



RESEARCH ARTICLE

# Geographical indication of Kanyakumari Matti banana: A comprehensive analysis of farmer awareness, perception and constraints

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## Abstract

The present study focuses on the awareness, perception and constraints of farmers about the GI tag of Kanyakumari Matti banana in Tamil Nadu state, India. Using data from 120 farmers across 3 blocks, socio-economic factors that impact GI awareness and perception are analysed through correlation and regression analyses. Constraints has been ranked by Garrett Ranking method. The result shows that the awareness is of a moderate nature, as 47.5% of farmers have medium awareness about GI. Out of 21 variables, 17 variables have been selected as per discussion with extension scientists. The variables like educational status, information-seeking behaviour and attitude towards GI were found to be significantly correlated with both awareness and perception. GI is perceived to be beneficial in protection of product origin and increased demand as per farmers (80.83%), whereas in the case of technological advancement, the percentage is 36.66% and unauthorized use prevention is 35%. Major constraints are lack of GI-specific training (71.86%) and market price fluctuation (98.26%). Targeted capacity building, infrastructure development and supportive policy are suggested for better adoption of GI and enhanced access to its market. These findings provide useful information for policymakers and stakeholders to design focused interventions that might enhance the economic benefit and sustainability of GI-certified agricultural produce.

## Keywords

constraints; farmer awareness; Geographical Indication (GI); Matti banana; perception

## Introduction

Geographical Indication is one of the upcoming concepts in agriculture, which tries to guarantee higher market values and preserve the quality of the product originating places (1). Kanyakumari Matti banana, highly valued because of its unique flavour and nutritious values, gets a GI tag. However, such certification will be effective only when the farmers are made aware of its benefits and they come forward to adopt it. This study has been done on the socio-economic

profile of farmers, awareness about GI certification and perceived benefits. It also enumerates constraints in the cultivation and marketing of Matti bananas and suggests recommendations for overcoming the bottlenecks. The main farmers constraints were the high pay of laborers, the absence of storage facilities, the low price of vegetables after harvest and the unavailability of good-quality seed (2). A greater awareness of GIs could lead to more sustainable consumer behaviour that prioritizes local products and supports regional economies (3). Outside of the area where it is produced, e-commerce could help this traditional food's standing (4). GI is a helpful technique for protecting high-quality products by confirmation and certification from production (5). Awareness significantly impacts social interactions, as it aids in understanding others' mental states and intentions (6). Perception is important because it constitutes the way in which, through our senses, we understand the world and will influence communication, learning and cultural interpretation. Labelling of products like GI tagging have shown a significant increase in consumers perception, awareness, knowledge and consumption in recent years (7). Perception is generally a cognitive process whereby an individual can assess and respond appropriately to their environment; thus, perception is a basic step toward the development of attitudes and behaviours (8). Farmers are positive and strongly believe that GI standards should be implemented. Therefore, more socialization and advertising are needed to increase farmers' interest in putting the GI program into practice. Which is a good perception towards GI (9).

### Objectives

The specific objectives of the study are:

- To analyse the level of awareness among farmers regarding the geographical indication of Kanyakumari Matti banana.
- To investigate the perceived opinion of farmers towards the geographical indication of Kanyakumari Matti banana.
- To find out the constraints in the cultivation of Matti banana and suggestions to overcome the limitations.

