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A Systematic Review of Green Recovery Model for Forest and Farm Producer Organizations in Vietnam Post-Natural Disasters

Hong Hai Pham, PhD
Faculty of Business Administration, University of Finance - Marketing,
Phu Nhuan District, Ho Chi Minh City, Vietnam
Kim Lien Le, MA
Faculty of Basic Sciences, Vietnam Women's Academy,
Dong Da District, Hanoi, Vietnam

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Abstract

"Green Recovery" is mentioned as a scientific way to revive the economy, solve challenges in health, climate change, biodiversity conservation, and increase the economy's resilience to other crises that may occur in the future. This paper develops a theoretical framework for green recovery specifically tailored to forest and farm producer organizations (FFPOs) in Vietnam, which are often severely affected by natural disasters, with a specific focus on the case of Typhoon Yagi in Vietnam. Drawing on a systematic review of over 40 peer-reviewed academic studies, the research identifies five foundational pillars of an effective green recovery model: (1) sustainable resource management, (2) green policy integration, (3) technological innovation, (4) community engagement, and (5) circular economy development to minimize environmental impacts. Implementing such a model would not only accelerate post-disaster recovery but also facilitate the transition to a low-carbon, more resilient economy. The paper also provides recommendations for public institutions and international organizations to integrate green recovery into long-term development strategies. In particular, it emphasizes the need to invest in green

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infrastructure, promote the adoption of sustainable technologies and implement eco-certification programs to enhance the global competitiveness of FFPOs. In conclusion, green recovery is not only a means of mitigating the impact of natural disasters but also a strategic tool for fostering sustainable and inclusive development. Further research is needed to assess the effectiveness of different green recovery strategies within specific socio-economic contexts and to refine policies that support FFPOs.

Keywords: Green recovery, Green recovery model, Forest and farm producer organizations, Resilience, Sustainable Development

Introduction

In the context of increasing climate change in both frequency and intensity, forest and farm producer organizations are facing severe challenges in recovering production and protecting the livelihoods of communities post-natural disaster. The destruction caused by Typhoon Yagi (Typhoon No. 3) serves as a prominent example, recorded as one of the worst storms in Vietnam's history.

Green recovery, in this context, refers to a post-crisis rebuilding approach that integrates environmental sustainability, climate resilience, and inclusive development into economic revitalization efforts. It goes beyond traditional recovery models by embedding long-term ecological and social objectives into short-term recovery policies (World Bank, 2021; UNEP, 2020; Phillips and Heilmann, 2021).

With wind speeds reaching category 17, Yagi devastated 26 provinces in the north and Thanh Hoa, causing heavy rains, flooding, and landslides, leaving 329 people dead or missing, along with significant damage to infrastructure and agriculture. The total economic loss was estimated to exceed 50 trillion VND, slowing projected GDP growth and severely affecting the livelihoods of thousands of households (Government, 2024).

Recovery of production post-disaster presents a significant challenge for forest and farm producer organizations, not only due to property and infrastructure losses but also because these organizations often lack the resources, technology, and techniques required for sustainable recovery. In this context, the traditional recovery model-focused on rebuilding as before-appears inadequate in the face of the challenges posed by climate change.

Therefore, the need for a sustainable recovery model, specifically the "Green Recovery" model, has become urgent. This model aims not only to restore production but also combines sustainable economic development, environmental protection, and enhanced resilience against future disasters. However, to effectively implement this model, a clear and comprehensive theoretical framework needs to be established, incorporating key factors such

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as natural resource management, green technology application, and active community participation.

This paper will focus on building a theoretical framework for the green recovery model for forest and farm producer organizations after natural disasters. It will also provide practical recommendations based on both international and domestic experiences, aiming to support forest and farm producer organizations in effectively applying the green recovery model, ensuring resilience, and sustainable development in the future.

2. Research Overview

2.1. Concept of Green Recovery and Green Recovery Model

2.1.1. Concept of Green Recovery

The Green Recovery is the name given to a series of economic recovery measures aligned with achieving long-term climate change and sustainability objectives, to move toward a sustainable and economic model for the planet, which is both more resilient and inclusive.

The study by Strand and Toman (2010) does not explicitly explore the concept of green recovery, but introduces the idea of the green stimulus, a set of policies and interventions aimed at restarting economic activity in the short term while ensuring the protection and improvement of natural resources and environmental quality. What distinguishes the “green stimulus” from general environmental policies is its rapid implementation and its targeted way of responding to economic shocks while generating environmental benefits (ILO, 2010).

