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RESEARCH ARTICLE

# Exploring agricultural entrepreneurship through marketing channel analysis: Evidence from GI-tagged Kodungallur snap melon

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## Abstract

This study evaluates the marketing efficiency of three distinct marketing channels for Kodungallur snap melon, a GI-registered indigenous cultivar from Kerala, India. Using an ex post facto research design with data collected from 60 snap melon farmers and 15 market intermediaries through random sampling, the research assessed marketing costs, margins, price spreads and efficiency. The findings reveal that marketing channel III (producer → retailer → consumer) demonstrates the highest marketing efficiency with a value of 2.72 using Shepherd's method and 1.61 using Acharya and Agarwal's method. A majority (61.66 %) of the farmers adopted organic production methods, which resulted in better price realization and higher marketing efficiency compared to inorganic practices. Producer's share in consumer's rupee was highest in channel III (63.33 %), followed by Channel II for organic produce (54.83 %). These findings highlight the economic advantages of shorter marketing channels and organic production practices for snap melon farmers, providing valuable insights for enhancing agricultural marketing systems and farmer incomes in the region. Furthermore, the results offer critical perspectives not only for optimizing marketing strategies but also for strengthening agribusiness prospects and fostering agricultural entrepreneurship development within the GI crop sector.

**Keywords:** geographical indication; marketing channel; marketing efficiency; price spread; snap melon

## Introduction

Snap melon (*Cucumis melo*) is a minor cucurbit and India is recognized as one of its secondary centres of origin (1). Although melons exhibit broad genetic diversity, specific types are preferred for commercial cultivation across various global regions. In India, numerous indigenous melon varieties are cultivated regionally. Nearly 40 species are acknowledged within the cultivated variants (2). Snap melon, often referred to as '*phoot*' due to its tendency to burst open at maturity, is cultivated in various parts of India such as Rajasthan, Punjab, Bihar, Uttar Pradesh, Karnataka, Tamil Nadu and Kerala. The fruit is valued for its high content of vitamin C, essential minerals and dietary fibre (1). The fruit consists of nearly 90 % water and is ideal for hydration and cooling the body. It is rich in essential micronutrients, including iron and dietary fibre, contains minimal fat and has nutritional and medicinal properties (3). Known for promoting digestive health, it functions as a natural gut cleanser and enhances appetite. The pulp is also traditionally used for treating skin issues like minor burns and abrasions. Furthermore, when mixed with turmeric or aloe vera, it is believed to enhance wound healing.

Snap melon is utilized in various culinary forms owing to its versatility and nutritional value. The tender, immature fruits are commonly consumed raw, cooked or as pickles. When fully ripe, the fruit is appreciated for its musky flavour and often eaten as a dessert. Its cooling properties make it an ideal ingredient for refreshing summer beverages. Additionally, the seed kernels are incorporated into traditional drinks like *thandai* and are used in bakery items. The fruit also holds significant potential for value-added products such as pickles, jams, chutneys and squashes (4).

Kodungallur snap melon (*Cucumis melo* L. var. *momordica*), locally known as '*Kodungallur pottuvellari*' in Malayalam, is a regional cultivar cultivated in Kodungallur and the surrounding areas of Thrissur and Ernakulam districts in Kerala (5). Kodungallur snap melon was accorded GI registration in 2022, highlighting its distinct regional identity and heritage. It is primarily cultivated in the block panchayats

of Kodungallur, Thalikulam, Mathilakam, Mala and Vellangallur in Thrissur district and in Paravur, Alangad, Parakkadavu and Angamaly in Ernakulam district. The fruit is largely grown during summer in rice fallow fields and is sometimes cultivated in coconut groves during the same period. The unique soil characteristics of these regions make them well suited for the cultivation of snap melon. The sandy coastal alluvial soils in these regions are considered highly suitable for the successful cultivation of this crop (5).

Snap melon varieties from other states typically exhibit a firm-textured flesh with a light orange hue, while the Kodungallur snap melon is distinguished by its spongy flesh and creamy white colour. Due to its high nutrient content, palatability and ability to reduce body heat, the fruit is particularly favoured during the summer months. In Kerala, the crop is primarily grown for its fully ripened fruits, which are utilized in juice preparation. Mature snap melon fruits naturally burst open upon ripening, which is why they are locally known as "*pottuvellari*".

