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EMPOWERING THAI SMALLHOLDER FARMERS: STRATEGIC PATHWAYS FOR SUSTAINABLE FINANCIAL INCLUSION

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Abstract

This study develops robust, actionable strategies to enhance financial access for smallholder farmers in Thailand, crucial for fostering sustainable rural development and improved livelihoods. Utilizing a rigorous qualitative methodology, the research involved semi-structured interviews with 35 key informants and focus group discussions across 18 provinces. Integrating SWOT and TOWS analyses, this work builds upon previous Structural Equation Modeling results to identify comprehensive strategic pathways. The study revealed significant internal strengths, including improved farmer education and robust community networks, juxtaposed with weaknesses such as limited financial literacy and insufficient collateral. Opportunities were identified in supportive government policies, emerging digital financial technologies, and growing demand for sustainable agricultural products. Concurrently, threats include high perceived agricultural lending risks, climate change impacts, market volatility, and an aging farmer population. The proposed strategic framework features four interlinked components: promoting financial literacy and capacity building, developing flexible financial products, supporting cooperative group formation for collective borrowing, and expanding digital financial services. This holistic approach aims to significantly increase credit access, strengthen financial resilience, reduce vulnerability to economic and environmental shocks, and contribute to a sustainable and inclusive rural financial system aligned with the United Nations Sustainable Development Goals.

Keywords: Smallholder Farmers, Financial Inclusion, Strategic Planning, Sustainable Development, Thailand

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Introduction

The agricultural sector is a crucial foundation of the economies of developing countries, especially in Southeast Asia, sustaining the livelihoods of millions of people and ensuring food security. The Food and Agriculture Organization of the United Nations (2023) states that smallholder farmers, who account for more than 80% of agricultural producers in this region, face ongoing challenges in accessing financing, thereby limiting their ability to invest in productivity-enhancing technologies, agricultural inputs, and climate-resilient practices. According to the World Bank Group (2022a), the Thai Rural Income Diagnostic reveals that smallholder farmers in Southeast Asia need approximately 100-200 billion per year to address gaps in land tenure security, market access, and long-term investments. However, less than 10% have access to formal credit due to barriers such as a lack of collateral and regulatory obstacles. This lack of funding increases vulnerability; without sufficient capital, farmers experience reduced yields (up to 30-50% in some cases) and face heightened climate risks, such as droughts and floods (World Wide Fund for Nature, 2021; Food and Agriculture Organization of the United Nations, 2025). As a result, smallholder farmers often fall into cycles of debt, declining productivity, and poverty, which hinder broader economic growth and food security (World Bank Group, 2022a; Ojo et al., 2024).

Building upon this global context, Thailand exemplifies these challenges despite its robust agricultural sector. Although the government and financial institutions, such as the Bank for Agriculture and Agricultural Cooperatives (BAAC), have promoted rural credit initiatives, structural barriers persist, including stringent collateral requirements, limited financial literacy, uneven access to services, and regulatory hurdles (Sombun et al., 2021; World Bank Group, 2022a; Ratanavararak & Chantarat, 2023). These obstacles undermine the production efficiency and long-term economic stability of smallholder farmers, who constitute a significant portion of the agricultural population. For example, limited capital restricts the adoption of modern technology and climate-resilient practices, resulting in reduced yields and higher vulnerability to environmental impacts (World Bank Group, 2022a). This aligns with previous research by the investigator (Mangsiri, 2025), who developed a Structural Equation Model (SEM) to analyze the causal relationships affecting access to financial services. The findings revealed that the lack of collateral and financial knowledge is a significant obstacle for Thai smallholder farmers. Although these quantitative insights are valuable, they often remain unimplemented in practice, creating a gap in translating analytical results into actionable strategies that could help break the cycle of poverty and promote inclusive growth.

Therefore, to fill this research gap, the present study uses Structural Equation Modeling (SEM) results as a basis for conducting a SWOT analysis to identify internal strengths and weaknesses, as well as external opportunities and threats affecting smallholder farmers' financial access. These findings are further expanded through the TOWS matrix to formulate a comprehensive action plan comprising short-, medium-, and long-term projects, key performance indicators (KPIs), responsible parties, and timelines. The plan serves as a practical framework for key stakeholders—including the Ministry of Agriculture and Cooperatives, the Ministry of Finance, the Bank of Thailand (which supervises commercial banks providing agricultural credit), the Ministry of Digital Economy and Society, and local administrative organizations. The engagement of these agencies is essential for policy formulation, regulatory reforms, and the integration of digital infrastructure to address connectivity constraints in rural areas. By aligning with the economic, social, and financial needs of smallholder farmers, this plan supports the United Nations Sustainable Development Goals (SDGs), particularly Goal 1 (No Poverty), Goal 8 (Decent Work and Economic Growth), and Goal 10 (Reduced Inequalities) (United Nations, 2015; Food and Agriculture Organization of the United Nations, 2023). Ultimately, promoting an inclusive financial system through coordinated public-private action can enhance the quality of life for smallholder farmers, increase productivity, and contribute to

sustainable agricultural development in Thailand and beyond (Demirgüç-Kunt et al., 2022; World Bank Group, 2022a).

