

From Farm to Fork: Reimagining Vegetable Marketing for Sustainable Agricultural Growth

¹S Vincent Raj, ²Dr S Ganesan

¹Research Scholar

Department of Commerce, Raja Doraisingam Government Arts College

Affiliate to Alagappa University, Sivagangai

²Associate Professor & Head

Department of Commerce, Raja Doraisingam Government Arts College

Affiliate to Alagappa University, Sivagangai

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Abstract: The marketing of vegetables strengthens agricultural sustainability, improves farmers' livelihoods and ensures food security. Despite the progress, the sector continues to face challenges – a fragmented supply chain, post-harvest losses, price volatility, weak market infrastructure they can't access readily. These restrictions hamper the marketing of fresh vegetables and their availability to consumers. In light of these challenges, this paper analyses innovative practices for vegetable marketing by merging sustainable agricultural practices and contemporary marketing techniques. The research evaluates changes in vegetable marketing from conventional distribution systems to tech-oriented, consumer-driven, value-adding supply chains. This emphasizes the significance of digital marketplaces, farmer producer organizations, cold-chain logistics, traceability systems, value addition, and farm-to-consumer marketing models in improving market efficiency and reducing food wastage. The paper focus on planners and users of marketing infrastructure, to understand the problem areas. Further it discusses the important role of government policies, institutional support, and public-private partnerships in creating resilient vegetable marketing systems that benefit producer. Also it benefits intermediaries and consumers as well. By integrating contemporary literature and modern marketing practices, the paper presents a conceptual framework for sustainable marketing of vegetables that is economically viable, environmentally friendly and socially inclusive. The results stress that innovation, digitization plus integrated supply chains can help enhance farmers' income, benefit consumers and sustain the agri-growth through re-dispatch of vegetable marketing. This research study will be helpful to policymakers, researchers, agribusiness professionals and agricultural extension agencies in developing efficient and sustainable vegetable marketing system.

Keywords: Vegetable marketing, Sustainable Agriculture Growth(SAG), Farming activities, Government policies, Fresh Produce Marketing; Farmer Producer Organizations (FPOs); Value Chain Management etc.

1. INTRODUCTION

Most of the economy of the developing nations mainly relies on agriculture, which is one of the largest employment and income-generating sectors. Due to its enormous contribution to human nutrition, vegetable cultivation occupies a unique position in the agricultural sector and rural livelihoods as well as development. Vegetables are an important source of vitamins, minerals, dietary fiber, and antioxidants necessary for healthy eating. All over the world, demand for fresh, safe and high-quality vegetables has increased with the increase in population, urbanization and health-consciousness. The

consumption pattern has changed for vegetables produced. It has engaged in a transformation of vegetable production from subsistence to dynamic commercial enterprise which requires efficient marketing system for delivering fresh produce from the farm to consumer with minimum loss.

Although the production of vegetables is gaining importance, their marketing is one of the weakest links in the value chain. Vegetables differ from many staple crops. The vegetables are perishable with a short shelf life and seasonal availability and price. Farmers often face problems such as insufficient storage, poor transportation, lack of reliable market information, several intermediaries, and price fluctuation. Farmers' bargaining power decreases, post-harvest losses increases and profitability limits due to such challenges. As a result, even though consumers get to pay higher retail prices, the producer may only get a small share of the final value of the market.

The farm to fork approach has emerged as an integrated approach to strengthening the agricultural supply chain at all stages, starting at production and extending through harvesting, processing, transport, distribution, retailing, ending consumer consumption. Rather than treating production and marketing as separate activities, the Farm-to-Fork approach recognizes that they are closely linked to the quality, safety, sustainability and economic return of food. Hence, effective vegetable marketing is no longer limited to selling one's produce in local markets but involves quality assurance, value addition, branding, traceability, logistics management, consumer engagement, and eco-friendly business practices. Such a view opens up possibilities to cut down waste, increase transparency and boost competitiveness of agricultural products

As a result of recent technological development, agricultural marketing has developed. The methods for marketing and distribution of vegetables use digital marketplace, mobile-based trading platforms, electronic payment systems, precision farming, block-chain-enabled traceability, artificial intelligence (AI) and Internet of Things (IoT) apps. These developments enable prices to be agreed in real time, strengthen communications between producers and buyers and improve inventory. Similarly, digital technologies can enable farmers to make informed decisions not only about what to produce and when to market but also to reduce their reliance on intermediaries. Consequently, it has become essential that technology must come into the picture of vegetable marketing for efficiency, profitability, and resilience.

