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**STATE MANAGEMENT OF THE SAFE
VEGETABLE SUPPLY CHAIN IN HANOI**

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INTRODUCTION

1. Rationale for the Study

In the context of international integration and increasingly stringent requirements for food safety (FS), the development of agricultural supply chains toward linkage, transparency, and quality control has become inevitable. However, the safe vegetable supply chain in Vietnam remains unsustainable due to fragmented production, weak linkages, uneven compliance, and information asymmetry among actors in the supply chain.

For Hanoi, while consumer demand is substantial, heavy reliance on inter-regional supply renders the supply chain multi-actor, multi-location, and inherently risk-prone. In practice, violations persist regarding FS conditions, traceability, and compliance with established procedures, while state management remains limited in terms of coordination, supervision, support, and the application of technology.

Therefore, the research topic “State management of the safe vegetable supply chain in Hanoi” is necessary to clarify the scientific basis, assess the current situation, and propose solutions to improve management based on a supply chain approach, thereby contributing to ensuring food safety and promoting sustainable development.

2. Research Objectives and Tasks

The dissertation aims to systematize and clarify the theoretical foundations of state management of the safe vegetable supply chain based on a supply chain logic and systems management approach; at the same time, to develop an analytical framework covering the content, instruments, and criteria for evaluating the effectiveness and efficiency of management. On that basis, the dissertation analyzes and assesses the current operation of the supply chain and state management in Hanoi during the period 2019–2023, identifies achievements, limitations, and underlying causes, and thereby proposes solutions to enhance management effectiveness and promote the sustainable development of the safe vegetable supply chain toward 2030.

To achieve the above objectives, the dissertation undertakes the following main tasks: reviewing prior studies and developing a theoretical framework; surveying, collecting, and analyzing the current state of state management according to key content areas; evaluating influencing factors and emerging issues; and proposing orientations and

groups of solutions to improve state management of the safe vegetable supply chain in the forthcoming period.

3. Research Object and Scope

The research object of the dissertation is the state management of the safe vegetable supply chain. The product scope focuses on leafy vegetables and root vegetables; the supply chain is examined across all stages, from input supply, production, harvesting, preliminary processing, preservation, and distribution to consumption.

In terms of spatial scope, the study concentrates on safe vegetable supply chains within Hanoi, including certain chains linked with neighboring provinces. Regarding stakeholders, the dissertation considers both state management agencies at all levels and the actors in the supply chain.

In terms of time, the data used for analyzing the current situation primarily cover the period 2019–2023, with surveys conducted in 2023, and proposed solutions extending to 2030.

In terms of content, the dissertation focuses on four principal areas of state management: developing supply chain development plans; promulgating standards and regulations on food safety (FS); implementing policies to support actors in the supply chain; and inspection, supervision, and handling of violations within the safe vegetable supply chain.

4. Theoretical and Practical Foundations and Research Methods

The dissertation is developed on the basis of integrating modern economic management theories with the specific characteristics of safe agriculture. Its practical foundation is grounded in both domestic and international experience in managing safe vegetable supply chains; the characteristics of the supply chain; the current state of agricultural development and consumer demand in Hanoi; the implementation of food safety (FS) policies; and trends in digital transformation in supply chain management.

Regarding research methods, the dissertation employs a combination of approaches, including: collection of secondary and primary data through surveys, investigations, and interviews; descriptive statistics; SWOT analysis; synthesis; case study research; and the Likert scale to evaluate factors related to state management.

5. Novel Contributions of the Dissertation

In terms of theory, the dissertation proposes an analytical

framework for state management of the safe vegetable supply chain based on a systems management and end-to-end supply chain logic approach, shifting from the management of individual actors to the regulation of linkages and information transparency among supply chain nodes. The framework consists of four unified components: supply chain development planning; orientation through standards; promotion through support policies; and control through risk-based supervision. At the same time, the dissertation clarifies the mechanisms through which groups of factors influence state management of the safe vegetable supply chain.

In terms of practice, the dissertation identifies policy gaps, particularly the lack of binding accountability for aggregation and distribution stages in maintaining traceability; it also highlights limitations in supervision due to the absence of a risk-based approach. On that basis, the dissertation proposes a system of breakthrough solutions, including: the development of a shared digital data system to support traceability; the establishment of inter-provincial coordination mechanisms; and the transformation of support policies toward the development of logistics infrastructure and e-commerce for the supply chain.

6. Structure of the thesis

In addition to the Introduction, Conclusion, References, and Appendices, the thesis is structured into four chapters.

Chapter 1. OVERVIEW OF RELATED STUDIES AND THE RESEARCH ORIENTATION OF THE DISSERTATION

1.1. OVERVIEW OF STUDIES RELATED TO STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN AT THE PROVINCIAL LEVEL

Domestic and international studies on the safe vegetable supply chain have clarified the role of supply chain linkages in ensuring product quality and food safety (FS); at the same time, they have identified the structure of the supply chain as comprising multiple actors in the supply chain, from production to consumption, as well as influencing factors such as policies, markets, infrastructure, and the

degree of linkage among actors. Many studies also affirm the role of the State in orienting, supporting, and controlling quality within the safe vegetable supply chain.

