

REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

N°31 | Spring 2019



Cities4Forests

Connecting cities
and forests around
the world. p. 35

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TAKE THE INITIATIVE!

Applying environmental legislation.

#EUGreenWeek

13-17 May 2019

#EUGreenWeek 2019, 13-17 May

Environmental laws have a huge impact on our life. They improve water and air quality, they protect nature, and they encourage recycling and waste management. But to really make an appreciable difference, these EU laws have to be properly implemented.

The next edition of EU Green Week will put this process of environmental implementation into the spotlight. Following on the findings of the 2nd Environmental Implementation Review, which the European Commission will publish in March 2019, we'll be asking questions such as do these laws really matter, and what are the added benefits for citizens? How can we move from knowing that stakeholders need to take ownership of these laws to actually making it happen? And most importantly, how can the EU facilitate the process, making sure that citizens' voices are heard?

EU Green Week 2019 will include events across Europe, with the official opening event on 13 May in Warsaw and a high-level summit in Brussels from 15 to 17 May.

How can you participate?

1. Organise or attend one of many partner events that will be happening across Europe from April to June. The call for proposals for Partner Events is now online, you can register on the website: <https://www.eugreenweek.eu/en/register-your-partner-event>. For more information on partner events, check the guidelines on the partner events page.
2. Join us in Brussels at the conference which will take place from 15 to 17 May. Registration for participation at the Brussels conference will open at the end of March 2019.
3. Visit [eugreenweek.eu](https://www.eugreenweek.eu) or follow EU Environment on Twitter (@EU_ENV) to stay updated!



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Thanks for reading REVOLVE
Learn more at: revolve.media

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Forests Simply Provide Better Health

Forests are essential to people and the planet.

72% of Europeans live in a city or urban area. Bettering the quality of life, forests have huge value in the urban environment. Everyone has a favourite park, a favourite bike track, picnic spot or walking trail. Our ease in associating trees with happiness is an illustration of the important relationship between cities and forests: they are good for our mental health and they have huge physical benefits too; they fight climate change and guard nature; they help keep water resources and air clean – that is the value of the forests on our doorstep. The forests to which we can cycle, walk or bus.

Beyond that, tropical forests and rainforests play a major role in regulating our global climate. Our direct experience of these forests is as small as their direct impact on our lives is large. They are vital. The European Commission is fully aware of the value of forests, big and small, near and far.

Since 2003, the EU has been implementing the Forest Law Enforcement, Governance and Trade Action Plan (FLEGT AP) to fight illegal logging and associated trade – both important drivers of deforestation. The FLEGT AP consists of a combination of demand- and supply-side measures in 7 inter-related action areas. On the supply side, the FLEGT AP

The EU should promote actions to minimize the impact of its consumption on deforestation.

places forest governance reforms and capacity-building among its key components, while on the demand side the EU Timber Regulation lays down the obligations of operators who place timber and timber products on the market, contributing to addressing the problem of deforestation and forest degradation. In addition, dialogue and cooperation with other major markets are promoted.

We are also in the process of developing a communication to step-up EU actions against deforestation and forest degradation. The initiative will increase the coherence of existing EU policies and tools, taking full advantage of how policy areas overlap. The consequences of deforestation will be seen through the lens of many EU policies. The communication will also help better implement and reinforce actions already undertaken by the EU and its Member States, support existing commitments by governments and the private sector, promote collaboration and the exchange of good practices, and raise awareness.

Given the important role of forests in contributing to all relevant SDGs and other international commitments, we see the communication as an EU contribution to achieve internationally-agreed objectives. The Sustainable Development Goals, the Paris Agreement on climate

change, and the 2017 UN Strategic Plan for Forests to name but three. That is, of course, not to forget that we are building towards the Parties to the Convention on Biological Diversity (COP15) which will be hosted by China in 2020.

European citizens put a high value on forests, especially for the wildlife they contain, and for their role in preventing natural disasters and climate change. Forests certainly need protection, which is why there is an explicit reference to them in SDG 15. Moreover, it is why the European Commission has a 3-point approach:

- 1.** The EU Forest Strategy is built around the notion of multi-functionality, with a view to steering Europe towards the sustainable management of its forests.
- 2.** The strategy on bio-economy is to develop bio-based sectors, especially at the local level, while ensuring we remain within ecological boundaries.
- 3.** On deforestation, FLEGT has delivered some powerful changes, especially through the Timber Regulation and the upcoming communication.



Deforestation is a complex issue, caused by multiple drivers. The European Commission highlights that, in order to be effective, work on deforestation needs to take into account the causes. We need to take an honest look at land use planning.

There is a need to adopt a balanced approach regarding commodities, which can be associated with deforestation. The EU should promote actions to minimize the impact of its consumption on deforestation. To do this means recognizing the environmental and social challenges. Of course, we must in parallel acknowledge the important role in economic development of producer countries.

Our initiative will emphasize the EU intention to engage constructively with and support producer countries efforts. We will also dialogue with other consumer countries, as well as businesses and civil society. Central to our initiative is the rights of indigenous peoples; we must respect their human rights, and we must promote the exchange of good practices to raise awareness across all stakeholders.

As this Commission mandate ends in 2019, I hope that our successes in greening our cities is apparent. Our commitment to the birds and habitats directives has only grown. And our recognition of the value of biodiversity is ever present. ●

KARMENU VELLA

European Commissioner for the Environment, Maritime Affairs and Fisheries



The Secret Power of *Shinrin- yoku*

The Art and Science of Japanese Forest Bathing

WRITER: QING LI



We all know how good being in forests can make us feel. We have known it for millennia. The sounds of the forest, the scent of the trees, the sunlight playing through the leaves, the fresh, clean air in the forests – these things give us a sense of comfort. They ease our stress and worry, help us relax and to think more clearly. Being in forests can restore our mood, give us back our energy and vitality, refresh and rejuvenate us. In Japanese, we have a word for those feelings that are too deep for words: *shinrin-yoku* or forest bathing.

What is forest bathing/ *shinrin-yoku*

The forest environment has long been enjoyed for its quiet atmosphere, beautiful scenery, calm climate, clean fresh air and special good smell. Empirically, forest environments may reduce stress and have a relaxing effect; therefore, walking in forests may have beneficial effects on human health. In Japan, a national health program for forest-bathing or *shinrin-yoku* was introduced in 1982 by the Japanese Forest Agency for the stress management of workers. *shinrin* in Japanese means ‘forest’, and *yoku* means ‘bath’. So *shinrin-yoku*

means bathing in the forest atmosphere or taking in the forest through our senses. This is not exercise, or hiking, or jogging. It is simply being in nature, connecting with it through our sense of sight, hearing, taste, smell and touch. In 2005, I conducted the first forest bathing study in Iiyama, Nagano prefecture in Japan and the terms of forest bathing and *shinrin-yoku* in English were first scientifically named and defined by me in this study. Because forests occupy 67% of the land in Japan, forest bathing is easily accessible. Forest bathing (*shinrin-yoku*) is like a bridge. By opening our senses, it bridges the gap between us and the natural world.

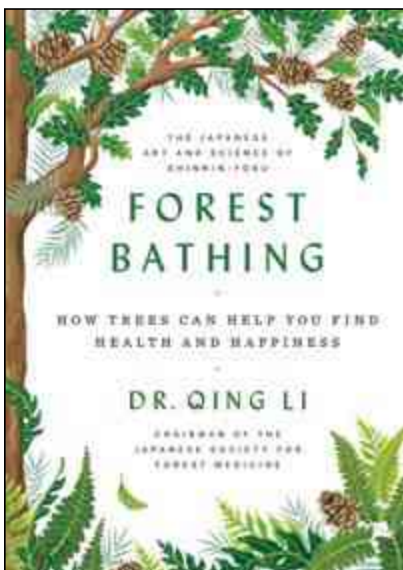


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In Japanese, *shinrin* means ‘forests’ and *Yoku* means ‘bath’.
In Korean, forest bathing is called: *salim yok*.



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Why is *shinrin-yoku* necessary?

In 1984, the word ‘technostress’ was coined to describe unhealthy behavior around new technology. Technostress can arise from all manner of everyday usage, like checking your phone constantly, compulsively sharing updates and feeling that you need to be continually connected. Symptoms run from anxiety, headaches, depression, mental fatigue, eye and neck strain to insomnia, frustration, irritability and loss of temper. Since the year 2000, we have officially become an urban species. The urban population



1. Scenery of the bamboo forest in Sagano, Kyoto, Japan. Photo: M. Taira

2. Mikuni Pass in winter, Eastern Hokkaido, Japan. Photo: Tatsuo Nakamura

3. Li Q. Forest Bathing. The Japanese Art and Science of Shinrin-Yoku – How Trees Can Help You Find Health and Happiness. Viking Books (Penguin Random House USA), New York, USA, 2018.4, pp.1-309.

worldwide grew from just 746 million in 1950 to 3.9 billion in 2014, according to the United Nations Population Division. By 2050, 75% of the world's projected 9 billion population will live in cities. In Japan, rates of cancer and lifestyle-related diseases such as heart disease, diabetes, cerebrovascular disease and hypertension are increasing. According to the Ministry of Health, Labour and Welfare of Japan, the percentage of workers with anxiety and stress was more than 50% in 1982, 62.8% in 1997, 58% in 2007, and 60.9 in 2012, suggesting a major mental health problem. Moreover, according to the National Police Agency of Japan, more than 30,000 people have committed suicide every year since 1998; in 2007, there were 33,093 reported suicides, 14,684 of which were due to health problems including 6,060 due to depression. There is also the phenomenon known as *karoshi*, or death from overwork in Japan. Therefore, the health management of workers, especially in relation to stress-related diseases, has become a major social issue and an effective new method for prevention of diseases

is needed. It is urgent to establish preventive measures against stress and lifestyle-related diseases; however, effective prevention methods have not been established.

