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Front Line Demonstration (FLD) on Integrated Crop Management Practices in Brinjal

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With its vast geographic area and varied agro-climatic conditions, Arunachal Pradesh is well suited for growing varieties of vegetable crops. In India, the significant vegetable crop brinjal (*Solanum melongena* L.) is grown over an area of 7.43 lakh hectares and produces 128.01 lakh tonnes with a productivity of 17.50 t/ha. India's major states for brinjal production include West Bengal, Odisha, Gujarat, Madhya Pradesh, Bihar, Chhattisgarh, Andhra Pradesh and Karnataka. In comparison to the national average of 17.16 tons/ha, Arunachal Pradesh has an area of 330 ha, produces 1790 tonnes and has an average productivity of 5.42 tons/ha (NHB data base, 2020-21).

In the Tirap district, brinjal is grown throughout the year, providing farmers with significant profits. The brinjal's shoot and fruit borer has developed a very serious problem in the district recently, resulting in a significant yield loss of between 20% and 40%. Krishi Vigyan Kendra, Tirap conducted integrated crop management on brinjal yield and economics through frontline demonstration at farmers' field. The main objective of frontline demonstration was to demonstrate newly released crop production, protection technologies and its management practices at the farmer's field under different agro- climatic regions and farming situations and also convincing farmers about the brinjal production technologies for further wide scale diffusion. Therefore, a study on effect of integrated crop management practices on yield and economics of Brinjal in Tirap district of Arunachal Pradesh was conducted during 2017-18.

Table 1. Package and Farmers' Practices demonstrated in Brinjal FLD.

Particular	Technological intervention	Existing practices	Gap
Variety	GB (Abu)	Local or unknown	Full gap

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		privatehybrid/variety	
Seed rate	145 g /ha	200 g /ha	Partial gap
Seed treatment	Seed was treated with	Not treated	Full gap
Transplanting method	Transplanting on raised bed	Flat bed	Full gap
Spacing	90 cm x 60 cm	60 cm x 30 cm	Partial gap
Application of recommended doseof manure	5 kg/ meter^2	Nil/without recommend ation	Partial gap
Application of Bio fertilizer	Soil application of *Azospirillum* & PSB @ 2 kg/ha mix with FYM	No application	Full gap
Plant protection measures for control of insect pest and disease	Need based application of plant protection bio-pesticides for control: Fruitfly, mites and sucking pest - Spray of 5 % NSKE	Not followed, any type of spray	Full gap
Harvesting	Manual	Manual	No Gap

Materials and Methods

The Front line demonstrations were conducted on brinjal crop (Variety: GB/Abu) at farmers' field of Tirap district, Arunachal Pradesh during the year 2017-18 in nine villages namely Deomali, Namsang, Makat, Noitong, Soha, Doidam, Turret, Khela and Panidurya. The total twenty (20) numbers of demonstrations were demonstrated in 1 ha area. The critical inputs were supplied to farmers and applied as per the package of practices for brinjal crop recommended by Assam Agricultural university- Jorhat. Before conducting FLDs, a list of farmers was prepared from group meeting and specific skill training was imparted to the selected farmers regarding different aspects of cultivation. The difference between the demonstration package and existing farmers practices are mentioned in Table 1.

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Use of high-quality seeds of the improved variety GB (Abu) obtained from AAU, Jorhat were sowed in nurseries and transplanted in raised beds with the use of organic manure in demonstration plots. The customary ways were seen as a local check. The output data were gathered from FLD plots and control plots and then the extension gap, technology gap, and technology index; demonstration economics, as well as the benefit cost ratio, were calculated. The shown trials were continuously observed and all relevant information regarding the essential characteristics of the new types was gathered. Also, information on the farmers' customary methods of production was gathered. The formulas presented by Samui et al. (2000) and Dayanand et al. (2012) were used to calculate the technology gap, extension gap, and technology index as shown below:

1. Technology gap = Potential yield (kg/ha) - Demonstration yield (kg/ha);
2. Extension gap = Demonstration yield (kg/ha) – Farmers yield (kg/ha)
3. $$\text{Technology index} = \frac{\text{Potential Yield - Demonstration yield}}{\text{Potential yield}} \times 100$$
4. $$\text{Impact on yield} = \frac{\text{Yield of demonstration plot – yield of control plot}}{\text{Yield of control plot}} \times 100$$

(% increase over control)

Results and Discussion

The productivity of brinjal in the Tirap area was reported to range from 247 to 228 q/ha with better production technology, with a mean yield of 238 q/ha, which is 25% higher than farmers' custom. It implies that proved technologies were widely used even after FLD. These results were consistent with the work of Yadav and colleagues (2004). The high yielding potential variety, soil type, proper crop management and need-based application of a biocontrol material to control insect pests were the key contributors to the increased fruit yield of brinjal. The aforementioned findings concurred with those of Singh *et al* (2011). The 40 q/ha extension gap that was computed throughout the study period highlights the need for farmers to be educated about adopting improved agricultural production practices in order to buck the trend of a huge extension gap. The farmer's participation in putting out such a demonstration with good results was reflected in the trend of the technology gap of

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112 q/ha. The difference in weather and soil fertility status may be the cause of the observed technological gap. The technology index (32%) demonstrates the viability of the presented technology.

Table 2. Technology gap, Extension gap, Technology index and Productivity enhancement in Brinjal

Year	Fruit yield (q/ha)			(%) Increase in productivity	Technology gap (q/ha)	Extensiongap (q/ha)	Technologyindex (%)
	Potential	Demonstration	Control				
2017-18	350	238	198	25	112	40	32

Table 3. Cost of cultivation (Rs/ha), net return (Rs/ha) and benefit: cost ratio of Brinjal as affected by demonstration and local practices control.

Year	Yield (q/ha)		Cost of Cultivation(Rs/ha)		Gross Return (Rs/ha)		Net Return (Rs/ha)		Benefit Cost ratio B:C Ratio	
	Demonstration	Control	Demonstration	Control	Demonstration	Control	Demonstration	Control	Demonstration	Control
2017-18	238	198	52,632	58,624	2,38,000	1,98,000	1,91,368	1,39,376	3.46	3.37

Calculating the total cost of cultivation, gross return, net return, and B:C ratio (BCR) of the before FLD plot and after FLD plot allowed researchers to determine the economic viability of the demonstration technologies above and above the control. The sum of the costs for labour, irrigation, plant protection measures, seed, manure, and soil preparation was used to compute the overall cost of cultivation. It was discovered that the demonstration's cost of producing brinjal per hectare was Rs 52,632 as opposed to Rs 58624 under the control. The technical gap can be significantly closed by using scientific brinjal farming techniques, which will increase the district's output and boost the producers' economic standing. Also, in order to close the extension gap and improve the district's output

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of brinjal, extension organisations in the area must offer the farmers sufficient technical assistance using a variety of educational and extension methods.

Conclusion

Farmers were successfully influenced by the frontline demonstration to adopt integrated crop management in the production of brinjal. Following the frontline demonstration in the farmers' fields, the majority of the farmers were aware of the recommended brinjal cultivation procedures. B:C ratio, net return, and brinjal yield all increased in the demonstration plot compared to farmer practise. The increased productivity under FLD above current methods of brinjal growing raised awareness and encouraged other farmers in the district to adopt acceptable production techniques for brinjal.

Demonstration Photos

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