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Performance and income augmentation through frontline demonstration of turmeric var. Pitambari and Sugandham

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Abstract

In the pursuit of creating awareness about the potential of Turmeric varieties, comprehensive demonstrations were precisely conducted in the 2022-23. In the Pitambari variety, the substantially increased in yields of demonstrated plot was observed 282.50 q/ha as compared to control plots (257.50 q/ha). Notably, the yield increment was calculated 9.71% with 13.87% technology index. Similarly the extension gap was recorded 25.00 q/ha and technology gap was found 45.50 q/ha. Moreover, the BCR was higher in the demonstrated plots of (3.36) when compared with the check plot (3.15). Furthermore the net return increase was observed 13.02% and additional return was recorded 45,730 Rs/ha. Whereas, in the case of Sugandham variety, the considerably improve in yields of demonstrated plot was observed 155.00 q/ha as compared to control plots (137.50 q/ha). Notably, the yield increment was calculated 12.73% with 22.50% technology index. Similarly the extension gap was recorded 17.50 q/ha and technology gap was found 45.00 q/ha. Moreover, the BCR was higher in the demonstrated plots of (1.89) when compared with the check plot (1.64). Furthermore the net return increase was observed 36.24% and additional return was recorded 38,902 Rs/ha.

Keywords: Turmeric, Pitambari (GNT 3), Sugandham, yield, technology gap, extension gap and technology index

Introduction

Turmeric (*Curcuma longa* L.) a well-known horticultural crop not only used as a spices but also a condiment, dye, drug and cosmetic as well as having its importance in religious ceremonies. (Dubey *et al.*, 2017) [2]. In Sanskrit, it is referred to as Haridra, meaning, one that adorns the body of the omnipotent, all-powerful Hindu deity, Hari, Lord Vishnu. In Ramayana, turmeric is listed amongst eight ingredients, to be mixed in water to perform the arghya ritual. Arghya ritual comprises of washing the feet, of venerable guests like the rishis, learned Brahmins and devatas. Four types of turmeric are mentioned in the ancient Ayurvedic texts (Bhavaprakasha Nighandu) compiled in the 14th century. Haridra (Turmeric), Vana Haridra (Wild Turmeric, *Curcuma aromatica* Salisb), Karpooora Haridra (Camphor Turmeric) Daru Haridra (Tree Turmeric).

Turmeric's use in traditional medicine can be traced back centuries, with its presence in Ayurvedic and traditional Chinese medicine systems. Recently communicated that turmeric can even effectively bestowed against the life-threatening viral disease COVID-19 by impairing the main protease enzyme (Rajagopal *et al.*, 2020) [7].

All parts of Turmeric are edible, major edible part is rhizome and contain abundant starch. Particularly, it is the vital kitchen ingredient of curry powders. Also, rich source of major components of the diet *viz.*, proteins, minerals and vitamins. North Gujarat is famous for its fresh turmeric recipe. In recent years, there has been a growing interest in natural compounds and traditional remedies for their potential health benefits.

In India, Turmeric is grown in around 0.29 million hectares of area with an annual production of 1.1 million tonnes of turmeric (Spice board, 2021) [10]. India is a leading producer and exporter of turmeric in the world. Andhra Pradesh, Tamil Nadu, Orissa, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra, Assam are some of the important states cultivating turmeric, of which, Andhra Pradesh alone occupies 38.0% of area and 58.5% of production (Dubey *et al.*, 2017) [2]. The farmer of South Gujarat particularly Tapi and Navsari districts, Turmeric is cultivated in large areas. South Gujarat is known as a bowl of horticultural crops. (Gurjar *et al.*, 2023) [4].

Turmeric cultivation in this region is practiced after half completion of summer. Navsari district has medium black soil, warm climate (Gurjar *et al.*, 2022, 2023) ^[5, 6] Moreover, this spice crop production is very low in the Navsari district therefore it gives opportunity to local farmers in the market for price. Therefore, to find out the performance of the Turmeric var. Pitambari and Sugandham in the farmer's field, KVK Navsari organized demonstrations in the farmer's field with the following objectives:

1. To study the performance of the Turmeric varieties in the farmer's field
2. To find out the economics
3. To find out the Extension gap, Technology gap and Technology index

Materials and Methods

Krishi Vigyan Kendra (KVK) demonstrated scientific cultivation practices for Turmeric var. Pitambari (21 FLDs with 0.07 ha area) and Sugandham (12 FLDs with 0.04 ha area) in Navsari, Jalalpure and Gandevi talukas (Blocks) within the Navsari district during the summer season of 2022-23 (Table 1). These demonstrations were carried out in well irrigated areas with good drainage facilities in the fields of farmers. The selecting of the sites, farmers and the design of the demonstrated plot followed the advised put forth by Choudhary (1999) ^[1]. Farmer lists were prepared through surveys studies and meetings. Moreover, the skill trainings were conducted on scientific farming practices and plant protection measures. (Gurjar *et al.*, 2023) ^[5]. A notable part of these demonstrations was farmers were also advised to use fertilizers and manure, such as 60-60-60 g NPK/ha with 10 t/ha well-rotten FYM as well as planting distance of 45 x 30 cm. Farmers were also advised for sowing method with sowing month. Furthermore, they were informed to collect the variety in the month of February which they usually grow.