The crop is grown twice a year, with the first planting taking place between the end of November and the first week of December, followed by harvesting in January or February. The second planting occurs in February, with harvests typically in March and April. Snap melon cultivation offers the potential for high returns with minimal investment. The harvest period aligns with the Kodungallur Bharani festival, leading to increased demand due to the large influx of devotees. *Pottuvellari* fruits are in high demand primarily during the summer months. The crop grows rapidly, with a maturation period of 75-80 days and the first yield can be harvested from as early as the 47$^{th}$ day. With yields of 14-16 tonnes per hectare, Snap melon cultivation is highly productive and economically beneficial (5).

However, a well-structured and efficient marketing system plays a vital role in enhancing the income levels of farmers. Efficient marketing infrastructure, organized distribution channels and proper marketing mechanisms help secure better and stable prices for agricultural produce compared to poorly organized marketing practices (6). Effective marketing system serves as a key driver of transformation in the agricultural economy, playing an essential role in increasing the income of producers and farmers while improving consumer satisfaction (7). Several studies have indicated that as the number of intermediaries in a marketing chain increases, its efficiency tends to decrease, implying that direct or shorter supply chains are more productive (8, 9). Marketing channels become less efficient when more intermediaries are involved, as this raises operational costs and leads to a greater share of the marketing margin being consumed before reaching the producer (10). Research findings across agricultural economics studies indicate that marketing chains with fewer intermediaries typically achieve higher levels of efficiency. Marketing chains with fewer intermediaries tend to be more efficient and can empower smallholder farmers by increasing their control over pricing and market access. Reducing the number of intermediaries often lowers transaction costs and intermediation rents, allowing smallholders to capture a greater share of the final market price and improve their profitability and competitiveness, especially when supported by access to market information and contract farming arrangements (11, 12). Therefore, assessing the marketing costs, profit margins and price distribution becomes essential when marketing snap melon. Agricultural costs play a key role in determining the economic sustainability of the farm sector, especially as rising input prices continue to affect the profitability of crop enterprises.

Improving the marketing efficiency of GI-tagged crops like Kodungallur snap melon not only enhances farmer profitability but also opens avenues for entrepreneurial engagement in the agri-food sector. Efficient marketing systems reduce dependency on intermediaries, encourage value addition and support farmer-led innovations in production and distribution. This creates opportunities for smallholders to transition from mere producers to agri-entrepreneurs who can better manage risks, respond to market demand and participate in high-value value chains. Therefore, enhancing the efficiency of marketing channels is central to promoting sustainable agricultural entrepreneurship, particularly in regions with unique, location-specific crops like GI produce.

The crop marketing sector in India is still in its nascent phase. Research into marketing structures, including the producer-wholesaler-retailer-consumer pathway, is crucial to gain insights into how these players operate in the market with respect to costs, commissions and transportation-related price changes (13). Hence, this study, conducted in the geographically indicated area of the Kodungallur snap melon, seeks to evaluate the marketing channels involved in its trade and estimate the marketing efficiency of each channel.

## Materials and Methods

The research utilized a ex post facto research design. This research design facilitates the examination of how existing variables have influenced outcomes that are already in place. Data collection was undertaken in the GI-designated area of Kodungallur snap melon, using simple random sampling to ensure representative and impartial respondent selection. Two blocks from each district were randomly selected. A total of 60 farmers engaged in Kodungallur snap melon cultivation were selected for the study, with the distribution across block panchayats presented in Table 1.

With the assistance of farmers and officials from the Kodungallur municipality and Alangad block panchayat, a list of wholesalers, commission agents and retailers engaged in the marketing of Kodungallur snap melon within the study area was compiled. A total of fifteen intermediaries were chosen by randomly selecting five representatives from each category. A well-structured questionnaire was used to collect relevant data from the participating farmers and marketing intermediaries.

**Table 1.** Selection of respondents for the research study

| Location | | |
|---|---|---|
| Thrissur District | Kodungallur Municipality | 15 |
| | Vellangallur Block Panchayat | 15 |
| Ernakulam District | Alangad Block Panchayat | 15 |
| | Angamaly Block Panchayat | 15 |
| Total no. of Farmers | | 60 |
| Total no. of market intermediaries | | 15 |

Marketing cost refers to the expenditures involved in transferring goods and services from the point of production to the final consumer. This included various costs such as transportation, weighing, loading and unloading, packaging, storage, spoilage and other expenses involved in the marketing process. It refers to the expenses, whether monetary or non-monetary, borne by both producers and intermediaries during the process of selling and purchasing snap melon until it reaches the final consumer.

