



منظمة الأغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Продовольственная и  
сельскохозяйственная  
организация  
Объединенных  
Наций

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON FORESTRY

### TWENTIETH SESSION

Rome, Italy, 4-8 October 2010

## FOREST BIODIVERSITY, FIRE AND WATER IN THE CONTEXT OF CLIMATE CHANGE

### Forest and water in the context of climate change

1. Forests influence the amount of water available and regulate surface and groundwater flows while maintaining high water quality. Forests and trees contribute to the reduction of water-related risks such as landslides, local floods and droughts. Forested watersheds supply a high proportion of the water for domestic, agricultural, industrial and ecological needs in both upstream and downstream areas. The availability and quality of water in many regions of the world is increasingly threatened by overuse, misuse, pollution and the impacts of climate change. A key challenge faced by land, forest and water managers is to maximize the wide range of forest benefits without detriment to water resources and ecosystem function. This challenge increasingly reinforces the importance of sustainable forest management.

2. In arid and semi-arid areas the role of forests in the water cycle is very much debated and can even be controversial. Forests are obviously important consumers of water and accordingly reduce the water availability for other land use systems such as agriculture and grazing. On the other hand, trees and forests provide important ecosystem services such as shading effects, improved infiltration, improved water quality and protection against soil degradation and erosion. Sustainable forest management in arid and semi-arid areas therefore needs to carefully weigh these trade-offs and come up with balanced solutions.

3. Climate change will very likely have an important adverse impact on the availability and quality of water in many regions of the world. The Fourth Assessment Report of the IPCC forecasted considerable changes in the amount and temporal and spatial variation of precipitation in every region. While increased water availability is expected in the moist tropics and in higher altitudes, decreasing precipitation and soil moisture are likely to adversely affect other areas such as for example large parts of Africa, Central, South and East Asia, Southern and Eastern Australia and in New Zealand, Southern Europe, in Amazonia and semi-arid areas of Latin America, the

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already water-stressed areas of North America and several of the small islands<sup>1</sup>. The consequences of these changes could be far reaching and substantive: forest productivity may increase in some regions but, in others, vegetative cover could experience drastic decline. In areas where precipitation increases or its patterns change, harmful impacts could include torrential rain, floods and landslides, with negative consequence for a.i. human lives, infrastructure and water quality.

4. Trees and forests can reduce the incidence of erosion, landslides and floods and the impacts of desertification exacerbated by climate change. However, they themselves are vulnerable to climate change. Reduced and more erratic rainfall and runoff will influence the vitality, resilience, and even survival of trees and ecosystems. Action needs to be taken to reduce forests' vulnerability and enhance their resilience to climate change with the aim of ensuring continued provision of forests' vital ecosystem services and protective functions. These adaptation measures need to be consistent with sustainable forest management principles and practices based on improved knowledge of the functioning of forest ecosystems.

5. Forests' role in climate change mitigation is well recognised and there exist ambitious initiatives, in particular those related to REDD-plus, to tap into the opportunities offered by forests and forestry. It should be emphasized however that forests can only take up carbon if they take up water at the same time. Since part of the price of carbon sequestration is paid in water this will also accentuate the debate about the role of forests in the hydrological cycle and in particular about the trade-offs between the water consumption of forests and the ecosystem services (including climate change mitigation) they provide.

6. To address all these challenges, enhanced synergy is needed between the water and forest communities, through institutional mechanisms aimed at implementing action programmes at the national and regional levels. Similarly, there is an urgent need for an even better and regionally differentiated understanding of the interactions between forests and water, particularly in the context of climate change, and for embedding the research findings into policies.

7. The topic on forests and water has been receiving increasing attention and gaining momentum over the last three years. This process started in November 2002, when an FAO supported International Expert Meeting on Forests and Water was held in Shiga (Japan) as part of the 3<sup>rd</sup> World Water Forum. More recently an important momentum was the endorsement of the [Warsaw Resolution 2 "Forests and Water"](#) of the Ministerial Conference on the Protection of Forests in Europe (now Forest Europe) in November 2007. Since 2008, a number of events on forests and water were organised by FAO or key partners, each of them looking at the issues from a slightly different perspective:

- The 26<sup>th</sup> Session of the European Forestry Commission's Working Party on the Management of Mountain Watersheds, August 19-22 2008, Oulu, Finland;
- The III International Conference on Forests and Water, September 14-17 2008, Mragowo, Poland;
- The Plenary Session on Forests and Water held during the European Forest Week, October 20-24 2008, FAO Headquarters, Rome, Italy;
- The International Conference "Water and Forests: a Convenient Truth?", October 30-31 2008, Barcelona, Spain;
- The workshop on Forests and Water, May 12-14 2009, Antalya, Turkey;

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<sup>1</sup> IPCC: Climate Change 2007 Synthesis Report. Summary for Policy Makers (Geneva, Switzerland, 2007) p. 11.

