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Adoption of Improved Package of Practices of Soyabean Crop and Its Constraint Faced by Soyabean Growers

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The broad bed and furrow system has been mainly developed at the International Crops Research Institute for the Semi-arid Tropics (ICRISAT) in India.The scientist and farmers are concerned with the low productivity of Soybean under present agro-situations, keeping the aforementioned perspectives in mind and realizing the importance of broad bed furrow technology for soyabean crops in dissemination of technology. The study was carried out to know the effect of demonstration

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conducted at different locations on the production and profitability of the farmers. The field experiments were conducted at the farmer's fields in the operational village of Krishi Vigyan Kendra, Sangvi (Rly) Yavatmal-II district of Maharashtra. The selection of 50 respondents was randomly drawn from villages a cluster of five villages namely Dhulapur, Lohi, Tarnoli, Chikhali in Darwha tehsil and Karkheda, in Ner tehsil of Yavatmal. Thus, an attempt was made to examine the adoption of broad bed furrow technology in accordance with all the 21 recommended agronomic practicesin order to obtain important conclusions and suggestion for extension experts and soybean growers to update farmers technical knowledge. The majority of soybean growers (60%) had low level of overall adoption of the recommended practices. Under broad bed furrow technology, soybean growers are advised to implement 21 agronomic practices. Of these, 52% fully adopt the improved soybean varieties, 56% use recommended seed rate, 76% use herbicides to control weeds, and 50% of soybean growers partially adopt the improved package of practices to control insects and diseases. The majority of soybean grower encounter obstacles such as the unavailability of BBF machine (96 %) and skill labours (56%), as well as challenges while utilizing BBF technology (92%). Only 50 per cent of large size holding soyabean grower use BBF technology and 44 per cent of those with higher family income have access to it. It was concluded that improved package of practices of soybean cultivation was found superior in comparison with conventional seed drill.

Keywords: Adoption; improved package; soyabean; kharif season crop.

1. INTRODUCTION

Soybean (*Glycine max* L.) primarily a kharif season crop is a significant oilseed crop of India, ranking third place next to groundnut and rapeseed & mustard in terms of area and production. This crop possesses a higher potentiality to replace various oilseeds to overcome the shortage of edible oil and protein rich food. Soybean is one of the oldest cultivated crops of the world. In India large portion of the population are vegetarians, under this situation crop like soybean with high protein content and high yield potential became an important crop. Soybean protein is receiving more focus than any other source of protein today. Additionally, it provides numerous vitamins, calcium, phosphorous and iron. These characteristics make them well-suited for human consumption. Food uses of soybean use and fermented products like soya sauce and cheese.

'The scientist and farmers are worried about the low yield of Soybean under present agro situations. In order to overcome these problems, it is needed to educate and bring out the facts of the cultivation practices in the notice of the farmers through demonstration of improved production technology at their field so that they may augment technology based on seeing is believing it will develop the faith among the growers' (Singh et al., 2018). 'In a rainfed eco-system, it is crucial to strategize agriculture by making best use of rainfall potential. For achieve a sustainable crop production system under rainfed condition, it is vital to conserve of rain water and recycle it efficiently. The rainwater can be conserved in either in-situ or ex-situ setting within natural or man-made structure for additional irrigation. In-situ rainwater conservation can be implemented through tillage or management of the land surface' (Singh et al., 2000). 'The BBF landform management system primarily lowers the speed of runoff water and thereby enhance the time water to infiltrate and reduces sediment losses. Moreover, during the period of intense rainfall, the furrows facilitate the safe drainage of excess water from the plots and thus preventing water accumulation around the crop' (Kampen, 1982) (Raghuwanshi et al. 2009). Thus, keeping the above views in mind and realizing the importance of broad bed furrow technology for soyabean crops in dissemination of technology the study was carried out to know the effect of demonstration conducted at different locations on the production and profitability of the farmers.

