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## Analysis of constraints affecting farmer engagement in vegetable export from Kerala

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### ABSTRACT

Vegetable exports have emerged as an important avenue for enhancing farmer's income, promoting value addition, and strengthening India's agricultural trade. Despite Kerala's favourable agro-climatic conditions and production potential, the participation of vegetable farmers in export markets remains limited. Identifying the major constraints experienced by non-export vegetable farmers is essential for designing appropriate extension and institutional interventions that encourage export participation. The present study was conducted in three major vegetable-growing districts of Southern Kerala, namely Thiruvananthapuram, Kollam, and Alappuzha, to identify and prioritize the constraints affecting farmer's engagement in vegetable export. A total of 90 vegetable farmers, comprising 30 respondents from each district, were selected using a multistage random sampling procedure. Garrett Ranking Technique was employed to prioritize the constraints perceived by the respondents. The findings revealed that limited knowledge of export processes emerged as the most severe constraint with an overall Garrett Mean Score (GMS) of 74.69, followed by ignorance about government schemes (68.67), lack of direct contact with exporters (67.28), and lack of cold storage facilities in villages (61.13). The study suggests that strengthening export-oriented extension services, improving awareness of government schemes, facilitating direct farmer-exporter linkages through Farmer Producer Organizations (FPOs) and developing decentralized cold-chain infrastructure are critical for improving farmer's preparedness for vegetable export.

**Keywords:** Vegetable export, Export constraints, Vegetable farmers, Garrett ranking, Agricultural extension

### Introduction

India is the second-largest producer of vegetables in the world (National Horticulture Board, 2023) [1] and possesses considerable potential for expanding exports of fresh and processed vegetables because of its diverse agro-climatic conditions, year-round production capability, and increasing demand for horticultural commodities in international markets (Department of Scientific and Industrial Research, 2019) [2]. However, India's share in the global vegetable export market remains comparatively low despite substantial production, indicating the existence of several production, marketing, institutional, and infrastructural constraints that limit farmer's participation in export markets (Singh *et al.*, 2023) [3]. The Government of India's Agriculture Export Policy recognizes horticultural commodities, particularly fruits and vegetables, as high-value agricultural products capable of improving farmer's income through export-oriented production, value addition, and improved market access (Ministry of Commerce and Industry, 2019) [4].

Kerala occupies an important position in India's horticultural sector owing to its favourable climate, diversified cropping systems and increasing cultivation of vegetables under homestead and commercial farming systems (Government of Kerala, 2024; Kerala State Planning Board, 2025) [5, 6]. The state has initiated several programmes to enhance vegetable production through the Department of Agriculture Development and Farmer's Welfare, Vegetable and Fruit Promotion Council Kerala (VFPC), Krishi Bhavans, Farmer Producer Organizations (FPOs) and Kerala Agricultural University (Government of Kerala, 2024) [5]. Nevertheless, vegetable exports from Kerala remain relatively limited compared with the state's production potential (APEDA, 2024) [7]. Export participation requires compliance with quality standards, grading, packaging, traceability, sanitary and phytosanitary measures, and efficient post-harvest management (APEDA, 2024; ICAR-IIHR, 2020) [7, 8]. These requirements often pose challenges for farmers who have not previously engaged in export-oriented cultivation (Extension Journal, 2024) [9].

Agricultural extension plays a crucial role in bridging the gap between production and export markets by disseminating technical knowledge, organizing training programmes, facilitating institutional convergence, and strengthening market linkages (NAARM, 2024; EEI, 2024) [10, 11]. Understanding the specific constraints perceived by farmers is therefore essential for designing effective extension strategies and policy interventions. Although several studies have examined production and marketing constraints in vegetable cultivation, limited empirical evidence is available regarding export-related constraints among non-export veg

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etable farmers in Kerala (JAEM, 2025; Extension Journal, 2024) [12, 9]. The present study addresses this research gap by identifying and prioritizing the constraints influencing farmer's engagement in vegetable export using Garrett Ranking Technique.