Literature Review

Access to Finance for Smallholder Farmers

Access to financial resources is a crucial factor that promotes agricultural development, especially for smallholder farmers in Thailand, who often face resource and funding constraints (Demirgüç-Kunt et al., 2018; World Bank Group, 2020). The lack of financial resources limits farmers' ability to invest in quality seed technology and infrastructure, which impacts long-term productivity and income (Maiga, 2024). In the Thai context, smallholder farmers often face structural obstacles, such as a lack of collateral, insufficient formal land ownership documentation, and poor or nonexistent credit history, which hinder their ability to access formal loans (Ahmad & Manh, 2022).

Meanwhile, informal financial sources such as borrowing from relatives, intermediaries, or local lenders play a significant role in rural areas. These sources, however, frequently entail high interest rates and substantial financial risks, such as the potential loss of productive assets (Linh et al., 2020). Several personal and structural factors have been found to influence access to finance, including the level of education, financial literacy, cooperative membership, and the ability to prepare proper documentation (Ololade & Olagunju, 2013; Masuka et al., 2025). Additionally, a report by the Food and Agriculture Organization of the United Nations (2022) highlights that a persistent barrier persists in rural and remote areas: the lack of access to information and support services related to government loan programs and financial assistance.

SWOT and TOWS as Analytical Tools

SWOT analysis is widely used as a strategic planning tool to identify the internal strengths and weaknesses, as well as the external opportunities and threats, associated with smallholder farming systems. It serves as a valuable framework for understanding both the potential and challenges that farmers face in accessing financial services (Hill & Westbrook, 1997). According to Barney (1991), the Resource-Based View (RBV) holds that internal resources, such as farming knowledge, experience, and land-use efficiency, are key assets that can create a competitive advantage for smallholder farmers in securing loans.

External conditions, such as stakeholder involvement, particularly institutions like the Bank for Agriculture and Agricultural Cooperatives (BAAC), and supportive policies from the government, also play an important part in determining financial access. Freeman (1984) underscores the role of stakeholders in influencing behavior, while DiMaggio & Powell (1983) emphasize how institutional norms and rules affect organizational and individual decision-making.

Despite its usefulness, SWOT analysis has been criticized for its subjectivity and lack of prioritization, which can limit its effectiveness (Hill & Westbrook, 1997). To overcome these limitations, the TOWS matrix is used as an extension of the SWOT matrix. It enables the transformation of identified factors into actionable strategic directions (Weihrich, 1982). For instance, combining internal strengths such as community solidarity and agricultural knowledge with external opportunities such as government loan programs can guide strategies like promoting group loans or cooperative-based financial literacy initiatives (Jumanne, 2024)

Recent Developments in Mobile-Based Lending and Digital Financial Innovations in Southeast Asia

Recent research from the last two to three years has shown that mobile lending and other digital financial innovations could significantly improve financial access for smallholder farmers in Southeast Asia. For example, the World Bank's first Digital Transformation Policy Development Support Program (World Bank Group, 2023a) has helped the Philippines make changes to encourage the use of digital technologies. These changes include mobile lending

platforms that use alternative credit scoring to get around the need for traditional collateral. This has made it 25-30% easier for small businesses and farmers in rural areas to get loans. The Indonesia Economic Quarterly (World Bank Group, 2024) discussed how digital platforms, such as Gojek's financial services and the OVO mobile wallet, have made mobile lending easier for smallholder farmers. They can now get small loans through real-time approval applications, which has led to higher productivity. In Vietnam, the use of digital tools like MoMo and Viettel Pay has also connected mobile lending with online agricultural commerce. This process has made it easier for rural families to obtain loans and reduced informal lending by 15%. The Asian Development Bank (2025) report further states that Southeast Asia is a leader in adopting digital payments, remittances, and lending, resulting in a 40% annual growth in fintech, particularly in Malaysia and Singapore. Platforms like Grab Financial use AI to assess risks, benefiting smallholder farmers through lower interest rates. Innovations such as blockchain-based supply chain finance in Indonesia and Vietnam have reduced default risk by 25% while promoting sustainability. These developments can serve as a model for Thailand to integrate with existing tools (e.g., the BAAC app) to enhance the resilience of smallholder farmers. However, challenges such as data privacy and the digital divide persist, underscoring the need for context-specific strategies, as demonstrated in this study through SWOT and TOWS analyses.

Related Empirical Studies in Thailand and Developing Countries

Empirical studies in Thailand and other developing countries highlight common barriers to financial access for smallholder farmers, such as a lack of collateral and complex loan procedures (Mangsiri, 2025). Comparable findings from Awotide et al. (2015) and Ledgerwood et al. (2013) indicate that financial institutions often fail to address farmers' needs due to poorly structured loans and high interest rates. In India, Menon et al. (2020) reported that only 29% of farmers access formal credit, attributed to bureaucratic complexities and institutional distrust. Collectively, these studies underscore the need to strengthen formal mechanisms, tailor services to farmers' economic and social contexts, and reach consensus on strategies that incorporate digital tools, simplified documentation, group lending, and community education.

Summary of the main points from the review of relevant literature and research to provide an overview of the factors affecting access to funding sources and the importance of SWOT and TOWS matrix analysis to translate into an action plan, as shown in Table 1.