With regard to the management of agricultural supply chains in general and the safe vegetable supply chain in particular, existing studies have addressed several aspects such as planning development, promulgating support policies, developing infrastructure, controlling food safety, and promoting market linkages. However, most studies approach the issue from the perspective of production techniques or the management of individual actors, and have not fully considered the supply chain as an object of state management based on a systems approach and end-to-end supply chain logic.

1.2. ACHIEVEMENTS OF RELATED STUDIES

Based on the review of domestic and international studies, the dissertation inherits key findings in terms of approaches, methods, and research content. Regarding approaches, existing studies have affirmed that quality management and food safety (FS) in the safe vegetable supply chain must be considered within the linkages among actors in the supply chain, from production and distribution to consumption. On that basis, the dissertation adopts an approach that encompasses all stages of the supply chain, groups of actors participating in the chain, and the management process of the safe vegetable supply chain.

In terms of research methods, the dissertation inherits the combined use of secondary and primary data through surveys and interviews with relevant stakeholders; at the same time, it applies analytical methods to identify objective and subjective factors affecting state management of the safe vegetable supply chain.

Regarding research content, the dissertation builds upon findings related to the theoretical foundations of the safe vegetable supply chain, state management of the safe vegetable supply chain, factors influencing the management process from production to consumption, as well as certain policy implications for the sustainable development of the safe vegetable supply chain. On this basis, the dissertation further develops the research by clarifying state management of the safe vegetable supply chain under the specific conditions of Hanoi.

1.3. RESEARCH GAPS

The review of existing studies indicates that no research has comprehensively and in-depth analyzed state management of the safe

vegetable supply chain in Hanoi. Therefore, the dissertation focuses on addressing four main gaps:

(1) The lack of a unified analytical framework for the content of state management based on supply chain logic, covering the entire management cycle.

(2) The lack of evidence and mechanisms explaining the impacts of state management instruments on the compliance behavior of actors in the supply chain at each stage, thereby failing to account for differences in implementation effectiveness among groups of actors and distribution channels.

(3) The absence of a supply chain governance approach suitable to the specific characteristics of Hanoi, namely “peri-urban production – multi-channel urban consumption,” while simultaneously considering both domestic and inter-regional supply sources, a diverse distribution system, and requirements for inter-sectoral and multi-level coordination.

(4) The lack of identification and classification of factors affecting the effectiveness and efficiency of state management across the supply chain (including institutions–implementation organizations, coordination, information–supervision, characteristics of distribution channels, etc.), as well as the absence of a basis for selecting priority solutions and implementation conditions.

Chapter 2. THEORETICAL AND PRACTICAL FOUNDATIONS FOR STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN AT THE PROVINCIAL LEVEL

2.1. THEORETICAL FOUNDATIONS OF THE SAFE VEGETABLE SUPPLY CHAIN

2.1.1. Some related concepts

The safe vegetable supply chain is the continuous linkage of activities performed by actors in the supply chain at different stages (processes) of the production–consumption process of safe vegetables, including the following activities: supply of inputs → production of safe vegetable products → transportation → distribution of safe vegetable products to final consumers in the market. The continuity of activities among actors at the different stages of the safe vegetable supply chain is carried out based on the principles of linkage, mutually beneficial cooperation, and shared risk.

2.1.2. Characteristics of safe vegetables and the safe vegetable supply chain

Safe vegetables are an essential category of agricultural food products of biological origin, directly affected by natural conditions, cultivation techniques, input materials, and post-harvest handling conditions. Due to their short growth cycle, susceptibility to quality changes, difficulty in assessing safety through ordinary sensory perception, and the presence of risks at multiple stages, safe vegetables require management based on risk prevention throughout all stages—from production, harvesting, preliminary processing, preservation, and transportation to consumption.

The safe vegetable supply chain is a multi-actor system, comprising entities involved in input supply, production, procurement, preliminary processing, preservation, transportation, distribution, and consumption. Actors in the supply chain are interdependent through product flows, information flows, responsibility flows, and levels of compliance. Therefore, the effectiveness and safety of the supply chain depend not only on individual actors but also on the degree of linkage, coordination, and information transparency across the entire supply chain.

2.1.3. Classification of the safe vegetable supply chain

- By administrative boundaries
- By the number of participating actors in the supply chain
- By the leading and coordinating entity of the supply chain

2.1.4. Functions of actors in the supply chain of the safe vegetable supply chain

2.2. THEORETICAL FOUNDATIONS OF STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN

2.2.1. Concept and characteristics of state management of the safe vegetable supply chain within a province

2.2.1.1. Some related concepts

State management of the safe vegetable supply chain at the provincial level is the integrated intervention of relevant state agencies at the provincial, district (former), and commune levels, in accordance with state regulations, to regulate the safe vegetable supply chain so as to ensure its smooth operation, continuous expansion in scale, and the delivery of vegetables to consumers in compliance with FS requirements. Thereby, it safeguards the interests of all actors in the supply chain as well as the interests of safe vegetable consumers within the province.

2.2.1.2. Characteristics of state management of the safe vegetable supply chain

Public authority and legal enforceability; Consistency, coherence, and inter-sectoral and multi-level coordination; Compliance and implementation organization; Regularity and continuity.

