The *Rice* Paper

Adaptation Finance Acceleration for the Agriculture Sector: Improving Vietnam Resilience

The **Sustainable Finance Sector Committee (SFSC)**, the newest sector committee under EuroCham Vietnam, is dedicated to advocating for the growth of the Sustainable Finance sector in Vietnam.

We bring together financial institutions, specialised service providers, industrial parks and corporations to exchange and promote market practices and regulations, moving towards a sustainable future for all.

Executive Summary

Food insecurity poses a significant risk to peace and stability, particularly as climate change exacerbates vulnerabilities in agriculture and food systems. This paper explores innovative financial mechanisms to strengthen Vietnam's food security and sovereignty, proposing a comprehensive adaptation finance framework that integrates:

- **Adaptation Finance** to enhance climate resilience.
- **Parametric Insurance** (Weather Index Insurance) to mitigate financial risks from extreme weather events.
- **Public-Private Partnerships (PPP)** to incentivise private sector investment.
- **Disaster Recovery Bonds** to ensure rapid recovery from climate-induced disruptions.
- **Investment in Climate-Resilient Agriculture** to support cutting-edge technologies and infrastructure development.

The framework focuses on mobilising sustainable finance to secure Vietnam's national food reserves, enhance climate resilience, and support technological advancements in agriculture. These initiatives aim to reduce dependency on external technologies, build local capacity, and improve satellite monitoring to better benchmark agricultural productivity and climate impacts.

Key components of the proposed strategy include:

1. **Leveraging Proceeds from Key Exports**: Establishing a dedicated fund to channel revenues from agricultural exports into climate adaptation projects.
2. **Promoting Resilience-Building Technologies**: Investments in technologies such as drought-resistant seeds, IoT monitoring, and early warning systems.
3. **Private Sector Engagement**: Utilising PPPs to attract investment and expertise for scaling sustainable practices.
4. **Carbon Emission Reductions**: Encouraging sustainable farming practices to reduce emissions, generate carbon credits, and finance green transitions.

This approach aligns with Vietnam's **Nationally Determined Contributions (NDCs)** under the Paris Agreement and supports global sustainability objectives:

- **SDG 2 (Zero Hunger)**: Ensure food security and reduce vulnerability.
- **SDG 13 (Climate Action)**: Build resilience to climate impacts.
- **SDG 17 (Partnerships for the Goals)**: Foster collaboration between public and private sectors.

By integrating financial strategies with adaptation measures, Vietnam can mitigate the economic impacts of climate change while contributing to global food security. This vision enables a sustainable, equitable, and resilient food system, ensuring accessibility and affordability for all, particularly vulnerable communities.

Context / Preface

Objective

To design an integrated adaptation finance mechanism that combines **Share of Proceeds from Food Commodity Trading**, **Adaptation Finance for Climate Resilience**, **Parametric Insurance (Weather Index Insurance)**, **Public-Private Partnerships (PPP)**, and **Disaster Recovery Bonds** to strengthen food security and food sovereignty in Vietnam and its trading partners. We also present a stimulation for the projected gains from the mechanisms above to establish a **baseline fund value** that can be readapted and readjusted over time. The proposed mechanism aims to enhance **national food reserves** while building **resilience to climate-related disruptions**, ensuring **sustainable** and **equitable solutions** to address the growing risks posed by climate change. This approach will enable countries to meet their own food security needs while supporting others in times of crisis, contributing to **global resilience** with **food affordability** and **accessibility for all**. The ultimate goal is to reduce carbon emissions through encouraging sustainable agricultural practices and leveraging carbon credit generation to further incentivise environmentally friendly initiatives, paving the way towards a lower carbon footprint across the agricultural sector.

Definitions

Concept	Defining Body	Definition
Natural disaster - Thiên tai	UNSD, 2008	• a situation or event, which overwhelms local capacity, necessitating a request to the national or international level for external assistance. • an unforeseen and often sudden event that causes great damage, destruction and human suffering.
	Regulation on Natural Disaster Prevention and Control No. 33/2013/QH13	Natural disasters are **abnormal natural phenomena** that can cause damage to **people, property, the environment, living conditions, and socio-economic activities**, including: storms, tropical depressions, whirlwinds, lightning, heavy rain, floods, flash floods, inundation, landslides due to rain or runoff, land subsidence due to rain or runoff, storm surge, saltwater intrusion, heatwaves, droughts, severe cold, hail, frost, earthquakes, tsunamis, and other types of natural disasters.
Natural disaster risk - Rủi ro thiên tai		The potential damage that natural disasters can cause to people, property, the environment, living conditions, and socio-economic activities.
Natural disaster prevention and control - Phòng, chống thiên tai		Systematic process that includes activities for prevention, response, and recovery from the consequences of natural disasters.

Adaptation finance	World Resources Institute	Finance for actions that help communities reduce the risks they face and harm they might suffer from climate hazards like storms or droughts.
Adaptation - Thích ứng	UNFCCC	Adjustments in ecological, social or economic systems in response to actual or expected climatic stimuli and their effects.
	Article 90 of the Law on Environmental Protection 2020	Activities aimed at enhancing the resilience of natural and social systems, minimizing the negative impacts of climate change, and taking advantage of the opportunities that climate change presents.

