

# 2018 NGP Review



NEW  
GENERATION  
PLANTATIONS  
*platform*

FOR PEOPLE, PLANET AND PROSPERITY





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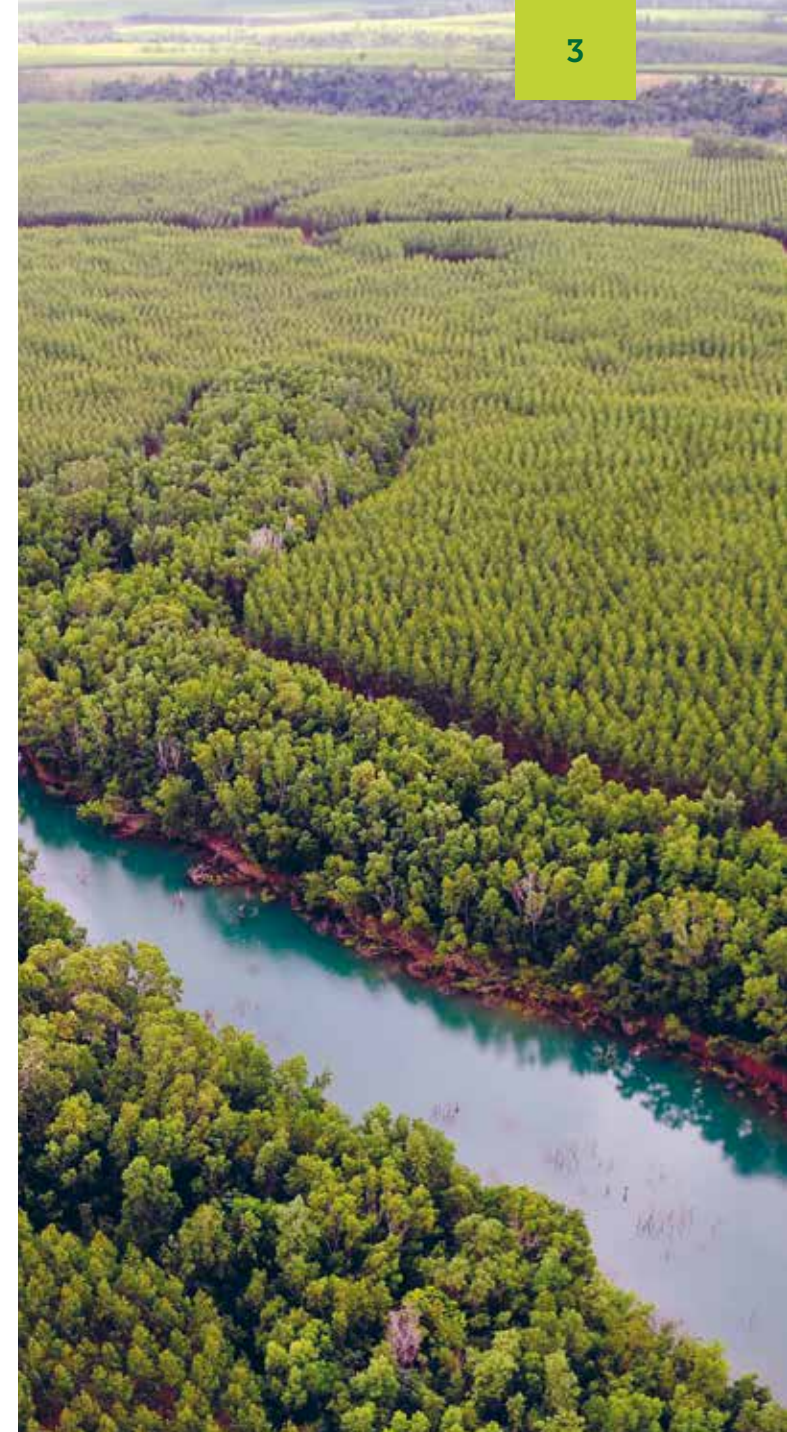
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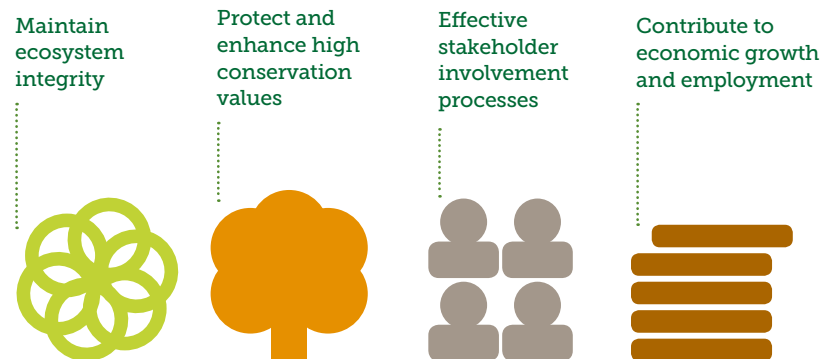




## Foreword

When the New Generation Plantations (NGP) platform was founded in 2007, many saw plantations as part of the problem – a threat both to nature and the people living around them. But we have learnt a lot over the past decade. Understanding has improved, and so too have plantation management practices and relationships with neighbouring communities.

Today, we say with confidence that plantations that follow NGP principles are part of the solution – to restoring nature, to enabling sustainable development, and to combating climate change.



This is a message we want to spread further, and we are excited this year to hold our annual Encounter alongside the 4th International Congress on Planted Forests (ICPF 2018) in Beijing. This alliance is the result of an important strategic collaboration with the IUFRO Task Force Planted Forests for a Greener Future, which aims to improve the interface between science, society and forestry.

And it happens at an important moment, with the release in October 2018 of the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C. The IPCC report looks at the feasibility of achieving the ambition of the Paris climate agreement to limit the average global temperature rise to 1.5°C above pre-industrial levels. To achieve this, it will be necessary not just to reduce greenhouse gas emissions but also to remove large amounts of carbon dioxide from the atmosphere.

A technology already exists that can do this, rapidly and at a remarkably low cost. It is called planting trees. Establishing plantations that follow

NGP principles can absorb globally significant quantities of carbon dioxide, while helping to conserve forests, restore degraded landscapes and bring socio-economic benefits.

Moreover, as new technologies develop, almost everything we do now with fossil fuels can be done with fibre from trees, while timber can also substitute for energy-intensive construction materials like concrete and steel. By providing a reliable, renewable and climate-positive source of fibre, plantations can contribute to reducing emissions and supporting the transition to a sustainable bio-based economy.

This review takes a closer look at these and other topics, as we seek to further develop the solutions plantations can provide. We hope it will give you new insights, food for thought, and inspiration.