## Materials and Methods

### Study area

The study was conducted in three districts of Southern Kerala, namely Thiruvananthapuram, Kollam and Alappuzha. These districts were selected because vegetable cultivation is widely practiced under diverse production systems and the districts possess potential for integrating farmers into vegetable export value chains through institutional support and improved market infrastructure. The selected districts also represent different agro-ecological and marketing conditions, making them suitable for examining district-wise variations in export-related constraints.

### Sampling procedure

A multistage random sampling technique was adopted for the study. In the first stage, three districts namely Thiruvananthapuram, Kollam and Alappuzha were purposively selected. In the second stage, vegetable-growing areas within each district were identified. Finally, 30 vegetable farmers were selected from each district, resulting in a total sample size of 90 respondents. Only farmers engaged in vegetable cultivation but not currently participating in vegetable export activities were included in the study.

### Instruments and data collection

Farmers were asked to rank the constraints that limited their engagement in vegetable export. Eleven export-related constraints covering knowledge, institutional support, infrastructure, market linkage, certification, documentation, production inputs and communication were included in the schedule.

#### Garrett Ranking Technique

Garrett Ranking Technique was employed to identify and prioritize the constraints perceived by the respondents. This technique converts individual ranks assigned by respondents into numerical scores, enabling comparison of constraints based on their average importance.

Initially, the rank assigned by each respondent was converted into a percent position using Garrett's formula:

$$\text{Percent Position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

Where:

- $R_{ij}$  = Rank assigned for the  $i^{\text{th}}$  constraint by the  $j^{\text{th}}$  respondent.
- $N_j$  = Total number of constraints ranked by the respondent.

The percent positions were converted into Garrett scores using Garrett's conversion table. The scores obtained from all respondents were summed and divided by the number of respondents to obtain the Garrett Mean Score (GMS) for each constraint. Constraints were then ranked in descending order of Garrett Mean Scores, with the highest score indicating the most severe constraint.

## Results and Discussion

The Garrett Ranking Technique was employed to identify and prioritize the constraints perceived by vegetable farmers in Thiruvananthapuram, Kollam, and Alappuzha districts regarding their engagement in vegetable export. Garrett Mean Scores (GMS) were calculated for each constraint for the pooled sample. The constraints were ranked according to their overall Garrett Mean Scores, with a higher score indicating greater severity. The results revealed that farmers experienced a combination of knowledge, institutional, infrastructural, market and production-related barriers, suggesting that

successful participation in vegetable export requires interventions beyond production alone.

**Table 1.** Major constraints perceived by vegetable farmers in export (N = 90)

| Constraint                                 | Overall GMS | Overall Rank |
|--------------------------------------------|-------------|--------------|
| Limited knowledge of export processes      | 74.69       | I            |
| Ignorance about government schemes         | 68.67       | II           |
| Lack of direct contact with exporters      | 67.28       | III          |
| Lack of cold storage in the village        | 61.13       | IV           |
| Difficulty meeting international standards | 49.88       | V            |
| Documentation complexities                 | 49.10       | VI           |
| High input cost                            | 47.39       | VII          |
| High cost of global certification          | 39.20       | VIII         |
| Pesticide dependency and handling issues   | 35.93       | IX           |
| Limited availability of quality inputs     | 35.10       | X            |
| Language barriers                          | 25.64       | XI           |

