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Performance of Soybean Variety JS 97-52 in Kohima District of Nagaland, India

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A B S T R A C T

Krishi Vigyan Kendra, Kohima District of Nagaland a conducted front-line demonstration with 10 beneficiaries in Tesophenyu village during the *Kharif* season of 2021-22 and 2022-23. Soybean variety JS 97-52 high yielding was selected for demonstration with all improved practices along with a control plot where farmer's practices were carried out. The productivity of soyabean yield ranges from 1820-1749 kg/ha with mean yield of 1784.5kg/ha under the demonstrated plot. The mean yield increases from 44.06% during the year 2021-22 and 41.08% during the year 2022-23 over farmer's practice indicating the existence of technology gap and extension gap. The technology index varied from 30.02 % to 27.3% which shows the feasibility and effective of the newly demonstrated under farmer's field. The average benefit cost ratio of recommended practices was 3.73 and that of farmers practice was 2.89.

Introduction

Soyabean is a legume crop widely grown in Nagaland for its distinctive characteristics and adaptability to diverse agro-climatic conditions and soils. Soybean is grown as sole crop or mixed with maize or other pulses mostly in Jhum field. Soybean is considered an important crop because of its dual purpose that is oil seed as well as pulses crop. Soyabean forms an integral part of the diet widely used as condiment 'Akhuni/Axone' a traditional soybean based fermented in preparation of various naga cuisine in most of the naga household.

In spite of its popularity in the states, the farmers give very little priority for its cultivation on large scale as a sole crop because of less awareness of improved technology of soybean production. Suitable sowing time, Choice of variety and plant population are important input to achieve synchronous maturity and higher productivity of soybean. Poor agronomic practices are one factor which is responsible for low productivity.

Another major challenge is the traditional practice of slash and burn of the jhum lands which has led to resource degradation and most of fertile top soil is washed down during rainy season especially leading to reduced soil fertility. Therefore, to overcome the soil from loss and improve its fertility and productivity, Soybean which is most commonly crops grown as sole or intercropping can act as one of the most common agronomical soil conservation methods for protecting the soil (Vizokhonyü *et al.*, 2021). Hence, with an effort by the KVK Kohima introduce the recommended technologies of soybean production with HYV JS-97-52 through front line demonstration on farmers field during *kharif* season of 2021-22 and 2022-23.

Materials and Methods

The present study was carried out by the Krishi Vigyan Kendra, Kohima District of Nagaland during the *Kharif* season of 2021-22 and 2022-23 in the farmer's fields in Tesophenyu village. The frontline demonstrations were carried out in 5 ha area with 10 beneficiaries. Group discussion and Farmers scientist interaction were conducted before intervention. In between the technology intervention HRD components Training, Demonstration and Monitoring of the demonstration plot were also included to boost the farmers for better understanding and skill about the demonstrated technology on soybean. The major issues identified were unavailable of quality seeds on time, non-awareness of HYV of soybean, improper sowing methods, continue using of same old variety resulting in low productivity. Several technological gaps have also been emerged and identified during interaction.

Prior to demonstration, the farmers were selected and trained on the technology. The demonstration plot was also monitored time to time by KVK experts at farmer field to suggest necessary and need based advisories. The soybean crop was sown during the *kharif* season on fourth week of June 2022-23 using soybean variety JS-97-52 and harvested on maturity during October 2023. The data on yield and economic were collected from both the demonstration field and farmers practice to further study the technology gap, extension gap and technology index, the calculation was analysed given by Samui *et al.,* (2000).

Technology gap = Potential Yield (Py) - Demonstration Yield (Dy)

Extension gap = Demonstration Yield (Dy) - Farmer's Yield (Fy)

$$\text{Technology Index (\%)} = \frac{\text{Technology Gap}}{\text{Potential Yield}} \times 100$$

Results and Discussion

The result from the performance of FLD revealed that (Table 1) the yield obtained in both the years were higher than the farmers practices. The productivity of soyabean yield ranges from 1820-1749 kg/ha with mean yield of 1784.5 kg/ha under the demonstrated plot. The mean yield increases from 44.06% during the year 2021-22 and 41.08% during the year 2022-23 over farmer's practice. Similar results have been reported by Tiwari *et al.,* (2014). The reasons for lesser yield under farmer's practice may be attributed to various factor such as use of local/un-recommended variety, delayed sowing, unproper methods of sowing can be reflection of lack on technology adoption. Similar result has been reported by Diwedi *et al.,* (2010). The higher yield of the soyabean crop maybe due recommended HYV which implies for higher yield and productivity. Similar results have been reported earlier by Jain and Dubey (1998).