**Luis Neves Silva**  
**Lead, New Generation**  
**Plantations platform**



## **Production, restoration, mitigation: a new generation of plantations**

**By Luis Neves Silva, Peter Freer-Smith and Palle Madsen**

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**Over 10 years, the NGP concept has demonstrated ways to address some of the biggest global challenges**



**We live in a world in urgent need of new solutions.**

Globally, population growth, economic development, urbanization and increasing prosperity are driving ever greater consumption. Meeting these growing demands will increase the already huge pressure on the world’s natural resources. At the same time, hundreds of millions of people live in poverty – nearly 800 million don’t get enough food, over 650 million don’t have a safe water supply, and more than a billion lack access to electricity.<sup>1</sup>

Ecosystems which provide the basis of our society and economies are being stretched to breaking point. Biodiversity continues to decline, while deforestation rates – which had slowed over the last two decades – have recently begun increasing again.<sup>2</sup> Urgent action is needed to keep the average global temperature rise to well below 2°C, as well as to adapt to the inevitable impacts of climate change. The need to reduce dependency on fossil fuels and switch to renewable resources is becoming more and more obvious.

Earlier this year, we published a paper in the journal *New Forests*<sup>3</sup> arguing that well-managed forest plantations in the right places in the landscape can be part of the solutions to these challenges. Over the last 10 years, NGP has demonstrated a concept that works: a new generation of plantations that maintain ecosystem integrity, protect and enhance high conservation values, are developed through effective stakeholder involvement processes, and contribute to economic growth and employment.

At an area of 277.9 million hectares in 2015, planted forests represent an increasing proportion of the global forest area, providing a significant and rising proportion of global roundwood production. Estimates suggest that planted forests have the potential to produce up to two-thirds of global industrial roundwood demand, rising to as much as 80% in 2030.<sup>4</sup> Increased production from planted forests is important, as demand for wood-based products will grow to unprecedented levels over the coming decades<sup>5</sup> – not only to supply growing populations and economies with traditional timber and paper products, but also to provide energy and innovative materials to support the transition towards a bioeconomy.



AT AN AREA OF  
**278**  
 MILLION  
 HECTARES  
 IN 2015, PLANTED  
 FORESTS REPRESENT  
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 PROPORTION OF  
 THE GLOBAL  
 FOREST AREA



**PLANTED FORESTS  
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 ROUNDWOOD  
 DEMAND, RISING  
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 IN 2030.**

## PRODUCTION, RESTORATION, MITIGATION

However, sustainable development requires production to be balanced with the need for multiple other ecosystem services. Well-managed plantations integrated into good landscape design can supply wood products while protecting and taking the pressure off (semi-)natural forests and other ecosystems. A relatively small proportion of the land managed by NGP participants is in plantation forestry (c.43% overall) with the remaining areas being wildlife reserves, restored natural forests, grassland or agricultural land (see table 1).



Table 1. Land managed by NGP participants

Country	NGP participants' land area (ha)	NGP participants' plantations area (ha)	% of plantations FSC certified	Land-use history
Argentina	358,867	197,754	66	Primarily cattle ranching and farming, to lesser extent forestry
Brazil	2,953,595	1,491,686	80	Cattle ranching and farming
Chile	1,827,767	1,221,996	97	Cattle farming and agriculture
China	166,200	87,900	98	Mostly previous plantations, some barren land
Ghana	32,000	7,000	0	Degraded forest land due to intensive logging
Laos	3,900	2,300	0	Degraded land due to shifting cultivation and war
Mozambique	356,000	9,368	0	Degraded land due to intensive logging, shifting cultivation and charcoal production
Portugal	119,009	99,285	100	Eroded, abandoned, low productive lands
Rwanda	9,992	9,992	0	Planted forests (buffer zone area)
South Africa	263,486	173,015	100	Grasslands or agricultural areas
Tanzania	8,221	8,221	31	Unused land, some of it agricultural
Uganda	21,967	21,967	100	Planted forests and sugar plantation
UK	873,000	870,000	100	Mostly agricultural land
Uruguay	805,333	538,072	97	Cattle grazing
Others*	3,319,400*	0	n/a	Largely natural and semi-natural forest
<b>TOTAL</b>	<b>11,118,737</b>	<b>4,738,556</b>	<b>90</b>	



As well as providing an efficient but sustainable source of timber, plantations have a critical role to play in combating climate change. A recent estimate suggests that natural climate solutions such as conservation, restoration and improved land management can provide over a third of the cost-effective climate mitigation needed between now and 2030 to achieve the goals of the Paris climate agreement – with tree planting playing a significant role.<sup>6</sup> In addition, using wood instead of fossil fuels or materials like cement, steel, aluminium, cotton or plastics has significant mitigation potential.

Many countries have included large-scale forest restoration pledges as part of their national climate change plans, and various multi-country initiatives have been launched. The Bonn Challenge, launched in 2012, aims to begin the restoration of 150 million hectares of deforested and degraded lands by 2020, and 350 million hectares by 2030.

NGP participants have demonstrated sustainable models for bringing degraded land back into productive use, in a way that also supports rural development, nature conservation and climate adaptation. In Brazil's Atlantic forest, for instance, a landscape mosaic model combines eucalyptus plantations with rainforest restoration on former cattle pasture. In China's Gansu province, meanwhile, tree and shrub plantations are being established on arid lands to stop the encroachment of the desert, while providing an income for local farmers.

Plantations may not provide the same ecosystem services and habitats for biodiversity as natural forests. However, this is rarely a relevant comparison; the more relevant reference is the currently degraded land where afforestation takes place, rather than the old-growth forests that were historically lost. Moreover, it could be argued that for production services, the relevant comparisons are the production systems of the materials, such as concrete, steel and plastic, that wood replaces. The ecosystem services provided by the land managed by NGP participants, in comparison to those offered by the former alternative land uses (see table 1), are summarized in table 2 on page 10.





In Brazil's Atlantic forest, a landscape mosaic model combines eucalyptus plantations with rainforest restoration (below) on former degraded cattle pasture (above).





Table 2. Ecosystem services from plantations, in relation to other ecosystems and land uses.

Source: Baral et al. 2016. A proposed framework for assessing ecosystem goods and services from planted forests.

Ecosystem services	Provision of ecosystem services from planted forests in relation to:			
	 Degraded	 Managed pasture	 Plantation forestry	 Agriculture
<b>Provisioning services</b>				
Food production	↑	↓	↑	↓
Timber production	↑	↑	↓	↑
Medicines	↑	↑	⊖	↑
Freshwater	↑	⊖	↑	↑
<b>Regulating services</b>				
Fresh air regulation	↑	↑	⊖	↑
Carbon sequestration and storage	↑	↑	⊖	↑
Natural hazard regulation	↑	⊖	⊖	↑
Water purification	↑	↑	↑	↑
Disease regulation	⊖	⊖	↑	⊖
Pollution	↑	⊖	↓	↓
Erosion prevention and soil protection	↑	↑	↑	↑
<b>Habitat or supporting services</b>				
Habitat for species	↑	⊖	↑	↑
Maintenance of genetic diversity	⊖	⊖	↑	↑
<b>Cultural services</b>				
Spiritual and religious values	↑	↑	↑	↑
Aesthetic values	↑	↑	↑	↑
Recreation and ecotourism	↑	⊖	↑	↑



Growing trees can slow desertification, which is otherwise likely to increase as a result of climate change. Gansu province, China.