2.2.2. Objectives and entities of state management of the safe vegetable supply chain within a province

- Management objectives: To develop safe vegetable production in a modern and sustainable manner, improve productivity, quality, product value, and competitiveness; to improve the livelihoods of farmers and actors in the supply chain; to ensure food safety (FS), protect consumer rights, and harmonize interests among stakeholders in the supply chain; and to promote sustainable local socio-economic development.

- Entities of state management of the safe vegetable supply chain at the provincial level: Central level, provincial level, district level, and commune level.

2.2.3. Contents of state management of the safe vegetable supply chain at the provincial level

- Formulating development plans for safe vegetable supply chains within the province

- Promulgating documents regulating standards and conditions to guide production and consumption entities in ensuring food safety (FS).

- Implementing support policies to assist actors in the supply chain participating in the safe vegetable supply chain in complying with legal regulations on food safety (FS).

- Inspecting and handling violations of food safety (FS) regulations committed by actors in the supply chain participating in the safe vegetable supply chain.

2.2.4. Criteria for evaluating state management of the safe vegetable supply chain at the provincial level

- Criteria for evaluating the formulation of development plans for the safe vegetable supply chain.

- Criteria for evaluating the promulgation of regulations on standards and conditions for the production and consumption of safe vegetables.

- Criteria for evaluating the implementation of support policies for actors in the supply chain participating in the safe vegetable supply chain.

- Criteria for evaluating inspection and supervision of the activities of actors in the supply chain in the safe vegetable supply chain.

2.2.5. Factors influencing state management of the safe vegetable supply chain

Groups of factors originating from central government policies; groups of factors from the local state management apparatus; groups of factors from the market and the characteristics of the safe vegetable supply chain; and groups of factors from the characteristics of actors in the supply chain of the safe vegetable supply chain.

2.3. PRACTICAL EXPERIENCES IN STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN WITHIN PROVINCES AND LESSONS LEARNED FOR HANOI

2.3.1. International experience

- Experience of Gyeonggi-do Province, Republic of Korea
- Experience of Shandong Province, China
- Experience of Bangkok, Thailand

2.3.2. Experience of selected domestic localities

- Experience of Ho Chi Minh City
- Experience of Da Nang City

2.3.3. Lessons learned for improving state management of the safe vegetable supply chain in Hanoi

Experience from both domestic and international contexts indicates that Hanoi needs to develop appropriate planning for safe vegetable production zones, while simultaneously improving the system of standards and regulations for each stage of the supply chain and clearly assigning management responsibilities.

At the same time, it is necessary to implement synchronized support policies to promote supply chain linkages and to develop infrastructure, technology, and consumption markets; to strengthen inspection, supervision, and the handling of violations in order to ensure food safety.

In addition, the role of actors in the supply chain should be enhanced, particularly that of “leading” entities, while modern distribution systems should be further developed to improve the effectiveness of quality control and expand the market for safe vegetables.

Chapter 3. CURRENT SITUATION OF STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

3.1. OVERVIEW OF THE CURRENT SITUATION OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

3.1.1. Natural and socio-economic characteristics of Hanoi

3.1.2. Situation of production and consumption of safe vegetables under the supply chain model in Hanoi

Local supply (2023): The area of safe vegetables participating in supply chains reached 2,819.09 ha; the area meeting FS eligibility conditions was 2,547.02 ha (90.35%), while the area with VietGAP certification was only 270.07 ha (9.58%). The estimated output was 211.60 tons/day, concentrated mainly in Dong Anh (93.88 tons/day), Me Linh (29.10 tons/day), Thuong Tin (21.59 tons/day), and Hoai Duc (16.10 tons/day). These four localities accounted for approximately 75.93% of total output and constitute “upstream clusters” that should be prioritized for risk-based state management.

Inter-regional supply (2023): Supply chains originating from outside Hanoi provided 30.8 tons/day, concentrated in a small number of distribution hubs (Biggreen: 20 tons/day, approximately 64.94%; the top three distributors Biggreen–VINECO–Soi Bien: 26.6 tons/day, approximately 86.36%). This indicates that the distribution stage in Hanoi is a key “risk node”.

Consumption channels: Only 4.8% of safe vegetables passed through “controlled” channels (supermarkets + specialized shops + contractual supply). The remaining 95.2% went through traditional channels (wholesale markets 55.8%, direct sales at traditional markets 26.8%, traders 12.6%). This makes it difficult for consumers to identify safe vegetables, prevents safe vegetables from achieving a significantly higher price than conventional vegetables, and thereby reduces compliance incentives and overall supply chain effectiveness.

3.1.3. Current situation of the safe vegetable supply chains in Hanoi

3.1.3.1. Current structure of the safe vegetable supply chain by number of actors

Among 111 safe vegetable supply chains, long chains predominate: chains with two actors in the supply chain account for 61.26% (68 chains), and chains with three actors account for 1.80% (2

chains); short chains with only one actor account for 36.94% (41 chains). This shows that most supply chains separate production from purchasing/consumption stages; therefore, state management must control not only production but also intermediary and downstream stages (facility conditions, preservation and transportation, and batch-based traceability records).