The World Bank (2012) defined ‘green’ in terms of sustainable economic growth. A focus on sustainability rather than consumption underpins the definition: “Green refers to a world in which natural resources are conserved and sustainably managed to improve livelihoods over time.” The strategy had three elements, with ‘green’ measures distinguished from ‘clean’ measures, where climate mitigation actions were placed. Climate change adaptation actions were found in a third element (‘resilience’) of the strategy’s vision for a “green, clean, and resilient world for all”.

However, the wide variation in national contexts – as well as the mandates of international organizations – poses a challenge in adopting a unified definition of green recovery. Since the outbreak of the COVID-19 pandemic globally, various definitions have been proposed in the research literature. The World Bank Technical Working Group (2021) has agreed on the following definition to guide the work of the Green Recovery Initiative (GRI):

"A comprehensive and inclusive response to the COVID-19 crisis that integrates climate change considerations into the short-term economic recovery, while promoting a carbon-neutral and climate-resilient economic

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transformation, in line with the objectives of the Paris Agreement and the 2030 Agenda for Sustainable Development."

This definition assumes that there is a common understanding of what the proposed economic transformation means in different national contexts. Exploring the appropriate approach for each country will depend on the specific context and institutional environment of that country.

In short, a green recovery is a roadmap to address the impacts of future pandemics, natural disasters and climate risks, and build a more resilient future.

2.1.2. Green Recovery Model

The green recovery model includes policies, measures, and strategies aimed at promoting economic recovery after crises while ensuring environmental protection and sustainable development. Barbier (2020) highlights that an effective strategy, building on the lessons of the 2008 financial crisis, should focus on investments in energy efficiency and on immediately feasible clean energy projects. While these initiatives have contributed to the creation of new jobs and the expansion of renewable energy for several years, their long-term impact on the decarbonization of the global economy has been limited.

Agrawala et al. (2020) argue that an effective green recovery model requires coordination between economic and environmental policies, promoting green industries, and reducing greenhouse gas emissions. For forest and farm organizations, this model may include measures to encourage reforestation and the use of renewable energy.

The International Monetary Fund (IMF, 2020) and the Asian Development Bank (ADB, 2021) emphasize that support a green recovery through policy actions during the pandemic recovery that support climate goals. To this end, four themes for public investment projects: boosting climate-smart infrastructure; developing and adopting climate-smart technologies, supporting adaptation, and avoiding carbon-intensive investments. Green equates to climate actions.

Phillips, J. and Heilmann, F. (2021) in GIZ report proposed green recovery model as “a packages of measures addressing the social, economic and political consequences of the Covid-19 crisis in a way that sets a course for long-term structural reforms and a transformative shift towards sustainability, biodiversity protection, resilience and climate neutrality.” Twenty-three examples of green recovery initiatives are documented. A major conclusion of the report is “striving for agenda coherence between climate, biodiversity, disaster risk reduction and sustainable development goals should be the guiding principle for designing and implementing green recovery measures.”

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In summary, the green recovery model in the context of forest and farm organizations is a comprehensive framework focused on sustainable economic reconstruction, environmental protection, and increasing resilience to natural disasters. This model not only supports immediate post-crisis recovery but also paves the way for long-term sustainable development for organizations and related communities.

2.2. Lessons from Green Economic Stimulus Measures

2.2.1. Lessons from the Great Recession

According to the OECD (2020), during the global financial crisis of 2008-2009, many countries implemented green stimulus packages to foster sustainable recovery. Key lessons learned from this period include:

1) *Integrating green elements into stimulus packages*: Countries like South Korea and New Zealand incorporated green elements into their economic stimulus packages. For example, South Korea's Green New Deal of July 2020 is part of a wide national strategy to create 659,000 jobs and help the country overcome the economic crisis while addressing climate and environmental challenges. South Korea committed approximately USD 61 billion in five years (2020-25) to boost renewable energy capacity to 42.7 GW by 2025 from 12.7 GW in 2019 and expand the green mobility fleet to 1.33 million electric and hydrogen-powered vehicles. The plan also promises refurbishment of public rental housing and schools to make them zero-energy, and transformation of urban areas into smart green cities.
2) *Investing in sustainable infrastructure*: Investments in green infrastructure, such as public transportation and sustainable construction, not only created jobs but also improved the quality of life and reduced carbon emissions. The OECD regularly monitors countries' performance and best practices in the infrastructure sector. A notable example is New Zealand, which used its economic stimulus package to develop sustainable infrastructure projects with the aim of mitigating environmental impacts.

In detail, some key figures on the country's infrastructure are:

Public investment in infrastructure: represents 17.3% of total gross fixed capital formation (GCF) in 2020.

Infrastructure quality: score of 75.5/100 in 2019, reflecting the level of development and efficiency of the national infrastructure network.