In an increasingly complex world of limited resources and volatility, fundamental changes are required to create better production models, business paradigms and governance. The NGP concept can help provide the ecological infrastructure for a green future. Well-managed plantations integrated intelligently into the landscape provide opportunities to increase the supply of renewable raw materials, restore degraded ecosystems to build resilience and create value for people living alongside them.

*This article is based on a longer paper of the same title that appeared in New Forests. First published online, 26 April 2018. Full references can be found in the original article.*

<https://bit.ly/2y37vNG>

### About the authors

**Luis Neves Silva** works for the WWF Forests Practice and is a member of the IUFRO Task Force Sustainable Planted Forests for a Greener Future. He has led the NGP platform since its inception.

**Peter Freer-Smith** is an adjunct professor at the Department of Environmental Science and Policy at University of California Davis, US, and a member of the IUFRO Task Force Sustainable Planted Forests for a Greener Future. Previously, he was Chief Scientist at the Forestry Commission (UK).

**Palle Madsen** is professor of silviculture at the Forest and Landscape College at the University of Copenhagen. He is a member of the IUFRO Task Force Forest Adaptation and Restoration Under Global Change.



#### ICPF 2018

##### New Generation Plantations for Natural Climate Solutions

The authors will be hosting a dialogue session about how a new generation of plantations can provide a natural climate solution, and identifying future lines of research.

Find out more: <https://bit.ly/2IiuFob>



#### ICPF 2018

##### Sustainable Intensification – Can we increase forest production without adverse impacts on the environment and society and under a rapidly changing climate?

Luis Neves Silva and other members of the IUFRO Task Force Sustainable Planted Forests for a Greener Future will be looking at how sustainable intensification can help meet increased demands for fibre from forests without causing environmental degradation.

Find out more: <https://bit.ly/2OQTLNi>



#### ICPF 2018

##### The Role of Sustainable Intensification in Restoration and Provision of Forest Products – Connecting the Dialogue

This side event will discuss how science, industry and civil society can reach a more cohesive dialogue on harnessing technological innovation to provide solutions for challenges such as restoration, biodiversity and ecosystem services, and the capacity to increase production and mitigate climate change.

Find out more: <https://bit.ly/2Q8CXRZ>



## Going with the grain: how wood can help us build a sustainable future

By Andrea Stocchero and Anna-Liisa Myllynen

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Using wood from sustainable plantations in construction can replace more energy-intensive materials, store carbon, and bring multiple benefits for people



Human history has been deeply influenced by the use of wood. Wherever people have lived close to trees, they have used wood – as a fuel, to make countless objects, to build homes and other structures. Wood is part of our common cultural heritage. While people appreciate its aesthetic qualities, research also suggests that buildings with many wooden features have a positive effect on our health, comfort and well-being.

In the coming decades, wood will be needed more than ever to meet the demands of rapidly developing societies while combating climate change and other environmental threats. Nowhere are the benefits of wood more apparent than in the construction sector.

The need for building materials is growing fast and the global floor area in buildings is expected to double to more than 415 billion square metres by 2050.<sup>7</sup> While this is driven largely by urbanization and economic growth in emerging economies, many developed countries also face housing crises and the need to retrofit and renovate the existing building stock.

Today, the manufacturing of concrete, bricks and steel is responsible for 8-15% of global greenhouse gas emissions causing climate change.<sup>8</sup> Substituting where possible those building materials with wood can contribute to climate change mitigation thanks to lower material manufacturing and processing emissions.

This is not the only climate benefit of using wood in construction. It's well known, of course, that trees sequester carbon from the atmosphere while growing. Using sustainable wood in construction means that the carbon storage can be extended from the forest to the building – often for decades, or even centuries – while replanted trees continue the carbon sequestration process.

Wood is already manufactured into a variety of construction products, including structural elements, exterior and interior finishes, and insulation. In fact, most of today's building components can be made from wood. And the possibilities are increasing with innovations in wood-based design and construction, including the increasing availability of engineered wood products. These include cross-laminated timber (CLT) panels, made from multiple layers of wood glued together at 90-degree angles to form super-strong panels, and laminated veneer lumber (LVL), made from veneers bonded together under heat and pressure.

Engineered wood panels allow for larger and taller wooden buildings, and offer improved performance in other areas such as fire and earthquake resistance. Currently, the tallest wooden building in the world is a 53m-high 18-storey student residence in Vancouver, Canada, completed in 2017. But even more ambitious proposals are being developed, including a 350m 70-storey skyscraper in Tokyo which would contain 180,000 cubic metres of wood.<sup>9</sup>

Such buildings can store significant amounts of carbon. Stora Enso calculates that its CLT panels store around 730kg of carbon per cubic metre.



**THE NEED FOR BUILDING MATERIALS IS EXPECTED TO DOUBLE TO MORE THAN**

**415**

**BILLION SQUARE METRES BY 2050.**



They were recently used to construct the superstructure of Crome Court, a seven-storey student accommodation building on the University of East Anglia campus in the UK. The structure contains 1,680 cubic metres of CLT, storing 1,226 tonnes of carbon during its lifetime. With the building containing various carbon-reducing measures, it will take an estimated four years of continuous use before its emissions approach the amount of carbon stored within the structure.

Wood's thermal properties can also improve a building's energy performance. Energy use in buildings represents roughly one-third of global final energy consumption and accounts for nearly 20% of all greenhouse gas emissions.<sup>10</sup> According to the International Energy Agency, energy demand in buildings could increase by 50% by 2050.<sup>11</sup> When well-designed and installed, products such as CLT can control air-tightness and reduce heat loss, optimizing energy consumption for heating and cooling as well as improving people's comfort, health and well-being.

Another advantage of using wood in construction is that it is a renewable resource, and can help the shift to a circular economy. Global use of materials is accelerating, with construction accounting for around 40% of all materials used.<sup>12</sup>



Crome Court, University of East Anglia, stores 1,226 tonnes of carbon in its timber superstructure.





Rather than being extracted from quarries, mines and riverbeds, wood can be grown, and regrown, in well-managed forests and plantations that have a positive impact on biodiversity and ecosystem services.

An estimated 10-15% of construction materials – mainly concrete and brick – are wasted, while more than half the materials arising from buildings demolition are sent to landfill.<sup>13</sup> By contrast, high-precision manufacturing and prefabrication reduce wood waste, both during manufacture and at the end of life. Waste wood from manufacturing, construction and demolition can be recycled, reused and manufactured into other products, and, at the end of their life, wood products can be burnt to provide bioenergy, substituting for fossil fuels.