2. MATERIALS AND METHODS

The field experiments were conducted at the farmer's fields in the operational village of Krishi Vigyan Kendra, Sangvi (Rly) Yavatmal-II district of Maharashtra. The selection of 50 respondents was randomly drawn from villages a cluster of five villages Dhulapur, Lohi, Tarnoli, Chikhali in Darwha tehsil and Karkheda, in Ner tehsil of Yavatmal district of Maharashtra and from each village 10 respondentto assess adoption of broad bed furrow (BBF) practices of Soyabean (Var. JS

95-60) was used and constraints faced by them. Therefore, an effort was made to study all the 21 recommended agronomic practices-wise adoption of broad bed furrow technology for drawing the meaningful conclusions and suggestions for farmers and extension professionals for updating the technical know-how of the farmers. Using an interview schedule, the soyabean growers were interviewed in order to get the data. An exploratory design of social research was used for study. For the measurement of the extent of adoption, a list of improved package of practices of soyabean crop was prepared and responses of the soyabean growers were collected based on it. Extent of adoption was measured on three-point continuum i.e. complete, partial and non-adoption.

3. RESULTS AND DISCUSSION

Table 1 revealed that component wise adoption of improved package of practices of soyabean crops in soybean growers are as follows;

3.1 Tillage and Land Preparation

Out of 21 agronomic practicesrecommended under BBF technology by the soybean growers; only 48 per cent soyabean growers fully implemented deep summer ploughing once in 3-4 years. Further, 46 percent partial adopted the practice of two criss-cross harrowing for seed bed preparation. Similarly, due to restricted FYM availability, only 32 per cent soyabean growers partially apply the FYM 10 t/ha to soyabean plot.

3.2 Variety, Seed Treatment, Sowing and Plant Geometry

It is quite encouraging to observe that majority of soyabean grower (52.%) have adopted improved soybean varieties The recommended seed rate and timely sowing were adopted by 56 and 50 % farmers, respectively. In case of partial adoption, half of the soybean growers maintained plant to plant and 64 per cent of their crops row to row due to ignorance of recommended spacing.

3.3 Weed Control& Plant nutrition

The majority of soyabean growers utilize herbicide for weed control (76 %) while56 per cent engage in manual weed control practices/interculture operation for managing weeds in soyabean crop. Whereas, the majority of soyabean growers (60%) use and partially apply recommended dose of NPK followed by 42 per cent soyabean growers partially apply the recommended amount of sulphur to soyabean crop.

3.4 Plant Protection and Harvesting

The majority of soyabean growers partially implement insect (56%) and disease (50%) control measures according to improved package of practices. Merely 32 per cent of soyabean grower partially implement soil and water conservation practice because of lack of knowledge and unawareness BBF technology. Timely harvest helped to avoid crop loss by majority of the farmers. The fore mentioned results are consistent with findings reported by Verma (2008), Singh et al (2011) and Gupta et al (2017) Lakpale et al. (2012).

The data (Table 2) concerning the adoption levels of soyabean growers related to broad bed furrow technology revealed that majority of soybean growers (60%) exhibited a low level of adoption of the suggested package of practices (Katare et al. 2013). Merely 12 per cent of the soyabean growers adopted the technologies at high level, whereas, only 28 per cent soyabean growers had medium level adoption, which present a significant issue for the development.

3.5 Constraints Faced by Soyabean Growers During Adoption

Further analysis of the data (Table 3) indicates theconstraints faced by soyabean grower while adopting of improved package of practices *i.e.* broad bed furrow technology in soyabean crop. The majority of soyabean growers encounters issue such as the lack of access to broad bed furrow machines (96 %) and skill labours (56%), they experience challenges when using of broad bed furrow technology (92%), some are unaware of the package of practice of related broad bed furrow technology (80%) and its importance (74%). Only a significant proportion of large size holding soyabean growers utilize broad bed furrow technology (50%) and those with higher family income have better access to this technology (44%).

