



Policy Brief - Smart Farming for Sustainable Agricultural Development in Vietnam



AVALVE - AOP

Executive Summary

Vietnam has articulated a strong national vision for smart, ecological, and sustainable agriculture. High-level Party resolutions, climate commitments, digital transformation strategies, land reforms, and preferential financing instruments together form one of the most comprehensive policy frameworks for smart farming in the region.

However, despite this strong foundation, systemic implementation gaps continue to prevent these policies from translating into widespread adoption at farm level, particularly among smallholders, cooperatives, and early-stage agri-technology enterprises. These gaps stem from land fragmentation, shortages of technical expertise, limited access to finance, weak technology validation mechanisms, and unclear agricultural data governance.

International experience shows that countries that have successfully scaled smart agriculture did so not by issuing additional policies, but by creating state-coordinated intermediary mechanisms - such as land banks, technology verification centres, digital finance infrastructure, and farmer digital literacy programmes.

This policy brief proposes a Vietnam-specific implementation pathway, informed by international best practices and illustrated through a practical case study of AVALVE, a South Korean AI-based vertical farming enterprise operating in Vietnam since 2023. The brief recommends that with targeted institutional reforms, Vietnam can close the implementation gap and position smart agriculture as a driver of inclusive growth, climate resilience, and global competitiveness.

I. Introduction

Vietnam's agricultural sector contributes 11.03% to GDP and employs 26% of the workforce [1] [2]. Despite a record \$45.37 billion in exports in early 2025 [3], long-term sustainability is threatened by climate change (projected 10.6% losses by 2050) [4] and mandatory digital traceability in EU and US markets [5]. Smart farming adoption is an urgent economic imperative to maintain regional competitiveness and bypass the bottlenecks in structural land, labor force and technical expertise. Despite a strong legal framework, a gap between policy and action slows digital innovation. Moving from passive incentives to active advocacy is essential to protect 70% of smallholder farmers [6] in smart agriculture, boost Vietnam's competitiveness, and open high-value markets.

II. Vietnam's Foundational Policy Framework

Vietnam's smart agriculture agenda is anchored in a strong legal and institutional foundation. Key Party resolutions, including Resolution 19-NQ/TW (2022) and Resolution 57-NQ/TW (2024), together with the revised Law on High-Tech (2025), formally position *eco-agriculture* and *smart rural development* as central pillars of national socio-economic transformation. These instruments mandate the integration of digital technologies across agricultural production, management, and traceability systems, providing a high-level legal basis for smart farming adoption nationwide.

In parallel, Vietnam's climate change and green growth framework places smart agriculture at the core of its long-term sustainability strategy. Decisions 896/QD-TTg (2022) and 1658/QD-TTg (2021) articulate Vietnam's commitment to achieving Net Zero emissions by 2050, explicitly promoting carbon-neutral farming practices, renewable energy use in agriculture, and high-tech solutions for climate adaptation and resilience in rural areas.

The government has also introduced a robust set of financial and investment incentives to support agricultural modernization. Resolution 46/NQ-CP (2025), Directive 05/CT-TTg (2025), and Decree 116/2018/ND-CP (2018) collectively deploy a VND 100,000 billion concessional credit package aimed at reducing financial barriers for agri-technology enterprises, cooperatives, and modern production models, particularly those applying high-tech and digital solutions.

On land and infrastructure, the 2024 Land Law, together with Decree 57/2018/ND-CP, establishes the legal basis for developing high-tech agricultural zones and production clusters. These instruments provide significant land-rent exemptions and infrastructure support for investors, reflecting the state's intention to facilitate land access and physical conditions conducive to smart farming investments.

Vietnam's digital transformation and circular economy strategies further reinforce this direction. Decisions 749/QD-TTg (2020) and 540/QD-TTg (2024) prioritize the deployment of IoT and AI platforms in agriculture, while emphasizing the scaling of science and technology transfer to improve resource efficiency, promote circular production models, and reduce agricultural waste.

Finally, the expansion of organic and sustainable farming is guided by Decisions 150/QD-TTg (2022) and 885/QD-TTg (2020), which aim to develop certified organic production zones nationwide. These policies encourage the application of high-tech solutions to enhance resource conservation, waste treatment, and environmental sustainability across agricultural value chains.

