Policy Brief

Forests as Pillars of Social and Economic Resilience

This publication is based on the report "Forests as Pillars of Social and Economic Resilience. A Global Assessment Report" published as IUFRO World Series Vol. 45 (2025).

Editors

Craig R. Allen
Nelson Grima
Viola Belohrad

For a full list of authors, see the report.

Layout

Jak Wagnon

Cover picture

Mango tree in Torem village, Burkina Faso © Tree Aid

Published by

International Union of Forest Research Organizations

ISBN 978-3-903345-37-9

Printed by

Ferdinand Berger & Söhne GmbH
Wienerstraße 80
3580 Horn
Austria

Funding support for this publication was provided by the German Federal Ministry for Economic Cooperation and Development, the Ministry for Foreign Affairs of Finland, the United States Forest Service, and the Austrian Federal Ministry of Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management. The views expressed within this publication do not necessarily reflect the official policy of the governments represented by these institutions/agencies or the institutions to whom the authors are affiliated.

Contents

Photo: The forests of Podocarpus National Park, Ecuador are essential to the social and economic resilience of surrounding villages © Viola Belohrad

Foreword

In the face of rapid and unpredictable change, the quest to build resilience has emerged as a policy imperative. Governments, international organisations and civil-society actors are seeking to integrate resilience into diverse areas of policy, with the aim of enabling communities and systems to cope with and recover from shocks and to strengthen their capacity to adapt and transform. Increasing resilience is essential for achieving the Sustainable Development Goals and ensuring a sustainable future for all.

Forests are indispensable for the social and economic resilience of communities, both locally and globally, because of their multiple roles in supporting livelihoods, underpinning food and water security, regulating climate, maintaining biodiversity, and performing many other functions. There is an urgent need to deepen understanding of the dynamic and complex feedback mechanisms between forests and human societies and to integrate resilience thinking into policy and management. With that in mind, the Global Forest Expert Panel on Forests as Pillars of Social and Economic Resilience, a joint initiative of the Collaborative Partnership on Forests led by the International Union of Forest Research Organizations, undertook a comprehensive assessment of the science on the multidimensional relationships between forests and social and economic resilience. This policy brief distils the main key messages of that effort. I am confident it will help inform holistic, effective and just policymaking that responds to rapid change.

Zhimin Wu

Director, FAO Forestry Division

Chairperson, Collaborative Partnership on Forests

Introduction

Forests, covering 31% of the Earth's land surface, are crucial for biodiversity, climate regulation, and human well-being. They also provide economic benefits through timber and non-timber products and offer cultural and recreational values. 95% of all people outside urban areas (around 4.2 billion people) live within five kilometres of a forest. Forests support 1.6 billion people directly and all global populations indirectly. Additionally, forests absorb a significant amount of global carbon emissions, making them vital in mitigating climate change. Despite their importance, forests face severe threats from, among others, climate change, deforestation, invasive species and land-use changes. Although deforestation has slowed in some regions, global forest cover is still declining. The Triple Planetary Crisis (climate change, biodiversity loss, and pollution) further accelerates forest degradation, creating feedback loops that increase vulnerability to disturbances such as pests and wildfires.

Forests and human communities form complex social-ecological systems (SES), where human activities impact forest sustainability both positively and negatively. SES resilience refers to the ability of human-nature systems to withstand stressors and shocks and to adapt and reorganise, if necessary. SES resilience includes the capacity of communities and economies to cope with disturbances (i.e., social and economic resilience). This policy brief presents the key messages from the scientific assessment "Forests as Pillars of Social and Economic Resilience" published as IUFRO World Series Vol. 45 in 2025. These key messages relate to how forests contribute to resilience and suggest pathways for sustainability. Integrating resilience thinking into policy and management can ensure that forests continue to support environmental stability, economic security, and social well-being.

The field of forest management is shifting from the traditional 'sustained yield forestry' towards holistic approaches that integrate ecological, social, and economic resilience. Approaches such as 'sustainable forest management' (SFM) and 'ecosystem management' prioritise biodiversity, human well-being and adaptive strategies to address climate change and socioeconomic pressures. Resilience theory, particularly SES resilience, plays a central role

in modern forest governance by recognising the dynamic, interconnected nature of forests. Although assessing resilience is a challenging task that includes defining goals that integrate social and ecological factors while navigating policy barriers, it is necessary to do so to be prepared for potential regime shifts. These shifts occur when disturbances push a system beyond its capacity to recover, often resulting in long-term and undesirable social-ecological change. Telecoupling, the potential of SES separated by geography and/or scale to interact with one another, further complicates resilience assessment and management, as seen in global deforestation linked to commodity markets.