Various expectations of consumers have changed over the last decade. These days consumers increasingly want vegetables which are fresh, healthy, pesticide-free, sustainably produced and ethically sourced. Consumers are showing preference for locally produced vegetables and organic farming with full knowledge of the supply-chain due to a growing awareness about food-safety and environment. As a result, marketing strategies of retailers and agribusiness firms are changing towards quality, certification, green packaging and more digital. The coordinated efforts of the farmers, wholesalers, retailers, logistics solution providers, policymakers, and technology developers are required to achieve these expectations for responsiveness and consumer orientation.

Sustainability has emerged as a key goal in agricultural marketing because of growing worries about climate change, depletion of natural resources, food waste, and ecosystem degradation. Traditional marketing systems of vegetables face inefficient transport, higher packaging, lesser storage facility, more post-harvest losses which cause economic inefficiency and environmental impact. Sustainable vegetable marketing aims to tackle these problems, promoting cold chains with high energy efficiency, low food loss, recyclable and reusable packaging materials, shorter supply chains, use of renewable energy and well as eco-friendly logistics. The resource efficiency of agricultural production systems such as agroecology and organic farming is strengthened.

The majority of vegetable producers are smallholder farmers. However, they still face several barriers to accessing profitable markets in many developing countries. Due to their poor financial abilities, fragile infrastructure, dispersed fieldholding, inadequate information, and poor institutional support, they cannot participate in organized value chains. Strengthening farmer collectives, such as Farmer Producer Organizations (FPOs), agricultural cooperatives and contract farming, can significantly enhance market access, augment bargaining power, and reduce transaction costs, while also facilitating investment in storage, grading, packaging and transport facilities. Institutional innovations are essential in developing inclusive vegetable marketing systems that benefit all stakeholders in a fair manner.

Government strategies and institutional actions equivalently play a major role in new . Rural infrastructure, cold storage, transport, digital agriculture, extension services, market intelligence, quality certification and financial inclusion investments can promote marketing efficiency in agriculture. The integration of new technology, market access and value chain coordination is through public-private partnerships. Entrepreneurship, innovation, and sustainable agricultural policy

development and implementation also creates an enabling environment for competitive vegetable markets while protecting the interest of producers and consumers.

Vegetable producers are taking the chance to trade locally and internationally due to the enhancing globalization of food markets. Globalization, however, also requires higher standards of quality, traceability, food safety and sustainability. So producers and marketers should adopt internationally accepted standards and certification to remain competitive in growing markets. Integrating quality management and sustainable marketing helps to foster consumer confidence, boost export potential and strengthen the viability of agriculture in the long run.

Shifting vegetable marketing from transactions to technology-enabled, integrated, sustainability-focused value chains reimagines how farmers, consumers respond. Systems of marketing in future must facilitates cooperations of stakeholders, digitalization, efficient logistics, transparency of markets, consumer engagement, and environmental sustainability. As a result, the streamlining of the flow of vegetables from the farm gate to the consumer maintains quality, minimizes wastage, raises farmers' income, and enhances food security.

In the wake of these developments, a Farm-to-Fork perspective has been adopted by the present study to examine vegetable marketing issues. It looks at new marketing strategies, technological innovations, sustainability practices, and policy interventions impact on the efficiency and resilience of vegetable supply chains. With the interplay of agricultural marketing, supply chain management and sustainable development, the study will contribute to the understanding of how the modern vegetable marketing systems can work towards achieving inclusive agricultural growth, improve livelihood opportunity in the 21st century and sustainable food system.