III. Implementation Gaps and Practice Lessons

Despite these laws, a systemic gap prevents policies from reaching fields:

- **Land and Resource Access:** Highly fragmented landholdings and complex, short-term tenure laws make it difficult for investors to acquire the large, stable plots required for high-tech infrastructure like IoT and automated systems.
- **Legal and Administrative Hurdles:** Inconsistent regulations for emerging technologies (AI, blockchain) and a lack of a "single-window" administrative system create high costs and registration delays for foreign companies.
- **Technology validation:** Vague definitions of "high technology" and a focus on paperwork rather than practical testing have hampered its development. Without evidence demonstrating the effectiveness of artificial intelligence and smart technologies, investors and farmers are hesitant to adopt them.
- **Financial and Investment Gaps:** Accessing capital is restricted by strict collateral requirements and a limited domestic venture capital framework. Additionally, vague criteria for "high-tech" status create uncertainty regarding tax incentives and government support.
- **Human Resources and Data:** A significant digital literacy gap among the rural workforce hinders technology adoption, while an evolving and incomplete legal regime for data privacy creates risks regarding the ownership of agricultural data.

IV. Comparative Analysis and Multi-faceted Recommendations

Successful international models solve these gaps by moving from administrative oversight to technical empowerment.

<i>Gap/Barrier</i>	<i>International Success Model</i>	<i>Recommendation</i>	<i>Key Stakeholders</i>
Land Fragmentation	<i>Japan's Farmland Bank (2014):</i> State acts as intermediary to rent and sub-lease, minimizing conflicts [7].	Establish Land Banks under the 2024 Land Law to consolidate plots into investor-ready blocks via professional cooperatives.	Ministry of Agriculture and Environment (MAE), Provincial People's Committees, Agricultural Cooperatives

Technology Validation	<i>Singapore AI Verify & Korea Smart Farm Innovation Valley:</i> Controlled hubs for training, leasing, and demonstrating state-of-the-art technologies for young agri-professionals [8], [9]	Consider the need to deploy Technical Testing Hubs in high-tech zones to replace paper labels with automated AI audit reports.	Ministry of Science and Technology (MOST), National Innovation Center (NIC)
Financial Gaps	<i>India's Arya.ag:</i> Uses stored crops (warehouse receipts) as collateral for post-harvest liquidity [10]. <i>Blended finance:</i> Combining public and private capital—is essential to amplify public investment and attract private investors [11].	Implement a Digital Warehouse System allowing 70–80% of crop value to serve as immediate credit collateral. Establish a National AgTech Blended Finance Fund to provide partial guarantees for commercial loans to high-tech SMEs.	Ministry of Finance, State Bank of Vietnam, Agribank, Fintech Startups
Literacy & Human Resource	<i>India “Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) & China Talent Pairing:</i> National literacy mission and university-village experts [12], [13]	Launch "Digital Farmer" certifications as a mandatory condition for receiving state high-tech subsidies.	MAE, Vietnam Academy of Agriculture Science, Universities
Data Rights	<i>EU Data Act/Code of Conduct:</i> Farmer as "Data Originator" with explicit consent rights [14].	Adopt an "Open Data for AI" policy that defines farmers' data rights while allowing AI firms to plug into local datasets.	National Data Association, MOST

V. Bridging Critical Gaps with AVALVE’s AI-aided climate smart farm.

AVALVE is a South Korean AI startup that established a ginseng seedling vertical farm in Vietnam in 2023. It directly addresses the "Implementation Gap" in the following ways:

- *Overcoming Land/Productivity Barriers:* By utilizing 3-4 layers vertical hydroponics, AVALVE increases productivity by 300% on small footprints and reduces water usage by 90%, making high-tech farming viable even on fragmented plots.
- *Solving Technology Validation Barriers:* Using AVALVE’s AI strawberry pilot in Vietnam as a verification model provides "ground truth" performance data. This builds the verifiable trust investors and farmers, effectively accelerating technology adoption.
- *Filling the Sustainability/Carbon Gap:* By growing premium Korean crops locally, AVALVE reduces the annual carbon footprint of air freight by approximately 1,100 tons of CO₂, helping Vietnam meet its Green Growth Strategy targets.

- *Bypassing the Expertise Gap*: AVALVE's AI system autonomously controls optimal cultivation conditions, replacing the need for on-site expert intervention. This allows beginners and marginalized groups to grow high-value crops easier.



Image 1. Start cultivating strawberries in an Avalue AI-based smart farm



Image 2. Harvested strawberry fruits



Image 3&4. Testing strawberry quality

VI. Conclusion

With a clear vision and robust policy ambition already in place, Vietnam's smart agriculture agenda would benefit from stronger institutional bridges linking national strategies to farm-level realities. International experience, and practical cases such as AVALVE, demonstrate that smart agriculture scales when governments move beyond regulation toward technical empowerment, validation, and coordination. By expanding land banks, establishing technology testing centres, enabling digital and blended finance, and investing in human capital, Vietnam can transform smart agriculture from a policy objective into a nationwide engine of sustainable growth.

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