Resilience is a property of complex adaptive systems, requiring governance strategies that balance ecological integrity, economic stability, and societal values. As forests continue to face climate-induced shocks, effective resilience-building must incorporate adaptive learning, polycentric governance, and proactive monitoring to sustain both, ecosystems and human communities. With this policy brief, we aim to provide some guidance on how to do so.

Photo: Timber is one of the many goods and services that forests provide. Carinthia, Austria.
© Gerda Wolfrum

Key Messages

01

Understanding and enhancing the resilience of forest social-ecological systems is key to ensure sustainable benefits

Forests are complex social-ecological systems. They encompass and are shaped by not only flora and fauna, but also humans, biophysical elements such as land or water, and importantly, the feedbacks and relationships amongst these components. Social components, ranging from individuals to societies and economies, interact with biotic and abiotic components in such a way that changes in one element can drive changes elsewhere, sometimes in unpredictable ways.

During much of the 20th century, forest policy emphasised a sustained yield management focused on continuous and often maximised supply of timber, where experts and centralised institutions managed forests assuming a relative stability and predictability. In many cases, this approach resulted in a declining quality and quantity of forests, social conflicts, and rural poverty. More recently, forest stewardship has turned to the concept of sustainably managing forests and to approaches focused on forest resilience.

Resilience assessments are important tools to better understand the drivers of resilience and vulnerability of forest social-ecological systems (SES), and to inform adaptive responses. Currently, however, resilience assessments are largely conducted in a retrospective manner, with rare instances of integration into forward-looking forest management approaches, which limits the potential benefits of such assessments. There is a need for further refinement of the conceptual and methodological tools for resilience assessment, as well as for the development of more effective mechanisms for engaging stakeholders and feeding results into decision-making.

Resilient forests help to keep humanity away from global tipping points and to avoid the 'Humpty Dumpty Effect', a situation where a complex system, once significantly disrupted, cannot be fully restored to its original state, even with considerable effort. **It is far simpler and safer to maintain and enhance the resilience of forest SES than to revert undesirable states. Therefore, forest SES resilience is a necessary policy and management goal for the future.**

Photo: Rainforests in Namdapha National Park, Arunachal Pradesh, India © Jitendra Raj Bajracharya, ICIMOD

Economic benefits of forests in numbers

Between 3.5 and 5.8 billion people make use of or are dependent on Non-Timber Forest Products (NTFP)

NTFP collection is not only for subsistence and culture but generates economic returns. For example, the international trade of pine nuts and forest mushrooms was worth USD 1.8 billion in 2022.

Global wood production is at record levels, at about 4 billion m^3 per year

In 2022, an estimated 2.04 billion m^3 of roundwood were harvested and 1.97 billion m^3 of wood were harvested for fuel.

Globally, more than 1.6 billion people depend directly on forests for their livelihoods

Of those, around 300 to 350 million are Indigenous People who live within or in close proximity to dense forests and depend almost entirely on forests for subsistence.

Coastal and mountain forests protect against landslides and extreme weather

In the EU, storm protection through forests is expected to reduce climate-related costs by up to 35% by 2050.

About 33 million people (1% of global employment) are estimated to work directly in the formal and informal forest sector

Ecosystem services and other non-marketed goods from forests and other ecosystems account for up to 89% of the total source of livelihood for rural and forest-dwelling poor households

Forests provide key benefits for enhancing social and economic resilience, both locally and globally

02

Forests provide direct and indirect benefits at multiple scales for the resilience of social and economic systems, ranging from individuals to societies, both proximate and distant. Forest-dependent communities have livelihoods and lifeways that are strongly dependent and connected with the forests themselves, and their resilience is inextricably linked to the resilience of the forests as a very tightly coupled social-ecological system. Other forest proximate communities, including urban ones, are not as dependent upon direct forest contexts and their products, but their resilience is enhanced by forest proximity. Benefits they derive include access to places of meaning, products and services such as timber and non-timber forest products, clean water, recreation, and many others. Distant communities are affected by the status of forests in a more indirect manner, since forests provide them mainly with key benefits such as global biogeochemical cycles like carbon sequestration, or benefits related to biodiversity.

Forests are highly beneficial locally and globally for mitigating the effects of shocks (and undesired change in general) on social and economic systems, and for providing sources of adaptation as humanity copes with a rapidly changing planet.

