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Farmer Preparedness and Constraints for Agribusiness Opportunities at Vizhinjam International Seaport, Kerala

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HIGHLIGHTS

- Institutional and policy barriers were the most critical constraints limiting farmer preparedness.
- Market fragmentation and weak collectives restricted integration with port-led agribusiness.
- Digital divide and low awareness of export standards reduced export readiness.
- Strengthening FPOs, ICT-enabled extension, and farmer-centric schemes is essential.

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ABSTRACT

The study was conducted during 2024-25 in Thiruvananthapuram district, Kerala, to assess farmer preparedness and constraints in leveraging agribusiness opportunities associated with the Vizhinjam International Seaport. The principal objective was to identify and prioritize constraints affecting farmer participation in port-led agribusiness. A total of 100 farmers were selected using purposive and random sampling techniques. Data were collected through a structured interview schedule, focus group discussions, and expert consultations. The Garrett Ranking Technique was applied to rank the identified constraints. The results revealed that institutional and policy barriers such as frequent policy shifts and inadequate extension–export support were ranked as the most severe. Market fragmentation, weak farmer collectives, land fragmentation, labour scarcity, and digital gaps also limited preparedness. Farm-level and compliance-related challenges, including stagnant productivity and certification costs, were reported but considered relatively less critical. It was concluded that systemic and governance issues outweigh farm-level problems in determining export readiness. The study highlights the need for policy stability, farmer-centric export schemes, strengthened FPOs, ICT-enabled extension, and targeted capacity building to ensure inclusive integration of smallholders into global value chains through Vizhinjam Seaport.

INTRODUCTION

Agriculture remains the backbone of India's economy, providing livelihoods for nearly half of the workforce while contributing about 18% to the national GDP (Government of India, 2023). With globalization, the competitiveness of agricultural exports is influenced not only by production but also by logistics efficiency, port connectivity, and compliance with international standards (UNCTAD, 2023; World Bank, 2023). Seaports reduce transaction costs, improve time efficiency, and strengthen access to global markets, thereby serving as critical nodes in international value chains (Notteboom & Rodrigue, 2005).

Kerala holds a distinctive place in India's agricultural landscape. Even with land fragmentation, Kerala leads in exporting

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high-value agricultural and marine commodities such as spices, coconut and seafood, aided by established export channels via Cochin Port. (NABARD, 2019; Spices Board of India, 2023). The state's long history of maritime trade reinforces its comparative advantage in port-linked agribusiness. However, fragmented holdings, high labour costs, and inadequate infrastructure continue to restrict the participation of smallholders in global export markets (Manoj & Joseph, 2016).

The Vizhinjam International Seaport, located in Thiruvananthapuram district, is India's first deep-water transshipment hub. Strategically positioned just 10 nautical miles from the busy East–West shipping lanes, it is expected to reduce shipping costs, improve turnaround time, and strengthen India's position in global maritime trade (Government of Kerala, 2020). For Kerala's farmers, Vizhinjam presents a significant opportunity to link their high-value crops with international markets, thereby transforming regional agribusiness.

Yet, infrastructure development alone does not ensure farmer integration into export-led trade. Smallholders continue to face multiple barriers to preparedness. These include limited awareness of international quality and safety standards (Henson & Jaffee, 2008), weak collectivization and bargaining power (Trebbin, 2014), high compliance and certification costs (Navya et al., 2022), and structural issues such as fragmented landholdings (Aswani & Varghese, 2023). Farmer preparedness is a multidimensional concept encompassing awareness of export opportunities, adoption of export-oriented practices, attitudes towards trade, access to information and resources, and institutional support systems (Rogers, 2003; Reardon et al., 2009; Malik et al., 2023). Unless these dimensions are adequately addressed, the benefits of Vizhinjam Seaport are likely to bypass smallholders, reinforcing the dominance of larger agribusiness players.

In this context, it becomes necessary to assess the extent of farmer preparedness and identify the constraints that restrict their ability to leverage the agribusiness potential of Vizhinjam International Seaport. The present study was undertaken during 2024–25 in Thiruvananthapuram district with the objective of prioritizing these constraints and generating insights for policy and extension interventions to strengthen smallholder participation in port-led agribusiness growth.

METHODOLOGY

The study was conducted during 2024–25 in Thiruvananthapuram district of Kerala, purposively selected as it hosts the Vizhinjam International Seaport. A multi-stage random sampling technique was adopted to select respondents. Five agricultural blocks–Nedumangad, Parassala, Athiyannur, Vellanad, and Nemom–were identified, and from each block, one panchayat was chosen based on the production of agricultural commodities. Subsequently, twenty farmers were selected from each panchayat, constituting a total sample of 100 respondents.

