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Impact of front-line demonstration (FLD) on the yield and economics of banana in Madurai district of Tamil Nadu

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Abstract

Tamil Nadu is the fourth highest banana producing state in the country. In the past five years, there has been 32% increase in banana production in the state. One of the major constraints of traditional farming is low productivity due to lack of recommended package of practices and high yielding varieties. To replace this inconsistency of practices, Krishi Vigyan Kendra, Madurai conducted Front line demonstrations in the farmer's field. Through frontline demonstration farmers were provided with all the basic inputs (improved practices). The technology adopted in his field is micronutrient spray @ 2% on 4th, 5th and 6th month's interval from the date of planting. This resulted in higher yield than that obtained through the farmer's practices. The average percentage of increase over farmers practice through this demonstration was recorded to be 11.9 percent during 2019-20 and 15.4 percent during 2020-21. The average extension gap in the improved practices was 15.0 q/ha during 2019-20 and 20.0 q/ha during 2020-21. The average technology gap in the improved technology was found to be 7.0 q/ha during 2019-20 and 5.0 q/ha during 2020-21.

Keywords: FLD, banana, micronutrients, foliar spray, economics

Introduction

India is the world's largest producer of bananas, accounting for more than 25% of the global yield and country exported bananas worth of 660 crores in 2019-20. Tamil Nadu is the fourth highest banana producing state in the country. In the past five years, there has been 32% increase in banana production in the state. Tamil Nadu exports the fruit to South Korea, Europe and South Africa, mainly from Theni and Dindigul region as it produces the best quality banana in the state (Sivarajah, 2022) ^[1]. Bananas are considered not only as a staple food and cash crop in the economy but several millions of people subsist mainly on banana and plantain for source of food energy. It contains reserve of energy like carbohydrates, phosphorous, calcium, iron, vitamins and minerals. It is called as "kalpatharu" (gives whatever you want). It occupies the dining table of everyone's home. It reduces the heart diseases. It gives immediate energy. It plays the main role in removing malnutrition. The bananas are the world's fourth most dietary staple food (Meenakshi and Prasad, 2022) ^[22]. The main objective of the FLDs is to demonstrate and popularize the improved production technologies among the farmers.

Materials and Methods

The present study was carried out in Krishi Vigyan Kendra, Agricultural College and Research Institute, Madurai during *Kharif* season of 2019-20 and 2020-21. Ten farmers were selected in Melavalavu and Melanedungulam villages, Kottampatti and Thiruparangundrum blocks of Madurai district during 2019-20 and 2020-21, Ten farmers were selected in Kottampatti block and Thiruparangundrum block during 2019-20 and 2020-21. Altogether twenty front line demonstration on cultivation of Banana (Muppattai) were laid out in one acre each totaling 8 ha respectively under irrigated condition. Training programme was imparted to the beneficiaries related to crop production technologies as a part of demonstration. The various aspects included

in the frontline demonstration were introduction of new variety, integrated nutrient management, weed management, proper irrigation schedule, integrated pest management and harvesting. The detail guidance regarding scientific cultivation practices of banana cultivation were given to the farmers to increase the awareness of improved technology and to increase productivity of banana. The technology adopted in his field is micronutrient spray @ 2% on 4th, 5th and 6th month's interval from the date of planting. Yield data were collected from farmer's practices and improved practices. Cost of cultivation, gross return, net return and benefit cost ratio (B: C ratio) were computed and analysed. The technology gap and technology index were calculated using the following formula as given by Samui *et al.*, 2000 [3].

% increased over farmers practices = Improved practices (IP) – Farmers practices (FP) / farmers practices (FP) x 100

Technology index = Potential Yield – Demonstration Yield / Potential Yield x 100

Technology gap = Potential Yield - Demonstration Yield

Extension gap = Demonstration yield – Yield under Farmers Practices

B: C ratio = Net income (Rs. / ha) / cost of cultivation (Rs. / ha)

Results and Discussion

Yield

The average yield of banana under improved practices was 163 q/ha during 2019-20 and 165 q/ha during 2020-21. The yield was much higher than compared to that of farmer's practices which was only 148 q/ha during 2019-20 and 145 q/ha during 2020-21. The average percentage of increase in the yield over farmer's practices was 10.1% and 13.8% respectively during 2019-20 and 2020-21. The results indicated that the Frontline Demonstration gives better impact on farming community of Madurai district by higher productivity due to adopting new improved cultivation practices (Santhosha *et al.*, 2020 and Ancy and Kurien, 2000) [4, 5].

Extension Gap (EG)

The average extension gap in the improved practices was 15.0 q/ha during 2019-20 and 20.0 q/ha during 2020-21. This gap shows that there is need to educate the farming community about the improved crop management techniques. There is also need to educate the farmers about new high yielding varieties to replace the low yielding local or old varieties. This will increase the yield per capita and overcome the extension gap (Table 1) narrated same by Nazreen Hasson, 2019 [6].