Table 3.3. structure of the safe vegetable supply chains by number of actors

Chain group	Number of actors	Number of chains (n)	Percentage (%)
Short chains	1	41	36,94
Long chains	2	68	61,26
	3	2	1,80
Total		111	100,00

Source: Compiled by the author

3.1.3.2. Current forms of linkages among actors in the safe vegetable supply chains in Hanoi

In terms of linkage forms (S–M–T): the most common model is integrated S → T (41 chains; 36.94%). Two-actor models are diverse and mainly concentrated at the downstream stage, including: Cooperative → Enterprise (19.82%), Cooperative → Supermarket/Commercial Center (18.92%), Cooperative → Canteens/Schools (10.81%), Enterprise/Farm → Distribution Enterprise (11.71%).

Three-actor chains (S → M → T) are very limited in number (1.80%) but are more complex in terms of traceability and coordination of responsibilities, requiring clear supervision mechanisms and synchronized data systems.

3.2. ASSESSMENT OF THE CURRENT SITUATION OF STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

3.2.1. Formulating development plans for safe vegetable supply chains in Hanoi

Hanoi has issued 92 documents providing orientation and management for the development of the safe vegetable supply chain, notably: the coordination program with the Ministry of Agriculture and Rural Development on ensuring food safety (FS) and trade connectivity

(2021–2025); the plan for developing agriculture under the supply chain model (2021–2025); the plan for maintaining and developing the production and consumption of safe vegetables (2021–2025); and the plan for ensuring food safety (FS) and improving the quality of agricultural products (2023–2030).

Table 3.6. Level of dissemination and understanding among actors regarding the plan for developing the safe vegetable supply chain in Hanoi

No.	Actors in the supply chain of the safe vegetable supply chain	Disseminated and understood	Disseminated but not clearly understood	Not informed	Total (n=150)
1	Input suppliers	27%	40%	33%	15
2	Safe vegetable producers/initial production establishments	55%	20%	25%	60
3	Purchasing, preliminary processing, preservation, and transportation establishments for safe vegetables	82%	18%	0%	45
4	Processing establishments + direct consumption	100%	0%	0%	5
5	Safe vegetable consumption actors/points of sale	100%	0%	0%	25
Average		72%	16%	12%	

Source: 2023 survey results

Based on the survey of actors in the supply chain regarding the level of dissemination and understanding of these plans, the results show that 72% of actors had been informed and clearly understood the plans; 16% had been informed but did not clearly understand; and 12% had not been informed (mainly input suppliers and small-scale farmers).

Regarding the appropriateness of the development plan for the safe vegetable supply chain, 53% of producers stated that the plan was only partially appropriate due to persistent challenges in financial support and technology application. 60% of purchasing and preliminary processing establishments assessed the plan as appropriate; however, 16% considered it inappropriate due to insufficient operational support. 72% of consumption actors considered the plan only partially

appropriate because it did not sufficiently meet requirements for the supply and quality of safe vegetables.

Assessment from state management agencies: The plan is feasible, but financial support, technological capacity, and distribution system development need to be improved.

3.2.2. Promulgating documents regulating standards and conditions to guide production and consumption entities in ensuring food safety and participating in supply chain linkages

3.2.2.1. Regulations on the formation of supply chains

Hanoi has implemented Decision No. 3075/QĐ-BNN-QLCL (2017) of the Ministry of Agriculture and Rural Development, and has also promulgated other documents to ensure security and food safety (FS) and to improve the quality of agro-forestry-fishery products. However, the level of understanding among actors in the supply chain regarding this content remains low (18% did not understand thoroughly, and 36% did not know or did not seek information). Input suppliers and farmers had the lowest level of understanding (80% did not know). In general, registration procedures remain complicated, creating obstacles for enterprises and cooperatives that wish to participate in the safe vegetable supply chain.

3.2.2.2. Regulations on conditions and standards for all stages of the safe vegetable supply chain in Hanoi

Awareness and compliance with regulations on the production and trading of safe vegetables vary across actors in the supply chain: on average, 35% clearly understood; 44% understood but not thoroughly; and 21% did not know or did not seek information. Among them, farming households had the highest “not aware” rate (47%), showing limited attention to commitment agreements with commune-level People’s Committees, and mainly following cooperatives/enterprises or relying on experience. Regarding the completeness of regulations, 55% assessed them as complete, 35% as “partially complete,” and 10% as “incomplete.” The compliance survey indicates that 61% complied partially and 13% did not comply, mainly due to lack of awareness, limited dissemination/support, and insufficiently stringent supervision.

3.2.3. Implementing support policies for actors participating in the safe vegetable supply chain in Hanoi

Support policies play an important role in promoting the production, trading, and consumption of safe vegetables. In Hanoi, a number of

policies have been promulgated, such as: Decision No. 13/2019/QĐ-UBND on support for developing cooperation and linkages in agricultural product consumption; Decision No. 2085/QĐ-UBND (2021) on developing agriculture under the supply chain model in the period 2021–2025; Resolution No. 08/2023/NQ-HĐND on policies encouraging agricultural development in Hanoi; and several other official dispatches and implementation guidelines.

