

# New generation plantations: towards sustainable intensification

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*Well-managed tree plantations in the right places can help conserve biodiversity and meet human needs.*

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**T**he WWF Living Forest Report (WWF, 2011) projects that wood harvesting could triple by 2050 to approximately 10 billion m<sup>3</sup>. It is not enough, however, simply to produce more. If the combined needs of global food security, poverty reduction and environmental sustainability are to be met, production must be integrated, inclusive and sustainable. The past paradigm of input-intensive production cannot meet this challenge; productivity must be achieved through sustainable intensification (Godfray *et al.*,

*A eucalypt plantation in Parque das Neblinas restored to lush rainforest on a steep slope, with the dark green, glossy leaves typical of native forest in the area*

2010). This means, among other things, conserving, protecting and enhancing natural resources and ecosystems while improving the livelihoods and well-being of people and social groups and bolstering their resilience. Mechanisms are needed to develop and ensure sustainable forest management practices while preserving or enhancing social and environmental

values in landscapes in an environment of constantly increasing and diversifying demand for forest biomass.

Scientific and technological innovations are core elements in developing such mechanisms, as is open dialogue with all stakeholders on appropriate governance frameworks for the uptake and deployment of approaches to raising forest productivity. Equally important is system-wide planning and zoning, involving cross-sectoral cooperation to maximize the efficiency of production by all land-users while reducing competition for land and water. Any approach must ensure that local stakeholders are included in relevant planning and implementation processes, using tools such as free, prior and informed consent.

#### THE NEW GENERATION PLANTATIONS APPROACH

To achieve the greater intensification of productivity required, existing performance standards, which were designed to manage linear, incremental change, will not suffice. Future standards must be designed to respond to the complexity of systemic transformational changes that comes with the highly disruptive process of further intensification. Such standards must ensure a governance framework that provides social safeguards, achieves

inclusive local economic development, provides effective ecosystem stewardship, and stimulates preferential procurement and increased consumer awareness.

It is within this new paradigm that the principles of the “new generation plantations” (NGP) concept (Figure 1) carry particular significance. Well-managed tree plantations in the right places can help conserve biodiversity and meet human needs while contributing to sustainable economic growth and local livelihoods if they:

- Adopt inclusive local economic development and forestry as an increasingly central theme. Engaging with stakeholders means far more than carrying out consultations and obtaining the consent of communities affected by plantations. It is about building relationships with stakeholders, talking and listening to them, and empowering them to meet their needs and achieve their aspirations.
- Maintain ecosystem integrity and protect high-conservation-value areas, making sure that plantations don’t disrupt natural cycles – for water, nutrients, carbon and biodiversity – and increasingly look beyond individual operations towards maintaining and restoring ecosystems on a broader landscape scale.

- Are profitable. Plantations create jobs, often in poor rural areas, but they have the potential to do far more than that. Plantations should be a means for achieving inclusive green growth, and the benefits should be shared with the local communities who are sharing the landscape.

The NGP concept, therefore, provides a strong, inclusive model and approach for implementing sustainable intensification as a contributor to the functioning of socially and ecologically resilient landscapes.

An existing significant contributor to the functioning of resilient landscapes is the family farmer. FAO’s *The State of Food and Agriculture* published towards the end of the International Year of Family Farming (FAO, 2014) makes a compelling case for concerted efforts to bring innovation to family farming. Five hundred million family farmers – managing 90 percent of all farms in the world and occupying around 70–80 percent of farmland – produce more than 80 percent (in value terms) of the world’s food. The overarching view of FAO is that family farms must be supported “to innovate in ways that emphasize sustainable intensification

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The principles of the new  
generation plantations concept





of production and improvements in rural livelihoods” (FAO, 2014). Sustainable intensification can be achieved through a cohesive multistakeholder innovation system to develop new technologies and practices suited to stakeholder needs and local conditions or by overcoming barriers and constraints to the adaptation and adoption of existing technologies and practices and access to relevant markets.

Forestry should follow a similar route. Given that the environmental issues of plantation forestry are well known and there are well-developed tools for addressing them, multistakeholder processes are the new frontier for evaluating process-based technological advances and ensuring inclusive local economic development. These will reconcile stakeholder perspectives and priorities and clarify how to bring innovation to family farmers at the local level.