The traditional practices followed by farmers were continued in the case of local checks (Gurjar *et al.*, 2022 and 2023) ^[6] ^[5]. The BCR was determined based on collected data. Information regarding monetary returns and production expenditures were gathered to assess the economic feasibility. The methodologies suggested by Eswaraprasad *et al.*, (1993) ^[3] and Samui *et al.*, (2000) ^[9] were followed to measure the effectiveness of the demonstrations. The details of the formulas are mentioned below.

Extension Gap = Demonstration Yield – Farmer Yield

Technology gap = Potential Yield – Demonstration Yield

Technology index = (Technology gap / Potential Yield) *100

Yield Increase % = ((Demonstration Yield – Farmer Yield) / Farmer Yield) *100

Results and Discussion

The exhibited variety plots of Pitambari yielded (Table 2) an average of 282.50 q/ha, while the check plots yielded 257.50 q/ha. This led to a notable yield increase of 9.71%. The demo variety had the potential to yield 328.00 q/ha. The gap between the demonstration yield and farmer yield, known as the extension gap, was 25.00q/ha, while the gap between potential yield and demos yields (the technology gap), stood at 45.50q/ha. The technology index was calculated 13.87%. This number indicates that there is a gap present between technology developed and technology adopted at farmer's field and represents the feasibility in conducting a demonstration (Rambabu *et al.*, 2022) ^[8].

Another turmeric variety, Sugandham, was similarly evaluated. The variety exhibited plots of Sugandham yielded an average of 155.00 q/ha, while the check plots yielded 137.50 q/ha. This led to a notable yield increase of 12.73%. The demo variety had the potential to yield 200.00 q/ha. The extension gap was calculated 17.50 q/ha, while the technology gap, stood 45.00 q/ha. The Technology index was observed 22.50%.

The research paper (Table 3) simplifies the understanding of demonstration outcomes by offering a detailing expenditure and returns for different turmeric varieties. Taking Turmeric Pitambari as an example, the demonstration incurred a gross cost of 1,68,011 Rs. per hectare and yielded a gross return of 5,65,000 Rs., resulting in a net return of 3,96,989 Rs. and BC ratio of 3.36. In comparison, the check plots had a gross cost of 1,63,740 Rs., a gross return of 5,15,000 Rs., a net return of 3,51,260 Rs. and a BC ratio was calculated 3.15. This indicates a net return increase of 13.02% due to the demonstrated variety

Similarly, Turmeric variety Sugandham exhibited a gross cost of 1,63,740 Rs. in the demo with a gross return of Rs. 3,10,000, leading to a net return of 1,46,260 Rs. and a BC ratio of 1.89. The check plots had a gross cost of 1,67,642 Rs., a gross return of 2,75,000 Rs., a net return of Rs. 1,07,358 and a BC ratio was recorded 1.64. Here, the demonstration contributed to a net return increase of 36.24%.

The purchase price of all varieties was similar; hence the additional cost was not recorded. Even though Pitambari recorded 45,730 Rs. and Sugandham variety recorded 38,902 Rs. additional returns by just utilizing the varieties with scientific approach.

Table 1: Area and Total participant data and FLDs Detail of Turmeric Varieties during the year 2022-23

Sr. No.	Crop and Variety name	Season	Area (ha)	Total Farmers
1	Turmeric var. Pitambari (GNT 3)	Summer	0.07	21
2	Turmeric var. Sugandham	Summer	0.04	12

Table 2: Yield performances and calculations for FLDs of Turmeric Varieties during the year 2022-23

Sr. No.	Name of crop and variety demonstrated	Distance of planting	Potential yield of the demo variety (q/ha)	Yield obtained (q/ha)		Extension gap (q/ha)	Technology gap (q/ha)	Yield increase (%)	Technology index (%)
				Demo average (q/ha)	Check Average (q/ha)				
1	Turmeric var. Pitambari (GNT 3)	0.45*0.30	328.00	282.50	257.50	25.00	45.50	9.71	13.87
2	Turmeric var. Sugandham	0.45*0.30	200.00	155.00	137.50	17.50	45.00	12.73	22.50

Table 3: Expenditure and Monetary Returns of FLDs on Turmeric Varieties organized during the year 2022-23

Sr. No.	Demonstration detail	Expenditure and Returns (Rs./ha)								Net Return increase per cent	Additional	
		Demo				Check					Cost (Rs/ha)	Return (Rs/ha)
		Gross Cost (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B: C ratio	Gross Cost (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	B: C ratio			
1	Turmeric var. Pitambari (GNT 3)	1,68,011	5,65,000	3,96,989	3.36	1,63,740	5,15,000	3,51,260	3.15	13.02	0	45,730
2	Turmeric var. Sugandham	1,63,740	3,10,000	1,46,260	1.89	1,67,642	2,75,000	1,07,358	1.64	36.24	0	38,902

Conclusion

The findings of this study highlight that the awareness of cultivation of Turmeric varieties resulted in a significant increase in yield (9.71% and 12.73%) and the net return recorded 13.02% and 36.24% for Pitambari and Sugandham crops, respectively. The Technology gaps and extension gaps existed between the use of demonstration and farmer's practices. It can be easily observed from the data that by application of technical knowledge adopting recommended practices and by improvement of extension activities farmers can reach up to potential yield. Furthermore, Pitambari variety has given best performance with additional return to farmers in the South Gujarat region.

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