### Materials and Methods

The current study adopts an ex-post facto research design to examine the view of farmers regarding the GI status of the Kanyakumari Matti banana. The study has been conducted in the Kanyakumari district of Tamil Nadu, where 4218 ha are under banana cultivation and the geographical and climatic conditions of the region add a characteristic flavour to Matti banana. A detailed map showing the study area is shown in Fig. 1. Three blocks of Rajakkamangalam (Fig. 2), Kurunthancode (Fig. 3) and Thiruvattar (Fig. 4) were purposively selected considering the high density of Matti banana farmers and 6 villages from those blocks were selected based on the banana cultivation density. A total of 120 respondents (20 from each village) were selected using random sampling. There have been 17 independent socio-economic factors such as age, occupation, education, family type, farming experience, farm size, information-sharing behaviour, information-seeking behaviour, decision-making behaviour, annual income, social participation, mass media exposure, attitude towards geographical indications, risk orientation, scientific orientation, economic motivation and innovativeness were chosen after due consultation with experts and previous studies, that have been tested to understand their impacts on farmers' awareness and perceptions toward the GI tag. Determining the socio-economic factors will help to design strategies for the benefit of farmers (10). Data were collected from the sample through a structured interview schedule pre-tested and revised after feedback. For the relationship of independent variables with the perception of farmers, Pearson's correlation coefficient has been implemented and multiple regression analysis has also been used to evaluate each variable. For ranking the constraints that farmers confront, Garrett's Ranking Technique has been applied such that it elaborates on the problems that these farmers face in terms of GI awareness and adoption. The study is aimed at providing suggestions on how designing strategies might become effective in targeting farmers where an area can reach its full impact, depending on their socio-economic profiles.

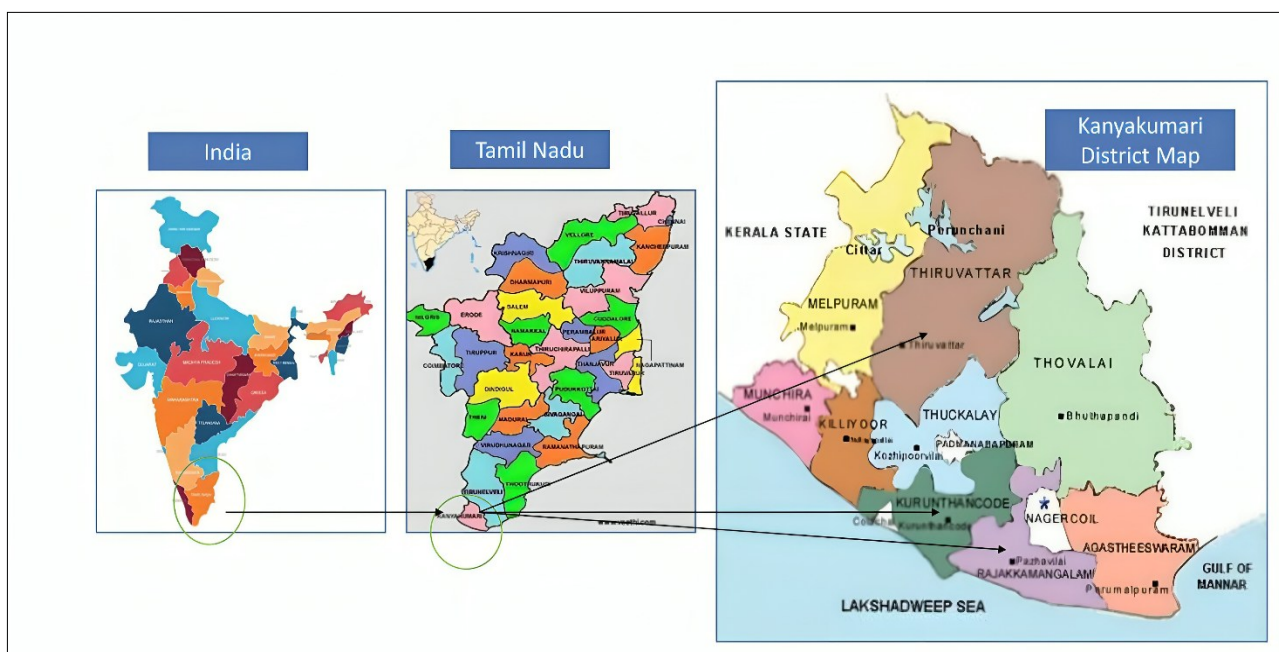


Fig. 1. Map showing study areas.