CO_2 emissions: equivalent to 6.5 tonnes per capita in 2020, an indicator of the level of greenhouse gas emissions per capita.

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Energy Transition Index: with a score of 71/100 in 2021, highlighting the country's progress in the transformation towards a more sustainable energy system..

3) *Encouraging innovation*: The stimulus packages were also designed to encourage innovation in green technology, thereby promoting the development of sustainable products and services. Investments in research and development of clean energy technologies accelerated the transition to a green economy.

2.2.2. Lessons from the COVID-19 Crisis

A study by UNEP (2020) shows how the COVID-19 pandemic has prompted many countries to rethink their environmental policies and regulations. These tools are essential to facilitate the transition to a more resilient and sustainable economy. Measures taken include removing fossil fuel subsidies, applying the polluter pays principle, promoting green jobs and including environmental criteria in economic recovery plans. Noteworthy lessons include:

4) *Sustainable recovery*: Many countries are committed to building economic recovery packages that would not harm the environment. Many governments have committed to developing economic recovery plans with low environmental impact.

National and regional examples:

South Korea has invested approximately $4.84 billion in the green transformation of urban infrastructure by 2022, creating 89,000 new jobs. The funds were used to reduce public facilities to zero emissions and implement innovative IT systems to reduce air pollution, support the production of low-emission vehicles and improve air quality.

In the European Union, the Green Deal has been placed at the heart of the economic recovery strategy. The plan includes initiatives to make the agricultural sector more sustainable, finance renewable energy and provide incentives for the deployment of electric vehicles and related infrastructure.

2) Supporting green businesses: Governments have launched support programs to promote sustainable businesses and support employment in low-carbon sectors.

Concrete examples:

In Latin America, paid work programs promote employment in the recycling sector and provide opportunities for Venezuelan migrants.

Some countries in the region, such as Brazil, have created recycling cooperatives that provide jobs to disadvantaged groups.

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In Pakistan, a $47 million stimulus package has employed unemployed workers in the "10 Billion Trees Tsunami" project, which aims to reforest rural areas and restore natural ecosystems.

3) *Raising public awareness*: The health crisis has heightened attention to the importance of public health and environmental protection.

Information campaigns have been launched to promote environmentally friendly practices and encourage public participation in sustainable reconstruction efforts.

2.2.3. Model Green Recovery Programs

The "green" stimulus plans adopted by Germany and Canada are significant examples of effective sustainable growth strategies.

Germany approved a EUR 130 billion stimulus package to help the economic recovery and to secure and promote employment by strengthening broad consumption and incentivizing investments in green and digital technologies. The EUR 50 billion Future Investment Package aims to intensify research and development in climate protection and future technologies. With this, the government intends to give these sectors a significant boost and provide a combined economic and employment stimulus. Building back after the COVID-19 crisis shall put Germany on a trajectory towards a low-carbon and climate-friendly economy and society (European Commission, 2020; Walton & Jonker, 2020).

Canada also made a notable contribution. From the beginning of the pandemic in early March to the end of 2020, the federal government committed CAD 14.7 billion to programs that support clean energy. This was followed by an additional CAD 14.9 billion for public transit in February 2021. According to the EPT, the federal government's five largest energy-related commitments are in areas that will help advance the climate agenda. While the EPT covers only energy-related announcements, the climate plan also includes promising initiatives on nature and conservation, agriculture, adaptation, and more. In addition, the government made a historic and commendable announcement to raise the carbon price to CAD 170 per tonne by 2030, which was well-received internationally (Corkal et al., 2021).

Experiences with green incentives and economic stimulus programs during both the Great Recession of 2008 and the COVID-19 crisis show that integrating sustainability elements into economic stimulus programs not only promotes economic growth but also contributes to environmental protection and lays the foundation for more balanced development in the long term. These findings provide a solid theoretical basis for building a green recovery model applicable to forestry and agricultural enterprises affected by natural disasters and underline the importance of investing in renewable energy, sustainable infrastructure and human capacity development.

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2.3. International experiences on green recovery

2.3.1. Experience from GIZ, 2020 (Phillips et al., 2020; Phillips, J., & Heilmann, F., 2021)

GIZ (German Agency for International Cooperation) supports the German government and its partner countries in coping with the immediate as well as the long-term consequences of the COVID-19 crisis. The aim of the support is to make economic and social recovery climate and environmentally friendly and to strengthen the resilience of people, organizations, companies and ecosystems to the consequences of future crises. GIZ's experience highlights that green recovery must be based on community participation and stakeholder engagement. The most important findings of the study are:

Community engagement: Recovery strategies must be guided by the principles of a green economy, which include well-being, equity, resource efficiency, respect for planetary boundaries and good governance. It is essential that local communities actively participate in the planning and implementation of recovery initiatives and ensure that no one is left behind. A just transition must respect human rights, protect the most vulnerable in society and create new green job opportunities. Reconstruction plans should integrate different visions and values, including the perspectives of women, youth and indigenous peoples. Some countries such as Amsterdam, Bhutan, Costa Rica, Iceland, New Zealand and Scotland have already started to implement these principles. The most effective initiatives are often those in which local organizations are strongly involved and can thus actively contribute to decision-making and resource management.