Total Marketing Cost (MC) is calculated as the sum of the producer's cost (C1) and the costs incurred by the various intermediaries (Cmi) involved in the marketing channel.

$$MC = C1 + Cm1 + Cm2 + Cmi \quad \text{Eqn.1}$$

MC = Total Marketing Cost.

C1 = Cost incurred by the producer.

Cmi = Cost incurred by $i^{th}$ middle-man in the process of buying and selling snap melon

Price spread refers to the difference between the amount a consumer pays and the sum received by the producer for an equivalent quantity of farm produce during the marketing process.

$$\text{Price Spread} = Pc - Pp \quad \text{Eqn. 2}$$

Where,

Pc = Price paid by the consumer

Pp = Price received by the producer

This study defines marketing margin as the financial return obtained by the intermediaries for their services in transferring and handling goods along the marketing chain. The profits of various market intermediaries, who were engaged in transporting the produce from the initial production point to the consumer, were recorded.

$$MM = \sum_{i=1}^{N} \left( \frac{\{Si - Pi\}}{Qi} \right) \quad \text{Eqn. 3}$$

MM = Total Marketing Margin

$S_i$ = Selling price by the $i^{th}$ intermediary

$P_i$ = Purchase price by the $i^{th}$ intermediary

$Q_i$ = Quantity of goods handled by the $i^{th}$ intermediary

Producer's share in consumer rupees is referred as the amount that the farmer receives, represented as a percentage of the retail price.

$$Ps = \left( \frac{Pp}{Pc} \right) \times 100 \quad \text{Eqn. 4}$$

Where,

Ps = Producer's share in consumer rupees

Pc = Price paid by the consumer

Pp = Price received by the producer

Marketing efficiency is the degree of market performance (14). It indicates how well the marketing system performs in delivering goods and services to consumers (15). To ensure accuracy marketing efficiency was calculated using Shepherd's formula and Acharya and Agarwal's method. The term efficient marketing describes the cost-effective distribution of snap melon from farmers to consumers, ensuring that the services provided align with consumer needs. According to Shepherd's method, marketing efficiency can be assessed by the ratio of the total value of goods marketed to the corresponding marketing costs. A greater ratio signifies enhanced efficiency, while a lower ratio indicates reduced efficiency.

$$ME = \frac{V}{I} \quad \text{Eqn. 5}$$

Where,

ME = Marketing Efficiency

V = Value of goods sold (Consumer Price)

I = Total Marketing Cost + Total Marketing Margin

### Acharya and Agarwal's method

The ideal assessment of marketing efficiency involves examining the marketing cost, the margin retained by intermediaries, the income earned by the farmer and the consumer's purchase price according to (16). An increase in marketing costs, margins and the consumer's purchase price typically result in a decline in ME. An increase in the price obtained by the farmer is indicative of improved marketing efficiency.

$$ME = \frac{Pp}{MC + MM} \quad \text{Eqn. 6}$$

Where,

ME = Marketing Efficiency

Pp = Price received by the producer

MC = Total Marketing cost

MM = Total Marketing margin

## Results and Discussion

Three marketing channels were identified for the marketing of Kodungallur snap melon, they are:

- Producers → Commission agents → Wholesaler → Retailer → Consumer
- Producers → Wholesaler → Retailer → Consumer
- Producers → Retailers → Consumer

These channels reflect varying degrees of intermediary involvement, influencing marketing costs, margins and producer returns.

### Production practices of farmers

Production practices among snap melon farmers indicate that 65 % favour organic approaches, while 35 % rely on chemical-based or inorganic farming systems (Table 2). This points to a clear preference among farmers for ecologically sustainable agricultural methods, which may be attributed to rising consumer demand for organic goods and improved understanding of the advantages organic farming offers for maintaining soil health and ensuring long-term sustainability.