**Fig. 2.** Survey collected from farmers in Kanyakumari district of Rajakkamangalam block.



**Fig. 3.** Survey collected from farmers in Kanyakumari district of Kurunthencode block.



**Fig. 4.** Survey collected from farmers in Kanyakumari district of Thiruvattar block.

## Results and Discussion

### Assessing Farmers' Awareness Levels on Geographical Indication

The adoption process of agricultural innovations, such as GI certification, includes farmers' awareness levels since awareness leads directly to farmers' decisions to participate in such programs. This participation enables farmers to reap economic, social and market-related benefits from GI products. In the case of Matti banana, farmers' awareness about the GI tag offers the prime basis for deducing the understanding of farmers on its potential to add value to the product, authenticity protection and improvement in market access. Assessing awareness levels will help guide governmental organizations and policymakers in developing long-term adaption measures for farmers (11).

Important questions about GI like GI associated with name of place or production and variation of price due to GI followed by only associations can apply for tag were tabulated to know about the awareness level of farmers.

From Table 1, it is noted that 68.33% of respondents having known about the GI tag and it is associated with the place of origin. The have knowledge about GI and it will help them to increase the rate of Matti banana. Respondents have seen consumers are gradually increased for this banana due to its popularity and high nutrition values. These particular respondents also have knowledge about products with GI tags when they are produced in places other than its own do not claim the benefits of GI. Only original produce and products get high value and popularity among consumers. 62.50% of respondents are acknowledged that GI tag doesn't belong to an individual because it's related to a place not a person. The Kanyakumari banana and Horticulture Farmers Producer Company Limited applied for GI tag in 2021 and got certificate on august 2023. 60.00% of respondents are seen there is price changes in market when there is a product with GI tag. Mostly like other non-agricultural GI products are having high price than normal ones which is acknowledged by most of the respondents. So, they are aware there will by price variation for GI products. Only 26.66% of respondents are known about the validation period for GI tagged certificate. Those 32 respondents mostly belonged to the farmer producer company-related people who have applied for the GI tag and only knew about the validation period. Rest of farmers think it is a permanent certificate and no need to be

**Table 1.** Respondents' distribution according to their awareness level on geographical indication

(n=120)\*

| Sl. No. | Questions  | Frequency | Percentage (%) |
|---------|--|-----------|----------------|
| 1.      | GI associated with names and places or production areas with products          | 82        | 68.33          |
| 2.      | An individual cannot get GI  | 75        | 62.50          |
| 3.      | Registration of a GI is valid for 10 years                                     | 32        | 26.66          |
| 4.      | Price variation for GI products  | 72        | 60.00          |
| 5.      | GI is a location-specific  | 82        | 68.33          |
| 6.      | GI tag is an important tool that creates consumer awareness and loyalty        | 47        | 39.16          |
| 7.      | Matti banana as a GI product   | 89        | 74.16          |
| 8.      | Products of the same category not having that origin cannot be claimed as GI   | 82        | 68.33          |
| 9.      | If a registered GI is not renewed it is liable to be removed from the register | 45        | 37.50          |
| 10.     | Credibility and benefits of GI   | 36        | 30.00          |
| 11.     | GI of Matti banana have influence on farmers                                   | 40        | 33.33          |

\*Multiple responses obtained

renewed. Just 37.50% of respondents believe that a registered geographical indicator could be deleted from the registry if it is not renewed. Which shows they are not fully aware about GI registration process and validation. 39.16% of the respondents feels that GI tag helps consumers to feel good about original produce. So, they feel like much better to buy GI tagged products. GI tag is the best way to know about the truthfulness of produces. 30% of respondents are known about the Credibility and benefits of GI products which was due to intermediaries and lack of awareness. Only 33.33% of respondents think that GI of Matti banana have good influence on farmers. This is because it has been only 1 year these particular banana good GI tags. So, it will take time to have influence on respondents. In spite of the fact that goods bearing GI tags meet higher quality requirements, Geographical Indications (GIs) face a number of difficulties in India. Among the difficulties include farmers' and producers' ignorance about post-GI systems, subsidies and the registration procedure. Furthermore, the infrastructure needed to market and promote GI-tagged items is inadequate. And because of unethical market activities, a lack of postproduction control and inefficient marketing techniques, the availability of GI-tagged items is limited in both domestic and international markets. Strong enforcement measures are necessary in export and home markets (12).

