

Study of paddy seeds supply chain analysis by private sector in north 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 north Bihar. The three districts of north Bihar i.e., Madhubani, Darbhanga and Samastipur, which have good opportunities for paddy cultivation was selected for this study. The 75 seed vendors (25 seed vendors from each district) were selected as randomized sampling manner and interviewed for 12 factors related to paddy seed supply chain during this study. The 300 farmers (100 farmers from each district) were selected as randomized sampling manner and interviewed for 31 factors related to paddy seed supply chain. This study was based on the primary and secondary data. Primary data were collected in year 2023 from 75 seed vendors and 300 farmers using questionnaire by close interaction. Secondary data were collected from the literature available with the public and private seed producers and distributors. The data were tabulated, classified, quantified and analyzed with the help of pie-charts and percentage.

There are only about 50% of seed vendors of survey area (Madhubani, Darbhanga, Samastipur district of Bihar) have storage facility for seeds. There is need to develop storage facility of seeds in this area for timely availability of paddy seeds to farmers. About one-third seed vendors face troubles related with transportation facility of seeds, timely supply of seeds from seed companies climatic constrains and distant location of seed production centre. By provide the proper transportation facility of seeds and start the seed production centre of seed companies nearby these districts will help for easy and timely availability of paddy seeds in Madhubani, Darbhanga and Samastipur districts of north Bihar. There are wide opportunities for paddy seed marketing is available in this area. The adoption of strategies like enhancement of seed storage facility, provide proper transportation facility to seed vendors, development of seed production centre of seed companies nearby these districts, more enhancement of transportation facility by train and timely availability of seeds to vendors will provide good market place of seed companies in this area. The highest market share was observed for paddy variety NK5251 of Syngenta seed company in theses area, followed by paddy variety Arize 6444 of Bayer, Suruchi MRP-5569 of Mahyco, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu and Messina Basmati of Messina Beej Private Limited were observed in theses three districts i.e., Madhubani, Darbhanga and Samastipur districts of Bihar. The paddy varieties NK5251 of Syngenta, Arize 6444 of Bayer, Suruchi MRP-5569 of Mahyco, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu and Messina Basmati of Messina Beej Private Limited are mostly preferred by farmers of this district for cultivation. The observations of this study suggest 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 these districts of north Bihar.

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

I. 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 [1]. India ranks second (21.6%) worldwide, next to China (28.8%) [2]. 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 north Bihar is 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, Darbhanga and Samastipur districts of Bihar, India.

II. MATERIALS AND METHODS

The study was conducted in Madhubani, Darbhanga & Samastipur districts 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. This is to analyze the forward, backward integration of supply chain. Madhubani, Darbhanga & Samastipur district of Bihar was

selected purposely because it is one of the major paddy growing belt in Bihar. Secondly, most of the private seed companies market it seed in these districts of Bihar.

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 75 seed vendors and 300 farmers from different locations of these three districts i.e., Madhubani, Darbhanga & Samastipur districts of Bihar were selected. The 25 seed vendors and 100 farmers from each district were selected in randomized manner.

Secondary data were collected from the literature available with the public and private seed producers and distributors. The data were tabulated, classified, quantified and analyzed with the help of pie-charts and percentage.

III. RESULTS

Seed vendors response

The cumulative response of seed vendors belongs from three districts (Madhubani, Darbhanga and Samastipur) of Bihar about twelve different factors associated with seed marketing and storage of survey area is mentioned in Table 1. The 54.67% seed vendors have storage facility for seeds, but remaining 45.33 % seed vendors have no storage facility of seeds. The 62.67% seed vendors has proper transportation facility for seeds and remaining 37.33% seed vendors face troubles related with transportation facility of seeds. The 36% seed vendors of this survey area has problems for timely supply of seeds from seed company whereas the 64% seed vendors get timely delivery of paddy seeds from seeds company. The 38.67% seed vendors suffers the delay delivery of seeds and storage problems due to climatic constrains but 61.33% seed vendors has no effect of climatic constrains. The 60% seed vendors has supply chain problem due to distant location of seed production centre, whereas 40% seed vendors get easily seeds. The two-third (66.67%) of seed vendors transports there seeds by trucks and one-third (33.33%) seed vendors are able to carry seeds by train.