International Regulatory Background:

Paris Agreement	Article 6 of the Paris Agreement Under Article 6.4 of the Paris Agreement, a share of proceeds is collected from carbon credit transactions to support adaptation efforts in vulnerable developing countries. For example: 1. **Funding for Adaptation**: A fixed percentage of the revenue from carbon credit sales is contributed to the Adaptation Fund, which finances adaptation projects and programs in developing countries that are particularly vulnerable to the adverse effects of climate change. 2. **Administrative Costs**: The share of proceeds may also cover administrative expenses to ensure the efficient operation of carbon markets and the implementation of related mechanisms.
SDGs	• SDG 2: Zero Hunger • SDG 12: Responsible Consumption and Production • SDG 13: Climate Action • SDG 17: Partnerships for the Goals
National NDC	**Emission Reduction Targets for the Agriculture Sector (p. 10, Table 3)**: • **Unconditional Contribution**: The agriculture sector aims to reduce **12.4 MtCO2eq** by 2030, which is equivalent to a **1.3% reduction** compared to the Business-As-Usual (BAU) scenario. This reduction is projected to require a financial investment of **USD 2,122.8 million**. • **Conditional Contribution**: With international support, the agriculture sector targets a reduction of **50.9 MtCO2eq**, equivalent to a **5.5% reduction** compared to BAU. This reduction would need an estimated investment of **USD 16,102.2 million**.

	BAU Scenario Emissions for Agriculture Sector: ● **2014**: Emissions were **89.8 MtCO2eq**. ● **2020**: Emissions were projected to increase to **104.5 MtCO2eq**. ● **2025**: Emissions were projected to reach **109.2 MtCO2eq**. ● **2030**: Emissions are expected to rise to **112.1 MtCO2eq** under the BAU scenario.

1. Food crises and national impact

Food security and political stability are deeply connected, with food insecurity often catalysing civil unrest and prolonged conflicts. As illustrated in the context of various countries, regions with high levels of food insecurity, particularly those experiencing protracted crises, are almost three times more likely to face instability and conflict compared to other developing nations. For example, countries with a significant proportion of undernourished people are **40% more likely** to relapse into conflict within a decade. The impact of food insecurity on political stability becomes even more pronounced during times of extreme price hikes, as seen during the Arab Spring. Consequently, ensuring food security is a matter of addressing hunger and a strategic investment in peace and stability.

Extreme weather events & food production decline	• Between 2010 and 2011, extreme weather events, such as **droughts in Russia and China**, drastically reduced global cereal production. • **Cereal production** in Egypt fell from **22.8 million tonnes** in 2009 to **19.5 million tonnes** in 2010, due to weather disruptions. Similarly, **Syria's cereal production** dropped from **4.7 million tonnes** in 2009 to **3.2 million tonnes** in 2010.
Effects of increased food prices:	• Global food prices soared by **40%** by late 2010, largely due to extreme weather affecting global supply. This spike in prices put immense pressure on countries like Egypt, where the government relied heavily on food imports. • Egypt, Syria, and Morocco had populations where **40-50%** of household incomes were spent on food, making these countries particularly vulnerable to food price increases.
Food Insecurity as a Catalyst for Unrest:	• In Egypt, food inflation reached **18.9%** between January 2010 and January 2011, significantly reducing the purchasing power of families, especially the poorest, who were already spending more than half of their income on food. • Rising bread prices in Egypt, where **45-55% of wheat** was imported, contributed to widespread protests that culminated in the deposition of President Mubarak.

Source: Soffiantini, 2020

Key Policy Recommendations

- **Prioritise Food Security as National Security**: Include food security considerations in national security and disaster-response plans, recognizing the link between food instability and social unrest.
- **Strengthen Early Warning Systems**: Improve meteorological and agricultural data collection to anticipate weather-driven disruptions, enabling faster, more

targeted responses.

- **Invest in Climate-Resilient Supply Chains**: Expand cold-chain logistics and improve storage infrastructure to stabilize supply and minimize price fluctuations during extreme weather events.
- **Promote Inclusive Social Safety Nets**: Implement targeted subsidies and social programs for vulnerable populations, ensuring consistent access to basic foods in times of crisis.

