



# Background Analytical Study Forests, inclusive and sustainable economic growth and employment

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In response to paragraph 31 of resolution 13/1, the UN Forum on Forests Secretariat commissioned three background analytical studies on the contribution of forests to the achievement of the Sustainable Development Goals under review by the High-level Political Forum on Sustainable Development in 2019 in consultation with the Bureau of the fourteenth session of the Forum, taking into account the thematic priorities of the fourteenth session. The studies are: (a) Forests and climate change; (b) Forests, inclusive and sustainable economic growth and employment; and (c) Forests, peaceful and inclusive societies, reduced inequality and inclusive institutions at all levels.

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## Executive Summary

The adoption in 2015 of the UN Sustainable Development Goals (SDGs) together with the Paris Climate Agreement mark an unprecedented global turning point for humanity, that has agreed on a universal development plan for attaining socially inclusive and highly aspirational socio-economic development goals. This creates opportunities for implementing large scale transformational collective solutions, where forests should play a key role in achieving the SDGs. Governments have recognized this through the UN Strategic Plan for Forests 2017-2030 (UNSPF). The UNSPF underlines that solutions need to be coordinated and collaboratively implemented between the forest and other sectors and multiple players, by creating enabling environments through effective governance and institutions, and public and private investments that foster collective impacts.

This background analytical study focuses on “forests, inclusive and sustainable economic growth and employment”, particularly on the socioeconomic functions of forests, aiming to help the technical discussions on the thematic priorities at UNFF14, as well as for the Forum’s input to the 2019 High Level Political Forum on Sustainable Development (HLPF).

Society and forestry have gone through significant development paradigm changes, especially since the 1940s, searching for sustainable and inclusive society that embraces human rights, equity, poverty and environmental concerns. To achieve this vision, forestry has become more integrative and participatory with more inclusive governance arrangements and adaptive learning for collective impact, especially in the growing movement of integrated landscape management, restoration, and integrated value chain approaches. Collaborative approaches are fundamental to realize the capacities and assets of multiple players at all levels, for transformational changes at the scale and speed needed. The UNFF and governments could further the exchange of experiences and develop the capacities of key stakeholders on the theme of forest-based inclusive and sustainable economic growth and employment, taking advantage of the Collaborative Partnership on Forests (CPF) and the Global Landscapes Forum (GFG 4.3, SDG 17).

According to UNFF over 1.6 billion people depend on forests for subsistence, livelihoods, employment and income generation, but at the end all of humanity depends on forests. Forests provide a wide range of goods and services, that create opportunities to address many of the SDGs and play an important role in the economy of many countries and rural communities, especially the poorer ones (GFG 2.1, SDG 8). Its contribution to the global GDP in 2011 was USD600 billion (0.9 percent), but it is significantly higher in low-income countries, where it reaches 1.4 percent, compared with only 0.1 percent in high-income countries. Additionally, non-wood forest products (NWFPs) are important sources of livelihood for many rural dwellers and for industries that process or use these products. The annual value of forest contributions exchanged for cash in the developing world is in the neighborhood of US\$ 250 billion, but it is likely to be two to three times greater for benefits that are not exchanged for cash. The total number of people employed in the formal forestry sector is around 13 million, but those employed in the informal sector are near 45 to 50 million (SDG 8).

To end poverty and food insecurity and hence support an inclusive and sustainable society, governments would need to further develop policies that secure tenure rights and equal benefit sharing for the poor and vulnerable, including indigenous people, landless farmers, rural women and youth. These policies should facilitate access to markets and better prices by accessing the formal economy, payment for ecosystem services (PES), credit and other sources of financing, including blended finance (SDGs 8, 17).

Information about forest ownership is important to better understand who controls forests use and management, and who benefits or loses from the variety of products and services they provide.

Over the last two decades, a marked shift towards devolution of rights to local actors over natural forests has taken place across the global tropics. This positive trend sets the stage for community-based management of forests and locally-controlled forest enterprises (LCFEs). These strategies have proven to be effective to contribute to local livelihoods, ecosystem protection, and sustainable and inclusive development. For the long-term success of forest management by families, indigenous peoples and local communities, governments should also support forest producer organizations (FPO) by strengthening their capacities and linking them with investment and market opportunities. Long-term support to FPO would pay-off through the conservation of the natural capital and sustainable community development, nurtured by asset building based on their natural capital. Interventions to support LCFEs could range from policies that secure land tenure, inclusive territorial planning, avoid overregulation, public and private sector investment, access to credit, technical assistance, capacity building for social organization and enterprise development, equal benefit sharing and monitoring and learning. UNFF is in a good position to support LCFEs within the global development agenda and with national governments, creating enabling environments, technical and financial support and strengthening capacities of all actors (GFGs 2.1, 2.2, 2.3, 2.4, 6.3, SDGs 8, 17).

Agenda 2030 has potential for transformational change through the realization of synergies among the SDGs. In this regards, forests, as stated by the UNSPF, play a prominent role in the success of the SDGs, through collaborative intersectoral planning and leadership. Policy nexus that are closely related to SDGs such as forests and ecosystem services and livelihoods, forests and the green economy, and, forests and rights, justice, equality and inclusion, could guide priority setting to address tradeoffs and mobilize synergies with other SDGs and sectors. This requires integrated, innovative, inclusive and collaborative governance systems across sectors, and hence higher levels of collaborative leadership skills. Integrated landscape management and restoration and sustainable value chains can facilitate collaboration between players from different sectors and result in more effective forms of social organization for SFM (GFG 6.3, SDG 17).

The forest sector interacts with several sectors such as agriculture, water, energy, tourism and health, among others. Agriculture is by far the main driver of deforestation, while at the same time forests are important for food security and nutrition (FSN), especially for people living in remote areas. To accomplish the ambition of ending hunger and poverty, sectoral ministries could ensure policy coherence across governments, integrating strategies that deal with forests, agriculture, food, land use, and rural and national development. UNFF and CPF through the Global Landscapes Forum could play a facilitating role fostering intersectoral collaboration (GFGs 2.3, 6.3, SDG 17). Around three-quarters of the globe's accessible freshwater comes from forested watersheds, hence forest-based solutions (FBS) offer a great potential for the sustainable management of water resources. Forests also regulate the provision of water and water-related ecosystem services within a larger climate-forest-water-people system, that is under considerable pressure from increasing and changing demands from growing populations and economic development. Clear mandates from the highest policy level can significantly accelerate FBS uptake and foster improved intersectoral cooperation, which is also critical for ensuring the delivery of co-benefits important for inclusive and sustainable development at the local, national and global levels (GFG 6.3, SDG 17). Forests play an important role in creating options for affordable and clean energy, particularly in developing countries. Forests supply about 40 percent of the global renewable energy in the form of woodfuel, resulting in around 50% or 1.86 billion m<sup>3</sup> of global wood production being used for energy.

This use might increase and hence it would require additional financing, knowledge transfer, policy/institutional changes, market development and regulatory mechanisms, to ensure the poor participate in this new economy (GFG 6.3, SDG 17). Emerging wood-based products offer new markets that are expected to increase, especially in construction, textiles, chemicals, biofuels, packaging and a number of small upstream niche markets such as cosmetics, food additives, and pharmaceuticals. A higher use of wood-based products could also become an effective climate change mitigation option. This increase in value-added would be particularly important for rural economies that have a higher dependency on forests for income and employment. National policies and NDCs could help creating proper conditions and solutions for sustainable wood production, taking into consideration all actors in value chains, especially the most marginalized, ensure property rights and access to legal sources of wood and NWFP (GFGs 2.1, 2.4, 6.3, SDGs 8, 17).

Sustainable consumption that entails moving from efficiency improvements to lifestyle changes, to broader cultural changes, to sociotechnological system changes, is also a requirement for a more sustainable future. This would need deeper levels of system change, including, interventions and policies to move from relative decoupling via technological improvements, to strategies to change the behavior of individual consumers, to broader initiatives to change systems of production and consumption. National-level interventions can include a range of incentives (e.g. tax policies, benefit-sharing, PES), disincentives (e.g. moratoria, fees) and enabling measures (e.g. adequate governance, enforcement, policies and land-use planning, secure tenure rights). Local-level interventions need to be suited to local conditions considered within the context of national forest policies and plans to ensure the right incentives, enabling conditions, and policy levers are in place (GFG 6.3, SDG 17). Overall, demand for wood products will continue to rise and to place pressure on natural forests, yet sustainably managed forests will play a significant role in enabling us to move away from a reliance on more carbon-intensive materials (e.g. concrete, steel). This shift towards new activities could create new or renewed competition: (a) between wood energy and traditional industrial uses; (b) between wood energy and other sources of energy and (c) between wood in green building and other building materials.

Balancing the increasing demands for land and forests through SFM and forest landscape restoration (FLR) will be critical for ensuring remaining and new forests are managed effectively to balance multiple objectives pertaining to timber production, social outcomes and environmental concerns. This will require governments to develop locally appropriate policies and governance structures to support SFM and FLR planning and implementation, incorporate local needs and enforce regulations and the proactive engagement of the private sector and blended finance from ODA and impact investors. SFM and FLR also offers potential for high quality employment, and a vibrant forest-based economy offers an alternative to those who would otherwise migrate to urban areas for employment (GFGs 2.1, 4.3, 6.3, SDG 8, 17).

Given the deteriorated condition of the world's natural capital and ecosystem services, a sustainable future path for humanity must be based on decoupling economic growth from nature and forests degradation. This is not impossible and has been achieved in some countries. Countries could benefit by fostering smart development approaches that recognize forests' significance for sustaining economic growth across many sectors. REDD+ readiness plans have included policies that aim at strengthening forest sector governance and institutions, land tenure, illegal logging, and improve cross-sectoral coordination and collaboration that ensure agricultural intensification does not increase forest clearing. Activities at the landscape and farm scale could include afforestation, reforestation, assisted natural regeneration, agroforestry and ecoagriculture. When designing interventions, countries could explore

synergies to understand how addressing one driver affects other underlying drivers. International level efforts should address market forces, particularly commodity markets (GFGs 2.2, 2.4, 4.3, 6.3, SDG 17).

In addition to their direct, cash and non-cash economic contributions, forests also provide substantial levels of employment. More than 13 million people are employed in forest sector activities in the formal sector. In the informal sector of small and medium forest enterprises (SMEs), another 40-60 million people may be employed (in addition to forest-dwelling indigenous peoples and local communities, who primarily depend on forests for their livelihoods). In some countries SMEs account for 80 to 90 per cent of forest-related employment (GFG 2.2, SDG 8). Globally, employment in forestry and logging seems likely to decline as productivity increases in most parts of the world. However, this decline is unlikely to occur in countries with high wood fuel use, where labor-use efficiency is unlikely to change in the foreseeable future. The forestry sector however needs to address decent work deficits such as low wages and productivity, widespread informality, illegal logging, significant gender equality gaps, low unionization rates, highly hazardous work, lack of job security, and inadequate occupational safety and health conditions. Labor productivity has increased in most regions over the last 10 years but remained higher in the developed regions compared to developing regions. Average wages in forestry are lower than in other sub-sectors. Additionally, the wage and salary conditions differ between regions; in industrialized countries forestry wages converge with the manufacturing sectors, while in many developing countries they are at or close to the minimum wage. The forestry workforce is exposed to high risks of accidents, including many fatalities and serious health problems. The intrinsically hazardous nature of the work and high turnover makes forestry a risky sector. Adequate formal and non-formal training on SFM, especially harvesting, is one of the key elements in breaking the circle of low productivity, low wages, high accident rates, high turnover in the workforce and high environmental impact (SDG 8, 17).

The UNSPF is the first strategy that provides a global framework of roles and responsibilities for all actors at all levels to achieve the GFGs. The promotion of forest-based partnerships across sectors and stakeholders is key for achieving the GFGs and it is defined in GFG 6.

# 1. Introduction

## 1.1 From aspiration to transformation

The adoption in 2015 of the UN Sustainable Development Goals (SDGs) together with the Paris Climate Agreement, mark an unprecedented global turning point. This is an enormous opportunity since humanity has never before agreed on such a universal development plan for attaining socially inclusive and highly aspirational socio-economic development goals within globally defined environmental targets. Humanity's grand ambition is surely to aim at an inclusive and prosperous world development within a stable and resilient Earth system (Randers et al. 2018).

However, at the same time there is equally unprecedented overwhelming scientific evidence that humanity continues to put pressures on Earth's life support systems that result in growing risks to health, livelihoods, food security, water supply, human security and economic growth, undermining possibilities for achieving the SDGs (IPCC, 2018; Randers et al. 2018). Scientists recognize that humanity has entered a new geological epoch, the Anthropocene, where our modern world constitutes the largest driver of change on Earth (Waters et al. 2016; Zalasiewicz et al. 2015; Waters et al. 2014). The current condition of our planet is a social construct that demand social and institutional solutions at scale, including sustainable production and consumption of natural resources.

Despite of the clear urgency for implementing large scale transformational collective efforts, these are clearly lagging behind and much more action is needed. Achieving the 2030 Agenda for Sustainable Development, including the 17 Sustainable Development Goals (SDGs) and the UN Strategic Plan for Forests 2017-2030 (UNSPF) with its Global Forest Goals (GFGs) is critical to tackle the complex challenges we face, from ending poverty and hunger and responding to climate change, to building resilient communities, achieving inclusive growth and sustainably managing the Earth's natural resources (FAO 2018). *It is time to rise together to take on the grand challenge* (Randers et al. 2018).

## 1.2 The critical role of forest and trees in the 2030 Agenda

Forests and trees play vital social and economic functions, including the provision of goods and services, such as food income and employment, that are necessary conditions to advance inclusive and sustainable economic growth. They also provide ecosystems services that are critical for the wellbeing of all of humanity. Governments have recognized this through the UNSPF and its GFGs, becoming the first strategy of its kind to achieve forest-related SDGs.

It is worth noting the key messages that emerged from the discussions at UNFF13 recognizing that:

- 1) Forests are crucial for food, water, wood, energy, biodiversity, health and climate change, and that the SDGs can only be achieved if forests are sustainably managed and forest landscapes are restored;
- 2) Halting deforestation and restoring degraded forests by 2020 (SDG 15.2) requires urgent action now. Best practices and tools are available but their application must be upscaled and progress accelerated;
- 3) Fragmentation in global forest governance remains a challenge. Enhanced synergies are needed across the United Nations system and beyond the CPF;

Implementing the UNSPF and achieving its GFGs and targets is an effective means to accelerate achievement of all SDGs.

Hence the UNSPF provides a global framework for actions at all levels, for sustainably manage all types of forests and trees outside forests and to halt deforestation and forest degradation.

The 2018 edition of The State of the World's Forests (FAO 2018) recognizes the interlinkages and facilitates our understanding of how policies on forests and trees contribute to achieving many SDGs and targets of the 2030 Agenda, that are directly related to inclusive and sustainable economic growth. Among the main findings are:

Forests and trees make vital contributions, both to people and the planet, bolstering livelihoods, providing clean air and water, conserving biodiversity and responding to climate change;

Despite the fact that the Global Forest Resources Assessment (FAO 2016) found that the world's forest area decreased from 31.6% of global land area to 30.6% between 1990 and 2015, the pace of loss has slowed in recent years;

There is evidence that forests are being managed more sustainably to contribute to achieve the SDGs related to livelihoods and food security for many rural poor, access to affordable energy, sustainable economic growth and employment (in the formal sector), sustainable consumption and production, and climate change mitigation;

The people left furthest behind are often located in areas in and around forests;

Water quality, essential to the health and life of both rural and urban populations, is directly related to forest management;

Modernizing the traditional wood energy sector has the power to improve livelihoods, create sustainable value chains and unlock resources for investments in sustainable forest management;

Qualitative evidence suggests that forests and trees make significant contributions to the SDGs through the informal sector, agroforestry, opportunities to empower women, sustainable water management, tourism, sustainable cities, climate change adaptation, and tackling land degradation and biodiversity loss;

Many countries have already successfully integrated forests and landscape approaches that link multiple SDGs into wider sustainable development programs;

Addressing agriculture and forests together in formulating national development policies is critical to achieving the SDGs;

The world's primary objectives of ending poverty and achieving sustainability will be enhanced by strengthening legal frameworks that recognize and secure the rights of local communities and smallholders to access forests and trees;

Access to land, resources and investments in and around forests can propel women, youth and other rural entrepreneurs to be agents of change in the transformation to a sustainable world;

A positive enabling environment is fundamental for attracting the private sector to pro-sustainability activities;

Stakeholder engagement and a commitment to good governance are fundamental to effective policy implementation;

To accomplish the historic ambition of ending hunger and poverty and transforming to a sustainable world, the 2030 Agenda expects sectoral ministries to change the way they work and to coordinate policies across government.

As is increasingly recognized, effective solutions must take into consideration that there are many interlinkages between the forest and other sectors, especially agriculture, water and energy. These

interlinkages (or nexus) demand the creation of enabling environments that include collaborative and participatory governance and institutions and effective public and private investments for the sustainable conservation, management and restoration of forests and trees, that have the purpose of an inclusive and sustainable society.

### **1.3 Purpose of this background analytical study**

This background analytical study focuses on “forests, inclusive and sustainable economic growth and employment”, particularly on the socioeconomic functions of forests, acknowledged as one of the seven thematic elements of sustainable forest management (SFM) referred to in the UN Forest Instrument (2016).

The purpose of this paper is to help the technical discussions on the thematic priorities at UNFF14, as well as for the Forum’s input to the 2019 High Level Political Forum on Sustainable Development (HLPF), specifically addressing the following UNSPF’s Global Forest Goals (GFGs):

#### **GFG 2 Enhance forest-based economic, social and environmental benefits, including by improving the livelihoods of forest dependent people.**

2.1 Extreme poverty for all forest dependent people is eradicated.

2.2 Increase the access of small-scale forest enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets.

2.3 The contribution of forests and trees to food security is significantly increased.

2.4 The contribution of forest industry, other forest-based enterprises and forest ecosystem services to social, economic and environmental development, among others, is significantly increased.

#### **GFG 4 Mobilize significantly increased, new and additional financial resources from all sources for the implementation of sustainable forest management and strengthen scientific and technical cooperation and partnerships.**

4.3 North-South, South-South, North-North and triangular cooperation and public-private partnerships on science, technology and innovation in the forest sector are significantly enhanced and increased.

#### **GFG 6 Enhance cooperation, coordination, coherence and synergies on forest-related issues at all levels, including within the UN System and across CPF member organizations, as well as across sectors and relevant stakeholders.**

6.3 Cross-sectoral coordination and cooperation to promote sustainable forest management and halt deforestation and forest degradation is significantly enhanced at all levels.

This study also addresses how forests contribute to the SDGs, more specifically to:

SDG8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all. And,

SDG17 Strengthen the means of implementation and revitalize the global partnership for sustainable development.

This paper builds upon and complement previous background papers (i.e. Agrawal et al. 2013. Economic contributions of forests. Background Paper 1. United Nation Forum on Forests. 10th Session) and complements the other two background papers that will be presented in this UNFF14: 1. “Forests and



climate change” and 3. “Forests, peaceful and inclusive societies, reduced inequalities, education, and inclusive institutions at all levels”.

## **2. The development path towards inclusive and sustainable economic growth**

### **2.1 Evolution of the sustainable development paradigm towards inclusiveness**

There is a growing recognition that sustainable development should reconcile economic and inclusive growth. However, not enough progress has been achieved, often leading to strong trade-offs, mostly in favor of economic growth (Gupta et al., 2015).