Farmers response

The cumulative farmers response about thirty-one different factors associated with farmers for supply chain of paddy seed in survey area is mentioned in Table 2. The 14% marginal farmer, 35.33% small farmer, 28% semi-medium farmer, 15.67% medium farmer and 7% large farmers of survey area 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 21.11%, 18.84%, 16.35%, 15.78%, 14.19% and 13.73% respectively. The 40.33% farmers of this district obtain information about seed variety of paddy

from news papers, 41.67% from friends, 7.33% by TV channels and 10.67% from online platforms. The 25.33% farmers has constraints related with timely supply of seeds, 45.67% farmers has problem to use good seeds due to its high cost, 17.67% farmers has issues related with seed quality, 11.33% farmers has no choice to select the seeds as per requirement of their soil in survey area. The 90.33% farmers of this district are aware about benefits of hybrid paddy seeds, whereas the 9.67% farmers have no proper knowledge about hybrid paddy varieties. The only 31.67% farmers of this district have knowledge about different paddy varieties, but 68.33% farmers are not aware about different paddy varieties. The 92% farmers of this district purchase paddy seeds from local vendors and only 8% farmers purchase paddy seeds by online marketing. The 51% farmers are needed training for hybrid paddy cultivation, but 49% farmers has no need of such training. In this district only 17.33% farmers are trained for paddy cultivation by Seed Company, whereas 82.67% farmers are not aware by such training programme. Only 8.0% farmers field are regularly visited by company persons of seed company and get required suggestions from seed company persons, but 92% farmers field are not monitored by seed company persons in this district.

Market share of seed companies

The seed of six seeds companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds is marketed in all three districts i.e., Madhubani, Darbhanga and Samastipur of survey area. The highest sell of Messina Beej Private Limited paddy seeds (21.11%), was observed followed by Mahyco (18.84%), Bayer (16.35%), Syngenta (15.78%), JK Agri Genetics (14.19%) and Nuziveedu Seeds (13.73%) (Table:3; Figure:1). The highest market share was observed for paddy variety NK5251 of Syngenta seed company in these area, followed by paddy variety Arize 6444 of Bayer, Suruchi MRP-5569 of Mahyco, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu and Messina Basmati of Messina Beej Private Limited were observed in these three districts i.e., Madhubani, Darbhanga and Samastipur districts of Bihar (Table: 3).

IV. DISCUSSION AND CONCLUSION

There are only about 50% of seed vendors of survey area (Madhubani, Darbhanga, Samastipur district of Bihar) have storage facility for seeds. There is need to develop storage facility of seeds in this area for timely availability of paddy seeds to farmers. About one-third seed vendors face troubles related with transportation facility of seeds, timely supply of seeds from seed companies climatic constraints and distant location of seed production centre. So by provide the proper transportation facility of seeds and start the seed production centre of seed companies nearby these districts will help for easy and timely availability of paddy seeds in these districts of north Bihar. There are wide

opportunities for paddy seed marketing is available in this area. The adoption of strategies like enhancement of seed storage facility, provide proper transportation facility to seed vendors, development of seed production centre of seed companies nearby these districts, more enhancement of transportation facility by train and timely availability of seeds to vendors will provide good market place of seed companies in this area.

The all six seed companies i.e., Messina Beej Private Limited, Mahyco, Bayer, Syngenta, JK Agri Genetics and Nuziveedu Seeds are performing good marketing approaches in this area. The 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 in this area. The nearby location of Messina Beej Private Limited and preference of its seeds in this area provide its opportunities to spread its seed marketing in these districts. Most of the farmers of in this area 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 varieties as per requirement of soil are important issues related with farmers in this area. The seed companies should reduce the cost of seeds or to provide subsidiary on seeds to farmers of these districts (Madhubani, Darbhanga, Samastipur) of Bihar. The seed companies should also distribute its paddy seeds in these districts according to soil and choice of farmers requirements. The most of the farmers of these districts are aware about benefits of hybrid seeds which provides amazing marketing opportunities to hybrid seeds by seed companies in these districts. The some farmers have knowledge about varieties of paddy, therefore it is required for enhancement of awareness regarding paddy varieties in these districts. 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 farmer's field of this district is not regularly visited by advisors of seed companies. By emphasizing the good consultancy services, subsidiaries, timely availability of paddy seeds as per requirement of farmers will tremendously increase seed marketing of seed companies in this area. These findings are more less in agreement with the earlier reports of such type of study in different locations of India and abroad [2, 3, 4, 5, 6, 7, 8, 9].

The highest market share was observed for paddy variety NK5251 of Syngenta seed company in these area, followed by paddy variety Arize 6444 of Bayer, Suruchi MRP-5569 of Mahyco, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu and Messina Basmati of Messina Beej Private Limited were observed in these three districts i.e., Madhubani, Darbhanga and Samastipur districts of Bihar

The paddy varieties NK5251 of Syngenta, Arize 6444 of Bayer, Suruchi MRP-5569 of Mahyco, JKRH 2609 of JK Agri Genetics, NP 360 Moti of Nuziveedu and Messina Basmati of Messina Beej Private Limited are mostly preferred by farmers of these district for cultivation. The observations of this study suggest 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 these districts of north Bihar.

