware about benefits of hybrid seeds which open the door for marketing the hybrid seeds by seed companies in this district. Similar findings were also reported by earlier researcher (Anand *et al.*, 2022). There are very few farmers have knowledge about varieties of paddy, therefore it is required for enhancement of awareness regarding paddy varieties in this district. Most of the farmers of this district purchase seeds by local seed vendors, it indicates that more emphasis should be provided to seed vendors regarding availability and distribution of paddy seeds. Most of the farmers field of this district is not regularly visited by advisors of seed companies. By providing the good consultancy service to farmers will enhance the marketing facility to seed companies.

The farmers of Madhubani district of Bihar prefer to cultivate paddy varieties, Arize 6444 of Bayer seed company, Suruchi MRP-5569 of Mahyco, NK5251 of Syngenta, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu Seeds and Prabhat of Messina Beej Private Limited. It indicates the good market opportunities of these varieties in this district. More promotion of these paddy varieties will enhance the sell rate of these paddy varieties and to develop a good marketing opportunities for seed companies in this district. These findings are more or less in agreement with the earlier reports of such type of study in different locations of India and abroad (Pasutham, 2012; Galli *et al.*, 2015; Chauhan *et al.*, 2017; Prasad *et al.*, 2017; Dwiastuti *et al.*, 2018; Singh *et al.*, 2021; Anand *et al.*, 2022; Shravanthi and Sahoo, 2022; Singh *et al.*, 2022). There are many opportunities of paddy seed marketing is present in these districts. The development of proper storage facilities for seed, good transportation system in low cost, subsidized seed price, awareness regarding paddy varieties among farmers, availability of paddy varieties according to choice of farmers and providing good consultancy services by seed companies will enhance the marketing opportunities of paddy seeds in Madhubani district of Bihar.

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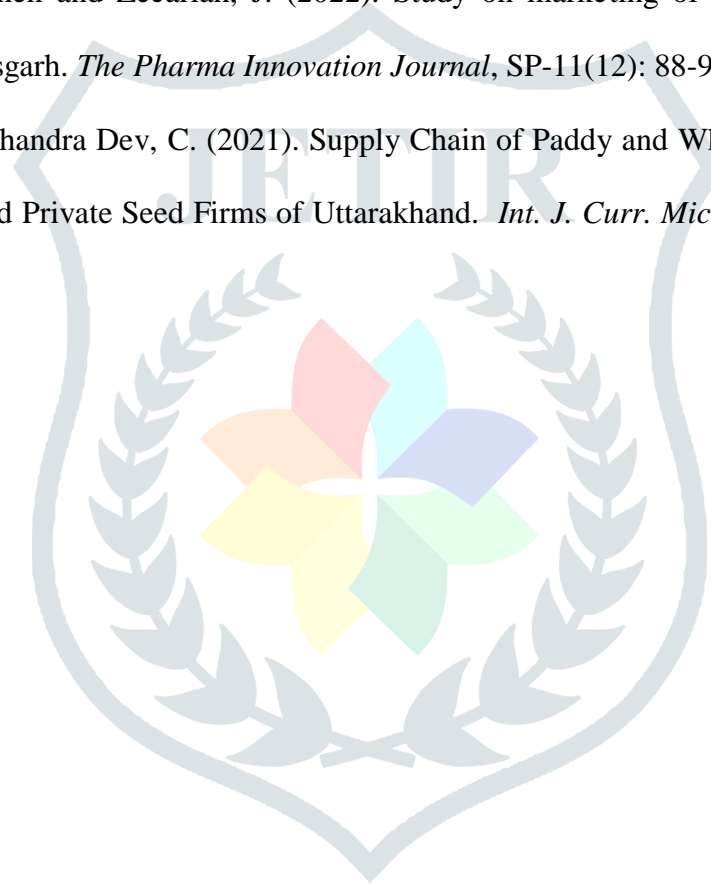
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**Table 1: Vendors survey for multiple factors related with seed supply**

Sl. No	Factors	Seed Vendors response (%)	Sl. No	Factors	Seed Vendors response (%)
1	Availability of proper storage facility	40	7	Effect of Climatic Constrains	44
2	Not availability of proper storage facility	60	8	Not effect of Climatic Constrains	56
3	Proper transportation facility	48	9	Constrains related with distance of seed production centre present	80
4	No proper transportation facility	52	10	Constrains related with distance of seed production centre absent	20
5	Supply issues from company are remain	40	11	Transportation of seeds by trucks	84
6	No supply issues from company are remain	60	12	Transportation of seeds by trains	16

**Table 2: Farmers survey for multiple factors related with paddy seed supply**

Sl. No	Factors	Farmers response (%)	Sl. No	Factors	Farmers response (%)
1	Marginal farmer	14.00	17	Constrain for Cost of seed	45.00
2	Small farmer	37.00	18	Constrain for Quality of seed	19.00
3	Semi-Medium farmer	26.00	19	Constrain for Seed variety as per soil	10.00
4	Medium farmer	16.00	20	Knowledge about benefits of hybrid paddy varieties	87.00
5	Large farmer	07.00	21	No knowledge about benefits of hybrid paddy varieties	13.00
6	Messina Beej Private Limited	19.29	22	Knowledge of different paddy seed varieties	26.00
7	Mahyco	16.79	23	No knowledge of different paddy seed varieties	74.00
8	Bayer	17.86	24	Paddy seeds are purchased by local vendors	94.00
9	Syngenta	16.07	25	Paddy seeds are purchased by online platforms	6.00
10	JK Agri Genetics	15.36	26	Need training program for hybrid paddy cultivation	54.00



11	Nuziveedu Seeds	14.64	27	No need training program for hybrid paddy cultivation	46.00
12	Information of paddy variety obtained by News papers	37.00	28	Seed company provide training for cultivation	14.00
13	Information of paddy variety obtained by Friends	45.00	29	Seed company does not provide training for cultivation	86.00
14	Information of paddy variety obtained by TV channels	08.00	30	Company person perform field visit	06.00
15	Information of paddy variety obtained by Online platforms	10.00	31	Company person does not perform field visit	94.00
16	Constrain related with timely supply	26.00			

**Table 3: Market share of seed company in Madhubani**

Sl. No	Seed company name	Paddy Varieties	Market share (%)
1	Messina Beej Private Limited	Messina Basmati	3.93
		Saumya	2.86
		Prabhat	4.29
		Rajeshwari	3.57
		Saryoo 52	2.50
		Sonali	2.14
2	Mahyco	Suruchi MRP-5569	10.70
		MRP 5491	6.07
3	Bayer	Arize 6444	11.10
		Arize 6129	3.93
		Arize Tej	2.86
4	Syngenta	NK5251	10.40
		S 7002	5.71
5	JK Agri Genetics	JKRH 2609	8.21
		JKRH 2354	4.64
		JK Swarnamoti	2.50
6	Nuziveedu Seeds	NP 360 Moti	6.43
		NP 218 Sourabh Gold	4.64
		NP 1024 Moti Gold	3.57