Primary data were collected using a structured interview schedule, supported by in-depth interviews, focus group discussions, and direct field observations. The schedule was developed based on the study objectives, relevant literature, and expert consultations, and comprised sections on farmers' awareness, institutional and infrastructural support, market access, technological readiness, and economic constraints. The tool was pre-tested in a non-sample panchayat (Kanjiramkulam) with fifteen farmers to assess clarity, content validity, and reliability. Based on the feedback, ambiguous or redundant items were revised or removed. Secondary data were sourced from institutional reports such as NABARD (2019), Spices Board of India (2023), and the Department of Ports, Government of Kerala (2020), along with relevant research publications and government documents. Data analysis involved descriptive statistics such as frequency and percentage to describe respondent profiles and interpret results, while the Garrett Ranking Technique was used to prioritize the constraints faced by farmers in leveraging agribusiness opportunities associated with the Vizhinjam International Seaport.

The constraints faced by farmers in leveraging agribusiness opportunities were identified and prioritized using the Garrett Ranking Technique (Garrett & Woodworth, 1969). Respondents were asked to rank the selected constraints according to their perception of severity. The percentage position for each rank was calculated using the formula:

$$\text{Per cent position} = \frac{100(R_{ij}-0.5)}{N_j}$$

Where, R_{ij} is the rank for i^{th} constraint experienced by the j^{th} individual, N_j is the number of constraints ranked by the j^{th} individual

The calculated percentage positions were then converted into scores using the Garrett conversion table. The individual scores for each constraint were aggregated across respondents and divided by the total number of farmers to obtain the mean scores. The constraints were finally ranked in descending order of mean values, which facilitated the identification of the most critical factors affecting farmer preparedness for seaport-linked agribusiness opportunities. All collected data were compiled, coded, and analyzed using appropriate statistical tools. The analysis ensured both accuracy and validity, enabling meaningful interpretation of the results in alignment with the objectives of the study.

RESULTS

To provide a structured perspective, the fifteen identified constraints were categorized in Institutional and Policy Constraints (1-6), Market and Structural Constraints (7-9), Technological and Information Constraints (10-11), Digital divide and poor access to export-market information (12) and Farm-Level and Economic Constraints (13-15).

This classification enables clearer interpretation, showing that institutional and policy-related factors predominate in constraining farmer preparedness, while market, technological, and farm-level issues further compound the challenges to export readiness.

The study attempted to identify and prioritize the constraints faced by farmers in leveraging agribusiness opportunities in the wake of Vizhinjam International Seaport. Using the Garrett Ranking Technique, 15 constraints were ranked based on the mean scores obtained from farmer responses. The results are presented in Table 1. A higher mean score indicates a more severe constraint as perceived by the respondents.

Table 1. Constraints faced by farmers in leveraging agribusiness opportunities

Rank	Constraint Statement	Mean Score
1	Frequent changes in state government cause shifting priorities, inconsistent support, and poor follow-through on export promotion and rural infrastructure.	52.61
2	Institutional gaps in extension and export support result in inadequate guidance on procedures, market linkages, and compliance with international standards.	51.72
3	Market fragmentation and weak farmer collectives limit aggregation, bargaining power, and coordinated access to port-based exports.	50.75
4	Highly fragmented landholdings restrict large-scale production, mechanization, and supply consistency required for export markets.	49.66
5	Scarcity of farm labour has driven wages up, sharply increasing cultivation and post-harvest costs.	49.20
6	Information gaps and a rural digital divide delay access to export market data, e-platforms, and real-time price intelligence.	49.16
7	Limited awareness and preparedness for meeting export standards, certifications, and global buyer requirements.	48.70
8	Restrictive agricultural regulations and excessive government intervention reduce market flexibility and slow decision-making for export ventures.	47.98
9	Poor last-mile infrastructure and logistic bottlenecks between farms and the port reduce export efficiency and quality.	47.91
10	Smallholder farmers are often sidelined in policy-making, with port-linked infrastructure and schemes favouring larger, organized players.	46.70
11	Absence of farmer-centric schemes to integrate smallholders with Vizhinjam port-based trade and value chains.	46.43
12	Complex documentation, permits, and legal compliance for exports are difficult to navigate without costly middlemen or consultants.	45.97
13	Stagnant farm productivity due to policy emphasis on traditional crops, low irrigation efficiency, and slow adoption of agri-technologies.	44.23
14	High export compliance costs–small and marginal farmers struggle to afford certifications, quality assurance, traceability, and audits.	41.59
15	Lack of clear government policies focusing on farmer integration with port trade and value chains.	38.61

