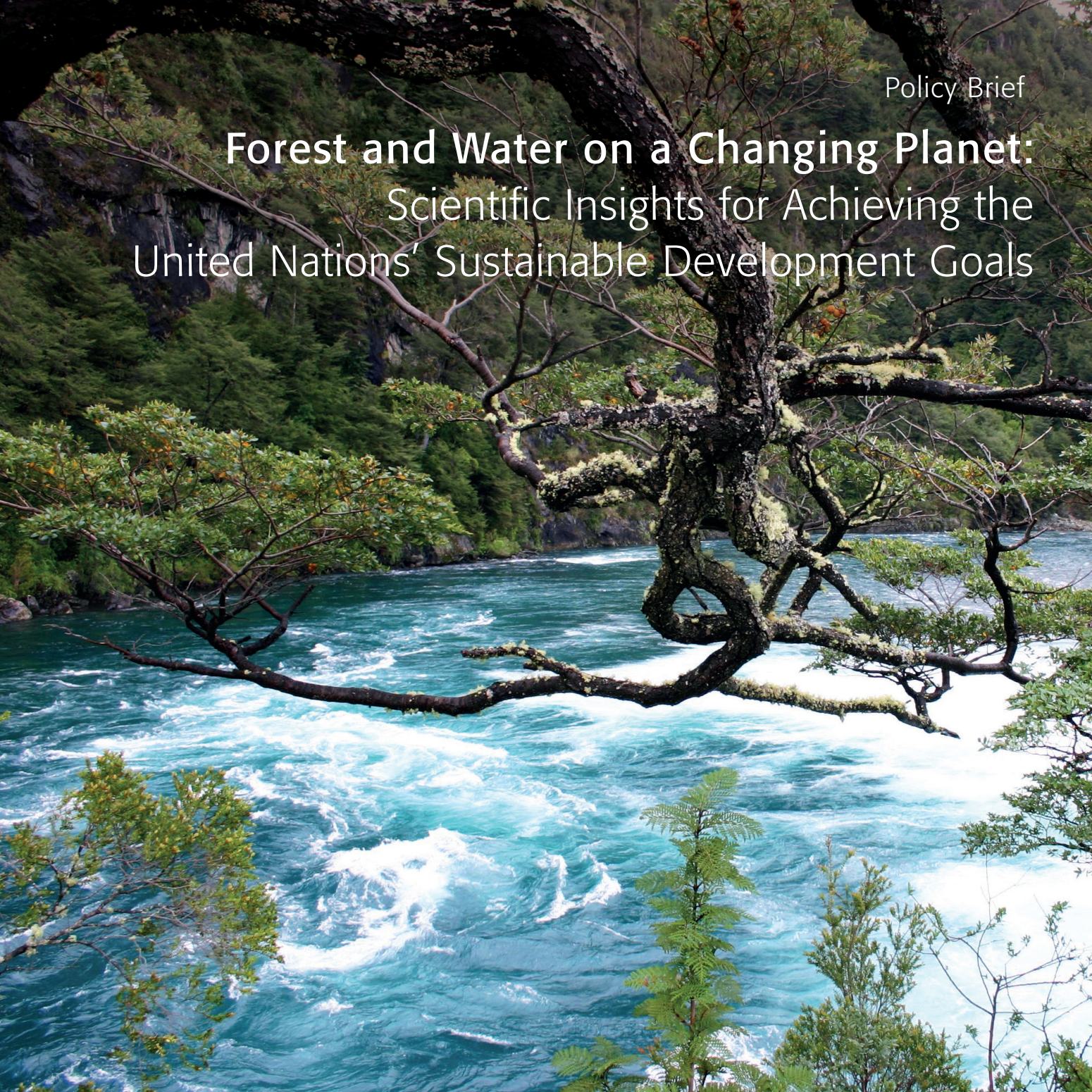

Policy Brief

Forest and Water on a Changing Planet: Scientific Insights for Achieving the United Nations' Sustainable Development Goals

This publication is based on the report *"Forest and Water on a Changing Planet: Vulnerability, Adaptation and Governance Opportunities. A Global Assessment Report"* published as IUFRO World Series Volume 38.

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Photo: Leaf area is an important measure for the water use of trees – © iStock: Keikona

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Foreword

All life on Earth needs water, making it one of the planet's most precious resources. Most of this water comes from forested watersheds, but as the global population grows and the pace of climate change accelerates, demand is rising rapidly. This poses a critical question: what can people do for forests and forests do for people to ensure the sustainable supply of quality water for their mutual health and wellbeing?