#### Association and contribution of characteristics with awareness

Examining the relationship and influence of the profiles of the growers of Kanyakumari Matti bananas on their awareness of GI. The results of the computation of the multiple regression coefficient and simple correlation are shown in Table 2. According to the table, among the 17 variables for this study educational status ( $X_2$ ), farming experience ( $X_6$ ), information-seeking behaviour ( $X_8$ ), Information sharing behaviour ( $X_9$ ) mass media exposure ( $X_{11}$ ), attitude towards GI ( $X_{13}$ ) and scientific orientation ( $X_{15}$ ) had shown positive and favourable (significant) relationship at 1% level. Farm size ( $X_5$ ), social participation ( $X_{10}$ ) and innovativeness ( $X_{17}$ ) have shown positive and significant relationship at 5% with awareness

level of farmers growers. Whereas age ( $X_1$ ), decision making behaviour ( $X_{12}$ ) had shown negative and significant relationship at 1% level of probability with awareness level of farmers.

From the table, it revealed that increase in following variables like educational status ( $X_2$ ), farming experience ( $X_6$ ), information seeking behaviour ( $X_8$ ), information sharing behaviour ( $X_9$ ), mass media exposure ( $X_{11}$ ), attitude towards GI ( $X_{13}$ ) and scientific orientation ( $X_{15}$ ) had shown positive and significant relationship at 1% level. Farm size ( $X_5$ ), social participation ( $X_{10}$ ) and innovativeness ( $X_{17}$ ) will increase the awareness level of farmers. Whereas increase in age ( $X_1$ ), decision making behaviour ( $X_{12}$ ) will decrease the awareness level of farmers. It is observed from the table that variables educational status ( $X_2$ ), farming experience ( $X_6$ ), information seeking behaviour ( $X_8$ ), information sharing behaviour ( $X_9$ ) mass media exposure ( $X_{11}$ ), attitude towards GI ( $X_{13}$ ) and scientific orientation ( $X_{15}$ ) had shown positive contribution at 1% level of probability. Farm size ( $X_5$ ), social participation ( $X_{10}$ ) and innovativeness ( $X_{17}$ ) at 5% of probability towards awareness level of farmers. Whereas, age ( $X_1$ ), decision making behaviour ( $X_{12}$ ) had shown negative contribution towards the awareness level of farmers.

The prediction equation was fitted for awareness level of respondents is given below

$$Y_1 = 12.782 - 0.112 (X_1) + 0.286 (X_2) - 0.116 (X_3) + 0.163 (X_4) + 0.187^{**} (X_5) + 0.298^{**} (X_6) + 0.103 (X_7) + 0.205^{**} (X_8) + 0.197^{**} (X_9) + 0.162^{*} (X_{10}) + 0.231^{**} (X_{11}) - 0.328^{*} (X_{12}) + 0.221^{**} (X_{13}) - 0.026 (X_{14}) + 0.198^{**} (X_{15}) - 0.046 (X_{16}) + 0.166^{*} (X_{17})$$

It could be inferred from the above equation that a unit increase farm size ( $X_5$ ), farming experience ( $X_6$ ), information seeking behaviour ( $X_8$ ), social participation ( $X_{10}$ ), mass media exposure ( $X_{11}$ ) and attitude towards GI ( $X_{13}$ ) by a unit *Ceteris paribus* would result in the increase in awareness level of respondents 0.187, 0.298, 0.205, 0.162, 0.231 and 0.221 units respectively. A unit increase age ( $X_1$ ) and decision-making behaviour ( $X_{12}$ ) would decrease in awareness level by 0.112 and 0.328 units.

