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Geographical indications as a pathway to SDG achievement: Evidence from GI and Non-GI farms in Tamil Nadu

¹LT Thirumarudhan and ²M Anjugam

¹Research Scholar, Department of Agricultural Economics, TNAU, Coimbatore, Tamil Nadu, India

²Professor, Department of Agricultural Economics, TNAU, Coimbatore, Tamil Nadu, India

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Corresponding Author: LT Thirumarudhan

Abstract

Geographical Indications (GIs) are increasingly promoted as instruments for rural development, price premium realization and livelihood enhancement. This study compares the cost of cultivation, yield and profitability of GI and non-GI farms for three crops viz., garlic, banana, and jasmine in Tamil Nadu, India. Using primary survey data from 270 farmers, 90 farmers for each crop (60 GI and 30 non-GI). The study estimates and compares costs, returns and input–output ratios. The results show that while GI farms often incur higher production and maintenance costs and sometimes lower yields, they consistently realize higher market prices, resulting in significantly higher net returns. GI banana benefits from both yield and price advantages, while GI garlic and jasmine derive profitability mainly through price premiums. The findings highlight the role of GI certification in achieving key Sustainable Development Goals, particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), and SDG 12 (Responsible Consumption and Production).

Keywords: Geographical indications, sustainable development goals, farm profitability, rural development, Tamil Nadu

1. Introduction

Agricultural development is central to achieving the Sustainable Development Goals (SDGs), particularly those related to poverty reduction, food security and sustainable livelihoods. Agricultural markets have witnessed growing demand for differentiated, quality-assured and origin-linked products. Geographical Indications (GIs) serve as intellectual property rights that protect the reputation and distinctiveness of products associated with specific regions, thereby offering a market-based mechanism to enhance farmers' income and strengthen rural livelihoods (WIPO, 2017) ^[19]. In India, GI registration has expanded rapidly and is promoted as a tool for enhancing farmers' income, ensuring fair market access and fostering sustainable rural development. Geographical Indications (GIs) have been widely recognized as instruments for enhancing rural development, improving market access and securing price premiums for traditional and region-specific products. Tregear *et al.* (2007) ^[16] highlighted that GI products often command higher prices due to their perceived authenticity, quality assurance and cultural embeddedness. Bramley *et al.*, (2009) ^[5] conceptualized GIs as mechanisms that strengthen local value chains, protect traditional knowledge and foster collective action among producers. Several international studies provide empirical evidence on the economic benefits of GI certification. Rangnekar (2004) ^[15] emphasized that GIs can promote rural development by linking product reputation to geographical origin, thereby enhancing farmers' bargaining power. Belletti and Marescotti (2011) ^[3] found that GI protection helps stabilize farm incomes and reduce market volatility by enabling product differentiation. Barjolle, *et al.*, (2011) ^[1] further

argued that well-governed GI systems contribute to territorial development by fostering cooperation among stakeholders and strengthening local institutions.

Empirical studies from Europe indicate positive income and market outcomes associated with GI products. Moschini *et al.*, (2008) ^[11] showed that origin labelling and GI protection significantly influence consumer willingness to pay, leading to higher farm-gate prices. Menapace *et al.*, (2013) ^[10] reported that consumers exhibit stronger trust and higher purchase intentions toward certified origin products, reinforcing the market advantage of GIs. Grunert and Achmann (2016) ^[7] also found that geographical origin labels enhance perceived quality and consumer confidence, particularly in food markets. In Asia, Ngokkuen and Grote (2010) ^[12] demonstrated that GI certification positively affected income levels among Thai Jasmine rice farmers, with institutional support and cooperative membership playing key roles in adoption. Yin *et al.* (2024) ^[17] found that GI certification significantly improved household income and reduced income inequality among tea farmers in China. Similarly, Zhao *et al.* (2014) ^[18] reported that GI protection enhanced product branding, market access and price realization in Chinese agricultural markets.