**Table 2.** Method of production

| Method of Production | Frequency | Percentage (%) |
|---|---|---|
| Organic | 37 | 61.66 |
| Inorganic | 23 | 38.33 |

## Marketing channels adopted

The distribution of marketing channels adopted among snap melon growing farmers highlights the dominance of certain channels based on production methods (Fig. 1). Marketing channel II is the most widely adopted, with 61.6 % of organic producers and 21.6 % of inorganic producers using it, suggesting that this channel is likely well suited to the needs of both organic and inorganic farmers. That is out of the total 60 farmers 37 farmers followed organic method of production and all the organic farmers opted the marketing channel II for selling their produce. Among the 23 inorganic farmers, 13 farmers opted marketing channel II. This preference is mainly because snap melon is a highly perishable fruit and farmers engaged in large-scale cultivation preferred to sell their produce quickly in bulk to wholesalers, who offered reasonable rates and ensured timely procurement. The marketing channels I and III were only opted by the inorganic farmers and none of the organic farmers relied on these marketing channels for marketing. Marketing channel I is used by only 6.66 % of farmers, indicating that it is less effective. Meanwhile, 10 % of farmers use marketing channel III, that is marketing it directly to the retail stalls which is opted by only small-scale farmers. This channel is primarily adopted by small scale farmers, as retail outlets typically procure only limited quantities required for daily sales. Moreover, due to the highly perishable nature of snap melon, retailers are unable to store large volumes for extended periods, making this channel unsuitable for large-scale producers.

## Marketing costs and efficiency of marketing channels

Various marketing expenses such as transportation, loading and unloading, weighing, packing and losses due to spoilage were borne by both intermediaries and farmers involved in the snap melon marketing process. The marketing costs and margins calculated for each marketing channels are listed in Table 3. In marketing channel I, the commission agents collected the produce from the farmers' fields and hence the farmers did not bear any marketing cost. But the net price received by the farmers in marketing channel I is low when compared to other marketing channels. This is primarily because channel I involves a higher number of intermediaries commission agents, wholesalers and retailers each of whom adds their own margin and cost. As a result, the producer's

**Table 3.** Calculation of marketing costs and marketing margins

| SL No. | Particulars (calculated in ₹/Kg) | Channel I | Channel II | | Channel III |
|---|---|---|---|---|---|
| | | Inorganic | Organic | Inorganic | Inorganic |
| | Farmers' selling price | 23 | 34 | 27 | 38 |
| 1. | Marketing cost | - | 1.5 | 1 | 2.5 |
| | Net Price Received by the Farmer | 23 | 32.5 | 26 | 35.5 |
| | Selling Price of Commission Agent | 30 | - | - | - |
| 2. | Marketing cost | 3 | - | - | - |
| | Marketing margin | 4 | - | - | - |
| | Selling Price of Wholesaler | 38 | 42 | 36 | - |
| 3. | Marketing cost | 4 | 3.5 | 4 | - |
| | Marketing margin | 4 | 4.5 | 5 | - |
| | Selling Price of Retailer | 60 | 62 | 60 | 60 |
| 4. | Marketing cost | 5.5 | 4 | 5.5 | 5.5 |
| | Marketing margin | 16.5 | 16 | 18.5 | 16.5 |
| | Consumer's purchase price | 60 | 62 | 60 | 60 |
| 5. | Total marketing cost | 12.5 | 9 | 11 | 5.5 |
| | Total marketing margin | 24.5 | 20.5 | 23.5 | 16.5 |