**Table 2.** Correlation and multiple regression analysis of characteristics of respondents with their awareness level on GI Matti banana

| Variable                      | Variable No. | 'r' value (Correlation) | Regression coefficient (b) | t-value | p-value |
|-------------------------------|--------------|-------------------------|----------------------------|---------|---------|
| Age                           | $X_1$        | -0.337*                 | -0.112*                    | -2.625  | 0.031   |
| Educational status            | $X_2$        | 0.237**                 | 0.286**                    | 4.315   | 0.009   |
| Occupational status           | $X_3$        | -0.303                  | -0.116                     | -1.542  | 0.364   |
| Annual income                 | $X_4$        | 0.248                   | 0.163                      | 2.456   | 0.132   |
| Farm size                     | $X_5$        | 0.195*                  | 0.187*                     | 2.829   | 0.038   |
| Farming experience            | $X_6$        | 0.342**                 | 0.298**                    | 2.909   | 0.007   |
| Family type                   | $X_7$        | 0.118                   | 0.103                      | 1.388   | 0.160   |
| Information seeking behaviour | $X_8$        | 0.246**                 | 0.205**                    | 3.114   | 0.009   |
| Information sharing behaviour | $X_9$        | 0.109**                 | 0.197**                    | 2.575   | 0.003   |
| Social participation          | $X_{10}$     | 0.208*                  | 0.162*                     | 2.444   | 0.021   |
| Mass media exposure           | $X_{11}$     | 0.211**                 | 0.231**                    | 3.506   | 0.008   |
| Decision making behaviour     | $X_{12}$     | -0.146*                 | -0.328*                    | -4.454  | 0.037   |
| Attitude towards GI           | $X_{13}$     | 0.312**                 | 0.221**                    | 3.355   | 0.002   |
| Economic motivation           | $X_{14}$     | 0.210                   | -0.026                     | -0.359  | 0.775   |
| Scientific orientation        | $X_{15}$     | 0.120**                 | 0.198**                    | 1.325   | 0.008   |
| Risk orientation              | $X_{16}$     | -0.064                  | -0.046                     | -0.659  | 0.995   |
| Innovativeness                | $X_{17}$     | 0.105*                  | 0.166*                     | 2.506   | 0.041   |

$R^2 = 0.534$ ,  $F = 12.782$ , \*\* significant at 1% level

\*Significant at 5% level



### Assessing Farmers' Perception Levels on Geographical Indication

Perceived opinion of farmers as a dependent variable refers to the collective attitudes beliefs or judgements that the farmers hold about a particular practice or policy. Perception captures how farmers view and assess certain aspects of their work environment, agricultural innovations, government policies or market conditions as shaped by their experiences, knowledge and social influences. Perception also determines how cultural narratives are created and comprehended. Exploring multiple modalities of perception can help us better comprehend historical and contemporary cultural activities (13). Hence, the perceptions of farmers regarding geographical indication of Kanyakumari Matti banana has been studied and outcomes are presented in Table 3. The perception by farmers is crucial for the success and sustainability of GI certification of agricultural products. Positive perception towards GI will drive farmers to adopt the certification, enhancing product authenticity and quality standards that will add value to the market. Farmers' perceptions towards innovations could help in the development of sustainable production (14).

#### Benefits recognized by farmers due to GI tagging of Matti Banana

**Social Benefits :** Place of origin/product protection-80.83%: This clearly shows that farmers are strong-minded about the GI tag being very helpful in protecting the authenticity and reputation of Kanyakumari Matti bananas. Over half of the respondents also believe that Matti banana growing has a possibility to increase to 60.00% and protection of the producers' interests to 54.16%. Very few farmers consider that the GI tag is associated with bringing together farmers (37.50%), which means its collaborative features are yet to be understood or anticipated under GI.

**Economic Benefits :** The most recognized economic benefit is the possibility of premium pricing and consumers' willingness

to pay, at 76.66%, showing a great deal of expectations in the improved market value. The majority also perceives increased profits through product differentiation due to a GI tag by 63.33% and by price variation by 60.00%, hence indicating optimism about economic gains. Interestingly, fewer farmers only expect the GI tag to bring about technological progress or prevent unauthorized use.

**Marketing Benefit:** Increase demand for the product - This is the most perceived benefit, at 80.83%, on par with protection of place of origin. This may not be a good indication because of high expectations from market growth. However, with the few exceptions noted, only a small percentage of farmers expect the GI tag to further exports to international markets (23.33%) or other countries (25.00%). This suggests that the attention is centered on domestic markets or lacking information about international trade opportunities.

Fewer than half of the respondents, that is, 46.66%, feel that GI would result in quality improvement or better grading. Which implies that farmers are having good perception about geographical indication (15).

