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Analyzing impact of seed village programme on seed replacement rate in soybean

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Abstract
Agriculture is vital to Indian economy. In fact, agriculture is in grained to civilization irrespective of territory. Thus, the socio-economic development of Indian society largely depends on the progress of agriculture. The productivity of crops is the focus of agriculture development. This becomes more important with the rising challenge of shrinking land. Seed can play an important role in raising the productivity of the crop. It can be enhanced by increasing the seed replacement rate. The study was conducted with 120 respondents randomly selected in six village of Bhainsdehi block. During the study, the data obtained from the department of farmer welfare and agriculture development Betul, seed replacement rate of Soybean was 11.50% before the programme, but after that Seed Village Programme was started, the seed replacement rate has improved. The current seed replacement rate of soybean in Bhainsdehi block of Betul district is 30.12%, which was better than old seed replacement rate. So, there is certainly a positive, good and absolute effect of seed village programme on seed replacement rate.

Keywords: Seed village programme (SVP), seed replacement rate (SRR)

Introduction
Soybean is cultivated as major rainy season crop in India particularly in central part of the country. Madhya Pradesh has its major share in area (70%) and production (65%) in India and hence knows as "Soy State". In the state the average productivity of soybean is very low (10-12 q ha-1) as compare to its genetic potential (25 q ha^{-1}), (Rajan *et al*., 2021) [6]. Seed is the starting point of agriculture and dictates ultimate productivity of other inputs. Good quality seed alone increases the yield by 15-20 percent. Despite implementation of the organized seed programme since the mid 60s, the seed replacement rate has only reached the level of 15%. 85 percent of the seeds used are farm saved (Bhavani *et al*., 2019) [1]. However, shortage of quality seed during the sowing season is a recurring phenomenon in India, as the government's capacity to produce sufficient seed is limited and private seed is costly and available for only a few crops. The use of farm-saved seeds continuously leading to genetic degeneration of the seeds resulted in reduced yields and plant vigour within 2–3 years. In the recent past, private seed companies increase seed prices exorbitantly with monopolistic market power, leading to higher input costs and reduced incomes to farmers, which are unbearable to small land holding farmers. It is therefore necessary to improve the stock of farm saved seeds for enhancing crop production and productivity. Many studies indicated that higher SRR is essential for maintaining crop vigour and higher yields and returns. For this, seed production, seed distribution and other connected aspects will have to be improved and strengthened at the farmer's level. To upgrade the quality of farmer-saved seed this is about 80-85% of the total seed used for crop production programme. It is proposed to provide financial assistance for distribution of foundation/certified seed at 50% cost of the seed of crops for production of certified/quality seeds only and to provide training on seed production and technology to the farmers (Bhavani *et al*. 2022) [2]. The seed produced in these seed villages will have to be preserved till the next sowing season. Seed village programme is a component of the Central Government scheme for development and strengthening of infrastructure facilities for production and distribution of quality seed and is being implemented on all India bases from the year 2005-06 (Bordolui *et al*., 2020) [3]. The government has covered about 64,000 villages under this component since inception in 2005-06. A village where in trained group of farmers are involved seed production of various crop's and serve to the essentials of themselves, fellow

farmers of the village and farmers of the neighbouring village in appropriate time and at economical cost is called Seed Village. The Seed Programme includes the participation of state government, SAU system, public sector, cooperative and private sector institutions (Krishnamoorthy *et al.* 2022) [4]. In Madhya Pradesh during 2014, Soybean was cultivated in 6.38 m ha with annual production of 5.37 m ton and productivity 842 kg/ha. (Agricultural Statistics at a Glance 2014). In Betul district soybean was cultivated on 189.4 (000ha.) with annual Production of 180.6 (000t), and productivity 1003(kg/ha.) during 2013-14 (Agriculture contingency plan for Betul district 2013-14). The seed village programme was launched in the Betul district since 2007-08 by the department of farmer welfare and agriculture development govt. of M.P. The implementing agencies will be State Department of Agriculture, State Agriculture Universities, Krishi Vigyan Kendra, State Seed Corporation, National Seed Corporation, and State Farms Corporation of India (SFCI), State Seed Certification Agencies, and Department of Seed Certification. In M.P. the good quality seed is being distributed to farmers through Farmers Welfare and Agriculture Development by Seed Village Programme, due to this there is a considerable improvement in Seed Replacement Rate for Wheat, Soybean and Chickpea.