Table 1 Summarizes the main points from the literature review and related research

Section	Key Points	Citations
Access to Funding Sources	- Critical for investing in technology, seeds, and infrastructure, reducing rural disparities. - Formal sources face barriers like a lack of collateral and complex processes. - Informal sources carry high interest rates and risks. - Education, financial knowledge, and cooperative membership enhance access.	Ololade & Olagunju (2013); Demirgüç-Kunt et al. (2018); Linh et al. (2020); World Bank Group (2020); Ahmad & Manh (2022); Balana & Oyeyemi (2022); Food and Agriculture Organization of the United Nations (2022); Maiga (2024); Masuka et al. (2025)
SWOT Analysis	- Identifies internal (strengths, weaknesses) and external (opportunities, threats) factors. - Internal resources (e.g., skills) provide competitive advantages. - Stakeholders (e.g., BAAC, government)	DiMaggio & Powell (1983); Freeman (1984); Barney (1991); Hill & Westbrook (1997)

Section	Key Points	Citations
	influence access. - Limitations include a lack of prioritization, which the TOWS Matrix mitigates.	
TOWS Matrix	- Matches factors to form strategies (SO, WO, ST, WT). - Aligns strengths (e.g., community networks) with opportunities (e.g., policies). - Example: Digital platforms to improve financial literacy.	Weihrich (1982); Barney (1991); Porter (1996); Jumanne (2024)
Mobile-Based Lending and Digital Financial Innovations	- Mobile Lending and Digital Innovations Recent research (2023-2025) highlights that mobile lending and digital financial tools significantly enhance financial access for smallholder farmers in Southeast Asia. (Philippines, Indonesia, Vietnam Regional Trends)	World Bank Group (2023b; 2024); Asian Development Bank (2025)
Related Research	- Structural barriers (e.g., lack of collateral) limit Thai farmers' access. - Highlighting unmet farmer needs caused by poor loan structures and high rates - 29% of Indian farmers rely on informal loans due to complex procedures.	Ledgerwood et al. (2013); Awotide et al. (2015); Menon et al. (2020); Mangsiri (2025)

The literature review reveals gaps in research in Thailand. Although studies have examined Thai farmers' access to credit, there remains a lack of integration of spatial data with systematic strategy analysis to develop truly actionable strategies at the community level. Additionally, there is a lack of in-depth studies on strategies that leverage community strengths and modern technology to overcome financial obstacles. This research aims to analyze internal and external factors affecting access to funding sources for smallholder farmers in Thailand, using SWOT and TOWS matrices to develop appropriate strategies. The research findings will help fill the identified gaps and support sustainable agricultural development.

Strategic Framework

The "Strategic Pathways to Financial Access" conceptual framework was developed to address structural, institutional, and personal factors that affect smallholder farmers' access to financial resources. This systematic strategic planning process comprises three key steps:

1) SWOT Analysis: Utilizes qualitative data from in-depth interviews and focus groups to evaluate internal strengths and weaknesses, alongside external opportunities and threats, forming a comprehensive analytical framework.

2) TOWS Matrix: Applies SWOT outcomes to formulate four strategy types (SO, ST, WO, WT), generating proactive, reactive, and recovery approaches tailored to the context.

3) Action Plan: Designs operational plans across short-term, medium-term, and long-term horizons, incorporating Key Performance Indicators (KPIs) for progress tracking and concrete evaluation.

This framework integrates empirical SEM data from prior research with strategic analysis to establish best practices for Thai smallholder farmers, as depicted in the accompanying diagram.

Figure 1 Conceptual Framework

Research Methodology

This study adopts a qualitative strategic approach, integrating SWOT analysis, TOWS matrix, and action plan development with findings from a prior Structural Equation Modeling (SEM) analysis, which explained 80.24% of the variance in credit access among smallholder farmers in Thailand. The SEM results highlighted credit approval criteria (CAC), credit literacy (CL), and constraints in accessing funds (CAF) as key determinants, with CAC exerting the most substantial positive influence on CL ($\beta = 0.674$) and loan access (LA) ($\beta = 0.822$), while collateral and income documentation limitations negatively affected CL ($\beta = -0.251$). Credit literacy—particularly in financial planning and debt management (factor loading = 0.970)—was found to enhance credit access ($\beta = 0.376$) significantly. These empirical insights were mapped onto the SWOT framework to identify systemic strengths, weaknesses, opportunities, and threats, and subsequently applied in a TOWS analysis to formulate proactive and defensive strategies that address the structural and institutional barriers identified in the SEM model. (Mangsiri, 2025)

Participants and Sampling

Participants were chosen for their direct involvement in financial access issues, with selection criteria emphasizing expertise, experience, and stakeholder representation to ensure comprehensive and diverse data collection. The sample's diversity, spanning geographical regions, demographic profiles, and experiential backgrounds, is deemed adequate to capture varied perspectives, thereby reducing bias and bolstering credibility in line with qualitative research standards (Creswell & Poth, 2018). Through purposive sampling, the 35 key informants from 18 provinces were categorized into four groups, as follows:

Table 2 Number and Characteristics of the Sample

No	Participant Group	Number	Characteristics
1	Smallholder farmers	10	Have diverse agricultural experience of no less than 15 years, direct experience in agricultural operation loans, and serve as representatives in each region.

No	Participant Group	Number	Characteristics
2	Financial institution officers	5	Possess over 10 years of experience in providing in-depth information on lending criteria or serving as credit assessors; come from agencies such as the Bank for Agriculture and Agricultural Cooperatives (BAAC) and commercial banks, with postings in provinces such as Lampang and Kanchanaburi.
3	Community leaders	10	Able to explain the mechanism of joint lending and represent diverse group sizes and locations, including farmer market networks, heads of farmer markets, village heads, heads of farmer councils, heads of community enterprises, heads of new-generation farmers, and heads of natural farming networks, with leadership experience of 5-15 years.
4	Policy experts and academics	110	Possess expertise at the policy level, with diverse backgrounds enabling them to recommend strategies aligned with national objectives; include representatives from the Provincial Agricultural and Cooperative Office, Provincial Livestock Office, Provincial Agricultural Office, Provincial Land Reform Office, Provincial Agricultural Research and Development Center, and university professors.