From a feeling to a science

Although a national health program for *shinrin-yoku* began to be introduced in 1982 by the Japanese Forest Agency, there has not been sufficient medical evidence supporting the beneficial effects of forest bathing due to technical limitations regarding measurements, and evidence-based evaluations. A therapeutic menu of forest bathing benefits then came into demand. Against this background, the Japanese Society of Forest Therapy was established in 2004 for conducting the evidence-based research on the effects of forest environments on human health. The Ministry of Agriculture, Forestry and Fisheries of Japan initiated a



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4. Bench under the tree in the Royal Botanic Gardens in London. Photo: Dmitry Naumov

5. Scenic temple located in the mountains northeast of Yamagata City. The temple grounds extend high up a steep mountainside, from where there are great views down onto the valley. Photo: Vadim Ozz



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**In 2012, we
established
Forest
Medicine as
an official
new medical
practice.**

- Professor Dr. Qing Li



research project in 2004 to investigate the therapeutic effects of forests on human health from a scientific perspective. I was invited as a main member in the project. Since 2004, I have conducted serial studies to investigate the effects of *shinrin-yoku* on human health. I have collected a vast amount of data, proving that forest bathing promotes both physical and mental health by reducing stress.

- 1.** *Shinrin-yoku* can increase human natural killer (NK) activity and the number of NK cells and the intracellular levels of anti-cancer proteins, such as perforin, granzymes and granulysin. The increased NK activity and anti-cancer proteins last for more than 7 days, even up to 30 days. This suggests that if people do *shinrin-yoku* once a month, they may be able to maintain a higher level of NK activity. This is very important in terms of health promotion and preventive medicine. NK cells are immune cells and play an important role in defense against bacteria, viruses and tumors. People with higher NK activity showed a lower incidence of cancers, whereas people with lower NK activity showed a higher incidence of cancers, indicating the importance of NK cell function on cancer prevention. Therefore, it suggests that forest bathing may have preventive effects again cancers.

- 2.** *Shinrin-yoku* can reduce stress hormones, such as adrenaline, noradrenaline and cortisol and may contribute to stress management.

- 3.** *Shinrin-yoku* can reduce blood pressures and heart rate and may have preventive effect on hypertension.

- 4.** *Shinrin-yoku* can increase the activity of parasympathetic nerve and reduce the activity of sympathetic nerve showing relaxing effects.

- 5.** *Shinrin-yoku* can reduce the symptoms for anxiety, depression, anger,





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fatigue and confusion and increased general vigor. This suggests forest bathing has a preventive effect on depression.

6. *Shinrin-yoku* can improve sleep quality.
7. People living in areas with lower forest coverage have significantly higher mortality rates from cancers than people living in areas with higher forest coverage.
8. Phytoncides released from trees significantly increased human NK activity and the intracellular levels of anti-cancer proteins such as perforin, granzymes and granulysin in human NK cells.
9. Stress may induce and/or exacerbate many lifestyle-related diseases, such as cancers, hypertension, ischemic heart disease, gastrointestinal ulcer, and depression; *shinrin-yoku* can reduce stress hormones suggesting that forest bathing may have preventive effects on lifestyle-related diseases mediated by reducing stress hormones.

What is forest medicine?

Imagine a new medical science that could let you know how to be more active, more relaxed, healthier and happier with reduced stress and reduced risk of lifestyle-related diseases and cancers by visiting forests. This new medical science was established in 2012 and is Forest Medicine.

The urban population worldwide grew from just 746 million in 1950 to 3.9 billion in 2014.

- Source: United Nations Population Division

Forest Medicine studies the effects of forest bathing on human health and is a new interdisciplinary science, belonging to the categories of alternative medicine, environmental medicine and preventive medicine. Forest Medicine is an evidence-based preventive medicine. Forest Medicine is developed from *shinrin-yoku* and forest therapy, which is a research-based healing practice through immersion in forest environments with the aim of promoting mental and physical health and improving disease prevention while being able to enjoy and appreciate the forest. Forest therapy is defined as a proven *shinrin-yoku* effect. ●

6. Hoh Rain Forest, Mossy Trees, USA. Photo: Steve Bower

7. Taiga river. Bolshekhokhtsirsky Nature Reserve. Khabarovsk region, far East, Russia. Photo: Konstantin Baidin

8. Shomyo Falls, Toyama, Japan. Photo: Janken

62 Forest therapy bases in Japan

Based on the above studies, we have established over 60 forest therapy bases in Japan, from sub-arctic Hokkaido in the north to sub-tropical Okinawa in the south.

www.fo-society.jp/



User's guide: Shinrin-yoku 101

People can enjoy forest bathing with all five senses:

1. Sense of sight: green color, yellow color and red color, forest landscapes.
2. Sense of smell: forest fragrances from trees and flowers, such as pungent phytoncides.
3. Sense of hearing: forest sounds, birds singing and the breeze rustling in the leaves of the trees.
4. Sense of touch: touching trees, put your whole body in the forest atmosphere.
5. Sense of taste: eating foods and fruits from forests, taste the fresh air in forests.

10 tips for forest bathing:

1. Make a plan based on your physical abilities and avoid tiring yourself out.
2. If you have an entire day, stay in the forest for about 4 hours and walk about 5 kilometres; if you have just a half day, stay in the forest for about 2 hours and walk about 2.5 kilometres.
3. Take a rest whenever you feel tired.
4. Drink water/tea whenever you feel thirsty.
5. Find a place you like, then sit for a while and read or enjoy the scenery.
6. If possible, bathe in a hot spring after the forest trip.

7. Select the forest bathing course based on your aims.
8. If you want to boost your immunity (natural killer activity), a three-day/two-night trip is recommended.
9. If you just want to relax and relieve stress, a day trip to a forested park near your home would be recommended.
10. Forest bathing is a preventive measure, so if you come down with an illness, see a doctor.

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Money Can Grow on Trees

**Q&A HARRY ASSENMACHER
FOUNDER OF FOREST FINANCE,
GERMANY**

Money doesn't really grow on trees—but one German company, Forest Finance, offers something similar: sustainable forest and agroforestry projects to investors keen on restoring forests and fighting climate change, while making a return on investments. REVOLVE caught up with the company's founder, Harry Assenmacher, to learn more.

Forest Finance celebrates 25 years of doing business in 2019. How did the idea of forest investment come about, and what have you achieved?

The idea stems from a rather personal practicality. Many years ago, my pension did not look very good and I wanted to build something that could become a part of it later. Back in the 1990s, I had worked for the German Association for Environment and Nature Conservation (BUND) and had been in contact with forest enterprises in the tropics. One was in Panama, where I had been invited to see their projects. I learned the concept of establishing “mixed forests” – where only a selection of mature trees is cut and sold – allowing for a functioning forest to always remain. I liked this approach and used it to reforest the first three hectares of land I owned in Panama. The idea of



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creating a forest was welcomed with enthusiasm by friends and colleagues, and more people wanted to do the same which led to the idea of offering forest financing in Germany.

We initially offered a product with at least one hectare of forest, but I wanted to offer small-scale investors the possibility to become a forest owner. I created the *TreeSavingsPlan* that was offered online in 2003 already. Our mission was – and still is – to buy degraded land and to reforest it with local species to recreate indigenous forest. We are the first company in Panama, whose forests are FSC-certified since 1997.

**Our mission was
– and still is – to
buy degraded
land and to
reforest it with
local species
to recreate
indigenous
forest.**



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What is FSC® and the FSC Certification®?

The Forest Stewardship Council® (FSC®) is an international, non-governmental organisation that promotes forest conservation through environmentally sustainable management. It represents a worldwide commitment to sustainable and socially responsible forestry. The FSC has developed an internationally recognized label for wood. Only companies which adhere to the strict FSC principles of responsible forestry are awarded the FSC label. Compliance is verified each year by external bodies. The FSC is supported by numerous environmental organizations and trade unions. Forest Stewardship Council/SCS Global Services certified forest operations meet comprehensive standards that protect the environment and the rights and welfare of workers, their families and communities.

1. Harry Assenmacher Founder of Forest Finance, Germany. Photo: ForestFinance
2. Yield from first teak harvest after thinning in 2010 on the oldest ForestFinance forests in Las Lajas, Chiriqui. Photo: ForestFinance
3. These Amarilis (*Terminalia Amazonia*) were obtained from natural regeneration on Forestfinance reforestation. They still need to grow a bit to be planted on the open areas. Photo: ForestFinance
4. An impressive forest has formed 14 years after the reforestation work in which monkeys, toucans and other forest dwellers frolic. Photo: ForestFinance
5. Young sloth in the ForestFinance Finca Quebrada Limon, Panama. Photo: ForestFinance



In 2007, we bought a forest management company in Panama and went from forest investors to forest managers. At this point we developed our own forest investment products which led to the addition of cocoa plantations (i.e. agroforestry) to our portfolio and Green Acacia in Colombia. Since 2018, we now offer our newest agroforestry product: investments in organic agriculture for producing olives and dates in Morocco.

