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Impact of frontline demonstration on yield enhancement of turmeric in Balaghat district of Madhya Pradesh

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Abstract
To spread the production technology of the high yielding (243.6 q/ha) turmeric variety Palam Pitambari with a high curcumin content (6.8%), Krishi Vigyan Kendra, Balaghat held 10 demonstrations in various villages in the Balaghat district of Madhya Pradesh from 2018–19 to 2019–20. Through meetings and conversations with farmers, the crucial inputs in the production technology now in use were determined. The main reasons for the low production of the turmeric crop in Balaghat district were ignorance about high yielding cultivars, uneven plant populations, unchecked weeds, ignorance of fertilizers, and a lack of plant protection measures. To ensure rhizome treatment, balanced fertilizer application, watering, and prompt plant protection measures, farmers underwent training. In comparison to local methods, these actions guaranteed greater yields in the range of 11.1 to 12.9%.

Keywords: Front line demonstration, Palam Pitambari, yield, benefit/cost ratio

Introduction
Assamese farmers cultivate turmeric (*Curcuma longa* L.), renowned as the king of spices, in their baris (homestead gardens). The crop may enable the farmer to earn more money. These variables contribute to low production because farmers in the baris grow this crop using a conventional system, using only FYM at planting time and no other nutrient treatment strategies. Another significant reason for the low productivity in this area is a lack of understanding about high-quality planting material. With a crop period of 300–315 days and an average yield potential of 268 q/ha, the Balaghat condition is resistant to leaf blotch and leaf spot. The cultivar has 5.5 percent essential oil, 6.8 percent curcumin, and 16.37 percent dry matter. According to Chandra *et al.* (2005) [3], it is extremely resistant to the diseases leaf spot (*Colletotrichum capsici*) and leaf blotch (*Taphrina maculans*). There is therefore a lot of room to boost turmeric's productivity. According to Manan *et al*. (2019) [6], in sandy soils with low levels of NPK, farmers must use 25% more phosphatic fertilizer than is advised coupled with the usage of mulching material @ 6 t/ha in order to maximize the rhizome yield of turmeric. KVKs are essential to the rural economy in generaldistinguish field as horticulture, agronomy, plant protection etc. KVK, Darrang has done intensive training about scientific cultivation, demonstration on new variety and other interventions. The present study was conducted with an aim to disseminate recommended technology to farmer's field through frontline demonstration on turmeric crop in the operational area of the KVK.

Materials and Methods
During the years 2018–19 and 2019–20, Krishi Vigyan Kendra (KVK), Balaghat, performed ten frontline demonstrations on the turmeric crop at farmers' fields in various villages throughout the district. Choudhary (1999)'s [4] recommendations regarding the choice of farmers, the design of the demonstration, the involvement of farmers, etc. were followed when performing FLDs. The necessary inputs were provided, and frequent visits to the demonstration fields by KVK specialists made sure that the farmers were given the right direction. As a preventative step against the disease rhizome rot, the recommended measures included treating rhizomes with Ridomil (2.5 g/l) for 40 min prior to sowing. To combat leaf spot disease, use FYM @ 20 t, N:P:K @ 30:50:60 kg/ha, engage in cross-cultural exchanges, and apply 1% Bordeaux mixture every 15 days. Group gatherings and field days were also held to provide cost ratio were also worked out (Samui *et al*., 2000) [8]

Table 1: Yield performance and economic data of the Palam Pitambari variety of turmeric frontline demonstration.