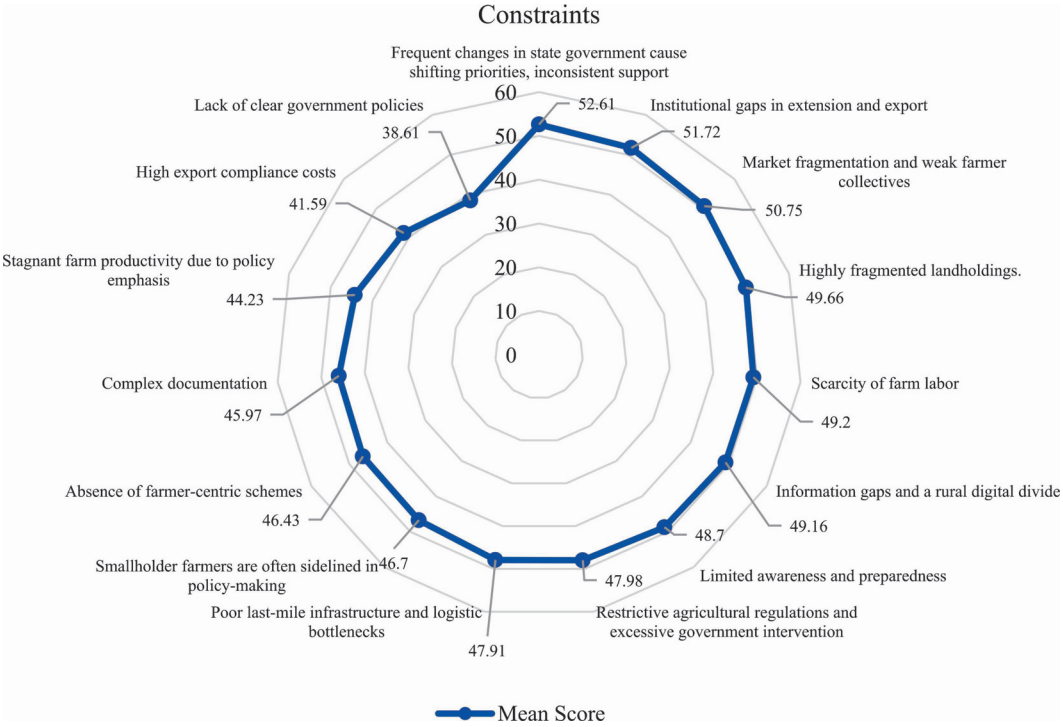

Figure 1. Mean Garrett scores of constraints faced by farmers in leveraging agribusiness opportunities (Radar Chart Placeholder).

The ranking highlights that institutional and governance-related barriers dominate farmer concerns. The most severe constraint (Rank 1) was frequent policy changes (Mean = 52.61), indicating that farmers are highly vulnerable to government instability and shifting priorities. This was closely followed by institutional gaps in extension and export support (Mean = 51.72), which shows that farmers lack clear, continuous guidance on export-oriented practices, certification, and market linkages. Together, these top two constraints emphasize that the readiness of farmers to exploit port-led agribusiness opportunities is strongly tied to policy consistency and extension effectiveness. The third-ranked constraint (Mean = 50.75), market fragmentation and weak farmer collectivization, demonstrates that smallholder farmers are unable to aggregate produce effectively for large-scale exports. This is a well-recognized

issue in Kerala's agriculture, where the predominance of marginal holdings limits economies of scale. Unless farmers are integrated into stronger Farmer Producer Organizations (FPOs) or cooperatives, their bargaining power will remain low.

Farm-level structural issues such as fragmented landholdings (Rank 4, Mean = 49.66) and labour scarcity (Rank 5, Mean = 49.20) further constrain export preparedness. Small farms limit mechanization and large-scale production, while rising wages inflate cultivation and post-harvest costs. Together, these highlight that the inherent smallholder nature of Kerala's agriculture acts as a major bottleneck in scaling up for international trade. Technological and knowledge-related gaps also emerged as significant mid-ranked constraints. The digital divide and lack of timely access to export market data (Rank 6, Mean = 49.16) and low awareness of export standards and certification requirements (Rank 7, Mean = 48.70) point to limited preparedness in terms of information flow and compliance. In the era of digital agriculture and global trade, these gaps place farmers at a competitive disadvantage.

Regulatory and infrastructural barriers featured in the middle of the ranking. Restrictive regulations (Rank 8), poor last-mile connectivity (Rank 9), and the absence of farmer-centric export schemes (Rank 11) indicate that institutional rigidity, weak infrastructure, and poor scheme design together reduce farmers' ability to capitalize on port-led opportunities. Documentation and legal compliance burdens (Rank 12, Mean = 45.97) further add to transaction costs, discouraging participation in export markets. Lower-ranked constraints included stagnant farm productivity (Rank 13) and high export compliance costs (Rank 14). Though ranked lower, these remain significant challenges, as low yields and unaffordable certification processes prevent farmers from competing with global suppliers. The least severe constraint (Rank 15, Mean = 38.61) was lack of long-term government policy on farmer integration. Although farmers perceived it as less immediate compared to day-to-day challenges, the absence of a strategic export vision risks marginalizing smallholders in the long run.