The main contents of support policies focus on: technical training and supply chain management; development of cooperation and linkages in production and consumption; construction of preliminary processing and preservation facilities for agricultural products; development of high-tech agriculture; granting planting area codes; and digital transformation in agriculture.

Survey results show that training support policies are the most effective and should continue to be strengthened. Support policies for granting planting area codes are consistent with practical needs but are not widely known among actors. Support policies for production–consumption linkages face many difficulties and require improvements in appraisal and implementation procedures. Policies investing in preliminary processing facilities, high technology, and digital transformation have not had a strong impact and require stronger communication and support for access.

Thus, the State needs to adjust policies to enhance implementation effectiveness, especially by improving accessibility and timeliness for actors in the supply chain of the safe vegetable supply chain.

3.2.4. Inspection, supervision, and handling of violations of food safety regulations by actors participating in the safe vegetable supply chain in Hanoi

Hanoi conducts periodic inspections of approximately 200–300 establishments per year, combined with ad hoc inspections in key production areas and wholesale markets. The Sub-Department of Cultivation and Plant Protection coordinates with provinces to control quality from production to consumption; the results indicate that 30–40% of establishments remain in violation, mainly due to expired VietGAP certification/FS certificates, improper use of fertilizers/plant protection pesticides, failure to record production logs, and lack of traceability labels. Handling measures are assessed as insufficiently deterrent; in some localities, inspections are not strict and mainly involve reminders.

Table 3.15. evaluation by actors of inspection and supervision of production and business activities in the safe vegetable supply chain

No.	Actor groups	Inspection frequency	Inspection content	Transparency	Level of satisfaction
1	Input suppliers	3,6 (Fair)	2,7 (Average)	2,2 (Low)	3,7 (Fair)
2	Safe vegetable producers	2,5 (Average)	3,2 (Average)	2,2 (Low)	2,4 (Low)
3	Purchasing, preliminary processing and preservation establishments	3,0 (Average)	2,6 (Average)	2,7 (Average)	3,2 (Average)
4	Processing establishments & direct distribution	3,7 (Fair)	4,6 (High)	4,0 (Fair)	4,0 (Fair)
5	Consumption actors	3,7 (Fair)	4,7 (High)	3,1 (Fair)	3,0 (Fair)

Source: 2023 survey results

Based on the survey results, it is evident that state authorities need to strengthen inspections at the production stage and improve transparency after inspections. A major limitation of current inspection activities is that they mainly focus on enterprises and cooperatives, while small-scale farmers are rarely supervised. At the same time, there is a lack of rapid testing tools and a shortage of specialized human resources.

3.3. ANALYSIS OF FACTORS AFFECTING STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

3.3.1. Factors originating from central government policies

The FS legal framework (with the Law on Food Safety No. 55/2010/QH12, effective from 01 July 2011, as its foundation) orients management across the entire supply chain and provides a basis for risk-based management and traceability.

Decree No. 15/2018/NĐ-CP (dated 02 February 2018) serves as a crucial legal basis for Hanoi to organize state management according to the supply chain approach: it standardizes FS procedures and conditions and allocates authority by actor group and stage, including: small-scale farming households (commitment form – commune-level People’s Committee); purchasing/preliminary processing/preservation/

transportation establishments (Certificate of eligibility for food safety – Department of Agriculture and Rural Development); shops/supermarkets (Certificate of eligibility for food safety – Department of Industry and Trade); and simultaneously provides mechanisms for recognition of equivalence (GMP, HACCP, ISO 22000, etc.).

The group of linkage and supply-chain support policies creates incentives for organizing production and enhancing inter-regional coordination, including Decree No. 98/2018/NĐ-CP (encouraging cooperation and linkages), together with programs and decisions targeting Hanoi such as Decision No. 5391/QĐ-BNN-TT (26 December 2016) on planning safe vegetable areas supplying Hanoi; Decision No. 1791/QĐ-BNN-QLCL (19 May 2015); and Coordination Program No. 7237 (23 October 2021, period 2021–2025) on cooperation in supply chain development and ensuring FS for goods supplied to Hanoi.

The main mechanisms of impact are: (i) establishing a legal and standards-based corridor for unified state management of FS under a supply chain approach; (ii) promoting linkage and inter-regional coordination to enhance quality control, traceability, and supply stability. (Implementation of Decree No. 98 may be less effective if financial guidance and procedures for dossiers and disbursement are not synchronized).

3.3.2. Factors originating from the state management apparatus for the safe vegetable supply chain in Hanoi

The state management apparatus affects the effectiveness and efficiency of supply chain management through four aspects: assignment and decentralization of authority, inter-sectoral coordination, coverage by locality and establishment type, and human resource capacity. It is organized under an inter-sectoral model involving the Health, Agriculture and Rural Development, and Industry and Trade sectors, and at multiple administrative levels, in accordance with Decision No. 14/2019, Decision No. 28/2022 (dated 04 July 2022), as amended by Decision No. 58/2024 (dated 11 September 2024).