Year	Demo.	Avg. yield (q/ha)		% Increase over FP	Gross expenditure (Rs/ha)		Gross return (Rs/ha)		Net return (Rs/ha)		B:C Ratio	
		Demo.	FP		Demo.	FP	Demo.	FP	Demo	FP	Demo.	FP
2018-19	5	303.4	215.3	11.1	220000/-	205000/-	455100/-	117980/-	237500/-	119750/-	2.06	1.57
2019-20	5	310.9	220.4	12.9	215000/-	240000/-	621800/-	440480/-	381800/-	225480/-	2.59	2.04
Average	10	307.15	217.85	12	217500/-	222500/-	538450/-	279230/-	309650/-	172615/-	2.32	1.80

Farmer	Plant Hight 2020							
	90 Days		120 Days		150 Days		180 Days	
	FP	TP	FP	TP	FP	TP	FP	TP
S.No.	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer
1	17.5	28.5	56.5	65.5	63.5	72.8	75.6	85.1
2	22.4	33.2	59	66.5	71.2	79.6	80.5	93.9
3	27.5	37.3	61.1	68.7	74.5	83.1	83.1	96.5
4	19.5	31.6	57.8	66.2	67.5	74.3	79.9	91.5
5	16.8	27.4	53.9	63.1	64.6	71.2	75.4	88.5
Average	20.74	31.6	57.66	66	68.26	76.2	78.9	91.1

Farmers	Leaf/Plant 2020							
	90 Days		120 Days		150 Days		180 Days	
S.NO.	FP	TP	FP	TP	FP	TP	FP	TP
1	4	8	9	11	11	12	12	13
2	6	8	9	12	11	14	15	16
3	6	10	12	14	15	15	16	18
4	6	8	7	9	10	11	12	13
5	4	7	6	8	9	11	11	11
Average	5.2	8.2	8.6	10.8	11.2	12.6	13.2	14.2

Farmers	Leaf/Plant- 2019							
	90 Days		120 Days		150 Days		180 Days	
S.NO.	FP	TP	FP	TP	FP	TP	FP	TP
1	3	7	8	11	9	12	9	13
2	4	8	9	13	11	14	15	16
3	5	9	11	14	13	16	16	18
4	4	6	6	8	9	10	11	12
5	3	6	5	7	8	10	10	11
Average	3.8	7.2	7.8	10.6	10	12.4	12.2	14

Farmer	Plant Height-2019							
	90 Days		120 Days		150 Days		180 Days	
	FP	TP	FP	TP	FP	TP	FP	TP
S.No.	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer	Local Variety	Palam pitambaer
1	17.5	28.5	54.3	63.4	61.1	69.4	73.5	84.2
2	22.4	33.2	56.7	64.7	69.5	76.2	79.8	90.3
3	27.5	37.3	57.9	66.2	73.2	80.2	81.5	94.2
4	19.5	31.6	55.9	64.9	63.4	71.7	78.3	85.4
5	16.8	27.4	52.1	59.3	61.2	68.5	72.7	80.8
Average	20.74	31.6	55.38	63.7	65.68	73.2	77.16	86.98

Results and Discussion

The data (Table 1) showed that the performance of various turmeric. During all of the demonstration years, it was discovered that palam pitambari was significantly higher under the demonstration plots than under the control. While the average production for farmers' methods was 215.3 and 220.4 q/ha in the corresponding years, the yield under demonstrations was 303.4, 310.9, and q/ha in 2018–19 and 2019–20, respectively. But in 2018–19 and 2019–20, the percentage increase over local yields was 11.1 and 12.9, respectively. Similar results in Palam Pitambari Turmeric have been reported by Chandra *et al*. (2005) [3]. Due to the use of high producing varieties, timely planting, balanced fertilizer doses, plant protection measures, etc., the results clearly showed the advantages of FLDs over the currently used procedures in terms of boosting the yield of turmeric in the research area. The differences in microclimate and the cost of the local market can be used to explain the year-to-year variations in yield and cultivation costs. The study also showed that demonstration plots had a greater benefit/cost ratio than the control. The demonstration plot's B:C ratio was found to be the greatest (2.59). This might be due to variation of price during the study years. The farmers have also satisfied with the colour of the turmeric powder.

Conclusion

The study came to the conclusion that plant protection methods and need-based plant diseases on enhanced turmeric varieties considerably increased the production. In comparison to farmer practices, demonstration plots showed higher net returns and benefit cost ratios. The method can be used to increase the turmeric crop's yield and cover more

ground. The introduction of modern industrial technology will significantly improve local residents' livelihoods and income.

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