To understand the role forests and trees play in inclusive and sustainable economic growth, it is useful to review the evolution of the paradigms on sustainable development. Gupta et al. (2015) summarize the development discourse evolution and literature over time, including the recognition of (i) universal human rights in the 1940s; (ii) investing in countries ‘lagging behind’ in development in the 1950s; (iii) human rights to protect political, economic and social rights in the 1960s; (iv) internalized environmental impacts and the need for an organized response in the 1970s and to reconcile environment and development through sustainable development in the 1980s; (v) how unemployment, inequality and persistent poverty call for a strong development focus, income redistribution, a rural focus and human development indicators in the 1970s; (vi) the post-development critique of development as a discourse and the need to study social movements, including the realities of the poor by participatory development, a focus on entitlements, capabilities and freedom, and two parallel processes focusing on environmental and social and third world women’s survival and emancipation respectively in the 1990s, reflected in Agenda 21 of the United Nations; and (vii) the Millennium Development Goals (MDGs) in 2000 as a way to prioritize ‘the bottom billion’. After the MDGs countries developed the SDGs as the last and current process and paradigm that has significantly influenced this evolution in recent years, making it the dominating framework against to measure progress at different levels and by different actors.

The forest sector has also been an object and subject in the development and implementation of these paradigm changes. According to FAO (2002), in the 1950s and early 1960s, the main focus was on industrial timber species, since development was perceived as industrial development for economic growth and rising material well-being, despite that the multiple functions of trees and forests were understood well already at that time. In the 1970s and the 1980s there was an increased realization in the world of the fundamental need for rural development as a cornerstone for national well-being. Tree plantations in agroforestry systems, multipurpose trees plantations for timber, food, fuel and fodder was increasingly in focus; many countries implemented projects with those objectives. The 1990s was the time of attention to land use planning and the wise management of forests and the development of sustainable forest management (SFM), which in turn became the decade marked by increased environmental concerns. Towards the end of the 1990s the social dimensions of forests and forestry became more pronounced. The changing paradigms that led to the adoption of the MDGs and then the SDGs have also been influential in shaping forestry, underlying the importance of inclusiveness and sustainable economic growth and employment and achieving multiple objectives by properly managing synergies and trade-offs. No doubt forestry is becoming a more integrative and participatory discipline.

While initially inclusive development focused primarily on the social aspects, there was a strong ecological component, as the poorest often depend for their livelihoods upon local resources (forests, soil, fish, water) and are vulnerable to land, forests, water, fish and carbon credit grabbing. Global recession could have exacerbated the trend in global politics to adopt development/environment trade-offs in favor of a focus on growth and employment (Gupta et al., 2015); governments are increasingly developing processes and policies to reconcile both the environment and inclusiveness, making the UNFF14 a good opportunity for supporting them.

In these discussions, policies and processes for inclusive development should include marginalized people, sectors and countries in social, political and economic processes for increased human well-being, social and environmental sustainability, and empowerment. Governments could benefit by considering inclusive development as an adaptive learning process, which responds to change and new risks of exclusion and marginalization (Gupta et al. 2015). In this regards, collective impact based on adaptive learning and effective participatory governance play a critical role, especially in the growing movement of integrated landscape management, land restoration and value chain approaches among others.

Gupta et al. (2015) conceptualize inclusive development at three levels: first, in terms of inclusiveness per se; second, in terms of inclusiveness in the Anthropocene; and third by elaborating on inclusive development as a relational concept.

Inclusive development per se focuses, first, on human material, social-relational and cognitive/psychological well-being. Inclusiveness in the Anthropocene requires us to recognize that there are limits to our resources and sinks and that we need to share these equitably. Our ecosystems provide us multiple services – provisioning (for example, timber and non-timber forest products), regulatory (for example, climate regulation, flood control), supportive (for example, nutrient recycling) and cultural (for example, aesthetic) – on which the poor often directly depend. The aspects of inclusive development as a relational concept implies analyzing the underlying forces (factors and actors) that create, perpetuate and contest multiple inequalities at local through to global levels and how these levels interact with each other, how the poor (including the least developed countries) can be empowered, and how the upward movement and concentration of wealth at local through to global level can be countered, how both development and governance processes and outcomes can be made inclusive and how adverse inclusion can be prevented. Thus, a relational approach to inclusiveness would imply looking at the entire system, aiming at improving inclusiveness via participation and equity (Gupta et al. 2015).

The obvious conclusion is that the systems at the global, national and local scales need profound transformations, from a market-centered economy to a collaborative and inclusive wellbeing strategy for all; from a competitive driven economy to a collaborative and inclusive one. This demands significant mindset changes or even more than that, an evolution in the level of our consciousness that is aligned with the aspirations of Agenda 2030. The forest sector is going through this evolutionary mindset changes, for example, with the growing movement on integrated landscape management, land restoration and integrated value chain approaches, there is a realization of the need to develop more effective governance systems that could foster collective impact from multiple stakeholders working together under a shared vision. One of these examples are the model forests that link a comprehensive mix of stakeholders, natural resource users and land use sectors within a given landscape and help create a common vision of sustainability and constructive dialogue involving all stakeholders. One example is the International Model Forest Network (IMFN) that includes more than 60 large scale landscapes in six regional networks covering 84 million hectares in 31 countries. Other examples under the umbrella of the visionary Bonn Challenge

are the Initiative 20x20 in Latin America and the AFR100 (the African Forest Landscape Restoration Initiative); both are country-led efforts centered in a shared vision to restore 20 and 100 million hectares respectively of degraded land by the year 2020.

These inclusive development initiatives could benefit by (i) developing relevant epistemic communities<sup>1</sup>, communities of practice and social movements, (ii) transforming governance into interactive governance to enable empowerment and (iii) adopting appropriate governance instruments (Gupta et al. 2015). UNFF and CPF could promote some of these initiatives through the Global Landscapes Forum (GLF), that is probably the world's largest knowledge-led inter-sectorial platform on sustainable land use, dedicated to achieving the SDGs and the Paris Climate Agreement. The GLF reaches thousands of organizations and millions of people as a growing movement to address landscape-level issues, connecting through face-to-face and digital means, community leaders, practitioners, media, policy makers, donors, scientists, traditional knowledge experts, investors and the private sector. UNFF and CPF could leverage the GLFs potential on the theme of forest-based inclusive and sustainable economic growth and employment.

The elements mentioned above are developed more extensively in the Background Analytical Study 3 "Forests, peaceful and inclusive societies, reduced inequalities, education, and inclusive institutions at all levels".

## **2.2 Forest ownership and rights for inclusive and sustainable development pathways**

Two of the most critical barriers and challenges to achieve forest-based inclusive and sustainable economic growth, are insecure land tenure and unequal benefit sharing among forest users (Andersson et al. 2018). Understanding who owns the forest and who has forest use and management rights is critical in tracking environmental, social and economic development, and hence in strengthening the contribution of forests towards an inclusive and sustainable economic growth pathway that also includes the generation of decent jobs and employment. Clear ownership and management rights are vital for good governance and sustainable management of forests, including access to markets and better prices by accessing the formal economy, incentives, payment for ecosystem services (PES), credit and other sources of financing. Information about forest ownership helps to better understand who controls forest management and use, and who benefits or loses from the variety of products and services provided by forests. When forest tenure and/or rights is secure, it promotes capital investment by governments and private sector, including communities and smallholders, influencing the arrangement of incentives that motivate the sustainable use of forest resources (Timko et al. 2018; FAO 2016).

However, according to the Global Forest Resources Assessment 2015 (FAO 2016), in 2010 76 percent of the global forest area was publicly owned, only 20 percent was private, and 4 percent was of unknown ownership. Western and Central Africa is the region with the highest proportion of public ownership (99 percent), followed by Western and Central Asia (98 percent) and South and Southeast Asia (90 percent). The highest proportion of private forest is found in East Asia and Oceania (42 percent), followed by North America (33 percent). During the period 1990 to 2010, forest area under public ownership decreased by

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<sup>1</sup> Epistemic community, in international relations is a network of professionals with recognized expertise and authoritative claims to policy-relevant knowledge in a particular issue area who may have different backgrounds and may be located in different countries, but they share a set of norms that motivate their common action, a set of beliefs about central problems in their area of expertise, shared criteria for evaluating knowledge, and a common policy enterprise (Encyclopaedia Britannica).

about 120 million hectares, while privately owned forests showed an increase of 115 million hectares. The largest increase in private ownership was observed in the upper-middle-income category, where the area of private ownership nearly doubled; China accounted for an increase of 85 million hectares, mainly as a result of the implementation of the 2008 reform of collective forest ownership. At the global level, the management rights of publicly owned forests are dominated by public administration. Between 1990 and 2010 the proportion of public forests managed by private companies increased from 3 percent to 15 percent, while the area managed by public administration decreased from 95 percent to 82 percent (FAO 2016).

According to deMarsh et al. (2014) families, communities and indigenous peoples own or manage more than 30 percent of the world's forests. The countries with the largest public forest area under community management in 2010 were Brazil and Colombia with 152 million hectares and 30 million hectares, respectively. Timor-Leste and Saint Pierre and Miquelon reported having 100 percent of their publicly owned forests under community management rights (FAO 2016). The Indonesian government is committed to allocating 12.7 million hectares of forest land to local communities, as an attempt to promote social justice by transferring property rights and thus giving opportunities for communities to benefit from forest resources, creating new opportunities for the inclusion of forest people (De Royer et al. 2018).

In their efforts to achieve the SDGs, governments could consider ways to provide secure rights and improved access to forests for marginal groups based on the lessons learnt with locally-controlled forest enterprises (LCFEs) in other countries. Community forests are essential to promoting inclusiveness and sustainability, including women and youth who play a key role in their long-term viability. Lack of recognition and protection for customary rights have dispossessed many indigenous people and rural communities from their ownership and access to forests, and often exposed forests to higher rates of degradation and conversion to other uses. The lack of secure access rights and land tenure may be a disincentive for many poor or marginalized communities to invest in managing land more sustainably or in required inputs and make the raising of capital much more difficult. Inadequate or unclear tenure regimes also limit the efficient delivery of payments for ecosystem services (PES) and other reward mechanisms (Timko et al. 2018).

The focus on gender equality and women's empowerment as a fundamental human right is explicit across all the SDGs, both as a stand-alone goal (SDG 5) and as a cross-cutting theme with more than 30 related targets; gender-sensitive forest management can contribute to broader gender equality. Rural women are far more likely than urban women to be illiterate, unemployed and live without adequate social protection coverage. Women's empowerment is a powerful multiplier of well-being and a prerequisite for sustainable development. Women are also pivotal to ensuring food security as they tend to grow or collect fuelwood and a greater diversity of products for healthy diets and can contribute to improved local forest governance and conservation by complementing male perspectives and preferences on forest uses and by resolving forest-conflicts in more peaceful ways. Equal access to ownership and control over land and natural resources is a specific target (SDG 5A) and is pertinent to both men and women as the greatest share of forest products are collected for subsistence use. Even though forestry has traditionally been a male-dominated sector, there are growing examples of women taking a leading role in some key economic and policy decisions related to forests, including in LCFEs (Timko et al. 2018).

The objective of peaceful and inclusive societies with access to justice for all (SDG 16) is the ultimate goal of the 2030 Agenda. This theme is addressed in the Background Analytical Study 3, however, it is

important to remind that forests are often conflict-ridden spaces of contestation and refuge for marginalized or dissenting populations, while access to justice is a frequent concern for forest residents facing land encroachments and human rights abuses. The participation of multiple stakeholders, including the voice of people marginalized, in policy and decision making processes enables greater ownership, lessens potential for conflict and improves the chances of long-term policy success, especially at the local level (e.g. model forests and collaborative management of watersheds and biological corridors). In this regard, policies could benefit from adhering to universal principles and the diversity of socio-economic contexts, while also paying attention to the needs and participation of disadvantaged and marginalized populations (Timko et al. 2018).

Examples of successful policies of forests managed by communities that resulted in positive social, economic and environmental outcomes are found in Mexico with the ejidos and in Guatemala with community forestry concessions. These communities have developed successful commercial forestry enterprises around timber and non-timber products. Some of these are among the world's most advanced examples of commercial community forestry. While in Vietnam, a project to develop environmentally and economically sustainable smallholder tree plantations led 43,000 households to cultivate 76,500 hectares of previously non-forested land. Loans managed by a Vietnamese state-owned development bank were extended to more than 28,000 farmer households (World Bank 2016).

A number of factors account for the long-term success of forest management by families, indigenous peoples and local communities. In all cases, however, forest producer organizations (FPO) have played central roles (e.g. Scandinavia and Latin America). FPOs are formal or informal associations of forest producers – women and men, smallholder families, indigenous peoples and local communities – who have strong relationships with forests and (often) farms in forested landscapes. However, more support is needed to strengthen the capacities of FPOs and to link them with investment and market opportunities.

In an ideal scenario communities would receive coordinated support from diverse service providers to build their productive, business and financial capacities; they would benefit from an enabling framework that effectively guarantees their land rights. This is a long-term process that requires support beyond short-term projects from committed and capable providers of technical, business and financial services. Long-term investments in such processes would pay-off through the conservation of the natural capital and sustainable community development nurtured by asset building based on their natural capital.

### **2.3 A path towards inclusive development through locally-controlled forest enterprises**

The current trend in forest tenure towards increased private ownership, and private companies having increased management responsibilities for public forests, is likely to continue. The challenge however is reconciling this trend with the participatory and inclusive approach put forward by the SDGs. Decentralization of forests from national to subnational levels is also expected to continue in many countries, as is the privatization of forests in upper- middle-income countries, particularly as national incomes increase.

Industrial concessions and ownership occupy vast areas of the world's forests. Yet, only a small fraction of that land is controlled by businesses owned and operated by indigenous peoples and local communities, even though the conservation and sustainable management of forests relies to a great degree on the actions of local people who at the same time depend on those forests for the variety of benefits flows. It is increasingly recognized that local users need to receive benefits, offering the potential to increase income and employment while conserving forests. But inequality, insecure land tenure, and elite capture may undermine the achievement of those intervention goals (Andersson et al. 2018).

Decision makers are faced with dealing effectively with the conflicting interests based on maximizing profit and local ownership for livelihood survival and community benefits.

Over the last two decades, a marked shift towards devolution of rights to local actors over natural forests has taken place across the global tropics. While this trend sets the stage for community-based management and the development of local enterprises, outcomes to date have been mixed. Yet, the development of LCFEs is one of the most promising strategies for bolstering such local capacity – but is not always embraced in all territories or placed high on the political and investment agendas. A wealth of evidence has illustrated, that under the right conditions, locally controlled forestry contributes to local livelihoods, ecosystem protection, and sustainable and inclusive development. In the Maya Biosphere Reserve (MBR) in Guatemala, forest concessions have been granted to local communities on close to 400,000 hectares. Over the past two decades, community management of the concessions has contributed to the reduction of deforestation to a minimum (0.1% per annum), unlike the adjacent core and buffer zones of the MBR where deforestation rates continue to be high (1% and 5.5% per annum, respectively). Although there is a growing shift in forest ownership and management to LCFEs, these small and medium sized enterprise models still face major policy and legislative hurdles (INDUFOR 2018; Macqueen et al. 2012).

The G32 defines LCFEs in terms of the local right for forest-owner families and communities to make decisions on commercial forest management and land use, with secure tenure rights, freedom of association, and access to markets and technology. For rights-holder groups ‘locally’ means on the periphery or within a forest where owners live with the social and environmental impacts of their management decisions. ‘Controlled’ refers to operations where decision-making power and accountability is vested in the local people that reside in these forestlands, and without a distant board of directors or shareholders (Macqueen et al. 2018). The growing movement of locally controlled forestry comes with the broader awareness that centralized state forestry has in most cases failed to provide effective forest stewardship, and that LCFEs meaningfully contribute to inclusive development through rural and local economies, the supply of sustainable timber and non-timber forest products, and the protection of vital forest landscapes. Third party monitoring and certification has been successful in ensuring effective forest stewardship in some community concessions and has contributed to improve local capacities on SFM and to connect communities with markets.

LCFEs, and a notable subset, community forest enterprises (CFEs), have been extensively covered in forest management and rural livelihood literature. Their role in the broader world of forestry is often discussed in terms of enabling environments, threats and challenges to overcome when scaling their operations, impacts of forest enterprises, and local, replicable solutions to common enterprise problems. Emerging in different contexts, LCFEs are highly diverse in terms of their enterprise development, types of forest ecosystems, tenure arrangements, production focus, and reliance on technical and financial assistance. In most cases these LCFEs have received technical or financial assistance from NGOs and donors and in a few cases communities have established their own enterprise for technical assistance, processing/value addition and marketing (e.g. Mexico and Guatemala).

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<sup>2</sup> G3 is the alliance of the three forest rights-holder groups: Global Alliances of Community Forestry (GACF), International Family Forestry Alliance (IFFA), and International Alliance of Indigenous and Tribal Peoples of the Tropical Forests (IAITPTF).

Mexico is a global leader in the LCFE movement that started in the 1980s, followed in 1990s by the community forest concessions in Guatemala and the decentralization, municipalization and devolution of rights to the local communities in Bolivia through forest concessions, municipalities, social associations of villagers and original community territories assigned to indigenous peoples. The extractive reserves in the Brazilian Amazonia are also an innovative approach to match conservation and development objectives, which were originally envisaged as part of a land struggle by forest dwellers. In some cases (e.g. Acre) there is a process of value addition to enhance income and employment, both in the case of rubber and Brazil nut. Several of the former initiatives are FSC-certified, which provides some assurance that the three dimensions of sustainability have been considered. Prior to the 1990s, these forests belonged to the state or were controlled by private owners (HLPE 2017). The positive social, ecological and economic impacts of LCFEs in several leading communities in these countries deserve to be highlighted, as well as the fact that (a) such advanced LCFEs still make up only a small fraction of forest communities and (b) threats to community forests continue, despite tenure security and significant government support. There are other countries, where tenure rights are just being won (e.g. Honduras, Indonesia, DR Congo), and hence conditions are less favorable to LCFE development. Guatemala will soon decide the future of its community forest concessions that has been probably the most successful example of reconciling forest conservation with inclusive economic development in this country.

On the other hand, the sustainability of LCFE depends to a great degree on reducing economic inequalities and helping disadvantaged users to improve their wellbeing. In the absence of institutional arrangements that regulate the distribution of forest benefits, LCFE activities would be susceptible to elite capture, where the richer or more powerful members or user groups receive a disproportionately large share of the benefits, exacerbating economic inequalities within these groups. Elite capture and corruption could also occur not only occur at the local level, but it is also a major limitation for equitable benefit sharing at all levels of governance, particularly when land tenure systems, institutions and participation in decision making are weak. Democratic accountability could help reducing the likelihood of elite capture and corruption (Andersson et al. 2018).

Interventions to support LCFE could range from policy advocacy, inclusive territorial planning, secure tenure, overregulation, government and private sector investment, access to credit and information technology, capacity building to improve social organization, development of associations, business skills, inclusive enterprise development, benefit sharing, learning exchange and market opportunities.

According to deMarsh et al. (2014) at least four fundamental conditions must be in place to enable sustainable forest management by communities, families and indigenous peoples: 1) secure tenure; 2) fair access to markets; 3) access to support services, especially extension; and 4) Forest Producer Organizations (FPOs). FPOs can ensure – through lobbying, and by providing services directly to their members – that the first three conditions are in place and are maintained. Governments could facilitate the development and strengthening of FPOs in many ways: creating a suitable legal and regulatory framework; developing policies that provide a framework for, and actively encourage, ongoing engagement and cooperation with FPOs; creating laws and policies that seek to establish a balance between large industrial corporations and locally controlled forest organizations in the marketplace and in access to public incentive programs and other resources; providing opportunities for FPOs to participate in policy development; developing and stimulating the provision of capacity-building services; reducing business barriers; encouraging gender equality, the active involvement of women and youth in FPOs, and good governance; and recognizing and raising public awareness of the important contributions of community and family forestry. Governments can further support by working with FPOs to show early

tangible results; ensuring that laws allow appropriate forms of legal status for FPOs; having a policy of engagement and a practice of dialogue with FPOs; ensuring “buy-in” at all levels of government and among staff; developing rural economies and improving livelihoods; and helping FPOs build their capacity.

UNFF and CPF are in a good position to support LCFEs within the global development agenda and with national governments, creating enabling environments, technical and financial support and strengthening capacities of all actors, that could yield positive social, economic and environmental outcomes.