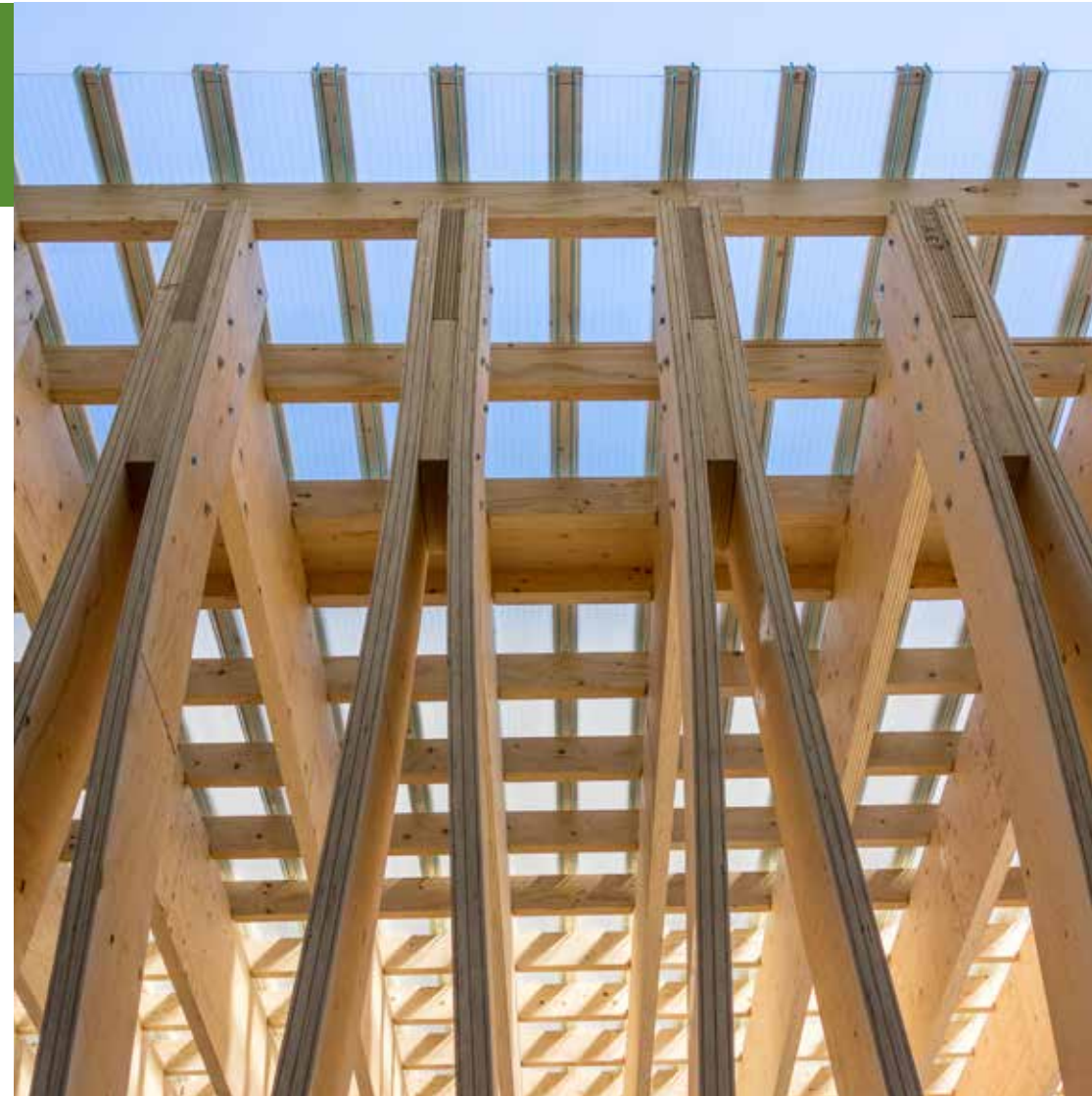
Wood can also extend the life of buildings themselves. Refurbishments and retrofits can improve comfort, attractiveness and energy efficiency, while extensions and building adaptations using lightweight engineered wood products tend to require little to no strengthening of the existing structure or foundations. For example, rooftop extensions using semi-prefabricated CLT structures have great potential to ease urban housing pressure by allowing an increase in urban density while minimizing disruption to existing residents during installation. A survey

A survey of the Greater London area suggested that rooftop extensions could provide 140,000 new homes.

of the Greater London area suggested that rooftop extensions could provide 140,000 new homes.<sup>14</sup> To give an example, at 150 London Road, Kingston-upon-Thames (UK), Stora Enso supplied CLT to convert an office block into 15 apartments with a rooftop extension comprising eight duplexes.

Rooftop extensions can also provide extra value to buildings and income to building owners, which can help finance renovations to improve energy efficiency and aesthetics. This is highly relevant in the context of climate change: in the EU, for example, 23,000 homes need energy renovation every day for the next 30 years to meet Europe's climate and energy targets.<sup>15</sup>

There should be little surprise, then, that international recognition of the importance of wood in a sustainable, low-carbon future is growing. In 2017, the UN Food and Agriculture Organization (FAO) event "Sustainable Wood for a Sustainable World" concluded that sustainable wood value chains are relevant for all 17 of





## GOING WITH THE GRAIN

the Sustainable Development Goals (SDGs), especially for decent work and economic growth (SDG8), responsible consumption and production (SDG12), climate action (SDG13) and life on land (SDG15).<sup>16</sup>

Realizing these socio-economic and environmental benefits will require policy support, finance and business innovation to facilitate the use of wood in design and construction. The NGP platform can play an important role in raising the profile of wood, forging partnerships and, of course, growing the trees needed to build a resilient, sustainable world.

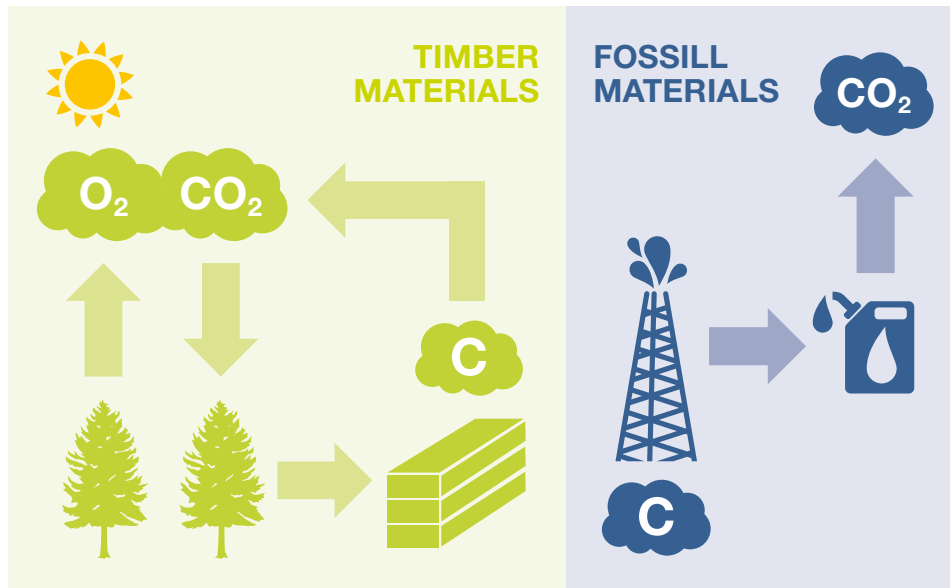
## About the authors

**Andrea Stocchero** is an architect and researcher specialized in building sustainability, energy efficiency and the use of bio-based materials. With Scion (New Zealand Forest Research Institute) he is researching wood building technologies and the multi-performance and carbon mitigation benefits of increasing the use of wood in the design and construction sector.