Building sustainable supply chains: Creating green value chains not only provides income opportunities for communities involved in the reconstruction process, but also increases the well-being of farmers and reduces pressure on natural resources.

Training and skills development: Strengthening the capacities of local organizations and communities through training and technology transfer programs is essential for the effective implementation of green recovery measures.

2.3.2. Experience from UNEP (2020)

UNEP (United Nations Environment Programme) has played a key role in developing models for green recovery, with a focus on restoring ecosystems and building community resilience. Key aspects highlighted by UNEP include:

- *Restoration and protection of ecosystems*: The loss of natural habitats is closely linked to the emergence of zoonotic diseases such as COVID-19 and is exacerbated by anthropogenic factors such as

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overexploitation of wildlife, unsustainable use of natural resources and climate change.

At the economic level, the degradation of ecosystem services generates losses estimated at at least $479 billion per year.

To ensure effective recovery, it is critical to preserve biodiversity and avoid incentives that accelerate its degradation. Recovery plans should include balanced risk assessments and consider natural capital aspects such as ecosystem quality, air and water purity and impacts on biodiversity.

Nature-based solutions (NbS) represent an innovative and sustainable approach to economic recovery. These actions aim to protect, sustainably manage and restore ecosystems while responding to societal challenges and promoting human well-being. They are effective and cost-efficient strategies that strengthen environmental, social and economic resilience.

- *Transitioning to sustainable development models*: It is essential to abandon unsustainable development models and adopt strategies that are more compatible with environmental protection, such as the circular economy and the development of renewable energies.

The concept of circularity is based on the regeneration, reuse and recovery of resources and promotes more efficient management of materials throughout their life cycle.

The introduction of processes that extend the life of products (such as remanufacturing, repair and refurbishment) could reduce the consumption of new resources and, in some sectors, reduce industrial waste by up to 99%. At the same time, greenhouse gas emissions would fall by 79 to 99%. These strategies can be an important lever for the post-COVID-19 recovery.

- *Integrating science and policy*: A key aspect of effective green recovery is the alignment between scientific research, public policy and business practice.

One possible long-term strategy is to introduce rules based on green public procurement, whereby administrations encourage the purchase of goods and services with a low environmental impact, thus supporting eco-innovation and the market for sustainable products.

This approach is particularly relevant in the context of the post-pandemic recovery, as governments account for a significant share of the demand for goods and services.

Legislators could also introduce measures to strengthen extended producer responsibility and ensure that companies are involved in the disposal of products at the end of their life cycle, thus encouraging more sustainable design.

In addition, tax incentives and financial incentives for clean technology research and development could encourage industry to adopt innovative methods to extend the useful life of products.

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2.3.3. Experience from Phillips & Heilmann

Research by Phillips & Heilmann (2021) highlights that green recovery must integrate social, economic and environmental factors in a balanced way to ensure long-term positive impacts. The findings include:

The first finding is social impact assessments by analysing the social impact of reconstruction programmes to ensure that all population groups, especially the most vulnerable, can benefit from these programmes. This assessment will help you identify priority areas that need to be addressed for broader recovery.

The next one is developing supportive policies for forestry and agricultural organisations, providing financial incentives and encouraging investment in sustainable practices to support long-term growth.

The final one is strengthening resilience to enable communities to recover and thrive. To do this, organizations must improve their access to information, resources and finance so that they can better address environmental and economic challenges.

Through the analysis of research experiences from GIZ, UNEP and Phillips & Heilmann, we can draw lessons for organizations on building a green recovery model for agricultural and forestry organizations. That is, this model should be based on four pillars: community participation, ecosystem protection and restoration, combining science and politics, and social impact analysis. These elements not only support economic recovery but also lay the foundation for more sustainable development, enhanced climate change adaptation and protection of natural resources from environmental risks and natural disasters.

2.4. Integrating the role of Forest and Farm Producer Organizations in sustainable development and economic recovery

Forest and Farm Producer Organizations (FFPOs) are fundamental pillars to promote sustainable development and support economic recovery, especially in communities most vulnerable to the impacts of climate change. Mainly composed of smallholder households, cooperatives and production groups operating in forests and rural areas, the FFPO plays a key role in addressing the consequences of natural disasters, building local resilience through sustainable resource management strategies, inclusive economic development and innovation in production.

