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## Influencing factors and farmers' constraints for improved planting material in Jhabua district of Madhya Pradesh

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### Abstract

Since times immemorial, agriculture has remained as the strongest backbone of our economy and has the power to transform Indian economy from a developing nation to a developed nation. When we talk about agriculture productivity, the agricultural sector is highly dependent on the availability and quality of seeds for a productive harvest. But, ironically, the adoption of improved seed and other planting material in developing countries shows mixed results despite its potential to increase agricultural productivity. To arrive at a better understanding of the observed adoption rates, a lot of research is focused on finding the cultivars and variety traits that are attractive to farmers. Considering the importance of improved planting material in enhancing farmers' income and their welfare as well as nation's prosperity, the present Empirical Research Paper, utilizing the published theoretical literature and Communication Approach of the Descriptive Cross-sectional research design, assesses the influencing factors for procurement of improved planting material by farmers in Jhabua district of Madhya Pradesh. It also highlights the constraints faced by these farmers. Based on a survey of 100 farmers selected through purposive sampling method, this study found that majority of the farmers were using previous years' produced material for seed purpose and commercial nurseries was the major source of seedling procurement. Farmers were found to mostly consider price followed by variety of seed and delivery time while procuring seedlings. Major constraints faced by the farmers in getting quality planting material were high price, unavailability of range of variety, late delivery, non-uniform seedling, and inadequate variety of seed.

**Keywords:** Agricultural productivity, improved planting material, procurement, seed and seedlings

### Introduction

Since times immemorial, agriculture has remained as the strongest backbone of our economy and it is the main source of economic livelihood for the majority of population of our country. Yes, agriculture has been the main-stay of more than two third of our population, providing livelihood to nearly 60% of our country people. But, we are living in the age of discontinuity. So, the world is undergoing a sea change with the trend of modernization of industries across all spheres set-in, the market horizons have been stretched across the globe and the bases of competition have also been changed. The agriculture sector is also a part and parcel of this. With the passage of time, from the infancy stage of merely subsistence farming; the agriculture sector has matured in the form of business venture. This is probably due to factors including rapid economic growth in both developing and developed countries, introduction of new technologies, market expansion, market liberalization, increased demand for food, decreasing farming population as result of urbanization, liberalized and open economic policies, bilateral and multilateral economic agreements, developed infrastructure facilities in farming areas and government agricultural policies (Thakkar, 2019) [9].

With increased opportunities and consequent competitive scenario in this open economy, agriculture sector has the power and potential of not only ensuring livelihood security to our countrymen; but also to provide employment opportunities to millions of people and thereby improve their standard of living in general. Agriculture has long been seen as a sector with tremendous potential in India and it certainly has the power to transform Indian economy from a developing nation to a developed nation.

When we talk about agriculture productivity, the agricultural sector is highly dependent on the availability and quality of seeds for a productive harvest. In fact, the response of all other inputs depends on quality of seeds to a large extent and estimated 15-20% contribution is made by quality seed alone to the total production; which is dependent on the crop and it can be

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further raised up to 45% with efficient management of other inputs. Today, the Indian seed industry is the fifth largest seed market in the world and valued at more than Rs 2500 crores. The seed industry has grown steadily in the last few decades. A number of transformations have taken place in this sector over the past few decades like rising penetration of the organised sector, growth in contract farming, agriculture becoming more mechanized, easy loan facilities, rise of exports, use of agrochemicals and high yielding seeds and an increasing role of the private sector in processing, branding and marketing, etc. Government took many progressive and reformative steps in recent past for the growth of seed sector in the country. But, ironically, the adoption of improved seed and other planting material in developing countries shows mixed results despite its potential to increase agricultural productivity. To arrive at a better understanding of the observed adoption rates, a lot of research is focused on finding the cultivars and variety traits that are attractive to farmers. Considering the importance of improved planting material in enhancing farmers' income and their welfare as well as nation's prosperity, the present study was focused on identifying the influencing factors for procurement of improved planting material and constraints of farmers in getting quality improved planting material in Jhabua district of Madhya Pradesh.

Here, it is also noteworthy that the Indian Online Nursery market is expected to grow at a rate of steady CAGR for the forecast period FY2023-FY2027. The high internet penetration and the proliferation of smart devices are increasing the accessibility of the consumers to explore the online sales channel. Buying through the online sales channel provides the consumer with enhanced convenience, and affordable options is one of the major influencing factors; driving the demand for the Indian Online Nursery market. The improving economic conditions of middle-class families coupled with rising awareness about the green plantation is influencing the market demand. The presence of small living areas in the urban cities, increasing air pollution, and favorable government policies are adding fuel to the fire. Online Nursery allows consumers to explore many options in a single swipe and offers lucrative discounts and offers to surge sales via online sales channels. Market players are offering plants and vegetables with warranty options in case the plant gets adversely affected during the transportation process.