### **3. Contributions of forests to inclusive and sustainable economic growth**

#### **3.1 Socioeconomic benefits and contribution of forests and their equitable allocation considering gender, youth and other groups**

Forests and trees are at the very basis of life on our planet. They constitute key components in a healthy environment and they are of critical importance to human and societal development. Their presence throughout history has enabled the growth of cultures and productivity, their absence has routinely diminished the likelihood of both. They also provide wood and non-wood products which constitute one of the largest, but often less publicized and publicly noted economic sectors worldwide, underpinning the economies of many nations and critically important as buffers during periods of scarcity and as nutrition for the cash poor (safety nets) (FAO 2002; Agrawal 2013).

The UNFF (UNFF 2015) recognizes that over 1.6 billion people depend on forests for subsistence, livelihoods, employment and income generation, and recognize that forests provide a wide range of goods and services, which create opportunities to address many of the most pressing sustainable development challenges. At the end however, all of humanity depends on the world’s forests.

The role of forests and trees in the provision of goods for rural communities is fundamental to their well-being and food security. Their services in watershed management, soil stabilization, rehabilitation of degraded lands, and as providers of shade and shelter, is at times even more fundamentally important than their multiple productive roles. Over the past decades the role of forests and forest ecosystems as guardians and habitats for biological diversity has been much highlighted and may be today better known to the man-on-the-street than their productive, protective and social functions (FAO 2002).

Changes in forest cover and the economic contributions of forests to development have created many different patterns across the globe, but the basic pattern of deforestation accompanying the initial period of economic growth, followed by a phase during which forest area and cover stabilize and then slowly begin to recover seems to be remarkably consistent - with obvious differences in timing. The specific reasons for this pattern differ – in some cases these are primarily owed to changes in the distribution of economic activities from agriculture to industry to service sectors, in other cases to active government policies aiming to improve forest cover or penalize illegal extraction (e.g. Costa Rica), and in yet other cases as a result to the role of international capital and trade (e.g. livestock and soybean in Latin America or oil palm in South East Asia). But under all these patterns of loss, stabilization, and recovery, the constant is the contributions forests make to international trade, national economies, employment, and household incomes (Agrawal et al. 2013). Such recovery is strongly linked with inclusive development, since this will only occur if nations avoid or emerge from extreme poverty. In Ethiopia, Haiti, and Togo, for instance, poverty traps have forced farmers to clear their remaining forests for farming (Laurance et al. 2014).



Around 40 percent of the extreme rural poor – or some 250 million people – live in forest and savannah areas. Policies that secure tenure rights for the poor and vulnerable, including indigenous people, landless farmers, rural women and youth, will go a long way to ending poverty and food insecurity and hence to a more inclusive society (FAO 2018).

### ***3.1.1 Value of wood and non-wood products***

According to the 2015 Global Forest Resources Assessment (FAO 2016), 2.2 billion ha of forests are designated for the production of wood and non-wood forest products (NWFPs) and/or multiple use which in many cases also include production. However, even though forests are important for the poorer countries and people, more than half of this designated forest area is located in higher income countries.

Forestry contributes to a country's gross domestic product (GDP) in both formal and informal economic sectors. In many countries with rapidly expanding economies, the relative share of forestry and logging is decreasing at the national level. Yet the economic impact of revenue and employment from forestry and logging is often felt most at the local level.

According to the State of the World's Forests 2014 (FAO 2014), the forest sector (including forestry and logging, wood industry, and pulp and paper) in 2011 contributed an estimated total amount of USD600 billion or about 0.9 percent to the global GDP. Data reported to FRA 2015 by 148 countries indicate that forestry and logging contributed about USD117 billion. Of this amount, high-income countries accounted for 41 percent, while low-income countries accounted for only 5 percent. However, the proportion of this contribution to national GDP is much higher in low-income countries, where it amounts to 1.4 percent compared with only 0.1 percent in high-income countries, confirming the relative higher importance of forestry in poorer economies.

As national incomes increase, dependence on wood fuel (especially fuelwood) for domestic use is likely to continue to decrease as a proportion of GDP. However, for low-income and lower-middle-income countries, woodfuel contributions to GDP will remain important for the foreseeable future.

For high-income countries, the relative contribution of forestry to GDP is decreasing as a result of faster growth in the non-forest sector. However, in all cases value added from forestry is less important at the national level than it is for local economies, where communities and regions can be highly dependent upon forest-related income and employment.

NWFPs are an important source of livelihood for many rural dwellers and of income for industries that process or use these products. Despite their importance, it is difficult to obtain reliable and consistent data on NWFPs, because most NWFPs do not enter the commercial marketplace, and data on non-commercial values are unreliable or absent. Only 74 countries reported data to FRA 2015 on the value of NWFP removals and for the majority of them, data were either partial or incomplete. However, some countries provided detailed information, and the values of NWFP removals per hectare reported by them were quite substantial (FAO 2016). In the community forest concessions in Guatemala, the economic contribution of NWFP could in some cases match that of timber, which is also of significant importance for women who participate in the post-harvesting activities.

### ***3.1.2 Importance of non-cash forest benefits***

According to Agrawal et al. (2013), data on various aspects of how much forests contribute social, economic, and institutional benefits are patchy in space and time, are very difficult to compare across countries and regions, and are insufficient as a firm basis for policy action. But even if the available data

allow only a blurry picture of the extent of non-cash economic benefits forests provide and of the relative magnitude of cash vs. non-cash benefits, the information is sufficient to allow the inference that non-cash forest benefits are far larger than those derived from high-visibility forest products such as logs, timber, pulp and paper that are exchanged for monetary gain. If the value of forest contributions exchanged for cash in the developing world is in the neighborhood of US\$ 250 Billion, it is likely to be two to three times greater for benefits that are not exchanged for cash. If the total number of people employed in the formal forestry sector is around 13 million, in the informal sector is nearer 45 to 50 million (ILO 2015; Agrawal et al. 2013). These indicative numbers for the relationship between the size of the formal vs. the informal forest sector are sufficient for the conclusion that the informal sector is far larger than the formal, cash-valued forest sector and its social and economic importance. This also brings challenges regarding working conditions that are discussed in section “Forests and full and productive employment”.

### **3.2 Interlinkages between forests and other sectors**

The Millennium Ecosystem Assessment published in 2005 was influential in demonstrating the links between the deteriorating condition of ecosystem services and their effect on planetary health and human wellbeing, and hence limiting the achievement of Agenda 2030. Recognizing these interlinkages among the global challenges the SDGs were designed to be interdependent, hence requiring enhanced policy coherence and systems thinking. This nature gives Agenda 2030 a significant potential for transformational change through the synergies among SDGs. Since forests interact with many other sectors, there is a prominent role for forests to play in the success of the SDGs. This will demand leadership capacity for collaborative intersectoral planning and to break down the silos and instead smartly build bridges with other sectors.

To support SDGs integration and highlight challenges to, and opportunities for, policy coherence among sectors that affect forests, Timko et al. (2018) identify three policy nexus that are each defined by a set of closely related SDGs: forests and ecosystem services and livelihoods; forests and the green economy; and, forests and rights, justice, equality and inclusion. Policy coherence within each of these policy nexus will require clear priorities to address key tradeoffs and mobilize synergies with other SDGs, that would demand integrated, innovative, inclusive and collaborative governance systems across sectors. For the coming years it will be critical to develop new governance instruments to facilitate stakeholder’s integration and intersectoral mechanisms that ensure effective and relevant inclusion and participation. This will require well-informed rural communities with access to knowledge platforms that allow their engagement in policy design and implementation. This will require that forest sector players, public and private, acquire higher levels of collaborative leadership skills to influence other sector players (see collaborative intelligence - Markova and McArthur 2015), learning how to think and agree with people and sectors who think differently for the shared purpose of collective impact. In nature collaborative autonomy of organisms in their ecosystems makes evolution possible and similarly humans' ability to collaborate to obtain otherwise inaccessible goals may be one main cause for our success as a species (Melis 2013).

The shift from the MDGs to the much broader SDGs has given further impetus to the debate on the nexus between the multiple sectors of policy-making that the Goals are to cover. The key message in this debate is that different domains—for instance, forests, water, energy and food—are interconnected and can thus not be effectively resolved unless they are addressed as being fully interrelated and interdependent (Boas et al. 2015). Integrated landscape management can play a practical and effective role by facilitating the collaboration between actors of different domains or sectors. This could become a new and more effective

form of social organization for the sustainable management of natural resources in landscapes. For this to happen, there is a need for processes that enhance the active participation and collaboration among the key stakeholders and the governance needed to facilitate the implementation of interventions (political, social, economic and technological) through negotiation, conflict management and decision making.

The “nexus approach” gained prominence after the Bonn 2011 Conference on the “Water, Energy and Food Security Nexus”, arguing that such an approach can result in improved water, energy, and food security (and forests) by integrating “management and governance across sectors and scales”, reducing trade-offs, and building synergies, overall promoting sustainability and a transition to green economy (Hoff 2011). Soto-Golcher and Visseren-Hamakers (2018) reviewing the forest, agriculture and climate change nexus at the global level, also conclude that coherent policies and integrated approaches are urgently needed, since these governance systems are highly interrelated.

Ellison et al. (2017) reviewing a substantial body of research conclude that forest, water and energy interactions provide the foundations for carbon storage, for cooling terrestrial surfaces and for distributing water resources. Hence, forests and trees must be recognized as prime regulators within the water, energy and carbon cycles. If these functions are ignored, planners will be unable to assess, adapt to or mitigate the impacts of changing land cover and climate. The authors call to action to target a reversal of paradigms, from a carbon-centric model to one that treats the hydrologic and climate-cooling effects of trees and forests as the first order of priority.

Acknowledging the growing evidence that forests interact in multiple ways with other sectors, the UNSPF calls Member States to “Identify and implement measures to enhance cooperation and cross- sectoral policy and program coordination among sectors affecting and affected by forest policies and management, with a view to integrating the forest sector into national decision-making processes and promoting sustainable forest management, including by addressing the underlying causes of deforestation and forest degradation, and by promoting forest conservation;” and to “Integrate national forest programs, or other strategies for sustainable forest management into national strategies for sustainable development, relevant national action plans and poverty-reduction strategies.” More recently in December 2018 the Ministerial Katowice Declaration on Forests for the Climate calls to accelerate actions to ensure that the global contribution of forests and forest products is maintained and further supported and enhanced by 2050, in order to support the achievement of the long term goal of the Paris Agreement.

This evolving thinking means the need for a coherent approach to land use in order to address the nexus between forests, agriculture and food systems, water and energy at the international, regional, national and landscape levels, through cross-sectoral dialogue and collaboration. Furthermore, the global forest, agriculture and climate change governance systems are characterized by a multitude of actors and institutions and a great diversity of frames (e.g. production, conservation). Efforts aimed at integration to enhance synergies and reduce conflicts among the systems have taken different forms, in particular for the different pairs of domains in the nexus. Integration has been promoted through soft law, programs, promotion of integrative approaches (e.g. the landscape approach, climate smart agriculture, agroforestry, ecoagriculture). The integration at the nexus of the three domains is still more incipient, although there is potential, with the advantage of having several actors (e.g. FAO, UNEP, World Bank, UNCCD, GEF and UNFF Global Forest Financing Facilitation Network (GFFFN and the Global Landscapes Forum) involved in two or all of the domains and international financial mechanisms increasingly

promoting integration, like the blended finance<sup>3</sup> (Soto-Golcher and Visseren-Hamakers 2018, OECD 2017, Boas et al. 2015).

The extent of integration has been different for each pair of governance systems; while forest and climate change enjoy an extensive two-way integration for both mitigation and adaptation, forest and agriculture have experienced lower levels of integration. This difference can be explained by the degree of legalization and the dominant frames (i.e. production and/or conservation) in the different governance systems; especially, the dominant “productivity” frame in the global agriculture governance system has limited the integration with forest concerns. Integration has greater potential to be enhanced from the direction of the “strong” domain to the others (one-way integration). The prevalence of soft instruments for forest and agriculture and the absence of a strong legally binding agreement have given more space and flexibility to integrate emerging or urgent issues, such as climate change, into their governance systems (Soto-Golcher and Visseren-Hamakers 2018). These authors suggest that integration efforts in these governance systems could be best enhanced outside the formal intergovernmental processes, as is already happening through initiatives such as the Global Alliance on Climate Smart Agriculture (GACSA), the Landscapes for People, Food and Nature, Global Partnership for Forest Landscape Restoration and the International Partnerships for Satoyama Initiative among others. Working outside of the intergovernmental regime might lower the “threat” of potential legally binding targets and allow to move beyond the separation of mitigation and adaptation, thereby opening up more opportunities for effective integration through landscape approaches, restoration, value chains and other integrated approaches. Joint and inclusive stakeholder planning can be an effective channel to create ownership and take responsibility for governance processes and decision making at the policy formulation level as well as in the management of forest resources. A unique example of joint planning among different public sectors is the Regional Agro-Environmental and Health Strategy that is a consensus-led initiative of the council of ministers within the Central American Integration System to address the synergies and trade-offs of the three sectors in seven countries.

Interplay management<sup>4</sup> efforts among these domains are also influenced by factors, policies or decisions that fall outside their scope, for instance water scarcity, energy prices or trade. Regarding the latter, international markets and financial incentives sometimes seem to have more – negative or positive – influence on behavior than the norms and rules regulating natural resource use. Trade and trade agreements are clearly influencing the way the governance systems interact and the trade-offs they encounter. Therefore, good understanding on the role of trade in the forest, climate change and agriculture nexus would be beneficial for understanding the driving forces leading to unsustainable land-use change and for developing the most effective policies to address these issues (Soto-Golcher and Visseren-Hamakers 2018).

Political will and (inter-)national institutional and organizational reforms are necessary in order to move from conflicts to synergies in the interaction among the governance systems. Current approaches such as REDD+ or CSA alone will not be sufficient to ensure durable and sustainable results. Transformational changes are needed to address fundamental inconsistencies, such as perverse incentives, lack of multi-

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<sup>3</sup> Blended finance is an approach that mixes different forms of capital to support development (OECD 2018)

<sup>4</sup> Defined as the management of inter-institutional relationships within international environmental governance to contribute to environmental policy integration.

sectoral policies and funding mechanisms and impacts of global unsustainable consumption patterns. The recognition by the international community of the need for transformational change, and the role of international governance in such change, among others in the SDGs, provides opportunities for further enhancing the synergies in the forest–agriculture–climate nexus and beyond, such as water and energy (Soto-Golcher and Visseren-Hamakers 2018). Another element to consider closing the gaps and excessive sectorialization, is to bring together and create spaces for scientists and policy-makers to come together and UNFF and CPF are in a good position to play a facilitating role. This is particularly relevant in the field of natural resources/forests/water, where verifiable research information and expertise is essential to be communicated with policy-makers and community leaders. Eventually these spaces could become the starting point of new governance structures to address the complex issues of global sustainability as demanded by the SDGs.

There is growing agreement that sectoral perspectives to land management are inadequate to meet global challenges such as poverty, hunger and malnutrition, social inequity, habitat and biodiversity degradation and water scarcity. More integrated, collaborative and comprehensive institutional approaches are needed beyond projects and programs. Some of these approaches have been attempted in the past and some are still operational, but some have failed to deliver significant impact, possibly because of the narrow focus of the institutions vis-à-vis the complex interlinkages among sectors and actors. To date most efforts in these areas have been financed by grants and mostly through Overseas Development Assistance (ODA), however it has been recognized that these are insufficient (OECD 2018). In recent years we are witnessing a growing interest from the private sector and private investors to be part of more integrated approaches to land use and value chains, opening a great opportunity for blended finance. OECD (OECD 2018) states that the vision underpinning the 2030 Agenda is broad and ambitious, calling for an equally broad and ambitious financing strategy, demanding the need for significant additional development finance – and accorded a prominent place to private sector participation through blended finance. Integrated landscape and value chain approaches have a good potential to contribute since their goal is to better link players, land use practices, institutions and policies with other activities and investments creating the conditions for transformational collective impact. These approaches should aspire at integrating policy and action across stakeholders in synergistic ways, giving special attention to aspects of social equity (i.e. gender, youth, marginalized groups).

### ***3.2.1 Interlinkages between forests and trees with the agricultural sector***

Commercial agriculture drives at least two-thirds of tropical deforestation globally, with the majority of forest clearance and impacts stemming from the production of the “big four” commodities: palm oil, soy, timber and pulp, and cattle (Donofrio et al. 2017). Unfortunately both sectors have a history of following separate, unconnected paths. Several actors have undertaken some initial efforts to enhance integration through, e.g. soft law (e.g. certification and “zero deforestation”), programs of funding organizations (e.g. integrated conservation and development programs-ICDPs and integrated landscape approaches). Some of these actors are active in one system or the other, but some are involved in both. For the integration of agriculture considerations into forest governance, the Ministerial Declaration of the UNFF (2015) recognizes the need to address the drivers of deforestation and forest degradation that are intersectoral in nature. There is also a call for the integration of SFM and the commitments of the Forest Instrument into, among others, sectoral policies (UNFF 2015, Soto-Golcher and Visseren-Hamakers 2018). As for the integration of forests into the agriculture domain, guidance is provided in the Principles for Responsible Investment Agriculture and Food Systems of the Committee on World Food Security (CFS 2014). It considers, amongst its principles, respect for forest land tenure (principle 5) and calls for “preventing,

minimizing and remedying, as appropriate [ . . . ] negative impacts on forests” (principle 6) (Soto-Golcher and Visseren-Hamakers 2018). Through different initiatives and public–private partnerships, several NGOs, research organizations, governments and private sector actors are promoting “zero deforestation” commitments in the supply chain of agricultural products. Further efforts are needed to extend the impact and to engage marginalized groups and seek social equity (Donofrio et al. 2017).

Of the multilateral environmental agreements, the United Nations Convention to Combat Desertification (UNCCD) seems to have an integrated approach to forests and agriculture, since it focuses on addressing land degradation, including through sustainable land management and agroforestry practices. The GEF, the financing mechanism of the three Rio Conventions (UNFCCC, CBD and UNCCD), has a comprehensive approach to its focal area on land degradation and highlights the landscape approach as a tool “for an integrated natural resources management”, defining it as “. . . a framework to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change”. The landscape approach has increasingly been promoted by the FAO, UNFF, donors, NGOs and research institutes (Soto-Golcher and Visseren-Hamakers 2018). The Bonn Challenge has also engaged several governments, including ministries of forests, environment and agriculture.

The friction between the dominant frame in agriculture governance of higher productivity levels (and consequently the need for more productive land) and forest’s dominant frame of the need for forest conservation for carbon sequestration and storage in the case of REDD+, should be considered to enhance the integration of global policies in these domains. Efforts to integrate agriculture and forest considerations in both directions need to consider that both domains have a medium and medium-to-high density of institutions, with no overarching framework. In general, while integration can take place in different forms, a domain with a high degree of legalization would favor the development of norms and rules to address an issue, however this can take more time and face more obstacles. In a domain with a low degree of legalization, softer approaches such as individual programs and projects, might be sufficient and faster at the local level, but these might have a smaller global impact (Soto-Golcher and Visseren-Hamakers 2018).

Another important interlinkage between forests and agriculture is through the contribution of forests to food security and nutrition (FSN), that is gaining understanding in recent years. For example, it is known that micronutrient malnutrition affects about a third of the world's population, and children in low-income and middle-income countries are particularly vulnerable. Consequences include impaired cognitive and physical development, and increased childhood morbidity and mortality. A recent study with 43,000 rural households in 27 developing countries found that high exposure to forests causes children to have at least 25% greater dietary diversity than no exposure, whereas the effect becomes non-significant at larger distances (Rasolofoson et al. 2018). Forest contribute to human health by providing more diverse and nutritious foods, such as wild fruits and vegetables that are a crucial source of micronutrients in many rural and smallholder communities, and often provide a major contribution to cash income at the household level. Bushmeat and fuelwood for subsistence and income generation contribute both directly and indirectly to FSN in sub-Saharan Africa, South-East Asia and Latin America (Sunderland et al. 2013). These results strengthen the evidence for integrating forest conservation and management into portfolios of FSN interventions.

