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Enhancing awareness and productivity potential of mango ginger varieties (Amravanti and Jyoti) through comprehensive frontline demonstration

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Abstract

This study aims to disseminate the potential of Mango Ginger varieties, Amravanti and Jyoti, through comprehensive demonstrations conducted in Navsari district during the 2022-23 period. The study encompasses multiple blocks, particularly Navsari, Jalalpore and Gandevi and evaluated the impact of these demonstrations on yield augmentation and economic gains. The results reveal that cultivation of the Amravanti variety led to a substantial increase in yields (130.00 q/ha), outperforming the farmers plots (117.50 q/ha) by 10.64% yield increase. Moreover, the Jyoti variety demonstrated remarkable yield enhancement (245.00 q/ha), surpassing the control plots (212.50 q/ha) by 15.29% yield increase. Furthermore, the extension gap (12.50 q/ha and 32.50 q/ha), technology gap (30.00 q/ha and 66.00 q/ha), technology index (18.75% and 21.22%) and net return increase (15.57% and 42.49%) were calculated for Amravanti and Jyoti variety, respectively. Notably, the benefit-cost ratio exhibited higher values in the demonstrated plots of Amravanti (3.49) compared to the check plots (3.16) whereas, 1.80 and 1.56 BCR was calculated in Jyoti compared to the check plots. Remarkably, both varieties demonstrated incremental returns of 50,000 Rs/ha (Amravanti) and 48,750 Rs/ha (Jyoti) without incurring additional costs.

Keywords: Mango ginger, Amravanti, Jyoti, yield, economics, BCR, technology index

Introduction

Mango ginger (*Curcuma amada* Roxb.) is a lesser known yet flavorful horticultural crop. Belonging to the ginger family Zingiberaceae, it shares a close botanical affinity with turmeric (*Curcuma longa*). Distinguished by rhizomes resembling common ginger, mango ginger uniquely lacks the pungency of ginger and imparts a raw mango flavor, thus earning its distinctive nomenclature. Taxonomical classification remains a point of contention, with some authorities regarding *Curcuma mangga* as synonymous, while others delineate it as a distinct species; *C. mangga* originates in southern India, and *C. amada* in the east, as per Jana *et al*, 2010 [6].

Mango ginger stands out as a sought-after spice and vegetable due to its distinctive flavor profile, characterized by sweet notes with subtle earthy, floral, and pepper undertones reminiscent of raw mango. It has found a delectable place in salads and stir-fries, enriching South Asian, Southeast Asian, and Far East Asian cuisines. It is commonly used to flavor dishes, including a traditional curry made from buttermilk and chickpea flour. In South India, it stars in pickles, while North India employs it for chutneys. Gujarat features it in culinary and panichaa preparations and Nepal's southern plains include it as chutney in community feasts. A noteworthy mention is the popularity of mango ginger and elephant foot yam pickle in Nepal's southern plains.

Mango ginger is an enigmatic horticultural gem, recognized by an array of regional epithets that mirror its diverse cultural significance. Referred to as Amragandhi Haridra in Sanskrit, In the Hindi vernacular, it resonates as Amba Haldi, encapsulating the essence of both mango and turmeric in its vibrant rhizomes. The name Safed Haldi follows suit, aptly describing its pale hue, a departure from the conventional turmeric's deep yellow. In Gujarat's devotional culinary system, it emerges as Amba Haldar, a name that pays homage to its kinship with turmeric while celebrating its unique mango-like flavor. Maharashtra, with its rich culinary heritage, elevates it to Aamba Haldi and Pandhari Haldi, capturing its dual identity as a spice and a healer. Amarada in Bengali echoes the sensory delight it brings, as 'Amarada' translates to 'eternal delight', signifying its enduring allure.

Venturing southwards, we encounter a diverse medley of names. In Kannada, it assumes the guise of Ambekombu, a term that fuses its botanical ties and aromatic prowess. The Telugu-speaking regions embrace it as Mamidi Allam and Karu Vasupu, eloquently acknowledging its kinship with both mango and ginger. Tamil Nadu, known for its rich culinary heritage, christens it Samidi Allam, a name that encapsulates its unique sensory profile. In the lush landscapes of Kerala, it resonates as Mangayiriyi, a name that encapsulates the essence of its raw mango-like flavor.

Beyond its linguistic resonance, mango ginger occupies a distinctive place in culinary and medicinal realms. Its flavor profile, a symphony of sweetness with nuanced floral and peppery undertones, embellishes an array of dishes, enriching the culinary traditions of South Asia, Southeast Asia, and the Far East. In dishes like the traditional buttermilk and chickpea flour curry, it imparts a sensory journey that marries tradition and innovation. Medicinally, Ayurveda and Unani systems extol its virtues as an appetizer, alexiteric, antipyretic, aphrodisiac, and more, bestowing it with a role in holistic well-being.

In the context of horticulture, South Gujarat plays a pivotal role, earning the region the moniker of "bowl of horticultural crops" (Gurjar *et al.*, 2023) [4]. However, the cultivation and production of Mango ginger remain limited in this area only. Navsari district has medium black soil, warm climate (Gurjar *et al.*, 2022, 2023) [3, 5]. This environmental situation is best suitable for Mango Ginger. The locally available thin type variety consumption is more in tribal areas of South Gujarat namely, Dangs, Valsad, Tapi and Navsari district for salad and pickle. Whereas is the Saurashtra people prefers its thick variety type locally available variety it is known as 'Kachuro' used for powder and 'Panichuu'. The appearance of Amravanti is thin type and Jyoti is thick type like ginger. Generally, farmers grow locally available varieties which are lower in yield. To increase yield and quality production this demonstrations were conducted. The study aims to achieve the following objectives:

1. Comprehensively evaluation of the performance of the Mango ginger varieties
2. To ascertain the economic viability of these Mango ginger varieties.
3. To determine the Extension gap, Technology gap and Technology index

Materials and Methods

The Krishi Vigyan Kendra (KVK) in Navsari organized comprehensive Front-Line Demonstrations (FLDs) to promote the scientific cultivation techniques of Mango Ginger var. Amravanti (GNMT 1) planted at 0.45 x 0.15 meters (Table 2) and Jyoti (NMT 1), planted at a distance of 0.45 x 0.30 meters within the Navsari district. These FLDs were strategically executed during the summer season of 2022-23, primarily focusing on the Amravanti and Jyoti varieties (refer to Table 1 for specifics). Across the fields of farmers in Navsari, Jalalpore, and Gandevi talukas (Blocks), a total of 19 FLDs spanning 0.10 hectares were dedicated to Amravanti, while 18 FLDs encompassing 0.02 hectares were designated for the Jyoti variety. Rigorous adherence to site selection, farmer engagement, and demonstration layout was observed, aligning with the guidelines proposed by Choudhary (1999) [1]. A meticulous process of farmer identification through surveys and consultations facilitated the formation of participant lists, followed by skill-enhancing training sessions

held at the KVK campus on the application of scientific cultivation practices and optimal plant protection measures (Gurjar *et al.*, 2023) [4].

Central to these demonstrations was the utilization and analysis of Mango Ginger var. Amravanti and Jyoti. To ensure the scientific growth of these varieties, farmers were advised on the judicious use of fertilizers and organic manure, including a recommended application of 60-60-60 kg NPK/ha along with 10 t/ha well-rotten FYM. Traditional methodologies were upheld in the local check cases, maintaining consistency with established practices by local farmers (Gurjar *et al.*, 2022 and 2023) [4, 5].

The evaluation of the economic feasibility of cultivating the Amravanti and Jyoti crops employing the prescribed techniques involved the computation of the BC ratio. Integral to this assessment were data collection efforts encompassing monetary yields and production expenses extracted from the demonstration plots. Furthermore, the effectiveness of the FLDs was gauged through the determination of the technology gap, extension gap, and technology index, utilizing methodologies endorsed by Eswaraprasad *et al.* (1993) [2] and Samui *et al.* (2000) [7]. 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

Percent increase Yield = ((Demonstration Yield – Farmer Yield) / Farmer Yield) * 100

Results and Discussion

For the Amravanti variety, the demonstration plots yielded an average of 130.00 q/ha, a 10.64% increase over the check plots yielding 117.50 q/ha. The potential yield is 160.00 q/ha, revealing an extension gap of 12.50 q/ha and a technology gap of 30.00 q/ha. The technology index was 18.75%. A similar assessment for the Jyoti variety indicated a 15.29% yield increase, with the demonstration plots yielding 245.00 q/ha compared to 212.50 q/ha in the check plots. The potential yield is 311.00 q/ha, leading to an extension gap of 32.50 q/ha and a technology gap of 66.00 q/ha, with a technology index of 21.22%.

The economic analysis (Table 3) showcased the financial outcomes of the demonstrations. For instance, Amravanti incurred a gross cost of 1,48,926 Rs. per hectare, a gross return of 5,20,000 Rs. with a net return of 3,71,074 Rs. and a BC ratio of 3.49, reflecting a 15.57% net return increase compared to, the check plots had a gross cost of 1,48,926 Rs., a gross return of 4,70,000 Rs., a net return of 3,21,074 Rs. and a BC ratio of 3.16.

Similarly, Mango Ginger Jyoti variety exhibited plot recorded a gross cost of 2,04,015 Rs. with a gross return of Rs. 3,67,500, leading to a net return of 1,63,485 Rs. and a BC ratio of 1.80, whereas the check plots had a gross cost of 2,04,015 Rs., a gross return of 3,18,750 Rs., a net return of Rs. 1,14,735 and a BC ratio of 1.56. Here, the demonstration contributed to a net return increase of 42.49%.

Despite similar purchase costs, both varieties demonstrated additional returns - 50,000 Rs. for Amravanti and 48,750 Rs. for Jyoti - highlighting the economic advantage of adopting scientific approaches.

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

Sr. No.	Crop and Variety name	Season	Area (ha)	Total Farmers
1	Mango Ginger var. Amravanti	Summer	0.10	19
2	Mango Ginger var. Jyoti	Summer	0.02	18

Table 2: Yield performances and calculations for FLDs of Mango Ginger 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	Mango Ginger var. Amravanti	0.45*0.15	160.00	130.00	117.50	12.50	30.00	10.64	18.75
2	Mango Ginger var. Jyoti	0.45*0.30	311.00	245.00	212.50	32.50	66.00	15.29	21.22

Table 3: Expenditure and Monetary Returns of FLDs on Mango Ginger 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	Mango Ginger var. Amravanti	1,48,926	5,20,000	3,71,074	3.49	1,48,926	4,70,000	3,21,074	3.16	15.57	0	50,000
2	Mango Ginger var. Jyoti	2,04,015	3,67,500	1,63,485	1.80	2,04,015	3,18,750	1,14,735	1.56	42.49	0	48,750

Conclusion

In conclusion, cultivating Amravanti and Jyoti Mango Ginger varieties with awareness and scientific practices resulted in significant yield increments of 10.64% and 15.29%, respectively. Moreover, both varieties exhibited notable net return increases in the demonstration plots - 15.57% for Amravanti and 42.49% for Jyoti. The presence of technology and extension gaps underscores the potential for higher yields through improved practices. Notably, Amravanti showcased the best performance and provided additional returns for farmers in South Gujarat.

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