After 25 years, we have managed the investments of over 20,000 clients with a total investment of nearly \$100 million. We are active in Panama, Vietnam, Colombia, Peru and Morocco, and have reforested more than 8,000 hectares of land and have sustained over 2,000 hectares of protected area, including mangroves in Panama. We have planted over 10 million trees globally.



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Creating and maintaining forests has helped provide local jobs. We have also expanded the value added of our activities and use our harvest to produce finished boards and craft products at our wood processing centre in Panama. We are proud of our other products, such as chocolate and praline from our cocoa plantations that are sold at our coffee house in Panama City.

We have also had our share of difficulties and lessons learned. We had to refine our forest management and schemes over the years having learned that certain tree species do not harmonize with each other. But we have also learned which tree species do harmonize and so we combine them more often. It is crucial to incorporate these lessons into our products to optimize them. The

necessity and need for harmony holds true for our staff and collaborators as well. As a company with activities in four continents, it is important to develop international teams of diverse individuals who must cooperate in very different places — this is not always easy.

We have reforested more than 8,000 hectares of land and have sustained over 2,000 hectares of protected areas [...] we have planted over 10 million trees globally.

How does sustainable investment work in the forest industry? Is it always sustainable? And how big is this business?

Sustainability is our guiding principle and at the core of the Forest Finance philosophy. The framework we use are the UN Sustainable Development Goals (SDGs) which we have been committed to for many years. We have implemented 8 of the 17 SDGs and we are working towards pursuing more. In 2018, we received the German CSR



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6. Cacao harvest in Peru, project manager Marisol Najarro. Photo: ForestFinance

7. Seedlings of various native tree species are grown and cared for in the nursery. If they reach a height of 20 to 40 cm, they can be transplanted to the forest. Photo: ForestFinance

8. A young Almendro (*Dipteryx Panamensis*) is surveyed, the recorded data are summarized for the customers in the growth report. Photo: ForestFinance

9. Visit of the tree nursery Santa Cruz in Panama. Seedlings are repotted. They are taken from the soil, the roots are cut and then repotted into larger containers. Photo: ForestFinance

Award 2018 in the category “Global Responsibility” and continue to ensure that our social, economic and ecological objectives are of equal weight and importance and complement each other. We make sustainable investments in forests and agroforests. Our approach is different from big forest investment funds whose plantations aim for optimal exploitation and return on investment. In their case, monocultures and total deforestation are part of their business model – an approach that has nothing to do with sustainability or sustainable investments.

All our projects aim for long-term sustainable results, such as the development of forests or a local

forest scheme. With our forest-saving scheme, when we harvest after 25 years, the forest will remain as a functioning eco-system with animals, insects, biodiversity – and other key functions of a living and sustainable forest such as water storage, soil protection and minimum erosion.

In fact, one can destroy entire landscapes by growing trees. The planting of trees alone does not create a liveable ecosystem if you do not create a forest in accordance and harmony with the local conditions. Our projects contain around 20% of land that we leave untouched as protected areas. Here nature can develop and is not influenced by economic processes.

Forest Finance offers a variety of financial products. Who are your clients and what financial products do they choose?

Our clients are people – like you and me – who want to participate in making small but significant ecological investments. Some clients increase their investments over the years. We also have foundations and institutional clients in our portfolio, but the focus is on private investors.



Most clients do not buy specific products; they rather choose multiple products to diversify risks and opportunities. These products range in terms of duration, location and forestry concept. Our mixed forest products have a 25-year term and originate in Panama. Agroforests with fine cocoa are produced in Peru and Panama. In Morocco, we have started our newest product with organic cultivation of olives and dates, with a low maturity of 6 years.

The return on investment can range between 0-10%. We are talking about a natural product that develops over



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a long period of time. Looking at the longer-term price developments for wood and cocoa, and taking average growth rates into account, we realistically expect returns between 4-7%.

So far, we have paid out more than \$7.5 million in gains to our investors. However, the large returns are still pending for most projects as the main income will be generated at the end of the projects.

What are the risks?

As a natural product, there are many risks that can lead to a total loss. But we believe that most risks are calculable. We have never had any damage from fire and have been able to limit insect infestation thanks to our mixed forest systems. In Vietnam, we had two consecutive violent storms which are still a concern to us today and will be in the future. Looking back at a quarter of a century of successful business development, we notice that larger agroforestry investments are only suitable for high-risk investors who have a long-term vision and the necessary liquidity.



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10. The cocoa beans are dried after harvest in their own post-harvest station. Photo: ForestFinance

11. Seeds of various native tree species that are planted in ForestFinance nurseries in plant bags. Photo: ForestFinance

12. Cocoa beans from the ForestFinance cocoa forests in Panama. Photo: ForestFinance

13. Forest cemetery "Rest in Trees" in the community Hühmel-Pitscheid, Germany. Photo: ForestFinance

14. Finca Quebrada Limón in Bocas del Toro, Panama (Finca is a Spanish term that is also used in English for rural agricultural land). Photo: ForestFinance

15. Young anteater climbs on banana tree, Finca Quebrada Limon, Panama. Photo: ForestFinance

What are the advantages of forest investments and how does climate change impact your business?

Our motto is: "Building Forests" – this is our biggest added-value. Through our work, ecosystems are created, trees grow, CO2 is extracted from the atmosphere, biodiversity preserves habitats and humankind receives an attractive ecosystem. One disadvantage of this investment is that it is long-term. Wind turbines or solar panels bring a faster return on investment. In the case of forests, the trees must grow before reaping profits which, in my opinion, is

much more natural and beautiful. That's also why we are directly affected by climate change. Heavy rainfall or long periods of drought affect the growth on our lands. And of course, no one can predict exactly where and how quickly climate change will occur in the future. ●

Read more online: revolve.media

ForestFinance

Wir machen Wald. EST. 1995

The ForestFinance Group disposes of twenty plus years of experience in TreeSavings, the development and operation of sustainable forest products. ForestFinance has planted ecological mixed forests in Panama since the '90s. Further projects are located in Vietnam, Colombia and Peru.

www.forestfinance.de



1

The City-Forest Nexus

Can making things out of wood help connect two of our greatest assets?

WRITER: **SCOTT FRANCISCO**

Walking the streets of most global cities today, things seem to be going pretty well. Between the lights, buildings, people, trees – clean streets and easy access to good food and transportation – it can be difficult to see things like climate change, soil degradation, or the loss of a species that shared our planet for as long as we have. Faraway from city centers, the world is losing tropical forests at the unprecedented rate of 44,000 Ha per day – the equivalent of 40 football fields every minute – with very serious consequences for our collective future. With any urban future entirely dependent on the future of nature, now is the time for every major city to do more to restore, protect and sustain the natural ecosystems on which they depend.



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Cities today house more than half of the population and produce 70-80% of global GDP, energy consumption, CO₂ emissions, and solid waste. These startling percentages are increasing as the world continues to urbanize, but more importantly, they point to increasing connectivity and interdependence. Because virtually all of a city's resources and waste travel a great distance, cities cannot be understood as separate entities, or use balance-sheets limited to activities within their own boundaries. Politics, immigration, finances, food, energy or garbage – let alone little things like air and water – everything that happens in a city depends on the vast global systems of social and natural flows. Even (and especially) ideas are not contained within city boundaries. Adding all of this together would suggest that any meaningful solutions to

Any 'urban future' is entirely dependent on the future of nature.

1. Toronto is Canada's largest city and is consistently ranked as the world's most diverse city.
Photo: Patrick Tomasso

2. Balok Mangrove Forest Reserve, Malaysia. A vital carbon and biodiversity reserve. Photo: Eutah Mizushima

climate change, biodiversity, pollution, or waste must happen in our cities to have any credibility or real teeth.

One way cities can manifest solutions to some of these pressing environmental challenges is to reinvent their relationship to the world's forests. Our extensive work with both cities and forests shows that current connections between these two global heavyweights are typically competitive, not cooperative – usually distant, opaque, and based on a one-way flow of goods and services. But new projects and ideas, growing public awareness and cutting-edge research are offering blueprints for creative relationships that can be interdependent and intimate; virtuous cycles where mutual needs and resources are shared for the benefit of cities and forests, people and planet.



The 'raw materials' for mutual benefit between cities and forests abound: Cities are creative centers of dense human activity, ideas and consumption. Forests create oxygen, transform CO₂ into biomass and cool the planet, representing one third of the total climate change solution. Cities are where the majority of people live. Forests provide a home for most of the earth's biodiversity. Cities need tremendous amounts of food, materials and energy every day. Forests grow and replenish continuously, providing stable soils and climate for agriculture, building materials, food, water and medicines. Cities celebrate beauty, ideas and knowledge. Forests are treasure chests of wild genetic resources, beauty and mystery to be discovered by future generations.

Ideas for proactive relationships between cities and forests include forest-friendly coffees and plant products that support local forest economies, along with sourcing guidelines for commodities that may threaten rainforests. There are educational and tourism programs that connect children from urban and rural areas, investments in watersheds that provide cities a reliable supply of clean water, and pension funds that invest in forest plantations. Added to this list of opportunities is selective, sustainable timber production, guided by local community leadership. Research and case studies have shown that by combining advanced forest management techniques, transparent monitoring, and deep local knowledge of forests, communities are able to

generate income, comparable to clearing land for agriculture, while keeping forests intact.