In the Indian context, Rangnekar (2011) ^[14] emphasized the potential of GI protection to safeguard traditional knowledge and enhance rural livelihoods, particularly for smallholders and artisanal producers. Basavaraj *et al.* (2023) ^[2] provided empirical evidence that GI-tagged Hadagali jasmine significantly improves farmers' income and employment opportunities. Jamal *et al.*, (2024) ^[8] found that GI certification enhanced market access and price realization for

Darjeeling tea producers, while also strengthening institutional governance structures. Jena and Grote (2012) ^[9] reported that GI registration improved farmers' bargaining power and value chain participation in Basmati rice production. Recent studies have increasingly linked GIs to sustainability and development outcomes. Nirosha and Mansingh (2024) ^[13] emphasized that GI sustainability is an emerging research domain and highlighted the need for empirical studies connecting GI performance with the Sustainable Development Goals (SDGs). Bowen (2010) ^[4] argued that GIs contribute to sustainable rural development by promoting environmentally responsible practices and preserving agrobiodiversity. Giovannucci *et al.* (2009) ^[6] also noted that GIs support inclusive growth by enabling small-scale producers to access premium markets and maintain traditional production systems.

Despite this growing body of literature, several gaps remain. Most existing studies focus on single commodities or specific regions, limiting the generalizability of findings. Moreover, few studies offer comparative assessments of cost structures, yields, and net returns between GI and non-GI farms across multiple crops. There is also limited empirical work explicitly linking GI adoption with SDG achievement, particularly in the Indian agricultural context. This study addresses these gaps by providing a multi-crop comparative economic analysis of GI and non-GI farms in Tamil Nadu and by examining the contribution of GI certification to key SDGs.

2. Methodology

2.1 Study Area

The study was conducted in Dindigul and Madurai districts, selected GI-producing regions of Tamil Nadu covering three crops: Kodaikanal Hill Garlic, Virupakshi Hill Banana and Madurai Malli Jasmine. The sample size is 270 farmers,

comprises of 60 GI farmers and 30 non-GI farmers for each crop were selected using purposive sampling

2.2 Data Collection

Primary data were collected through structured interviews during the year 2023-2024 covering: Input use, Cost of cultivation, Yield and output prices and Gross and net returns

2.3 Analytical Framework

The economic performance of GI and non-GI farms was assessed using: Cost of cultivation (variable and fixed), Gross returns, Net returns, Input-output ratio and Cost of production per quintal. Differences between GI and non-GI farms were tested for statistical significance at the 5% level.

3. Results

3.1 Cost and Returns of Garlic

GI garlic farms incurred a total cultivation cost of Rs. 2.52 lakhs per ha, marginally higher than non-GI farms (Rs. 2.51 lakhs). Variable costs constituted over 95% of total costs for both groups. GI farms incurred higher expenses on FYM, human labour, bullock labour, and plant protection chemicals, reflecting more intensive and sustainable cultivation practices. However, seed cost was significantly lower for GI garlic due to lower seed prices. Although non-GI garlic recorded a significantly higher yield (31.17 qtl/ha) compared to GI garlic (24.63 qtl/ha), GI garlic commanded a significantly higher price (Rs. 23,333/qtl vs Rs. 17,500/qtl). Consequently, GI garlic achieved higher gross returns (Rs. 5,74,700/ha) and net returns (Rs. 3,22,064/ha) compared to non-GI farms (Rs. 2,93,636/ha). The input-output ratio was also higher for GI garlic (2.27 vs 2.17). GI garlic is more profitable primarily due to price premium rather than yield advantage.

Table 1: Comparison of Cost of Cultivation of GI and non-GI Garlic

Sl. No	Particulars	Kodaikanal Hill garlic (GI) N=60		Non – GI Garlic# N=30		Difference over non-GI Garlic
		Rs. /Ha	Per cent	Rs. /Ha	Per cent	
I	Variable Cost	240839	95.33	243877	96.84	-3038
1	Seed	65538	25.94	87616	34.79	-22078*
2	FYM	12672	5.02	10541	4.19	2131*
3	Fertilizer	24608	9.74	28000	11.12	-3392
4	Human labour	70513	27.91	58350	23.17	12163*
5	Bullock labour	4280	1.69	3683	1.46	597*
6	Plant protection chemicals	47472	18.79	39733	15.78	7739*
7	Interest on working capital	15756	6.24	15954	6.33	-198
II	Fixed Cost	11797	4.67	7963	3.16	3835
8	Rental value of land	10000	3.96	6668	2.65	3333
9	Land revenue & taxes	100	0.04	68	0.03	32
10	Depreciation	925	0.37	707	0.28	218
11	Interest on fixed capital	772	0.31	520	0.21	252
	Total Cost	252636	100.00	251840	100.00	797

#non-GI = Mettupalayam garlic variety

*Significance at 5% level

Table 2: Input Use of GI and non-GI Garlic Farms (Per ha)