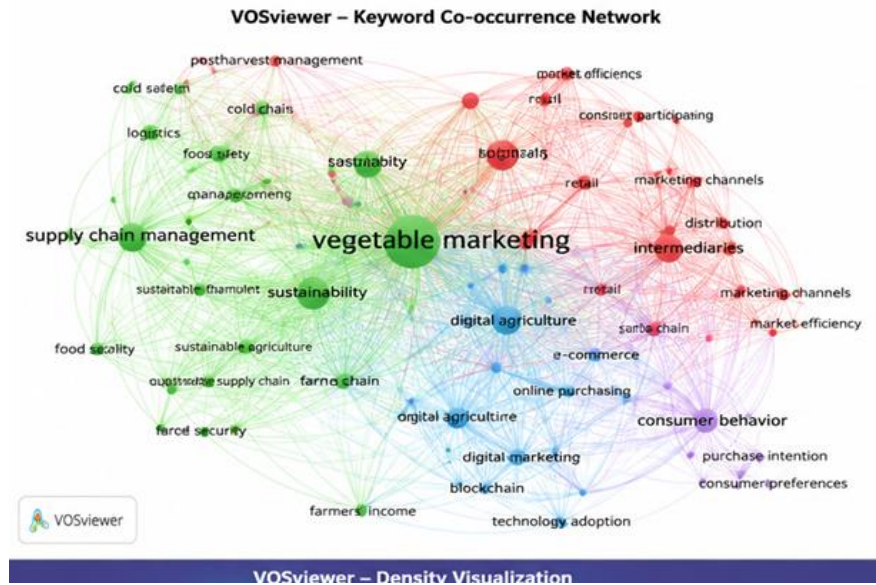
2. REVIEW OF LITERATURE

Over the last 30 years, vegetable marketing has undergone a radical transformation due to globalization, technological progress, changed consumer preferences, and a growing demand for sustainability. Researches in agricultural marketing systems up to now were mostly production and distribution-oriented. But the recent ones are on value chain integration, consumer-oriented marketing, digital transformation and sustainable marketing systems. There is a great deal of research effort going on to ameliorate the income of farmers through an integrated Farm-to-Fork mechanism. This benefitted post-harvest loss mitigation, food and nutrition security, sustainable agricultural development, etc.

Initial research suggested that institutional arrangements are decisive in improving marketing efficiency and farmer welfare. In the view of Martin (2001), agriculture has become a competitive agribusiness that will require more market integration and effective supply chain coordination. In the same vein, Chengappa (2001) pointed that institutional reforms, market infrastructure, pricing transparency and intervention mechanisms are essential for upgrading agricultural marketing systems of the developing countries. This studies laid down the theoretical underpinning of agricultural marketing beyond production by focusing on market access, coordination, and institution efficiency.

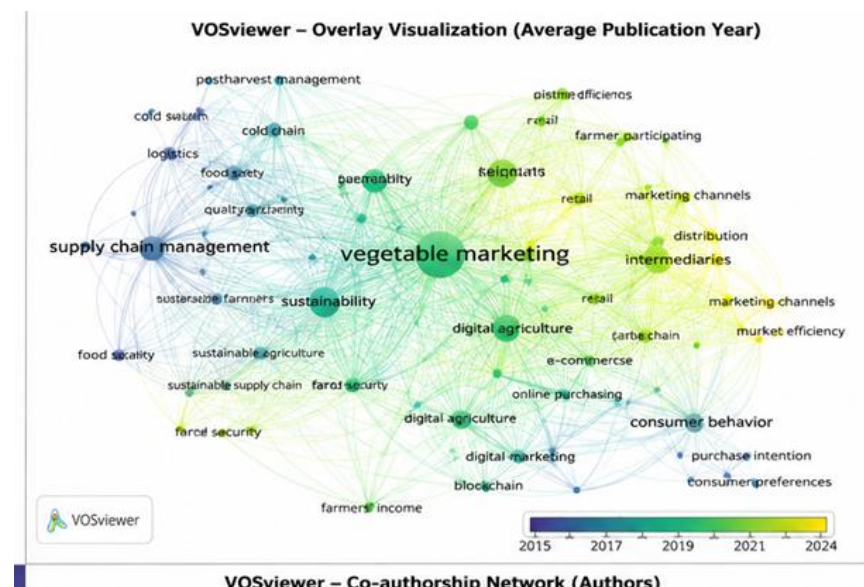
Due to the growing importance of horticultural commodities, more attention was focused on the marketing of vegetables during the early 2000s. In Kenya, vegetable export system can be used as a model to enhance the vegetable marketing in the country. This may stem from better logistics, quality management, and a coordinated value chain. Lenné et al. (2005) try to depict this notion very clearly. 30 words The findings suggest that smallholder farmers who join an organized marketing system will enhance the quality of the product, market efficiency, and export competitiveness. Mithöfer et al. (2008) also observed that smallholders have managed to access export markets more effectively, and both through flexible contractual arrangements and improved market coordination. But, they also pointed to infrastructural and financial obstacles, and lack of technical knowledge which still limited the participation of many producers in modern supply chains.

The growth of supermarkets and organized retailing further changed vegetable marketing in developed and developing countries. Blandon et al. (2009) found that small-scale vegetable producers in Honduras improved product quality, gained access to new markets, and earned higher incomes by participating in supermarket supply chains. Anyway, participation of supermarkets required an obligatory adherence to quality standards, regular supply of the product and bettering of production methods. According to Galanopoulos et al. (2009), the vegetable producers in the Mediterranean would operate in a technological innovative, logistics savvy, and sustainably produced competitive world, as a result of increasing global competition.