In October 2014, at its 41<sup>st</sup> session, the Committee on World Food Security (CFS) requested the High-Level Panel of Experts for Food Security and Nutrition (HLPE) to prepare a study on sustainable forestry for FSN

to inform the debates at the 44<sup>th</sup> CFS Plenary Session of October 2017. The key issue was to optimize the multiple, direct and indirect, contributions of forests and trees to FSN, in a context of increasing and competing demands on land, forests and trees (including for wood, food, energy and ecosystem services), as well as of climate change. The report identified four main channels through which forests and trees contribute to FSN: direct provision of food; provision of energy, especially for cooking; income generation and employment; and provision of ecosystem services essential for food production in the long term, including water regulation, soil protection, biodiversity conservation and climate change adaptation and mitigation (HLPE 2017).

This report calls for SFM to take fully into account and integrate the multiple and competing uses of forests and trees as well as the diverging and sometimes conflicting interests, needs and rights of different stakeholders. SFM would then require the establishment of intersectoral governance mechanisms at different scales that enable the full and effective participation of concerned stakeholders, particularly of forest-dependent indigenous peoples and local communities, articulate different functions of forests and trees (including wood and food production, biodiversity conservation and socio-cultural benefits), consider short- and long-term objectives, and that recognize and reduce conflicts between stakeholders. The HLPE (2017) also calls for an integrated approach, in particular at the landscape level, to better manage synergies and trade-offs and to integrate different spatial and temporal scales to address local and global challenges.

There are also important initiatives addressing the role of forest to FSN such as the Bonn Challenge, a government lead global initiative focusing on the restoration of degraded lands with the World Conservation Union (IUCN), World Resources Institute and other partners. Also research programs undertaken by the International Union of Forest Research Organizations (IUFRO) and its many international and national members, as well as the Center for International Forestry Research (CIFOR), the World Agroforestry Centre (ICRAF), and the CGIAR Research Program on Forests, Trees and Agroforestry (FTA), among others.

Better integration between SFM and FSN requires integrated, innovative and inclusive governance systems across sectors at different spatial and temporal scales, ensuring the full and effective participation of all concerned stakeholders and affected groups, particularly of women, as well as vulnerable and marginalized groups, including indigenous peoples and forest-dependent communities. In particular, appropriate arrangements must be designed at the landscape scale, where the challenges are to optimize the concrete cohabitation among cities, agriculture, forests and other natural areas, and to better integrate FSN concerns in forest management (HLPE 2017; Reed et al. 2016; Sayer et al. 2013).

The realization of the right to adequate food of local communities, forest-dependent communities and indigenous peoples requires ensuring their land and forest use rights. Forest-based goods and services are also crucial for the realization of social, economic and cultural rights of people around the world. In this context, laws, policies and interventions related to forests should not only avoid infringing rights but advance human rights outcomes, prioritizing the most disadvantaged groups in order to achieve substantive rather than formal equality. Such processes should respect the human rights principles of non-discrimination and equality, transparency and access to information, participation, empowerment, legality and accountability. SFM strategies could use FSN concerns, in particular those of the most vulnerable and marginalized forest-dependent people, as one lens to set their priorities and define the best balance between the different functions and objectives of forests and trees (HLPE 2017).

The HLPE (2017) provides the following recommendations for better integration between SFM and FSN:

- Develop and use policy-relevant knowledge on the direct and indirect contributions of forests and trees to FSN;
- Enhance the role of forests in environmental processes at all scales without compromising the right to adequate food of forest-dependent people;
- Support the contributions of forests to improve livelihoods and economies for FSN;
- Promote multifunctional landscapes for FSN that integrate forests and trees as key components;
- Acknowledge the importance and strengthen the role of forests and trees in enhancing resilience at landscapes, community and household levels for FSN;
- Recognize and respect land and natural resource tenure and use rights over forests and trees for FSN; and,
- Strengthen inclusive forest governance systems across sectors and scales for FSN.

Additionally, vulnerable groups in developing countries usually depend on woodfuel for cooking and hence for food utilization. With adequate policy and legal frameworks in place – such as secure forest tenure, integrated landscape and value chain approaches that improve access to markets – woodfuel production and harvesting can lead to sustainable green energy. The widespread availability of woodfuel and its ubiquitous market are opportunities for employment and sustainable development. The loss of forests means woodfuel is becoming costly in many regions. The average time needed to collect one cubic meter of woodfuel varies from about 106 hours in Latin America and the Caribbean to 139 hours in Asia and Oceania. Even in countries with only moderate woodfuel scarcity, women have still been reported to walk up to ten kilometers to gather wood for cooking. Thus, the availability or scarcity of woodfuel can make a significant difference in cooking and dietary decisions (FAO 2018). The interlinkages between forests and energy is discussed in the next section.

Forests, agriculture and water also make another important nexus. It is well known that agriculture is the main user of water and also many agricultural lands are affected by water floods or drought. Therefore, the management of forests and trees for water benefits is of great importance for agriculture. Forests, wetlands and grasslands, as well as soils and crops, when managed properly, play important roles in regulating water quality by reducing sediment loadings, capturing and retaining pollutants, and recycling nutrients. Where water becomes polluted, forest ecosystems can help improve water quality. Water pollution from agriculture, notably nutrients, remains a critical problem worldwide, including in developed countries. It is also the one most amenable to forest-based solutions (FBS), as these can rehabilitate ecosystem services that enable soils to improve nutrient management, and hence lower fertilizer demand and reduce nutrient runoff and/or infiltration to groundwater (WWAP/UN-Water 2018, FAO 2013). Here forests within agriculture dominated landscapes and trees in agroforestry systems can also play an important role.

Waterways and lakes in and near urban areas can be polluted by soil erosion and water runoff that may contain fertilizers and pesticides from agricultural lands. Forests, trees and urban forestry are being increasingly recognized for their role in reducing water quality problems in urban and peri-urban communities by decreasing storm water runoff and soil erosion. Trees also absorb some of the nutrients in the soil that would otherwise be washed away. Communities can have cleaner water by managing existing natural vegetation, planting additional trees, and reducing the use of pesticides and fertilizers. This is particularly important with an increasingly growing urban population.



Forests play a critical role in the hydrological cycle (SDG 6) providing more than 75% of the world's accessible fresh water and protecting water by removing pollutants and buffering the impacts of intense rainfall (Timko et al. 2018). A positive trend is that the area of forests managed for soil and water conservation has increased globally over the past 25 years, and in 2015 a quarter of forests were managed with soil and/or water conservation as an objective (FAO 2018). Further information on the forest – water interaction is presented in the next section.

The State of the World's Forests 2018 (FAO 2018) underlines that sustainable agriculture needs healthy and productive forests. Forests and trees supply hundreds of millions of people with food, energy, and income, and act as a safety net during hard times. To accomplish the historic ambition of ending hunger and poverty, sectoral ministries could ensure policy coherence across governments, integrating strategies and balancing trade-offs. Actions on forests, agriculture, food, water, energy, land use, rural and national development should be integrated in the future, if the 2030 Agenda is to be realized. Here UNFF could play a key role fostering intersectoral collaboration.

### ***3.2.2 Interlinkages between forests and water and their role on inclusive and sustainable development***

The role forests play on water was discussed in UNFF13 and a background analytical study was presented by Ellison (2018). Therefore this section makes reference to the main issues raised in that paper and also adds some other aspects relevant to the interactions between forests and water that are relevant to inclusive and sustainable development.

Access to clean water is one of the most fundamental human rights and hence it is considered in SDG 6 that aims at ensuring its availability and sustainable management. However, more than two billion people still do not have access to safe drinking water, 80 percent of the global population live in areas where water resources are insecure and the number of people at risk from floods is projected to rise from 1.2 billion today to around 1.6 billion in 2050 (WWAP/UN-Water 2018, FAO 2013).

Forests and forested landscapes regulate the provision of water and water-related ecosystem services within a larger climate-forest-water-people system (Mansourian et al. 2018). This function is under considerable pressure from increasing and changing demands from growing populations, and economic development. In the two-way relationship between society and the environment, continued economic development also depends on water security attained through sustainable water resources management. Therefore, sustainable growth implies that economic growth be decoupled from ecosystem degradation, and vice-versa, and that negative environmental threats and impacts on human development are minimized. Forests play a fundamental role since around three-quarters of the globe's accessible freshwater comes from forested watersheds.

According to the 2018 edition of the UN World Water Development Report (WWAP/UN-Water 2018), global water use has increased by a factor of six over the past 100 years and continues to grow steadily and expected to increase another 30% by 2050, the vast majority occurring in countries with developing or emerging economies. This could result in two-thirds of the world's population experiencing water stress conditions, as a function of population growth, economic development and changing consumption patterns, among other factors (WWAP/UN-Water 2018, FAO 2013). At the same time, humanity is witnessing increasing water related problems with extreme events such as droughts and floods. It is estimated that currently around 30% of the global population resides in areas and regions routinely impacted by either flood or drought events. The availability and quality of water in many regions of the world is increasingly threatened by overuse, misuse, pollution and projected negative impacts of climate change. For example, since the 1990s water pollution has worsened in all rivers in Africa, Asia and Latin

America. Ecosystem degradation is a leading cause of increasing water resources management challenges that have had major negative impacts on hydrology, from local to regional and global scales. Ecological processes in a landscape influence the quality of water and the way it moves through a system, as well as soil formation, erosion, and sediment transport and deposition in lakes and oceans – all of which can exert major influences on hydrology (WWAP/UN-Water 2018, Ellison 2018, Ellison et al. 2017).

As a response watershed restoration and protection has become increasingly important for meeting multiple challenges in sustaining water supplies to rapidly growing cities and reducing risks (WWAP/UN-Water 2018, FAO 2013). According to FAO (2018) the area of forests managed for soil and water conservation has increased globally over the past 25 years, and in 2015 a quarter of forests were managed with water and/or soil conservation as an objective, including growing experiences were farmers are compensated to conserve or restore forests.

The first key message presented in UNFF13 was that forest-water interactions represent a powerful adaptation tool that, with the appropriate emphasis on spatial organization and up- and downwind impacts, can provide important pathways for optimizing land use practices and water availability across space (Ellison 2018). According to the UN World Water Development Report (WWAP/UN-Water 2018) sustainable water security will not be achieved through business-as-usual approaches and recommend upscaling nature-based solutions (NBS) to achieving the 2030 Agenda. This is an excellent opportunity for the forest sector to make forests and trees an important part of the set of NBS to water management, with potential to support a green economy, generating social, economic and environmental co-benefits, including improved human health and livelihoods, sustainable economic growth, decent jobs, ecosystem rehabilitation and maintenance, and the protection and enhancement of biodiversity. The value of some of these co-benefits can be substantial and tip investment decisions in favor of forest-based solutions (FBS), considering that there is rapid growth in investments and good potential for further growth since they are still well below 1% of total investment in water resources management infrastructure (most investments are still in usually less effective conventional grey water infrastructure). The current situation, with ageing, inappropriate or insufficient grey infrastructure worldwide, creates opportunities for FBS that embed perspectives of ecosystem services, enhanced resilience and livelihood considerations in water planning and management.

The benefits of forests and SFM for the supply of water are multiple, including maintaining high water quality. SFM usually results in low input of nutrients, pesticides and other chemicals compared to more intensive land uses such as agriculture. By minimizing erosion, forests reduce the impairment of water quality due to sedimentation. By trapping sediments and pollutants from up-slope land uses and activities, forests help protect water bodies and watercourses. Through the stabilization of river banks, tree and shrub roots reduce erosion in riparian zones, preventing siltation downstream. Source water protection also reduces water treatment costs for urban suppliers and contributes to improved access to safe drinking water in rural communities (FAO 2013, Ellison et al. 2011) and large cities such as New York, Munich or Quito. SFM and certification can play an important role making sure that forest operations comply with water resources management objectives.

However, the effects of forests on water is not without controversy. Ellison et al. (2011) examining the literature on the subject propose that rather than focusing primarily (or even exclusively) on demand-side relationships (consumption) it is at least equally important to consider supply-side relationships. Placed in a larger regional and global context, forest–water interactions play a pivotal role in supplying the atmospheric moisture that becomes precipitation in the hydrologic cycle. Forests, wetlands and the

evapotranspiration they produce, are one of the principal drivers of precipitation. Without forests and wetlands, precipitation will be significantly diminished, since ocean evaporation is not sufficient to provide adequate moisture vapor for all terrestrial regions. In particular, summertime precipitation in many regions is driven by the evapotranspiration regime. In UNFF13 Ellison (2018) made the point that the interest in mobilizing a broader scale of up- and downwind forest-water interactions should not be perceived as dispensing with decades of paired-catchment basin research on catchment-level forest-water interactions. To the contrary, broad, up- and downwind, supply-side approaches to forest management strategies rely and build upon the decades of paired-catchment basin research illustrating that forests “use” water. Moreover, it would be foolhardy to dispense with such well-defined concepts, since they provide the foundation for understanding how, from a supply-side perspective, water can be redistributed from one location to others by means of the atmosphere.

Water is therefore both a local and a global resource that does not respect political and national boundaries. Transboundary water-related conflicts typify the challenges related to the interlinkages between the climate-forest-water-people system. In particular, climate change and climatic variability exacerbate the uncertainty of the delivery of forest-water related ecosystem services (Mansourian et al. n.d.). This gave reason to propose transboundary integrated water management frameworks that require institutional reconfigurations to render them capable of addressing the complete forest-water cycle. This means integrating all regions and countries that are linked to the land-based up- and downwind production of atmospheric moisture into existing up- and downstream surface flow management frameworks. Likewise, the more fully integrated management of natural resources can be addressed at the national institutional level as well, both through the greater integration of natural resource ministries and agencies, as well as through the development of more fully integrated, cross sectoral, natural resource policy frameworks (Ellison 2018).

Changing land use patterns, both in the developing and in the developed world, should be subject to increased scrutiny. Progressive deforestation and wetland destruction have direct implications for the global hydrologic cycle. In this regard, maintaining and/or significantly increasing current levels of forest cover seems advisable. Deforestation, due to its impact on the evapotranspiration regime, on soil degradation and loss, and reduced soil water retention represents a significant threat to planetary survival. Increasing forest and wetland cover is likely to have beneficial feedbacks on regional water budgets. Thus, along with accepted forest ecosystem functions (such as carbon sequestration, climate mitigation, biodiversity preservation and fossil fuel substitution through bioenergy), forests play an important role in helping manage the world's water regime (Ellison et al. 2017, 2011).

Appropriate valuations of ecosystem services or calculations of the water footprint of forests and forest-based products can have significant impacts on future forest use and hence on green growth models. PES schemes provide monetary and non-monetary incentives to upstream communities, farmers and private land owners to protect, restore and conserve natural ecosystems and to adopt sustainable agricultural and other land use practices. These actions generate benefits to downstream water users in the form of water regulation, flood control, and erosion and sediment control, among others, thus ensuring a constant, high-quality water supply, and helping reduce water treatment and equipment maintenance costs. Climate change further intensifies the salience of issues related to forest ecosystem services and water supply (Ellison et al. 2011). A key feature of FBS is that they tend to deliver groups of ecosystem services together – even if only one is being targeted by the intervention, hence, usually offering multiple water-related benefits and often help address water quantity, quality and risks simultaneously, hence contributing to building overall system resilience (WWAP/UN-Water 2018).

Challenges and limitations to upscaling FBS so that they reach their full and significant potential are generic across the sectors and at global, region-specific or place-based scales. In many situations, there remains a historical inertia against FBS due to the continuing overwhelming dominance of grey infrastructure solutions in the current instruments – from public policy to building codes and regulations. This dominance can also exist in civil engineering, market-based economic instruments, the expertise of service providers, and consequentially in the minds of policy makers and the general public. These and other factors collectively result in FBS often being perceived to be less efficient, or riskier, than built (grey) systems. FBS often require cooperation among multiple institutions and stakeholders, something that can be difficult to achieve, since current institutional arrangements did not evolve with cooperation on FBS in mind. There need to be increased awareness, communication and knowledge at all levels, from communities to regional planners and national policy makers, of what FBS can really offer. In this regards, Ellison (2018) in UNFF13 concluded that Art. V of the UNFI and Global Forest Goal 6 (esp. 6.2) of the UNSFP offer numerous opportunities for mobilizing both currently recognized and new forest-water interactions in the general framework of sustainable forest management, the development and implementation of criteria and indicators Art. V(i), and the further integration of national forest programs into national strategies for sustainable development, national action plans, and strategies for the reduction of poverty (Art. V(l)). Likewise, forest and water interactions can be further integrated into the fabric of improving knowledge on the science and research of SFM (Art. V(r-v)).

Transforming agricultural policy represents a significant pathway for financing the further uptake of FBS. This requires overcoming the fact that the vast majority of agricultural subsidies, and the majority of public funding and all private sector investment in agricultural research and development, support the intensification of conventional agricultural, which increases water insecurity. Mainstreaming the concept of sustainable ecological intensification of agricultural production, which involves deploying FBS (e.g. improved soil and landscape management techniques through agroforestry systems, ecoagriculture and zero deforestation), is not only the recognized way forward in order to achieve food security but would also be a major advance in FBS financing for water.

FBS can require much greater levels of cross-sectoral and institutional collaboration than grey-infrastructure approaches, particularly when applied at landscape scale. However, this can also open opportunities to bring those groups together under a shared agenda and help countries address the policy landscape that in many cases remains highly fragmented. Better harmonization of policies across economic, environmental and social agendas is a general requirement in its own right, but sustainable water management could be a practical thread to address multiple objectives. FBS are not only a beneficiary of such harmonization but also a means to achieve it, because of their ability to deliver multiple, and often significant, co-benefits beyond just hydrological outcomes. Clear mandates from the highest policy level can significantly accelerate FBS uptake and foster improved intersectoral cooperation. As humankind charts its course through the Anthropocene, and tries to avoid the tragedies of the past, adopting FBS is not only necessary for improving water management outcomes and achieving water security, it is also critical for ensuring the delivery of co-benefits that are essential to all aspects of sustainable development at the local, national and global levels. Although FBS are not a panacea, they will play an essential role in building a better, brighter, safer and more equitable and sustainable future for all.

### ***3.2.3 Interlinkages between forests and energy and their role on inclusive and sustainable development***

Forests play an essential role in creating options for affordable and clean energy, particularly in developing countries (SDG 7). UNFF13 discussed this subject based on background analytical study presented by Bull (2018). Like in the section above, this section makes reference to the main issues raised in Bull (2018) paper and adds some other aspects relevant to the interactions between forests and energy, with special reference to their role on inclusive and sustainable development.

Forest and wood products play a pivotal role in meeting the targets in SDG 7 but history suggests we would need to do a better job in managing forest and other woodlands, especially to demonstrate that forest management play a positive role in the climate change discussion (Bull 2018). On the other hand, forest and energy and the more complex forest-energy–food–water nexus is a central concern for the 21st century (Timko et al. 2018). Woodfuel – including both fuelwood and charcoal – is the human’s oldest source of energy and the most used renewable source today. Overall, forests supply about 40 percent of the global renewable energy in the form of woodfuel, resulting in around 50% or 1.86 billion m<sup>3</sup> of global wood production being used for energy (FAO 2018). Several studies have demonstrated the contribution of woodfuel to livelihoods and food security. About 2.4 billion people – one-third of the world’s population–, use woodfuel for basic energy needs such as cooking and sterilize water, and heating homes. 17% of the wood used for fuel is converted to charcoal, which is steadily increasing, generating employment and income for 40 million people, mostly in less developed regions. As one of the most affordable, reliable and sometimes the only accessible energy sources and a safety net for basic energy services, woodfuel plays a important role for people affected by natural disasters and humanitarian crises, especially in refugee situations (FAO 2018).