Technology and Extension gap

Technology gap under studies revealed that (Table 1) mean yield gap of 715.5 kg/ha indicates factors attributing to variation in soil fertility, weather condition, availability of water, plant protection measures and other environmental factors. Similar results have been reported by Katare *et al.,* (2013) in their studies on technology gap. Raj *et al.,* (2013) reported similar result in their studies on technology gap by soil fertility and weather conditions. Technology gap under these studies revealed that more demonstration can be conducted with technology intervention in cooperating soil fertility management in different location. Studies under extension gap revealed that yield gap ranges from 535 kg/ha to 530 kg/ha. The lack of extension gap is due to methods of sowing and selection of improved varieties and other recommended practices. Extension gap could be reduced by having proper planning and involvement from extension workers and department as well. Similar findings were reported by Meena *et al.,* (2016) and Bhargav *et al.,* (2017). The technology index varied from 30.02 % to 27.3% which shows the feasibility and effective of the newly demonstrated under farmer's field. Application and use of different recommended practices could significantly increase the yield and productivity.

Economic Return

The cost of cultivation was a little higher in the demonstrated plots (Table 2) as compared to farmer's practice due to the cost incurred in purchased of seeds, labour cost and transportation. The cost investment on recommended practices ranged from Rs. 18640 to 19600/ha with a mean value of Rs. 19120/ha against farmers practice with variation in cost investment of Rs. 17800-Rs. 16800/ha with a mean of Rs. 17300/ha.

Table.1 Performance of FLD during 2021-22 and 2022-23

Year	Crop (Variety)	No. of FLD	Yield(kg/ha)			Per cent increase yield over local check	Technology gap (kg/ha)	Extension gap (kg/ ha)	Technology index (%)
			Yield potential	FLD Yield	Farmers practice				
2021-22	JS 97-52	10	2500	1749	1214	44.06	751	535	30.04
2022-23	JS97-52	10	2500	1820	1290	41.08	680	530	27.2

FLD=Frontline demonstration

Table.2 Economics of FLD and Farmers practices

Year	Cost of cultivation (Rs. /ha)		Gross return (Rs. /ha)		Net Return (Rs/ha)		B:C Ratio	
	FLD	Farmers practice	FLD	Farmers practice	FLD	Farmers practice	FLD	Farmers practice
2021-22	19600	17800	69960	48560	50360	30760	3.56	2.72
2022-23	18640	16800	72800	51600	54160	34800	3.90	3.07
Average	19120	17300	71380	50080	52260	32780	3.73	2.89

FLD=Frontline demonstration, B:C=Benefit:Cost

Cultivation of soybean under recommended practices gave higher net return of Rs.50360 and Rs.54160 compared to Rs.30760 and Rs.34800 per hectare under farmers practice during 2021-22 and 2022-23 respectively. The higher net returns in improved production practices were due to higher grain yield in demonstrated plots as compared to farmer's practice. Similar results have been reported by Suryavanshi *et al.,* (2020).

The average benefit cost ratio of recommended practices was 3.73 and that of farmers practice was 2.89. This may be due to higher yields obtained under recommended practices compared to farmer's practice. Similar results have been reported, (Tomar, 2010). From the result it can be stated that all the economic indices show higher results under improved technology than the farmers practices. Similar findings have been reported by Hannah *et al.,* (2023) and Singh *et al.,* (2019).

The result of the Frontline demonstration on soyabean JS 97-52 shows that yield can be increased by proper intervention and in cooperating the recommended practices and technology in soyabean production in Kohima district, Nagaland. The cost benefit ratio shows the economic viability and more remunerative in terms of return which can motivate the farmers for adoption of technology and cultivation of soyabean in the district. Hence, more efforts should be made to encourage the farmers by conducting more demonstration in the farmers field for enhancement in terms of yield, economic and to reduce the technological and extension gap and shows the potentiality of the crop in farmers' field.

Author Contribution

Dr. Martina Shitiri, Conceived the original idea and conducted the research in the field, collected data's and wrote the manuscript. Dr. Ruokuo Mezhatsu, Supervision and wrote the manuscript

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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