



This year's New Generation Plantations (NGP) Encounter was held alongside the **4th International Congress on Planted Forests (ICPF 2018)** in Beijing in October. ICPF is an international academic conference organized by the **International Union of Forest Research Organizations (IUFRO)**, bringing together hundreds of forest researchers from all over the world. The theme of this year's conference was "Planted forests – a solution for green development", echoing the message of the recently published **NGP Review 2018**.

The joint event was a landmark in our ongoing collaboration with the

IUFRO Task Force on Planted Forests for a Greener Future.

Scientific knowledge is essential for informing good policies and management practices and addressing major emerging issues like sustainable intensification, landscape restoration and climate change. All NGP participants work with researchers, so by working together with IUFRO we can help both to set the agenda and provide focus on key topics, and to aggregate and analyse research findings. Over the next few pages, we look at some of the major issues discussed during the NGP Encounter sessions.



Sustainable intensification: can we increase forest production without adverse impacts?

“Sustainable intensification: An approach to produce higher levels of forest ecosystem services from the same area of land while decreasing the negative environmental, social and cultural impacts of forestry production.”

Proposed definition for sustainable intensification in forestry from Tim Payn, lead scientist at New Zealand research institute Scion, based on IIED (2015) Sustainable Intensification Revisited.

Plantations make up just 7% of global forest cover, but supply around half of the wood used for industrial purposes. We know they are an efficient way to produce the timber products the world needs. But as demand increases, how can we increase supply without negatively affecting biodiversity, food security or local communities?

Tree breeding is one important factor. Scientific trials and the experience of NGP participant companies have demonstrated that improved genetic material performs better, with increased yields and shorter rotation lengths. In Brazil, for example, productivity per hectare in eucalyptus plantations almost doubled between 1970 and 2010. Research can help select the right trees for the growing conditions – particularly important in the context of climate change – and optimize inputs like irrigation and fertilizers. In many areas, including in Africa and the Russian boreal forest, there are also opportunities to significantly increase yields per hectare through better silviculture techniques.

But there's a danger in focusing too much on “intensification” and neglecting “sustainable”. One way to define sustainable intensification is an increase in the provision of ecosystem services in an area of land. That includes timber production – but also other the many other values that forest landscapes provide, and which society needs and expects.

Increasing productivity in plantations can free up land – but what do we use that free land for? To maximize the social and environmental benefits of sustainable intensification, this question needs to be decided at a landscape scale, with the participation of local communities. Brazil's Atlantic forest region provides one positive model, where the pulp and paper industry has taken a lead role in **restoring the native rainforest** alongside highly efficient eucalyptus plantations.

The drive to do more with less is also spurring innovations with major implications for the forestry sector. Could we see a move from high-volume, low-value commodities such as pulp and paper to lower-volume, higher-value products like cellulose-based ethanol or carbon fibres made from lignin? This also points to the importance of looking beyond the forest to consider the whole production chain: sustainable intensification isn't just about what happens on the ground, but can also contribute to the transition towards a bioeconomy.

Discussions on sustainable intensification continued the following week in New Zealand at the **Field Dialogue on Tree Plantations in the Landscape**, co-organized by NGP, The Forests Dialogue and Scion.



Sustainable wood in three dimensions

Last year, the UN Food and Agriculture Organization (FAO) launched Sustainable Wood for a Sustainable World, a collaborative initiative that promotes the use of sustainable wood to support sustainable development.

So what do we mean by sustainable wood? We need to consider the three pillars of sustainability: social, environmental and economic, or people, planet and profit. And we need to consider three dimensions of sustainable wood.

First, wood can be a sustainable material. Everything made from fossil-based materials today can be made from a tree tomorrow, and usually with far less negative impact. It's estimated that wood could reduce infrastructure's greenhouse-gas budget by 31% compared to conventional products like steel and cement. And of course wood is renewable: in New Zealand's planted forests, for example, it takes just one hour to grow back the wood used in a 12-storey timber building. Our recent story **Going with the grain** talks more about the advantages of using sustainable wood in the construction sector.

Second, sustainable wood needs to originate from sustainably managed forests. Plantations can provide an important source of legal, traceable, certified sustainable wood. Sustainable forest management is, of course, a key concern for NGP participants. It involves treating forest landscapes as complex ecosystems that are more than just trees, and managing aspects such as biodiversity, water, soils

and non-timber forest products at various scales. It also requires good governance, including integrated planning and decision-making across landscapes and sectors that everyone affected by plantations can participate in.

Third, sustainable wood should come from sustainable value chains to maximize the social, environmental and economic benefits. There are opportunities to improve resource efficiency, reduce waste, promote sustainable consumption and facilitate recycling and the cascading use of wood until it's finally burnt to produce energy. Equally, the economic and social benefits should be distributed equitably to improve livelihoods and create shared value. **The Sawlog Production Grant Scheme (SPGS)**, a joint project of the Ugandan government and the EU, provides one example: as well as supporting smallholders and companies to establish 42,000 hectares of plantations to date, the scheme has led to the emergence of local wood processing and resin tapping industries.

To maximize the social, environmental and economic benefits of wood, we need to consider all three dimensions. It's important to seek synergies and address trade-offs between them, to take account of all the potential impacts, and to understand the links between global priorities and what happens in the landscape and along the value chain. More research and better communications around sustainable wood are also needed. NGP is well placed to help coordinate these efforts.



Restoration, plantations and natural climate solutions

Shortly before the NGP Encounter, the Intergovernmental Panel on Climate Change released its report warning of the dangers of global warming exceeding 1.5°C, and the enormous efforts required to prevent this. The biggest priority is to reduce energy-related greenhouse gas emissions (which, as we've seen, using wood can help to do). But forestry and land use also have an essential role to play in mitigating and adapting to the impacts of climate change.