Sl. No	Particulars	Quantity		Difference over non-GI
		GI	Non-GI	
1	Seed (Kg)	437	438	-1.00
2	FYM (tonnes)	6.3	5.3	1.00 *
3	Fertilizers (Kg)	1533.75	1548.33	-14.58
4	Human Labour (Man-days)	117.5	97.5	20.00*
5	Bullock labour (hrs)	14.27	12.28	1.99*
6	Plant protection chemicals (Litre)	31.65	26.50	5.15*

*Significance at 5% level

Table 3: Yield and Net Return of GI and non-GI Garlic

Sl. No	Particulars	Value (per ha)		Difference over non-GI
		GI	Non-GI	
1	Mean total yield (Qtl)	24.63	31.17	-6.54*
	Grade I	9.85	21.82	-
	Grade II	9.85	9.35	-
	Grade III	4.93	--	-
2	Mean Price of the product (Rs./Qtl)	23333	17500	5833*
	Grade I	35000	20000	-
	Grade II	25000	15000	-
	Grade III	10000	--	-
3	Gross Return	574700	545475	29225*
4	Total Cost of Cultivation (Rs/ha)	252636	251840	797
5	Net Return	322064	293636	28429*
6	Input - Output Ratio	2.27	2.17	-
7	Cost of Production (Rs/Qtl)	10257	8080	-

*Significance at 5% level

3.2 Cost and Returns of Banana

GI banana cultivation incurred a significantly higher total cost (Rs. 2,55,450/ha) than non-GI banana (Rs. 2,28,763/ha), driven by higher expenditure on seed, FYM, fertilizers, labour, and interest on working capital. Despite using fewer seedlings, GI banana farms applied more FYM, fertilizers, and labour, reflecting input-intensive management. GI banana achieved significantly higher yield (131.57 qtl/ha)

than non-GI banana (116.90 qtl/ha) and realized a higher price (Rs. 5,300/ql vs Rs. 4,200/ql). This resulted in substantially higher gross returns (Rs. 6,97,321/ha) and net returns (Rs. 4,41,871/ha) compared to non-GI farms (Rs. 2,62,200/ha). The input-output ratio for GI banana was 2.72, far exceeding that of non-GI banana (2.14). GI banana benefits from both yield and price advantages, making it the most profitable among the three crops studied.

Table 4: Comparison of Cost of Cultivation of GI and non-GI Banana

Sl. No	Particulars	GI Banana		Non - GI Banana		Difference over non-GI
		Rs. /Ha	Per cent	Rs. /Ha	Per cent	
I	Variable Cost	214537	83.99	188242	82.29	-26295*
1	Seed	21525	8.43	15425	6.74	-6100*
2	FYM	12825	5.02	11425	4.99	-1400*
3	Fertilizer	27252	10.67	24964	10.91	-2288*
4	Human labour	85550	33.49	70688	30.90	-16593*
5	Plant protection chemicals	23440	9.18	26630	11.64	3190*
6	Miscellaneous charges	1728	0.68	1746	0.76	18
7	Interest on working capital	21004	8.22	17882	7.82	-3122*
II	Fixed Cost	40913	16.01	40521	17.71	-392
8	Rental value of land	35000	13.70	35000	15.30	0
9	Land revenue & taxes	221	0.09	155	0.07	-66
10	Depreciation	2846	1.11	2867	1.25	21
11	Interest on fixed capital	2846	1.11	2499	1.09	-347
	Total Cost	255450	100.00	228763	100.00	-26687*

*Significance at 5% level

Table 5: Input Use of GI and non-GI Banana Farms (Per ha)

Sl. No	Particulars	Quantity		Difference over non-GI
		GI	Non-GI	
1	Seedling (Nos.)	948	1064	-116*
2	FYM (tonnes)	6.41	5.71	0.70*
3	Fertilizer (Kg)	2182	1997.12	184.88*
4	Human Labour (Man-days)	177.93	150.28	27.65*
6	Plant protection chemicals (Ltr)	16	18	-2*

*Significance at 5% level

Table 6: Yield and Net Return of GI and non-GI Banana

Sl. No	Particulars	Value (per Ha)		Difference over non-GI
		GI	Non-GI	
1	Total Yield of main product (Qtl)	131.57	116.90	14.67*
2	Price of the product (Rs./Qtl)	5300	4200	1100*
3	Gross Return (Rs.)	697321	490963	206358*
4	Total Cost of Cultivation (Rs/ha)	255450	228763	26687*
5	Net Return (Rs./ Ha)	441871	262200	179671*
6	Input - Output Ratio	2.72	2.14	-
7	Cost of Production (Rs./Qtl)	1941	1957	-