1) *Resource Management and Sustainable Development*: FFPOs play an important role in resource management and sustainable development with the following characteristics: Being the most autonomous economic community organization; mobilizing and maximizing collective strength in resource management and sustainable development; connecting the majority of people from villages,

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hamlets, rural areas, and mountainous areas. According to the World Bank (2021), these organizations not only strengthen the operational capacity of their members, but also actively contribute to the protection of biodiversity and the maintenance of natural ecosystems. In the post-disaster period, the FFPO ensures that environmental restoration activities are carried out according to sustainable criteria, avoiding the degradation of resources and promoting ecological regeneration.

2) *Job Creation and Livelihood Recovery*: In an increasingly complex and diverse world, promoting social progress and equity is not only an important goal but also the core of sustainable development. At the intersection of economic benefits and social responsibility, FFPOs have emerged as a business model capable of promoting both economic and social development and social equity. Although not the sector that generates the most profits and economic growth, FFPOs play an important role and position in solving employment, ensuring the lives of members and workers, creating social stability, and contributing to the growth and development of each country. Research by Barbier (2020) shows that these organizations promote the adoption of sustainable production models, such as agriculture and forestry, that help reduce pressure on ecosystems, while providing new economic opportunities for local communities. The full integration of APPFs into post-disaster recovery processes combines environmental sustainability with the economic empowerment of populations most at risk of climate risk.
3) *Promoting Circular Economy*: The value chain is of great significance to production and business organizations and vice versa, production and business organizations are also the "breath" of the value chain of many diverse industries in the agricultural and non-agricultural sectors. FFPOs play an important role in building sustainable value chains. To develop sustainable product value chains, FFPOs need to innovate their thinking, ensure integrity in production and business, improve competitiveness, increase value through sustainable business management practices, promote diversity and inclusion in business according to the green economic model, circular economy. According to FAO (2020), these organizations promote waste reduction and resource reuse, and develop production processes with low environmental impacts. A specific example is the optimization of the use of wood for the production of organic handicrafts and agricultural products, reducing the withdrawal of new resources and increasing waste to create added value.
4) *Capacity Building and Community Cooperation*: One of the pillars of economic and social resilience is the development of local capacities.

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The FFPO provides technical training and operational support, improving risk management and responding effectively to environmental and economic shocks in the community. According to GIZ (2020), investing in the skills of FFPOs' members means building community resilience to climate change, promoting more sustainable production models and risk mitigation strategies (Phillips et al., 2020; Phillips, J., & Heilmann, F., 2021).

5) *Market and Financial Access*: Access to credit and markets is one of the most important challenges for forest and farming communities. FFPO facilitates connections between local manufacturers and national and international markets, creates collective brands and fosters partnerships with financial institutions. According to Hepburn et al. (2020), these sustainable business models strengthen the production chain and increase the competitiveness of forest and agricultural products, thereby improving the economic stability of the community.
6) *Equality and Social Inclusion*: FFPOs play an important role in ensuring social equity and inclusion, providing economic opportunities for women, youth, and ethnic minority groups. According to the World Bank (2021), these organizations promote the active participation of vulnerable groups in decision-making processes, foster local empowerment, and build more equitable governance in rural communities.
7) *Partnerships in Green Recovery Policies*: The FFPO is a strategic player in promoting green recovery policies, collaborating with governments, international organizations, and NGOs to protect ecosystems and value renewable energy. Their participation helps develop inclusive and sustainable legal frameworks, ensuring that disaster recovery focuses on the conservation of natural resources and long-term economic sustainability.

In a nutshell, FFPOs are an essential part of the green recovery model, from resource management to job creation, from the circular economy to supporting the most vulnerable communities. Their integration into post-disaster economic recovery programs not only strengthens the resilience of local communities, but also facilitates long-term sustainable development, balancing economic growth, environmental protection, and social well-being.

3. Research Methodology

In this paper, the author will apply a secondary research method to explore the theoretical framework of the green recovery model, focusing on the analysis and synthesis of relevant academic literature. Key concepts such

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as "green recovery" and the "green recovery model" will be clarified by reviewing existing research publications.