#### CASE STUDIES

NGP is an aspirational concept for a new era of production landscapes incorporating sustainable intensification. It brings a vision in which plantations contribute positively to communities and ecosystems through a combination of best-available knowledge on land-use planning; precision forestry operations (e.g. silviculture); ecosystem protection, management and active restoration; and local community empowerment. Since its creation in 2007, the NGP Platform<sup>1</sup> has collected and shared knowledge and experiences worldwide on how NGP principles are being integrated and implemented in practice. Examples are given below.

##### Uruguay

Land-use planning implies crop–livestock–forestry integration as a precondition for innovation in agriculture, forestry and conservation. An example is in Uruguay, where cattle-ranching is deeply embedded in the culture of rural areas. Forestry, as a relative newcomer there, is competing for

land with cows and soy. The discomfort of farmers at the increasing presence of forestry was becoming apparent in rural communities, with this competing sector putting at risk long-established ways of life and local cultural values. Far from seeing forestry and cattle as competing sectors, NGP shows how new forms of partnership can be developed that benefit both communities and companies by realizing the value of actively managing synergies between sectors. In Uruguay, NGP participants Stora Enso, UPM and Arauco are, among other things, leasing land to local cattle herders for grazing and introducing forestry components to integrated crop–livestock systems that improve carbon stock, diversify revenues and reduce risks.

##### South Africa

Precision forestry integrates accurate monitoring with measures to avoid planting in natural ecosystems and to protect areas with high conservation value. Plantation companies in South Africa demarcated wetlands and riparian zones and removed plantations from these sensitive ecosystems; in so doing, they were able to mitigate one of the main impacts of plantations: water use. This is best seen in the iSimangaliso Wetland Park World Heritage Site, where NGP participant Mondi helped transform a long history of dispute into a successful partnership that has minimal impact on natural ecosystems. There had been bitter disputes over the years at Lake St Lucia (in the World Heritage site) between the forest industry, environmentalists and local people because poorly sited plantations were having a negative impact on the lake and its wildlife by reducing freshwater flows. Mondi worked with the government, environmental non-governmental organizations and the park authority to determine which areas were suitable for commercial plantations and which should be returned to their natural state. A 120-km-long “ecoboundary” was mapped out that divided mostly wetland areas and other important

ecosystem components to be set aside for conservation from the dry mineral soils that were best suited for plantations and where impacts on natural ecosystems would be minimal. The plantation trees were removed from the wetland side of the ecoboundary and the land restored to wetlands and savannah. Certification of forest operations provides an independent means of verifying the sustainability of forest management practices.

##### Brazil

It is estimated that there are more than a billion hectares of degraded and deforested land worldwide (GPFLR, 2016), and land restoration is therefore a major global need. NGP can achieve active restoration at scale while responding to the productivity challenge. Brazil’s Mata Atlântica (Atlantic rainforest), a global biodiversity hotspot, has been devastated by past agricultural practices; today, only 8.5 percent of it exists in its original state (WWF, 2016), often in isolated fragments. Two Brazilian participants in the NGP Platform, Fibria and Suzano (both pulp and paper companies), have established partnerships with international and local conservation and social non-governmental organizations in the Mata Atlântica. Building on the requirements of the Brazilian Forest Code, they have invested in plantation development and ecosystem restoration, ensuring that 50 percent of their land is maintained or restored as forest ecosystems in a mosaic landscape approach. Along the way, they have selectively bred tree clones in their nurseries and research units to intensify production. The productivity of wood-fibre production has more than doubled in 40 years through the breeding of better-performing tree varieties and clonal selection (Gonçalves *et al.*, 2013), and there is potential to increase yields by a further 20 percent (May and Hirsh, 2014). This increase in productivity significantly reduces the pressure on natural forests and other land. The work by Fibria and Suzano demonstrates that by applying NGP principles, well-designed, well-managed

<sup>1</sup> <http://newgenerationplantations.org>



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plantations can be valuable for ecosystem restoration while ensuring high-yield production on a minimal area of land.