*Significance at 5% level

3.3 Cost and Returns of Jasmine

The establishment cost of Madurai Malli (GI) jasmine was Rs. 4,92,387/ha, slightly higher than non-GI jasmine (Rs. 4,75,748/ha). Human labour constituted nearly half of the establishment cost in both systems. Annual maintenance cost was also significantly higher for GI jasmine (Rs. 4,30,688/ha) compared to non-GI jasmine (Rs. 4,14,502/ha), primarily due to higher labour use. Non-GI jasmine recorded a significantly

higher yield (27.47 qtl/ha) than GI jasmine (24.98 qtl/ha). However, GI jasmine realized a significantly higher price (Rs. 40,000/qtl vs Rs. 30,000/qtl), resulting in higher gross returns (Rs. 9,99,200/ha) and net returns (Rs. 5,68,512/ha) compared to non-GI farms (Rs. 4,09,598/ha). The input–output ratio was higher for GI jasmine (2.32 vs 1.99). Similar to garlic, GI jasmine compensates for lower yield through substantial price premiums.

Table 7: Comparison of Annual Maintenance Cost of GI and non-GI Jasmine

Sl. No	Particulars	Madurai Malli (GI)		Non – GI Jasmine		Difference from non-GI
		Rs. /Ha	Per cent	Rs. /Ha	Per cent	
I	Variable Cost	363419	84.38	347506	83.84	15913*
1	Human labour	320149	74.33	305456	73.69	14693*
2	Fertilizer	10995	2.55	10941	2.64	54
3	Plant protection chemicals	8500	1.97	8375	2.02	125
4	Interest on working capital	23775	5.52	22734	5.48	1041*
II	Fixed Cost	36495	8.47	37262	8.99	-767*
5	Rental value of land	25000	5.80	25000	6.03	0
6	Land revenue & taxes	178	0.04	175	0.04	3
7	Depreciation	8552	1.99	9340	2.25	-788
8	Interest on fixed capital	2923	0.64	2909	0.66	14*
III	Amortized establishment cost	30774	7.15	29734	7.17	1040
	Total Cost	430688	100	414502	100	16186*

*Significance at 5% level

Table 8: Input Use of GI and non-GI Jasmine farms

Sl. No	Particulars	Quantity		Difference over non-GI
		GI	Non-GI	
1	Fertilizer (Kg)	845.83	841.67	4.16
2	Human Labour (Man-days)	529.215	504.42	24.80*
3	Plant protection chemicals (Ltr)	11.33	11.17	0.16

*Significance at 5% level

Table 9: Yield and Net Return of GI and non-GI Jasmine

S.No	Particulars	Value (per Ha)		Difference over non-GI
		GI	Non-GI	
1	Total Yield of main product (Qtl)	24.98	27.47	-2.49*
2	Price of the product (Rs./Qtl)	40000	30000	10000*
3	Gross Return (Rs.)	999200	824100	175100*
4	Total Cost of Cultivation (Rs/ha)	430688	414502	16186*
5	Net Return (Rs./ Ha)	568512	409598	158914*
6	Input - Output Ratio	2.32	1.99	--
7	Cost of Production (Rs./Qtl)	17241	15089	--

*Significance at 5% level

4. Conclusion and SDG Implications

The study provides strong empirical evidence that GI certification enhances farm profitability across garlic, banana and jasmine in Tamil Nadu. Although GI farms often incur higher production and maintenance costs, in some cases lower yields; the significantly higher prices realized in the market result in superior gross and net returns. Among the three crops, GI banana exhibited the highest profitability, driven by both yield and price advantages, while GI garlic and jasmine derived benefits primarily from price premiums. These findings underscore the economic value of GI protection as a tool for rural income enhancement, product differentiation, and market competitiveness. GI certification contributes directly to SDG 1 (No Poverty) through increased farm income, SDG 8 (Decent Work and Economic Growth) by supporting labour-intensive, value-added agriculture and SDG 12 (Responsible Consumption and Production) by

promoting quality assurance and origin-based production systems. Policy efforts should focus on strengthening GI governance, improving market linkages, enhancing consumer awareness and providing institutional support to farmers for sustaining quality standards. Future research may explore the long-term sustainability impacts of GI adoption and its contribution to inclusive and environmentally sustainable development goals.

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