2. Quantifying the Threat to Food Security and Agricultural GDP, and Proposing Adaptation Financial Solutions

2.1 Overview

- Vietnam is the world's **third-largest rice exporter** and continues to increase its export amount. (Statista, 2024)
    - In the first seven months of 2024, Vietnam exported **5.18 million tons** of rice, **earning $3.27 billion**, marking a 5.8% increase in volume and a 25.1% increase in value compared to the same period in 2023. (Communist Party of Vietnam, 2024)
- Vietnam's **agricultural export turnover** in 2024 will likely reach $**54-55 billion.**
- There are 7 exports with respective revenues exceeding 1 billion USD which are coffee, rubber, rice, fruit and vegetables, cashew nuts, shrimp, and timber (Nhan Dan Online, 2024) but for this research paper, we focus on 6 exports that is **coffee, rubber, rice, cashew nuts, fisheries/seafood, and salt.**
- **The Mekong Delta** is critical to both domestic and global food security due to its role as the largest rice-producing region in Vietnam, contributing approximately **50% of Vietnam's rice production** and accounting for **90% of its rice exports**. (Tran Trong Phuong et al. 2024)
- The region is a global food hub, and disruptions—due to climate change, salinity intrusion, or flooding—pose a serious threat to global food markets, especially in countries reliant on Vietnam's rice exports like the Philippines and many African nations. (Tran Trong Phuong et al. 2024)

Quantitative Evidence of Threat:

1. **Impact of Typhoon Yagi**:
    a. Typhoon Yagi (2018) caused extensive flooding in the Mekong region, directly impacting 50,000 hectares of rice fields and resulting in estimated crop losses worth **$100 million** (Vietnam Ministry of Agriculture).
    b. Post-disaster recovery costs for agriculture in affected areas exceeded **$50 million**, with minimal insurance penetration exacerbating losses.
2. **Sea Level Rise**:
    a. The Mekong Delta is sinking by **2-3 cm annually** due to groundwater extraction and sediment loss, while sea levels rise by **0.3 cm annually** (World Bank, 2022).
    b. Projections show that by 2050, **2 million hectares of arable land** could be submerged, leading to an estimated annual agricultural GDP loss of **$1.7 billion**, or about **15%** of Vietnam's agricultural output.
    c. Saline intrusion has already reduced rice yields by **10-15%** in affected areas, equating to a loss of over **$300 million annually**.
3. **Food Insecurity**:

a. Over **18 million people** in the Mekong Delta depend on agriculture for their livelihoods. With rising sea levels and more frequent typhoons, approximately **10% of households** are at risk of falling below the poverty line due to reduced agricultural productivity (UNDP, 2021).

2.2 Financial risks in the negligence of adaptation initiatives in agriculture

- Vietnam has the **3rd largest adaptation finance needs** according to the nation's NDC and National Adaptation Plan (UNEP, 2023)
- Total financing needs are estimated at around **$254 billion** from 2022 to 2040 (World Bank, 2022)
    - **$219 billion: upgrading private assets and public infrastructure** such as the Vietnam Irrigated Agriculture Improvement Project (case study used below) or sustainable shrimp farming.
    - **$35 billion: social programs** (such as building local capacity in community-based disaster risk management.)
- 1,091 climate-related projects (2013-2017) summed to **6.13 billion USD** (CARE, 2020).
- Cost of climate change adaptation is estimated to reach **3-5% of national GDP / year** by 2030 (CARE, 2020)
- Without proper adaptation and mitigation measures, it is estimated climate change will cost Vietnam about **12% to 14.5% of GDP** by 2050 (World Bank, 2022)
- Actual significant financial loss has been observed from the recent Yagi typhoon:
    - Damages are estimated at **VND81.5 trillion (US$3.31 billion)** across northern Vietnam, or **twice as much** as previous estimates (VNExpress, 2024) with negative effects on economic growth.

Proposed Adaptation Financial Products

*1. **Parametric Insurance (Weather Index Insurance)**:*

- **Mechanism**: Provides payouts based on pre-defined triggers like rainfall, wind speed, or flood levels rather than on actual losses.
- **Relevance**: Ensures rapid financial relief to farmers after events like Typhoon Yagi, reducing post-disaster recovery times.
- **Impact**: Could cover up to **70% of crop losses**, potentially saving **$200 million annually** in agricultural GDP.

*2. **Sustainability-Linked Loans (SLLs) for Climate-Resilient Infrastructure**:*

- **Mechanism**: Loans with reduced interest rates tied to achieving climate adaptation goals, such as building dikes or adopting saltwater-resistant crops.

- **Relevance**: Encourages investment in infrastructure to protect farmland from sea level rise and saline intrusion.
- **Impact**: Projects funded through SLLs could protect **1 million hectares** of farmland by 2030, preserving up to **$1.5 billion** in annual agricultural output.

*3. **Adaptation Bonds**:*

- **Mechanism**: Government or private bonds issued to finance large-scale climate adaptation projects, such as mangrove restoration or resilient irrigation systems.
- **Relevance**: Provides upfront capital for long-term resilience-building in the Mekong Delta.
- **Impact**: A $1 billion adaptation bond program could reduce disaster-induced GDP losses by **20-30%** over 10 years, safeguarding the livelihoods of over **5 million farmers**.