Data Collection

Two qualitative methods were employed:

1) Semi-structured in-depth interviews (45-60 minutes each) explored personal experiences, challenges, and strategies regarding financial access.

2) Focus group discussions (90-120 minutes, five groups) examined collective perceptions on access to finance, SWOT factors, and potential strategies. Audio/video recordings and field notes were used with participant consent.

Data Analysis

The study employed both Thematic Analysis and Content Analysis to interpret qualitative data.

1) Thematic Analysis (King et al., 2019) included descriptive coding, interpretative coding, theme development, and theme refinement. Separate analyses were conducted for interviews and focus groups.

2) Content Analysis (Schreier, 2012; Mayring, 2000) supplemented thematic findings by clarifying ambiguous expressions.

This process generated five key themes: 1) Structural constraints and lending conditions. 2) Financial literacy and business capabilities 3) Group mechanisms and community network 4) Policy and financial service development 5) Market and product development opportunities

Strategic Framework Development

Findings were organized using:

1) SWOT Analysis: Categorized internal and external factors affecting access to finance.

2) TOWS Matrix: Cross-matched SWOT factors to generate SO, WO, ST, and WT strategies.

3) Action Plan: Proposed short-, medium-, and long-term strategies, with assigned responsible agencies and KPIs.

Trustworthiness

Credibility was enhanced through triangulation across data sources and stakeholder groups. Member checking was conducted with selected informants to validate interpretations. A limitation was the geographically limited scope, which may not generalize to all regions.

Research Ethics

This study received ethics exemption from Suan Dusit University Research and Development Institute (Approval No. SDU-RDI-SHS 2024-046; Project Code SHS059/2567). Informed consent was obtained from all participants, and confidentiality was strictly maintained.

Research Results

Internal and External Factors Affecting Financial Access for Smallholder Farmers in Thailand Using SWOT Analysis

The SWOT analysis in this study employed qualitative data gathered through semi-structured interviews and focus group discussions with 35 key stakeholders, comprising smallholder farmers, community leaders, government personnel, and financial institution staff. This data facilitates a comprehensive identification of internal factors (strengths and weaknesses) and external factors (opportunities and threats) influencing smallholder farmers' access to funding sources in Thailand.

Table 3 Summary of Key Themes from Individual Interviews and Focus Group Discussions

Main Themes	Findings from Individual Interviews	Findings from Focus Group Discussions	Comparative Insights
1) Structural and Credit Conditions Constraints	Limited access due to a lack of collateral (no land title deed) and required financial documents.	In-depth details on group loan requirements, including minimum group members, necessary documents (e.g., ID, house registration, tax records), and borrower qualifications.	Focus group emphasizes the complexity and inflexibility of government lending regulations.
2) Financial Literacy and Business Skills	Lack of financial discipline and basic credit knowledge.	Lack of skills in writing business plans, project proposals, and understanding financial and production management.	Consistent findings, with the focus group offering more systemic and detailed perspectives.
3) Grouping Mechanisms and Community Networks	Collective groups improve bargaining power and increase financial access.	Suggested establishment of flexible and sustainable community funds.	Focus group provides tangible examples, such as fertilizer funds, that help reduce non-performing loans.
4) Policy and Financial Service Development	Recommendation for the government to ease credit conditions and provide financial literacy training.	Proposed One Stop Service, project proposal support systems, and comprehensive advisory services.	Focus groups yield clearer, more actionable policy-level practices.
5) Market and Product Development Opportunities	Farmers show interest in organic markets but face limited access to them.	Suggestions include market facilitation, price insurance, and direct market linkages with farmers.	Focus group extends the discussion to supply chain integration and strategic market planning.

