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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, the development of agricultural supply chains toward linkage, information transparency, and quality control has become an urgent requirement to ensure food safety (FS). Although a number of policies have been promulgated to promote linkages (Decree No. 98/2018/NĐ-CP; Decision No. 644/2014/QĐ-TTg; Decree No. 27/2022/NĐ-CP, etc.), many agricultural supply chains remain unsustainable due to low compliance, small-scale and fragmented production, unclear origins of inputs, and fragile linkages; meanwhile, state management of FS under a supply chain approach is still limited, and has not yet created sufficient incentives and enforcement pressure for compliance.

In Hanoi, vegetable demand is very large and highly dependent on inter-regional supply. In 2021, consumption reached approximately 103,300 tons per month (about 3.3–3.4 thousand tons per day), of which local self-supply accounted for about 65.1%. In the period 2023–2024, consumption increased to approximately 107,500 tons per month (about 3.5–3.6 thousand tons per day), while the local self-sufficiency rate in peak months was only about 54.23%. Inspections revealed that violations still existed (inspection of 648 establishments, detection of 20 violating establishments, issuance of 60 sanctioning decisions), mainly related to expired certificates, improper use of agricultural inputs, incomplete record-keeping, inadequate conditions for preliminary processing and preservation, and lack of proper traceability and labeling. This situation indicates the existence of risks at different stages of the chain and information asymmetry, requiring state management to shift from point-based control to supply-chain-based management, strengthen inter-sectoral and inter-provincial coordination, and apply risk-based supervision and traceability.

Therefore, the study entitled “State Management of the Safe Vegetable Supply Chain in Hanoi” is necessary to clarify the current situation and its causes, and to propose solutions for improving state management in the context of a supply chain characterized by multiple

actors, multiple administrative areas, and inter-regional linkages.

2. Novel contributions of the thesis

2.1. Theoretical contributions

The thesis develops an analytical framework for state management of the safe vegetable supply chain at the provincial level, comprising four components: supply chain development planning; FS standards/conditions; support policies; and inspection–supervision–handling of violations. At the same time, it identifies four groups of factors governing 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.

2.2. Practical contributions

The thesis reviews Hanoi's policies and identifies gaps that require improvement; assesses state management in the period 2019–2023 to clarify achievements, limitations, and their causes; and, on that basis, proposes orientations and solutions up to 2030 under five groups: planning; standards/conditions; support; inspection–examination–supervision–handling of violations; and additional solutions.

3. Structure of the thesis

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

Chapter 1. REVIEW OF STUDIES AND THE THESIS RESEARCH ORIENTATION

1.1. REVIEW OF STUDIES AND RESEARCH GAPS IN THE THESIS

1.1.1. Review of studies on the safe vegetable supply chain

1.1.2. Review of studies on management of the safe vegetable supply chain

1.1.3. Research gaps to be further addressed in the thesis

The literature review shows that no study has comprehensively and in depth analyzed state management of the safe vegetable supply

chain in Hanoi. Therefore, the thesis focuses on addressing four main gaps:

(1) The lack of a unified analytical framework for the contents of state management following supply chain logic, fully covering the management cycle.

(2) The lack of evidence and mechanisms explaining how state management instruments affect the compliance behavior of actors in the supply chain at each link, and thus the inability to explain differences in implementation effectiveness across actor groups/distribution channels.

(3) The lack of a supply-chain governance approach suited to Hanoi's specific characteristics of "suburban production – multi-channel urban consumption," while also considering domestic and inter-regional supply sources, a diversified distribution system, and the need for inter-sectoral and multi-level coordination.

(4) The lack of identification and classification of factors influencing the effectiveness and efficiency of supply-chain-based state management (institutions–implementation organization, coordination, information–supervision, distribution channel characteristics, etc.), and the lack of a basis for selecting priority solutions together with implementation conditions.

1.2. RESEARCH OBJECTIVES, SUBJECT, AND SCOPE

1.2.1. Research objectives

Overall objective: To assess the current situation and propose improvements to state management of the safe vegetable supply chain in Hanoi up to 2030.

Specific objectives: To systematize and clarify theoretical issues regarding state management of the safe vegetable supply chain at the provincial level; to synthesize domestic and international experiences to draw lessons for Hanoi; to assess the current situation and factors affecting state management of the safe vegetable supply chain in Hanoi; and to propose orientations and solutions to improve state management of the safe vegetable supply chain in Hanoi.

1.2.2. Research subject

The research subject of the topic is solutions for state management of the safe vegetable supply chain in Hanoi.

1.2.3. Research scope

Spatial scope: The study focuses on the safe vegetable supply chains produced and consumed in Hanoi, including safe vegetable supply chains originating from other provinces but consumed in Hanoi.

Temporal scope: Assessment for the period 2019–2023 and proposal of solutions up to 2030.

Content scope: (i) Formulating development plans for the safe vegetable supply chain. (ii) Promulgating regulations on FS standards and conditions. (iii) Implementing support policies for actors in the supply chain participating in the safe vegetable supply chain. (iv) Inspecting, supervising, and handling violations of FS regulations**.**

1.2.4. Research questions

What contents does the theoretical basis for state management of the safe vegetable supply chain include? What is the current situation of state management of the safe vegetable supply chain in Hanoi in the period 2019–2023? What are the achievements and limitations? What causes led to those achievements and limitations? What solutions can improve the effectiveness of state management of the safe vegetable supply chain in Hanoi up to 2030?