**Anna-Liisa Myllynen** is Senior Vice President, Head of Sustainability for Wood Products at Stora Enso.

Thanks also to Roy Antink (Stora Enso) and Elspeth MacRae (Scion).

## CARBON IN WOOD HAS A CIRCULAR LIFE



Use of carbon-neutral wood material and biomass instead of non-renewable and fossil materials reduces CO<sub>2</sub> emissions and mitigates global warming.



## ICPF 2018

### Barriers and opportunities to realizing the full value of planted forests' contribution to 'Sustainable Wood for a Sustainable World'

This session will contribute to the scientific background for promoting sustainable wood value chains from planted forests to support the SDGs and climate needs. It will feed into the field dialogue on Tree Plantations in the Landscape hosted in New Zealand (29 October – 2 November 2018), co-hosted by The Forest Dialogue, NGP, Scion Research and Toi Ohomai Institute of Technology.

Find out more: <https://bit.ly/2IhFbMb>

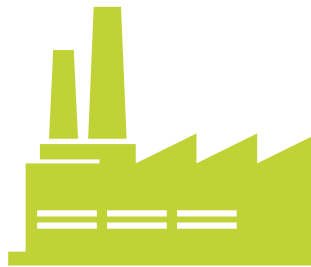




# WOOD AND THE SUSTAINABLE DEVELOPMENT GOALS

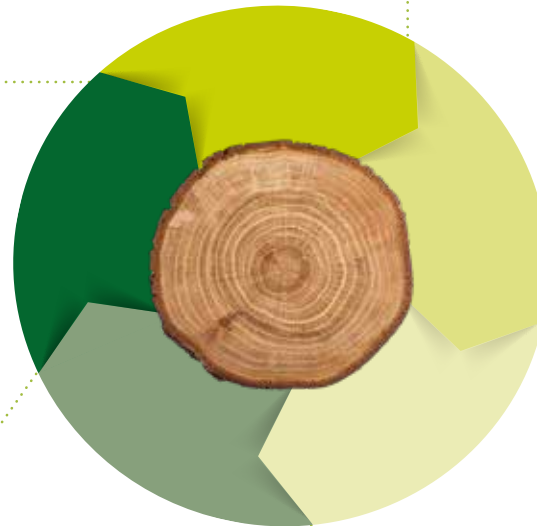
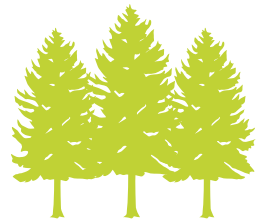
Wood value chains can contribute to all 17 of the SDGs.

<b>4</b> QUALITY EDUCATION 	<b>5</b> GENDER EQUALITY 	<b>6</b> CLEAN WATER AND SANITATION 	<b>7</b> AFFORDABLE AND CLEAN ENERGY 
<b>8</b> DECENT WORK AND ECONOMIC GROWTH 	<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 	<b>13</b> CLIMATE ACTION 



<b>1</b> NO POVERTY 	<b>2</b> ZERO HUNGER 	<b>14</b> LIFE BELOW WATER 	<b>16</b> PEACE AND JUSTICE 	<b>17</b> PARTNERSHIPS FOR THE GOALS 
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<b>6</b> CLEAN WATER AND SANITATION 	<b>8</b> DECENT WORK AND ECONOMIC GROWTH 	<b>10</b> REDUCED INEQUALITIES 
<b>13</b> CLIMATE ACTION 	<b>15</b> LIFE ON LAND 	



<b>4</b> QUALITY EDUCATION 
<b>5</b> GENDER EQUALITY 
<b>8</b> DECENT WORK AND ECONOMIC GROWTH 

<b>9</b> INDUSTRY, INNOVATION AND INFRASTRUCTURE 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 	<b>13</b> CLIMATE ACTION 
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<b>7</b> AFFORDABLE AND CLEAN ENERGY 	<b>12</b> RESPONSIBLE CONSUMPTION AND PRODUCTION 	<b>13</b> CLIMATE ACTION 
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<b>3</b> GOOD HEALTH AND WELL-BEING 	<b>7</b> AFFORDABLE AND CLEAN ENERGY 	<b>10</b> REDUCED INEQUALITIES 
<b>11</b> SUSTAINABLE CITIES AND COMMUNITIES 	<b>13</b> CLIMATE ACTION 	

Source: Sustainable Wood for a Sustainable World. FAO/Scion.



## Planting change in Africa

By Mads Asprem

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**Plantations and forest landscape restoration in Africa could bring enormous benefits to local people and the global climate – but current efforts need to be scaled up fifty-fold**



The world urgently needs more forests – and nowhere are they more important than Africa.

If global temperature rise is to be kept to 1.5°C, there needs to be a significant increase in global forest cover, in the order of 3-5 million hectares per year, to absorb carbon dioxide from the atmosphere.<sup>17</sup> Moreover, meeting global demand for timber products (especially for bioenergy) while preventing deforestation and degradation of existing forests will require around 250 million hectares of new plantations by 2050.<sup>18</sup>

Close to half of the land available globally for afforestation or reforestation is in Africa. More than anywhere else, establishing new forests in Africa creates positive social, environmental and economic impacts – from investment and employment opportunities (including for women) in rural areas, to clean energy and infrastructure development, to conserving and enhancing biodiversity. Our analysis suggests that forestry investments address at least 12 of the 17 Sustainable Development Goals. Few other sectors, if any, provide such a wide range of benefits.

Unfortunately, the millions of hectares of new plantations that we should be seeing in Africa have yet to materialize. If anything, the trends are going in the wrong direction.

Research by New Africa Impact suggests that, outside South Africa, just under 120,000 hectares of commercial plantations have been established in Africa since 2000, with the area of new smallholder plantations just slightly larger. This is only about 2% of what's needed – a drop in the ocean. Planting peaked in 2013-16, and the current rate of commercial planting is only around 5,000 hectares per year. In fact, the loss of government forest plantations since 2000 outweighs the total area of new commercial forests planted during the same period.

Most of the planting has been driven by a handful of entrepreneurial companies backed by individual private shareholders. Just two East African companies, Green Resources and the New Forests Company, account for about half the total new commercial plantations established this century.