The paper will begin by establishing a theoretical foundation related to green recovery. The author will systematize and analyze recent academic literature on this subject, drawing practical applications from the concepts. To achieve this goal, a systematic literature review will be conducted following the methodology outlined by Jesson et al. (2011). The entire research process is divided into three main phases:

Phase 1: The author will search for publications from peer-reviewed, high-ranking academic journals in the fields of green recovery and related initiatives. The primary database used will be Scopus, along with supplementary sources such as Web of Science, Elsevier, Emerald, and Science Direct. The main search terms will include "green recovery" and "green recovery initiative." The author will apply exclusion criteria to ensure the relevance and quality of the literature, including i) removing duplicate studies; ii) excluding studies with only abstracts; iii) eliminating studies that do not provide full-text access; iv) selecting only documents in English or Vietnamese; and v) excluding studies that do not focus on green recovery. After applying these criteria, a total of 40 peer-reviewed articles were selected through a rigorous screening process, balancing data saturation and analytical feasibility. This number marked the point where no significant new insights emerged. The review focused on studies published between 2010 and 2024 to ensure temporal relevance and thematic depth. Analytical categories were developed using a hybrid inductive-deductive approach. In cases of conflicting findings, a discrepancy resolution strategy was employed, including triangulation and contextual analysis. This methodological rigor enhances the reliability of the proposed green recovery framework.

Phase 2: The author will conduct a preliminary review of the selected literature by reading the titles, abstracts, and keywords. The goal of this phase is to clearly identify studies that directly reference the concepts of "green recovery" and the "green recovery model." This preliminary review will screen for the most valuable documents, from which suitable studies will be selected for more in-depth analysis.

Phase 3: The selected documents will be analyzed in detail and categorized according to relevant theoretical arguments. The author will evaluate the articles and dissertations based on factors such as the author, year of publication, field of research, country, application of the green recovery concept, research objectives, methods, key findings, limitations, and recommendations. From this information, analytical categories will be identified to conduct further analysis on the prospects and development potential of the green recovery model, based on the limitations of previous research.

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This secondary literature approach not only provides a comprehensive view of the development of the green recovery model but also helps identify factors influencing its implementation and real-world application. In doing so, the paper will contribute to clarifying the theoretical framework for the green recovery model, while also laying the groundwork for future research in this field.

4. Results and Discussion

The concept of green recovery is based on the integration of economic recovery measures with long-term climate and sustainability goals, outlining a more balanced, resilient and inclusive socio-economic model. Through an in-depth analysis of the main publications on the subject, five fundamental pillars of this model are identified: sustainable management of natural resources, the strategic role of FFPOs, global green recovery strategies, resilience and sustainable development, and technological innovation.

4.1. Natural resource management

Sustainable management of natural resources is the foundational pillar of a green recovery strategy. It is an inevitable requirement and also a measure of national governance capacity. "Environmental and natural resource sustainability can only be achieved in the context of equitable, effective and transparent national governance in accordance with the rule of law"[1]. It is the foundation of a green recovery. Studies such as those by UNEP (2020) and OECD (2020) emphasize the need for governance that not only promotes economic growth but also ensures the protection of ecosystems and the regeneration of resources such as land, water, minerals, animals and plants. An effective approach is not only to optimize resource use but also to reduce pollution, restore biodiversity and maintain ecological balance. FFPOs play an important role in this context, as they not only manage forests sustainably but also contribute to the development of non-timber forest products, creating cost-effective alternatives for rural communities. Effective resource management of FFPOs enables them to ensure sustainable development, especially in times of crisis, by providing nature-based solutions to adapt to climate change.

4.2. Global green recovery policy

The second element is global green recovery policies. Timo Maas and Paul Lucas (2021) found that although the global green recovery narrative has been widely endorsed by governments and international organisations around the world, this has yet to be matched with concrete policy efforts. Low-income countries largely rely on reorientation of development budgets and stimulus by international financial institutions. Effectively leveraging such

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reorientation is helped by a better understanding of the global green recovery narrative. Global policy, first of all, implies the need for strengthening global cooperation to achieve long-term environmental objectives. In addition, countries should acknowledge the coherence between various priority areas of green recovery and, early on, consider potential trade-offs and synergies between their primary recovery priorities and other sustainable development objectives. Furthermore, clear strategies need to be developed to address equity and inclusiveness in global recovery efforts, taking into account unevenly distributed impacts of the COVID-19 pandemic as well as distributive impacts of recovery policies. Finally, the combination of the magnitude of recovery investments and the urgency with which they need to be made, makes monitoring and accountability of investment decisions all the more pressing.

4.3. Participation and role of forest and farm producer organizations

FFPOs are key players in meeting the world's growing demand for food and forest products, improving the lives of rural communities, and achieving the Sustainable Development Goals (SDGs). According to studies by UNEP (2020) and Phillips et al. (2021), supporting national and international policies can strengthen FFPOs' resource management capacities, improve market access, and promote sustainable production standards. An important example is the introduction of eco-labels such as Participatory Guarantee Systems (PGS) which make it possible to recognize acquisitions for the sustainability of their products and improve their competitiveness in the global market.