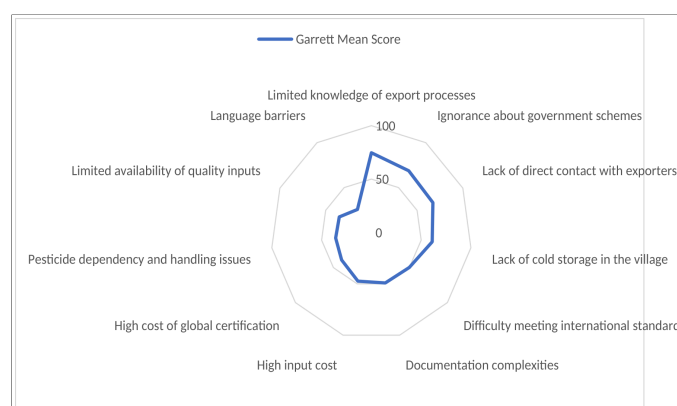


**Figure 1.** Major constraints perceived by vegetable farmers in export in Southern Kerala

The Table 1 and Fig 1 clearly demonstrate that knowledge-related and institutional constraints were perceived as more severe than certification costs or language-related issues. Farmers considered inadequate awareness of export procedures and institutional support as immediate barriers to participation in export markets, whereas certification cost and language were viewed as relatively less pressing constraints because most respondents had not yet entered the export system.

Limited knowledge of export processes emerged as the highest-ranked constraint among vegetable farmers, with an overall Garrett Mean Score of 74.69. This finding indicates that most farmers possess limited practical knowledge regarding export-oriented production and marketing. Farmers were unfamiliar with procedures such as identifying export buyers, understanding export documentation, grading and packaging standards, traceability requirements, sanitary and phytosanitary regulations, shipment procedures, payment mechanisms and export logistics. Although respondents were engaged in commercial vegetable cultivation, many lacked exposures to export-specific production practices that distinguish domestic marketing from export marketing.

Ignorance about government schemes was identified as the 2<sup>nd</sup> most important constraint, with an overall Garrett Mean Score of 68.67. This indicates that a substantial proportion of vegetable farmers were unaware of export promotion schemes, subsidies, financial assistance, infrastructure support, certification assistance, market linkage pro

grammes, and institutional services available through APEDA, the Department of Agriculture Development and Farmer's Welfare, the National Horticulture Board and other agencies. Limited awareness prevents farmers from accessing institutional opportunities that could reduce the financial and technical risks associated with export-oriented vegetable cultivation. It also implies an information dissemination gap within the agricultural extension system. Although several export promotion programmes are available, farmers often receive fragmented or delayed information regarding eligibility, application procedures, and benefits. Consequently, institutional support mechanisms fail to translate into farmer participation.

Lack of direct contact with exporters was ranked III overall, with a Garrett Mean Score of 67.28. The absence of direct interaction with exporters limits farmer's understanding of buyer preferences, export-quality specifications, delivery schedules, market demand, preferred varieties, price expectations and procurement procedures. Farmers depend largely on intermediaries and local markets, resulting in limited exposure to export value chains and uncertainty regarding export opportunities. Direct interaction between farmers and exporters is important for developing trust, improving quality compliance, reducing market information asymmetry, and ensuring better price realization. Farmer Producer Organizations can play an important role in aggregating produce, negotiating with exporters, and facilitating collective marketing arrangements.

Lack of cold storage facilities was ranked 4<sup>th</sup> overall, with an overall Garrett Mean Score of 61.13. Vegetables are highly perishable commodities requiring appropriate storage and temperature management to maintain freshness, nutritional quality and market value. Inadequate village-level cold storage facilities increase post-harvest losses, shorten shelf life, reduce quality, and make it difficult for farmers to meet export delivery schedules. Cold-chain infrastructure forms an essential component of export competitiveness because export markets require consistent quality during transportation and storage. The absence of decentralized cold storage, pre-cooling facilities, grading centres, and pack houses discourages farmers from producing vegetables for distant markets.

Difficulty in meeting international standards occupied the 5<sup>th</sup> rank, with an overall Garrett Mean Score of 49.88. International markets require compliance with food safety standards, Maximum Residue Limits (MRLs), grading specifications, traceability systems, sanitary and phytosanitary measures, and quality certification. Farmers perceived these standards as technically demanding because they lacked adequate guidance regarding production protocols and quality compliance. The finding suggests that farmers recognize international standards as an important barrier but perceive knowledge and institutional support as more immediate concerns. Strengthening extension training on GAP, residue management, traceability, and export-quality production can improve farmer's confidence in meeting international market requirements.