Technology Gap (TG)

The average technology gap in the improved technology was found to be 7.0 q/ha during 2019-20 and 5.0 q/ha during 2020-21. It might be due to different climatic and edaphic conditions which increase the technology gap (Nazreen Hasson, 2019 and Meena *et al.*, 2016) [6, 7].

Technology Index (TI)

The technology index shows the feasibility of the evolved technology at the farmer's field and the lower the value of technology index more is the feasibility of the technology. The index was found to be 4.1 during 2019-20 and 2.9 percent during 2020-21 of this study (Nazreen Hasson, 2019; Meena *et al.*, 2016 and Nallathambi, *et al.* 2012) [6, 7, 8].

Economic Return (ER)

The inputs and outputs prices of produce prevailed during the study of demonstration were taken for calculating cost of cultivation, gross return, net return and benefit: cost ratio (Table 2). The demonstration of banana under improved practices gave higher net return and B: C ratio of Rs. 89390/- and 1.36 during 2019-20 and of Rs. 91990/- net returns and 1.42 B:C ratio during 2020-21. This might be due to higher yield obtained from improved technology as compared to farmer's practices

Table 1: Technology index, technology gap and extension gap of Banana

Crop	Variety	Planting method	Area (ha)	Yield (q/ha)		Increase over FP	Technology index (%)	Technology gap (q/ha)	Extension gap (q/ha)
				IP	FP				
2019-20									
Banana	Muppattai	Line Planting	4	160	143	11.9	5.8	9.8	17
2020-21									
Banana	Muppattai	Line Planting	4	165	143	15.4	5.8	5.3	21

Table 2: Economic impact of the demonstration

Economics of demonstration (Rs. /ha)				Economics of check (Rs. /ha)			
Gross Cost	Gross Return	Net Return	BCR (R/C)	Gross Cost	Gross Return	Net Return	BCR (R/C)
2019-20							
64551	152190	87639	1.34	67500	140600	73100	1.08
2020-21							
64550	158731	94181	1.46	67300	137750	70450	1.04

Table 3: FLD farmer's details and economic analysis of Banana (2019-20)

S No.	Name of Farmer	Village	Dist.	Variety	Crop	Area (ha)	IP Yield (q/ha)	FP Yield (q/ha)	Net Income (Rs/ha)	B:C Ratio	IOFP (%)	TI (%)	TG (q/ha)	EG (q/ha)
1	Velaiyappan	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	160	145	86390	1.32	10.3	5.88	10.0	15
2	Rajaram V	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	165	148	90750	1.38	11.7	2.94	5.0	17
3	Pitchai R	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	159	148	86250	1.33	7.6	6.47	11.0	11
4	Selvaraj V	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	155	139	85250	1.38	11.0	8.82	15.0	16
5	Ayyavur T	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	160	140	86550	1.32	13.8	5.88	10.0	20
6	Mani B	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	165	145	90750	1.38	13.8	2.94	5.0	20
	Cinnanana	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	156	145	85900	1.38	7.6	8.24	14.0	11
8	Cinnanana	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	155	140	85250	1.38	10.3	8.82	15.0	15
	Thanraj V	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	160	135	86950	1.34	17.2	5.88	10.0	25
10	Karuppaiya N	Melavalavu	Madurai	Desi/Muppattai	Banana	0.4	167	145	93050	1.42	15.2	1.76	3.0	22

Table 4: FLD farmer's details and economic analysis of Banana (2020-21)

S No.	Name of Farmer	Village	Dist.	Variety	Crop	Area (ha)	IP Yield (q/ha)	FP Yield (q/ha)	Net Income (Rs/ha)	B:C Ratio	IOFP(%)	TI (%)	TG (q/ha)	EG (q/ha)
1	Ganesan	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	168	150	93990	1.43	12.0	5.88	2	18
2	A. Nandagobal	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	170	143	95500	1.45	18.9	2.94	2	25
3	C. malairajan	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	167	145	93803	1.45	15.1	6.47	3	22
4	C. pandi	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	163	139	92613	1.49	17.1	8.82	7	24
5	P. rajaram	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	163	140	89400	1.37	16.4	5.88	7	23
6	K. saraswathy	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	173	146	98588	1.49	18.7	2.94	11	13
7	Alagupillai	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	164	148	92610	1.47	10.7	8.24	5	17
8	Makkai	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	163	140	92613	1.49	16.3	8.82	5	25
	Kannan	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	165	138	91700	1.41	19.6	5.88	3	29
10	Perumal	Nedungulam	Madurai	Desi/Muppattai	Banana	0.4	175	145	100983	1.54	20.9	1.76	8	17

Conclusion

The FLD by Krishi Vigyan Kendra in Madurai significantly boosted banana yields and economic returns. Improved practices, like micronutrient sprays, increased yields by 10.1% in 2019-20 and 13.8% in 2020-21. The program highlighted the need for better farmer education, reducing extension and technology gaps. Economic analysis showed higher net returns and benefit-cost ratios, proving the effectiveness of adopting modern agricultural practices in Tamil Nadu.

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