Reliance on woodfuel is highest in Africa (63 percent), followed by Asia and Oceania (38 percent), and Latin America and the Caribbean (15 percent). In the Democratic Republic of the Congo, 90 percent of the capital city of Kinshasa's population rely on charcoal for cooking. Rural people in 13 countries in Africa as well as in Bhutan and the Lao People’s Democratic Republic use wood energy to provide for as much as 90 percent of their energy requirements, while in Nepal 70 percent of households use woodfuel. Woodfuel dependency continues even when a country moves through the process of industrialization, as in the case of China (FAO 2018).

According to Bull (2018) there would be a significant increase in the use of forest biomass resources to meet SDG 7 and this will require significant financing, knowledge transfer and policy/institutional changes. This will also present the challenge of developing market and regulatory mechanisms that will ensure the poor can participate in this new economy (SDG 1), help achieve more access to food security (SDG 2), ensure gender equality (SDG 5) and protect, restore and promote the sustainable use of the forest (SDG 15). Policy actors and leaders will have to ensure the economic and policy instruments are designed to address these challenges. The key instruments will include tenure allocation, market mechanisms, financing and loans, use of appropriate subsidies and the introduction of newer technologies.

Clear and secure forest tenure rights are key for sustainable woodfuel production, as they foster management practices that ensure regrowth or regeneration. In regions where community-based forest management systems are not supported through national legislation, woodfuel extraction is often associated with degradation of reserves, as is the case of the South African savannahs (FAO 2018). Universal access could also be designed into forest policies to ensure that women, the poor and the marginalized could all benefit from the greater use forest-based energy. This could also be an effective tool in adapting to climate change and assist in contributing to an increased share of renewable energy in

the energy portfolio. Forest and woody biomass will likely remain the most effective replacement of fossil fuels, especially in many low-income countries. Forest are renewable and expandable so represent the greatest opportunity to expand the use of renewable energy that is sustainable and at the lowest costs. Many studies on marginal abatement costs curves for technologies and forest illustrate the benefits of biomass use. Energy efficiency can be very cost effective in many instances, especially if appropriate clean technology is used such as improved cook stoves or kilns among others. The use of modern technology and capacity development in usage of bioenergy can reduce the use of wood, in the case of charcoal, by as much as 75% (Bull 2018).

Emphasis should be on sustainably producing and harvesting woodfuel to reduce forest degradation, as well as using it more cleanly and efficiently to improve the profitability and health of millions of people, particularly women and children (FAO 2018). National policies and NDCs should aim at creating proper conditions and solutions for sustainable wood fuel production, taking into consideration all actors in value chains, especially the most marginalized, ensure property and use rights and access to legal and sustainable sources of wood, SFM, tree plantations and agroforestry systems based on sustainable production systems (e.g. certification), more efficient charcoal production through proper kilns and training, financial mechanisms adequate to the conditions of charcoal produces, and linking producers with markets, especially those concerned with social and environmental performance.

### ***3.2.4 Interlinkages between forests and other sectors***

#### ***Human health***

Apart from agriculture and FSN, water and energy, forests also influence other sectors. For example, it is known that changes in the structure and function of the Earth's natural systems pose growing threats to human health. The report "Safeguarding human health in the Anthropocene epoch" of The Rockefeller Foundation–Lancet Commission on planetary health states that by unsustainably exploiting nature's resources, human civilization has flourished but now risks substantial health effects from the degradation of nature's life support systems in the future. Health effects from changes to the environment including climate change, ocean acidification, deforestation and land and forest degradation, water scarcity, overexploitation of fisheries, and biodiversity loss, pose serious challenges to the global health gains of the past several decades and are likely to become increasingly dominant during the second half of this century and beyond. These striking trends are driven by highly inequitable, inefficient, and unsustainable patterns of resource consumption and technological development, together with population growth (Whitmee et al. 2015).

Forests and tree-based agricultural systems impact human health in a diversity of ways, including provisioning of food, medicinal plants, fuelwood, clean water and income. Empirical evidence suggests that forest environments can improve peoples' mental health and reduce depression and stress. However, forests can also provide habitat for parasites and diseases that can affect humans and domestic animals. Deforestation and forest degradation, leading to habitat fragmentation, can also impact human health by increasing the risk of transmission of pests and diseases. The critical linkages between human, animal, and ecosystem health are encompassed in the concept of "One Health", which highlights the need for collaboration across sectors. (HLPE 2017).

As mentioned before woodfuel is important in many developing nations to cook foods that, in some cases, would otherwise be inedible or unpalatable. Fuelwood scarcity can affect cooking practices and dietary choices, it can result in skipping meals, and avoidance of foods which are particularly fuel demanding. Issues of fuelwood access and use must be included in agricultural systems and planning – poor access to

cooking fuel can mean that household resources, in terms of either time or money, are spent to procure fuel rather than healthy and nutritious food. Fuelwood scarcity can exacerbate gendered imbalances in workloads, leaving women with less time for child care, less time to engage in productive and income generating activities and exposing them to health risks. Careful attention to the species of fuelwood available will help ensure access to those that are more efficient, produce less smoke, produce less toxic smoke thereby not only reducing the amount of work needed to collect fuelwood but decreasing the risk of respiratory tract infection for those involved in cooking (Ellison et al. 2018).

The health sector, particularly those working on FSN, need to be better informed about the importance of sustainable forests, given that forests are positively associated with food security, health and well-being. Many of today's food plants that contribute to diverse and nutritious diets as well as major global commodities, such as coffee and chocolate, are derived from their wild relatives. Many of these originate in forests and require pollination by insects or other vectors. Forests and agroforests are havens for pollinators, yet they are under threat from changes in land use, primarily to intensification and monocultures, and a changing climate. Forests provide a diversity of healthy foods high in nutrients, helping to combat micronutrient deficiencies, often referred to as 'hidden hunger'. Communities living near forests have diets that are nutritionally superior and more diverse than those who do not have access to forest resources (Timko et al. 2018; Rasolofoson et al. 2018). A growing number of people around the world rely on forests for their health, recreational, de-stressing, spiritual and cultural well-being (Timko et al. 2018). In the poorest communities, forests serve as critical safety nets providing wild foods and other NWFP between harvests or in times of drought, flooding, crop failure and other emergencies. Forests ensure human health by serving as a natural pharmacy especially for the poor, with half of the traditional medicines relied upon in developing countries originating from plants in tropical forests. The clearance of forests has also been associated with outbreaks of zoonotic diseases, such as Ebola (Timko et al. 2018, Elmahdy et al. 2017). To help find solutions to the human health problems related with ecosystem degradation Whitmee et al. (2015) propose the concept of "planetary health", based on the understanding that human health and human civilization depend on flourishing natural systems and their wise stewardship. They conclude that the present systems of governance and organization of human knowledge are inadequate to address the threats to planetary health and call for improved governance to aid the integration of social, economic, and environmental policies and for the creation, synthesis, and application of interdisciplinary knowledge to strengthen planetary health. This endeavor will need that societies address the drivers of environmental degradation by promoting sustainable and equitable patterns of consumption, reducing population growth, and harnessing the power of technology for change. Solutions lie within reach and should be based on the redefinition of prosperity to focus on the enhancement of quality of life and delivery of improved health for all, together with respect for the integrity of natural systems.

### ***Nature-based tourism***

Tourism is one of the faster growing economic activities accounting for 10% of world's GDP, 7% of global trade and one in ten jobs. 2017 was a record year for international tourism with 7% growth in arrivals, representing the eighth consecutive year of growth, a sequence of uninterrupted growth not recorded since the 1960s. 57% of international tourist arrivals in 2030 will be in emerging economies, then if well managed, this sector could improve the lives of millions of people and contribute to the 2030 Agenda, especially if nature-based and community-managed ecotourism solutions are part of international, national and local strategies (UNWTO 2018).

Nature is a major attraction element for the tourism industry, and nature-based tourism (NBT) is perceived as one of the more rapidly expanding sectors within tourism in Northern Europe and elsewhere (Elmahdy et al. 2017).

While there is limited research on the impact of nature-based tourism, the 2017 report from the Center for Responsible Travel indicates that it accounted for 7% of the international tourism market and had a \$77 billion impact on the world's economy (CREST 2017). The consumer demand for responsible tourism is growing as travelers, especially the millennials, become increasingly aware of the impact of their decisions on local communities and the environment (CREST 2018). However, the increased interest in nature is cross-generational.

Pro-poor tourism is been advocated as a means of alleviating poverty in developing economies. Pro-poor models have generated a lot of interest and promotion, not only among researchers, but also amongst international and donor organizations. For example, the United Nations World Tourism Organization (UNWTO) has come up with the Sustainable Tourism Eliminating Poverty Initiative (STEP), which began in 2002. The focus of STEP is to encourage the promotion of activities that promote sustainable tourism (social, economic, ecological) with a focus on alleviating poverty through the development and creation of jobs for the poorest people (Haretsebe and Farai, 2014).

With the worldwide growth on popularity on healthy life styles, forests and forested landscapes can provide tourists with opportunities to view and experience aesthetic environments, relieve mental stress, become physically fit and connect with rural people (Elmahdy et al. 2017). Forests and mountains represent a valuable function in spiritual practice, particularly to indigenous peoples, but also for a growing number general public. Forest-based tourism has become a growing land-use activity in several countries and an important economic sector that involves a variety of different types of entrepreneurs, many of which are small and lead by women located in rural regions. Forest-based tourism can generate employment and income, in some cases the main one in rural areas, especially for the youth. In Costa Rica tourism is the main economic sector and source of income and employment, especially in rural areas, and has become an economic justification and complement for the conservation and restoration of forest ecosystems. Over the last half century, social science researchers have made great strides to better understand how to provide opportunities to attain the wealth of personal, social, economic, and environmental benefits available through the use of forests for recreation and tourism.

However, urbanization, rural depopulation, exploitation of land for road construction and energy production have led to different changes to landscapes and loss of their aesthetic values. Natural landscapes are a main driving force of NBT. Hence, all such changes were found to have a negative impact on NBT via for instance reducing the attractiveness of tourist landscapes and the quality of tourists' experiences. Conflicts between various stakeholders (e.g. tourism, forestry, energy production) is also documented in the literature. Protected areas are often significant attractions in the NBT system, and more recent environmental policies, in Scandinavia, have emphasized the need to integrate NBT with protection of nature so that the two can be of mutual benefit (Elmahdy et al. 2017).

With the growing and valuable role recreation and tourism play in the conservation and sustainable management of forests, decision makers could make sure that the benefits of forest-based recreation and tourism is specifically addressed in sectoral strategies and development plans. Policy makers and scientists should consider the potential of moving towards fully integrated landscape or territorial



approaches as a means of breaking down sectorial approaches to improve planetary health, reconciling food, timber, conservation, recreation and health objectives and hence provide a model for nexus approaches to the SDGs.

### **3.3 Value-added, processing, diversification and technology in the forest sector**

According to FAO (2014) total gross value-added in the (formal) forestry sector has not changed much during the period 2000 to 2011, with an average value of USD 583 billion per year (in real terms) and annual figures within +/- five percent of this average. In 2011, total gross value-added in the forestry sector amounted to USD 606 billion (adjusted for inflation and expressed in USD at 2011 prices and exchange rates). The formal timber sector produces more than 5,000 types of wood-based products.

Among the three sub-sectors, the pulp and paper industry make the largest contribution to GDP, accounting for 45 percent of the total gross value-added in the forestry sector. The wood industry is the next largest contributor, with a 30 percent share of the total, while forestry activities account for the remaining 25 percent of gross value-added. This distribution of value-added across sub-sectors remained stable in the 2000s, however, the share of the pulp and paper industry has been declining in recent years. The forestry, wood and furniture sub-sectors saw significant declines during the global economic crisis in 2008-2009, while the pulp and paper industry was able to hold its ground during the same period at the global level.

At the regional level, the majority of global value-added in the forestry sector is produced in the developed regions, due to the high levels of value-added achieved in the forest processing sectors in these regions. However, the share of global value added in developed regions has fallen from about 70 percent in the early 2000s to 50 percent in 2011, as value-added has increased in the Developing Asia-Pacific and Latin America and the Caribbean regions.

Value-added per unit of output has increased in the forestry sub-sector during 2000 to 2011 but has declined in the wood industry and the pulp and paper industry (due to falling real products prices). Developing Asia-Pacific is the only region where value-added per unit of output has increased in all three sub-sectors between 2000 and 2011. Value-added per unit of output in the forestry sub-sector is lower in developed regions than in developing regions (due to lower average round wood prices). In general, the reverse is true in the processing sectors. However, value-added per employee is far higher in developed regions than in developing regions in all sub-sectors.

The contribution of the forestry sector to GDP has continued to decline from over 1.2 percent in 2000 to 0.9 percent in 2011. This decline has occurred because other sectors of the global economy (especially services) have expanded more rapidly (i.e. global GDP has increased by 40 percent over the period) while value-added in the forestry sector has increased by only 3 percent. At the regional level, all regions display this downward trend without exception.

Emerging wood-based products offer potential new markets that are expected to increase, especially in construction, textiles, chemicals (including polymers), biofuels, packaging (plastics) and a number of small upstream niche markets such as cosmetics, food additives, and pharmaceuticals (Hurmekoski et al. 2018). These developments could support green growth economic models based on sustainable managed forests. Summed up, these markets could result in an increase in revenues of forest industries ranging from 18 to 75 billion euros per annum in the USA, Canada, Sweden, and Finland by 2030, depending on the product portfolio and the position of the firms in the value chains. This corresponds to 10%–43% of the current production value of forest industries in these four countries.

Given a projected decline of global graphic paper industry revenue of 5.5 billion euros by 2030, any of the identified product groups could roughly compensate for this decline by gaining a 1%–2% share of global markets. The contribution of new products could be even greater if the firms are also prepared and equipped to accommodate more downstream operations of, for example, the textile and chemical value chains. The respective impact on primary wood use is estimated to range from 15 to 133 million m<sup>3</sup>, corresponding to 2%–21% of the current industrial roundwood use, mostly in the construction markets. As many of the new products are based on the existing by-product flows of the sawmilling and pulping industry, feedstock availability remains constrained by the by-product flows of projected sawnwood and pulp supply. Important synergies between, mainly, wood-based construction on one side and wood-based textiles, biofuels, platform chemicals, and plastics and packaging on the other are apparent. At the same time, many of these emerging markets compete with each other, as well as with energy, wood-based panels, and pulp and paper industries, for the same by-product feedstocks (Hurmekoski et al. 2018).

A higher use of wood-based products could also become an effective climate change mitigation option. According to Gustavsson et al. (2017), a strategy based on active forest management with high harvest levels and efficient forest product utilization will provide more climate benefits, compared to reducing harvest and storing more carbon in the forest. At the same time the increased in value-added would be particularly important for the rural economies that have a higher dependency on the income and employment provided by forests, as described in section 3.1 and 4.1.

### **3.4 Impacts of unsustainable economic growth and activities on forests**

Human search for wellbeing and prosperity has been achieved worldwide mostly at the expense of nature, especially forests. This has been particularly marked over the last century, when substantial increases in human activities have resulted in forest decline, particularly in the tropical forests of the developing world, where unsustainable human populations continue to grow and the demand for food and land continue increasing (Crespo Cuaresma et al. 2017, FAO 2016).

Agriculture (including livestock grazing) has been the main driver of around 80% of the deforestation worldwide, with commercial agriculture as the main one in Latin America (around 2/3 of total deforested area), while in Africa and (sub)tropical Asia it accounts for around 1/3 of forest clearance and is of similar importance to subsistence agriculture. Mining, infrastructure and urban expansion are important but less prominent (FAO 2016). Growth in demand for agricultural products will occur in markets of emerging economies, particularly in the most populous countries of Asia and Sub-Saharan Africa. Therefore, the ways in which China, India, Indonesia, Bangladesh, Nigeria, Ethiopia, and South Africa respond to growing food demand will be major determinants of environmental change at a global scale (Sayer and Cassman, 2013).

On the other hand, findings on global patterns indicate that (commercial) timber extraction and logging activities account for more than 70% of forest degradation in Latin America and (sub)tropical Asia. Fuelwood collection, charcoal production, and, to a lesser extent, livestock grazing in forests are the most important drivers of degradation in large parts of Africa (FAO 2016).

An economic growth model based on the export of primary commodities and an increasing demand for timber and agricultural products in a globalizing economy are critical indirect drivers and are expected to increase in the coming years (Kissinger et al. 2012). Agriculture will increase dramatically, especially in tropical countries and this could have major impacts on tropical forests and semi-arid

environments and the proliferation of roads will at the same time increase the footprint of agriculture (Laurance et al. 2014).

### **3.4.1 Decoupling economic growth from deforestation**

Given the deteriorated condition of the world's natural capital and ecosystem services, a sustainable future path for humanity must be based on decoupling economic growth from nature and forests degradation. This is not impossible and has been achieved in some developed countries (e.g. Finland in the last century) and fewer developing countries (e.g. Costa Rica in the last 2-3 decades). To achieve this aim, it is critically important to understand that the underlying or indirect drivers of deforestation and forest degradation are complex interactions of social, economic, political, cultural and technological processes that affect the direct drivers to cause deforestation or forest degradation. They act at multiple scales: international (markets, commodity prices), national (population growth, domestic markets, national policies, governance) and local circumstances (subsistence, poverty) and therefore require the implementation of comprehensive system approaches (Laurance et al. 2014).

In REDD+ readiness plans, many countries identify weak forest sector governance and institutions, lack of cross-sectoral coordination and collaboration, and illegal activity (related to weak enforcement) as critical underlying drivers. Population growth, poverty and insecure tenure are also cited. International and market forces, particularly commodity markets are also key underlying drivers. Pressures from many international drivers to clear forests are expected to increase in future due to global urbanization, increasingly meat-based diets, long-term population trends, increasing developing country prosperity, growth in developing country regional markets for key commodities, and climate change adaptation factors (Kissinger et al. 2012). No doubt there is clear evidence that, particularly in developing countries, lack of enforcement mechanisms and resource allocation remain major concerns to be addressed.

Efficient management of farming growth that equally aims for economic development and limiting deforestation will require the creation of relevant public policies, the provision of support to the public and private sectors, and the promotion of alternative agricultural practices that dissociate deforestation and farming. Managing the expansion of commercial farming and its impact on forest ecosystems requires relevant and differentiated strategies for industrial-scale plantations and for the different forms of small-scale farming. It would be impracticable and ineffective to have a single overarching strategy. Spatial planning and the strengthening of the rule of law are essential in order to limit the fragmentation of forests. Small producers need incentives, land security, and public and private support if they are to adopt agricultural practices that are respectful of the environment (Dubiez et al 2016).

While pressures to clear forests will increase in the future, there are promising strategies to decouple economic growth from deforestation, such as REDD+ and deforestation free supply chains initiatives. In some cases, REDD+ incentives will be insufficient to affect drivers, therefore they should be complemented with national approaches — based on effective land-use planning, policies and incentives — that allow for re-directing high opportunity cost activities to places with lower forest cover without sacrificing economic development. Addressing the underlying factors is crucial to determine whether direct driver interventions will succeed in achieving the emissions reductions intended. Countries engaged in REDD+ readiness activities most commonly prioritize sustainable management of forests, followed by fuelwood efficiency, and better enforcement and institutional strengthening, particularly related to slowing rates of illegal logging. Community forest management

and addressing tenure and rights concerns is also a priority as mentioned in section 2.3. A significant number of countries place emphasis on REDD+ driver interventions appropriate to mosaic landscapes; these include agroforestry, afforestation, reforestation and assisted natural regeneration. Countries define strategies and interventions to deal with national and local scale drivers, but face problems addressing international drivers and acknowledge that international pressure will increase. Country interventions to affect drivers share commonalities and challenges. A few critical enabling factors stand out when designing strategies to affect drivers in REDD+ policy development and implementation, for instance, the importance of good governance and tenure security as a basis for effective REDD+ incentives. Others require more information and strategy sharing between and within countries (such as how to ensure agricultural intensification does not increase forest clearing, and how to create effective cross-sectoral commitments). Countries can explore synergies, such as how addressing one driver, affects other underlying drivers when designing interventions (Kissinger et al. 2012).