Key Policy Recommendations

- **Scale Up Adaptation Investments**: Direct significant capital (private and public) towards climate-resilient infrastructure and technologies (e.g., saltwater intrusion barriers, drought-resistant seeds).
- **Develop Financial Risk-Sharing Instruments**: Encourage both private-sector innovation and government-backed guarantees for parametric insurance, sustainability-linked loans (SLLs), and adaptation bonds.
- **Leverage Carbon Credits**: Integrate carbon credit revenue streams (e.g., from methane reduction in rice farming) into adaptation finance, reinvesting funds into local resilience-building measures.
- **Strengthen Data and Monitoring**: Enhance data collection on agriculture losses and climate impacts to refine risk models and create more effective insurance triggers.

3. Mechanisms to strengthen Agriculture sector resilience: Insurance

Acknowledging Vietnam's indispensable role in national and global food security yet is also one of the top five nations most susceptible to climate change, insurance schemes such as the Weather Index Insurance can be introduced and promoted to decrease the climate risk involved post-natural disasters for all stakeholders.

4.1 Relevant national insurance regulations

4.1.1 Decision No. 13/2022/QĐ-TTg - IMPLEMENTATION OF AGRICULTURAL INSURANCE ASSISTANCE POLICIES

- Regulates the implementation of agricultural insurance support policies in accordance with **Decree No. 58/2018/NĐ-CP.**
- **Scope**: Applies to individuals and organisations involved in planting rice, rubber, pepper, cashew, and coffee; breeding buffalo, cows, and pigs; and aquaculture of black tiger shrimp, white-leg shrimp, and tra fish.
- **Beneficiaries**:
    - Poor and near-poor households receive maximum insurance support levels.
    - Non-poor households and agricultural organisations receive maximum support when meeting specific criteria.
- **Location covered**: specific provinces.
- **Risks Covered**:
    - **Natural disasters** for all agricultural products, including storms, floods, drought, landslides, and tsunamis.
    - **Epidemic risks** for rice and livestock; however, no epidemic coverage is provided for rubber, pepper, cashew, coffee, or aquaculture.
- **Implementation Period**: Effective from June 24, 2022, to December 31, 2025.
- **Funding**: The central government provides maximum support to local governments as regulated in Decision No. 127/QĐ-TTg dated January 24, 2022.
    - The maximum support level is 90% of agricultural insurance premiums.
- Farmers have limited awareness of risk management and the benefits of agricultural insurance.
- Unstable incomes limit their ability to afford insurance premiums. (National Institute of Finance, 2023)
- Current insurance products, such as those for rice, buffalo, and shrimp, are not diverse or attractive enough for farmers, limiting their uptake. (National Institute of Finance, 2023)
- Vietnam's agriculture is characterised by small-scale, fragmented production that does not follow standardised technical processes, making it challenging for insurers to offer coverage. (National Institute of Finance, 2023)
- The number of agricultural insurance contracts issued so far is insufficient to support the principle of risk pooling ("many pay for a few") that insurance companies depend on. (National Institute of Finance, 2023)

- **Further research on financial policies** supporting agricultural insurance development is essential for effective policy-making and market growth in the coming years. (National Institute of Finance, 2023)

4.2 Overview of Weather Index Insurance:

- Definition: Weather Index Insurance (WII) provides payouts based on a **predetermined weather index** (e.g., rainfall levels or temperature), rather than **individual farm-level** damage assessments, simplifying the process and reducing administrative burdens.
- WII can be integrated into a **broader risk layering strategy**, where risks are shared between different levels (farmers, government, and insurers) in which manageable risks are retained at the local level while larger, catastrophic risks are transferred via insurance mechanisms.

OPPORTUNITIES	CHALLENGES
Simplified payouts based on weather indices reduce the need for individual farm loss assessments, lowering costs.	Lack of **reliable and accurate meteorological data** in rural areas which makes designing precise insurance indices difficult.
Reduced administrative costs make WII more accessible to smallholder farmers, helping protect livelihoods.	**Initial setup and implementation are costly** due to the need for capacity building and technical support for farmers and local insurers.
Scalable to cover large areas and many farmers without the need for complex loss adjustment processes.	Significant **technical expertise** is required to design the appropriate weather indices
Lower **insurance premiums** and make agricultural insurance affordable to rural farmers in Vietnam.	WII is **highly dependent on weather data** accuracy, and inconsistencies in data collection could affect the effectiveness of the insurance scheme.
Financial protection against extreme weather conditions **reduces farmers' vulnerability to income loss** caused by unpredictable climate patterns. This financial stability enables them to invest in more sustainable agricultural practices, further enhancing their resilience.	

Source: The World Bank (2011)

4.3 Case Study (Sinnarong, 2022) **Weather Index Insurance (WII) in Thailand**

Context: Thailand designed and implemented **WII** to address the adverse impacts of climate change on key economic crops, such as rice, oil palm, sugarcane, and rubber. The design

was based on weather indices like temperature and rainfall to provide payouts during extreme conditions without the need for farm-level loss assessments.

