

New Generation Plantations: towards sustainable intensification

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Abstract

In the longer term, as population and incomes grow, zero forest loss will require forestry and farming practices that produce more with less land, water and pollution, and new consumption patterns. Even with more frugal use and greater efficiencies, demand for wood is likely to grow. WWF projects that maintaining zero loss of natural forests after 2020, without significant reductions in consumption, would require up to 250 million hectares of new tree plantations by 2050 (WWF, 2011).

Well-placed, well-managed plantations are an important component of sustainable landscapes because they can provide an opportunity to restore degraded land, spare natural forest and enhance local socio-economic values whilst increasing productivity (NGP, 2015). Forest cover and related environmental services could expand through mosaics of new plantations, forest restoration and responsible farming, effectively blending crop, livestock and forestry as an integrated system. System-wide planning and zoning is an innovative solution to maximise the efficiency of production whilst reducing competition for land and water. The New Generation Plantations (NGP) experience is that the ecological and social infrastructure of mosaics provides a means to tackle the paradox that the more we advance on development, the more we fail on sustainability.

If the NGP concept is applied, plantations can have positive environmental and social impacts, by maintaining ecosystem integrity, protecting high conservation values and being developed through stakeholder engagement, while contributing to economic growth. The NGP is a learning and influencing platform of WWF, companies and governments, which through dialogue aim to develop sustainable solutions for better plantations. The platform advocates for conserving, protecting and enhancing natural resources and ecosystems, improving the livelihoods and well-being of people and social groups and bolstering local socio-economic and ecological resilience.

Keywords: plantations, conservation, socio-economic values, sustainability, sustainable intensification

Introduction, scope and main objectives

The WWF Living Forest Report projects that wood harvesting could triple by 2050 to approximately 10 billion m³ (WWF 2011). It is not enough, however just to produce more. If the combined needs of global food security, poverty reduction and environmental sustainability are to be achieved, production must be integrated, inclusive and sustainable. With limited scope for sustainable throughput of resources, ensuring wellbeing within planetary boundaries will require enhanced resource use efficiency, whilst meeting growing and shifting demand. The past paradigm of input-intensive production cannot meet the challenge; productivity must be achieved through sustainable intensification (Godfray *et al*, 2010). That means, inter alia, conserving, protecting and enhancing natural resources and ecosystems, improving the livelihoods and well-being of people and social groups and bolstering their resilience. Mechanisms to develop and ensure more sustainable forest management practices whilst preserving or enhancing social and environmental values within landscapes in an environment of constantly increasing and diversifying demand for forest biomass are an imperative.

Scientific and technological innovations are core elements in this equation as is open dialogue with all stakeholders on appropriate governance frameworks for their uptake and deployment in approaches to raise forest productivity. Equally important are system-wide planning and zoning, involving cross-sectoral cooperation to maximise the efficiency of production by all land-users whilst reducing competition for land and water. This approach must ensure that local stakeholders are included in the relevant planning and implementation processes, using tools such as Free Prior and Informed Consent.

The New Generation Plantations approach

However, to achieve greater intensification of productivity, existing performance standards, 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: these standards must ensure a governance framework that provides social safeguards, ensures inclusive local economic development, provides effective ecosystem stewardship and that stimulates preferential procurement and increased consumer awareness.

It is within this new paradigm, that the principles of the NGP concept carry particular significance: well-managed plantations in the right places can help conserve biodiversity and meet human needs, while contributing to sustainable economic growth and local livelihoods, by:

- Inclusive local economic development and forestry, as an increasingly central theme for forestry and plantations. Engaging with stakeholders means far more than simply carrying out consultations and obtaining the consent of communities affected by plantations. It's really about building relationships, talking and listening to them, and empowering them to meet their needs and achieve their aspirations;
- Maintaining ecosystem integrity and protecting high conservation value areas (HCV), making sure plantations don't disrupt natural cycles – for water, nutrients, carbon and biodiversity - and increasingly look beyond individual operations toward maintaining and restoring ecosystems on a broader landscape scale;
- Plantations should be profitable businesses. They create jobs, often in poor rural areas, but have the potential to do far more than this. Plantations should be a means to support inclusive green growth, and share benefits with the local communities who are sharing the landscape.