Research involving supermarket-led supply chains has various opportunities and challenges for smallholder farmers. As stated by a research paper by Andersson, the income, production efficiency and access to a stable market of farmers in Kenya were improved due to participation in supermarkets. However, the rewards weren't evenly distributed; those with a better combination of resources, education, and institutional backing were likely to participate. Elder (2019) demonstrated that the governance structures of supermarkets strongly influence the performance of smallholder cooperatives. Though contemporary retailer chains provide attractive market opportunities, poor resource farmers are often excluded due to strict procurement standards, quality certification requirements and centralized purchasing systems which can only be met by farmers with adequate institutional support.

Research on the vegetable supply chain has often focused on marketing efficiency. According to the study by Dastagiri et al. 2013, the country's vegetable marketing is one of the most extensive studies on Indian vegetable marketing that examines production trends, marketing efficiency, export competitiveness and producer share in consumer prices. According to their findings results, these marketing channels increased producers' share resulted in lower marketing cost and intermediary margins. According to the study, marketing efficiency is adversely affected by transport cost, labour cost, and marketing margin. On the other hand, infrastructure development and marketing from producer to consumer helps in raising income of farmers. In a similar manner, Dastagiri and Immanuelraj (2012) stated that the supply chain and innovative marketing models based on a supermarket may help India's horticulture markets modernize by strengthening value chain coordination and minimizing transaction costs.



Subsequent studies were increasingly concerned with the marketing outlet selection by farmers. Farmers' marketing decisions are significantly influenced by market accessibility and transportation facilities, as well as farm size, market information and institutional support (Dlamini-Mazibuko et al. 2019). Thus, enhancing infrastructure and bolstering market linkages may stimulate increased participation in lucrative marketing channels. A similar conclusion was reached by Brandão and Arbage (2016) when they asserted that an efficient supply chain management improves coordination between producers, wholesalers, and retailers and consumers while also reducing the operational inefficiencies along the vegetable retail network.

The increasing complexities of vegetable supply chains have sparked interest in the terms of supply chain governance and value chain integration. According to Brandão (2011), the efficient management of the supply chain requires the coordination of producers, distributors, retailers, and logistics operators. Through efficient integration, we can improve the product quality as well as manage inventory that reduces operational costs and improves customer satisfaction. Ramanathan et al. (2017) emphasize that poor handling practices, poor transport, poor storage and poor retail management lead to wastage of vegetables in the supply chain. To minimize food loss and promote efficient marketing, their analysis recommended strengthening logistics infrastructure, managing inventory, and using modern handling techniques.



Another important dimension of vegetable marketing research is consumer behaviour. A study by Sillani and Nassivera (2015) that focuses on consumers' purchase behaviour of minimally processed vegetables, states that freshness, convenience, food safety, nutritional value, packaging and price all strongly influence consumers. The research results indicate that marketing strategy must go beyond price and place premium quality, brand and consumer trust in contemporary marketing. Garner (2017) showed that the relationship between the producer and consumer became closer through trust, communication, and community builders at farmers' markets. The customer affiliations resulting from these social interactions create positive consumer loyalty and purchasing decisions which is essential in the vegetable marketing system.

Overall, the studies demonstrate how vegetable marketing has transformed from local fragmented marketing to value chain systems as a result of technology, institutional reforms, organized retailing, consumer preference, and sustainability. Despite considerable enhancement in market efficiency and integration of supply chain, challenges of infrastructure, farmer inclusion, quality assurance, market transparency and eco sustainability continues to shape the future of vegetable marketing research.

Research Gap

The research cited above depicts considerable amount of work done in the field of vegetable production, supply chain management, export competitiveness and sustainability of agriculture. Most existing studies focus on an individual dimension such as production efficiency, marketing channel, institutional reform, or sustainability adoption. The importance

of a comprehensive Farm-to-Fork framework that will enable digital transformation, sustainable marketing, consumer expectations, and value chain integration with policies has not received much attention. Most recent studies seldom provide an integrated conceptual view which encapsulates technological innovation as well as environmental sustainability, market efficiency and inclusive agricultural development. As a result, this study attempts to fill this gap by proposing an integrated Farm-to-Fork approach to reimagine vegetable marketing for sustainable agricultural growth.

Objectives of the Study

1. To examine the existing vegetable marketing system and its role in promoting sustainable agricultural growth.
2. To identify the major challenges affecting vegetable marketing across the farm-to-fork supply chain.
3. To analyze the influence of technological innovations, digital marketing platforms, and modern supply chain practices on vegetable marketing efficiency.

3. RESEARCH METHODOLOGY

This study adopts a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework to comprehensively examine the evolution of vegetable marketing and its contribution to sustainable agricultural growth. The PRISMA methodology provides a transparent, rigorous, and reproducible process for identifying, screening, evaluating, and synthesizing existing scholarly evidence. By employing this framework, the study minimizes selection bias and enhances the reliability of the review findings.