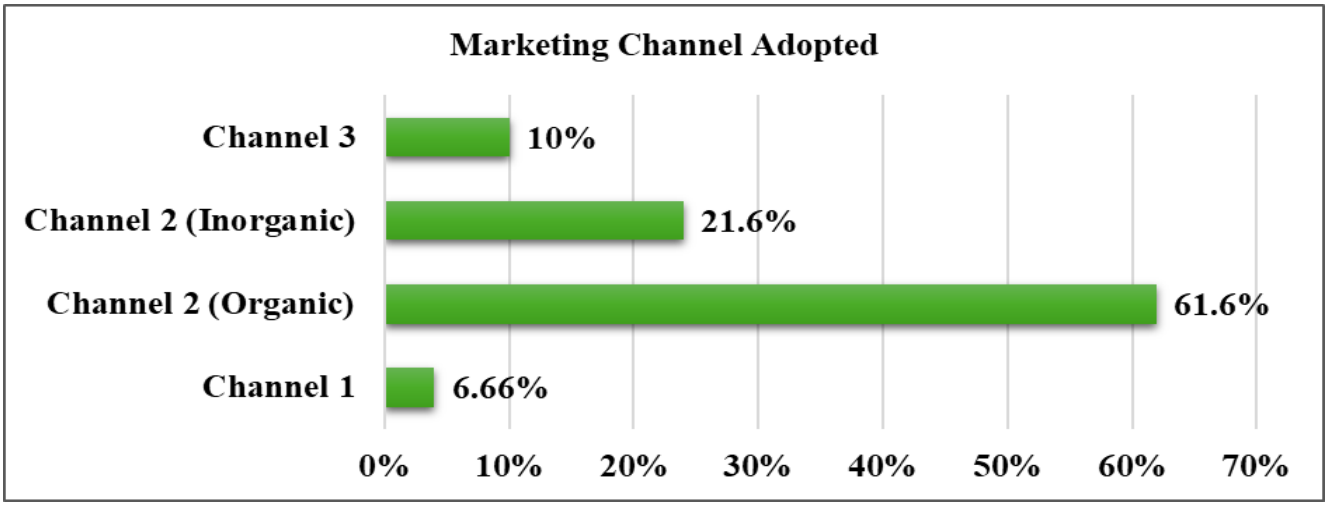


**Fig. 1.** Percentage of marketing channels adopted.

share in the consumer's rupee is greatly reduced, making this channel less profitable and less viable for long-term scalability. In marketing channel II, the organic farmers gained a better price of ₹32.5/kg for their organic produce and the produce was marketed to wholesalers. This is because wholesalers offered a higher price for organic produce due to its perceived quality and growing consumer demand. However, the inorganic farmers who marketed their produce through marketing channel II received only a net price of ₹26/kg. The marketing channel III opted by inorganic farmers sold out their produce directly to the retail outlets and received a net fair price of ₹35.5/kg. As their production volume was relatively low, these farmers chose to bypass intermediaries and sell their produce directly to retailers.

The commission agents in marketing channel I then marketed the produce to the wholesalers. The marketing margin they received in this process was ₹4/kg and they incurred a marketing cost of ₹3 for each kilogram of the produce marketed. The wholesalers in marketing channel I marketed the snap melon at a rate of ₹38/kg and incurred a marketing cost of ₹4/kg. The organic produce in marketing channel II was sold at ₹42/kg and the wholesalers received a slightly higher margin of ₹4.5/kg when compared to the margin of ₹4/kg received by the wholesalers for the inorganic produce marketed in channel I. However, a higher margin of ₹5/kg was obtained for the inorganic produce marketed in channel II. Also, the marketing cost of ₹3.5/kg for the organic produce in channel II was less compared to the costs incurred in the other marketing channels, since the spoilage loss was less for the organic produce and had a better shelf-life period compared to the inorganic produces.

Among the intermediaries, retailers benefitted the highest margins in the marketing process. In channel I and III the retailers gained a margin of ₹16.5/kg. The highest margin of ₹18.5/kg was received for the inorganic produces marketed through channel II. However, the margin of ₹16/kg received for the organic produce marketed in channel II was low when compared to other channels. Though the margins and marketing costs incurred by the intermediaries in the marketing process differed significantly, the consumer price didn't exhibit a wide variation. All the inorganic produces were sold at ₹60/kg and the organic produce at ₹62/kg. The organic produces received only a slightly higher price of ₹2/kg. The minimal price difference of ₹2/kg was due to the retailers' strategy to maintain comparable profit margins while avoiding a significant price hike that could discourage consumer purchases.

During marketing, retailers chose to sell inorganic produces first due to the superior storability and extended shelf life of organic produces.

The price spread and the farmer's share in consumer rupees was calculated for each marketing channels and is listed in Table 4. The price spread was the highest in marketing channel I with ₹37/kg followed by ₹32/kg for the inorganic produces in marketing channel II. The minimum price spread was observed in marketing channel III (₹22/kg), followed by Channel II for organic produce (₹28/kg). Thus, a lower price spread in marketing channel III indicates a more efficient marketing system, where a greater proportion of the consumer's payment reaches the producer. This reflects reduced intermediary costs and suggests better returns for farmers. However, the marketing channel III could be adopted by only small-scale farmers and for farmers cultivating in larger volumes marketing channel II with organic method of production is more economical.

**Table 4.** Calculation of price spread and producer's share in consumers rupee

| | | | | |
|---|---|---|---|---|
| Price spread (₹/Kg) | 37 | 28 | 32 | 22 |
| Producer's Share in Consumers' Rupee (%) | 38.33 | 54.83 | 46.66 | 63.33 |

Producer's share in consumer rupee refers to the proportion of the final retail price that is received by the producer. A higher share indicates that the farmer retains a greater portion of the consumer's payment, reflecting improved marketing efficiency and reduced intermediary margins. The Producer's share in consumer rupees suggests that marketing channel III is more efficient with a share of 63.33 %, followed by marketing channel II for organic produces with a share of 54.83 %.