In the light of all these promising as well as challenging developments, the present study is a sincere attempt to understand and analyze the important factors considered by farmers while procuring improved planting material and constraints faced by them in getting improved planting material in Jhabua district of Madhya Pradesh.

### Research Methodology

The study was carried out with the following Research Objectives:

- To study socio-economic profile of farmers in the study region.
- To know the procurement sources of improved planting material used by farmers.
- To study the influencing factor for procurement of improved planting material by farmers.
- To identify constraints faced by farmers in getting quality improved planting material.

Descriptive cross-sectional research design was used for the study. Petlawad Taluka of Jhabua district of Madhya Pradesh was purposively selected as the area of study. Purposive sampling method was used for selecting 100 farmers from 10 villages of Petlawad Taluka. In this sampling method, researchers select the samples based purely on the researcher's knowledge and credibility. In other words, researchers choose only those people who they deem fit to participate in the research study. Primary data have been collected through structured interview schedule consisting of mixture of open ended, closed ended and multiple response questions. It also consisted of Likert Scale based statements. The respondents were personally approached by the researchers for personal interview. Secondary data were collected from published papers, magazines, and also from the published and unpublished reports of the cooperative. Collected data have been analyzed using simple descriptive statistics.

### Review of Literature

Verma and Sharma (2000) <sup>[10]</sup> argued that in India, private enterprises develop hybrid seeds for the majority of vegetables, and they do not disclose the parental lines of hybrids. In comparison to commercial hybrid seed production, public sector hybrid seed production is less well organised. Hybrid seeds are typically grown in open fields, with the exception of capsicum, which is grown in a glasshouse. Furthermore, despite the high cost of hybrid seeds, farmers are becoming increasingly concerned about the cultivation of hybrid seeds.

Chilonda and Huylbroeck (2001) <sup>[1]</sup> investigated farmers' views about better agricultural technology adoption. They highlighted how lack of agricultural technology knowledge and information affects the adoption of improved agricultural technology.

Suhane *et al.* (2008) <sup>[8]</sup> studied the factors causing negative attitude toward improved maize seed. They found that insufficient knowledge, lack of information on improved seeds, insufficient agro-ecological conditions to grow improved seed, farmers' age, and availability of family labour are the major reasons for the apparent rejection of improved maize seed by farmers.

Gyau *et al.* (2009) <sup>[2]</sup> analyzed farmers' perception regarding the benefits of genetically modified corn. They found that farmers' attitudes regarding genetically modified seeds differ significantly. They recommended that personalised information may be used by technology proponents as a strategy to promote farmer acceptance and adoption of new technology and/or variety.

Matuschke and Qaim (2009) <sup>[3]</sup> undertook a survey to determine the impact of social factors on smallholder farmers' adoption of advanced seed technologies in developing nations. The study was conducted on wheat and millet growers in Maharashtra State of India. They found that individual social networks play a significant role in technology adoption decisions, as these networks use comprehensive data on farmer traits and social contacts. While village-level variables can be useful proxies at later stages of diffusion, but individual networks dominate in terms of influence in the early stages of adoption.

Mittal and Mehar (2015) <sup>[4]</sup> examined the elements that influence farmers' adoption of various hybrids. The findings suggested that farmer's age, education level, and farm size have significant impact on how they choose different hybrid seed crops.

Singh, Kumar and Jatwa (2019) [8] carried out a landmark study in the Indian state of Karnataka to discover the factors impacting the growth of the vegetable sector. Hybrid vegetable seed growers and seed firm employees were the respondents. The determinants of the expansion of the vegetable seed sector were identified using factor analysis. Policy considerations, geographical factors, market factors, and farmer-oriented variables were discovered to be the key contributors impacting the expansion of India's hybrid vegetable seed sector. The present study is also focused on farmer related variables for assessing the perception and constraints for using improved planting material in Jhabua district of Madhya Pradesh.

Patel and Thakkar (2023) [5] highlighted the changing profile of Indian farmers as they have started using smart phones and internet services. They noted that the progressive farmers of new generation are very techno friendly and when they will prefer smart-work rather than hard-work. They will use digital technologies and digital services very effectively for farming purpose. Consequently, such modern day tech-savvy farmers may rise to become early adopters of any new technology and/or variety.

In a hitherto study in Banaskantha district of Gujarat, Patel and Thakkar (2023) [6] assessed the awareness, expectations and usage of agricultural apps by farmers. Based on a survey of 200 farmers selected through multi-stage sampling method, this study highlighted the changing profile of farmers in Gujarat state with the use of various Agricultural Apps and the wide ranging expectations from the developers of these Apps. With this progressive outlook of farmers, we can accept them to adopt any new technology and/or variety including the use of improved planting material.