This key question is addressed in a new and comprehensive scientific assessment report published by the Global Forest Expert Panel (GFEP) on Forests and Water, a Collaborative Partnership on Forests (CPF) joint initiative, and led by the International Union of Forest Research Organizations. The present policy brief summarises the report's main findings and aims to inform international policy processes, in particular the 2030 Agenda for Sustainable Development and the implementation of related Sustainable Development Goals (SDGs). At its upcoming July 2018 session, the United Nations High-Level Political Forum on Sustainable Development will review not only SDG 15 on life on land but also SDG 6 on clean water and sanitation. The policy brief's publication is thus timely.

In summarising forests' vital and comprehensive roles in achieving the SDGs holistically, the policy brief's key messages emphasise the importance of addressing the complexity of climate-forest-water-people linkages to support informed decision-making and the development of science-based policies. Governments and other stakeholders working towards successful SDG implementation should be encouraged to start from the premise that water is central to attaining almost all of the Goals, and that forests are intrinsically and inseparably tied to water and vice versa. Policy and management responses must therefore focus on multiple water-related objectives across all SDGs, based on approaches that yield multiple benefits.

Peer-reviewed scientific inputs, through initiatives such as the CPF's GFEP, can help foster innovative strategies and achieve proven solutions. This policy brief and the associated scientific assessment report are thus important tools for informing policy-makers and stakeholders in their ambition to ensure sustainable development and access to clean water for all, founded on sustainable forest-related ecosystem services.

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Photo: Blue Nile falls in Tis Abay, Ethiopia – © iStock: Joel Carillet

Introduction

Water security is key to achieving the United Nations' Sustainable Development Goals (SDGs). In what has been called a new era of the Anthropocene, the changes we are inflicting on our planet are influencing the current and future availability of ecosystem services of importance to our survival. And provision of clean water is the most basic ecosystem service necessary for life on earth. Yet, increasingly we are facing water shortages, and an estimated four billion people do not have sufficient access to safe and reliable water.

Whereas the link between forests and climate is regularly considered in decision-making, that between water and forests remains under-represented. Even more importantly, water, forests and climate are intrinsically interlinked, but this relationship is still poorly understood when it comes to decision-making.

Forests influence water resources in multiple ways, and at multiple levels. Generalisations fail to capture these intricate interlinkages. Soils, rooting depth, leaf area and stems are key features of trees and forests that determine the way an individual tree uses water and consequently, its impact on water resources. Species diversity and age structure of a forest in turn influence the above four key factors. At landscape scales, the diverse mosaic of land use that typifies human-dominated landscapes, also determines the way forests and trees are able to influence water availability and quality. Recent recognition of the role of forests in downwind generation of precipitation further expands the geographical scope of the intricate relationship between water and forests.

Today, the fact that the world has mobilised around 17 SDGs, all of which have a connection to water, provides a crucial argument for paying more attention to the forest-water link. Policymakers are facing new challenges in implementing the multiple water-related objectives across the portfolio of SDGs. While the international community agreed the SDG framework based on moral principles, science is essential for developing the policies and practices required in achieving the related targets.

Led by IUFRO, the Collaborative Partnership on Forests' Global Forest Expert Panels (GFEP) initiative undertook a comprehensive scientific assessment of the state of knowledge on the forest-water relationship. This policy brief summarises the key messages of the report completed by the GFEP on Forests and Water.

Photo left: Men drawing water from Itare River – one of the water towers in Kenya – © Sande Murunga/CIFOR
Photo right: Flooding in forest after a heavy storm – © iStock: VioNet

KEY MESSAGES

01 The link between water and forests exists within a broader climate-forest-water-people system

Forests and forested landscapes regulate the provision of water and water-related ecosystem services within a larger climate-forest-water-people system. Although linking up the four elements of the system creates complexity, they are inextricably connected and must be considered as part of one whole system. Feedback loops between the four dimensions of this system influence each other. For example, climate change, caused by human activity, influences tree dieback which affects water quality and availability. Similarly, forest management for the single purpose of increasing carbon capture to mitigate climate change, influences water quality and quantity. Growing demand for water from an increasing human population will be amplified by water scarcity because of climate variability and change.

Water is both a local and a global resource that does not respect political and national boundaries. Transboundary water-related conflicts typify the challenges related to the interlinkages between the four elements of the system. In particular, climate change and climatic variability exacerbate the uncertainty of the delivery of forest-water related ecosystem services.