Building cities out of wood

Sustainably harvesting wood in order to protect forests opens a link to one of the most advanced concepts in urban design and architecture called "wood urbanism": literally building our cities with wood, from pot scrapers to skyscrapers.

Over the past decade the concept of tall wood buildings using "mass timber"



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frames and cross-laminated timber (CLT) panels has developed with much excitement and investment: a strategy for healthy, fire-safe urban buildings that can help to reverse climate change. The argument is that by replacing our most CO₂-intensive building materials (like concrete, steel and aluminum) with a material that naturally sequesters carbon rather than emits it, we can reduce the CO₂ entering the atmosphere by as much as 30% annually – an amount equivalent to the world's entire transportation sector. This calculation assumes we can build 50% of the world's new urban buildings with wood, which prominent architects, engineers and foresters assert is possible today. And this is no fantasy. Wood is currently

being used to build hundreds of safe, healthy and beautiful urban buildings at costs competitive with concrete and steel.

Brock Commons, an eighteen-story student residence recently completed on the University of British Columbia campus in Vancouver, is the world's tallest wood building. To win the contract, architects and engineers had to compete with conventional construction materials, and won the bid based on price and performance by a slim margin. Future-focused developers see substantial cost advantages on the horizon as fossil fuel costs inevitably skyrocket and as carbon pricing is implemented.

3. Ideas for proactive relationships between cities and forests include forest-friendly coffees, wood and plant products. Photo: Mike Marquez

4. Cities are creative centers of dense human activity, ideas and consumption. Photo: Freestocks

5. Beijing-based architecture studio Precht designed a modular residential structure, *The Farmhouse*, to reconnect city-dwellers with nature. Residents produce their own food in vertical farms, and external modules could bear solar panels to generate electricity. Renderings: Precht

6. Brock Commons, under construction. Photo: naturallywood.com, KK Law

7. Brock Commons, the world's tallest wood building. Completed in 2017. Photo: naturallywood.com, Brudner

8. Goldring Tower, a 14-story timber tower, is to be built on the University of Toronto campus in 2020. Rendering: MJMA and Patkau Architects

9. Tamedia Zurich. Photo: Shigeru Ban Architects.

Don't forget the forest

With evidence that healthy, carbon-sequestering wood buildings are possible, desirable and affordable, the question about their impact on the world's forests has yet to be fully answered. On the quantitative "supply-side", research by Dr. Chad Oliver at Yale University's School of Forestry shows that global forests already generate more than enough wood to build 50% of all urban construction – production levels that can be sustained indefinitely with good forest management and investment in supply chain systems. But even this assurance does not necessarily get us to an "interdependent and intimate" relationship between cities and forests. →



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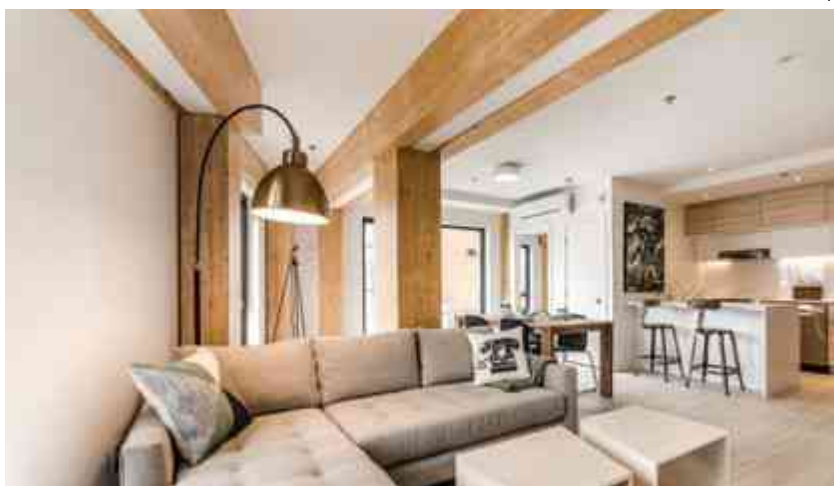
With most technical problems solved, the greater challenge is to link the charisma and 'in-your-face' solidity of big wood buildings to their forests of origin, a mental and emotional connection that validates the perpetual function and purpose of forests as social and natural systems. Establishing this link is key to reversing the underlying drivers of deforestation, which begin with a perceived lack of value of forests. This undervaluing is due in large part to how urbanization pushes forests into the cognitive distance, and global capitalism sees forests as "inefficient" in terms of quick return on investment. When urbanization and global capitalism get together, we get our perfect storm of global deforestation: 44,000 Ha lost per day. The good news is it is that to the degree that cities can promote distance and ambivalence towards the natural environment, then deforestation is also a problem that cities can reverse.

Cities are the great global consumers by sheer volume, eating up 75% of global resources. And they are also where the vast majority of consumer tastes, ideas and systems are invented, tested and formed. When designers in Paris, New York, Shanghai or Lagos decide it's time again to wear bell bottoms or high waisted pants, the world will follow. The same applies to other commodities like food, technology, transport and housing. If it is 'cool' to live in an industrial loft today it is because of the urban taste-making machine of the 1990s. If it is cool to live in a wood loft by 2020, we can credit the same. And a loft building made of wood sourced from a partner forest managed by a local community? Now we have something to talk about! And a more interesting story than the return of bell bottoms.

The quality and content of these stories is critical. We can't save the world's forests simply by cutting down trees to make buildings. It is important to acknowledge that some forests ought never to see a chainsaw because of their



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special ecological and social contribution or history. We must be selective about which forests are suitable to produce wood sustainably, and always define this from within the particular forest context. To do this we will have to get more comfortable with the chainsaw as a surgical tool that, in careful hands, can help forests live a long and productive coexistence. The community of Uaxactun, Guatemala has demonstrated how effective this strategy can be in a rainforest context. After twenty years of active forest management they have maintained and increased intact forest cover, compared the "protected areas" around them that are often ravaged by poachers, drug runners, fires and opportunistic cattle grazing. And they have done this while supporting the community with a range of forest

products including many species of certified sustainable wood. Recently this wood was used to reconstruct part of the famous Coney Island Boardwalk in New York City that was ravaged by Hurricane Sandy. Tourists can now make the connection between a faraway forest that they've helped conserve to slow climate change, and the dangerous impacts of "business as usual". All right under their feet.

10,11. The *Arbora* mixed-use loft development in Montreal is an example of urban lifestyle marketing of mass timber buildings in an urban context. Photos: Nordic Structures, Oxford Properties Group

12, 13. Wood sustainably harvested in Uaxactun, Guatemala used to rebuild the Coney Island Boardwalk in NYC. Photos: Scott Francisco

14. *Ponte dell'Accademia* in Venice; bridge rebuilt in wood in 1933. Photo: Didier Descouens

15. Tropical hardwood deck *Pont des Arts*, Paris. Photo: B. Monginoux



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Things get most interesting when this kind of selectively harvested wood used in city infrastructure can become a “souvenir”, part of a larger romance with forests that helps change the culture, knowledge and values regarding forests’ importance. The visible presence of wood in the city, can be branded (sometimes literally with a branding-iron) and hitched to the ideas, value, and location of a perpetual forest, akin to a marketing agency flogging a new product by associating with a celebrity’s face or lifestyle. In this case the future of the planet is at stake. Wood used this way is more than a carbon sink. It becomes a symbol, a vehicle for communicating, caring and acting on behalf of forests. In this brave new “wood-world” the question, “Where did your building grow?” will generate

conversation and pride, a chapter in a bigger narrative of rural and urban interdependence, where the many characters, people, plants and animals from around the world all have a role and a voice in sustaining urban life.

Scaling up, and down: from bridges to breadboards

Buildings are big. They deal with a huge volume of carbon, either as emitters or as sequesterers, and the wood used to make them is mostly sourced from northern coniferous forests in Canada, Europe and the United States. To unlock the full potential of the wood/city/forest



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value proposition, however, city planners, policy makers and consumers will need to embrace the diverse ecosystem of infrastructures that can be made of wood, from urban-scale bridges to boardwalks, benches, boats, bicycles and breadboards,

Each of these “parts of a city” is an opportunity to avoid using a high CO₂ emitting material like plastic, aluminum or steel, and for a new forest-positive story to be written. And the variety of wood needed for these infrastructures (hard, soft, heavy, light, durable flexible etc.) means the wood can be sourced from more diverse forests and communities around the world, including tropical forests. If this sourcing is done right – transparent, legal and part of a certified perpetual forest plan – it can capture the imagination of city dwellers while funneling trillions of dollars into good forest stewardship in the coming decade.

Over the past 17 years, Peter Pinchot has worked closely with community members in the threatened tropical forests of Ecuador. Their goal has been to ensure the forest avoids destruction, and pays for itself through sustainably-sourced wood products offered to the global market. After years of testing, setbacks, and innovation, their co-owned Whole Forest company now supplies unique wood products like [→](#)



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countertops, flooring, tables (and cutting boards) that showcase the many species found in these forests. This multidimensional partnership protects vast areas of tropical forest by combining ultra low-impact extraction, local employment (that depends on healthy forests) and a market willing to pay for a quality product branded with a meaningful narrative. Recently, Whole Forest has been able to offer carbon offsets with solid evidence that their products actually save forests from degradation and destruction.

