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Study on Brinjal's Demonstration in Arunachal Pradesh, India

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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 twenty numbers of frontline Demonstrations on Integrated Crop Management practices in Brinjal were demonstrated in selected villages of Tirap district, Arunachal Pradesh during Rabi season, 2017-18 and 2018-19 respectively. Before conducting the demonstration; field level surveys were conducted in selected villages to know the farmer's practices. As per result of survey; there was huge gap between scientific practices and farmer's practices. On the basis of surveys, Krishi Vigyan Kendra (KVK) Tirap, Arunachal Pradesh conducted the demonstrations. During the both years the extension gap was recorded in the demonstration plot as 40 & 59 q/ha respectively while the yield were as: 238 & 246 q/ha, Benefit: Cost Ratio ratios were 3.63 & 3.54 as compared control (198 & 187 q/ha and 2.37 & 2.12 respectively).

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Keywords: Frontline demonstration; integrated crop management; brinjal.

1. INTRODUCTION

With its vast geographic area and varied agro-climatic conditions, Arunachal Pradesh is well suited for growing a variety of vegetable crops. In India, the important 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. The states of West Bengal, Odisha, Gujarat, Madhya Pradesh, Bihar, Chhattisgarh, Andhra Pradesh and Karnata are leading producers of brinjal in India. Arunachal Pradesh state has an area of 330 ha, produces 1790 tonnes and has an average productivity of 5.42 tons/ha which ia very los as compared nation's productivity [1].

In the Tirap district, brinjal is grown throughout the year and provides substantial profits to the farmers. The shoot and fruit borer of brinjal has caused a very serious problem in the district recently, resulting in a significant yield loss of between 20% and 40%. Taking into account of above considerations, 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 Rabi season of 2017-18 and 2018-19 respectively" [2].

2. MATERIALS AND METHODS

The Frontline demonstrations were conducted on Brinjal crop (Variety: GB/Abu) at farmers' field of Tirap district, Arunachal Pradesh, India during Rabi season of 2017-18 and 2018-19 respectively in nine villages namely Deomali, Namsang, Makat, Noitong, Soha, Doidam, Turret, Khela and Panidurya. The total twenty (20) numbers of demonstrations having 0,1 ha plot size were demonstrated during the both years. 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 of brinjal. The difference between the demonstration package and existing farmer's practices are mentioned in bellow's Table 1.

Table 1. Package and farmers' practices demonstrated in brinjal FLD

Particular	Technological intervention	Existing practices	Gap
Variety	GB (Abu)	Local or unknown Private hybrid/variety	Full gap
Seed rate	145 g /ha	200 g /ha	Partial gap
Seed treatment	Seed was treated with Bavistin	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 dose of FYM	5 kg/ meter^2	Nil/without Recommended dose of application	Partial gap
Application of Bio fertilizer	Soil application of Azospirillum & PSB @ 2 kg/ha mix with 100 kg 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: Fruit fly, mites and sucking pest - Spray of 5 % NSKE	Not followed,any type of spray	Full gap
Harvesting	Manual	Manual	No Gap

Table 2. The weather during the research period

Month	Rainfall(mm)		Temperature ^{0}C				Relative Humidity (%)			
	2017	2018	2017		2018		2017		2018	
			Max.	Min.	Max.	Min.	M	E	M	E
April	247	186.0	34.4	12.2	35.2	13.2	82	67	81	65
May	327	117.5	35.6	14.6	36.7	15.1	86	73	89	75
June	241	433.4	36.8	16.5	37.7	17.2	91	80	93	82
July	347	336.6	34.2	18.4	35.4	18.9	93	83	95	81
August	493	277.3	33	19.1	34.2	20.1	87	85	89	87
September	371	186.2	32.3	18.8	33.6	20.1	88	84	91	86
October	162	118.0	26.5	17.2	27.4	18.4	89	90	92	92
November	7.6	15.4	25.1	12.3	25.9	14.1	87	82	89	88
December	0	0	25.8	9.4	26.2	10.2	85	83	86	87
January	12.2	12.7	25.4	8.6	26.2	9.1	85.7	88	84.9	88
February	69.6	69.0	26.1	7.9	26.9	8.3	88	90	83	92
March	138.2	123.0	28.7	8.8	29.1	9.2	85	81	82	83

Where Max. denotes maximum, min. denotes minimum, M denotes Morning, E denotes evening

The different types of Agroclimatic zones are prevalent in Arunachal Pradesh. The Tirap district falls under Eastern Himalayan Region (Zone II), Sub region-: Per Humid Hyper Thermic Foothills; where hot climate and humidity is very common characteristics. The rains start from End of February and continue up to September. The intermediatory dry spells; which are hot and humid, frequently occur.

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 and control plots and then the extension gap, technology gap, and technology index; economics 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 [3,4] 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. $\text{Technology index} = \frac{\text{Potential Yield} - \text{Demonstration yield}}{\text{Potential yield}} \times 100$

4. $\text{Impact on yield} = \frac{\text{Yield of demonstration plot} - \text{yield of control plot}}{\text{Yield of control plot}} \times 100$ (% increase over control)

3. RESULTS AND DISCUSSION

The productivity of brinjal in the Tirap area was reported to range from 228- 247 q/ha with better production technology, with a mean yield of 238 q/ha, which is 25% higher than farmers' custom (Table 3). It implies that proved technologies were widely used even after FLD. These results were consistent with the work of [5]. 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 [2]. The superior genotypes can boot brinjal yield in country [6,7]. The aforementioned findings concurred with those of [8,9]. 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 [4]. The farmer's participation in putting out such a demonstration with good results was reflected in the trend of the technology gap of 112 q/ha [10]. Training and awareness programmes are the vital factors for creating awareness among farming community [11]. The difference in weather and soil fertility status may be the cause of the observed technological gap [12,13]. The technology index (32%) demonstrates the viability of the presented technology [14,15] also revealed that improved package of practices can enhance the brinjal productivity at farmer’s field.

Table 3. Technology gap, extension gap, technology index and productivity enhancement in brinjal

Year	Fruit yield (q/ha)			(%) Increase in productivity	Technology gap (q/ha)	Extensio ngap (q/ha)	Technology index (%)
	Potential	Demo. plot	Control plot				
2017- 18	350	238	198	20	112	40	32
2018-19		246	187	32	104	59	30

Table 4. 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	
	Demo.plot	Control plot	Demo.plot	Control plot	Demo.plot	Control plot	Demo. plot	Control plot	Demo.plot	Control plot
2017-18	238	198	52,632	58,624	2,38,000	1,98,000	1,91,368	1,39,376	3.63	2.37
2018-19	246	187	54,214	59,829	2,46,000	1,87,000	1,91,786	1,27,171	3.53	2.12

Calculating the total cost of cultivation, gross return, net return, and B:C ratio (BCR) allowed researchers to determine the economic viability of the demonstration technologies. The sum of the costs for labor, irrigation, plant protection measures, seed, manure, and soil preparation were 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 (Table 4). 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 [16,17,18]. In order to close the extension on gap and improve the district's output of brinjal, extension organizations in the area must offer the farmers sufficient technical assistance using a variety of educational and extension methods. Proper integrated pest management practices can enhance the yield of brinjal in the country [19], He further added that these integrated pest management practices have to be disseminated on farmer's field for better outcome as well. Different types of biopesticides and insecticides are the best option to control major pest of brinjal like- fruit borer, stem borer, fruit fly etc. [20,21]. He has proved that bioagents enhances the brinjal yield with environmental safety; which are the main concern in the era of global warming.

4. CONCLUSION

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 practice. 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.

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 manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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