O'Rourke and Lollo (2015) state that given current trajectories of population and consumption growth, it is clear we face impending sustainability crises, since current efforts that focus on efficiency and market-based solutions are insufficient. They propose sustainable consumption that entails moving from efficiency improvements to lifestyle changes, to broader culture changes, to sociotechnological system changes. In the forest sector, we need to address sustainable consumption, making it not only more efficient but also gradually decoupling it from resource use such as zero deforestation approaches. This requires deeper levels of system change, including, interventions and policies to move from relative decoupling via technological improvements, to strategies, including education, to change the behavior of individual consumers, to broader initiatives to change systems of production and consumption. Deep system change is only possible if we view interventions and actions through an integrated lens of behavioral, structural, institutional, and cultural change, and then situate these changes within a systems framework for learning, iteration, and scaling. Sustainable consumption will need to develop and test a coherent package of integrated, adaptive, and reinforcing policies that address individual cognitive biases as well as deep infrastructural systems, and support a scalable transition toward real prosperity, equity, and environmental sustainability.

### ***3.4.2 Scales of interventions to affect drivers***

As drivers of deforestation and degradation operate at sub-national, national, regional, and global scales, so too must do strategies and interventions aiming to affect them. Interventions can engage actors at various scales, for instance commodity roundtables and public-private sector partnerships. Consumer and producer countries have a range of tools and interventions to address international activities driving deforestation. These can be voluntary measures (e.g. EU Voluntary Partnership Agreements, procurement and sourcing commitments) or regulatory (such as import controls). Where demand and supply side interventions are mutually reinforcing, there will be greater chance to affect driver activity. National-level interventions can include a range of incentives (e.g. tax policies, benefit-sharing, PES), disincentives (e.g. moratoria, fees) and enabling measures (e.g. adequate governance, enforcement, policies and land-use planning, secure tenure rights). Local-level interventions need to be suited to local conditions but considered within the context of national forest policies and plans to ensure the right incentives, enabling conditions, and policy levers are in place (Kissinger et al. 2012).

There is increasing interest in market-based instruments to recognize and valorize the different contributions of forests, especially related to environmental issues. Examples include carbon credits

and other PES, certification and green procurement. Forest certification plays an important role in assessing and monitoring the sustainable management of forests in an independent way. The two main international certification schemes. The Forest Stewardship Council [FSC] and the Programme for the Endorsement of Forest Certification [PEFC], introduced in the late 1990s, covered 438 million ha in 2014 (90 percent of which are situated in boreal and temperate climatic domains). Also, voluntary green building programs, codes and standards promote the use of legally and sustainably harvested wood products.

### **3.5 Impacts of sustainable forest use and incentives on economies**

The forest sector has an enormous potential to foster the transition to a greener and more sustainable economy that could bring economic, social and environmental development, through the sustainable management and conservation of forests and the sustainable utilization of the diversity of products and services they provide. By using the sun's energy forests play an essential role in the carbon cycle, releasing oxygen, while locking up carbon dioxide in the trees and soil. Part of this energy is transformed into wood, food, fiber and several other NWFP and biomass that provide essential environmental and social values and services. The contribution could be significant if governments and others seize the opportunity and take measures to support the wider use of forests and trees in biomass energy, green infrastructure and building and as carbon sinks and other forest-based solutions for water and risk reduction. Wood energy represents the most important source of bioenergy in most countries. Thanks to the implementation of policies aimed at increasing the share of renewable energy, especially when fossil fuel prices are high, wood energy is seen as a growing opportunity for wood utilization. The use of renewable biomaterials in infrastructures and buildings can be a positive contribution to climate change mitigation since their utilization can minimize the use of non-renewable energy. Renewable biomaterials have additional benefit as they sequester carbon during their life time. Advanced biomaterial and bioenergy solutions could play a much larger role in meeting human needs more sustainably by replacing a share of fossil fuels with forest residues and increasing the efficiency of use of forest biomass. The evolving market for wood, with rising demand for wood energy as well as market growth in the use of wood in construction in the context of green building, may well result in new competitive relationships (Timko et al. 2018; UNECE and FAO, 2009).

This would need to put even more emphasis on an economic development path that is inclusive, low in carbon emissions, and pursued in a manner that addresses responsible production and consumption. Traditional forest products such as timber and paper, are already a major economic sector and driven by global demand. Overall, demand for wood products continue to rise and to place pressure on natural forests, yet sustainably managed forests will play a significant role in enabling us to move away from a reliance on more carbon-intensive materials (e.g. concrete, steel). This shift towards new activities could at the same time create new or renewed competition: (a) between wood energy and traditional industrial uses; (b) between wood energy and other sources of energy and (c) between wood in green building and other building materials (UNECE and FAO, 2009).

Balancing the increasing demands for land, forests and trees through SFM and forest landscape restoration (FLR) will be critical for ensuring remaining and new forests are managed effectively to balance multiple objectives pertaining to timber production, social outcomes and environmental concerns. This will require governments to develop locally appropriate policies and governance structures to support SFM and FLR planning and implementation, incorporate local needs and enforce regulations and the proactive engagement of the private sector and blended finance. SFM and FLR also

offer potential for high quality employment (both direct and indirect), and a vibrant forest-based economy offers an alternative to those who would otherwise migrate to urban areas for employment. This can be particularly important in poorer areas in developing countries with significant forest resources and few other sources of stable employment, at least in the short-term. Forests can be locally transformative, providing substantial levels of local employment for many marginalized households. At least in the short term, transformation of the forestry sector through improvements in management practices, improved regulations, and expanding the scope of products produced from forests can increase the contribution of forests to SDGs 1, 8 and 9.

Innovation and education<sup>5</sup> in the forest sector should be fostered as it has the potential to increase the efficient use of forests through the creation or adoption of new products (e.g. advanced biomaterials), manufacturing processes, and business models. For example, forest ligno-cellulose is an important part of the renewable energy mix. However, to the degree innovation and new product demand promotes illegal logging, unsustainable harvesting, and the replacement of natural forests with plantations there may be tradeoffs between SDG 9 and SDG 15 as these are key drivers of degradation and deforestation. Advances in the forest industry that could better align the SDGs will require accounting for unintended consequences within forests and spillover effects on communities living near forests (Timko et al. 2018).

While industrialization can result in improved infrastructure which can enhance both local access to NTFPs and market access, roads penetrating into wilderness or frontier areas are a major proximate (as well as indirect) driver of habitat loss and fragmentation with potentially irreversible impacts on ecosystems. The proliferation of transport routes through forests is often chaotic or poorly planned. Policy makers will be challenged to guide large-scale zoning plans that seek to limit the environmental costs of road expansion, while maximizing its benefits for human development. Recycling, forest certification, regulating forest-based production to be deforestation-free, and efforts to reduce demand have contributed towards promoting both responsible consumption and production (Timko et al. 2018).

Countries could benefit by decoupling economic growth from deforestation and forest degradation, but instead fostering forest smart development approaches that recognizes forests' significance for sustaining economic growth across many sectors, including agriculture, energy, infrastructure, and water. Forest smart development transforms how sectors operate by identifying opportunities for mutual benefit and creating practical solutions that can be implemented at scale. Forest-smart solutions support development outcomes and impact such as improved food security, green growth, and climate change mitigation and adaptation (PROFOR n.d.)

## **4. Forests and full and productive employment**

### **4.1 Contributions of the forest sector to formal and informal employment**

In addition to their direct, cash and non-cash economic contributions, forests also provide substantial levels of employment. More than 13 million people are employed in forest sector activities in the formal sector. In the informal sector of small and medium forest enterprises (SMEs), another 40-60

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<sup>5</sup> Education is discussed in the Background Analytical Study 3 "Forests, peaceful and inclusive societies, reduced inequality, education, and inclusive institutions at all levels.

million people may be employed (in addition to forest-dwelling indigenous peoples and local communities who primarily depend on forests for their livelihoods) and in some countries SMEs account for 80 to 90 per cent of forest-related employment. However, employment in forestry is considered heavily under-reported due to a lack of data, particularly for informal or part-time employment, hence the lack of systematic data makes it near impossible to estimate closely how many people are employed in the sector. In addition, the wood fuel industry creates jobs for tens of millions of households in the form of small-scale wood collection, charcoal production, transportation, and retail. The Sub-Saharan Africa charcoal sector alone employs an estimated 7 million people (Agrawal et al. 2013, ILO 2011, ILO n.d.).

According to a more recent report by FAO on the contribution of the forestry sector to national economies in the period between 1990 to 2011, total employment in the (formal) forestry sector decreased by about 6%, from 14.0 million in 2000 to 13.2 million in 2011. Most of this decline was in the forestry sub-sector (21% decrease) and the developed regions (i.e. North America, Western Europe and the Developed Asia-Pacific region). These losses were partly offset by an increase in employment in the forestry sector in the developing regions (FAO 2014).

At the global level, employment used to be divided equally between the three main sub-sectors: forestry, the wood industry, and the pulp and paper industry. The recent trend, however, indicates that employment in forestry has shrank over time, with the exception of the developing regions, where forestry activities remain more important than processing activities compared with developed regions (FAO 2014). This confirms the high importance of forests and trees for the employment of rural people, especially in developing countries.

Globally, the forestry sector currently employs about 0.4 percent of the total labor force; this figure has declined from 0.5 percent in 2005. The downward trend is quite gradual though, suggesting that the sector has been able to create new jobs at a rate that has almost kept up with growth in the working-age population. The contribution of the forestry sector to total employment is higher in the developed regions and Eastern Europe than in developing regions. This is largely because a significant number of people are employed in the processing sector, indicating the importance of promoting value-added and processing in developing countries to generate more employment (FAO 2014).

Employment in forestry and logging (harvesting and silvicultural operations, including the collection of wood fuel and NWFPs) contributes to society's economic, environmental and social welfare. Forestry activities are carried out in rural areas, where there are often few alternative sources of employment, which makes such employment in these communities exceptionally important. For countries that reported total employment and female employment, the percentage of female employment increased from 20 percent in 1990 to 32 percent in 2010. Countries with the highest number of women working in forests were Bangladesh (600,000), China (301,000) and Mali (180,000). Countries with the greatest share of female employment were Mali (90 percent), Mongolia and Namibia (45 percent) and Bangladesh (40 percent). Bangladesh has updated its forest policy and legislation to enhance women's participation in social forestry development, while in Mongolia, women have historically been responsible for activities such as wood fuel collecting, reforestation and education, while in Mali women are actively involved in woodfuel and NWFP collection (FAO 2016).

Globally, employment in forestry and logging seems likely to decline as productivity increases in most parts of the world. However, this decline is unlikely to occur in countries with high woodfuel use, where labor-use efficiency is unlikely to change in the foreseeable future.

Productivity, working conditions, gender, wage, safety and anti-discrimination policies/measures in forest sectors

Oftentimes debates over forests tend to focus on biodiversity and ecological issues and neglect the human and labor dimensions, including the function of forests for society and the role and conditions of forestry workers. The forestry sector faces important decent work deficits such as low wages and productivity, widespread informality, illegal logging, significant gender equality gaps, low unionization rates, highly hazardous work, lack of job security, and inadequate occupational safety and health conditions. The relationship of ancestral communities with forest activities, the link between non-rural communities with forest and trees, the benefits of forest and its products on the wellbeing of societies, and so on, are topics that require more attention. In Southern Chile there are unemployment government programs to train and provide income to marginalized sectors of society. (ILO 2011, ILO n.d.).

All of the traditional sub-sectors in forestry differs in its social and labor characteristics and varies from country to country. While some forest industries are dominated by large, vertically integrated forestry firms, others are based on small, private forest owners. Very different levels of technology are found in the industry, from full mechanization to exclusively manual work (ILO n.d.).

This sector is characterized by a high degree of informality, particularly in developing countries, in large part due to the expansion of illegal logging activities. Illegal logging includes some proportion of unregistered traditional use of forests, which if properly controlled, can have also a positive impact in improving workers conditions and controlling forest degradation. However, this sector has at the same time considerable potential for creating green jobs, particularly through activities such as reforestation, afforestation, agroforestry and sustainable forest management (ILO 2011, ILO n.d.).

#### **4.2.1 Low labor productivity and earnings**

Labor productivity (i.e. the amount of output per employee) has increased in all three sub-sectors and in most regions over the last 10 years and remained higher in the developed regions compared to developing regions. Most of the growth in productivity took place in the early and mid-2000s, before the recent economic crisis. Productivity fell at the global level between 2007 and 2009 but has gradually recovered in recent years (FAO 2014).

Average wages in forestry activities are lower than the average in other sub-sectors. In 2011, the value added per worker amounted to US\$ 48,300 in formal forestry activities, to US\$ 31,500 in the wood industry and to US\$ 61,900 in the pulp and paper industry. These disparities in value added are not always reflected in the wage levels in the three sub-sectors. While jobs in primary extractive activities are low paid, jobs in the two forest processing sub-sectors are comparable to wage levels in similar manufacturing industries. Additionally, the wage and salary conditions differ between regions. In industrialized countries, forestry wages converge with the manufacturing sectors, while in many developing countries they are at or close to the minimum wage (ILO n.d.).

#### **4.2.2 Safety and health**

Forestry, especially logging, is one of the most hazardous dangerous occupations in most countries. All segments of the forestry workforce, in particular contractors, self-employed and forest farmers, are exposed to high risks of accident, including many fatalities and serious health problems. Additionally, forestry workplaces are frequently found in remote areas and sometimes in temporary and shifting locations. Factors behind the high number of accidents and fatalities include inadequate



organization, planning and supervision of forestry work, as well as poor tools and equipment. Lack of skills and know-how among workers, supervisors and managers are also underlying factors causing accidents and fatalities. Additionally, subcontracting practices in forestry have led to precarious and unstable employment practices in many countries (ILO 2011, ILO n.d.).

The implementation of reduced impact logging (RIL) and improvements with new production and harvesting technologies, have contributed to the training of workers and improvements in planning and organization that result in the reduction of accidents and health hazards and increases in productivity. This could also result in a reduction in the labor force required by the forestry industry in harvesting and logging.

#### **4.2.3 Training forestry workers**

Training is another challenge in the industry, since formal training is rudimentary or non-existent in many countries, especially developing countries. Most workers are self-trained or receive on-the-job-training, but lack formal training, since this is often limited to high-level positions of management and to supervisors. Existing formal training is often rudimentary and does not address the productivity or safety of unskilled and semi-skilled workers. Adequate formal and non-formal training of sustainable forest management, especially harvesting, is one of the key elements in breaking the circle of low productivity, low wages, high accident rates, high turnover in the workforce and including high environmental impact (ILO 2011, ILO n.d.).

#### **4.2.4 Target groups: disadvantaged, vulnerable and marginalized populations**

**Female workers:** women are under-represented in the forestry sector, especially in management and decision-making positions, and tend to work in low-status, low-paid work. Having fewer opportunities for employment, they often form part of a family work unit, and many times face widespread skepticism regarding their ability to undertake skilled work. In recent years, women's participation in the sector in some countries has increased, while in others they have particularly suffered the effects of the global crisis (ILO 2011, ILO n.d.).

**Migrant workers:** migrant workers have long been an issue in the forestry sector, as in many other sectors. They carry out the most dangerous jobs and are often subject to human rights violations and poor working conditions. They usually have lower levels of skills and limited access to health care and training (ILO n.d.).

**Indigenous and tribal populations and other forest-dependent communities:** globalization and exploitation of natural resources by national and multinational companies have increased pressure on forest resources and been linked to development-led displacement of indigenous peoples and forest-dependent communities. Many indigenous people face challenges to pursuing their traditional livelihoods, face conflicts over land rights and suffer coercive labor conditions when outside their own communities (ILO n.d.).

**Child and forced labor:** child labor and forced labor are present in many forestry workplaces, which are often in remote areas. Isolation increases vulnerability to exploitation, hampering law enforcement and union representation. Additionally, lack of schools in remote areas makes it difficult for children to enroll in and attend schools. In recent years, the ILO Committee of Experts on the Application of Conventions and Recommendations has documented serious violations of fundamental rights concerning child labor in the forestry sector (ILO n.d.).

ILO's approach to improve the employment conditions and support the transition to the formal economy of the sector include (ILO 2011, ILO n.d.):

Promote employment creation including through the development and implementation of national policies targeting green job creation and raising awareness about the role of forestry work in protecting the environment.

Enhance training and skills development to ensure and maintain a competitive and sustainable forestry workforce. This includes forest management issues such as silviculture, logging, fire management, awareness-raising about the role of forests in protecting the environment and biodiversity, the role of forests in poverty reduction, gender equality, forest conservation, deforestation, etc.

Improve working conditions through the enforcement of labor inspection in the industry, the establishment of health and safety policies and management systems that systematically identify hazards and preventive measures as well as the promotion of health and safety requirements in all stages of forestry work, from planning to implementation.

Promote social dialogue and cooperation among stakeholders at all levels including with international institutions in adopting forestry work certification mechanisms in ensuring sustainable forest management as well as fostering transparent multi-stakeholder verification of compliance with forestry management standards.

Promote the ratification and effective implementation of relevant international labor standards, as well as the universal application of the fundamental principles and rights at work: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labor; the effective abolition of child labor; and the elimination of discrimination in respect of employment and occupation. This is a minimum step towards ensuring decent work in forestry.

ILO advises governments in the design, monitoring and implementation of policies relevant to decent work in the forestry sector. It also facilitates and strengthens social dialogue and builds the capacity of constituents, including through the dissemination and application of forestry-related tools on, for instance, occupational safety and health and labor inspection (ILO n.d.).

More recently ILO has also assessed the risks associated with the global economic crisis and its effects on jobs and food prices, advocating for a change towards a green economy. Job Opportunities for Youth (JOY) projects have been successfully implemented in a number of countries, including Malaysia, Indonesia and Peru, where ILO has worked with local governments and in conjunction with small farmers and entrepreneurs to promote decent work and green jobs for young women and men. As part of the JOY project in Indonesia, ILO conducted a study on labor conditions in forestry, drawing on the project's assessment of the importance of green jobs and their impact of youth employment policies (ILO n.d.).

For over 50 years, ILO has worked together with FAO and UNECE through the Joint FAO/UNECE/ILO Committee on Forest Technology, Management and Training to develop manuals and codes of practice, and other related documents. Additionally the FAO/ECE/ILO Experts Network was launched to implement Sustainable Forest Management and it has since organized seminars and workshops dealing with several issues of sustainable forest management in Europe, including the development of sustainable and competitive forestry operations, safety and health and good practices in contract labor (ILO 2011, ILO n.d.). In June 2014, ILO participated in the first meeting of the Team of Specialists on

Green Jobs in the Forest Sector, to develop guidelines, training materials and seminars on good practices in the coming years (ILO n.d.).

The International Programme on the Elimination of Child Labor (IPEC) created in 1992 with the overall goal of the progressive elimination of child labor, places particular attention to the forestry sector, where many children work. In Brazil, ILO has been working with federal and state governments in the fight against forced labor and the promotion of green jobs in the forestry sector. The project “Ending Forced Labor, Generating Green Jobs: an approach for the promotion of social inclusiveness and sustainable development in Brazil” was successfully implemented between 2011 and 2013, developing an approach that combines the reinforcement of labor inspection with the identification of alternative employment opportunities. ILO has worked towards the implementation of country activities in Indonesia, Malaysia and Peru to deal with illegal logging, create better jobs and working conditions, and protect fundamental rights at work. Additionally, ILO conducts regularly evaluations of its forestry sector projects (ILO 2011, ILO n.d.).

Governments could benefit partnering with ILO work to improve the voice and bargaining power of small-scale growers, small entrepreneurs and workers through workers’ organizations, cooperatives and through promotion of effective negotiations. A large part of this work in the forestry sector has been dedicated to facilitating and strengthening social dialogue, through holding meetings and workshops among its tripartite constituents in over 70 countries, including Brazil, Chile, China, Indonesia, Malaysia and Peru (ILO 2011, ILO n.d.). More countries could benefit from ILOs advise and collaboration to governments, employers and worker organizations to improve the working conditions and the productivity and hence the contribution of the forest sector to the SDGs.