This model, while challenging, can be replicated and scaled-up to the global demand for wood products in our cities. Imagine a 25-story building made entirely from different wood species, sourced from forests that each maintained a balance of consumption and regeneration, economic prosperity and cultural vitality. With thoughtful urban policies to increase transparency and demand for these forest products, the benefits can be distributed all the way back to small landholders, indigenous peoples, and workers at all levels in the supply chain, generating good employment and improving livelihoods. These are the people at the front-lines of deforestation or conservation, and they are often marginalized observers of urbanization with options limited to moving



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15,16. Whole Forest supplies unique wood products like countertops, flooring, tables (and cutting boards) that showcase the many species found in threatened tropical forests of Ecuador.

17. This multidimensional partnership protects vast areas of tropical forest by combining ultra low-impact extraction, local employment (that depends on healthy forests) and a market willing to pay for a quality product branded with a meaningful narrative.

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to the cities themselves, or continued liquidation of forests for subsistence. By involving them in an exciting global vision that connects urban innovation, good forest management and well-paid, hands-on work in the forest, these people can become genuine partners in the city-forest alliance.

Building our cities with wood to fight climate change and improve the built environment is a beautiful and realistic vision that can shift the attention of urban governments and culture towards the life-giving importance and romance of the world's forests. Thriving and restored forests are one of the mightiest chess pieces in decarbonizing our atmosphere and protecting biodiversity. Forests and wood offer a triple advantage to climate change: Not converting a forest to farmland or pasture prevents massive amounts of CO₂ from entering the atmosphere; planting trees and restoring forests (two important but sometimes very different things) can suck enormous amounts of CO₂ from the atmosphere; and using wood in long term infrastructure locks in CO₂ pulled from the atmosphere, while allowing new trees to grow in the forest to continue the cycle. Even reducing global deforestation by half, and using wood for 50% of global construction would stop 13 billion tons of CO₂ going the atmosphere every year (35% of total emissions) bringing us much closer to the urgent 2 degree mandate of the Paris Agreement.

Forests and cities share several intrinsic characteristics that can help this virtuous cycle accelerate

- Wood is beautiful and charismatic: an endless muse for both modern and traditional design, at any scale.
- Cities are at the forefront of the discourse on climate change.
- Forests are now recognized as one of the most significant factors in climate change mitigation.
- Cities are full of energetic experimenters and tastemakers, “early adopters”, and risk takers - often willing to pay more for something meaningful, new and exciting.
- Forests are coming into mainstream consciousness through the voices of art and science that invigorate and nourish city life.
- Cities have money. Concentrations of wealth means that people with means can pay for new ideas that are not yet efficient, often just for the prestige of “being first”.
- Cities are diverse. Different needs and desires mean that parallel experiments can happen side by side. Subsidized housing projects and luxury condos can learn and benefit from each other, and usually do.
- Biophilia is a growing trend and science: People are increasingly looking to natural solutions in design and architecture. Wood provides a significant set of biophilic solutions.
- Health and the science of environmental psychology (and physiology) show that both wood environments, trees, and forests are powerful antidotes to many serious ailments.
- New forestry approaches and tools, social and technical, are expanding our ability to extract wood with less harm to forest systems.

Can cities rewrite the global story?

To leverage the wood-city-forest nexus towards these ambitious goals, we will need creative urban policies and projects that favor sustainable wood, assisted by markets, regulation, and culture. We will need cultural leaders in cities (designers, engineers, artists,

writers) to catch the vision and show us how cool wood can be. We will need city agencies to create novel partnerships with real places and people where forests are managed transparently and sustainably. And we will need urban consumers (individuals, organizations and governments) that recognize and are willing to pay for forest products that support the many stakeholders in the value chain stretching back and forth between the forest and the city.

For our global story to end well, cities must first learn to see and listen to the faraway forests. Once they see forests for what they are, cities will step up, and offer to lead the dance, inevitably leading to a new and exciting love affair. Taking the long term view, cities and forests will find a myriad of ways to support each other and work together as mysterious and powerful partners in what could just be, happily ever after. ●

#Wood4Climate

WRITER: **SILVIA MELEGARI**

Europe is moving towards better and greater climate action on forests inside and outside the Union – the manifold forest- and wood-based products will play a pivotal role, if managed more sustainably.

The latest findings of the IPPC Report are clear: rising temperatures are affecting our climate and consequently our environment and the functioning of our world. Our economy is affected as well. Global warming can be attributed to two factors, those that occur naturally and those that may be anthropogenic (human-activity-induced). Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.¹

Coherent and holistic solutions are needed to reduce and remove the emission of greenhouse gases from the atmosphere. It is imperative to combat climate change and at the same time avoid curbing economic and social development. Sustainably managed forests and products derived from these forests play an essential role in mitigating climate change by reducing greenhouse gases emissions and contribute to an environmental-friendly economic growth. The positive effects of using wood from sustainably managed forests can be strengthened if actions are taken to use more long-life wood products.





2

Growing trees absorb carbon dioxide from the air and convert it to oxygen, which is then released and stored as carbon in their branches, leaves or needles, trunks, roots and surrounding soil. When trees start to decay, or when forests die due to wildfire, insects or disease, the stored carbon is released back into the atmosphere. In any of these cases, the carbon cycle begins again as the forest is regenerated, either naturally or by planting. Forests managed for timber have an important role to play in conserving global biodiversity. Scientific studies proved that unmanaged forests are often susceptible to disturbances including insect and disease outbreaks and generate a much greater carbon debt if they are combusted during a wildfire, rather than a managed forest with much less dead and dying fuel wood.

Harvested wood products store carbon over time depending on the type of products and how they are used over short and long time-scales. Harvested wood products create an opportunity to provide long-term carbon reduction benefits by storing carbon and by substituting more energy-intensive materials. Manufacturing wood into products requires far less energy than other materials – and almost no fuel

energy. Indeed, most of the energy comes from converting residual bark and sawdust to electrical and thermal energy, adding to wood's light carbon footprint.

Harvested wood products create an opportunity to provide long-term carbon storage benefits by storing carbon and by substituting more energy-intensive materials.

The benefits of wood

Increasing the use of wood or wood-based materials in construction and in products such as furniture, cabinets, flooring, doors and window frames represents a significant opportunity for emission reductions. With growing pressure to reduce the carbon footprint in buildings, designers are increasingly called upon to balance functionality and cost objectives with reduced environmental impact. Wood is a natural choice. It's renewable, recyclable, and has a lighter

1. Source: 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. Learn more: www.ipcc.ch/

2. Wooden building at Camber Sands beach, United Kingdom. Photo: Oliur



WOOD PRODUCTS

carbon footprint than other construction materials. Additionally, it is the only structural building material with third-party certification systems in place to verify that products come from a sustainably-managed resource. European producers use wood coming only from sustainably-managed forests to ensure that the wood we use minimizes its footprint on local ecology, habitats and peoples.

The need for more urban housing and the engagement for climate change mitigation imposes building solutions with low energy and low carbon footprints. Wood offers us a new way to think about sustainable buildings. On average, when we substitute wood for energy-intensive building products, we

offset two tons of carbon emissions for every dry metric ton of wood used. This occurs because we are eliminating fossil fuel emissions that would have been released into the air had we used more energy-intensive materials, thus adding to the net benefit of wood.

New advances in engineered wood are allowing the construction of tall, safe, and more economical wood buildings. Moreover, wood has a higher insulation rating compared to other materials as a result of its natural cellular structure. Using wood helps to save energy over the life of a building, as its cellular structure provides outstanding thermal insulation: as per estimations, 15 times better than concrete, 400 times better than steel and 1 770 times better than aluminium.

When forest products are used in construction, they continue to store carbon for the whole life of the structure and beyond when wood fibre is recycled or reclaimed. The possibility of re-using wood products (after one service unit) is another important climate benefit characteristic of this material. Wood can be re-used as product either for the same purpose as before or for less demanding purposes after simple reshaping, for example from structural timbers to flooring. Even if wood products after one service unit are not qualified for further use, they can still be reprocessed for making new wood-based products or be use as a source of renewable energy. ●



3. Villa Heekholland, Hook of Holland, Netherlands.
Photo: David Peters

4. Wood cellular structure provides outstanding thermal insulation: 15 times better than concrete, 400 times better than steel and 1 770 times better than aluminium.
Photo: Clarisse Meyer



Created in 1958, the European Organisation of the Sawmill Industry (EOS) is a Brussels-based non-profit association representing the interests of the European sawmilling sector on European and International level. Through its member federations and associated members, EOS represents some 35.000 sawmills in 13 countries across Europe (Austria, Belgium, Croatia, Denmark, Finland, France, Germany, Latvia, Norway, Romania, Sweden, Switzerland and the United Kingdom) manufacturing sawn boards, timber frames, glulam, decking, flooring, joinery, fencing and several other wood products. Together, they represent 77% of the total European sawn wood output and a turnover of almost 37 billion EUR with over 259,000 job opportunities annually in the EU.

www.eos-oes.eu

A Blueprint for EU Climate Action on Forests & Wood Products

To mitigate climate change, we need to reduce greenhouse gas emissions and store more carbon. Healthy forests can do both. For this reason, governments and organizations can improve their social responsibility and reduce their environmental footprint through policies and procurement processes that encourage the use of wood products coming only from sustainably-managed forests. Wood products, legally-sourced from sustainably-managed forests, can play a key role in decarbonizing the economy – due to their lower carbon footprint compared to other materials and the CO₂ stored in them – while boosting the circular bioeconomy.