#### Association and contribution of characteristics with perception

Investigating the connection and impact of the Kanyakumari Matti banana growers' profiles on their understanding of GI. Table 4 displays the outcomes of the computation of the simple correlation and multiple regression coefficient.

Out of 17 variables, the Table shows that the following have a positive and significant relationship with farmers' perceptions at the 1% level: educational status ( $X_2$ ), annual income ( $X_4$ ), farming experience ( $X_6$ ), information-seeking behaviour ( $X_8$ ), social participation ( $X_{10}$ ), mass media exposure ( $X_{11}$ ), attitude toward GI ( $X_{13}$ ) and economic motivation ( $X_{14}$ ). At 5%, innovativeness ( $X_{17}$ ) has a favourable and substantial association. At 5%, only age ( $X_1$ ) has a significant and negative connection. According to the findings, farmers' perceptions

**Table 3.** Distribution of respondents according to their perception of GI on Matti banana

(n=120)\*

| Sl. No.                        | Perception of farmers  | Frequency | Percentage (%) |
|--------------------------------|--|-----------|----------------|
| <b>I. Social benefits</b>      |  |           |                |
| 1                              | Protection of interest of producers/collective benefits          | 65        | 54.16          |
| 2                              | Protection of place of origin / product                          | 97        | 80.83          |
| 3                              | Possibility of increase in Matti banana cultivation              | 60        | 50.00          |
| 4                              | Possibility of increase in production                            | 58        | 48.33          |
| 5                              | Mechanism for linking of farmers                                 | 45        | 37.50          |
| <b>II. Economic benefits</b>   |  |           |                |
| 6                              | Realization of price variation due to GI tag                     | 72        | 60.00          |
| 7                              | Possibility of larger income flow due to origin based product    | 59        | 49.16          |
| 8                              | Possibility to a premium price and consumers' willingness to pay | 92        | 76.66          |
| 9                              | Economic development of the community                            | 69        | 57.50          |
| 10                             | Increase in profits through product differentiation              | 76        | 63.33          |
| 11                             | Signalling device in marketing to obtain                         | 57        | 47.50          |
| 12                             | Technological advancement due to GI                              | 38        | 36.66          |
| 13                             | Unauthorized use can be prevented                                | 42        | 35.00          |
| <b>III. Marketing benefits</b> |  |           |                |
| 14                             | GI tag influence the export to international markets             | 28        | 23.33          |
| 15                             | GI tag influence as the export to other countries                | 30        | 25.00          |
| 16                             | Increase in demand of the product                                | 97        | 80.83          |
| 17                             | Quality enhancement / grading is possible                        | 56        | 46.66          |

\*Multiple responses obtained

**Table 4.** Correlation and multiple regression analysis of characteristics of respondents with their perception level on GI Matti banana

| Variables                     | Variable No     | r-value (correlation) | Regression coefficient (b) | p-value | t-value |
|-------------------------------|-----------------|-----------------------|----------------------------|---------|---------|
| Age                           | X <sub>1</sub>  | -0.152**              | -0.172*                    | 0.042   | -1.156* |
| Educational status            | X <sub>2</sub>  | 0.876**               | 0.185**                    | 0.002   | 2.808** |
| Occupational status           | X <sub>3</sub>  | -0.143                | 0.389                      | 0.364   | -0.367  |
| Annual income                 | X <sub>4</sub>  | 0.643**               | 0.197**                    | 0.006   | 2.950** |
| Farm size                     | X <sub>5</sub>  | 0.089                 | 0.081                      | 0.118   | 1.236   |
| Farming experience            | X <sub>6</sub>  | 0.134**               | 0.156**                    | 0.005   | 2.393** |
| Family type                   | X <sub>7</sub>  | 0.176                 | 0.845                      | 0.160   | 1.208   |
| Information seeking behaviour | X <sub>8</sub>  | 0.312**               | 0.203**                    | 0.007   | 3.184** |
| Information sharing behaviour | X <sub>9</sub>  | -0.195                | 0.165                      | 0.274   | -1.185  |
| Social participation          | X <sub>10</sub> | 0.245**               | 0.178**                    | 0.004   | 2.816** |
| Mass media exposure           | X <sub>11</sub> | 0.280**               | 0.175**                    | 0.005   | -1.604  |
| Decision making behaviour     | X <sub>12</sub> | -0.161                | 0.153                      | 0.217   | -1.054  |
| Attitude towards GI           | X <sub>13</sub> | 0.521**               | 0.324**                    | 0.002   | 5.058** |
| Economic motivation           | X <sub>14</sub> | 0.287**               | 0.192**                    | 0.005   | 3.021** |
| Scientific orientation        | X <sub>15</sub> | 0.014                 | 0.096                      | 0.618   | 0.147   |
| Risk orientation              | X <sub>16</sub> | -0.126                | 0.149                      | 0.995   | -0.845  |
| Innovativeness                | X <sub>17</sub> | 0.198*                | 0.138*                     | 0.023   | 2.357** |