03

Generally, forest resilience is declining, and the combined impact of climate change and other disturbances poses critical threats to forest social-ecological systems

The resilience of forests varies geographically, and larger forests with higher diversity are often more resilient. Although there is some partial and fragmented good news, in general, forest resilience is declining as forests face increasing pressures from growing demand for products and alternative land uses such as agriculture, which are driven by increasing human populations and consumption and the escalating throughput of economies. Attempts to maximise production at the cost of other ecosystem services can lead to trade-offs that undervalue services other than timber production and can indirectly cause forest ecosystem collapse.

Stressors that affect forests have increased to the point that local and global tipping points are being approached, and in many cases, may already have been exceeded. These threats are particularly pronounced for forest-dependent communities across the Tropics living in landscapes of frontier dynamics and rapid commodity expansion, land appropriation, and land use change. Additionally, economies are connected at global scale, and activities carried out in one region of the world, such as increasing consumption of an agricultural product in a particular country, can drive pressure on forest on the other side of the world, where that product is produced. **This increasingly telecoupled reality of contemporary systems means that those experiencing most burdens are often not those driving negative changes for short-term benefits, which raises important equity and justice concerns.**

Photo: Agribusiness expansion poses critical threats to forests and forest-dependent Indigenous and local communities in some areas of Cameroon
© Viola Belohrad

04

Governance of forest social-ecological systems can enhance resilience with adaptive and transformative approaches, but is currently uneven and sometimes inequitable

Forest governance and institutions are the rules, policies, and laws enacted to shape forest access, use, and management, and fundamentally affect the resilience of forest social-ecological systems. Both formal and informal governance and institutions, not only from the forest sector but also from the many other sectors that influence forests, steer forest system priorities, including what is considered the desired state of a forest social-ecological system, who benefits or loses from the current state of the forest and management policies, and how to respond to rapid changes.

There is a need to address the power relations and the resistant but undermining structural legacies in which forest governance is embedded. Historically, the institutions of Indigenous and forest-dependent peoples have often been weakened, suppressed, or overlooked and dismissed in favour of global economic priorities and groups holding hegemonic power. Human rights and justice needs should be addressed and rectified by engaging more inclusive, equitable, iterative, and adaptive governance approaches that adequately weave and bridge plural knowledge systems and practices.

Adaptive governance, i.e. flexible, inclusive, and iterative approaches to managing social-ecological systems, is essential to ensure that forests remain a source of resilience. Adaptive governance involves connecting actors and institutions at multiple levels to enable the effective stewardship of ecosystems in the face of shocks or disturbances, along with fostering flexibility, self-organisation, collaboration, learning and experimentation.

Many forests are already in less desirable states or have highly compromised resilience. Determining what is desired is inherently subjective and context dependent, involving multiple perspectives and attention to inclusiveness, justice, equitability, and trade-offs. Transformative governance aims to intentionally shift a social-ecological system to a more desirable, novel, self-organising state. Transformative governance builds on adaptive governance, but requires additional capacities such as exemplary leadership, innovation, and systemic investments to disrupt existing system drivers. Transformation is a risky endeavour, but one with potentially high returns.

Governance and institutional attributes of resilience

1. Polycentric, multilevel, and networked governance
2. Participation
3. Collaboration
4. Self-organisation and networks
5. Adaptive and flexible processes
6. Innovation from learning
7. Equity and inclusion
8. Plural knowledge systems in use
9. Social learning
10. Accountability
11. Legitimacy
12. Transparency, trust, low corruption
13. Exemplary leadership

05

Forest-focused interventions are unlikely to be sufficient in building resilience independent of other, complementary policy interventions

A broad range of interventions is currently available to address threats and enhance forest resilience. However, no silver bullet or one-size-fits-all solution exists, and an adaptive mix of approaches fitted to and linked across different settings and scales is necessary. Examples of response options with significant resilience enhancing potential are: integrated-fire management; community-based agroforestry; adaptive collaborative management of forests; and recognising and securing land and resource rights of Indigenous Peoples and local communities. Forest landscape restoration and innovations such as digital technologies and Nature-based Solutions offer promising pathways to enhance forest resilience and climate adaptation, but they require equitable access, supportive policies, fair financing, and a focus on community-led processes that prioritise local needs and interests.