Documentation complexities received the 6<sup>th</sup> rank, with an overall Garrett Mean Score of 49.10. Export documentation involves certificates, declarations, invoices, phytosanitary certificates, registration procedures, and compliance records. Farmers perceived documentation as a technical process requiring institutional assistance. Limited familiarity with export documentation discourages farmers from exploring export opportunities independently. The result reinforces the need for institutional facilitation through export facilitation centres, Krishi Bhavans, APEDA outreach programmes, and Farmer Producer Organizations capable of supporting documentation requirements.

High input cost ranked 7<sup>th</sup> overall, with a Garrett Mean Score of 47.39. Farmers indicated that seeds, fertilizers, pesticides, labour, irrigation, packaging materials and transportation increase the cost of export-oriented vegetable production. Although input cost was not perceived as the most severe constraint, uncertainty regarding export prices and market access may discourage investment in export-quality cultivation practices. This score indicate that rising production costs represent a common concern throughout Southern Kerala.

High cost of global certification occupied the 8<sup>th</sup> rank, with an overall Garrett Mean Score of 39.20. Certification requirements such as Global G.A.P. involve compliance costs, inspection charges, record maintenance, and infrastructure investments. However, since respondents had not yet entered export markets, many viewed certification costs as a future barrier rather than an immediate challenge.

Pesticide dependency and handling issues ranked 9<sup>th</sup> overall, with an overall Garrett Mean Score of 35.93. Export markets impose strict residue limits on vegetables. Farmers acknowledged pesticide management as a concern but considered export knowledge, institutional awareness, and infrastructure more urgent constraints. Nevertheless, residue management remains important because non-compliance can result in rejection of export consignments. The findings suggest the need for training programmes on integrated pest management, safe pesticide application, residue monitoring, and adherence to pre-harvest intervals.

Limited availability of quality inputs received the 10<sup>th</sup> rank, with an overall Garrett Mean Score of 35.10. Quality seeds, planting materials, fertilizers, and bio-inputs are important for producing uniform export-quality vegetables. Although this constraint received a relatively lower rank, farmers recognized that consistent availability of quality inputs is essential for export-oriented production. The lower ranking suggests that farmers currently perceive institutional and knowledge constraints as more immediate than input availability.

Language barriers received the lowest Garrett Mean Score (25.64) and were ranked eleventh. The result indicates that language was not considered a major obstacle to vegetable export engagement compared with knowledge, infrastructure, institutional support, and market linkage. Farmers perceived practical training and institutional facilitation as more important than language assistance.

## Conclusion

The results of the study revealed that vegetable farmers in Southern Kerala face a range of knowledge, institutional, market, infrastructural and production-related constraints that limit their engagement in vegetable export. Among the eleven constraints examined, limited knowledge of export processes emerged as the most important constraint, with a Garrett Mean Score of 74.69, followed by ignorance about government schemes (68.67), lack of direct contact with exporters (67.28) and lack of cold storage facilities in the village (61.13). In comparison, language barriers, limited availability of quality inputs and pesticide-related issues received relatively lower rankings. These findings from the study indicates that the major barriers are concentrated around information access, institutional support, market linkages and post-harvest infrastructure, rather than production alone. Therefore, strengthening export-oriented extension programmes, awareness regarding government schemes and export procedures, direct farmer-exporter linkages through FPOs, and decentralized cold-chain facilities would help improve farmer's preparedness for participation in vegetable export. Thus, this study highlights the need for coordinated interventions by agricultural extension agencies, farmer organizations and other export-promoting institutions to facilitate the transition of vegetable farmers towards export-oriented value chains.

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