Research Design

The present study is qualitative and descriptive in nature, relying exclusively on **secondary data** obtained from peer-reviewed journal articles, books, conference proceedings, government publications, institutional reports, and international databases. The review synthesizes existing knowledge related to vegetable marketing, farm-to-fork supply chains, digital agriculture, sustainable marketing practices, post-harvest management, value chain integration, consumer behaviour, and agricultural policy interventions.

Data Sources and Search Strategy

The systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. A comprehensive search was performed across multiple electronic databases, including Scopus, Web of Science, ScienceDirect, SpringerLink, Taylor & Francis Online, Wiley Online Library, and Google Scholar. To provide additional policy and institutional perspectives, publications from the Food and Agriculture Organization (FAO), National Horticulture Board (NHB), Agricultural and Processed Food Products Export Development Authority (APEDA), and the Ministry of Agriculture and Farmers Welfare, Government of India, were also considered. These databases and institutional sources were selected because of their extensive coverage of agricultural marketing, food systems, sustainability, and supply chain research.

The search strategy was designed using predefined keywords combined with Boolean operators (AND, OR, and NOT) to maximize the retrieval of relevant studies. The principal search terms included "vegetable marketing," "farm-to-fork," "fresh produce supply chain," "agricultural marketing," "sustainable agriculture," "digital agriculture," "value chain management," "post-harvest management," "farmer producer organizations," "food security," and "green supply chain." The search was restricted to English-language publications published between 2015 and 2025.

Following the PRISMA 2020 framework, the study selection process comprised four sequential stages: identification, screening, eligibility, and inclusion. During the identification stage, relevant records were retrieved from the selected databases and institutional sources. Duplicate records were subsequently removed before the screening stage, where titles and abstracts were examined to determine their relevance to the objectives of the study. The remaining full-text articles were evaluated during the eligibility stage using predefined inclusion and exclusion criteria. Finally, studies that met all eligibility requirements were included in the qualitative synthesis. The complete study selection process is presented through the PRISMA 2020 flow diagram.

Inclusion and Exclusion Criteria

To ensure the quality, relevance, and consistency of the systematic review, predefined inclusion and exclusion criteria were established before the literature screening process. Only studies directly related to the objectives of the present research were considered for qualitative synthesis.

Inclusion Criteria	Exclusion Criteria
Peer-reviewed journal articles	Conference abstracts without full text
Publications written in English	Editorials, commentaries, book reviews, and opinion articles
Studies published between 2015 and 2025	Publications published before 2015
Studies focusing on vegetable marketing, farm-to-fork systems, sustainable agriculture, agricultural marketing, digital agriculture, value chain management, post-harvest management, food security, and Farmer Producer Organizations	Studies unrelated to vegetable marketing or sustainable agricultural growth
Full-text articles available	Duplicate records retrieved from multiple databases
Empirical, conceptual, review, and systematic review studies	Studies with insufficient methodological information or incomplete findings

The application of these inclusion and exclusion criteria ensured that only high-quality and relevant studies were retained for the final review. Duplicate publications were removed during the screening stage, while irrelevant studies identified through title, abstract, and full-text screening were excluded. The final set of eligible studies formed the basis for thematic analysis and synthesis of evidence on vegetable marketing and sustainable agricultural growth.