Methodology

The study was conducted in Betul district of Madhya Pradesh. The district has 1341 villages having 556 Gram panchayat. There are two important agriculture seasons *viz*., kharif and rabi and main crop grown soybean, sorghum, Maize, Rice, wheat, sugarcane and mango, guava, Ooange (Agriculture Contingency Plan for District: Betul 2009-10). The district has been divided into 7 tehsils namely Betul, Multai, Chicholi, Bhainsdehi, Shahpur, Amla, Aatner, Ghoradongri. There are 10 blocks in Betul district namely Betul, Shahpur, Ghoradongri, Chicholi, Multai, Pattan, Amla, Bhaisdehi, Bhimpur and Aathner out of which Bhainsdehi block will be selected purposively because there is maximum number of beneficiaries as compared to another block of the district. From each selected village 20 farmers were selected through simple random sampling method to make the sample size 120 for the study. The interview schedule was designed for collecting the relevant information of selected variables. The data were collected personally with the help of a pre-tested interview schedule. Data collected were qualitative as well as quantitative. The quantitative data were interpreted in terms of percentage and qualitative data were tabulated on the basis of approved categorization method. The statistical tools like frequency, percentage, mean and chi-square test were used in the study, to study the impact of seed village programme on seed replacement rate of soybean farmers before seed village programme and after the inception of seed village programme.

Seed Replacement Rate (SRR)

Seed Replacement Rate is the percentage of area sown of total area of crop planted in the season by using certified/quality seeds other than the farm saved seed with reference to Soybean crop. It was measured with help of self-scoring.

$$SRR = \frac{\text{Total seed distributed (q.)}}{\text{Total seed requirement (q.)}} \text{ X } 100$$

Results and Discussion

Table 1 shows that out of total Seed Village Programme beneficiaries, 49.17 percent were having medium Seed Replacement Rate, followed by 37.50 percent had low and 13.33 percent beneficiaries were having high Seed Replacement Rate. Thus, it can be concluded that maximum percentage (49.17%) of beneficiaries were having medium Seed Replacement Rate

Table 1: Distribution of seed village programme beneficiaries according to their seed replacement rate

S. No.	Categories	No. of beneficiaries	Percentage
1.	Low Seed Replacement Rate (Up to 7%)	45	37.50
2.	Medium Seed Replacement Rate (8 to 11%)	59	49.17
3.	High Seed Replacement Rate (12 to 15%)	16	13.33
Total		120	100.00

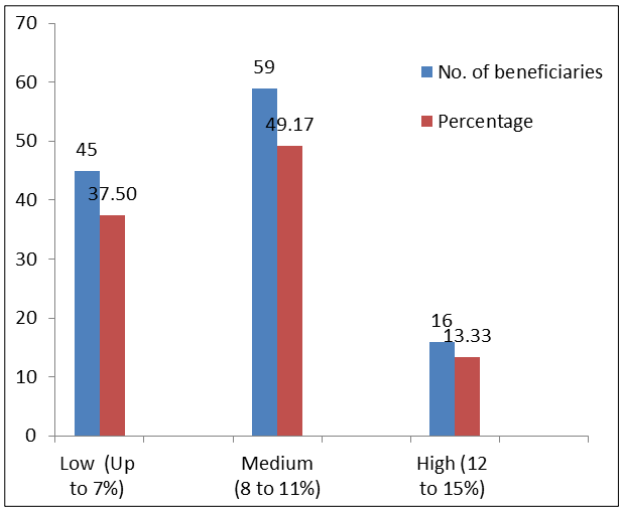

Fig 1: Beneficiaries according to their Seed Replacement Rate

Table 2: Distribution of beneficiaries according to change in Seed Replacement Rate

Crop	Seed Replacement Rate (%)		Absolute change (%)
	Before	After	
Soybean	11.50	30.12	18.62