4.2.1 Key Features of Thailand's WII:

- For rice production in the **Northeast**, WII reduced risk by **7.45% in 2018** and is projected to reduce risks by **up to 12.68%** by 2090. Similar reductions were noted for oil palm and rubber production in the **South**.
- **Risk Reduction Performance (RRP)** for rubber is projected to increase by **up to 13.44%** by 2090, demonstrating the system's capacity to buffer against long-term climate risks.
- WII has effectively reduced income variance for insured farmers across various crops, making it a key tool in managing **income stability** in regions highly vulnerable to climate variability. For rice farmers, income variance was reduced by more than **7%**.

4.2.2 Scaling

- Thailand's model offers important lessons on scaling WII across different crop types and regions. Vietnam, with its diverse agricultural landscape, could benefit from a tailored WII program covering multiple crops, including **rice**, **coffee**, and **rubber**, to mitigate the unique risks faced by each sector.
- The Thai experience suggests that **collaboration between the public and private sectors** is crucial to scaling WII, involving banks, insurers, and agricultural cooperatives.

4.2.3 Recommendations for Vietnam

- Design WII schemes specifically for Vietnam's key agricultural sectors—rice, coffee, and rubber—based on localized climate data.
- Invest in expanding Vietnam's weather station network, particularly in rural and high-risk areas, to reduce basis risk and ensure accurate WII payouts.
- Ensure that WII schemes are affordable and accessible by implementing **subsidy programs** targeted at smallholder farmers, potentially leveraging adaptation finance mechanisms.
- Develop strong public-private partnerships to support the development and scaling of WII, drawing lessons from Thailand's experience in engaging multiple stakeholders.

4.3 Recent scenario of WII in Vietnam

- About **40% of the total production value of the Mekong Delta**, equivalent to **6.8 billion** USD, can be protected by index insurance. (Hillridge, 2024)
- WII scheme has been introduced in Vietnam by the following entities:

4.3.1 Bảo hiểm Quân đội (MIC)

MIC is to pay insurance to the Insured in the event that the total cumulative rainfall in **any seven (07) consecutive days in a month** at the Insured Location exceeds the **Trigger Threshold***. Accordingly:

- These seven (07) consecutive days must be in the same month; and
- The compensation amount paid for each Trigger Threshold and the payment amount in a month shall not exceed the insurance amount for each month; and
- MIC will only pay compensation for **one** Insurance Event in a month. If a (01) month has more than one period of seven (07) consecutive days in which the total cumulative rainfall exceeds the Trigger Threshold, MIC will pay the compensation amount corresponding to the period of seven (07) consecutive days with **the highest total cumulative rainfall**.

**Information on Trigger Threshold (Ngưỡng kích hoạt) not found*

4.3.2. Hillridge Insurance Technology Company (Australia)

4.3.2.1 Weather Index Insurance – Drought Insurance

(in collaboration with MSIG Insurance Company Vietnam and the Australian Department of Foreign Affairs and Trade (DFAT))

- The minimum premium for an index insurance contract is 65 USD, the insurance period is 3 months; and the maximum compensation can be up to over 1 thousand USD, depending on weather risks.
- Over 200 insurance contracts have been issued for coffee growers in the Central Highlands provinces. (vung Tay Nguyen)

Source: MONRE, 2024,Hillridge Drought Insurance, 2024

4.3.2.2 Typhoon Index Insurance

- The insurance **utilizes satellite data to measure the severity of storms** and calculate the **distance** from the storm to the insured farm.
- Data is collected from the **University Corporation for Atmospheric Research (UCAR**) and **storm classification by Vietnam's MONRE**.
- **Compensation Calculation**:
    - Farmers can receive compensation within 10 days.
    - Payments are triggered automatically based on specific parameters (e.g., wind speed and proximity of the storm) without the need for lengthy damage assessments.
- **Hiep Thuan Agricultural Cooperative, Quang Nam Province**, became the first customer to purchase Storm Index Insurance for more than 150 hectares of acacia forest.

Source: Bao Minh 2024, Hillridge 2024

Key Policy Recommendations

- **Expand Weather Index Insurance (WII)**: Incentivize greater uptake among smallholder farmers by offering premium subsidies, streamlined claim processes, and robust public awareness campaigns.
- **Enhance Meteorological Infrastructure**: Invest in rural weather stations and satellite data to reduce basis risk and improve the accuracy of insurance payouts.
- **Align with National Insurance Policies**: Coordinate new parametric products with existing laws (e.g., Decision No. 13/2022/QĐ-TTg) to ensure regulatory compatibility and maximize farmer participation.
- **Engage Public-Private Partnerships**: Encourage collaboration between insurers, banks, government agencies, and cooperatives to design innovative, scalable insurance solutions.

4. Mechanisms to strengthen Agriculture sector resilience: establishing a fund for Vietnam's climate change and economy transition adaptation

Drawing on an extensive review of existing literature, policy benchmarking, and policy dialogue discussions, the authors propose the creation of a fund aimed at strengthening national resilience against natural disasters and climate-related risks through broad community participation. A portion of this fund could be directed toward supporting the National Reserve (kho dự trữ quốc gia), whose development and expansion have traditionally been constrained by limited government-based funding. By infusing additional capital from the fund, the establishment and expansion of the reserve can be expedited, thereby creating a responsive system capable of addressing emergency needs and safeguarding food sovereignty. In sharing these insights, the authors remit to the relevant authorities the final consideration of how best to adopt and implement this approach, recognizing that informed deliberation and adaptation to local contexts are key to achieving these objectives effectively.