The marketing efficiency calculated using Shepherd's method and Acharya and Agarwal's method is listed in Table 5 and 6 respectively. The results of Shepherd's method suggests that marketing channel III with a score of 2.72 was the most efficient followed by marketing channel II with a score of 2.1 for organic produce (Table 5, Fig. 2). According to the efficiency scores calculated using Acharya and Agarwal's method, channel III demonstrated the highest marketing efficiency, attaining a score of 1.61, indicating better returns to producers relative to marketing costs and margins. This was followed by channel II for organic produce, which achieved a score of 1.101 (Table 6, Fig. 3).

The analysis of marketing efficiency using both Shepherd's method and Acharya and Agarwal's method consistently identified channel III as the most efficient marketing route, followed by channel II for organic produce. This alignment across both methods highlights the effectiveness of channel III in minimizing marketing costs and maximizing producer returns. The relatively higher efficiency scores indicate a more favourable price transmission and reduced intermediary margins. These findings underscore the potential of channel III as a model for promoting efficient and sustainable marketing of snap melon.

**Table 5.** Calculation of marketing efficiency scores using shepherd's method

| **Marketing Channels** | **Channel 1** | **Channel 2** | **Channel 3** | |
|---|---|---|---|---|
| | **Inorganic** | **Organic** | **Inorganic** | **Inorganic** |
| Consumer Price / (MC + Total Marketing Margin) | 1.62 | 2.1 | 1.73 | 2.72 |