Study Selection Process

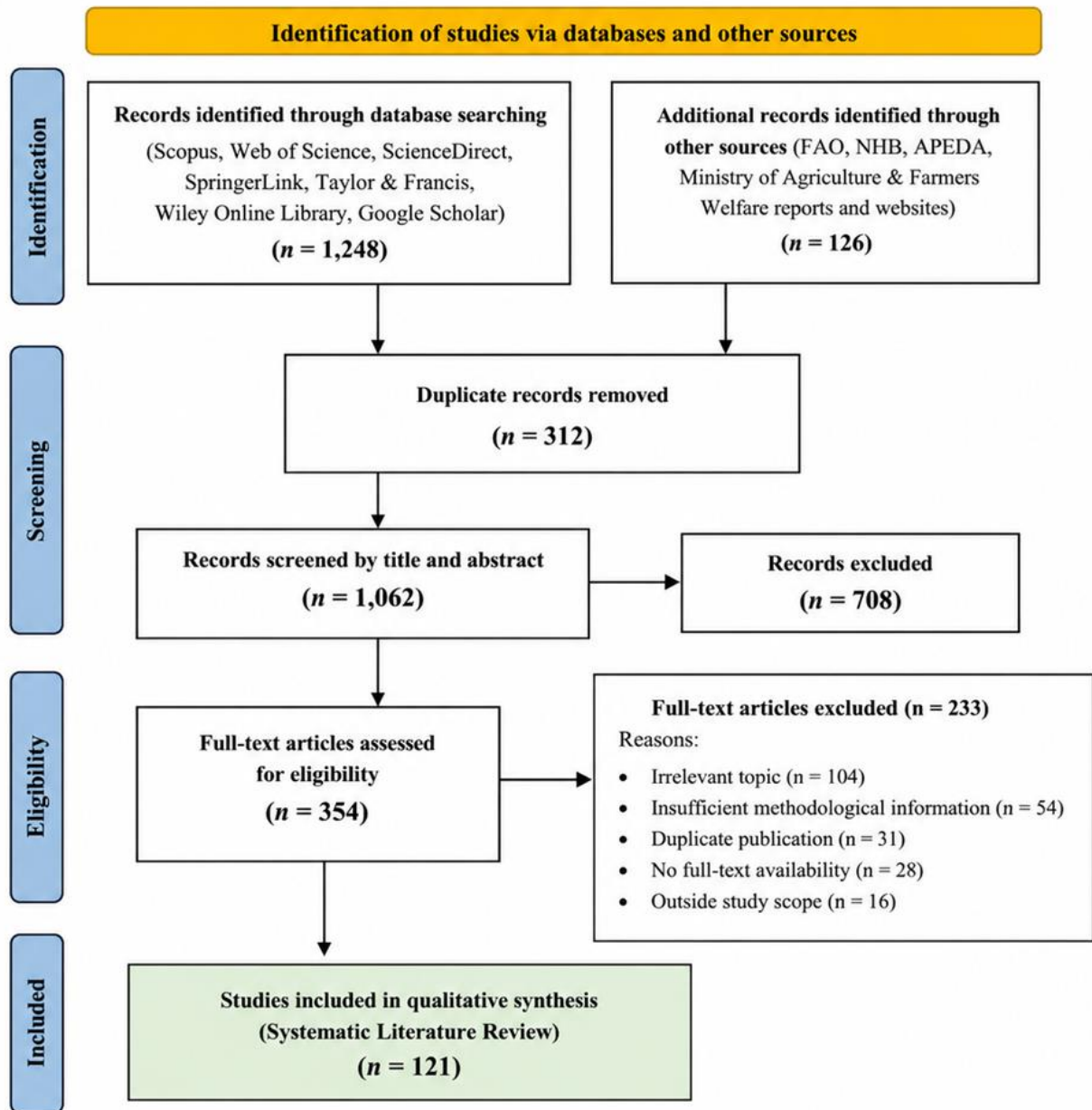
The study selection process was carried out in accordance with the PRISMA 2020 guidelines to ensure transparency, consistency, and reproducibility in identifying relevant literature. The selection process comprised four sequential stages: identification, screening, eligibility, and inclusion.

During the identification stage, relevant publications were retrieved from the selected electronic databases and institutional sources using predefined search terms. All retrieved records were exported to a reference management system, where duplicate publications were identified and removed.

In the screening stage, the titles and abstracts of the remaining studies were independently examined to assess their relevance to the objectives of the review. Publications unrelated to vegetable marketing, sustainable agriculture, farm-to-fork systems, or supply chain management were excluded at this stage.

The full-text versions of the shortlisted studies were subsequently assessed during the eligibility stage. Each article was evaluated against the predefined inclusion and exclusion criteria, considering factors such as research scope, methodological quality, relevance to the study objectives, and availability of complete information. Studies failing to satisfy these criteria were excluded from further analysis.

Finally, the studies that fulfilled all eligibility requirements were included in the qualitative synthesis. The selected publications formed the evidence base for analysing current trends, challenges, technological advancements, sustainability practices, policy interventions, and future directions in vegetable marketing. The complete study selection procedure is illustrated in the PRISMA 2020 flow diagram.

Figure 1. PRISMA 2020 Flow Diagram for Study Selection

Source: Prepared by the Authors based on PRISMA 2020 Statement.

Characteristics of the Selected Studies

Following the PRISMA 2020 study selection process, the final set of eligible publications was subjected to descriptive analysis to understand the characteristics of the existing literature on vegetable marketing and sustainable agricultural growth. The selected studies varied considerably in terms of publication year, geographical coverage, research design, data sources, analytical techniques, and thematic focus. This diversity enabled a comprehensive understanding of the evolution of vegetable marketing from traditional distribution systems to integrated Farm-to-Fork supply chains (Dastagiri et al., 2013; Tort et al., 2022; Kharashvili & Aduashvili, Year).