Integrating key resilience-enhancing attributes into policy and management is critical for the future of forest social-ecological systems, including:

1. **Maintaining diversity and connectivity with feedbacks**
2. **Supporting biophysical capital/assets**
3. **Supporting social and economic capital/assets and well-being**
4. **Promoting well-functioning polycentricity**
5. **Enhancing adaptive capacity**
6. **Fostering transformative capacity**
7. **Enhancing equity and justice**
8. **Providing for longevity and sustained support**
9. **Supporting locally-led and place-based solutions**
10. **Promoting plural values**

A key challenge is that the drivers of forest loss and degradation tend to arise outside of the forest sector and are often associated with disproportionately powerful agendas that can drive decline. As social-environmental pressures intensify, transformative changes that address both the proximate and distal drivers of forest decline and emphasise collective action, social equity, and environmental sustainability are essential to unlocking the full potential of forests to support resilient and thriving communities. Integrated, interactive, inclusive, adaptive, and 'connected conservation' approaches (involving coalitions of diverse actors across sectors and scales) offer frameworks to address multiple challenges to forests. Acknowledging the expanding evidence that the dominant capitalist development model's approach to wealth accumulation can drive environmental collapse, underscores the importance of a cross-sectoral focus directed at a system-level transformation, which may require new, rare, or unconventional approaches to ensure sustainable development and resilience.

Major Knowledge Gaps

In order to ensure resilient forest social-ecological systems, decision-makers should prioritise and fund research that addresses the following knowledge gaps:

1. What are the key drivers of resilience in forest SES?	▪ What are the key drivers of forest SES resilience and at what scales do they operate? ▪ What are the most important relationships and feedbacks? ▪ What are the critical thresholds present in particular forest SES?
2. How can we quantify forest SES resilience?	▪ What methodological approach(es) are most appropriate for assessing resilience in forests SES? ▪ What attributes matter the most, and why? ▪ What early warning indicators might be appropriate for detecting the loss of resilience in forest SES? ▪ What is the relative resilience of different forest types and regions globally?
3. What adaptive approaches can best serve forest SES?	▪ What are the alternative states and futures possible for forests? ▪ How do we ensure positive outcomes of transformative change? ▪ How does science best inform learning and decision-making processes? ▪ How do we assure voice and agency for marginalised stakeholders?

4. How do we prioritise governance, management, and policy options to enhance forest SES?	▪ What are the alternative states and futures possible for forests? ▪ How do we ensure positive outcomes of transformative change? ▪ How does science best inform learning and decision-making processes? ▪ How do we assure voice and agency for marginalised stakeholders?
5. How do we best communicate forest SES resilience benefits?	▪ How do we communicate better the importance of forests and their contributions to social and economic resilience? ▪ What modes of communication are better? ▪ How should communication vary with locations? ▪ How do we best communicate the consequences of low resilience?
6. How to equitably distribute benefits and burdens associated with forest SES?	▪ How can Indigenous Peoples' self-determination foster more equitable solutions? ▪ What are the trade-offs across benefits and across groups? ▪ What are the costs associated with trade-offs? ▪ How do we ensure transparency, legitimacy, and accountability?

Acknowledgements

This publication is based on the report "Forests as Pillars of Social and Economic Resilience. A Global Assessment Report" published as IUFRO World Series Vol. 45. We express our sincere gratitude to all panel members, authors, and reviewers.

We also gratefully acknowledge the generous financial and in-kind support provided by the German Federal Ministry for Economic Cooperation and Development, the Ministry for Foreign Affairs of Finland, the United States Forest Service, and the Austrian Federal Ministry of Agriculture and Forestry, Climate and Environmental Protection, Regions and Water Management.

Furthermore, we would like to thank the member organisations of the Collaborative Partnership on Forests (CPF) for providing overall guidance to the Expert Panel. Our special thanks go to the IUFRO Secretariat for providing indispensable administrative and technical support to the work of the Panel.

A short publication such as this cannot do justice to all the complexities and controversies related to forests and social and economic resilience. For a more comprehensive assessment, the reader is directed to the Expert Panel's full report.

Craig R. Allen

Nelson Grima

Viola Belohrad

Photo: Mangrove restoration in Malaysia © Alexander Buck

Photo: Atlas Mountains in Morocco © Alexander Buck

GFEP donors:

CPF Members:

CPF
Collaborative Partnership on Forests

IUFRO
Interconnecting Forests, Science and People

This publication is based on the report "Forests as Pillars of Social and Economic Resilience. A Global Assessment Report" published as IUFRO World Series Vol. 45 (2025).