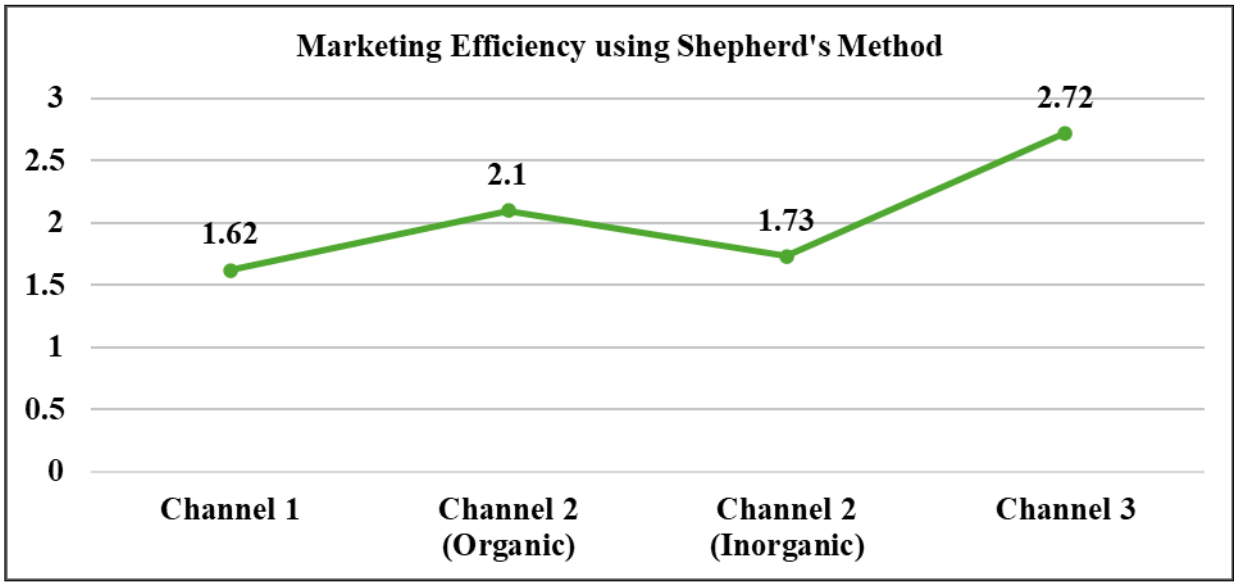


**Fig. 2.** Graph of marketing efficiency using Shepherd's method.

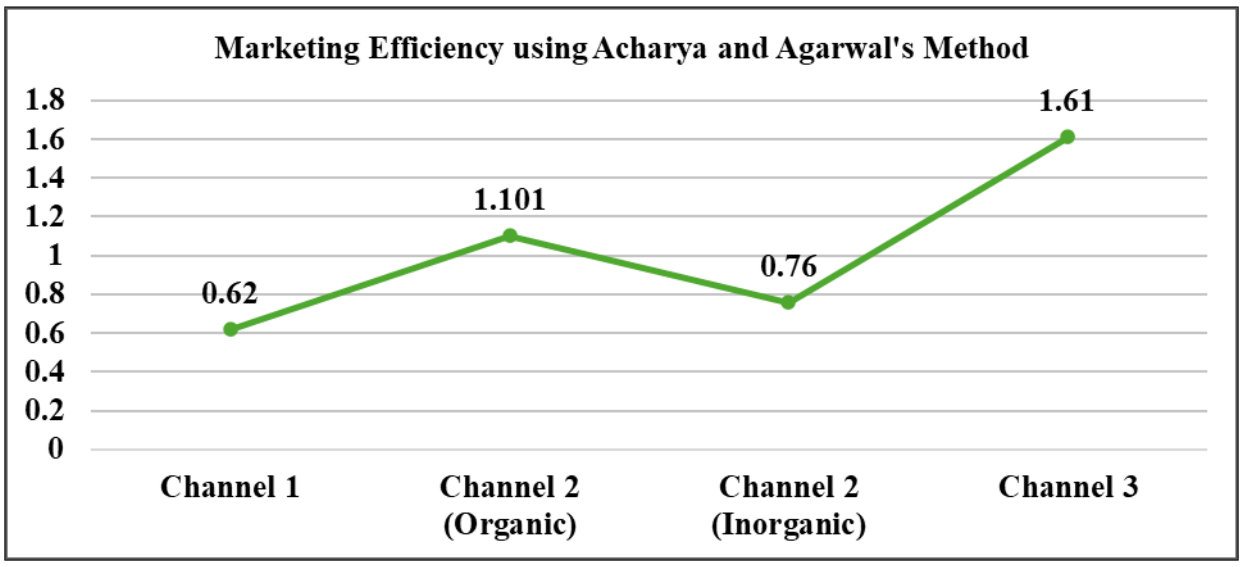


**Fig. 3.** Graph of marketing efficiency using Acharya and Agarwal's method.

**Table 6.** Calculation of marketing efficiency scores using Acharya and Agarwal's method

| Marketing Channels | Channel 1 | Channel 2 | | Channel 3 |
|---|---|---|---|---|
| | Inorganic | Organic | Inorganic | Inorganic |
| Net Price Received by Farmers / (MC + Total Marketing Margin) | 0.62 | 1.101 | 0.76 | 1.61 |

## Conclusion

This study provides valuable insights into the marketing dynamics of Kodungallur snap melon in Kerala, revealing that shorter supply chains, particularly marketing channel III (producer → retailer → consumer), yield the highest marketing efficiency (2.72 by Shepherd's method and 1.61 by Acharya and Agarwal's method) and the greatest producer's share in the consumer's rupee (63.33 %). However, due to the highly perishable nature of the crop and limited daily procurement by retailers, this channel is primarily feasible for small-scale farmers. The findings also highlight the economic advantages of organic production, with 61.66 % of farmers adopting this method and benefiting from better prices, longer shelf life and improved marketing efficiency. Organic farmers using marketing channel II achieved a producer's share of 54.83 % and efficiency scores of 2.1 and 1.101, respectively. Notably, some clusters of organic farmers are now scaling their own retail marketing initiatives to reduce dependence on intermediaries and maximize profits. These results underscore the importance of selecting marketing channels based on production volume and method, while also offering practical insights for fostering agri-based entrepreneurship. By encouraging value addition, direct marketing and organized farmer-led retailing, the study supports the development of sustainable, grassroots-level agricultural entrepreneurship within the GI crop sector.

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## Authors' contributions

SS contributed to the conceptualization and methodology of the analysis in the article. JT supported in the interpretation of the findings. MS assisted in the literature review and contributed to the manuscript writing. MA supported the data collection and contributed to the discussion of marketing efficiency. PGK and JS provided valuable insights on the introduction part and contributed to the final revisions of the manuscript. All authors read and approved the final manuscript.

## Compliance with ethical standards

**Conflict of interest:** The author(s) report no competing interests to declare.

**Ethical issues:** None

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