4.4. Resilience and sustainable development

Economic and environmental resilience is a crucial factor in ensuring long-term sustainability. It must be understood not only as the ability to withstand shocks, but also as the ability to adapt and accelerate the transition to more sustainable development models.

According to GIZ (2020), the direct involvement of FFPOs in economic recovery processes enables communities to rebuild the local production fabric while protecting natural resources. This approach reduces vulnerability to climate change and economic crises, thus strengthening the responsiveness of local communities.

4.5. Technological innovation

The adoption of innovative technologies is a key element in the success of the green recovery. International organisations such as the International Monetary Fund (IMF) and the OECD emphasise that innovation

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can accelerate sustainable change, improve production efficiency and reduce environmental impact.

FFPOs can benefit from integrating digital technologies into the management of forest and agricultural resources, optimizing production and reducing emissions. In addition, models based on the circular economy and the expansion of renewable energies are important tools to ensure more sustainable and resilient development.

Green recovery is not just a temporary strategy for economic recovery, but a long-term vision to build a sustainable and resilient socio-economic model. FFPOs play a crucial role in protecting natural resources and rural economic development, while national and international policies must create the necessary conditions for their full participation in sustainable value chains. The effective implementation of this model requires close synergy between public policies, technological innovation and the participation of local communities. Only through a systemic approach will it be possible to ensure inclusive economic growth, environmental protection and long-term resilience.

4.6. Implications for Vietnam

In Vietnam, programs such as the Forest Protection and Development Fund or the Climate-Smart Agriculture (CSA) Initiative have provided a basis for building the green recovery model. The implementation of a green recovery model for FFPOs addresses the task groups in Resolution No. 143/NQ-CP dated September 17, 2024, on key tasks and solutions to urgently remedy the consequences of Typhoon No. 3 (Yagi). Specifically:

1) *Task group on supporting the restoration of livelihood and social activities to stabilize people's lives*

The green recovery model focuses on restoring the environment affected by natural disasters, which directly impacts people's lives. Forest restoration and land management improvements will help stabilize social and livelihood activities by providing sustainable resources and improving living conditions. By developing sustainable livelihood opportunities, such as eco-tourism and organic farming, this model helps residents achieve stable incomes, contributing to the stabilization of their lives.

2) *Task group on supporting production facilities, households, cooperatives, and enterprises to quickly restore supply chains, labor, production, and economic growth*

The green recovery model can provide technical and financial support to production facilities and businesses in restoring and improving supply and production chains. The application of sustainable farming methods and effective resource management will help forest and farm organizations recover quickly and improve productivity. Green recovery initiatives can also promote

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investment in green technologies and production methods, thereby boosting economic growth and sustainable development.

3) *Task group on preparing for future natural disasters, storms, floods, and landslides*

A key part of the green recovery model is improving the resilience of ecosystems and communities to natural disasters. Measures such as forest restoration, land protection, and building preventive mechanisms will strengthen the ability to respond to future natural disasters. This model also includes developing response and risk management plans to minimize the impact of natural disaster events and improve preparedness for emergency situations.

Conclusion and Recommendations

Building a green recovery model for FFPOs in Vietnam needs to build on five fundamental structural elements such as sustainable resource management, green recovery policies, technological innovation, community participation and circular economy development (Figure 1). This approach not only contributes to the recovery of the economy after a crisis, but also ensures environmental protection and the definition of a long-term strategy for the sustainable development of rural communities. To ensure the success of this model, the support of the government, international organizations and local communities is essential.