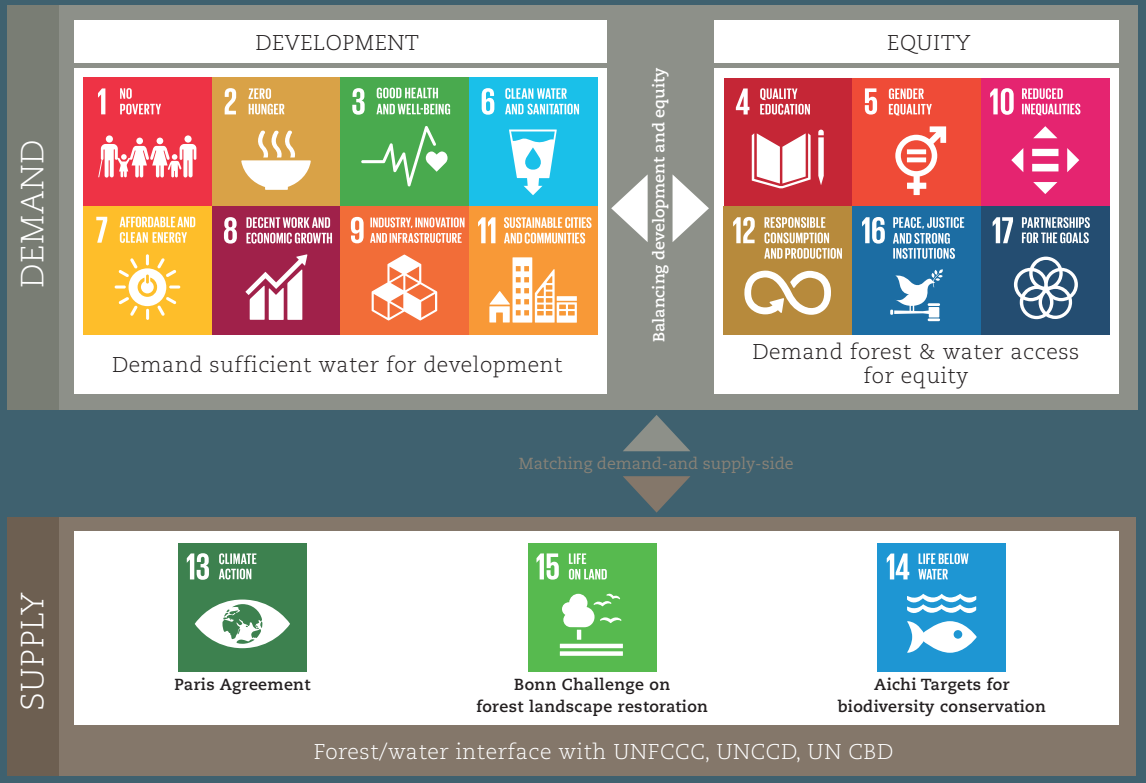
Changes to the coupled climate-forest-water system will affect the delivery of related ecosystem goods and services and associated development options. Impacts and consequences of these changes will not be distributed evenly across geographical, social or economic boundaries.

02 Water is central to all 17 SDGs

All of the SDGs are either directly or indirectly related to water and the forest-water nexus. Eight SDGs require an increased supply of safe, secure and reliable water. Six SDGs address social justice and equity, and their attainment will reduce injustice and inequity in access to forests and water. The remaining three SDGs build and maintain an ecological infrastructure that supports the other 14 SDGs by adapting to climate change and securing the integrity of the terrestrial and aquatic parts of the planetary system.

It is increasingly apparent that the SDGs cannot be tackled individually. Instead, a multi-objective approach is required, which manages and optimises the trade-offs. This is particularly important in climate-forest-water-people interactions that constitute the focus of the GFEP assessment on forests and water.

SUSTAINABLE DEVELOPMENT GOALS (SDGs) IN RELATION TO FOREST AND WATER



03 Forests, especially natural forests, contribute to the resilience of water supply for humans

The majority of the estimated four billion people facing insufficient access to clean water live in areas with low forest cover, and most of them depend on engineered infrastructure that redistributes water across watershed boundaries. Forests and tree cover can be a cheaper and multi-benefit approach to water management. Preservation of existing native forests and better-informed management of planted forests, are especially critical in areas with low forest and tree cover.

Natural forests improve resilience of water supply in the face of disturbance, climate change and climatic variability. Changes – both natural and anthropogenic – in natural forests may be undermining this resilience that cannot be fully replaced by tree planting efforts. Climate change and climatic variability and their impacts on natural forest health are reducing the already challenged capacity of forests to secure predictable water flows. Hence, preservation of existing native forests should be a priority in the face of changing climate and associated increased probability of extreme weather events and related hydrological disturbances.