V. REFERENCES

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

Sl. No	Factors	Seed Vendors response of Madhubani (%)	Seed Vendors response of Darbhanga (%)	Seed Vendors response of Samastipur (%)	Cumulative (%)
1	Availability of proper storage facility	40	52	72	54.67
2	Not availability of proper storage facility	60	48	28	45.33
3	Proper transportation facility	48	60	80	62.67
4	No proper transportation facility	52	40	20	37.33
5	Supply issues from company are remain	40	40	28	36.00
6	No supply issues from company are remain	60	60	72	64.00
7	Effect of Climatic Constrains	44	40	32	38.67
8	Not effect of Climatic Constrains	56	60	68	61.33
9	Constrains related with distance of seed production centre present	80	60	40	60.00
10	Constrains related with distance of seed production centre absent	20	40	60	40.00
11	Transportation of seeds by trucks	84	68	48	66.67
12	Transportation of seeds by trains	16	32	52	33.33

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

Sl. No	Factors	Farmers response of Madhubani (%)	Farmers response of Darbhanga (%)	Farmers response of Samastipur (%)	Cumulative (%)
1	Marginal farmer	14.00	13.00	15.00	14.00
2	Small farmer	37.00	36.00	33.00	35.33
3	Semi-Medium farmer	26.00	28.00	30.00	28.00
4	Medium farmer	16.00	15.00	16.00	15.67
5	Large farmer	07.00	08.00	06.00	7.00
6	Messina Beej Private Limited	19.29	20.20	23.68	21.11
7	Mahyco	16.79	20.20	19.41	18.84
8	Bayer	17.86	16.50	14.80	16.35
9	Syngenta	16.07	15.83	15.46	15.78
10	JK Agri Genetics	15.36	13.47	13.82	14.19
11	Nuziveedu Seeds	14.64	13.81	12.83	13.73
12	Information of paddy variety obtained by News papers	37.00	40.00	44.00	40.33
13	Information of paddy variety obtained by Friends	45.00	42.00	38.00	41.67
14	Information of paddy variety obtained by TV channels	08.00	07.00	07.00	7.33
15	Information of paddy variety obtained by Online platforms	10.00	11.00	11.00	10.67
16	Constrain related with timely supply	26.00	26.00	24.00	25.33
17	Constrain for Cost of seed	45.00	46.00	46.00	45.67
18	Constrain for Quality of seed	19.00	17.00	17.00	17.67
19	Constrain for Seed variety as per soil	10.00	11.00	13.00	11.33
20	Knowledge about benefits of hybrid paddy varieties	87.00	90.00	94.00	90.33
21	No knowledge about benefits of hybrid paddy varieties	13.00	10.00	06.00	9.67
22	Knowledge of different paddy seed varieties	26.00	34.00	35.00	31.67
23	No knowledge of different paddy seed varieties	74.00	66.00	65.00	68.33
24	Paddy seeds are purchased by local vendors	94.00	92.00	90.00	92.00
25	Paddy seeds are purchased by online platforms	6.00	8.00	10.00	8.00
26	Need training program for hybrid paddy cultivation	54.00	54.00	45.00	51.00
27	No need training program for hybrid paddy cultivation	46.00	46.00	55.00	49.00
28	Seed company provide training for cultivation	14.00	18.00	20.00	17.33
29	Seed company does not provide training for cultivation	86.00	82.00	80.00	82.67
30	Company person perform field visit	06.00	08.00	10.00	8.00
31	Company person does not perform field visit	94.00	92.00	90.00	92.00

Table 3: Market share of seed company in survey area

Sl. No	Seed company name	Paddy Varieties	Market share in Madhubani (%)	Market share in Darbhanga (%)	Market share in Samastipur (%)	Cumulative (%)
1	Messina Beej Private Limited	Messina Basmati	3.93	4.38	5.26	21.11
		Saumya	2.86	3.37	4.61	
		Prabhat	4.29	4.04	4.61	
		Rajeshwari	3.57	3.70	4.28	
		Saryoo 52	2.50	2.36	2.96	
		Sonali	2.14	2.36	1.97	
2	Mahyco	Suruchi MRP-5569	10.70	9.43	9.54	18.84
		MRP 5491	6.07	10.80	9.87	
3	Bayer	Arize 6444	11.10	10.80	10.20	16.35
		Arize 6129	3.93	3.37	2.63	
		Arize Tej	2.86	2.36	1.97	
4	Syngenta	NK5251	10.40	10.80	11.20	15.78
		S 7002	5.71	5.05	4.28	
5	JK Agri Genetics	JKRH 2609	8.21	6.73	7.24	14.19
		JKRH 2354	4.64	4.71	4.61	
		JK Swarnamoti	2.50	2.02	1.97	
6	Nuziveedu Seeds	NP 360 Moti	6.43	5.72	5.59	13.73
		NP 218 Sourabh Gold	4.64	4.38	3.95	
		NP 1024 Moti Gold	3.57	3.70	3.29	