## **5. Partnerships for fostering forest-based inclusive and economic growth and employment**

### **5.1 The crucial need for collaboration**

Economic development and population growth are increasing the demand for forest products and lands, hence the potential for conflicts, particularly in forested and poorer regions. This demand is projected to grow dramatically in the coming decades along with uncertain climate scenarios and other sort of disruptions (e.g. technology-driven unemployment) that would put additional pressure on people and forests. Furthermore, it is estimated that worldwide about two billion hectares of forest landscapes have been degraded or even lost, calling for growing investments in forest landscape restoration to reconcile social, economic and ecological benefits. Addressing these complex social and ecological challenges will demand effective partnerships, leadership, financing, skills and overall organizational changes. Never before humanity has been challenged to build its collective intelligence to jointly find solutions to global challenges. However, at the same time there is growing recognition that collaborative and integrated approaches are the most effective strategy for large scale social transformation.

In this regards, the UNSPF is well positioned as the first strategy that provides a global framework of roles and responsibilities for all actors at all levels to achieve the GFGs. The promotion of forest-based partnerships across sectors and stakeholders is key for achieving the GFGs and is defined in GFG 6 “Enhance cooperation, coordination, coherence and synergies on forest-related issues at all levels, including within the UN System and across Collaborative Partnership on Forests member organizations, as well as across sectors and relevant stakeholders”. GFG 6 calls for forest-related

programmes within the UN system to be coherent and complementary and integrate the GFGs and targets where appropriate (GFG 6.1); the same for Collaborative Partnership on Forests member organizations that together could encompass the multiple contributions of forests and the forest sector to the 2030 Agenda (GFG 6.2); cross-sectoral coordination and cooperation to promote sustainable forest management and halt deforestation and forest degradation at all levels (GFG 6.3); to achieve a greater common understanding of the concept of SFM and identify an associated set of indicators (GFG 6.4); and, to strengthen the input and involvement of major groups and other relevant stakeholders in the implementation of the UNSPF and in the work of UNFF.

## **5.2 Adaptive co-management**

There is a growing recognition that building trust, collaboration, institutional development, and social learning enhances efforts to foster ecosystem management and complex social–ecological dilemmas like the GFGs. Recognizing the need to foster the collaborative intelligence of the social systems, as proposed by Markova and McArthur (2015), adaptive co-management (ACM) have been implemented for three decades in different variations and in evolving forms. ACM is a governance approach for complex social–ecological systems that links the learning function of adaptive management (experimental and experiential) and the linking (vertically and horizontally) function of co-management (Plumer et al. 2012). Although the exact origin of the term ACM is unclear, according to Plumer et al. (2012) and R. Prabhu (personal communication November 22, 2018) it appears to have emerged in the course of a project at the Center for International Forestry Research (CIFOR) in 1997 (Ruitenbeek and Cartier 2001).

At that time some protected areas management initiatives had introduced the collaborative element (not necessarily the learning element at that time) and the International Model Forest Network (IMFN) started promoting ACM based on participatory, landscape-scale approach to the sustainable management of natural resources, particularly forests called model forests. The model forest approach offers an effective and flexible process that creates broad partnerships and represents the environmental, social and economic forces at play on the landscape, linked with national and international levels, offering a good example of institutional architecture for linking different spatial scales. The IMFN now includes more than 60 large scale landscapes in six regional networks covering 84 million hectares in 31 countries (IMFN, n.d. para. 1).

The ecosystem approach of the Convention of Biological Diversity has also been influential in the realization that integrated management of complex social-ecological system could be more effective if implemented at the landscape scale. In the early 2000s after the Mitch Huracan in Central America and acknowledging the need for further impact in watershed management projects, CATIE with financial support from the Swedish International Development Cooperation Agency (SIDA) along with local and national partners, proposed the adaptive co-management of watersheds as the necessary approach based on multi-stakeholder collaboration and learning for collective impact and inclusive governance mechanisms (Faustino et al. n.d).

Even though ACM approaches evolved at similar times in different regions of the world, the core features are common; they include innovative institutional arrangements and incentives across spatiotemporal scales and levels, learning through complexity and change, monitoring and assessment of interventions, the role of power, and opportunities to link science with policy (Plumer et. al. 2012, Faustino et al. n.d.). Barriga-Machicao and Campos (2011) compared three landscape scale ACM initiatives in Latin America: model forests, watershed management and biological corridors, and found

that the core elements of ACM were: shared vision, effective governance, financial mechanisms, learning process, and partnerships. A systematic review of 108 published items on ACM since the year 2000 concluded that although it is not a governance panacea and must be tailored to specific contexts, ACM is recognized as having the potential to address the problem of “fit” by enhancing the congruence between social institutions and biophysical systems, become an agent of governance that is good, right, and authentic as well as an arena in which to embrace uncertainty, and, build adaptive capacity (Plumer et al. 2012).

Not surprisingly, other sectors have also come to the same conclusion about the need for collaborative approaches for social transformation at scale. For example, the Stanford Social Innovation Review proposed collective impact as an approach to deal with complex issues for large scale social change in the Anthropocene. The core elements of the collective impact approach are not much different from those of ACM and include: common agenda; shared measurement systems; mutually reinforcing activities; continuous communication; and, backbone support organizations (Kania and Kramer 2011).

ACM, landscape approaches and collective impact all rely on the power of collaboration to foster collective action for a shared agenda, facilitated by inclusive governance mechanisms that provide the space for managing trade-offs and synergies.

### **5.3 Integrated landscape management**

Other approaches have evolved after ACM including integrated landscape approaches (ILA). ILA offer opportunities for engaging multiple stakeholders to work together and manage conflicts (Reed et al. 2015). Many tradeoffs are best addressed at these meso-scales, and much progress is being achieved through integration of multiple uses in mosaic landscape. Achieving better outcomes at this scale has been difficult for existing sectoral institutions, but the solution is not to replace those institutions but to facilitate the interactions among them and equip them to negotiate between conflicting and competing goals (Sayer and Cossman 2013). This will require an evolution in our level of consciousness to acknowledge that impact requires a great deal of collaborative leadership for collective impact.

There are several international partnerships promoting forest-based integrated landscape management at national and international levels such as the International Union of Forest Research Organizations (IUFRO), a global network for forest science cooperation of more than 15,000 scientists in almost 700 member organizations in over 110 countries; the Landscapes for People, Food and Nature Initiative, a global network of more than 70 conservation, development, and agriculture organizations; and the Global Partnership for Forest Landscape Restoration with over 30 governments and international and non-governmental organizations. These partnerships include several CPF members and hence offer a great opportunity for achieving GFG 6.

In a world where around, 30 percent of global forest cover has been completely cleared and a further 20 percent has been degraded, there is a growing movement for restoring forest landscapes. The Bonn Challenge, with its regional efforts, is the biggest initiative supported by governments, investors, NGOs and other players to bring 150 million hectares of deforested and degraded land into restoration by 2020 and 350 million hectares by 2030. It was launched in 2011 by the Government of Germany and IUCN, and later endorsed and extended by the New York Declaration on Forests at the 2014 UN Climate Summit. Underlying the Bonn Challenge is the forest landscape restoration approach (FLR), which aims to restore ecological integrity at the same time as improving human well-being through multifunctional landscapes. According to the Bonn Challenge, the restoration of 150 million hectares of degraded and deforested lands in biomes around the world – in line with the FLR approach – will

create approximately USD 84 billion per year in net benefits that could bring direct additional income and employment opportunities for rural communities. About 90 per cent of this value is potentially tradable, meaning that it encompasses market-related benefits. Achieving the 350 million hectare goal will generate about USD170 billion per year in net benefits from watershed protection, improved crop yields and forest products, and could sequester up to 1.7 gigatons of carbon dioxide equivalent annually (Bonn Challenge, A Global Effort. Para. 1 & 2).

The Global Partnership for Forest Landscape Restoration (GPFLR) recently estimated the world's extent of degraded land available for restoration and found that restoration offers opportunities with the potential to make real improvements to human lives and environmental quality. The GPFLR that was established to support governments, the private sector, local communities and others in their restoration efforts, is another example of a partnership that drawing together political support, financial muscle and the entrepreneurship of the private sector and massively scale up restoration from promising pilot initiatives to an area of many millions of hectares. This Partnership could benefit with more climate finance and private capital to flow into restoration projects to complement domestic budget allocations (Besseau et al. 2018).

#### **5.4 Leveraging financial investments**

Creating a successful collective impact initiative at the scale needed requires significant financial investment combined with proper knowledge, human resources and policies. Funding for FLR is increasing, however, meeting global targets and unlocking all the benefits of restoration requires significantly higher levels of investment. Estimates suggest that more than \$837 billion are needed to reach the 350 million hectare restoration target by 2030 (FAO and Global Mechanism of the UNCCD, 2015). According to the World Bank (2014) the required funding for SFM is estimated to be between \$70 billion and \$160 billion per year globally. Whatever figure we choose, mobilizing adequate financing to realize the potential role of the forest sector in the aspirations of Agenda 2030 remains a challenge.

While private financing is promising, it is not yet distributed evenly across regions. In many developing countries it has yet to materialize. Private sector investment in the forest sector in developing countries is seven times greater than the total official development assistance -ODA- (about \$US1.5 billion) for the forest sector. Therefore it is essential to engage the private sector – including small and medium forest enterprises – to achieve inclusive green growth. OECD proposes blended finance that by integrating public and private funds could significantly contribute not only to the financing needed but also to bringing together multiple players that could enhance the potential for impact at scale needed to achieve the SDGs (OECD 2018).

ODA and multilateral development banks (MDB) investments could contribute by supporting new partnerships, leveraging and engaging the private sector, centers of excellence on forestry, SMEs and local governments. There is also a need to socialize new knowledge and management practices that are inclusive, that find its ways into policies, and that local governments feel integrated in the overall benefits for their communities through sustainable forestry development. They could also contribute by unlocking the potential of small- and medium- forest enterprises (SMFEs) to generate wealth and jobs. SMFEs are the primary source of forest sector employment in most developing countries. They account for 80–90 % of formal and informal employment in all forest enterprises and meet a large share of domestic timber demand. Organizing efficient and sustainable value chains, better linking

products to markets, and supporting a good business environment are some steps to sustainably unlocking the economic potential of forests (World Bank 2014).

ODA and MDB could help countries overcome barriers that limit plantations so that they can meet the growing demand for forest products and services, while providing income and employment in rural and poor areas. Examples of such work include: clarifying land tenure rights, improving smallholders' technical and financial knowledge, and providing access to market information. For example, the World Bank is supporting public-private initiatives to establish, manage and harvest plantations on government-owned land. It is also helping build attractive business climate for private investors and setting high standards for responsible investments. MDB, as the World Bank could work with governments to define a regulatory framework that enables investors to conduct economically, socially and environmentally sound activities in the forest sector (World Bank 2014).

## 6. Recommendations

UNFF, governments and CPF should continue generating and disseminating knowledge and informing key decision makers and civil society about the role forests play for achieving the SDGs, particularly for the 1.6 billion people who depend on forests for subsistence, livelihoods, employment and income generation, and its contribution to the national and local economies (GFG 2.1, SDG 8).

UNFF, governments, donors and CPF should support the exchange of experiences and develop the capacities of key stakeholders at all levels for collective impact, inclusive governance arrangements and adaptive learning through integrated landscape management, restoration and value chains. Collaborative approaches and leadership will be critical to realize the capacities and assets of multiple players, for transformational changes at the scale and speed needed (GFG 4.3, SDG 17).

To end poverty and food insecurity and advance towards a sustainable society, governments should further develop policies that secure tenure rights and equal benefit sharing for the poor and vulnerable, including indigenous people, landless farmers, rural women and youth. These policies should facilitate access to markets and better prices by accessing the formal economy, PES, credit and other sources of financing, including blended finance (SDGs 8, 17). The generation of knowledge about forest ownership is key to better understand who controls forest use and management, and who benefits or loses from their variety of products and services.

Governments should continue supporting the devolution of rights to local actors over forests, especially through community-based management and the development of locally-controlled forest enterprises (LCFEs). Interventions could range from policies to secure land tenure, inclusive territorial planning, avoid overregulation, public and private sector investment, access to credit, information technology, capacity building for social organization and enterprise development, equal benefit sharing and learning. UNFF and CPF members could support LCFEs within the global development agenda (GFGs 2.1, 2.2, 2.3, 2.4, 6.3, SDGs 8, 17).

Agenda 2030 has potential for transformational change through the realization of synergies among the SDGs and forests play a prominent role in its success through collaborative intersectoral planning and leadership. Policy nexus such as forests and ecosystem services and livelihoods, forests and the green economy, and, forests and rights, justice, equality and inclusion, could guide priority setting to address tradeoffs and mobilize synergies with other SDGs. Governments could promote integrated, innovative, inclusive and collaborative governance systems across sectors. Integrated landscape

management and restoration and sustainable value chains can facilitate collaboration between actors of different sectors (GFG 6.3, SDG 17).

Collaboration between the forest and agricultural sector is needed for addressing the main drivers of deforestation, while at the same time enhancing the role forests play for FSN, especially for people living in remote areas. To accomplish the ambition of ending hunger and poverty, sectoral ministries could ensure policy coherence across governments, integrating strategies that deal with forests, agriculture, food, land use, and rural and national development. The UNFF, CPF and the Global Landscapes Forum could play a facilitating role fostering this intersectoral collaboration (GFGs 2.3, 6.3, SDG 17).

UNFF, governments, donors and CPF could support forest-based solutions for sustainable water resources management. Clear mandates from the highest policy level can significantly accelerate the uptake of FBS and foster improved intersectoral cooperation that is critical for ensuring the delivery of co-benefits for inclusive and sustainable development at the local, national and global levels (GFG 6.3, SDG 17).

Enhanced financing, knowledge transfer, policy/institutional changes, market development and regulatory mechanisms are needed to increase the contribution of forests to renewable energy and to ensure the poor participate in this new economy, particularly in developing countries (GFG6.3, SDG17).

Governments, CPF and academic institutions should support the development of wood-based products and their markets as strategies to move away from reliance on carbon-intensive materials and hence as an climate change mitigation option. These strategies should contribute to enhance income and employment in rural economies. National policies and NDCs could create proper conditions and solutions for sustainable wood production, taking into consideration all actors in value chains, especially the most marginalized, ensure property rights and access to legal sources of wood and NWFP (GFGs 2.1,2.4,6.3, SDGs 8, 17).

Sustainable consumption that entails moving from efficiency improvements to lifestyle changes, to broader culture changes, to sociotechnological system changes is a requirement for a more sustainable future. This would need deeper levels of system change, including, interventions and policies to move from relative decoupling via technological improvements, to strategies to change the behavior of individual consumers, to broader initiatives to change systems of production and consumption. National-level interventions can include a range of incentives (e.g. tax policies, benefit-sharing, payment for ecosystem services), disincentives (e.g. moratoria, fees) and enabling measures (e.g. adequate governance, enforcement, policies and land-use planning, secure tenure rights). Local-level interventions need to be suited to local conditions considered within the context of national forest policies and plans to ensure the right incentives, enabling conditions, and policy levers are in place (GFG 6.3, SDG 17).

Balancing the increasing demands for land and forests through SFM and forest landscape restoration (FLR) will be critical for ensuring remaining and new forests are managed effectively to balance multiple objectives pertaining to timber production, social outcomes and environmental concerns, such as high quality employment and a vibrant forest-based economy as an alternative to those who would otherwise migrate to urban. Governments could develop locally appropriate policies and governance structures to support SFM and FLR planning and implementation, incorporate local needs and enforce regulations and the proactive engagement of the private sector and blended finance. SFM and FLR also offers potential for (GFGs 2.1, 4.3, 6.3, SDG 8, 17).



A sustainable future path for humanity must be based on decoupling economic growth from nature and forests degradation, and countries could benefit by fostering smart development approaches that recognize forests' significance for sustaining economic growth across many sectors. Based on countries REDD+ readiness plans, policies aim at strengthening forest sector governance and institutions, land tenure, combat illegal logging, and improve cross-sectoral coordination and collaboration to ensure agricultural intensification does not increase forest clearing. Activities at the landscape and farm scale could include agroforestry, afforestation, reforestation and assisted natural regeneration. When designing interventions countries could explore synergies to understand how addressing one driver affects other underlying drivers. UNFF could support with strategies and interventions to address international drivers and market forces, particularly commodity markets through zero deforestation (GFGs 2.2, 2.4, 4.3, 6.3, SDG 17).

Governments and employers of the forest sector should address decent work deficits such as low wages and productivity, widespread informality, significant gender equality gaps, low unionization rates, highly hazardous work, lack of job security, and inadequate occupational safety and health conditions. Formal and non-formal training programs should also be implemented to improve productivity, job security and reduce environmental impact (SDG 8, 17).

UNFF, governments and CPF should continue using the UNSPF and the GFGs for the design and implementation of partnerships for collaboration within and across sectors to promote forest-smart solutions that support development outcomes to halt deforestation and forest degradation and contribute to FSN, water management, green growth, and climate change, enhancing the multiple contributions of forests and the forest sector to the 2030 Agenda (GFGs 6.1, 6.2, 6.3, 6.4).