The operational structure is based on the Food Safety Steering Committee, with management along two axes: sectoral/functional axis (Agriculture and Rural Development: production–collection–preliminary processing–preservation–transportation; Industry and Trade: circulation/points of sale; Health: coordination focal point); territorial axis (district- and commune-level People’s Committees responsible for management within their localities).

A prominent limitation is the “thin” and concurrent staffing at the grassroots level: the Sub-Department of Quality Management, Processing and Market Development has 33 staff members, but only 02 are directly responsible for safe vegetables; at the district level, there are usually only 01–02 officials who handle multiple tasks; at the commune/ward level, there are no specialized staff. As a result, risk-based supervision is not continuous, and effectiveness is uneven across localities.

The 2023 survey (n = 190) shows that 54% of respondents assessed coordination as not synchronized or overlapping (compared with 46% who considered it synchronized); 27% believed that additional personnel were needed; and opinions on adjusting organizational structure and functions were divided (46% in favor of adjustment, 54% in favor of maintaining the current structure). This reflects shortcomings in coordination and debates over institutional reform, which affect the effectiveness of state management under the supply chain approach.

3.3.3. Factors originating from the market and the characteristics of the safe vegetable supply chain

Demand for safe vegetables in Hanoi exceeds local supply capacity, while market trust and the ability to identify safe vegetables remain limited. This increases the risk of fraud and requires state management to shift more strongly toward risk-based and market-oriented management. The safe vegetable supply chain is characterized by dispersion, multiple actors, and inter-regional linkages, which raise supervision costs and require inter-provincial coordination in quality control, traceability, and FS early warning.

Information asymmetry and the role of intermediaries make traceability a key management tool. Although Hanoi has established a traceability system, its effectiveness depends on coverage, data standardization, and control over labels and codes. Therefore, state management cannot be limited to licensing, but must focus on controlling critical control points of the supply chain (collection, preliminary processing, wholesale markets, distribution) and managing according to commodity flows.

3.3.4. Factors originating from the characteristics of actors in the supply chain

Characteristics of actors in the supply chain (knowledge and capacity, willingness to cooperate, trust, experience, and transaction frequency) directly affect compliance levels, supervision costs, and

traceability capacity under supply-chain-based state management. The 2023 survey shows a clear disparity in capacity: business and production knowledge of input suppliers was the lowest (2.70) compared with consumption entities (3.70), indicating risks arising from the “upstream” stage and the need for risk-based state management that prioritizes high-risk stages.

Although awareness of the need for cooperation is relatively good (average 3.64) and willingness to cooperate is fairly high (3.50), trust at the input supply stage is the lowest (3.00), increasing information asymmetry and compliance costs, and requiring strengthened post-inspection and stricter requirements for record retention. Supply chain relationships are also unstable: production establishments show a high duration of participation (3.90), whereas consumption entities have the lowest transaction frequency (3.15), resulting in unstable outlets, reduced incentives for compliance investment, and difficulties in applying supply-chain-based management when linkages are weak

3.4. GENERAL ASSESSMENT OF STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

3.4.1. Achieved results

Hanoi has strengthened planning, administration, and inter-sectoral and inter-regional coordination; gradually specified standards and conditions; and diversified communication activities. Support policies have been implemented relatively widely (technical training support rated 3.6–3.7/5; support for planting area codes rated 4.6/5). The network of supply chains has expanded, with 106 supply chains originating in Hanoi and 05 originating outside Hanoi. Inspection, post-inspection, and information transparency have been enhanced (inspection of 200–300 establishments per year, application of labels/QR codes in some cooperatives), and during the period 2019–2023 many violating establishments were sanctioned.

3.4.2. Some difficulties and limitations

Dissemination of information is uneven, especially at the input supply and production household levels (only 45% “know and understand,” 36% do not seek information; 80% of the input supply group do not know, and 58% of producers do not clearly understand; procedures for commitment forms are not fully guided). Procedures for certification of supply-chain products remain complicated and costly (36% cite difficulties due to traceability and testing costs). The market

value of “supply-chain product certification” is not clearly recognized (77% of the production group/short-chain group consider it of little usefulness). FS compliance remains low (a high proportion of “partial compliance”); many support policies (except training) have low levels of awareness and accessibility (2.2–2.4/5), particularly linkage support policies with very low accessibility (~1.8/5). Inspections are uneven and not comprehensive: inspection frequency at the production stage is lower (2.5) than at the processing and consumption stages (3.7); sanctions are insufficiently deterrent; grassroots human resources are limited; and the application of inspection technologies is not widespread.

3.4.3. Causes of the difficulties and limitations

Resources for upgrading production (financial and technological) are limited; support policies lack flexibility and dissemination is insufficient; procedures are overlapping and inter-level coordination is not tight; high compliance and testing costs reduce participation incentives; inspection and supervision capacity is constrained (concurrent staffing, lack of technology and equipment); branding communication and market linkage are ineffective; and several mechanisms and policies are newly promulgated and require time for concretization, making the effectiveness of promoting supply chain linkages fall short of expectations during the study period.

Chapter 4. SOLUTIONS TO IMPROVE STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI UP TO 2030

4.1. SWOT ANALYSIS (STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS) OF STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI

4.1.1. Strengths

State management of the safe vegetable supply chain in Hanoi has established a relatively comprehensive legal foundation, providing a basis for supply chain-based management from production conditions to inspection and the handling of violations.