R<sup>2</sup> = 0.512, \*Significant at 5% level (p < 0.05)

F = 12.724, \*\* Significant at 1% level (p < 0.01)

will rise in response to increases in variables such as educational status (X<sub>2</sub>), yearly income (X<sub>4</sub>), farming experience (X<sub>6</sub>), information-seeking behaviour (X<sub>8</sub>), social participation (X<sub>10</sub>), mass media exposure (X<sub>14</sub>), attitude toward GI (X<sub>13</sub>), economic motivation (X<sub>14</sub>) and innovativeness (X<sub>17</sub>). On the other hand, a rise in variables such as age will lower farmers' perception of geographical indication. The Table 2 shows that the following variables had positive contributions at the 1% probability level: educational status (X<sub>2</sub>), annual income (X<sub>4</sub>), farming experience (X<sub>6</sub>), information-seeking behaviour (X<sub>8</sub>), social participation (X<sub>10</sub>), exposure to the media (X<sub>11</sub>), attitude toward GI (X<sub>13</sub>) and economic motivation (X<sub>14</sub>). 5% of the probability of farmers' perceptions are influenced by innovativeness (X<sub>17</sub>). On the other hand, age (X<sub>1</sub>) had a negative correlation with farmers' perceptions.

The R<sup>2</sup> value is 0.512 which reveals that 51.20% variation in the perception is explained by 17 variables selected for the study. The F value found to be significant at 1% level of probability.

The prediction equation was fitted for perception level of respondents is given below

$$Y_2 = 12.724 - 0.172^*(X_1) + 0.185^{**}(X_2) - 0.389(X_3) + 0.197^{**}(X_4) + 0.081(X_5) + 0.156^{**}(X_6) + 0.845(X_7) + 0.203^{**}(X_8) - 0.165(X_9) + 0.178^{**}(X_{10}) + 0.175^{**}(X_{11}) - 0.153(X_{12}) + 0.324^{**}(X_{13}) + 0.192^{**}(X_{14}) + 0.096(X_{15}) - 0.149(X_{16}) + 0.138^*(X_{17})$$

The aforementioned equation suggests that an increase of 1 unit *Ceteris paribus* in the following variables: educational status (X<sub>2</sub>), annual income (X<sub>4</sub>), farming experience (X<sub>6</sub>), information seeking behaviour (X<sub>8</sub>), social participation (X<sub>10</sub>), attitude toward GI (X<sub>13</sub>), economic motivation (X<sub>14</sub>) and innovativeness (X<sub>17</sub>) would raise respondents' perception levels by 0.185, 0.197, 0.156, 0.203, 0.178, 0.324, 0.192 and 0.149 units, individually.

A unit increase in age (X<sub>1</sub>) would decrease in perception level by 0.127 units.

## Findings

### Farmer Profiles and Awareness

The impact was analysed in the study. Of 17 socio-economic and psychological variables on farmers' awareness and perception of the GI tag. Most respondents were in the middle-aged to old age group, accounting for about 96%. The majority of the farmers, 89.9% of them, had formal education. This notwithstanding, their level of awareness about the GI tag was found to be quite moderate, with a total of 47.5% of the farmers showing a medium awareness level, while 32.5% had low awareness.