In line with the objectives of the 2015 Paris Agreement, the European Sawmill Industry aims to strengthen climate change mitigation through European policies that balance environmental, social and economic aspects. The following list encapsulates the main priorities of the sawmill industry:

- A comprehensive and coherent approach to sustainable forest management for the promotion of healthy forests that absorb more CO₂ and produce renewable wood products will have a large impact in reducing CO₂ emissions.
- Using 98% of logs coming from the European forests, the sawmill industries have played (and continue to play) a crucial role in shaping the landscape, economy, and culture of the forestry sector in Europe. Ensuring the longevity of forest resources through the implementation of sustainable forest practices has been always a concern for sawmill operators. As first transformer of forest biomass, the European sawmill industry is the key driver of the forest based bio-economy. Thereupon, in order to guarantee to the sector a reliable raw material supply is of utmost importance to:
 - o Implement climate policy objectives which do not neglect a sustainable mobilization of wood resources
 - o Encourage silvicultural practices to enrich the timber size and quality
- Assessing the impact of decisions affecting the use of forest resources should be more coherent and take into

considerations the cross-sectoral effects of wood product use and net impacts on the bioeconomy.

- Need to create markets – within and outside Europe – for traditional and innovative new wood products supports sustainable forestry, helps to counteract greenhouse gas emissions, and puts the timber industry at the forefront of a carbon-free Europe.
- Need for a level playing field: products entering the European market must comply with the high environmental and social standards that characterize the European Union.
- Need to recognize the environmental benefits of using wood products instead of more energy-intensive materials by assuring that carbon accounting systems are full-life cycle accounting systems.
- Need to support performance-based public procurement policies for building materials and foster tools to strengthen Green Public Procurement from more public sector entities.

The transition to a low-carbon economy presents significant opportunities and challenges. The European sawmill industry has the potential to boost the economic growth of Europe with the use of wood products while addressing climate change. Enhancing the competitiveness of the European sawmill industry and advocating for using more sustainable wood products contributes to sustainable and environmentally friendly economic growth for Europe.

#Wood4Climate #BetterWithForests



#Cities4Forests #ForestsMatter

The Role of Forests in Advancing EU Climate Action

La Rotonde Bertouille, Rue Baron Horta 9, 1000 Brussels | 21 March 2019, 4–7 p.m.



An initiative by **REVOLVE**

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Photo: Sonian Forest by Michel Petillo.



VIEWS

Cities**4**Forests

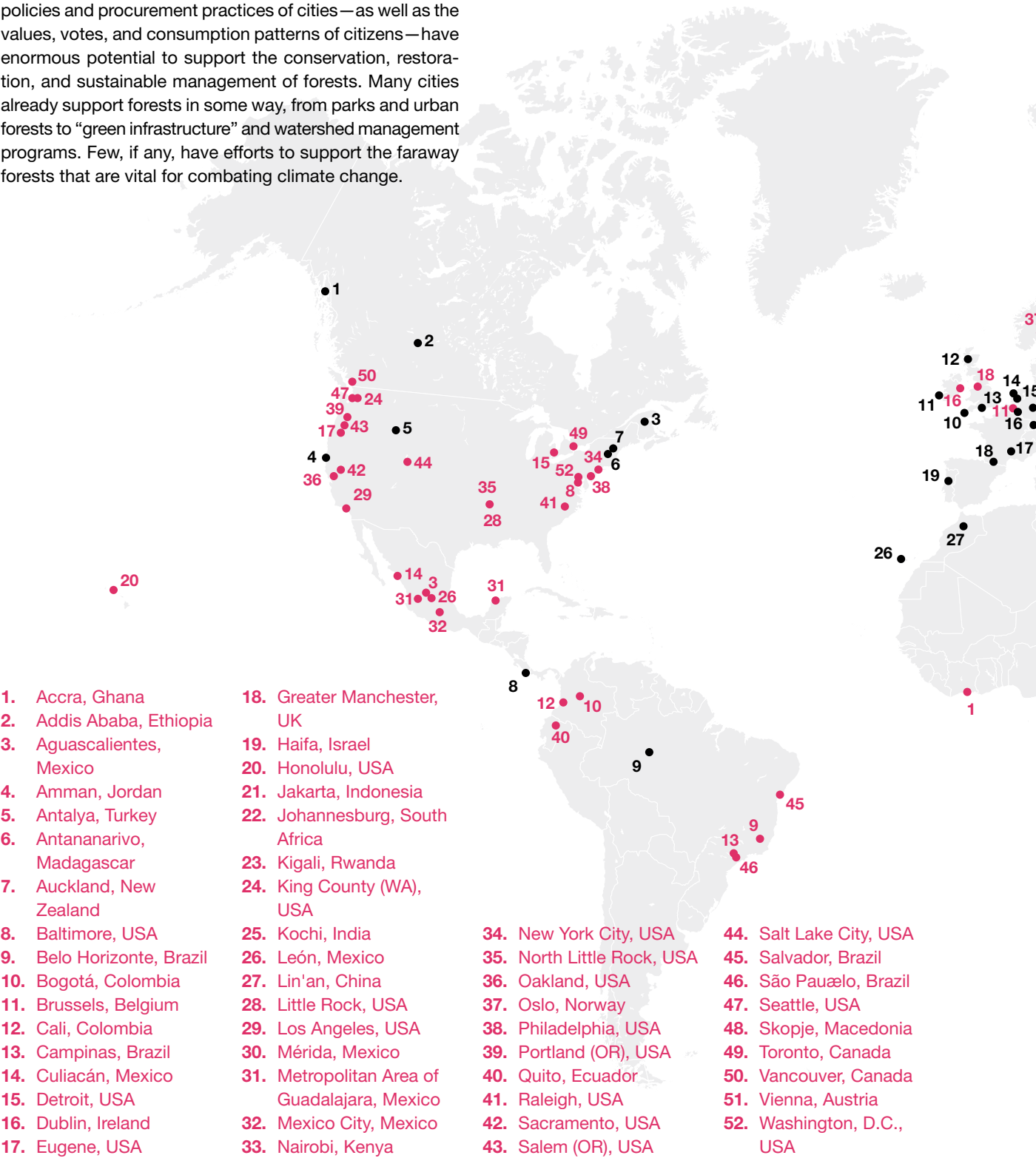
▲ Vancouver

Capilano Suspension Bridge Park,
North Vancouver, Canada.
Photo: Nicolas Savignat

The world is rapidly urbanising – more people than ever live in cities. To make our cities more liveable and climate-resilient, Cities4Forests is bringing cities together to better conserve, manage, and restore forests. This includes ‘inner’ forests in the urban environment; ‘nearby’ forests that supply clean water, jobs, and recreation; and ‘faraway’ forests that help to keep climate change in check. Cities4Forests supports peer-to-peer learning and provides technical assistance to improve policies and promote local action. Together, we can ensure forests can support residents’ health & wellbeing, climate resilience, water management and biodiversity. **#Cities4Forests**

CITIES4FORESTS

Cities depend on forests—and can do a lot to support them. More than half of humanity already lives in cities, and it is likely this will increase to over 2/3 by 2050. Because urban areas are increasingly where people live and work, the public policies and procurement practices of cities—as well as the values, votes, and consumption patterns of citizens—have enormous potential to support the conservation, restoration, and sustainable management of forests. Many cities already support forests in some way, from parks and urban forests to “green infrastructure” and watershed management programs. Few, if any, have efforts to support the faraway forests that are vital for combating climate change.



1. Tongass National Forest, Alaska, USA
2. Boreal Forest, Canada
3. Acadian Forest, Canada
4. Humboldt Redwoods State Park, CA, USA
5. Salmon-Challis National Forest, ID, USA
6. Green Mountain National Forest, VT, USA
7. White Mountain National Forest, NH, USA
8. Corcovado National Park, Costa Rica
9. Amazon Rainforest, South America
10. Wistman's Wood, Dartmoor, UK
11. Killarney National Park, Ireland
12. Caledonian Forest, Cairngorms National Park, Scotland, UK
13. New Forest National Park, UK
14. Amsterdamse Bos, Netherlands
15. Mastbos, Netherlands
16. Ardennes, Belgium
17. Cévennes National Park, France
18. Pyrenees National Park, France
19. Cork Oak Forests, Alentejo, Portugal
20. Black Forest, Germany
21. Kellerwald-Edersee National Park, Germany
22. Aggtelek National Park, Hungary
23. Moss Swamp, Romania
24. San Vito Cork Oak Forest, Lazio, Italy
25. Bosco Archiforo, Calabria, Italy
26. La Palma, Canary Islands, Spain
27. Azrou Cedar Forest, Morocco
28. The Congo Basin
29. Drunken forest, Kaliningrad, Russia
30. Stolby National Park, Russia
31. Yili Apricot Valley, China
32. Arashiyama Bamboo Grove, Japan
33. Yakushima National Park, Japan
34. The Sundarbans, India & Bangladesh
35. Mossy Forest, Malaysia
36. Brindabella National Park, Australia
37. Hump Ridge Track, Waitutu Forest, New Zealand
38. Karri Forest, Australia
39. Hill Country Heights Trek, Sri Lanka
40. Taiga Forests, Finland