**Results and Discussion**

**Socio-economic profile of farmers**

In this study, out of 100 respondent farmers, 50% of respondents were under the age group of 31-40 years followed by 36% in the age group of 41-50 years and only 4% farmers were in the age group of below 30 years. Mostly (27%) farmers had completed education up to SSC/Diploma followed by below SSC (24%), HSC (19%), graduate (8%) and 7% farmers were post graduates in terms of their education. But, 15% farmers were not literate. Most farmers (45%) were under 4 to 6 members' household category, followed by 34% with 2 to 3 members in family, and 20% of

farmers were having more than 6 members in the family. Only 1% farmer had only 1 member in the family. Most farmers (29%) were marginal farmers with land holding up to 1 Ha, 24% respondents were small farmers with 1-2 Ha land holding, 21% were semi-medium farmers with land holding of >2 to 4 Ha land, 18% were medium farmers with >4 to 10 Ha land and only 8% were large farmers with land holding of more than 10 Ha. Most (45%) respondents were doing Farming + Livestock followed by Farming + Business (20%), Farming + Livestock + Business (18%), Farming + Livestock + Service (9%), Farming + Service (5%) and Farming only (3%). So, only 3% respondents were dependent on farming only. So, majority of respondents (97%) were connected with other occupation with farming. This shows progressive nature and outlook of farmers.

For 40% farmers, canal was the major source of irrigation, while well was the major source of irrigation for 25% farmers, followed by bore for 22% farmers and lake for 13% of the total respondents. In and all, all the farmers had good source of irrigation.

**Table 1:** Crops grown in majority of the area by farmers through Transplanting

Crop	No. of Respondents	Percentage (%)
Tomato	41	41
Chilli	33	33
Watermelon	19	19
Another crop	7	7
Total	100	100

An effort was made to know the major crops grown through transplanting by the surveyed farmers on the majority area of their land holding. The results of this have been summarized in Table 1. Table 1 shows that out of total 100 respondents; 41% farmers were growing Tomato in majority of area through transplanting, 33% were growing Chilli and 19% were growing Watermelon through transplanting. 7% of the total respondents were growing other than these three major crops of this region; in majority of their land area as transplanting crop.

It was also found that out of 100 farmers, 58% were using hybrid seeds for vegetable crops like tomato, chilli and watermelon; and remaining 42% used other than hybrid seeds for these vegetable crops.

**Table 2:** Procurement sources of improved planting material

Particulars	Source	Percentage (%)
Source of seed procurement	Using previous years' material	70
	Purchasing from market	30
Source of seedling procurement	Own Nursery	28
	Commercial Nursery	72

Table 2 shows the procurement sources of improved planting material as used by the surveyed farmers. This table shows that majority of them (70%) were using previous years' material for seed purpose whereas remaining 30% were purchasing seeds from the market.

Further, majority of farmers (72%) used to procure seedlings from commercial nursery and remaining 28% preferred to prepare seedling in their own nursery.

**Factor influencing procurement of improved planting material**

For understanding the influencing factors for procurement of

improved planting material by farmers in the study region, farmers were asked to rate important parameters (as identified from earlier research studies) on a 5-point Likert scale. The scale had 5 points wherein HI-Highly Important-5 was the highest rating followed by I-Important-4, N-Neutral-3, LI-Less Important-2 and NI-Not Important-1 as the least important rating. Weighted Average Mean (WAM) was determined by adding values of scale which is multiplied by weight from 5 to 1 and divided by number of respondents. Based on WAM of these ratings, ranks were given to the influencing factors. These rankings of 7 influencing factors are shown in Table 3.

**Table 3:** Influencing factors for procurement of improved planting material

Factor	HI	I	N	LI	NI	WAM	Rank
Variety of the seed	27	26	18	11	18	3.33	2
Location of Nursery	24	26	19	11	20	3.23	4
Convenience of Booking	18	25	26	18	13	3.17	6
Age of the Seedling	20	22	25	24	9	3.20	5
Price	29	30	17	11	13	3.51	1
Delivery Time	25	27	17	15	16	3.30	3
Range of variety of seedlings available	19	18	25	22	15	3.01	7

5-Highly Important (HI), 4-Important (I), 3-Neutral (N), 2-Less Important (LI), 1- Not Important (NI)

Table 3 shows that the farmers consider different parameters while procuring improved planting material. The respondents gave the 1<sup>st</sup> rank to price with WAM of 3.51, as planting materials are very costly and minute changes per unit can make big difference in overall planting material cost. 2<sup>nd</sup> ranking parameter was found to be variety of the seed (3.33), followed by delivery time (3.30) as the 3<sup>rd</sup> important parameter, as timely delivery of planting material is very

important because delayed transplanting will affect the establishment of plant in the field. Location of the nursery (3.23) was found to be the 4<sup>th</sup> important parameter influencing the procurement of improved planting material by these farmers. Age of the seedling (3.20) was the 5<sup>th</sup> important factor followed by convenience of booking (3.17) with 6<sup>th</sup> rank and range of variety of seedlings available at nursery (3.01) as the last ranked factor out of the 7 factors.