The city has proactively planned and developed concentrated safe

vegetable production zones associated with traceability and consumption markets, thereby orienting and effectively concentrating resources.

At the same time, post-inspection activities have gradually been based on actual data, combined with clear assignment and decentralization of responsibilities down to the grassroots level, contributing to enhancing management effectiveness and coverage across the entire supply chain.

4.1.2. Weaknesses

State management of the safe vegetable supply chain in Hanoi still faces limitations due to its inter-sectoral and multi-level nature, which can easily lead to overlaps or gaps in management responsibilities, while supply chain activities are continuous across multiple stages and locations.

The management data system has not yet been integrated or interconnected across processes such as registration, appraisal, certification, post-inspection, and handling of violations; therefore, it has not effectively supported risk-based management by actors, locations, and violation history.

In addition, implementation resources, especially at the grassroots level, are not commensurate with the number of entities subject to management; professional capacity remains unstable, and the deterrent effect is not sufficiently strong, thereby reducing the continuity and effectiveness of management across the entire supply chain.

4.1.3. Opportunities

Digital transformation and the application of technology create conditions for enhancing transparency and the effectiveness of monitoring the safe vegetable supply chain. Decentralization of management strengthens supervision at the grassroots level, making it more closely aligned with the actual operation of the supply chain. At the same time, increasing consumer awareness contributes to promoting compliance and improving product quality.

4.1.4. Threats

Hanoi's vegetable market is supplied by multiple localities, which increases the risk of disruptions in traceability and creates difficulties in inter-provincial coordination in management. In addition, labeling fraud

and unfair competition undermine the compliance of actors in the supply chain. The large number of production and business establishments—widely dispersed and rapidly changing—together with pressures from urbanization and environmental pollution, increases the costs and complexity of food safety (FS) management.

4.2. VIEWPOINTS AND ORIENTATIONS FOR STRENGTHENING STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI UP TO 2030

4.2.1. Viewpoints on state management of the safe vegetable supply chain in Hanoi up to 2030

(1) Management of the safe vegetable supply chain must be based on FS under a risk-based approach, with end-to-end control from inputs to consumption.

(2) Traceability and digital data are core management tools, not merely labels.

(3) State management involves designing and maintaining compliance mechanisms: setting standards – providing guidance – supervising – handling violations, while simultaneously reducing compliance costs for actors in the supply chain.

(4) Management of the safe vegetable supply chain must be aligned with the characteristics of a large city and inter-regional linkages, controlling the flow of goods into Hanoi.

(5) State management aims at sustainable and ecological development and emissions reduction, integrating IPHM and organic–circular approaches.

4.2.2. Orientations

(1) Improving the institutional framework for supply chain-based and food safety (FS) risk-based management. It is necessary to shift from the management of individual establishments to management based on stages and levels of risk across the entire supply chain; to standardize food safety conditions, strengthen post-inspection, and ensure the accountability of actors in the supply chain for product quality.

(2) Modernizing data governance and traceability systems. The city needs to develop a unified, interconnected data system integrating information on production areas, production and business

establishments, monitoring results, and violation histories; traceability should be regarded as a core management tool serving supervision, early warning, and risk tracing.

(3) Reforming coordination mechanisms for implementation and decentralization of territorial management. It is necessary to clearly define responsibilities among specialized agencies and grassroots authorities, link decentralization with capacity enhancement of officials, and establish a unified inter-sectoral coordination mechanism in inspection, supervision, and the handling of violations.

(4) Improving support policies associated with promoting self-compliance and social monitoring. Administrative management instruments should be combined with economic incentive mechanisms, support for digital transformation and technology application; at the same time, information transparency should be enhanced to promote the supervisory role of consumers and actors in the supply chain.

4.3. SELECTED SOLUTIONS TO IMPROVE STATE MANAGEMENT OF THE SAFE VEGETABLE SUPPLY CHAIN IN HANOI UP TO 2030

4.3.1. Improving zoning and planning and development planning for the safe vegetable supply chain in Hanoi

Standardize the two-level planning system (up to 2030 and annual plans) under a unified governance framework; shift to risk-based management grounded in data (risk mapping, stratification of establishments, risk-based sampling); link planning of safe vegetable zones with hazard-control objectives; unify the indicator system and a shared database (planting area codes, validity of FS eligibility/VietGAP certification, production logs, traceability, samples/violations/handling measures).

4.3.2. Improving the legal framework and standards/conditions for actors

Systematize a common set of regulations applicable along the supply chain, clarifying “risk interface points” (preliminary processing–packaging–transportation–retail); design minimum requirements by risk level for small-scale entities and stricter requirements for intermediary and downstream actors; simplify and digitize procedures for issuance–renewal–revocation and supply chain confirmation; convert regulations

into compliance tools (handbooks, checklists, log templates, label/QR guidance, reminders for expiring documents).