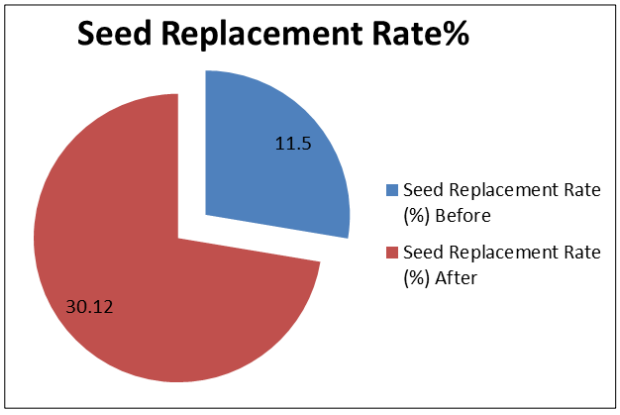

Fig 2: Beneficiaries according to change in Seed Replacement Rate

Table 2 the data obtained from the Department of Farmer Welfare and Agriculture Development Betul, in the year 2013-14 seed replacement rate of soybean was 11.50 percent, but after the Seed Village Programme was started, the seed replacement rate has improved. The data obtained from study

indicates that the current seed replacement rate of soybean is 30.12 percent, which is better than old seed replacement rate. This significant increase clearly indicates the program's efficacy in promoting the adoption of improved soybean seeds among farmers.

Table 3: Association between profile of beneficiaries and Seed Replacement Rate

S. No.	Variables	Chi-square value SRR
1.	Age	5.39 ^{NS}
2.	Education	9.63*
3.	Caste	3.15 ^{NS}
4.	Family Size	3.43 ^{NS}
5.	Social Participation	13.93*
6.	Occupation	11.46*
7.	Land Holding	8.58*
8.	Annual Income	13.66*
9.	Area under Seed	6.08*
10.	Market Orientation	11.81*
11.	Varietal Replacement	10.72*
12.	Production of Quality Seed	14.49*
13.	Economic Motivation	4.95 ^{NS}
14.	Aspiration Level	7.18 ^{NS}
15.	Mass Media Exposure	16.84*
16.	Extension Participation	13.09*

*Significant at 5% level of significance with 4 D.F.^{NS} Non-Significant

Table 3 shows that age, caste, family size, economic motivation, and aspiration level of beneficiaries do not exhibit any significant association with the seed replacement rate. Regardless of age, caste background, family size, economic motivations, or aspiration levels, there seems to be no discernible pattern suggesting an association with the likelihood of adopting new seeds. This suggests that these specific demographic and motivational factors may not be key determinants in predicting the seed replacement behaviour of the beneficiaries in the study. Other unexplored variables may play a more influential role in shaping seed replacement rates among the target population. The study also reveals several factors that exhibit a significant association with seed replacement rates among agricultural beneficiaries. Notably, education, social participation, occupation, size of land holding, annual income, area under the seed program, market orientation, varietal replacement, production of quality seed, mass media exposure, and extension participation all play discernible roles in influencing the likelihood of adopting new seeds (Nagar *et al*., 2022) [5]. This suggests a multifaceted interplay of socioeconomic, educational, and agricultural factors in shaping the decision-making process of farmers with regards to seed replacement (Bhavani *et al*., 2022) [2]. Policy makers and practitioners should consider these factors collectively to formulate effective strategies for promoting seed replacement and ensuring the successful adoption of improved agricultural practices.

Conclusion

The data obtained from study indicates that the current seed replacement rate of soybean is 30.12 percent, which is better than old seed replacement rate. The observed rise in seed replacement rates reflects a positive, substantial, and absolute effect attributable to the Seed Village Programme. The success in enhancing soybean seed replacement not only signifies the program's effectiveness but also underscores its role in advancing agricultural practices and contributing to the overall welfare of farmers in the Betul district. Regarding seed replacement rate of soybean crop highest percentage 49.17 percent of beneficiaries had medium seed replacement rate followed by low 13.33 percent and 37.50 percent in high. In relation to association between independent variables with their seed replacement rate, data revealed that SRR have significant positive association with education, social participation, occupation**,** size of land holding, annual income, area under seed programme**,** market orientation**,** varietal replacement**,** production of quality seed**,** mass media exposure, and extension participation with the seed replacement rate. But age, caste**,** family size, economic motivation and aspiration level of beneficiaries have no significant association with the seed replacement rate.

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