Therefore the NGP concept provides a stronger inclusive model and approach for implementing sustainable intensification as a contributor to the functioning of socially and ecologically resilient landscapes.



Fig. 1: The principles of the New Generation Plantations concept (NGP, 2011).

A significant contributor to the functioning of resilient landscapes is the family farmer. The State of Food and Agriculture published at the end of the International Year of Family Farming (FAO, 2014) has provided a compelling case for concerted efforts to bring innovation to family farming: 500 million family farmers – managing 90% of all farms in the world, occupying around 70–80% of farmland – produce more than 80% of the world's food in value terms. The overarching view of the FAO is that family farms must be supported “to innovate in ways that emphasise sustainable intensification of production and improve their livelihoods”. The FAO proposes that sustainable intensification can be achieved through a “cohesive multi-stakeholder innovation system to develop new technologies and practices suited to their needs and local conditions or through overcoming

barriers and constraints to the adaptation and adoption of existing technologies and practices and access to relevant markets”.

Forestry should not follow a different route. Given that the environmental issues of plantation forestry are well known and there are well-developed tools to address them, multi-stakeholder 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 down to the local level and the family farmer.

Results

The New Generation Plantations 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 the combination of best available knowledge on (i) land use planning, (ii) precision forestry operations (e.g. silviculture), (iii) ecosystem protection, management and active restoration, and (iv) local community empowerment. Over the last seven years the NGP platform has collected and shared knowledge and experiences worldwide, on how these principles are being integrated and implemented in practice:

(i) *Land use planning* implies crop-livestock-forestry integration as a precondition for innovation in agriculture, silviculture and conservation. An example is in Uruguay, where cattle ranching is deeply embedded in the culture of rural areas, and forestry as a relative newcomer, is competing for land with cows and soy. Farmers discomfort had become apparent in rural communities with new competing sectors 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 partnerships can be developed searching to benefit communities and the companies, by realising the value of actively managing the synergies between sectors. Land leasing to local cattle herders for grazing, or the introduction of forest components into integrated crop-livestock systems which can improve carbon stock, diversify revenues and reduce risks, are some of the ways forward the NGP Participants Stora Enso, UPM and Arauco are implementing in the country.

(ii) *Precision forestry operations*, such as silviculture, integrates accurate monitoring with measures to avoid planting in natural ecosystems and protect areas of high conservation value. NGP shows how South African plantation companies, through demarcating wetlands and riparian zones and removing plantations from these sensitive ecosystems, were able to start mitigating one of the main impacts of plantations: water use. This is best seen in the Isimangaliso Wetland Park World Heritage Site where the NGP Participant Mondi helped to transform a long history of dispute into a successful partnership, where impacts on the natural ecosystems would be minimal. Over the years, in Lake St. Lucia, there had been bitter disputes between the forestry industry, environmentalists and local people. Some poorly sited plantations were having a negative impact on the lake and its wildlife by reducing freshwater flows. The company worked with the government, environmental NGOs and the park authority to determine which areas were suitable for commercial plantations, and which should be returned to their natural state. They mapped out a 120-km long “eco-boundary” dividing mostly wetland areas and other important ecosystem components, to be set aside for conservation, from the dry mineral soils best suited to plantations, where impacts on the natural ecosystems would be minimal. The trees were removed, and the land restored to wetlands and savannah. Certification of forest operations provides the independent mean to verify the sustainable forest management practices.

(iii) *Land restoration* is a major need, with over 2 billion hectares of degraded and deforested land across the world, according to IUCN (2015). NGP shows how active restoration at scale has been achieved while responding to the productivity challenge. In Brazil, the Mata Atlantica (Atlantic Rainforest) is a global biodiversity hotspot that has been devastated by past agriculture practices; today only 7% of the Mata Atlantica exists in its original state, often in isolated fragments. The Brazilian NGP Participants Fibria and Suzano established partnerships with international and local conservation

and social NGOs, and building on the requirements of the Brazilian Forest Code, have been investing in plantation development and ecosystem restoration, ensuring that half of their land is maintained or restored Mata Atlantica forest ecosystems in a mosaic landscape approach. Along the way, the plantation companies have selectively bred tree clones within companies' nurseries and research units, to intensify production and increase productivity. Productivity has more than doubled in 40 years by breeding for better performing tree varieties and clonal selection, and further potential to increase yields by 20% is in reach. This significantly reduces the pressure on natural forest areas and other land. The Brazilian case demonstrates that if applying the principles of NGP concept, well designed and managed plantations can be valuable for ecosystem restoration, whilst ensuring high-yield production on minimal amount of land.