04 Forests can be managed for resilience of water supplies to enable adaptation to global change

Forest management practices can increase the resilience of forests and also of water resources. An increase in forest cover will generally have positive effects at local scales (e.g. on temperature and wind speeds), reduce water availability at landscape scales in non-tropical regions, and increase precipitation downwind in some places, at some times.

While the recovery of aboveground benefits (e.g. freshwater supply) is feasible within a few years, recovery of belowground benefits (i.e., infiltration and recharge of groundwater) is often a slower process, counted in decades rather than years. Water availability may constrain forest growth and management. Choices concerning increasing forest cover may also be influenced by water availability, especially when this is done through planting rather than natural regeneration.

Securing acceptable water quality may be at the expense of water quantity as there are trade-offs between the magnitude and regularity of water flows and associated water quality. These trade-offs depend on the type, density and distribution of tree cover, and require location-specific assessment. The collective body of scientific knowledge indicates that managing forests for water depends on selecting the right tree at the right place at the right time.

05 International and regional institutional and governance frameworks can play a key role in optimising climate-forest-water management

Improved governance of the climate-forest-water nexus requires higher levels of collective action and increased coordination across sectors and spatial scales. International governance can help to establish norms (such as the SDGs), provide fora in which norms can be discussed, negotiated and agreed upon, and create opportunities for assessing progress. National level governance that emphasises cross-sectoral approaches is important in recognition of the intricate linkages across the forest-climate-water system. Furthermore, governance systems characterised by polycentrism (with multiple centres of power and multiple levels of decision-making) may provide opportunities for reconciling interests in decentralised decision-making and at the same time provide for national and international coordination of policy objectives.

Any new institutional arrangement should be sensitive to distributional concerns, as well as to social and environment justice and equity, in particular, the rights of marginalised and vulnerable communities. Regulations and rights-based approaches to climate-forest-water relations provide an essential foundation for innovation in forest-water governance.

Incentive-based mechanisms present opportunities for coordination of interests and concerns in climate-forest-water management but must respect the rights of local, indigenous and other vulnerable communities. Market-based instruments are increasingly used as strategies to involve non-state actors in resource governance. Existing and potential future commitments to achieve deforestation-free product and value chains present opportunities for the coordination of up- and downwind, as well as up- and downstream interests and concerns.

06 A clear policy gap in climate-forest-water relations exists, waiting to be filled

The role of forests in current climate policy is essentially limited to targets to reduce net greenhouse gas emissions and to increase carbon storage. However, ill-conceived and poorly-defined local-scale efforts to increase carbon storage may reduce local water availability. Placing water at the centre of discussions of forest-climate interactions in areas of water scarcity will ensure the consideration of water impacts generated by carbon-centred forestation strategies. More balanced measures can be promoted through policies that take into consideration these different elements of the overarching climate-forest-water-people system. Linkages across the SDGs provide a further opportunity to design policies that straddle these divides and can address multiple objectives.

07 Outstanding knowledge gaps on the forest-water nexus must urgently be tackled

A series of regional assessments should complement and extend the current global GFEP assessment. Major knowledge and data gaps need to be filled to inform these regional assessments, including the following:

- Specific characteristics of both native and managed forests (e.g., tree species, ages, densities, etc.) that contribute to sustained season and annual water yield, by geographic region.
- Specific locations of forested areas which are most important as sources of water to ecosystems and to both downwind and downstream water users.
- Range of variability of forest water quantity and quality as a function of climate change and climatic variability across geographic regions.
- Comparison of changes in water quantity and quality across different land uses.
- Knowledge of how forests and the water that comes from these forests are perceived and valued by local people.

Photo: Spring in the temple forest of Dakshinkali, Nepal – © Dipak Gyawali

Climate, forest, water and people are closely intertwined and exhibit the features of a complex system. Understanding these interlinkages and feedback loops will support more effective and integrated policymaking and represents an important contribution towards meeting the SDGs. In turn, a more unified approach to tackling forest-water-climate challenges will benefit the health of our planet.

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A short publication such as this cannot do justice to all the complexities and controversies related to the linkages between forest and tree-based systems and water. For a more comprehensive assessment, the reader is directed to the Panel's full report. Nevertheless, the guiding thread running through both the full report and this policy brief is the importance of a greater understanding of the forest-water-people nexus, the effective management of landscapes and improved governance. It is our sincere hope that the policy brief may effectively assist policy- and decision-makers in tackling the challenges in achieving the Sustainable Development Goals in a holistic manner and in enhancing policy coherence for sustainable development.

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