Last year, The Nature Conservancy released a study looking at "natural climate solutions" – protection of forests and natural ecosystems, their restoration, and improved practices on working lands to increase carbon stocks and avoid emissions. It found that these solutions could deliver 30% of the climate mitigation needed between now and 2030 – with the biggest opportunities, around 70% of the total potential, found in restoring tropical forests.

India provides an impressive case study. Around a quarter of India's land area is forested, and 53% of this has been planted. In total, India's forests sequester 7 billion tonnes of CO₂ each year; by comparison, the country's annual CO₂ emissions are around 2.5 billion tonnes.

Forest restoration in India has served multiple purposes, including producing wood for industrial purposes, supplying fuelwood and materials for local people, and providing ecological services like erosion control. This is important: forest landscape restoration is not about trying to recreate the

landscapes of the past. Rather, it's about regaining ecosystem integrity and resilience in degraded and deforested landscapes, while enhancing human wellbeing. Productive plantations can be an important component of this – alongside restored forests to protect watersheds or provide wildlife habitat, crops, grazing land, agroforestry systems, and so on.

To have a hope of avoiding dangerous climate change, the world will need forest landscape restoration on an unprecedented scale over the coming decades. This will be an important theme for our ongoing collaboration with IUFRO. Research can help inform decisions on where restoration should take place and the most effective methods to use to meet different objectives, particularly in the context of a changing climate and increased risk of fire. At the same time, NGP participants can provide real-world models of forest landscape restoration that balances production and protection.

The role of plantations as natural climate solutions is an important part of our ongoing collaboration with **IUFRO Planted Forest Task Force**. Collecting evidence on climate benefits will help us to influence policy developments, including at the upcoming UN climate talks in Warsaw.



Green infrastructure for a Green Belt Road

China's Belt and Road Initiative (BRI) promises to be the biggest infrastructure programme in history. It offers huge opportunities for development and closer cooperation between countries but also poses major environmental risks. Plantations can help to ensure that development is resilient, low-carbon and sustainable, and that it delivers benefits to the people living nearby – often in harsh environments with limited opportunities.

China has **extensive experience of afforestation** for multiple purposes – including in the drylands through which the BRI passes, where hundreds of thousands of hectares of trees have been planted in an attempt to hold back the spread of the desert.

While these ecological objectives have been a main driver of plantation expansion in China, there's now a push to establish more productive, high-quality timber plantations. China no longer allows logging in natural forests, but the country has a large timber deficit. To address this, it aims to plant 7 million hectares by 2020 and 20 million hectares by 2035, with the long-term goal of meeting the country's timber requirements by 2050. Increasing timber supplies is vital if the BRI is to take advantage of the climate benefits of using wood in construction and for other industrial purposes.

Many of the regions through which the BRI passes could benefit from planting trees to restore land, combat desertification and sequester carbon. However, these plantations are more likely to be sustainable if they also provide an economic benefit for local people. With this in mind, FuturaGene has been supporting the development of plantations of yellowhorn – the **subject of an NGP study tour in 2017.**

Yellowhorn is a local tree well adapted to the harsh desert environment. China plans to plant 1.5 billion of the trees during the present decade. The tree's seeds provide a source of high quality oil, that can be used in cooking, in cosmetics or as a biofuel. As well as providing employment and income for growers, this offers the opportunity to develop new enterprises and industries along the value chain.

It's estimated that BRI-related investments will be worth more than US\$900 million. WWF wants to see strong action from governments and commitments from financial institutions to mitigate the environmental risks of BRI investments, such as ecological corridors and protected areas. This will require indicators to measure the impact of BRI projects on biodiversity, water, carbon, livelihoods and so on.

At the same time, there's a need to channel more of this investment into initiatives – like sustainable plantations – that deliver climate and other environmental benefits. Green bonds offer one promising route: in Brazil, FuturaGene's parent company Suzano has successfully raised nearly a billion dollars to finance projects with measurable positive environmental impacts through issuing green bonds.

NGP will be returning to the regions at the heart of the BRI with a **study tour connecting China and Russia in 2019.**



Summing up

ICPF 2018 concluded with a “World Café” session hosted by NGP, to collect participants’ ideas through dynamic discussions in small groups. Participants identified key findings and challenges around four themes – genetic resources and tree breeding; multipurpose management of planted forests; wood, fibre and non-wood forest products; and forest policy, land-use regulation and socio-economics in relation to planted forests. They also considered gaps that weren’t covered and need further research.

Some of the ideas discussed included:

- **Tree breeding:** Researchers, industry and NGOs need to cooperate more closely to improve knowledge, to transfer technologies to smallholders and low-income countries, to apply genetic techniques to forest restoration and other social and ecological objectives, and to communicate better with the public.
- **Multipurpose management:** The multiple purposes of planted forests are not always recognized by society, markets and policy-makers. All stakeholders need to be involved in landscape-level planning to maximize the multipurpose potential of planted forests.
- **Forest products:** As well as supplying more timber and other products already used today,

plantations will be the main source of fibre for a future low-carbon bioeconomy. More research is needed to understand how to meet the needs of biorefineries and bioenergy markets.

- **Forest policy:** Good policies are not always implemented in practice, and incentives are needed for change to happen. Global initiatives need to find solutions that work at the local/landscape level.

Participants agreed that future conferences would benefit from the involvement of social scientists, and more space to discuss the economic, political and social dimensions of how people interact with forest plantations.

Full findings from the World Café section have been compiled in a separate document.



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