● 52 founding cities of Cities4Forests

● 40 beautiful forests across the world



▲ **Auckland** Urban trees in Auckland, New Zealand. Photo: Matthew Blaikie

▼ **Detroit** Waterfront park in Detroit, USA. Photo: Kahari King





▲ **Honolulu** Ka'au crater trail, Honolulu, USA. Photo: Drew Farwell

▼ **Jakarta** Green roof of the National Library, Jakarta, Indonesia. Photo: Satria SP





▲ **King County** Tree planting initiative in King County (WA), USA.
Photo: King County

▼ **Greater Manchester** The City of Trees initiative aims to plant 3 million trees,
Manchester, UK. Photo: Chris Bull





▲ **New York City** Central Park, New York City, USA. Photo: Roberto Nickson

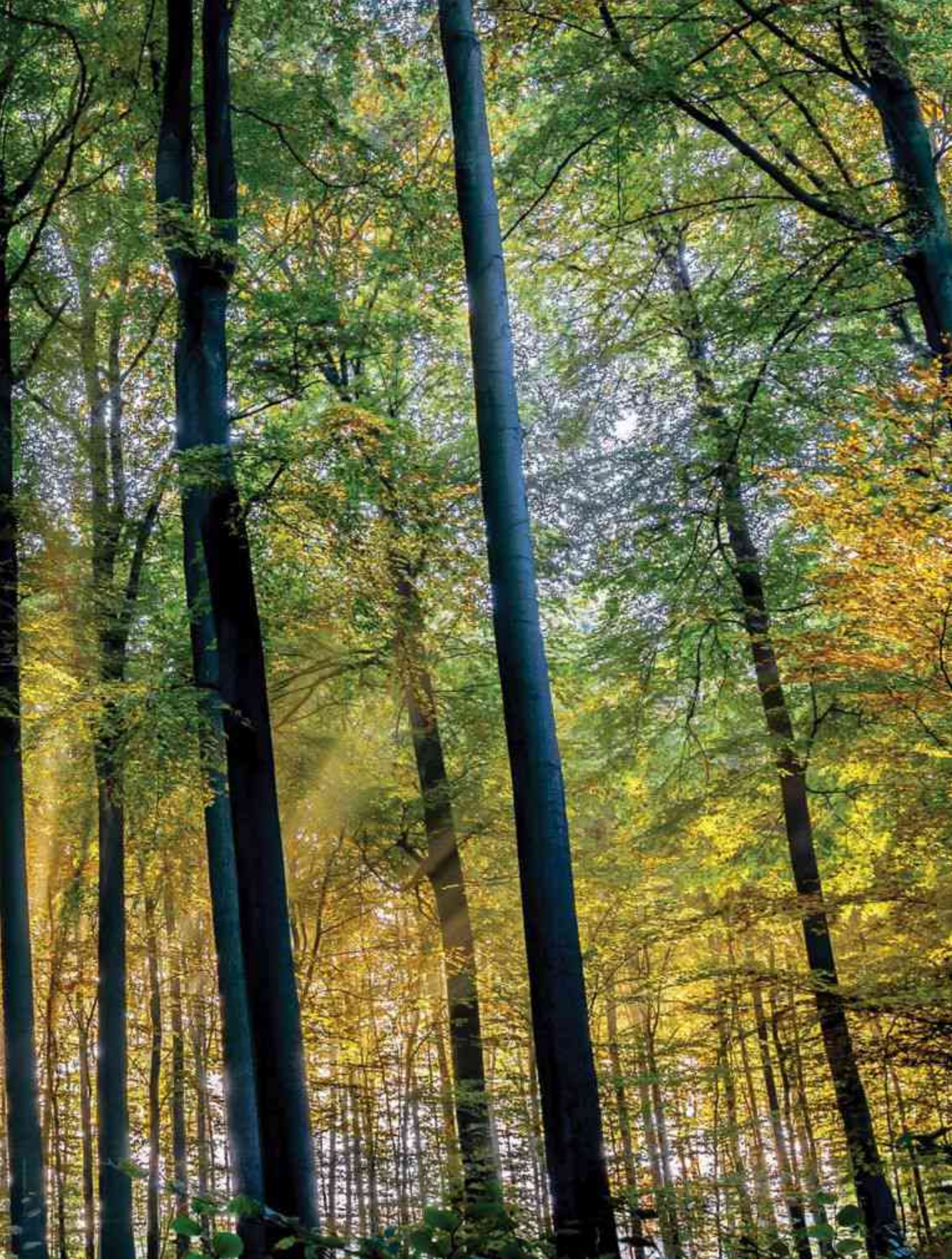
▼ **Philadelphia** Tree-lined boardwalk under the Benjamin Franklin Bridge, Philadelphia, USA. Photo: Devon Wellesley





▲ Brussels

Sonian Forest, Brussels, Belgium.
Photo: Michel Petillo





▲ **Portland** Urban trees, Portland (OR), USA. Photo: LexScope

▼ **Salt Lake City** Fall in Salt Lake City, USA. Photo: Jennifer Castner



▼ São Paulo

View of the 23 de Maio Avenue and
the Ibirapuera Park, São Paulo, Brazil.
Photo: Davi Costa





▲ Johannesburg

Jacaranda trees bloom in Johannesburg, South Africa. Photo: Pranesh Luckan





▲ **Guadalajara** Urban trees and colorful houses, Guadalajara, Mexico.
Photo: Joël de Vriend

▼ **Mérida** Green mobility, Mérida, Mexico. Photo: Jorge Zapata





▲ **Vienna** Belvedere Palace, Vienna, Austria. Photo: Daniel Plan

▼ **Washington** Cherry blossom trees in Washington, D.C., USA.
Photo: Karl Fredrickson





▲ Dublin

Flowered street, Dublin, Ireland.
Photo: Mark Dalton

► Oslo

Bay of Oslo, Norway.
Photo: Geir Anders Rybakken Ørsilien

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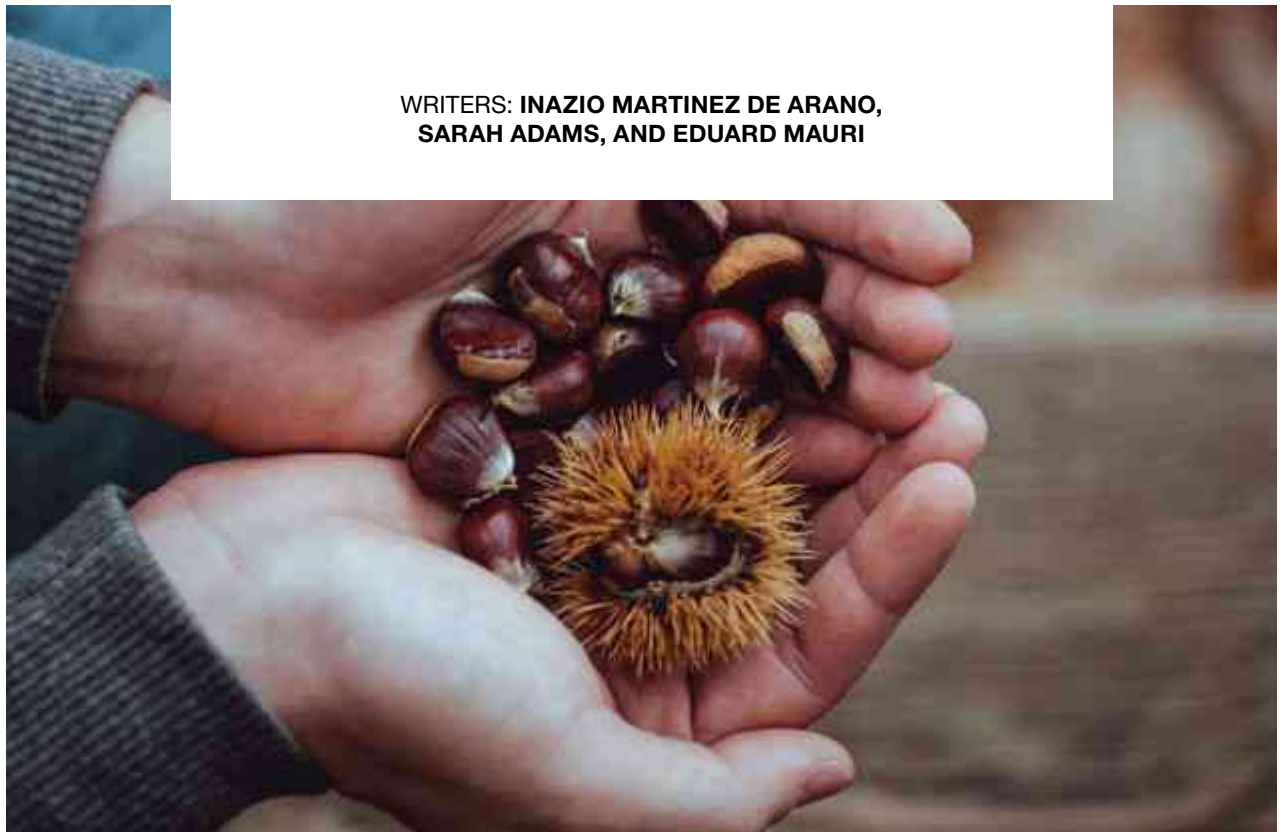
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Revealing Non-Wood Forest Products

WRITERS: INAZIO MARTINEZ DE ARANO,
SARAH ADAMS, AND EDUARD MAURI



The European Forest Institute (EFI) Mediterranean Facility explores and sheds light on the wealth of products that can boost the forest economy beyond wood.