**Table 4:** Constraints faced by farmers in getting quality improved planting material

Constraints	SA	A	N	D	SD	WAM	Rank
Unavailability of range of variety	25	23	24	18	10	3.35	2
Late Delivery	22	26	22	20	10	3.30	3
Non uniform seedling	24	20	27	10	19	3.20	4
High Price	30	28	20	14	8	3.58	1
Inadequate variety of seed	20	24	26	14	16	3.18	5

5-Strongly Agree (SA), 4-Agree (A), 3-Neutral (N), 2-Disagree (DA), 1-Strongly Disagree (SD)

### Constraints faced by farmers in getting quality improved planting material

For identifying the constraints faced by the surveyed farmers in getting quality improved planting material, they were asked to rate important constraints (as identified from earlier research studies) on a 5-point Likert scale; wherein SA-Strongly Agree-5 was the highest rating followed by A-Agree-4, N-Neutral-3, DA-Disagree-2 and SDA-Strongly Disagree-1 as the least important rating. Weighted Average Mean (WAM) was determined by adding values of scale which is multiplied by weight from 5 to 1 and divided by number of respondents. Based on WAM of these ratings, ranks were given to the major constraints, as shown in Table 4.

Top five major constraints faced by farmers in getting improved planting material are shown in Table 4. It shows that the top most constrain was reported to be the high price with WAM of 3.58 because they think that to get quality improved planting material, they have to pay very high price. This is consistent with the findings of influencing factors for procurement of improved planting material as price emerged as the most influencing factor with the 1<sup>st</sup> rank. Other major constraints faced by farmers were unavailability of range of variety (3.35), late delivery (3.30), non-uniform seedling (3.20), and inadequate variety of seed (3.18).

### Suggestions

To increase the use of improved planting material by farmers in the study region, the researchers have attempted to offer some suggestions, as listed below:

- Majority of farmers are growing tomato and chilli as transplanting crop. So, production of seedlings of these crops should be increased to ensure availability of required quality and quantity as and when required.
- Majority of the farmers are procuring planting material

from commercial nurseries. So, there is a high potential for growth of commercial nursery business in the region. So, technically sound people with entrepreneurial zeal can and should capitalize this opportunity.

- Farmers give high importance to price, variety of the seed and delivery time while procuring the planting material. So, ensuring the availability of the improved planting material of right variety at right price and at the right time to the farmers can certainly increase the usage of improved planting material by farmers.
- Unavailability of range of variety and late delivery were also found to be the major constraints bothering the farmers. So, range of varieties should be made available and timely delivery of the improved planting material should also be ensured.
- Other constraints like non-uniform seedling and inadequate variety of seed should also be overcome to encourage farmers to use improved planting material.

### Conclusion

Quite often, improved agricultural technologies promoted by governments and other actors are not necessarily adopted by farmers, particularly in developing countries. It may be due to lack of information and understanding on farmers' preferences and priorities and the way the improved technologies fit their realities. Considering the importance of improved planting material in enhancing farmers' income and their welfare as well as nation's prosperity, this study assessed the influencing factors and farmers' constraints for procurement of improved planting material in Jhabua district of Madhya Pradesh. Small farmers' seed sourcing practices are often influenced by social ties and cultural norms. So, it was relevant to understand from where and why farmers seek to acquire planting material. This study found that the major crops grown as transplanting in the Petlawad region were

tomato, chilli and watermelon. Canal was found to be the major source of irrigation for the farmers. Majority of the farmers were found to be using previous years' produced material for seed purpose and commercial nurseries was the major source of seedling procurement. Price was the most influencing factor considered by farmers followed by variety of seed and delivery time while procuring seedlings. Major constraints faced by the farmers in getting quality planting material were high price, unavailability of range of variety, late delivery, non-uniform seedling, and inadequate variety of seed. Based on the suggestions given as a fruitful outcome of this research, systematic efforts must be made by respective stakeholders to encourage farmers to use improved planting material, as this will not only help to increase the agricultural productivity and consequently nation's prosperity; but will also increase farmers' income and standard of living.

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