DISCUSSION

The Garrett analysis clearly shows that farmers' preparedness for seaport-linked agribusiness is influenced more by institutional and governance constraints than by farm-level issues. Frequent policy changes and discontinuity in export promotion emerge as the most critical barriers, which discourages smallholders from making long-term investments in agribusiness ventures. This finding agrees with earlier studies that highlight how policy instability reduces farmer confidence and weakens participation in commercial agriculture (Roy & Ghosh, 2022; Anamika et al., 2023; Kademani et al., 2024; Megha et al., 2025). The evidence confirms that infrastructure alone is insufficient to promote farmer integration with global markets unless supported by a stable policy environment. Institutional gaps in extension and export support further underline the lack of effective advisory systems to guide farmers in documentation, certification, and meeting international standards. This is consistent with the findings of Chandran and Podikunju (2021), who reported that inadequate extension services restricted vegetable growers in Kerala from adopting improved marketing practices. The absence of farmer-centric advisories points to the urgent need for reorienting extension systems toward export facilitation, certification literacy, and ICT-based support. Market and structural barriers also limit farmer preparedness. Weak farmer collectives (Rank 3) and fragmented landholdings (Rank 4) restrict aggregation and reduce bargaining power, thereby limiting participation in global value chains. These findings reinforce the conclusions of Trebbin (2014), who emphasized the role of farmer producer organizations (FPOs) in enhancing market access and export readiness. Labour scarcity and high wages, ranked fifth in severity, are symptomatic of Kerala's agrarian system and reduce farm-level competitiveness. This observation is in agreement with Aswani and Varghese (2023), who noted that dependence on hired labour and limited mechanization inflate production costs, making smallholder exports less competitive.

Preparedness gaps linked to digital exclusion and low awareness of export standards (Ranks 6 and 7) reflect broader international patterns. Kersting and Wollni (2012) and Fonseka et al. (2025) highlighted that inadequate knowledge of certification processes and high compliance costs constrain smallholders from meeting export quality standards, thereby limiting their integration into high-value markets and found that exclusion from ICT platforms and certification processes reduces the ability of smallholders to participate in high-value export chains. In the present study, farmers similarly identify lack of access to real-time information and inadequate knowledge of global standards as major barriers, which underscores the importance of digital extension approaches. Infrastructure and compliance-related barriers also remain important. Poor last-mile connectivity and logistic bottlenecks (Rank 9), complex documentation (Rank 12), high export compliance costs (Rank 14), and stagnant productivity (Rank 13) all limit export competitiveness. Comparable findings were reported in Assam and Tripura, where inadequate infrastructure and bureaucratic hurdles constrained farmer participation in markets (Das et al., 2014; Roy & Ghosh, 2022). These results suggest that logistical challenges are not unique to Kerala but represent a wider structural issue in Indian agriculture.

Overall, the results confirm that systemic and governance challenges dominate farmer concerns, while farm-level constraints, though present, are secondary. The evidence indicates that inclusive participation in seaport-led agribusiness requires policy stability, stronger FPOs, and reoriented extension systems that emphasize export preparedness. Investment in packhouses, cold chains, and logistics around Vizhinjam is equally critical to reduce costs and improve quality. By aligning these institutional, infrastructural, and extension efforts, Vizhinjam International Seaport can serve as a catalyst for farmer integration into global value chains.

CONCLUSION

The farmers' preparedness to leverage opportunities from the Vizhinjam International Seaport is constrained more by systemic and institutional barriers than by farm-level issues. Frequent policy shifts, inadequate advisory support, market fragmentation, weak collectives, labour scarcity, and the digital divide emerge as key obstacles. Farm-level concerns such as productivity and certification costs are important but secondary. The infrastructure development alone does not guarantee farmer participation in export-led agribusiness. Strengthening preparedness requires policy stability,

farmer-focused schemes, strong producer organizations, ICT-enabled extension, and targeted training to build export readiness. By reorienting extension services and fostering institutional convergence, farmers can be better integrated into port-led value chains. These interventions are essential for ensuring that smallholders equitably benefit from the seaport's role as a driver of agribusiness growth in Kerala.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the respondents regarding the study during the course of the data collection.

Conflict of interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The authors declare that during the preparation of this work, they thoroughly reviewed, revised, and edited the content as needed. The authors take full responsibility for the final content of this publication.

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