From my own experience of leading the former company for over 20 years, I know first-hand the challenges of establishing plantations in Africa. But we must not let these difficulties stand in our way. The time has come to push for new plantation projects in Africa on a dramatically larger scale.

Several initiatives have been established to promote afforestation and landscape restoration and development, such as the Bonn Challenge and AFR100, which aims to restore 100 million hectares of deforested and degraded land across the continent by 2030.<sup>19</sup> Despite their ambitious targets, to date these initiatives have delivered very little new tree planting or forest restoration. Serious participation from the private sector is needed to get projects off the ground.

In addition, many African nations are developing REDD+ programmes, accessing funding from industrialized nations for reducing emissions from deforestation and forest degradation.

**JUST UNDER**

**120,000**

**HECTARES OF  
COMMERCIAL  
PLANTATIONS HAVE  
BEEN ESTABLISHED IN  
AFRICA SINCE 2000**

**THIS IS ONLY ABOUT**

**2%**

**OF WHAT'S NEEDED**

**THE CURRENT RATE OF  
COMMERCIAL PLANTING  
IS ONLY AROUND**

**5,000**

**HECTARES PER YEAR**

## PLANTING CHANGE IN AFRICA

These must include afforestation components in order to ensure alternative wood supplies for people previously dependent on firewood and charcoal produced from protected forests.

The landscape approach practised by leading forestry companies worldwide has been successfully demonstrated in Africa by the likes of Green Resources, the New Forests Company, African Plantations for Sustainable Development (APSD), Global Woods and Form Ghana. A landscape approach that follows NGP principles is likely to combine a mosaic of large-scale commercial plantations; smaller-scale plantations and woodlots owned by local people; restored and protected natural forests, wetlands and grasslands; and crops and grazing. These should be complemented by programmes to support better agricultural practices, develop alternative livelihoods and provide a supply of sustainable energy. It is a model that works, and can be replicated.

This landscape mosaic model also points to the need for what we might call a mosaic funding landscape, blending different types of finance from different sources. Attracting finance remains the biggest challenge to large-scale afforestation in Africa. While forestry can promise attractive long-term returns, initial start-up costs are high



The landscape approach practised by leading forestry companies worldwide has been successfully demonstrated in Africa

Clockwise from the left:  
1. APSD's landscape mosaic, Ghana. 2. New Forest Company plantation, Uganda. 3. Smallholder eucalyptus plantation, Uganda.





## PLANTING CHANGE IN AFRICA

– particularly for companies that are committed to “doing the right thing” socially and environmentally. Africa also desperately needs investment in the forestry infrastructure – from high-performing seedlings to efficient sawmills – that will enable it to enjoy the benefits seen in other countries. To leverage commercial investment, plantations need support from other sources, such as development finance institutions (DFIs) and impact investors interested in social and environmental returns as much as financial ones.

In almost all countries where significant new tree planting has taken place, tax incentives and other government subsidies have been an important driver. Few African governments are in a position to offer such incentives, but DFIs can fill this role by, for example, providing cash grants for successful planting and investment into industry infrastructure. Existing plantation companies have struggled to service high-cost debts, so DFIs and impact investors should look to provide equity finance and/or much longer-term debt. Last year’s 15-year forestry loan from the African Development Bank to Form Ghana was an important instrument that hopefully will be replicated.<sup>20</sup>

Climate finance and carbon trading also have a role to play, though the results to date have been disappointing. Commercial brownfield plantation establishment is probably the lowest cost means of mitigating climate change, and nowhere is the potential greater than in Africa. If the global community is serious about keeping global temperature rise well below 2°C, a massive injection of climate finance into African plantations and forest restoration should be a top priority.

A number of investment funds that aim to support forest landscape restoration and afforestation in Africa are now being developed, and there were fruitful discussions during the recent NGP study [tour to Uganda](#). We urgently need to build on these foundations so that Africa, and the world, can benefit from new forests on a scale that matters.

### About the author

**Mads Asprem** is Managing Partner of New Africa Impact, a consultancy and project developer. He founded Green Resources and ran the company for 10 years until 2016. He worked 20 years in equity markets and investment banking, including 10 years at Morgan Stanley, where he was a Managing Director.



**A NUMBER OF INVESTMENT FUNDS THAT AIM TO SUPPORT FOREST LANDSCAPE RESTORATION AND AFFORESTATION IN AFRICA ARE NOW BEING DEVELOPED**



## **Strong bonds: using green bonds to finance environmental projects**

**By Estevão do Prado Braga**

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**Issuing green bonds has supported Suzano to invest nearly a billion dollars into projects to benefit the environment**



## STRONG BONDS

From biodiversity conservation and forest restoration to energy efficiency and water stewardship, responsible business practices in the forest products sector deliver long-term economic, social and environmental benefits. However, funding these activities properly in the first place is not an easy task, nor cheap. One way companies can finance such projects is by issuing green bonds.

Bonds are a well-established way of borrowing capital. Essentially, a bond is a promise to repay the money lent by a certain date, with an agreed rate of interest. Companies, as well as governments and other entities, can issue bonds, and the investors who buy them can further trade them on the securities market. A green bond is the same, but is specifically earmarked to finance environmental or climate-related projects under agreed conditions. It is now more than a decade since the first green bond was issued, and the size of the market in green bonds has more than doubled almost every year since. The value of green bonds issued in 2017 surpassed US\$150 billion.<sup>21</sup>

In 2016, Suzano became the first Latin American pulp and paper company to issue green bonds denominated in dollars, to a value of US\$500 million. At the same time, we became the first company to issue green bonds on the Brazilian market, raising a further R\$1 billion (~US\$243 million). Following the first successful issue, we issued another US\$200 million green bond in 2017.

These funds have supported us to invest in a number of projects that have positive environmental impacts, while also improving the efficiency and sustainability of our business. The green bond issue followed the Green Bond Principles

created by the International Capital Markets Association (ICMA) to provide greater credibility and transparency in the green bonds market.<sup>22</sup> The principles outline the sorts of activities green bonds should be used to finance, and how companies issuing them should communicate their objectives, manage the proceeds and report on the results. They also recommend some form of independent review.

**Suzano's green bonds have been used to finance projects falling under six categories:**



### Sustainable forests – forest management

These investments relate to sustainable forest management and compliance with national and international certification standards. Indicators we use to measure the results are the carbon stock in our planted areas (57.8 million tonnes of CO<sub>2</sub> equivalent in 2017) and the proportion of our owned or third-party forest areas with FSC or PEFC/Cerflor certification (78% in 2017).



### Sustainable forests – restoration of degraded areas

Restoring native forest on degraded areas alongside our eucalyptus plantations is a key part of our business, including on leased land where this isn't our legal responsibility. Proceeds from the green bond issue have to date supported the restoration of 5,886 hectares of native forest. These restoration activities are focused on Neblinas Park, a nature reserve near São Paulo owned by Suzano and managed by the Ecofuturo Institute, and in Bahia, where we aim to restore up to 30,000 hectares in the next 20 years.