- The Forests and Water Sessions and Side Event, October 18-25 2009, at the XIII World Forestry Congress in Buenos Aires, Argentina; and
- The Forests and Water Session, April 29 2010 during the 35<sup>th</sup> Session of the European Forestry Commission, Lisbon, Portugal.

8. These events highlighted the gaps and misconceptions which still persist and the need to translate scientific knowledge into tools that can be used by policy-makers, the need to create national and transboundary institutional capacity able to bring together all actors as well as to share among countries existing experiences related to joint forest and water management.

9. These various initiatives over the last three years were essential in furthering the dialogue on forests and water. However, in spite of its importance, the topic is still not receiving adequate attention of the international community. FAO is fully committed to move this agenda forward. In close collaboration with key partners<sup>2</sup> which took the lead in the different events mentioned above FAO took the initiative of synthesizing the recommendations resulting from this process in order to propose future actions and help develop a comprehensive and practical international forests and water agenda.

10. The recommendations to forest and water policy-makers and practitioners, which resulted from the various forests and water events, can be divided into three main categories: policy, financial mechanisms and research. Many of the proposed actions explicitly address climate change, while others would necessarily have to take into account climate change adaptation and mitigation needs and opportunities.

a. Policy recommendations:

- Develop an overview of existing national management schemes, legislative guidelines and principles with regard to forests and water, and on this basis assess the possibility for developing guidelines on forests and water;
- review national legislation relevant to forest and water management to harmonize the provisions and streamline the terminology between the forest and water sectors;
- strengthen institutional mechanisms enabling management of transboundary water resources;
- encourage a cross-sectoral approach in order to prevent possible conflicts between different sectors. Related to climate change, trade-offs and synergies between adaptation and mitigation measures need to be considered.

b. Recommendations related to Financial Mechanisms:

- Explore the mechanisms, feasibility and financial benefits of payment schemes for water-related forest ecosystem services;
- develop efficient economic tools to evaluate water-related ecosystem services provided by forests;
- develop cross-sectoral projects on payments for ecosystem services (PES), embedding strategies to address adaptation to climate change when appropriate. In this context, take account of the “Guidance on Water and Adaptation to Climate Change”<sup>3</sup> and the “Recommendations on Payments for Ecosystem

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<sup>2</sup> Key partners included the Government of Switzerland, the Government of Turkey, the Finnish Forest Research Institute (METLA), the Instytut Badawczy Leśnictwa, Poland (IBL), the UNECE Water Convention, Forest Europe, the European Forest Institute through EFIMED, the Latin American Network for Technical Cooperation in Watersheds (REDLACH) and the United Nations University.

<sup>3</sup> [http://www.unece.org/env/documents/2009/Wat/mp\\_wat/ECE\\_MP.WAT\\_30\\_E.pdf](http://www.unece.org/env/documents/2009/Wat/mp_wat/ECE_MP.WAT_30_E.pdf)

Services”<sup>4</sup> developed by the UNECE Water Convention with a wide range of stakeholders.

c. Recommendations for Research:

- Develop long-term monitoring systems to detect quantitative and qualitative changes of water resources within and from forested catchment areas;
- assess the impacts of specific stand structures and compositions on water uptake;
- further investigate climate change associated disturbances in the water cycle and the role of forests in mitigating these impacts;
- develop practical tools for analysing vulnerability and options for adapting forest ecosystems to climate change; assess expected impacts of modified stand structures and compositions on water uptake / water cycle;
- ensure an effective communication of research results to policy-makers.

### POINTS FOR CONSIDERATION

**11. The Committee may wish to:**

- review critical issues and knowledge gaps; lessons learned; as well as challenges and opportunities, including those in cross-sectoral cooperation, related to forests and water in the context of climate change and give recommendations to FAO for its future work on forests and water and consider this issue further in addressing agenda item 8 Programme Priorities for FAO Forestry.

**12. The Committee may wish to urge countries to:**

- intensify work in the area of forest and water in taking into account the outcome of related international initiatives as presented in paragraph 10. The Committee may wish to request FAO to assist Member Nations in this regard.

**13. The Committee may wish to take note of the synthesis report being prepared by FAO and request the Organization to include the results of its considerations in that document.**

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<sup>4</sup> [http://www.unece.org/env/water/publications/documents/PES\\_Recommendations\\_web.pdf](http://www.unece.org/env/water/publications/documents/PES_Recommendations_web.pdf).