The reviewed studies were conducted across both developed and developing countries, with a significant concentration of research from India, Kenya, Ethiopia, Honduras, Nicaragua, Mediterranean countries, East Africa, and Southern Africa, reflecting the global importance of vegetable production and marketing (Lenné et al., 2005; Mithöfer et al., 2008; Blandon et al., 2009; Andersson et al., 2015; Elder, 2019; Worku & Ülkü, 2022; Shayanowako et al., 2024). These studies employed

a variety of research designs, including empirical investigations, conceptual papers, systematic literature reviews, bibliometric analyses, scoping reviews, case studies, and policy analyses (Falagas et al., 2008; Buchinger, 2014; Tort et al., 2022; Saini et al., 2024). Most empirical investigations adopted quantitative techniques such as questionnaire surveys, regression analysis, efficiency analysis, marketing margin analysis, and value chain assessment, whereas conceptual and review studies synthesized evidence related to sustainable agricultural marketing, digital transformation, consumer behaviour, and supply chain development.

The analysis further revealed that vegetable marketing research has progressively shifted from conventional themes such as production trends, marketing channels, market efficiency, and price spread towards broader issues including digital agriculture, supermarket participation, blockchain-enabled traceability, Farmer Producer Organizations (FPOs), e-commerce platforms, sustainable logistics, consumer purchasing behaviour, and climate-resilient food systems (Dastagiri & Immanuelraj, 2012; Sillani & Nassivera, 2015; Garner, 2017; Soeyatno et al., 2024; Tort et al., 2022). Recent studies increasingly emphasize integrating technological innovation with sustainable marketing practices to improve marketing efficiency, reduce post-harvest losses, strengthen supply chain resilience, enhance farmers' income, and ensure food security (Worku & Ülkü, 2022; Alulu & Makyao, 2023; Shayanowako et al., 2024).

Another important observation emerging from the selected studies is the growing emphasis on post-harvest quality management and supply chain optimization. Research has demonstrated that efficient cold-chain systems, quality monitoring, food safety standards, ethylene management, packaging innovations, and logistics coordination play a decisive role in reducing food losses and maintaining vegetable quality throughout the supply chain (Sivakumar & Wall, 2013; Bill et al., 2014; Blanke, 2014; Janssen et al., 2014; Leblanc et al., 2015; Macheke et al., 2013; Zoellner et al., 2016). Similarly, studies focusing on retail and wholesale supply chains have identified transportation inefficiencies, inadequate storage infrastructure, and poor coordination among market participants as major contributors to vegetable wastage (Ramanathan et al., 2017).

Furthermore, the selected literature demonstrates growing interest in policy interventions, institutional reforms, and collaborative governance mechanisms that strengthen market infrastructure, supermarket participation, farmer organizations, cold-chain development, digital marketplaces, and public-private partnerships (Chengappa, 2001; Brandão, 2011; Brandão & Arbage, 2016; Dlamini-Mazibuko et al., 2019; Saini et al., 2024). The collective evidence indicates that future vegetable marketing systems should adopt integrated, technology-enabled, consumer-oriented, and sustainability-driven approaches capable of creating resilient agricultural value chains that benefit producers, intermediaries, retailers, policymakers, and consumers.

Overall, the descriptive analysis confirms that vegetable marketing research has evolved into a multidisciplinary field integrating agricultural economics, supply chain management, food science, consumer behaviour, digital technologies, sustainability, and public policy. This progression reflects the increasing recognition that sustainable vegetable marketing extends beyond efficient distribution and encompasses value creation, environmental stewardship, food security, farmer welfare, and long-term agricultural resilience. Table 1 presents the descriptive characteristics of the studies included in the systematic review, highlighting their authors, publication year, country, research design, thematic focus, and principal findings. This summary provides the foundation for the subsequent thematic synthesis and discussion.

Table 1. Characteristics of the Selected Studies Included in the Systematic Review

S. No.	Author(s)	Year	Country/Region	Research Design	Focus Area	Major Findings
1	Martin	2001	Global	Conceptual	Food systems	Emphasized the transition from subsistence agriculture to market-oriented agribusiness.
2	Chengappa	2001	India	Conceptual	Agricultural marketing	Highlighted the importance of institutional reforms and market infrastructure.
3	Lenné et al.	2005	Kenya	Empirical	Vegetable export system	Organized value chains improved marketing efficiency and export competitiveness.