Table 4 SWOT Analysis for Financial Access of Small-Scale Farmers in Thailand

Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
S1. Improved Education Among Younger Farmers: The share of agricultural workers with at least upper **secondary** education has increased from 12.1% in 2003 to 21.5% in 2013, providing a foundation for adopting modern financial tools and practices.	**W1. Limited Financial Literacy:** Many farmers lack skills in financial management, business planning, and understanding loan terms, which hinders their ability to access and manage formal credit effectively.	**O1. Government Support and Policies:** Initiatives such as subsidies, low-interest loans, and credit guarantee schemes from the Thai government, including programs by the Bank for Agriculture and Agricultural Cooperatives (BAAC), provide opportunities to improve financial access.	**T1. Perceived High Risk in Agricultural Lending**: Financial institutions often view agriculture as risky due to weather dependency, volatile commodity prices, and pest/disease vulnerabilities, reducing their willingness to lend to small-scale farmers.
S2. Indigenous Knowledge and Experience: Small-scale farmers in Thailand possess deep traditional knowledge of local farming practices, honed over generations, which allows them to adapt to local conditions and manage resources efficiently with minimal external financial input.	**W2. Lack of Collateral:** The absence of land titles or tangible assets prevents farmers from meeting the collateral requirements of formal financial institutions, limiting their access to loans.	**O2. Digital Financial Technologies:** The rise of mobile banking, digital payment systems, and online platforms (e.g., a potential "Farmer Finance Hub") can streamline loan applications, financial management, and access to market information.	**T2. Climate Change Impacts**: Increasing frequency of droughts, floods, and extreme weather events threatens agricultural productivity, raising repayment risks and deterring lenders.
S3. Strong Community Networks: Close-knit community structures enable resource sharing, collective bargaining, and informal credit systems, facilitating group-based loan applications and risk-sharing mechanisms.	**W3. Low Access to Formal Credit:** High interest rates, bureaucratic procedures, and geographical barriers discourage farmers from seeking formal loans, often forcing them to rely on expensive informal lenders.	**O3. Farmer Cooperatives:** Forming cooperatives or producer organizations can enhance collective bargaining power, enabling farmers to access larger loans, better loan terms, and shared resources like storage facilities.	**T3. Market Competition and Price Volatility**: Competition from large-scale farms and fluctuating global prices can destabilize farmers' incomes, making loan repayment challenging.
S4. Motivation and Resilience: Many farmers are highly motivated and experienced, enabling them to utilize financial resources	**W4. Small Farm Sizes and Low Productivity:** With farm holdings averaging less than 3.2 rai per **household**, and only 42% having	**O4. Growing Demand for Sustainable Products:** Increasing global demand for organic and **sustainably** produced goods offers	**T4. Aging Farmer Population**: The proportion of farmers aged 40-60 increased from 39% in 2003 to 49% in 2013, while younger

Strengths (S)	Weaknesses (W)	Opportunities (O)	Threats (T)
effectively when accessible and to persist despite challenging conditions.	access to water resources, productivity is often low, making it harder to generate sufficient income to qualify for loans.	opportunities for small-scale farmers to attract investment from financial institutions by tapping into premium markets	farmers (15-40) decreased from 48% to 32%, potentially reducing the labor force and innovation in farming, which may impact financial stability.
S5. Contribution to Food Supply: Small-scale farmers contribute significantly to Thailand's food supply, accounting for 50-70% of global output, underscoring their importance to the national economy and food security.	**W5. Information Asymmetry:** Inadequate access to information about financial products, market opportunities, and modern **farming** techniques limits their decision-making capacity and ability to secure funding.	**O5. Several government agencies provide support,** such as the Bank for Agriculture and Agricultural Cooperatives (BAAC) and the Department of Agricultural Extension	**T5. Economic Inequality and Poverty**: With 40% of farming households earning below Thailand's poverty line (32,000 baht annually) and rural incomes 68% of urban incomes in 2019, financial vulnerability limits their ability to invest in productivity or secure loans.

Strategic Directions for Improving Financial Access by Applying the TOWS Matrix

Based on the aforementioned SWOT Analysis, strategies or approaches to access funding sources for small-scale farmers in Thailand can be developed using the TOWS Matrix, aligning with future changes as follows. Details are shown in Table 5.

Table 5 TOW Matrix: Strategic Guidelines for Financial Access of Small-Scale Farmers

TOWS	**Internal/External Factors**	**Strategic Options**
SO (Strengths-Opportunities)	S1, S3, S4, S5 + O1, O2, O3, O4, O5	1) Expand financial literacy training programs using community networks (S3, S4) in conjunction with government policies (O1, O5). 2) Develop a digital lending platform in collaboration with fintech companies and banks (S1, S4 + O2). 3) Promote unsecured loan products alongside smart farming (S1, S5 + O3, O4). 4) Strengthening the sub-district cooperative network in line with regional agricultural trade policies (S3, S5 + O3, O5)
ST (Strengths-Threats)	S1, S2, S3, S4, S5 + T1, T2, T3, T4, T5	1) Apply digital technology to reduce climate and natural disaster risks (S1, S2 + T2, T3). 2) Utilize community networks and financial training to reduce reliance on informal loans (S3, S4 + T1, T5). 3) Establish a community revolving fund to cope with market fluctuations (S3, S5 + T3).
WO (Weaknesses-Opportunities)	W1, W2, W3, W4, W5 + O1, O2, O3, O4, O5	1) Organize financial literacy campaigns via mobile (W1 + O2, O4). 2) Promote alternative credit scoring systems to reduce the need for collateral (W2 + O2). 3) Upgrade local cooperatives and connect them to the provincial network (W3 + O3, O5). 4) Pilot e-KYC and digital wallets in rural areas (W4, W5, + O2, O4).
WT (Weaknesses-Threats)	W1, W2, W3, W4, W5 + T1, T2, T3, T4, T5	1) Establish a financial advisory unit in the Tambon Administrative Organization (TAO)/Cooperative (W1, W5 + T1, T5). 2) Collaborate with state-owned banks to develop a database of agricultural credit (W2, W3 + T1, T5). 3) Provide crop insurance and emergency loans to mitigate the impact of natural disasters (W4 + T2, T3). 4) Subsidize interest or suspend debt payments for vulnerable groups (W1, W2 + T5).

Each strategic option from the TOWS matrix is directly linked to specific activities in the Action Plan to ensure practical implementation. For example, the SO strategy of expanding group-based loans (S2+S5/O2) is operationalized through cooperative formation workshops, loan coordination, and national community enterprise networks. The WO strategy to promote alternative credit scoring (W2/O2) is implemented through flexible collateral pilots and the development of a credit database. The ST strategy on climate risk management (S4/T2) is actioned through drought-resistant crop training and precision agriculture pilots. In contrast, the WT strategy of providing disaster insurance (W4/T3) is realized through partnerships with insurance firms and emergency loan schemes. This alignment ensures that each strategy translates into measurable actions with defined timelines, responsible agencies, and KPIs.