The responsibility of managing and allocating the adaptation fund should remain with central banks. Central banks have the expertise and capacity to oversee fund distribution and ensure that the resources are directed to areas that will maximize impact. The central banks can manage the funds and allocate resources to selected major banks, such as Agribank and MBBank, because of their extensive reach and experience in financing agricultural projects. These banks can then provide access to adaptation finance for their clients, particularly in high-risk agricultural sectors that are critical to food security. This approach utilizes the PPP approach via the strengths of both public and private financial institutions, ensuring that the fund is managed with transparency and efficiency. Through this structure, the fund can support the implementation of climate resilience projects while encouraging all stakeholders to adopt sustainable financing practices.

5.1 Regulation No. 55/2015/NĐ-CP - Credit policy for agricultural and rural development

Legal entities	• **Cooperatives and cooperative unions** operating in rural areas or participating in agricultural production and business activities.
	• **Enterprises operating in rural areas** except for
	  o Real estate businesses.
	  o Mining enterprises.
	  o Electricity production units.
	  o Enterprises in industrial parks and export processing zones that are not directly involved in agricultural activities.
	• **Enterprises supplying agricultural inputs** for production and those involved in production, purchasing, processing, and consumption of agricultural products and by-products.

Loan types	• Loans for agricultural production activities from production, purchasing, processing, to consumption. • Loans for industrial production, trade, and service provision in rural areas. • Loans for seed production in cultivation, animal husbandry, aquaculture, and forestry. • Loans to develop rural industries and support the National Target Program for New Rural Development. • Loans for the living needs of rural residents. • Loans according to Government programs related to agriculture and rural development.
Exclusions	• Real estate businesses, mining enterprises, electricity production units, and enterprises in industrial parks and export processing zones are not eligible.
No collateral requirement	• Farmers can borrow up to **200 million VND** without collateral to support agricultural and rural development activities.

5.2 Overview of suggested mechanisms for the fund

MECHANISM	PURPOSE	BENEFITS	APPLICATION FOR VIETNAM
Share of Proceeds from Food Commodity Trading: A small percentage of each transaction in food commodities (e.g., 1-2% of the trade value) is set aside and directed into a National Food Security Reserve Fund. The commodities involved can include grains, rice, pulses, and other staples that form the backbone of food security systems.	To create a sustainable funding source for national food reserves.	Stable funding for reserves, support for domestic and international needs.	Can be applied to rice, coffee, and other key agricultural commodities, leveraging Vietnam's role as a top global exporter.
Adaptation finance for climate resilience: Part of the funds collected through the Share of Proceeds mechanism can be used to finance climate adaptation projects aimed at enhancing food security.	To invest in climate-resilient agricultural practices and infrastructure.	Reduced vulnerability to climate impacts, improved food security.	Use for funding drought-resistant crops, irrigation systems, and infrastructure improvements in the Mekong Delta.
PPP: Establish a PPP adaptation trust fund where the government, private sector, and impact investors co-finance national and regional adaptation projects related to food security.	To engage the private sector in financing and implementing food security projects.	Additional resources, innovation in project execution.	Establish PPPs for building food storage facilities or investing in sustainable farming technologies.

- Contributions from CSR programs, along with the proceeds from food trading, will be pooled into this trust fund.			
Disaster recovery bonds: resilience bonds specifically targeting food security infrastructure to finance projects that build resilient supply chains, ensure stable food reserves, and improve agricultural resilience to climate change.	To finance projects that enhance agricultural resilience and food supply chains.	Long-term funding, resilience building.	Issue bonds to support the expansion of reserve storage capacities and modernization of logistics networks.
Carbon credit: tradable certificates representing the right to emit one ton of carbon dioxide or the equivalent amount of another greenhouse gas. They are part of a market-based approach to incentivize reductions in greenhouse gas emissions.	To promote sustainable agricultural practices by compensating for emissions reductions and enabling funding for climate-resilie nt projects.	Agricultural and forestry projects that sequester carbon or reduce emissions (e.g., reforestation, soil management, methane reduction from rice paddies) can generate carbon credits.	Facilitate carbon credit schemes in Vietnam that reduce methane emissions in the Mekong Delta's rice production and support sustainable forestry in the Central Highlands.

Cost-Benefit Analysis: Establishing a Fund for Vietnam's Climate Adaptation in Agriculture

The establishment of a climate adaptation fund for Vietnam's agricultural sector would pool resources to finance resilience-building projects, promote sustainable practices, and provide emergency relief in the wake of climate-related disasters. Below is a cost-benefit analysis, leveraging quantitative data and examples from other developing markets.