### Educational Status and Information Access

Farmers with middle school education or higher had demonstrated higher levels of awareness. The study reported that farmers who were active information seekers-through either mass media, peers or agricultural extension workers-were relatively better aware of the GI benefits. However, it was revealed that 26.66% of the farmers were actually aware that GI registration is valid for a period of 10 years, which indicates greater dispersion of information.

### Perception of GI Benefits

In general, the perceived benefits were positive towards the GI tag; 81.67% of farmers expressed a good attitude towards the certification of the produce. Farmers recognized the potential for price differentiation, premium pricing and increased demand for Matti bananas arising from the GI tag. However, perceptions of wider social and economic benefits, such as protection from unauthorized use, were less strong at 35%, along with some other factors, including improved market access.

### Economic Motivations and Market Expectations

The other broad economic benefits expected from farmers were price variation, premium pricing and increased income within the community. Price variation due to the GI tag was expected by 60% of the respondents, while 63.33% expected

higher profits due to product differentiation. However, only 23.33% of the farmers expected the prices of Mangaloga Sholaga in international exports; most had plans relating to local consumption.

### Constraints in Adoption of GI Practices

The analysis identified several constraints hindering the full realization of GI benefits:

- Physical constraints: Labor scarcity (68.96%) and uneven rainfall (31.04%) were the most significant physical challenges in banana cultivation.
- Extension constraints: Lack of training on GI issues (71.86%) and limited knowledge about export procedures (48.46%) were cited as major obstacles.
- Economic constraints: The 2 biggest financial obstacles farmers faced were the high price of plant protection chemicals (68.20%) and the difficulty obtaining loans (61.80%).
- Marketing constraints: The perishability of bananas, lack of post-harvest facilities and market price fluctuations (98.26%) posed serious threats to profitability. Moreover, the absence of proper export infrastructure (78.90%) hindered farmers' ability to access international markets.

### Recommendations

**Capacity building:** Training programs regarding GI procedures, export strategies and the advantage of the GI tag are required. Extension services have to focus on enhancement in the farmers' technical knowledge, especially concerning pest and disease management. Capacity building aids in enhancing the skills and abilities of farmers, particularly in disadvantaged areas and improving agricultural productivity and community welfare (16). **Infrastructure development:** The establishment of post-harvest facilities, transportation, electricity, water access, market and export infrastructure are very important for widening the marketing scope for Matti bananas (17-21). A better and more organized marketing system of GI products would reduce these fluctuations in prices and exploitation by intermediaries. **Policy support:** Government intervention through the provision of credit facilities at reasonable costs with the availability of essential inputs like fertilizers and chemicals would definitely ease financial burdens on farmers. Geographical indications give more opportunities for exporting. Producers can leverage the unique characteristics and quality of their products to appeal to consumers seeking differentiated offerings (22).

### Conclusion

Farmers stand to gain much from the Kanyakumari Matti banana's GI certification, but there are a number of issues that need to be methodically resolved. According to the survey, farmers have a moderate level of awareness, underscoring the necessity of focused educational initiatives and training on GI treatments and advantages. Furthermore, awareness and perception are greatly influenced by variables including money, farming experience and educational

attainment. Maximizing the advantages of GI certification requires improving market orientation, fortifying post-harvest infrastructure and opening up export options. In order to turn this potential into real economic and social advantages, cooperation between farmers, institutions and legislators is essential.

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### Authors' contributions

Author VSAR writing of original draft, conceptualization and collection of data. Authors GS, TD, KPV, JS, KJ carried out revision of draft, inclusion of tables and figures, proof reading. Authors SS and KP has done revision, formatting and supervision. All the authors read and approved the final version of the manuscript.

### Compliance with ethical standards

**Conflict of interest:** Authors do not have any conflict of interests to declare.

**Ethical issues:** None

### Declaration of generative AI and AI-assisted technologies in the writing process

For paraphrasing few sentences, author have used only the ChatGPT AI tool. For data running and analysis, Author have used SPSS software. After using these tools, the authors reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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