4.3.3. Improving support policies for actors in the safe vegetable supply chain

Shift from dispersed support to targeted and conditional support, prioritizing critical stages (concentrated zones, key cooperatives/enterprises, preliminary processing–logistics); support standardization of production zones, planting area codes, and logbooks; invest in post-harvest infrastructure (preliminary processing, cold storage, transportation) through packages/supply-chain projects with post-inspection requirements; support traceability and digital transformation based on data (not only QR labels); create “market pull” through stable outlets (school canteens, hospitals, agencies; long-term contracts).

4.3.4. Strengthening inspection, supervision, and handling of violations

Standardize inspection plans using a risk matrix and a supply chain approach (not evenly distributed); monitor hazards through risk-based sampling and use results for governance; strengthen post-inspection following the principle of “the right act – the right authority – trace to the risk-generating stage” (activate backward traceability, recall, re-inspection); fill “gaps” for small-scale households and traditional channels through cluster-based inspections plus on-site guidance; increase deterrence through disclosure and classification of repeat offenders into high-risk groups.

4.3.5. Additional solutions

Innovate communication and compliance guidance based on behavior; enhance capacity to “translate” central government policies into guidance suitable for Hanoi; strengthen grassroots capacity (reduce concurrent duties, improve professional skills in risk-based inspection and traceability); mobilize social supervision and market pressure; strengthen internal self-control within the supply chain (leading actors, cross-checking, stricter control of input supplies, batch-based traceability at intermediary stages).

CONCLUSION AND RECOMMENDATIONS

1. CONCLUSION

The thesis has achieved the proposed objectives. In line with these objectives, the thesis has examined, analyzed, and clarified the following contents:

(1) Theoretical aspects

The thesis systematizes the concepts and connotations of the safe vegetable supply chain and the provincial-level framework of state management, consisting of four components: (i) formulating supply chain development plans; (ii) promulgating regulations on standards/conditions; (iii) implementing support policies; and (iv) inspecting–supervising–handling violations within the supply chain. At the same time, the thesis identifies four groups of factors affecting the effectiveness of state management of the safe vegetable supply chain: central government policies, the state management apparatus, the market and supply chain characteristics, and the characteristics of actors in the supply chain.

(2) Practical aspects

The thesis examines experiences in state management of the safe vegetable supply chain in several countries (Republic of Korea, China, Thailand) and in several domestic localities (Ho Chi Minh City, Da Nang), and draws lessons for Hanoi. On that basis, the THESIS assesses the current situation of state management of the safe vegetable supply chain in Hanoi according to the four contents stated above; analyzes influencing factors; and identifies achieved results, difficulties and limitations, and the causes of the limitations during the study period.

(3) Proposed solutions

Based on the assessment of the current situation and the causes of limitations, the thesis establishes eight orientations for strengthening state management of the safe vegetable supply chain up to 2030 and proposes five key groups of solutions: (i) improving zoning/planning and development planning for the supply chain; (ii) improving the legal framework on standards/conditions for actors in the supply chain; (iii) improving support policies; (iv) strengthening inspection–supervision–

handling of violations; and (v) additional solutions (communication and dissemination, strengthening capacity for policy implementation, consolidating the capacity of state management agencies, promoting the role of the market and social supervision, and enhancing information transparency–traceability–supply-chain-based self-control).

2. LIMITATIONS OF THE THESIS

(1) The thesis focuses primarily on state-related factors in establishing a legal corridor for actors in the supply chain to operate on an equal footing with fair competition, effectiveness, and sustainability; it does not yet examine in depth the contents related to supply chain governance and linkages among actors in the supply chain to achieve efficiency in production, preliminary processing, processing, and consumption of safe vegetables in Hanoi.

(2) The thesis has not examined state management coordination among localities regarding safe vegetable supplies coming into Hanoi from outside the city.

(3) The dissertation has not quantified the factors influencing state management of the safe vegetable supply chain during the period 2019–2023 based on the results of empirical survey data.

3. RECOMMENDATIONS FOR FURTHER RESEARCH

(1) Conduct deeper research on safe vegetable supply chain governance models to propose a suitable model for Hanoi.

(2) Study state management coordination among provinces with safe vegetable supply chains supplying Hanoi, in order to propose policy mechanisms that promote inter-regional cooperation to ensure quality and a stable supply of safe vegetables for Hanoi.

LIST OF PUBLISHED WORKS RELATED TO THE THESIS

1. Nguyen Thi Thu Ha (2022), “State Management of the Supply Chain of Safe Vegetables for Consumption in Hanoi City, Vietnam”, *International Journal of Advances in Engineering and Management (IJAEM)*, Volume 4, Issue 3, pp. 551–557.
2. Nguyen Thi Thu Ha (2022), “Domestic and International Experience in the Management of the Safe Vegetable Supply Chain – Lessons for Hanoi”, *Industry and Trade Magazine*, Issue No. 4, March 2022.
3. Nguyen Thi Thu Ha (2020), “A Study on Factors Affecting the Management of the Safe Vegetable Supply Chain in Hanoi”, *Industry and Trade Magazine*, Issue No. 3, February 2020.
4. Nguyen Thi Thu Ha (2015), “Improving the Efficiency of Safe Vegetable Production and Business in Van Noi Commune, Dong Anh District, Hanoi City”, *Economic and Forecast Review*, Issue No. 5, April 2015.