Table 1. Adoption of improved soybean package of practices under BBF technology by soyabean growers

Sr. No.	Package of practices	Full adoption	Partial adoption	No adoption
A	**Tillage and Land Preparation**			
1	Deep summer ploughing once in 3 years	24 (48.00)	22 (44.00)	4 (8.00)
2	Two cross harrowing/ cultivator	10 (20.00)	23 (46.00)	17 (34.00)
3	Apply FYM @ 10 t/ha	10 (20.00)	16 (32.00)	24 (48.00)
B	**Variety, Seed Treatment, Sowing and Plant Geometry**			
4	Use improved soybean variety	26 (52.00)	16 (32.00)	8 (16.00)
5	Use recommended seed rate	14 (28.00)	28 (56.00)	8 (16.00)
6	Germination test	9 (18.00)	15 (30.00)	26 (52.00)
7	Seed treatment with fungicide	7 (14.00)	15 (30.00)	28 (56.00)
8	Seed treatment with Rhizobium/ PSB culture	7 (14.00)	16 (32.00)	27 (54.00)
9	Timely sowing on BBF	20 (40.00)	25 (50.00)	5 (10.00)
10	Use of intercrop	32 (64.00)	11 (22.00)	7 (14.00)
11	Maintain row to row distance	15 (30.00)	31 (62.00)	4 (8.00)
12	Plant to plant spacing	14 (28.00)	32 (64.00)	4 (8.00)
C	**Weed Control**			
13	Herbicide use	38 (76.00)	9 (18.00)	3 (6.00)
14	Manual weed management/ inter-culture operation	12 (24.00)	28 (56.00)	10 (20.00)
D	**Plant Nutrition**			

15	Application of recommended dose of NPK	15 (30.00)	30 (60.00)	5 (10.00)
16	Application of recommended dose of Zinc	11 (22.00)	14 (28.00)	25 (50.00)
17	Application of recommended dose of Sulphur	13 (26.00)	21 (42.00)	16 (32.00)
E	**Plant Protection**			
18	Insect management	12 (24.00)	28 (56.00)	10 (20.00)
19	Disease management	10 (20.00)	25 (50.00)	15 (30.00)
20	Soil moisture conservation	11 (22.00)	16 (32.00)	23 (46.00)
F	**Harvesting**			
21	Timely harvesting	18 (36.00)	22 (44.00)	10 (20.00)

Table 2. Adoption improved soybean package of practices by soyabean grower

Adoption level	Number of soyabean grower	Percentage
Low	30	60.00
Medium	14	28.00
High	6	12.00
	50	**100.00**

Table 3. Constraints faced by soyabean growers during adoption of improved soyabean package of practices

Sr. No.	Constraints	Respondent N=50	Percentage
1	Unavailability of BBF Machine	48	96.00
2	Difficulties use of BBF technology	46	92.00
3	Lack of knowledge about package of practices in soybean on BBF technology	40	80.00
4	Lack of knowledge about importance of BBF technology in now days	37	74.00
5	Unavailability of skill labour	35	70.00
6	Lack of knowledge about soil management practices	32	64.00
7	Lack of knowledge about use of seed rate	28	56.00
8	BBF technology adopted only large size holding	25	50.00
9	Less contact with extension worker	24	48.00
10	Higher family income provides access to technology	22	44.00

4. CONCLUSION

Based on the findings from the current study, soybean cultivation using the tractor operated seed cum fertilizer drill method of sowing, along with harvesting using a combined harvester, is a crucial option for achieving improved crop growth, yield andlower cultivation costs. Additionally, mechanization also helps in avoid the losses caused by unexpected rainfall during the harvesting periods. In conclusion, it was determined that the method of soybean cultivation utilizing the broad bed furrow seed drill was found superior when compared to the conventional seed drill. The technology is beneficial for increasing soyabean productivity and necessitates the execution of demonstrations within the transfer of technology programme by KVK's. Horizontal spread of improved technologies may be accomplished the effective execution of frontline demonstrations and various extensions activities like training program, field day and exposure visit organized in Front Line Demonstration programs in the farmer's fields.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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