Another notable initiative is the Mucuri River Springs Project, which was launched in 2017 in partnership with The Nature Conservancy (TNC). It aims to improve water availability in the Mucuri river basin. By restoring native vegetation the project aims to recharge around 2,500 springs.



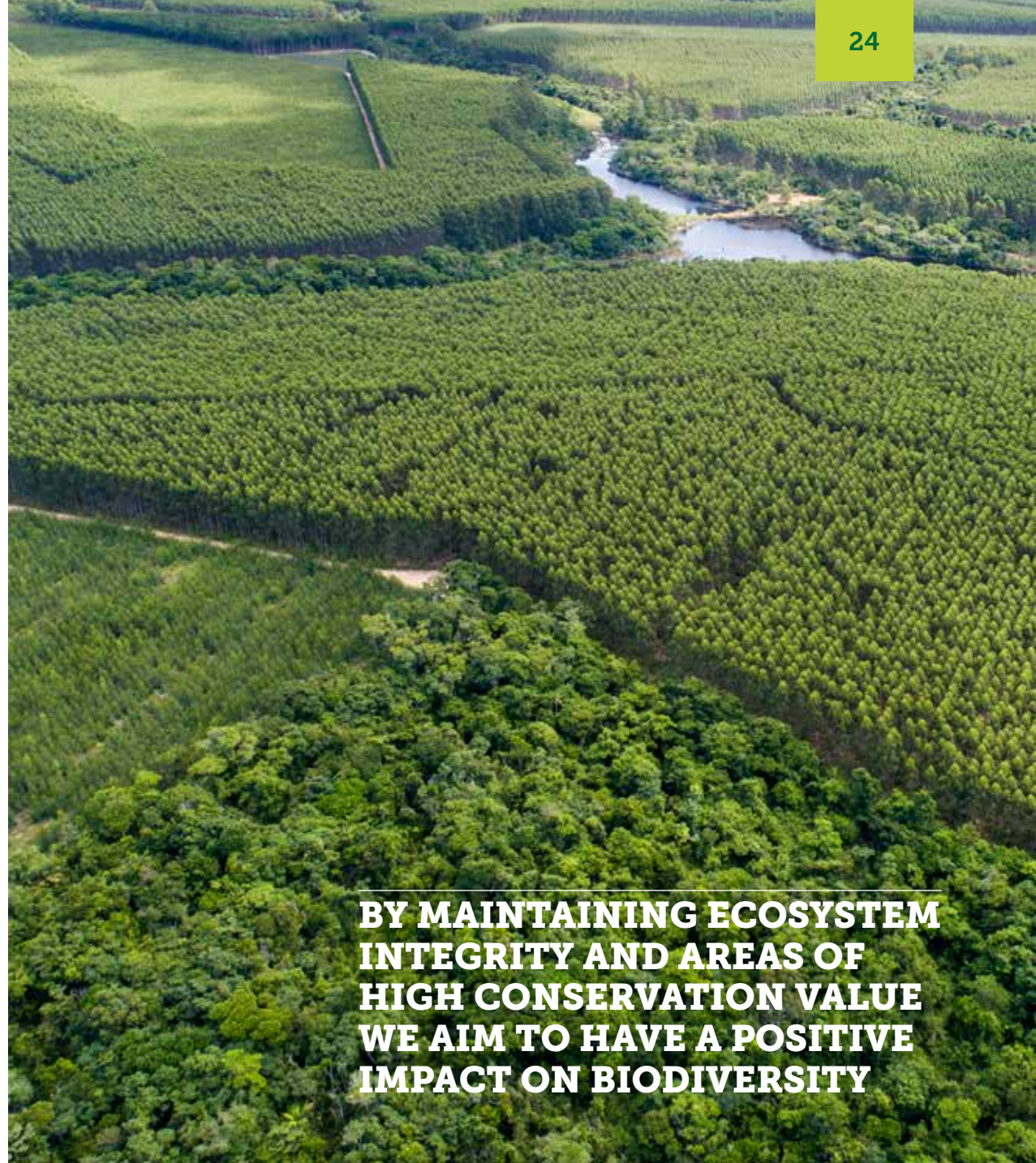
### Biodiversity conservation

By following our conservation principles, which are aligned with NGP principles of maintaining ecosystem integrity and protecting and enhancing areas of high conservation value, we aim to have a positive impact on biodiversity. In 2017, conservation areas covered 44.7% of our total owned and leased area, or 538,168 hectares, and included 31 areas of high conservation value. As well as supporting our work to maintain these areas, green bond proceeds enabled us to expand environmental education and research studies at Neblinas Park.



### Water management, Energy efficiency and Renewable energy

Green bond proceeds have financed a number of projects to improve the environmental performance of our pulp plants. We have upgraded several wastewater treatment facilities, improved energy efficiency, and generated more renewable electricity from black liquor, a by-product of the pulp-making process. At our Mucuri unit in Bahia, a new treatment plant reduced the organic load in the effluent by 60%, improving the quality of the river water as well.



**BY MAINTAINING ECOSYSTEM INTEGRITY AND AREAS OF HIGH CONSERVATION VALUE WE AIM TO HAVE A POSITIVE IMPACT ON BIODIVERSITY**



## STRONG BONDS



Compared to other sources of finance, complying with the Green Bond Principles brings some extra disclosure requirements to provide assurance to investors. However, we welcome these as a way of measuring, communicating and strengthening our environmental efforts. It also requires financial and sustainability teams to work together more closely: again, we welcome this, as we believe environmental considerations are not an add-on but should be at the very heart of our strategic decision-making. We believe



New Generation Plantation companies, like ours, have operations that already have high social and environmental performance, and as such, are in compliance with Green Bond Principles – so why not seize the opportunity?

For Suzano, issuing green bonds has been a highly positive experience, providing a competitive source of finance that has enabled us to improve or expand environmental initiatives. With great demand from investors, green bonds offer significant potential for NGP participants. We would be pleased to discuss our experiences with anyone who would like to know more.

### About the author

**Estevão do Prado Braga** is the Sustainability Manager for Suzano Pulp and Paper. He has more than 20 years of experience on sustainability issues, having worked for many years as an FSC auditor and as WWF's Global Forest & Trade Network manager in Brazil. Estevão has also served as a member of the FSC International Board of Directors since 2014.

Revenue from green bonds has helped Suzano expand its educational initiatives, including getting children involved in forest restoration projects.



Issuing green bonds has been a highly positive experience that has enabled Suzano to improve and expand its environmental initiatives.