Actionable Plan That Supports Inclusive Financial Services for Smallholder Farmers Based on Strategic Analysis

This study developed a strategic model to address persistent challenges in smallholder financial access, including a lack of collateral, limited financial literacy, and climate risk, by integrating SWOT analysis, the TOWS matrix, and prior SEM analyses. The model shown in Figure 2 aims to translate structural constraints into practical actions by aligning internal strengths with external opportunities while mitigating threats and weaknesses.

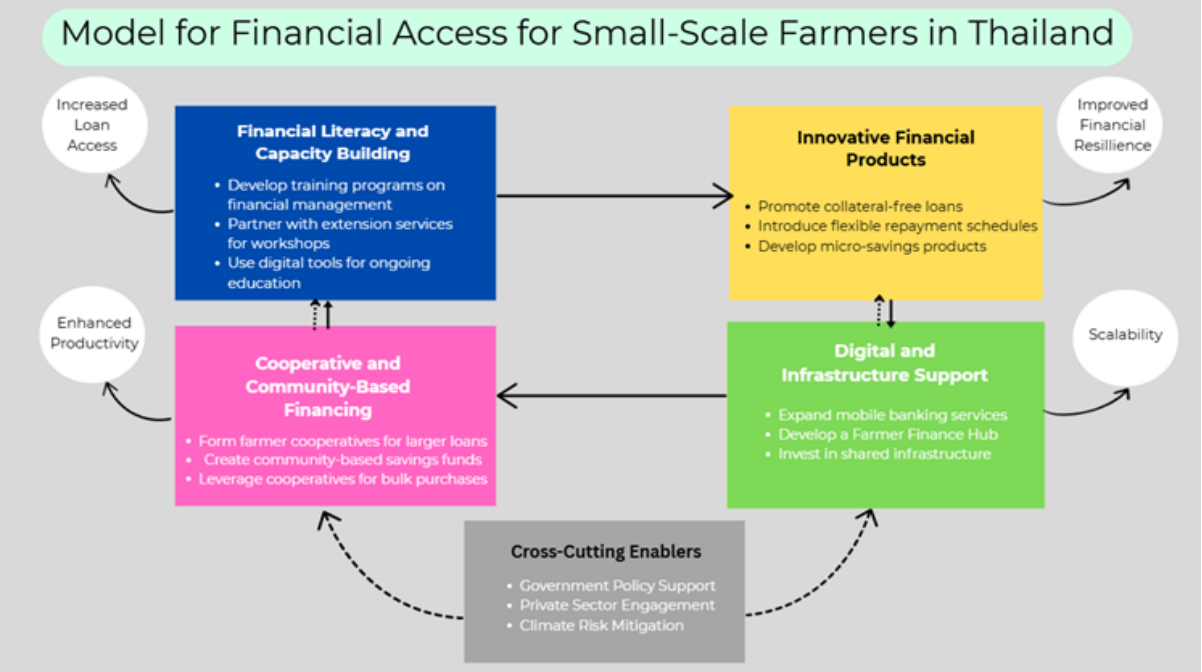

Figure 2 The strategic model for improving financial access among smallholder farmers in Thailand

The Strategic Model Comprises Four Interlinked Components

1) Promoting Financial Literacy and Farmer Capacity: This involves training programs on financial planning, credit literacy, and loan applications, delivered in partnership with government agencies, commercial banks, and private-sector technology providers. Beyond general training, targeted workshops will address the specific gap in preparing formal business plans for loan applications, a key barrier identified in the qualitative findings. Farmers will receive hands-on guidance in drafting loan proposals, conducting basic cash flow projections, and aligning business plans with lender requirements. Mentorship programs will be established to pair experienced cooperative leaders and financial advisors with farmer groups, providing continuous support beyond initial training.

2) Developing Flexible Financial Innovations: Financial products are tailored to farmers' needs, using alternative credit assessments (e.g., cash flow, production history) and repayment schedules that align with harvest cycles to reduce loan default risk.

3) Supporting Cooperative Group Formation for Collective Borrowing: This promotes the creation or expansion of farmer cooperatives, enabling joint borrowing, establishing internal community funds, and enhancing market negotiation power.

4) Expanding Digital Financial Services: Initiatives encompass mobile platforms like the "Farmer Finance Hub" and investments in digital infrastructure, enabling remote and underserved farmers to access formal financial services. Three enabling factors support these efforts: 1) government policy support, 2) private sector collaboration (e.g., fintech firms, e-commerce platforms), and 3) climate risk management (e.g., insurance, irrigation systems).