4	Mithöfer et al.	2008	Kenya	Empirical	Smallholder participation	Institutional support enhanced farmers' participation in export markets.
5	Blandon et al.	2009	Honduras	Case study	Supermarket supply chain	Supermarket participation improved farmers' market opportunities but increased quality requirements.
6	Dastagiri et al.	2013	India	Empirical	Marketing efficiency	Direct marketing channels increased producers' share and marketing efficiency.
7	Dastagiri and Immanuelraj	2012	India	Review	Supermarket supply chains	Modern retail improved value chain coordination and reduced transaction costs.
8	Andersson et al.	2015	Kenya	Longitudinal study	Supermarket participation	Supermarkets enhanced farmers' income and market stability.
9	Sillani and Nassivera	2015	Italy	Consumer study	Consumer behaviour	Freshness, convenience, food safety, and quality strongly influenced purchasing decisions.
10	Garner	2017	USA	Empirical	Farmers' markets	Social interaction and trust significantly influenced consumer loyalty.
11	Ramanathan et al.	2017	India	Empirical	Supply chain wastage	Identified transportation and storage as major causes of vegetable losses.
12	Elder	2019	Nicaragua	Case study	Supermarket governance	Cooperative participation depended on institutional and governance mechanisms.
13	Worku and Ülkü	2022	Ethiopia	Empirical	COVID-19 impact	Pandemic disrupted vegetable supply chains and market availability.
14	Tort et al.	2022	Global	Systematic Review	Sustainable supply chains	Sustainability requires integrated logistics, quality management, and stakeholder collaboration.
15	Alulu and Makyao	2023	Africa	Scoping Review	Indigenous vegetable value chains	Improved coordination and transportation strengthened value chain resilience.
16	Shayanowako et al.	2024	Southern Africa	Scoping Review	African leafy vegetables	Indigenous vegetables contribute to nutrition, resilience, and sustainable food systems.
17	Soeyatno et al.	2024	Indonesia	Systematic Review	Digital purchasing	E-commerce increasingly influences vegetable purchasing behaviour.
18	Saini et al.	2024	Global	Bibliometric Review	Supermarket supply chains	Research trends emphasize farmer participation, sustainability, and value chain integration.

Source: Compiled by the authors based on the selected literature.

4. RESULTS AND RECOMMENDATIONS

Vegetable marketing has evolved over the years which has adapted change from disparate traditional marketing systems to Farm-to-Fork supply chain that focuses on sustainability, technology, and consumer orientation. Every reviewed study states that an efficient marketing system enhances farmers' income, reduces post-harvest losses, increases transparency in the market and food security. Thus, the governments and agricultural agencies should keep investing in the modern marketing infrastructure including mal-efficient and the latest technology, such as cold storage, grading centres, transportation, and digital marketing, for an easy movement of the vegetable from the producer to the consumer.

The review shows that inadequate market infrastructure and fragmented supply chains with multiple intermediaries and poor logistics still impede marketing efficiency especially in less developed countries. These challenges cut on the bargaining power of producers while increasing marketing costs and food losses. Accordingly, policies should incentivize direct marketing models, Farmer Producer Organizations (FPOs), contract farming, and integrated value chains that minimize unnecessary intermediaries to enhance market access and accessibility to the smallholder farmer.

An important finding is that the vegetable marketing has undergone digital transformation due to e-commerce, mobile-based agricultural applications, blockchain technology, artificial intelligence, and electronic payment systems. The supply chain utilizes technologies that provide better market information and enable direct producer-consumer. Continuous investment in digital agriculture, farmer digital literacy programmes and technology-enabled marketing systems is, therefore, necessary for improving the market efficiency and competitiveness.

According to the review, organized retailing and participation in supermarkets presents good opportunities for improvement in product quality, market access, and income. Nevertheless, smallholder farmers cannot meet quality, certification, and regular supply requirements. Extension agencies, financial institutions and government agencies must provide technical training, certification support, affordable credit facilities and market linkage programmes that allow small farmers to effectively participate in organized retail markets to overcome these disadvantages.

5. CONCLUSION

There is an ample evidence available from the review literature which states that sustainable marketing of the vegetables mainly depends upon the effective post-harvest management, quality assurance, food safety norms, eco-friendly packaging, and cold-chain management. By reducing food waste at all levels of the supply chain, we can increase economic gains, provide environmental benefits and increase food security. To enhance the resilience of vegetable supply chains, it is important to prioritize investments in post-harvest technologies, quality monitoring systems, renewable energy-based storage facilities, and sustainable logistics.

Finally, the review indicates that future vegetable marketing systems should combine technological innovations, institutional support, customer involvement, and environmental sustainability as part of the Farm to Fork. To accomplish this goal, countries, research institutions, private enterprises, Farmer Producer Organizations, retailers, and consumers need to work together more effectively. The long-term growth of agriculture, enhancement of rural livelihoods, and national food security will be supported by the improved marketing systems for resilient inclusive and sustainable vegetable.

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