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## **Will northern forests be able to stand the heat?**

***Boreal forests are especially sensitive to global warming and are likely to be severely affected by climate change.***

(Copenhagen, 13 December 2009) – In international climate change negotiations, forest-related deliberations have so far mainly focused on mitigation, rather than adaptation. However, in the particularly vulnerable boreal regions, climate change is progressing too quickly to postpone adaptation action. Flexible approaches tailored to local situations must go hand in hand with substantial reductions of carbon emissions from fossil fuel and deforestation. Otherwise forests are at high risk of entirely losing their carbon-regulating services. This would, in turn, seriously accelerate climate change, a fact that has not yet been fully considered in current model generation.

In total, around 210% of the carbon in the atmosphere is stored in forest ecosystems and the boreal biome, which is the second largest terrestrial biome with one third of the Earth's forested area, has been estimated to contain up to 30% of all carbon stored in the terrestrial biomes. It mainly includes forests in North America, the Nordic countries and Russia. This region is expected to experience more warming than equatorial zones and its temperature-limited forests will therefore particularly suffer. Higher temperatures along with prolonged droughts, will lead to more intense pest infestations, fires and other environmental stresses that consequently will cause considerable forest degradation and destruction.

Today, research points us to the fact that there are options to reduce the vulnerability of forest ecosystems and to help forests adapt to climate change. Coinciding with the UNFCCC Climate Summit, the Forest Day 3 Learning Event on 13 December 2009 co-hosted by the International Union of Forest Research Organizations (IUFRO) and the European Forest Institute (EFI), looked at these options and informed participants about key impacts and vulnerabilities as well as priorities for adaptation and implications for forest management. This learning event confirmed the key findings of the Global Assessment Report on *Adaptation of Forests and People to Climate Change* that was published in April 2009 by IUFRO and which presented the state of scientific knowledge of current and projected impacts of climate change on forests and people along with options for adaptation.

According to the report, climate change is expected to affect the distribution of forest types and tree species. Evidence from past climate changes shows that tree species respond individually, but for the boreal domain a shift of the entire biome to the north is expected although the time frame for this shift is uncertain. At first, higher temperatures and precipitation could lead to increased growth and substantial gains in the supply of timber, as a study on the *Impacts of climate change on the growth of managed boreal forests in Finland (Kellomäki et al. 2008)* shows, but in the end the positive effects of such growth will most likely be outweighed by the increased prevalence of fire, storms, pests and diseases.

Therefore, forest managers need to support the adaptive potential of forests. “Taking into account local circumstances, fine scale local adaptation in itself is a challenge in the face of rapid climate change – but also reveals a unique property of tree species to adapt to environment“, said Professor Erik Dahl Kjær, Head of Research of the School for Forest, Landscape and Planning at the University of Copenhagen, at the Learning Event. In his presentation he borrowed a metaphor from Lewis Carroll’s ‘Through the looking-glass’. There the Red Queen tells Alice that in Wonderland she needs to run as fast as she can just to keep staying under the same tree. Now, due to human induced climate changes, it is the trees that will have ‘to run as fast as they can’ to stay adapted.

To help them win the race, there is a need to reduce vulnerability of forest ecosystems by reducing their exposure to climate change, decreasing their sensitivity and maintaining or increasing their resilience. Following the observations and thoughts of Charles Darwin 150 years ago, one way of achieving this goal is supporting natural selection by ensuring that forests rest on a highly diverse genetic foundation suitable for this natural selection to work. In addition, measures such as cutting forest fuel loads, planting hardier species, increasing reservoir storage capacity to help avoid water stress in drought conditions, or thinning overstocked stands need to be implemented as part of sustainable forest management.

“Policy makers should focus greater attention on helping forests and the people who live around them to adapt to anticipated problems,” confirmed Professor Risto Seppälä from the Finnish Forest Research Institute (Metla) and Immediate Past President of IUFRO, who chaired the expert panel that produced the Global Assessment Report. And he emphasized, “Wider application of well-understood sustainable forestry practices, which offer a range of benefits, could help forests avoid some of the damage induced by climate change.”

So, planning how to manage forests in order to make them fit for climate change is a first step towards adapting. In this planning process, however, it is imperative to integrate the people who live in or from the forest. Their livelihoods will be severely threatened by the expected increases in extreme weather events such as heat stress, drought, storms, and flooding and their related impacts. Many forest-dependent indigenous peoples and local communities hold traditional knowledge about the sustainable forest and water management that can help them respond to climate change stress, and such local knowledge can complement formal science.

At the Learning Event, Ms. Rose Kushniruk, a representative of the Champagne-Aishihik First Nation in Yukon, Canada, presented an existent example of such a successful participatory approach. “It was the severe spruce bark beetle infestation in the Yukon region that made the community people realize how their values were being impacted”, said Ms. Kushniruk. As a response, the Champagne-Aishihik First Nation Traditional Territory’s Forest Management Plan was set up. The plan emphasizes the local situation and its purpose is to provide direction for sustainable forest management in the area.

Ms Kushniruk explained, “From a global perspective, the change we need is overwhelming and people at times in the north don’t know how to react to that, it makes you feel hopeless in your little corner of the world. But we need to do small

things at the community level and to meaningfully incorporate and truly listen to all levels of knowledge, pool that knowledge. The knowledge we get from western science, local people and aboriginal people, when combined, is very powerful and respected. We need to start small at the community, find local community champions to move this forward. Once local people see something they love or value is being taken away or changed you'll have their attention, then anything can happen.”

To meet the challenges of adaptation, reduce the vulnerability of forests and people to climate change and achieve successful mitigation, a series of measures need to be combined. Besides a reduction of emissions from fossil fuels and deforestation, these range from new modes of governance that enable meaningful stakeholder participation, to strengthening sustainable management and broadening the genetic diversity of species. However, there is still poor understanding of how adaptation really works; the challenge is left for those dedicated to find out. As Professor Kjær put it, “At this stage it seems smart to invest a bit in both getting smarter – and in keeping options open.”

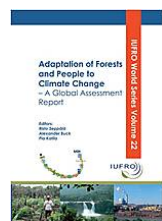
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Notes to the editor:

### The International Union of Forest Research Organizations (IUFRO)



is the only world-wide organization devoted to forest research and related sciences. Its members are research institutions, universities, and individual scientists as well as decision-making authorities and other stakeholders with a focus on forests and trees. Visit: <http://www.iufro.org/>



### Adaptation of Forests and People to Climate Change – A Global Assessment Report

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