Costs:

1. **Initial Capitalization**:
    a. A national adaptation fund would require an initial endowment of **$500 million - $1 billion** to cover priority projects (World Bank benchmark for adaptation funds in agriculture).
2. **Operational Costs**:
    a. Administrative and monitoring costs are estimated at **2-5% of the fund size annually**, translating to **$10 million - $50 million** per year.
3. **Investment in Infrastructure and Practices**:

   a. Projects such as dike construction, saline intrusion barriers, and resilient irrigation systems cost approximately **$10,000 - $25,000 per hectare** (FAO, Mekong Delta study).
   b. A nationwide roll-out of salt-tolerant crops would cost around **$500 million** over 10 years, based on uptake rates in Bangladesh's coastal agriculture program.
4. **Subsidies and Incentives**:
   a. Subsidies for crop insurance, farm equipment, and training programs could total **$50 million annually** for the first decade.

Benefits:

1. **Reduction in Disaster Losses**:
   a. Typhoon-related losses in Vietnam's agriculture sector currently exceed **$500 million annually** (UNDP, 2022). A well-managed fund could reduce these losses by **30-50%**, saving up to **$250 million annually**.
2. **Increased Agricultural Productivity**:
   a. Investments in resilient farming practices (e.g., salt-tolerant rice varieties) have shown a **20-25% yield improvement** in Bangladesh and India, equating to **$1 billion in additional GDP** annually for Vietnam.
3. **Job and Livelihood Protection**:
   a. Protecting the livelihoods of the **18 million people** dependent on agriculture in the Mekong Delta can prevent a **10-15% decline in income**, preserving approximately **$2 billion annually** in rural household earnings.
4. **Carbon Credit Revenue**:
   a. Transitioning to sustainable farming practices can generate **1-2 MtCO2eq of carbon credits annually**, potentially adding **$30-40 million in revenue** (based on carbon prices of $15-20 per ton in voluntary markets).
5. **International Funding Leverage**:
   a. A national adaptation fund could attract **$2-$4 in international funding** for every dollar invested, as demonstrated by Kenya's National Drought Management Authority and Ethiopia's Climate Resilient Green Economy Fund.

Use Cases from Other Developing Markets:

1. **Kenya**:
   a. Kenya's National Drought Management Authority pooled **$250 million** to finance climate resilience projects, reducing drought-related losses by **40%** and saving **$100 million annually** in agricultural GDP.
   b. Success: Rapid response mechanisms supported 1 million farmers during droughts.
2. **Bangladesh**:
   a. The Coastal Embankment Improvement Project (CEIP) invested **$400 million** to protect coastal agriculture from flooding and saline intrusion, reducing

annual crop losses by **25%** and boosting rice exports by **$200 million annually**.

3. **Ethiopia**:
    a. Ethiopia's Climate Resilient Green Economy Strategy mobilized **$1.5 billion** in funding, leading to a **30% reduction in climate vulnerability** for farmers and increasing agricultural output by **15%**.

Net Benefits:

- **Total Annual Benefits**:
    - Disaster loss reduction: **$250 million**
    - Productivity gains: **$1 billion**
    - Job protection: **$2 billion**
    - Carbon credits: **$30 million**
    - International co-funding leverage: **$500 million**
    - **Total**: **$3.78 billion**
- **Total Annual Costs**:
    - Infrastructure and practices: **$100 million**
    - Administration: **$30 million**
    - Subsidies and incentives: **$50 million**
    - **Total**: **$180 million**
- **Benefit-Cost Ratio**:
    - **3.78 / 0.18 = 21** (For every $1 invested, $21 in benefits are generated.)

Key Policy Recommendations

- **Create a Dedicated Adaptation Fund**: Establish a central fund—managed by relevant financial authorities—to pool resources for climate-resilient agriculture and rapid disaster response.
- **Use a Share of Proceeds Model**: Set aside a small percentage of revenues from key agricultural exports (e.g., rice, coffee) to capitalize the fund and ensure sustainable resource flows.
- **Mobilise Public-Private Partnerships**: Encourage banks (Agribank, MBBank) and other financial institutions to co-finance adaptation projects, leveraging public seed funding for greater impact.
- **Incentivise Sustainable Farming**: Link fund disbursements to performance targets (e.g., lower emissions, improved land use), fostering climate-smart practices across the sector.

5. Disaster Recovery Bonds (DRBs)

Disaster Recovery Bonds (DRBs) are financial instruments designed to provide immediate liquidity to countries affected by natural disasters, facilitating rapid recovery and reconstruction efforts. By transferring specific disaster-related risks to capital markets, DRBs enable governments to access funds swiftly post-disaster, thereby mitigating economic disruptions and enhancing resilience.