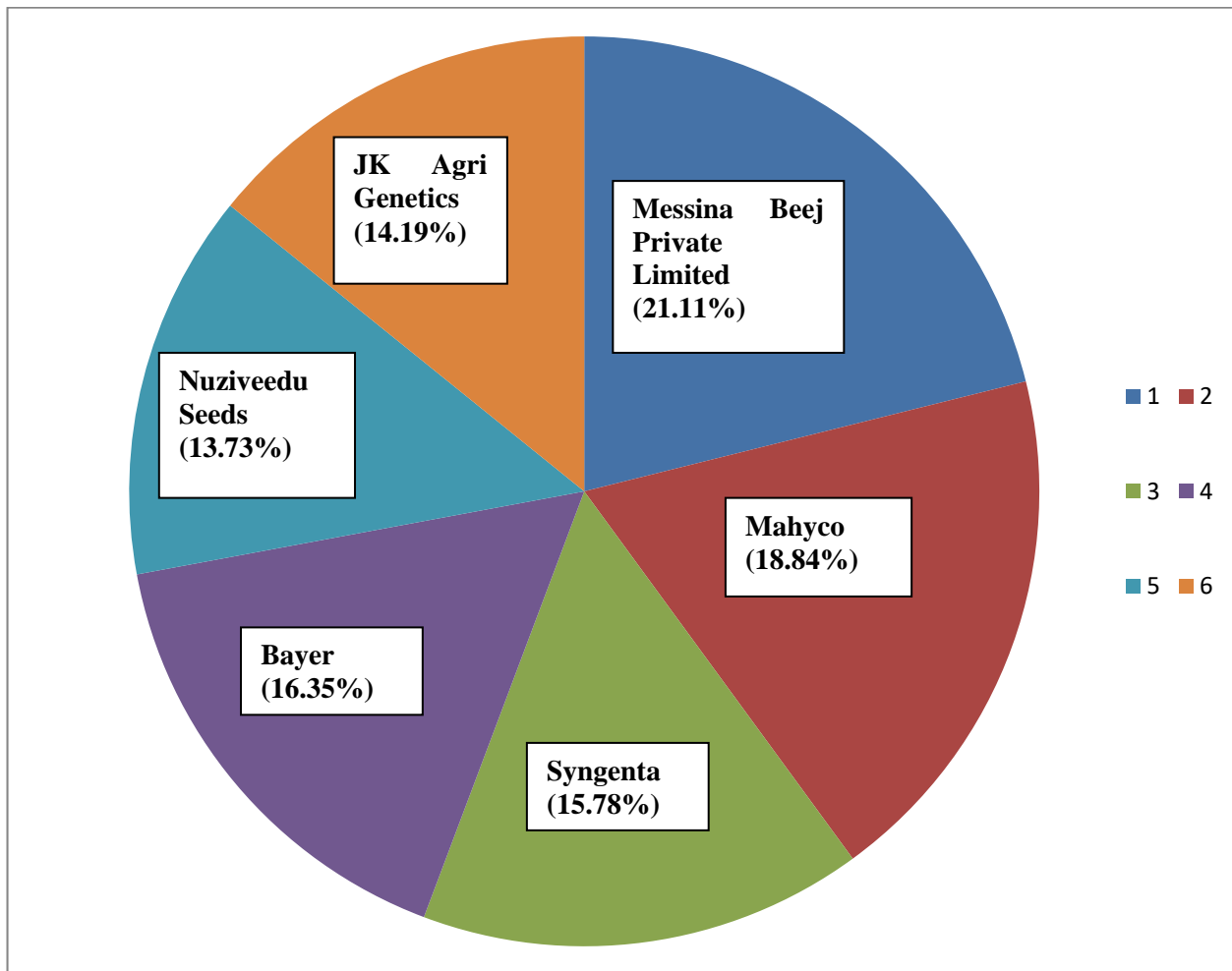


Figure 1: Pie-chart showing market share of seed companies for paddy seed in survey area

- 1: Messina Beej Private Limited (21.11%)
- 2: Mahyco (18.84%)
- 3: Syngenta (15.78%)
- 4: Bayer (16.35%)
- 5: Nuziveedu Seeds (13.73%)
- 6: JK Agri Genetics (14.19%)