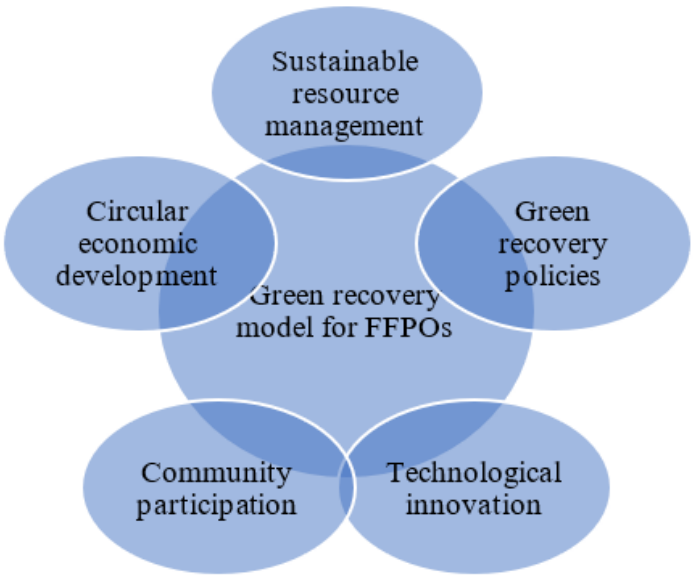

Figure 1. Proposed green recovery model for FFPOs in Vietnam

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Sustainable resource management not only ensures the optimization of resources but also brings significant benefits to FFPOs, from increased efficiency, productivity, cost optimization, and building a strong brand to improving their resilience to climate shocks and natural disasters. The efficient use of natural resources, the use of green technology and the conservation of biodiversity are important factors for sustainable development and long-term sustainability. In particular, the optimization of forestry and agricultural resources not only minimizes waste but also maintains the balance of natural ecosystems. Integrating management models based on environmental sustainability allows FFPOs to conserve natural capital while enhancing economic opportunities for rural communities.

Developing a circular economic model is a strategic solution for FFPO. The circular economic model in agricultural and forestry production is a closed-cycle production process, in which most waste and by-products are returned as input materials for other production processes through the application of biotechnology, physical and chemical technology, scientific and technical advances, and very flexible applications in the production and business organization process. The use of agricultural and forestry by-products creates added value and reduces resource waste. A specific example is the reuse of production residues to produce organic fertilizers or bioenergy, a practice that not only improves economic efficiency but also helps reduce environmental impacts and optimize resource use. These strategies are essential for the transition to a regenerative production model that can combine economic development and environmental protection.

Another important element of the Green Recovery model is the introduction of sustainability standards and increased competitiveness in international markets. The introduction of green certifications, such as the Participatory Guarantee System (PGS), brings practical benefits to many stakeholders: (1) For the distribution and retail system, PGS supports the connection of this system with FFPOs of safe and high-quality products. As an actor of the PGS system, the distribution and retail system is directly involved in monitoring and sharing information on product quality. Retailers gain access to reliable sources of quality products, thereby building trust with customers and increasing sales; (2) For consumers, PGS provides the opportunity to use products produced according to standards that ensure reliable quality. PGS helps build consumer trust through a direct connection between buyers and sellers. Consumers have the opportunity to broaden their understanding of the production process when they participate in the system, directly visit and learn about the products at the production site; (3) For local authorities, PGS promises to be a reliable, low-cost but effective system to be applied in the field of food safety management nationwide. PGS helps to rebuild people's trust in safe food and improve consumer health. PGS

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contributes to changing the behavior of producers towards meeting market needs, raising awareness of social responsibility, community connection, and environmentally friendly production. Environmental certification is not only an effective marketing tool but also demonstrates a specific commitment to sustainability and environmental protection. International recognition of these standards strengthens FFPO's position in the global value chain and promotes a just and sustainable transition.

Next, a crucial element for the success of the green recovery model is to strengthen the links between the FFPOs and local communities is. The cooperation networks between FFPOs, local businesses and civil society organisations enables the exchange of resources and knowledge in order to promote an integrated approach to rural development. The active participation of communities in resource management and the implementation of green recovery strategies ensures greater social cohesion and promotes a more inclusive and participatory development model.

Finally, a clear and targeted support policy from the government makes a good condition to the effective implementation of the green recovery model. The support policy should include key measures such as financial incentives to encourage FFPO's investments in the green transition; improved infrastructure to facilitate the adoption of innovative and sustainable solutions; specialized training programs in resource management, green technologies and circular economy; easier access to clean technologies, promotion of digital tools and innovation for the sustainable management of natural resources. The adoption of targeted public policies not only facilitates the implementation of the green recovery model but also enables the creation of a sustainability-friendly ecosystem in which FFPOs can thrive and contribute to national economic growth.

To sum up, investing in research and development to refine green recovery strategies and test the model in vulnerable areas is crucial to address the challenges of climate change and natural disasters. The development of national expansion plans will build on the success of this approach and facilitate access to international markets and the financing of sustainable development. The proposed solutions will actively contribute to Vietnam's economic, social and environmental sustainability. Green recovery is not just an economic recovery strategy, but a structural change that secures the long-term prosperity of rural communities and consolidates a sustainable and resilient future.

This paper, based solely on secondary data from a systematic literature review, lacks empirical validation, limiting insights into real-world implementation challenges. Language constraints may also have excluded relevant non-English or grey literature. Future research should focus on empirical case studies, participatory pilot projects, and comparative analyses

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across socio-ecological contexts to assess the model's applicability and explore trade-offs between recovery speed, equity, and sustainability. These efforts will strengthen both the theoretical robustness and practical relevance of the proposed framework.

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