## **An ecological infrastructure for a Green Belt Road**

**By Mike May, Wu Shuirong and Luis Neves Silva**

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**Plantations that follow NGP principles could provide the raw materials and the ecosystem services for the industries and people along the path of the Belt and Road Initiative**



## AN ECOLOGICAL INFRASTRUCTURE FOR A GREEN BELT ROAD

China's Belt and Road Initiative (BRI), perhaps the most ambitious infrastructure and development programme ever, plans to pour over US\$900 billion of investment into connecting China with the rest of the world. This 21st century Silk Road will link Central Asia, the Middle East, Europe and beyond in a spirit of "peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit".

For this grand scheme to succeed, it will need leadership, vision, cooperation and innovation, most notably because as the BRI unfurls, it will cross some of the harshest and most inhospitable regions of the world. The BRI will need to deliver solutions to people threatened by poverty, water stress, climate change and desertification. To fulfil President Xi Jinping's vision of a green, sustainable Belt and Road, a primary concern must be to avoid the negative environmental impacts that usually accompany large-scale infrastructure projects.

The environmental uniqueness and demography of the region and the lack of obvious models to follow present serious challenges to successful investment. However, solutions to mitigate risk are emerging. In 2017, NGP's [study tour to Gansu province](#) – the beginning of the ancient Silk Road, and a strategic hub of the new one – began exploring what a green infrastructure for the BRI might look like.

The NGP concept has been applied to support development and create value for local people while maintaining and restoring ecosystems around the world. The context of the BRI is new, but through diligent landscape-scale, cross-sectorial planning and zoning, mosaics of productive plantations and ecosystem restoration could create the ecological infrastructure needed to underpin this massive investment. Plantations following NGP principles can supply energy and raw materials for the industries and cities spanning the length of the BRI, while sparing habitats and supporting the restoration of degraded ecosystems.

Adopting such an approach at the outset could contribute to water security, biodiversity conservation, economic development and climate adaptation. This makes irrefutable sense: the BRI and all its beneficiaries



must, after all, coexist in a water-stressed economy and a changing climate, with the implications that this entails for the communities that call this region home. Providing resilience – for the first time – for regions at the margin of international attention is key to securing their future and avoiding climate-linked migration.

Such a vision could enable the BRI to be deployed along a path nurtured by nature and with the resources to fuel the industries targeted by the investments already envisaged.

Directly linking plantations to the industries along its path would create a diverse and renewable loop of production and consumption for the BRI through a bioeconomy. Green infrastructure on such a scale would bring enormous opportunities for job creation with direct benefits for the communities living in the regions through which the BRI will pass. In brief, the much-sought-after ideal of uncoupling development from emissions and degradation could be realized and set an example for impact investment elsewhere.

A plantation resource-based infrastructure for the BRI, based on a mosaic of productive plantations and landscape restoration and regeneration, could also contribute to China's pledge to increase its forest stock by 4.5 billion cubic metres between 2005 and 2030. Indeed, expanding plantations and restoring ecosystems alongside them could make a major contribution to mitigating the climate impact of the BRI – not just by sequestering carbon in the growing biomass, but also by increasing the carbon in degraded soils and by supplying timber to replace fossil fuels and energy-intensive materials, as discussed elsewhere in this publication.

### Already, moves have been made to implement this green infrastructure at different levels:



#### Partnership with local industry

FuturaGene is pioneering the science base and plantation stewardship efforts to harness the potential of yellowhorn (*Xanthoceras sorbifolium*), a locally adapted tree that produces oil-bearing seeds. A sustained supply of high-value edible oil (with distinct health properties similar to olive oil) or oil that could be used as a building block for a renewable chemical industry or cosmetics could create clusters of innovation, contribute to food security and invigorate industrial diversification and output.



#### Partnership with local and national government

In parallel, the Chinese National Forestry and Grassland Administration (formerly State Forest Administration) envisages that yellowhorn will be planted across 940,000 hectares once the varieties and capacity building with local farmers are in place.



#### New financing models

The [Land Degradation Neutrality Fund](#) is an obvious choice, since well-placed and well-managed plantations of locally adapted species could simultaneously improve soil carbon, spare water and provide new opportunities for local communities struggling to survive in this region. Scale could be increased through carbon finance; the [China Green Carbon Foundation](#), an NGP participant, is investigating how its expertise could be brought into play. Activities could be aggregated across the portfolio of countries into some form of green bond that could run into billions of dollars. Further finance should be sought from the industries that could benefit from a new source of renewable, carbon-neutral and societally beneficial oil.



#### Scientific research and innovation

FuturaGene is among those [investigating locally adapted woody species](#) suitable for industrial offtake and job creation or for landscape restoration. But other species from this region need to be explored for their offtake potential, or for their potential to create tree cover in the region. Programmes to protect endangered species such as *Acer pentaphyllum* (a rare maple species endemic to Sichuan province) could benefit substantially from a structured landscape mosaic combining productive areas alongside active nature conservation.



## AN ECOLOGICAL INFRASTRUCTURE FOR A GREEN BELT ROAD

One of the most significant recent innovations with great synergy with what we propose here is the recent reform of environmental and natural resources administration in China. In January 2018, as part of China's institutional reform, a new Ministry of Ecology and Environment and Ministry of Natural Resources were established. The new ministries will integrate and harmonize duties previously scattered across different departments and thus unify supervision and management. For the first time, China now has the institutional infrastructure to begin a comprehensive approach to environmental and natural resources policy development, monitoring and assessment, supervision and law enforcement at scale.

A new era for environmental governance and ecological restoration is unfolding, and China is taking ambitious steps to decarbonize growth, halt biodiversity loss and curb environmental degradation both nationally and globally. If NGP concepts, underpinned by the new

environmental policies, are brought to the planning table, the BRI, the industries it will create, the communities that could be drawn into its benefits and the fragile biomes it will traverse could all be winners.

### About the authors

**Mike May** is VP of Public Affairs at FuturaGene. With a doctorate in biological science, he has spent his career pursuing international cooperation, policy and technological solutions for global challenges. He sits on various United Nations and international policy boards.

**Wu Shuirong** is Professor of forest resources and environmental economics at the Chinese Academy of Forestry, Beijing. She is a member of the IUFRO Task Force Sustainable Planted Forests for a Greener Future.

**Luis Neves Silva** works for the WWF Forests Practice and is a member of the IUFRO Task Force Sustainable Planted Forests for a Greener Future.



### ICPF 2018 Green Belt Road

The authors will be discussing the potential for plantations to provide ecological infrastructure for the BRI, and introducing the concept of "Green Belt Road Bonds" to finance landscape restoration.

Find out more: <https://bit.ly/2DxVd69>

**OUR VISION IS OF A BELT  
AND ROAD NURTURED BY  
NATURE, PROVIDING THE  
RESOURCES TO FUEL THE  
INDUSTRIES AND SERVICES  
TO SUPPORT THE PEOPLE  
ALONG ITS PATH**

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**New Generation Plantations are forest plantations that:**

- maintain ecosystem integrity
- protect and enhance high conservation values
- are developed through effective stakeholder involvement processes
- contribute to economic growth and employment.

**[www.newgenerationplantations.org](http://www.newgenerationplantations.org)**