The model targets four key outcomes: increased loan access, particularly for collateral-less farmers; enhanced financial flexibility; reduced vulnerability to climate and economic risks; and scalable, sustainable financial inclusion.
To operationalize the model, the following table links each research objective to relevant model components, supporting factors, and intended outcomes:

Table 6 The connection between the model and the action plan

Objective	Model Component(s)	Supporting Factor(s)	Expected Outcome(s)
1) Improve credit access through cooperatives	Component 3	-	Increased Loan Access:
2) Enhance financial skills	Component 1 & 4	Private Sector (fintech apps)	Increased Loan Access: Improved Financial Resilience Scalability
3) Increase product value for income	Component 3	Private Sector (e-commerce)	Enhanced Productivity: Improved Financial Resilience Scalability
4) Reduce climate vulnerability	-	Climate Risk Management (insurance drought-resistant crops)	Improved Financial Resilience Scalability
5) Build community-based funding mechanisms	Component 3	-	Increased Loan Access: Improved Financial Resilience Scalability
6) Reform loan policies	Component 2	Government Policy, Private Sector	Increased Loan Access: Improved Financial Resilience Scalability
7) Expand digital finance for rural areas	Component 4	Government & Private sector	Increased Loan Access: Improved Financial Resilience Scalability

The action plan is designed to make the strategic model actionable, ensuring each objective is linked to its components. The strategy formulation is based on the TOWS matrix, with activities, timelines, responsible agencies, and budgets derived from real data from reports and similar projects in Thailand/SE Asia (from World Bank, ADB, and BAAC initiatives 2023-2025). Success metrics (KPIs) are defined based on measurable outcomes from agri-finance programs, with consideration of feasibility, scalability, and empirical evidence. Details are provided in Table 7.

Table 7 Action Plan for Access to Financial Resources for Small-Scale Farmers

Objective	Strategy (from TOWS)	Target Group	Activities	Timeline	Responsible Entities	Budget (Million THB)	Success Metrics
Increase Access to Credit for Small-Scale Farmers through Cooperative Groups	SO: Expand Group-Based Loans; Leverage community networks (S2) and institutional support (S5) for cooperative loan access (O2).	Small-scale farmers nationwide, especially those without land titles	- Conduct regional workshops for cooperative formation - Develop a national guideline for loan documents - Coordinate loan approval with financial cooperatives - Create a national network of community enterprises	1 Year (Oct 2025 - Sep 2026)	BAAC, DOA, DCD, National Cooperative Federation	50	- 500 cooperatives registered - 5,000 farmers access loans - 20% increase in group loans
Enhance Financial and Business Skills of Small-Scale Farmers	WO: Address knowledge gaps (W1) with training on planning/accounting via digital platforms (O4, O3).	Small-scale farmers lack financial management skills nationwide	- Organize provincial financial literacy trainings - Develop a mobile app for budgeting and learning - Establish advisory centers - Launch online courses - Collaborate with fintech firms for loan tracking tools	3 Years (Oct 2025 - Sep 2028)	MoAC, DSD, Education Institutions, Tech Companies	150	- 20,000 trained farmers - 30% increase in business plan submission - 25% higher loan approvals - 10,000 app users
Increase Value of Agricultural Products for Sustainable Income	WO: Develop Value-Added Products by improving quality (W5) with training and platforms (O1, O3).	Small-scale farmers producing generic products nationwide	- Training on processing (e.g., organic goods) - Host agricultural expos (Shark Tank style) - Develop a national e-commerce platform - Create brands and seek certifications	3 Years (Oct 2025 - Sep 2028)	DOA, ACFS, MoC, Private Sector (e.g., Lazada, Shopee)	150	- 300 new products - 20% income increase - 5,000 e-commerce users - 200 organic certifications
Reduce Vulnerability	ST: Adopt Climate-Resilient	Small-scale farmers in	- Fund irrigation systems - Train on drought-tolerant	5 Years (Oct 2025	RID, Land Dept, TMD,	550	- 50,000 rai irrigated

Objective	Strategy (from TOWS)	Target Group	Activities	Timeline	Responsible Entities	Budget (Million THB)	Success Metrics
to Drought and Environmental Risks	Technologies using expertise (S1) and tech (S4) for drought-resistance (T3).	drought-prone areas nationwide	crops - Pilot precision agriculture - Build a line-based weather alert system - Partner for crop insurance integration	- Sep 2030)	Science Ministry, Insurance Firms		- 30% crop loss reduction
Build Sustainable Community-Based Funding Mechanisms	ST: Strengthen Internal Funding via village funds (S2) to bypass complex regulations (T2).	Small-scale farmers in communities with village funds	- Establish or expand 1,000 community funds - Train in fund management - Link to local banks - Digitize fund monitoring	3 Years (Oct 2025 - Sep 2028)	DCD, Village Fund Office, Community Banks	100	- 1,000 funds - 20,000 farmers funded - Bad debt < 5% - 500 linked funds
Reform Credit Policies for Greater Flexibility	WT: Promote income-based collateral to reduce regulatory barriers (W2, T2).	Small-scale farmers without land titles	- Pilot flexible collateral schemes - Hold national credit reform forums - Launch microcredit programs - Build farmer credit database - Design bundled financial products	5 Years (Oct 2025 - Sep 2030)	BOT, Ministry of Finance, Bankers' Association, Credit Bureau	300	- 20 provinces piloted - 25% increase in microcredit - 50,000 farmers in the database
Expand Digital Financial Services for Remote Farmers	SO, WO, WT: Leverage tech (S4), training (O4), and digital platforms (O3) to address W1, W4, and T4 barriers.	Small-scale farmers in remote areas nationwide	- Develop Farmer Finance Hub platform - Integrate with mobile banking - Invest in rural digital infrastructure - Promote via Line and leaders	3 Years (Oct 2025 - Sep 2028)	Ministry of Digital Economy, BOT, Fintech Firms, Tech Companies	150	- Platform launched - Integrated with 5 banks - Internet access in 500 villages - 15,000 users

Conclusion and Discussion

The results of this study provide a comprehensive understanding of the internal and external factors influencing access to financing for smallholder farmers in Thailand, aligning with the research objectives. The analysis of these factors using SWOT analysis, the development of strategic directions through the TOWS Matrix, and the proposal of actionable plans were conducted. The SWOT analysis revealed key strengths, including strong community networks, local wisdom, and government support through institutions such as the Bank for Agriculture and Agricultural Cooperatives (BAAC), which aligns with Barney's (1991) resource-based view, which emphasizes the role of internal resources in creating competitive advantage. However, weaknesses such as limited financial knowledge, lack of collateral, and small farm size confirm previous studies (Ahmad & Manh, 2022; Mangsiri, 2025) that highlight structural barriers hindering access to formal credit. These research findings are consistent with the global study by Menon et al. (2020), which stated that only about 29% of farmers have access to credit from formal sources.