Quantitative Data Points:

- **Economic Impact of Disasters:** Between 2004 and 2014, 58% of all disaster-related deaths occurred in the 30 most fragile states, underscoring the disproportionate impact on vulnerable economies. United Nations Development Programme

- **Financial Benefits of DRBs:** Investing in Disaster Risk Reduction (DRR) through mechanisms like DRBs can yield significant economic benefits. For instance, a study on Indonesia revealed that appropriate DRR investments could substantially mitigate long-term economic losses from disasters. Eria

Use Cases from Developing Markets:

1. **Grenada's Hurricane Clause Activation (2024)** Financial Times**:**
    a. **Context:** In July 2024, Hurricane Beryl caused extensive damage in Grenada, equivalent to one-third of the nation's annual GDP.
    b. **Mechanism:** Grenada activated a "hurricane clause" in its government bonds, allowing the suspension of $12 million in interest payments over the following year.
    c. **Outcome:** This action provided critical fiscal space for immediate disaster response and recovery efforts, exemplifying how embedded disaster clauses can offer financial relief post-catastrophe.
2. **World Bank's Pandemic Emergency Financing Facility (PEF)** Wikipedia**:**
    a. **Structure:** The PEF issued $330 million in bonds and swaps to provide financial resources during pandemics.
    b. **Activation:** In April 2020, the facility was triggered by the COVID-19 pandemic, resulting in a payout of nearly $196 million to affected countries.
    c. **Significance:** This mechanism demonstrated the potential of DRBs to deliver timely financial support during health crises, reducing the economic strain on developing nations.
3. **Caribbean Catastrophe Risk Insurance Facility (CCRIF)** Time**:**
    a. **Function:** CCRIF is a risk-pooling facility that provides member countries with rapid financial liquidity following catastrophic events like hurricanes and earthquakes.
    b. **Example:** In 2024, Grenada received a record $44 million payout from CCRIF after Hurricane Beryl, facilitating swift recovery efforts.

c. **Impact:** The facility has enabled Caribbean nations to access immediate funds post-disaster, reducing the need for high-interest emergency borrowing and aiding in faster recovery.

Implications for Vietnam:

Vietnam, particularly the Mekong Delta region, is highly susceptible to climate-induced disasters such as typhoons and flooding. Implementing Disaster Recovery Bonds could offer the following benefits:

- **Rapid Mobilisation of Funds:** DRBs can provide immediate financial resources following a disaster, ensuring that recovery and reconstruction efforts commence without delay.
- **Economic Stability:** By securing funds swiftly, DRBs help maintain economic stability, preventing prolonged disruptions in key sectors like agriculture.
- **Risk Transfer:** These bonds transfer specific disaster risks to investors, thereby reducing the fiscal burden on the government during crises.

Key Policy Recommendations

- **Integrate DRBs into National Disaster Strategy**: Establish DRBs as a core instrument for post-disaster liquidity, ensuring rapid mobilization of funds post-typhoons, floods, and droughts.
- **Embed Clear Trigger Mechanisms**: Define transparent, data-driven triggers (e.g., wind speeds, flood levels) that automatically activate bond payouts, minimizing political or bureaucratic delays.
- **Coordinate with Existing Schemes**: Align DRB frameworks with insurance tools (e.g., CCRIF-inspired risk-pooling models) to create a comprehensive system of risk transfer.
- **Engage International Investors**: Position DRBs as attractive impact-investment products, leveraging global interest in climate resilience for lower financing costs.

6. Conclusions

The increasing frequency and severity of climate events, such as Typhoon Yagi and sea level rise in the Mekong Delta, underline the urgent need for innovative financial mechanisms to safeguard Vietnam's agricultural sector. This paper demonstrates that food insecurity and the resulting economic impacts pose significant threats to the livelihoods of millions and the nation's GDP. A proactive and integrated approach to climate adaptation finance is critical to addressing these challenges.

By establishing a dedicated adaptation fund, Vietnam can channel resources toward resilience-building infrastructure, sustainable farming practices, and disaster recovery. The proposed mechanisms, including parametric insurance, sustainability-linked loans, and adaptation bonds, provide a comprehensive strategy to mitigate risks, stabilize food systems, and foster economic sustainability. Drawing from successful use cases in countries like Kenya, Bangladesh, and Ethiopia, the cost-benefit analysis highlights the immense value such a fund could unlock, with every dollar invested yielding significant social, economic, and environmental returns.

This approach not only supports Vietnam's food security and sovereignty but also positions the country as a leader in climate adaptation for agriculture in developing markets. By leveraging international funding, generating carbon credits, and fostering public-private partnerships, Vietnam can strengthen its agricultural resilience, reduce its carbon footprint, and ensure equitable access to food for all. These efforts will contribute not only to national stability but also to global food security in the face of escalating climate challenges.

Key Policy Recommendations

- **Adopt a Multi-Pronged Financial Framework**: Combine parametric insurance, adaptation funds, DRBs, and carbon credit mechanisms for a holistic approach to resilience in agriculture.
- **Strengthen Institutional Coordination**: Harmonize efforts among ministries (finance, agriculture, environment), local governments, and private stakeholders to streamline decision-making.
- **Maintain a Long-Term Perspective**: Invest in research, training, and local capacity-building so that adaptation strategies can evolve over time in response to changing climate conditions.
- **Amplify International Partnerships**: Pursue co-financing and technical support from multilateral institutions (World Bank, UNEP) and leverage shared learning with other climate-vulnerable nations.

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