1.3. RESEARCH APPROACHES AND METHODS

1.3.1. Approaches

1. Management process approach
2. Stakeholder-group approach
3. Supply chain activity-based approach

1.3.2. Information collection methods

1.3.2.1. Collection of secondary information

1.3.2.2. Collection of primary information through a survey

(1) Survey subjects: State management officials related to the safe vegetable supply chain in Hanoi; actors in the supply chain of the safe vegetable supply chain (input suppliers, producers, purchasing establishments, processing establishments, consumption/retail entities, etc.).

(2) Survey modalities: Distributing paper questionnaires directly (offline) to collect information promptly and ensure accuracy; sending questionnaires via email using the Survey Monkey tool (online) to expand the scope of data collection.

(3) Sample size: 30 safe vegetable supply chains (28 chains produced in Hanoi, 2 chains from other provinces). A total of 190 questionnaires were distributed, with a 100% return rate.

(4) Sampling method: Stratified sampling combined with random sampling from a population of 111 supply chains according to the Cochran formula.

1.3.2.3. Collection of primary information through expert interviews

Subjects: Experts, scientists, managers, and public officials/civil servants implementing state management of the safe vegetable supply chain in Hanoi.

Modality: Direct exchanges, participation in seminars and conferences with agencies related to the management of the production and consumption of safe vegetables.

1.3.3. Data analysis methods

1.3.3.1. Statistical method

1.3.3.2. SWOT method

1.3.3.3. Synthesis and analysis method

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

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 refers to the influence of the entire system of legal regulations, policies, and instruments used by the State to orient, regulate, govern, and control the activities of actors in the supply chain, in order to promote an increase in the number of supply chains and ensure food safety (FS) of vegetable products throughout the supply chains, thereby meeting both the quantitative and qualitative demand for vegetables within the provincial locality.

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

Authority; unity; compliance; 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

Six key lessons are drawn:

(1) zoning and planning safe vegetable areas in association with land–water–environmental conditions to control production-stage risks;

(2) promulgating incentive policies (infrastructure, capital, technology transfer, labeling/packaging, and expansion of consumption channels);

(3) establishing standards and quality control across the entire supply chain, accompanied by publicly disclosed sanctions for violations;

(4) strengthening the compliance responsibility of actors in the supply chain and promoting coordination in line with market requirements;

(5) identifying "locomotive"/leading entities of the supply chain (cooperatives/enterprises/distributors) for focused support and, when necessary, market regulation;

(6) enhancing the role of modern distribution channels (supermarkets/retailers) to improve logistics and control inputs and outputs.

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 3.1. 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 inform-ed	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 3.7. 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	Tran-parency	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

The FS legal framework is relatively comprehensive (Law on Food Safety, Decree No. 15/2018, Decree No. 115/2018), providing a foundation for supply-chain-based and risk-based management; the City has a planning orientation up to 2030 associated with traceability and supply chain linkages; post-inspection based on evidence has been strengthened (sample monitoring, with the pass rate reported at approximately ~94% in cited reports); assignment and decentralization have been consolidated, increasing coverage down to the grassroots level.

4.1.2. Weaknesses

The inter-sectoral and multi-level model may lead to overlap and gaps in responsibility; supply chain data are not yet interconnected, and risk stratification based on violation history and monitoring samples is lacking, resulting in limited targeting accuracy; pressure is very high

due to the large scale of establishments under management; deterrent effectiveness depends on detection–traceability–handling capacity, and therefore sustainable compliance remains unstable.

4.1.3. Opportunities

The 2030 targets create an opportunity to shift from "input-based" management to outcome- and risk-based management with a system of indicators (batch-based traceability, non-compliant sample rates, dossier processing time, etc.); decentralization to the grassroots level can enhance locality-based supervision; publication of sample monitoring data and transparent communication create momentum for evidence-based management and for strengthening market trust.

4.1.4. Threats

Inter-regional supply makes traceability and attribution of responsibility more difficult; the risk of label fraud and product mixing arises due to price differentials; the large number of establishments, dispersion, and fluctuating consumption channels (including online channels) increase supervision costs; urbanization and environmental pressures raise the costs of managing production zones and controlling production conditions at the source.

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) Improve the institutional framework for risk-based and stage-based management, focusing on hazard control rather than certification formality.

(2) Organize implementation under an inter-sectoral model with a single data focal point and a single coordination mechanism.

(3) Manage concentrated safe vegetable production zones as priority objects: planting area codes, input control, and residue monitoring.

(4) Digital transformation and traceability become mandatory infrastructure, interconnected with the national system.

(5) Innovate inspection and post-inspection based on risk, linking detection – tracing – sanctioning – remediation.

(6) Increase compliance incentives: conditional support and public procurement prioritizing traceable and compliant products.

(7) Strengthen market governance at urban "nodes": logistics, wholesale markets, cold storage, and modern distribution channels.

(8) Intensify communication and social supervision, and publicly disclose (in a controlled manner) management data to create compliance pressure and market trust.

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 FOR FURTHER RESEARCH

1. Conclusion

The thesis has achieved the proposed objectives. In line with these objectives, the thsis 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 theisis 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. 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.