The external environment presents opportunities, such as government policies and digital financial technology, which offer solutions to overcome these obstacles. The Food and Agriculture Organization of the United Nations (2022) report supports the potential of digital platforms in promoting financial access. Conversely, significant barriers include threats such as climate change, market volatility, and an aging farmer population; these align with the World Bank Group's (2022b) research, which highlights that the high risk in agricultural loans poses a barrier for financial institutions. The TOWS matrix translates these factors into actionable strategies. TOWS translates these factors into practical strategies, such as using community networks (S3) along with government support (O1) to expand cooperative lending (SO strategy) and using digital platforms (O2) to address financial knowledge gaps (W1) through digital financial platforms (WO strategy). These strategies align with Porter's (1996) strategy adjustment theory, emphasizing the need to align internal capabilities with external opportunities.

The proposed action plan, which focuses on financial literacy, flexible financial products, cooperative lending, and digital banking services, will systematically address the identified barriers. For example, the development of the "Farmer Finance Hub" platform addresses information asymmetry (W5) and the geographical barriers identified in the SWOT analysis, supporting the findings of Jumanne's study (2024). Regarding the role of digital tools in improving access to credit, the emphasis on collaborative group lending (Component 3) leverages Thailand's strong community structures, a strength observed in qualitative insights from community leaders in Lampang province, which highlighted the role of local funds and cooperatives in mitigating financial constraints. However, the plan's reliance on digital infrastructure raises concerns about accessibility in remote areas where internet connectivity remains limited. Unstable connectivity and a lack of affordable data services pose barriers to the use of digital financial tools (Food and Agriculture Organization of the United Nations, 2022). This illustrates the importance of additional investment in rural digital infrastructure, as stated in Objective 7 of the action plan.

The integration of Structural Equation Modeling (SEM) results from Mangsiri (2025) with qualitative SWOT and TOWS analyses represents a methodological strength, bridging quantitative causal relationships with practical strategic planning. This approach addresses the research gap identified in the literature review, namely the lack of studies that combine quantitative and qualitative methods to develop actionable financial access strategies for Thai smallholder farmers (Suwanmaneepong et al., 2018). Nevertheless, the study’s limitation lies in its focus on 18 provinces, which may not fully capture the diverse contexts of Thailand’s agricultural sector. Future research could expand the geographical scope and incorporate longitudinal data to assess the long-term impact of the proposed strategies.

Aligning the action plan with the Sustainable Development Goals (SDGs), particularly Goals 1 (No Poverty), 8 (Decent Work and Economic Growth), and 10 (Reduced Inequalities), enhances its policy relevance. By addressing structural constraints and promoting inclusive financial systems, the proposed model contributes to sustainable agricultural development, echoing the World Bank Group's (2022) emphasis on financial inclusion as a driver of rural economic stability. The involvement of multiple stakeholders—government agencies, private sector partners, and community leaders—ensures a collaborative approach, as advocated by Freeman's (1984) Stakeholder Theory, but requires careful coordination to avoid implementation challenges.

Furthermore, improving financial access for smallholder farmers requires not only programmatic interventions but also regulatory reforms. Public-private partnerships (PPPs) play a pivotal role in facilitating such changes. Collaboration among the Ministry of Agriculture and Cooperatives, the Ministry of Finance, the Bank of Thailand, commercial banks, and fintech companies can help streamline lending regulations, develop alternative credit-scoring systems, and pilot flexible collateral schemes. This coordinated approach ensures that policy changes are informed by both grassroots realities and the financial sector's capabilities, thereby increasing the feasibility and scalability of implementation.

In conclusion, this study developed a robust model to improve financial access for smallholder farmers in Thailand by identifying key internal and external factors through SWOT analysis, developing strategic directions using the TOWS Matrix, and proposing concrete action plans. The study results indicate the potential of utilizing community networks, government support, and digital technology to overcome various obstacles, such as Limited financial knowledge, lack of collateral, and climate risk. The proposed model consists of four parts: promoting financial literacy and developing flexible financial products. Supporting cooperative lending and expanding digital banking services offer a comprehensive approach to increasing financial accessibility, aligning with global sustainable development goals.

The action plan focuses on short-, medium-, and long-term strategies, with clear timelines, responsible agencies, and key performance indicators to ensure practical implementation. This goal is achieved by integrating insights from qualitative interviews with community leaders, farmers, and financial stakeholders, along with SEM results. Therefore, this research fills a significant gap in the agricultural finance literature of Thailand. However, its success depends on effective coordination among stakeholders and investment in rural digital infrastructure. Future research should evaluate the outcomes of implementing the proposed strategies and explore scalability across diverse agricultural contexts in Thailand and abroad, thereby supporting sustainable rural development and economic equity.

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