(iv) *Local community empowerment* convenes forestry companies and civil society in multi-stakeholder processes developing mutual trust, shared understanding, and collaborative solutions to sustainable forest management. NGP shows how dialogue is the basis for exploring and reconciling local stakeholder perspectives and priorities with process-based technological advances, determining how inclusive local economic development can be enabled for those sharing their land with production companies, e.g. enabling smallholders to obtain certification for their operations for more effective supply of certified wood to plantation companies. In Chile, 130 people from 25 countries and 4 continents, coming from governments, companies, communities and civil society organisations gathered at the NGP Annual Meeting to debate how to make plantations work for people (NGP 2015). Unfortunately, trust has historically been lost in Chile, as in Brazil or South Africa. And, although progress has been made, it's clear that restoring trust is a long-term process, and has to be earned. Examples from the NGP Participants can be found in the Brazilian states of Bahia and Espirito Santo, where Fibria turned a situation of years of conflict round, with company and communities starting working together to achieve common goals. While in South Africa, Mondi has developed a model for engaging and settling with land claimant communities, in assisting them to develop sustainable forestry enterprises. Trust is a journey, and what NGP is showing is, it has at least begun.



Figure 2: Dialogue is the basis for mutual trust, shared understanding, and collaborative solutions. New Generation Plantations 2015 Meeting.

Discussion, conclusions and outlook

Well-placed and well-managed plantations are an important component of sustainable landscapes because they can provide an opportunity to restore degraded land, spare natural forest and enhance local socio-economic values whilst increasing productivity (WWF, 2011). Mosaics of new plantations, forest (and other ecosystems) restoration and responsible farming (NGP, 2014), could expand forest cover and related environmental services through effectively blending crop, livestock and forestry as an integrated system (Bungenstab and Almeida, 2014). System-wide and cross-sector planning and zoning in mosaic design is an essential pre-requisite to maximise the efficiency of production whilst reducing competition for land and water.

All the above combined opens the potential for a new era of Sustainable Intensive Silviculture: Robust land use planning that dynamically integrates optimised productivity in production areas through precision silviculture with conservation of forest areas and active restoration of rezoned degraded land and forest. Within this landscape of diverse, resilient ecological infrastructure, better prospects for the livelihoods of local communities can be achieved. Transforming conflict into cooperation, and land claims into business opportunities, is part of the change envisioned by NGP.

The question we wish to explore within the New Generation Plantations platform is; if the promise of an innovation-driven, technology rich sustainable intensification is an option for the future, how can we design frameworks that drive research in the right directions, that bring innovation down to the local level and the family farmer and that resolve the constraints on market access?

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

By doing so, productivity intensification could ensure sufficient land for other uses, such as food production for local markets and biodiversity, whilst further diminishing logging pressure on natural forests and their associated communities, ecosystem services and biodiversity.

For this to happen, the findings of the NGP platform accumulated over the last seven years will be critical (NGP 2015):

1. To make plantations work for people, forestry companies need to work together with local communities and civil society. And for that to happen, trust is critical.
2. However well plantations might be managed at the site level, they are part of a wider ecological, socio-economic and governance landscape. To have positive environmental and social benefits, at a scale that matters, we need to think and work together with others at a landscape level. Two key words will shape any future discussion of how we can do this. Landscapes need to be *resilient* – meaning that ecological and socio-economic systems continue to function and provide a full range of services in the face of changes and shocks such as the impacts of climate change. And the approach needs to be *inclusive* – developed with the participation of all stakeholders, and delivering benefits to all.
3. Creating shared value, involves companies working together with other stakeholders in the landscape to address social and environmental objectives while building long-term business competitiveness. It's about finding opportunities for mutual socio-economic and ecological benefits. For that to happen, it's important for partners to identify shared objectives and shared values, thereby reinforcing trust building approaches for long-term resilience.

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