## References

- Arun Agrawal, Ben Cashore, Rebecca Hardin, Gill Shepherd, Catherine Benson and Daniel Miller. 2013. Economic contributions of forests. Background Paper 1. United Nation Forum on Forests. 10<sup>th</sup> Session. Istanbul, Turkey. Retrieved October 2018 from [http://www.un.org/esa/forests/pdf/session\\_documents/unff10/EcoContrForests.pdf](http://www.un.org/esa/forests/pdf/session_documents/unff10/EcoContrForests.pdf)
- Barriga-Machicao, M.M. and Campos A., J.J. 2011. Gobernanza ambiental, adaptativa y colaborativa en bosques modelo, cuencas hidrográficas y corredores biológicos. Editorial Académica Española. LAP LAMBERT Academic Publishing GmbH & Co. KG. Alemania.
- Besseau, P., Graham, S. and Christophersen, T. (eds.), 2018. Restoring forests and landscapes: the key to a sustainable future. Global Partnership on Forest and Landscape Restoration, Vienna, Austria.
- Bonn Challenge. A Global Effort. Para. 1 & 2. Retrieved November 2018 from <http://www.bonnchallenge.org/content/challenge>
- Bull, G. 2018. Forest and energy. Background Analytical Study 3 prepared for the thirteenth session of the United Nations Forum on Forests April 2018. UNFF. Retrieved on December 2018 from [https://www.un.org/esa/forests/wp-content/uploads/2018/04/UNFF13\\_BkgStudy\\_ForestsEnergy.pdf](https://www.un.org/esa/forests/wp-content/uploads/2018/04/UNFF13_BkgStudy_ForestsEnergy.pdf)
- Carter S., Martin Herold, Valerio Avitabile, Sytze de Bruin, Veronique De Sy, Lammert Kooistra and Mariana C Rufino. 2018. Agriculture-driven deforestation in the tropics from 1990–2015: emissions, trends and uncertainties. Environ. Research Letters. Retrieved October 2018 from <http://iopscience.iop.org/article/10.1088/1748-9326/aa9ea4/meta>
- Committee on World Food Security. 2014. Principles for Responsible Investment Agriculture and Food Systems. FAO, IFAD and WFP. Rome. Retrieved November 2018 from <http://www.fao.org/3/a-au866e.pdf>
- Convention on Biological Diversity. n.d. COP 5 Decision V/6. Ecosystem Approach. para. 1. Retrieved November 2018. <https://www.cbd.int/decision/cop/?id=7148>
- Crespo Cuaresma, J., Danylo O., Fritz S., McCallum I., Obersteiner M. See L., Wash B. 2007. Economic Development and Forest Cover: Evidence from Satellite Data. *Sci. Rep.* **7**, 40678; doi: 10.1038/srep40678 (2017). Retrieved October 2018 from <https://www.nature.com/articles/srep40678>
- CREAST. 2018. The Case for Responsible Travel: Trends & Statistics 2018. Center for Responsible Travel. Washington D.C. Retrieved November 2018 from [https://www.responsibletravel.org/docs/The\\_Case\\_for\\_Responsible\\_Travel\\_2018\\_FINAL\\_FOR\\_WEB.pdf](https://www.responsibletravel.org/docs/The_Case_for_Responsible_Travel_2018_FINAL_FOR_WEB.pdf)
- CREAST. 2017. The Case for Responsible Travel: Trends & Statistics 2017. Center for Responsible Travel. Washington D.C. Retrieved November 2018 from [https://www.responsibletravel.org/docs/The%20Case%20for%20Responsible%20Travel%202017\\_Final%20for%20Release.pdf](https://www.responsibletravel.org/docs/The%20Case%20for%20Responsible%20Travel%202017_Final%20for%20Release.pdf)
- deMarsh, P., Boscolo, M., Savenije, H., Grouwels, S., Zapata, J., Campbell, J. and Macqueen, D., 2014. Making Change Happen. What can governments do to strengthen forest producer organizations? Rome,

FAO, the Forest and Farm Facility, Tropenbos International and the International Family Forestry Alliance. Retrieved November 2018 from <http://www.fao.org/3/a-h0038e.pdf>

De Royer, S .; Van Noordwijk, M .; Roshetko, JM. 2018. Does community-based forest management in Indonesia devolve social justice or social costs? *International Forestry Review* , Volume 20, Number 2, June 2018, pp. 167-180 (14). Retrieved December 2018 from <https://doi.org/10.1505/146554818823767609>

Donofrio S., Philip Rothrock, and Jonathan Leonard. 2017. *Supply Change: Tracking Corporate Commitments to Deforestation-free Supply Chains, 2017* (Washington, DC: Forest Trends, 2017). Retrieved November 2018 from [https://www.forest-trends.org/wp-content/uploads/2018/04/2017SupplyChange\\_Trackin-Committments.pdf](https://www.forest-trends.org/wp-content/uploads/2018/04/2017SupplyChange_Trackin-Committments.pdf)

Dubiez E., Karsenty A., Dessard H. and Gazull L. 2016. Decoupling deforestation from commercial farming development: combining territorial and zero deforestation approaches. Discussion Paper. CIRAD. Retrieved October 2018 from [http://agritrop.cirad.fr/582631/1/Decoupling\\_eng\\_PFBC%20Kigali.pdf](http://agritrop.cirad.fr/582631/1/Decoupling_eng_PFBC%20Kigali.pdf)

Ellison D., Morris C.E., Locatelli B., Sheil D., Cohen J., Murdiyarso D., Gutierrez V., van Noordwijk M., Creed I.F., Pokorny J., Gaveau D., Spracklen D.V., Bargaés-Tobella A., Ilstedt U., Teuling A.J., Gebreyohannis-Gebrehiwot S., Sands D.C., Muys B., Verbist B., Springgay E., Sugandi Y., Sullivan C.A. 2017. Trees, forests and water: Cool insights for a hot world. *Global Environmental Change*. Volume 43. Pages 51-61. Retrieved November 2018 from <http://www.sciencedirect.com/science/article/pii/S0959378017300134>

Ellison, D. 2018. *Forests and Water. Background Analytical Study 2* prepared for the thirteenth session of the United Nations Forum on Forests April 2018. UNFF. Retrieved on December 2018 from [https://www.un.org/esa/forests/wp-content/uploads/2018/04/UNFF13\\_BkgdStudy\\_ForestsWater.pdf](https://www.un.org/esa/forests/wp-content/uploads/2018/04/UNFF13_BkgdStudy_ForestsWater.pdf)

Ellison, D. , N. Futter, M. and Bishop, K. 2012. On the forest cover–water yield debate: from demand- to supply-side thinking. *Global Change Biology*, 18: 806-820. doi:10.1111/j.1365-2486.2011.02589.x Retrieved November 2018 from <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2486.2011.02589.x>

Elmahdy, Y.M., Haukeland, J.V. & Fredman, P. 2017. Tourism megatrends, a literature review focused on nature-based tourism. - MINA fagrapport 42. 74 pp. Retrieved October 2018 from <https://nordnorge.com/sites/n/nordnorge.com/files/081d39beb85dc150a68977de4cf37f31.pdf>

FAO. 2018. *The State of the World's Forests 2018 - Forest pathways to sustainable development*. Rome. Retrieved October 2018 from <http://www.fao.org/3/I9535EN/i9535en.pdf>

FAO. 2016. *Global Forest Resources Assessment 2015. How are the world's forests changing? Second edition*. Rome. Retrieved October 2018 from <http://www.fao.org/3/a-i4793e.pdf>

FAO. 2014. *Contribution of the forestry sector to national economies, 1990-2011*, by A. Lebedys and Y. Li. Forest Finance Working Paper FSFM/ACC/09. FAO, Rome. Retrieved October 2018 from <http://www.fao.org/3/a-i4248e.pdf>

- FAO. 2013. Forests and water: international momentum and action. Rome. Retrieved November 2018 from <http://www.fao.org/3/a-i3129e.pdf>
- FAO. 2014. Forest and water: a five-year action plan. Forest and Water Programme. Rome. Retrieved November 2018 from <http://www.fao.org/forestry/43810-05bc28890480b481d4310a3c5fe8a1003.pdf>
- FAO. 2002. Forest Genetic Resources, International and Australian perspectives. Paper prepared by Christel Palmberg-Lerche, August 2000. Forest Genetic Resources Working Papers, Working Paper FGR/36E (September 2002). Forest Resources Development Service, Forest Resources Division. FAO, Rome. Retrieved November 2018 from <http://www.fao.org/docrep/005/AC547E/ac547e02.htm#bm02>
- FAO & Global Mechanism of the UNCCD. 2015. Sustainable financing for forest and landscape restoration: Opportunities, challenges and the way forward. Discussion paper. Rome. Retrieved November 2018 from <http://www.fao.org/3/a-i5174e.pdf>
- Faustino J., Jimenez F. and Campos J. (n.d). La co-gestión de cuencas hidrográficas en América Central. Grupo de Reflexión en Gestión de Cuencas Hidrográficas en América Central. CATIE-ASDI. Retrieved November 2018 from <https://www.portalces.org/sites/default/files/migrated/docs/1104.pdf>
- Gupta J., Pouw N.R.M., and Ros-Tonen M.A.F. 2015. Towards an elaborated theory of inclusive development. European Journal of Development Research. Vol. 27, 4, 541-559. Retrieved October 2018 from <http://dare.uva.nl/search?identifier=3e841bd9-8717-4f49-ac17-ae259554ef3b>
- [Gustavsson L.](#), Haus S., [Lundblad M.](#), [Lundström A.](#), [Ortiz C.A.](#), Sathre R., [LeTruong N.](#) and [Wikberg, P.E.](#) 2017. Climate change effects of forestry and substitution of carbon-intensive materials and fossil fuels. Renewable and Sustainable Energy Reviews. [Volume 67](#), January 2017, Pages 612-624.
- Haretsebe M. and Farai M. 2014. Poverty Alleviation through Pro-Poor Tourism: The Role of Botswana Forest Reserves. Sustainability, Volume 6. 2014. 9. Pages 5697-5713. Retrieved November 2018 from <http://www.mdpi.com/2071-1050/6/9/5697>
- HLPE. 2017. Sustainable forestry for food security and nutrition. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome. Retrieved October 2018 from <http://www.fao.org/3/a-i7395e.pdf>
- Hoff, H. (2011). Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus. Stockholm Environment Institute, Stockholm. Retrieved November 2018 from [http://wef-conference.gwsp.org/fileadmin/documents\\_news/understanding\\_the\\_nexus.pdf](http://wef-conference.gwsp.org/fileadmin/documents_news/understanding_the_nexus.pdf)
- Hurmekoski E., Jonsson R., Korhonen J., Jänis J., Mäkinen M., Leskinen P., Hetemäki L. 2018. Diversification of the forest industries: role of new wood-based products. Canadian Journal of Forest Research, 2018, 48(12): 1417-1432. Retrieved on December 2018 from <https://doi.org/10.1139/cjfr-2018-0116>

ILO. 2015. Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204). Genève. Retrieved October 2018 from [https://www.ilo.org/employment/units/emp-invest/informal-economy/WCMS\\_443501/lang--en/index.htm](https://www.ilo.org/employment/units/emp-invest/informal-economy/WCMS_443501/lang--en/index.htm)

ILO. 2011. International Year of Forests 2011: What about the labor aspects of forestry? International Labor Office. Genève. Retrieved October 2018 from [https://www.ilo.org/wcmsp5/groups/public/---ed\\_dialogue/---sector/documents/publication/wcms\\_160879.pdf](https://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_160879.pdf)

ILO (n.d.). Decent work in forestry. Decent Work in the Rural Economy. Policy Guidelines. International Labor Office. Genève. Retrieved October 2018 from [http://www.ilo.org/wcmsp5/groups/public/---ed\\_emp/---emp\\_policy/documents/publication/wcms\\_437197.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_policy/documents/publication/wcms_437197.pdf)

INDUFOR. 2018. Scaling Up Locally Controlled Forest Enterprises. Final Report for the Rights and Resources Initiative. August 2018. Washington DC.

International Model Forest Network. (n.d.). Retrieved November 2018 from <http://www.imfn.net/international-model-forest-network>

IPCC: 2018. Global Warming of 1.5 °C; an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policymakers. October 2018. 33 p. Retrieved October 2018 from [http://report.ipcc.ch/sr15/pdf/sr15\\_spm\\_final.pdf](http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf)

Kania, J. and Kramer, M. 2011. Collective impact. Stanford Social Innovation Review. Winter 2011. Retrieved November 2018 from [https://ssir.org/images/articles/2011\\_WI\\_Feature\\_Kania.pdf](https://ssir.org/images/articles/2011_WI_Feature_Kania.pdf)

Kissinger, G., M. Herold, V. De Sy. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver Canada, August 2012. Retrieved October 2018 from [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/65505/6316-drivers-deforestation-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65505/6316-drivers-deforestation-report.pdf)

Laurance W.F., Sayer J., Cassman K.G. 2014. Agricultural expansion and its impacts on tropical nature. Trends in Ecology and Evolution. Volume 29.

Macqueen D., Buss C. and Sarroca T. 2012. Investing in Locally Controlled Forestry. A Review of TFD's Initiative on Investing in Locally Controlled Forestry 2009-2012. TFD Publication Number 7 2012. The Forests Dialogue, New Haven, USA. Retrieved October 2018 from [https://theforestdialogue.org/sites/default/files/tfdreview\\_ilcf\\_final\\_lo-res.pdf](https://theforestdialogue.org/sites/default/files/tfdreview_ilcf_final_lo-res.pdf)

Mansourian S., Wildburger, C. and Purret A. (editors). n.d. Forest and Water on a Changing Planet: Scientific Insights for Achieving the United Nations' Sustainable Development Goals. Policy Brief based on the report "Forest and Water on a Changing Planet: Vulnerability, Adaptation and Governance Opportunities. A Global Assessment Report" published as IUFRO World Series Volume 38. IUFRO.

Markova D. and McArthur A. 2015. Collaborative intelligence: thinking with people who think differently. Spiegel and Grau. New York.

Melis AP. 2013. The evolutionary roots of human collaboration: coordination and sharing of resources. *Annals New York Academy of Sciences*. 2013 Sep;1299:68-76. doi: 10.1111/nyas.12263. Review.

OECD (2018), Making Blended Finance Work for the Sustainable Development Goals, OECD Publishing, Paris. Retrieved November 2018 from <https://doi.org/10.1787/9789264288768-en>.

O'Rourke D. and Lollo N. 2015. Transforming Consumption: from decoupling, to behavior change, to system changes for sustainable consumption. *Annual Review of Environment and Resources* 2015 40:1, 233-259

Plummer, R., B. Crona, D. R. Armitage, P. Olsson, M. Tengö, and O. Yudina. 2012. Adaptive comanagement: a systematic review and analysis. *Ecology and Society* 17(3): 11.

<http://dx.doi.org/10.5751/ES-04952-170311>. Retrieved November 2018 from [file:///Users/josecampos/Downloads/ES-2012-4952%20\(1\).pdf](file:///Users/josecampos/Downloads/ES-2012-4952%20(1).pdf)

[PROFOR. n.d. Forest smart brief on forest sector small and medium size enterprises: Unlocking the potential of forest sector small and medium enterprises.](#) Retrieved on December 2018 from [https://www.profor.info/sites/profor.info/files/PROFOR\\_Brief\\_ForestSMEs.pdf](https://www.profor.info/sites/profor.info/files/PROFOR_Brief_ForestSMEs.pdf)

Randers J, Rockström J, Espen Stoknes P, Golüke U, Collste D, and Cornell S. 2018. Transformation is feasible; How to achieve the Sustainable Development Goals within Planetary Boundaries. Stockholm Resilience Centre. Report to the Club of Rome. 58 p. Retrieved October 2018 from <https://www.stockholmresilience.org/publications/artiklar/2018-10-17-transformation-is-feasible---how-to-achieve-the-sustainable--development-goals-within-planetary-boundaries.html>

Rasolofoson R., Hanauer M., Pappinen A., Fisher B., Ricketts T. 2018. Effects of forests on children's diets in developing countries: a cross-sectional study. *The Lancet Planetary Health*, Volume 2, Supplement 1, 2018. Page S15. Retrieved October 2018 from <https://www.sciencedirect.com/science/article/pii/S2542519618301001?via%3Dihub>

Reed J., van Vianen J., Deakin E.L., Barlow J. and Sunderland T. 2016. Integrated landscape approaches to managing social and environmental issues in the tropics: learning from the past to guide the future. *Global Change Biology* (2016) 22, 2540–2554. Retrieved October 2018 from <https://onlinelibrary.wiley.com/doi/abs/10.1111/gcb.13284>

Ruitenbeek J. and Cartier C. 2001. The invisible wand: adaptive co-management as an emergent strategy in complex bio-economic systems. Occasional Paper No. 34. CIFOR. Indonesia. Retrieved on November 2018 from [http://www.cifor.org/publications/pdf\\_files/occpapers/op-034.pdf](http://www.cifor.org/publications/pdf_files/occpapers/op-034.pdf)

Sayer J and Cassman K.g. Agricultural innovation to protect environment. 2013. *Proceedings of the National Academy of Sciences* May 2013, 110 (21) 8345-8348; DOI:10.1073/pnas.1208054110 Retrieved October 2018 from <http://www.pnas.org/content/110/21/8345>)

Sayer J., Sunderland T., Ghazoul J., Pfund J.L., Sheil D., Meijaard E., Venter M., Boedhihartono A.K., Day M., Garcia C. van Oosten C., and Buck L.E. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proceedings of the National Academy of Sciences* May 2013, 110 (21) 8349-8356; DOI:10.1073/pnas.1210595110

Soto Golcher and Visseren-Hamakers. 2018. Framing and integration in the global forest, agriculture and climate change nexus. *Environment and Planning C: Politics and Space*. Theme Issue: Integrative Governance. 0(0) 1–22. U.K. Retrieved November 2018  
from [https://www.researchgate.net/publication/326553129\\_Framing\\_and\\_integration\\_in\\_the\\_global\\_forest\\_agriculture\\_and\\_climate\\_change\\_nexus](https://www.researchgate.net/publication/326553129_Framing_and_integration_in_the_global_forest_agriculture_and_climate_change_nexus)

Sunderland, T., Powell, B., Ickowitz, A., Foli, S., Pinedo-Vasquez, M., Nasi, R. and Padoch, C. 2013. Food security and nutrition: The role of forests. Discussion Paper. CIFOR, Bogor, Indonesia.

The Economics of Ecosystems and Biodiversity (TEEB) (2018). TEEB for Agriculture & Food: Scientific and Economic Foundations. Geneva: UN Environment. Retrieved November 2018  
from [http://teebweb.org/agrifood/wp-content/uploads/2018/10/Layout\\_synthesis\\_sept.pdf](http://teebweb.org/agrifood/wp-content/uploads/2018/10/Layout_synthesis_sept.pdf)

Timko J., Le Billion P., Zerriffi H., Honey-Rosés J., la Roche I., Gaston C., Sunderland T., and Akozak R. 2018. A policy nexus approach to forests and the SDGs: tradeoffs and synergies. *Current Opinion in Environmental Sustainability*. Volume 34, October 2018, Pages 7-12. Retrieved November 2018  
from <https://www.sciencedirect.com/science/article/pii/S187734351730266X?via%3Dihub>

UNECE and FAO. 2009. The Forest Sector in the Green Economy. Geneva Timber and Forest Discussion Paper 54. United Nations. Geneva. Retrieved November 2018 from  
<https://sustainabledevelopment.un.org/content/documents/807DP-54.pdf>

UNFF. 2015. Ministerial Declaration of the High-Level Segment of the Eleventh Session of the United Nations Forum on Forests, International Arrangement on “The Forests We Want: Beyond 2015”. New York, USA: ECOSOC, p. 4. Retrieved October 2018  
from <https://www.un.org/ecosoc/sites/www.un.org.ecosoc/files/documents/2015/dec.2015254.pdf>

UNWTO. 2018. 2017 Annual Report. World Tourism Organization. UNWTO. Madrid. Retrieved November 2018 from <https://www.e-unwto.org/doi/pdf/10.18111/9789284419807>

Waters, C.N., Zalasiewicz J., Summerhayes C., Barnosky A.D., Poirier C., Gałuszka A., Cearreta A., Edgeworth M., Ellis E.C, Ellis M., Jeandel C., Leinfelder R., McNeill J. R., Richter D.dB, Steffen W., Syvitski J., Vidas D., Wapreisch M., Williams M., Zhisheng A., Grinevald J., Odada E., Oreskes N., Wolfe A.P. The Anthropocene is functionally and stratigraphically distinct from the Holocene. *Science* 08 Jan 2016: Vol. 351, Issue 6269, aad2622

Waters, C. N., Zalasiewicz, J. A., Williams, M., Ellis, M. A. & Snelling, A. M. (eds). 2014. A Stratigraphical Basis for the Anthropocene. Geological Society, London, Special Publications, 395. 24 March 2014.  
Downloaded from <http://sp.lyellcollection.org/> by guest on December 6, 2018

Whitmee S., Prof Andy Haines, FMedSci, Prof Chris Beyrer, MD, Frederick Boltz, PhD, Prof Anthony G Capon, PhD, Bráulio Ferreira de Souza Dias, PhD, Alex Ezeh, PhD, Howard Frumkin, MD, Prof Peng Gong, PhD, Peter Head, BSc, Richard Horton, FMedSci, Prof Georgina M Mace, DPhil, Robert Marten, MPH, Samuel S Myers, MD, Sania Nishtar, PhD, Steven A Osofsky, DVM, Prof Subhrendu K Pattanayak, PhD, Montira J Pongsiri, PhD, Cristina Romanelli, MSc, Agnes Soucat, PhD, Jeanette Vega, MD, Derek Yach, MBChB. 2015. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health. The Lancet. Elsevier.  
DOI:[https://doi.org/10.1016/S0140-6736\(15\)60901-1](https://doi.org/10.1016/S0140-6736(15)60901-1)

World Bank. 2016. Brief. Retrieved November 2018  
from <http://www.worldbank.org/en/topic/forests/brief/forests-generate-jobs-and-incomes>

WWAP (United Nations World Water Assessment Programme)/UN-Water. 2018. The United Nations World Water Development Report 2018: Nature-Based Solutions for Water. Paris, UNESCO.

Zalasiewicz J., Waters C.N., Williams M., Barnosky A.D., Cearreta A., Crutzen P., Ellis E., Ellis M.A., Fairchild I.J., Grinevald J., Haff P.K., Hajdas I., Leinfelder R., McNeill J., Odada E.O., Poirier C., Richter D., Steffen W., Summerhayes C., Syvitski J.P.M., Vidas D., Wagemann M., Wing S.L., Wolfe A.P., Zhisheng A., Oreskes N.. When did the Anthropocene begin? A mid-twentieth century boundary level is strategically optimal. *Quaternary International*, Volume 383, 5 October 2015, Pages 196-203.

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