### THE IMPORTANCE OF TRUST

Local community empowerment can bring forest companies and civil society together in multistakeholder processes that develop mutual trust and lead to shared understanding and collaborative approaches to sustainable forest management. In NGP, dialogue is the basis for exploring and reconciling local stakeholder perspectives and priorities with process-based technological advances. The aim is to determine practical ways to enable inclusive local economic development for those sharing their land with production companies; for example, smallholders can be supported in obtaining certification for their operations and thereby supply plantation companies with certified wood grown on their own land.

In March 2015 in Santiago, Chile, 130 people from 25 countries and four continents, representing governments, companies, communities and civil-society organizations, gathered at the NGP annual meeting to debate how to make plantations work for people (NGP Platform, 2015).

Historically, there has been a loss of trust in Chile between smallholders and plantation corporations; this is also true in Brazil and South Africa. Although progress has been made in all three countries and others, such as Paraguay, it is clear that restoring trust is a long-term process and must be earned. Participants at the meeting heard that Fibria has turned years of conflict around in the Brazilian states of Bahia and Espírito Santo, where the company and communities are starting to work together to achieve common goals. In South Africa, Mondi has developed a model for engaging and settling with land-claimant communities and assisting them to develop sustainable forest enterprises. Trust is a journey and, with NGP, the journey has begun.

### DISCUSSION, CONCLUSIONS AND OUTLOOK

Well-placed, well-managed plantations can be important components of sustainable landscapes, providing opportunities to restore degraded land, spare natural forest and enhance local socio-economic values while increasing productivity (WWF, 2011). Mosaics of new plantations, forest (and other ecosystem) restoration and

*A eucalypt plantation/Atlantic rainforest landscape mosaic – an example of a new generation plantation approach*

responsible farming (NGP Platform, 2014) can restore essential ecosystem services by effectively blending crops, livestock and forestry as an integrated system (Bungenstab and Almeida, 2014). System-wide, cross-sectoral planning and zoning in mosaic designs is essential for maximizing the efficiency of production while reducing competition for land and water.

NGP also offers the potential for a new era of sustainable intensive silviculture. It enables robust land-use planning that dynamically integrates optimized productivity in production areas through precision silviculture with the protection of high-conservation-value forests and the active restoration of rezoned degraded land and forest. This creates landscapes of diverse, resilient ecological infrastructure that offer improved prospects for the livelihoods of local communities. Transforming conflict into cooperation, and land claims into business opportunities, is part of the change envisioned in the NGP approach.

The question WWF and its partners want to explore in the NGP Platform is:

if innovation-driven, technology-rich, sustainable intensification is an option for the future, can we design a framework to drive research in the right direction, bring innovations to family farmers at the local level, and resolve the constraints on market access?

The fundamental challenge and opportunity of our times, therefore, is to develop leadership in the formulation of such a framework that masters production efficiency in transformative ways. Within this, the physical challenge is to develop and deploy innovations for the sustainable intensification of forest commodity production. The socio-economic challenge will be to ensure that technology reaches those who need it most.

Production intensification in forestry can ensure that there is sufficient land for other uses, such as food production for local markets and biodiversity conservation, while also diminishing logging pressure on natural forests and their associated communities, ecosystem services and biodiversity.

For the NGP approach to be adopted widely, the following three key findings of the NGP Platform will be crucial (NGP Platform, 2015):

1. To make plantations work for people, forestry companies need to work with local communities and civil society. For that to happen, trust is essential.
2. However well plantations might be managed at the site level, they are part of a wider ecological, socio-economic and governance landscape. To generate social and environmental benefits at a meaningful scale, collaboration is essential at the landscape scale. Two key words – “resilience” and “inclusivity” – must shape any discussion of how this can be achieved. Landscapes need to be resilient – meaning that ecological and socio-economic systems will continue to function and provide the full range of ecosystem services in the face of changes and shocks, such as those brought about by climate change. And the approach needs to be inclusive – that is, developed with

the participation of all stakeholders and delivering benefits for all.

3. Creating shared value involves companies working with other stakeholders in landscapes to address social and environmental objectives while building long-term business competitiveness – it is about finding opportunities for mutual socio-economic and ecological benefits. For this to happen, partners must identify shared objectives and values, thereby reinforcing trust-building approaches for long-term resilience.

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