When we think about the value of forests, we normally think about biodiversity, landscape, clear water and fresh air. When it comes to forest management and products, we think mainly about wood. It is easy to overlook the enormous potential of non-wood forest products (NWFPs) and how they can help us face societal challenges.

This is true even in the Mediterranean region, where wood production is limited and wood-based industries are not well developed. Research results from EU-funded projects like StarTree³ and INCREDIBLE⁴ are contributing to unveiling the enormous potential of NWFPs. These vital components of better preserved, better managed and better valued Mediterranean forests support more vibrant rural economies and healthier urban citizens. Surprised? We will go into the forest now to unearth some of its treasures.

Value of non-wood forest products

Non-wood products include wild and partially wild pine nuts, acorns and berries, as well as other edibles, such as mushrooms, honey, essential or medicinal herbs and fantastic natural and versatile materials, including cork and resin. Despite poor statistics and grey markets, the marketed value of non-wood forest products in Europe was estimated to be worth an enormous 2.3 billion euros. Even in wood-centred forest economies of northern or central Europe, non-wood forest products account for some 10% of the total value



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1. Forest outdoor activities, such as berry picking, can improve public health. Photo: Piotr Janus

2. Dedicated forest management is essential for ensuring production of certain NWFPs, like chestnut. Photo: Sébastien Bourguet

3. star-tree.eu

4. incredibleforest.net

5. Cork is only produced in the Mediterranean basin in high biodiversity forests. Photo: Donald Scott

6. Closeup of oak bark after the cork harvest. Photo: LBM1948

of round wood. Because of relatively weaker wood value chains and their very high biodiversity, these NWFPs represent a larger share of forest production in the Mediterranean region.

The opportunities offered by non-wood forest products go well beyond niche markets, small-scale activities and heritage. In fact, some rather traditional NWFPs can be found in global markets, in multiple innovative applications. For instance, in the case of cork,  which is only produced in the



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7. With over 800,000 ha of favourable pine forests, resin production represents a significant opportunity for the post-oil era in the Mediterranean. Photo: Kreuzschnabel

8. Many mushrooms and berries are collected but not actively managed. Photo: Alina Chupakhina

9. Stone pine nuts. Photo: Sven Mutke

10. Experiential tourism like mushroom-picking courses are gaining in popularity. Photo: Martin Vorel

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Mediterranean basin in high biodiversity forests, around 40 million bottle stoppers are produced daily and exported to wine producing countries around the world. But cork has a use that goes way beyond keeping wine in a bottle. Due to its excellent mechanical, thermal and acoustic properties, an impressive portfolio of innovative products have been developed, from fashion to construction and aeronautics. High-quality flooring, digitally printed wall panels, thermal protection for SpaceX Falcon rockets re-entry modules and, of course, fashion garments.

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Portugal has led this cork revolution through a strong focus on innovation and sustainable forest management. Cork is now one of its main export sectors and an inspiration to other Mediterranean cork producing regions.

New uses for ancient products

The need to transition towards a fossil fuel free economy and changing market conditions are re-opening opportunities for old, almost abandoned products, like resin. In central Spain, resin production was restored in over

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20,000 hectares (ha) of abandoned pine forests, attracting investments in new processing facilities. Natural resin derivatives are a must in the high-quality cosmetics industry and can replace oil derivatives in multiple green chemistry applications. With over 800,000 ha of favourable pine forests, resin production represents a significant opportunity for the post-oil era in the Mediterranean, even if the cost of labour is a major limitation in current market conditions.

Similarly, interest for natural tannins is coming back in Italy. *Genuine Italian Vegetable Tanned Leather* is a quality brand for the fashion industry, key for Italian leather competitiveness in global markets, showing how the importance of NWFPs go beyond their monetary value.

Indeed, the wealth of NWFPs is immense, with essential oils, medicinal herb-based products and specialty extracts from leaves, seeds and bark collected and cultivated around the Mediterranean increasingly used as raw materials for health, nutraceutical and cosmetic industries.



Over 70% of people who pick products go to the forest more than three times a year.



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A walk on the wild side

Dedicated forest management (with a range of management intensities) is essential for ensuring production of certain NWFPs, for example cork, resin, as well as chestnut and pine nuts in certain regions. Yet there are also many relevant *wild forest products*, which are collected but not actively managed. This is the case for many mushrooms and berries as well as for some honeys and medicinal or decorative plants.

The lack of data and statistics should not mislead us when judging the relevance of these wild forest products. A household survey conducted in 2015 by the StarTree project, asked 17,000 European citizens about their wild NWFP consumption habits – the results are astonishing: it turns out that over 90% of Europeans consumed some type of wild forest product every year; more

importantly, 35% of rural and 22% of urban respondents picked or harvested products themselves during the year, although with big regional differences, and with relatively more people picking the products themselves in Nordic and central Europe and fewer in southern and Atlantic countries. Over 70% of people who pick products go to the forest more than three times a year.

Non-wood forest products and urban lifestyles

Like many areas around the world, Mediterranean Europe is facing increasing urbanization, with almost three quarters of the population living in cities, towns and suburbs. Citizens live in increasing isolation from nature and

outdoor experiences and this is already becoming a public health problem. The concept of *Nature deficit disorder* describes the human costs of alienation from the natural world and this has a specific impact on children.

Meanwhile, the lack of opportunities in rural areas leads to rural abandonment and human desertification, or else over-exploited, fragile agro-ecosystems. In this context, the attraction potential of NWFPs and their capacity to bring citizens to nature must be leveraged to improve well-being in urban areas and a more balanced rural-urban relationship.

Some NWFPs benefits

There is considerable potential for wild, non-wood forest products to encourage nature-based tourism →

**Nature deficit
disorder is the cost
on human mental
and physical
health of being
alienated from
the natural world;
this disconnection
serious impacts on
all ages, especially
children.**



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11. Wild and traditional products are increasingly present in the menus of quality restaurants, regional gastronomic offers, thermalism and spas. Photo: Camila Meim

12. The positive effects on human health of forest outdoor activities, such as mushroom and berry picking, can improve public health and represent significant savings to the medical bill. Photo: Sandis Helvigs



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and generate income in rural areas. The experiential tourism mega-trend is behind innovations using NWFPs as iconic products in territorial marketing initiatives for branding a geographic area and networking its actors, such as the *Strada del porcino*, the *Route de la châtaigne*, and others. Mycological tourism, showing traceability of wild food from the forest to the restaurant or mushroom-picking courses are gaining in popularity and making it onto mainstream TV. In experiential tourism, visitors' experiences are essential to the value.

Linked to this is a second growing mega-trend towards a greater appreciation and use of locally-sourced, natural, traditional and wild resources. Wild and traditional products are increasingly present in the menus of quality restaurants, regional gastronomic offers, thermalism and spas. Linking NWFPs with tourism, short value chains and

direct sales are good opportunities for diversifying income sources and providing employment in rural areas. In addition, the positive effects on human health of forest outdoor activities, such as mushroom and berry picking, can improve public health and represent significant savings to the medical bill. The question now is if we be able to translate those saving into investments to develop the necessary infrastructure and marketing strategies to boost social innovation in NWPF-rich rural areas.

What needs to be done

Developing NWFP-based economies presents structural limitations that need to be overcome. One critical limitation is seasonal and yearly variations in availability and quality of certain non-wood forest products. No rain, no mushrooms: it is as simple and as complex as that.

A lack of a continuous, reliable flow of fresh products jeopardizes any effort to achieve a stable critical mass of products for the market.

The problem is exacerbated by the frequent atomization of supply and a typical lack of collaboration among actors along the different value chains. Typically, individual collectors sell a product to middlemen in largely, grey, informal markets. This limits traceability and respect for minimum standards for product storage and health. Non-registered transactions lead to tax evasion and, more importantly, can facilitate unfair labour conditions and conflicts between professional and leisure pickers. To improve supply chain arrangements, it is therefore essential to regulate harvesting rights and modalities, allowing that products can be traced (extremely important for edibles), avoiding unfair employment conditions, and balancing





13. Photo: Nick Grappone

the rights of the local population and hobbyist with the needs of more professionalized operators.

Action must be taken to facilitate better cooperation among collectors and between collectors and processors. Modern digital technologies can help, with Internet-based portals and social networks becoming relevant commercialization channels and a great opportunity for NWFPs. One example is a high-quality brand for wild mushrooms developed in the Spanish region of Castilla y Leon, that integrates interested agro-food operators, guaranteeing consumers geographic origin, sustainable picking, safety, and high visual and culinary quality, while also establishing economies-of-scale and joint marketing efforts. The brand builds upon a comprehensive effort that includes awareness and marketing campaigns, new picking regulations and a network of ICT-enabled mobile selling points where people who have picked the products can sell their daily

harvest with full web-based traceability and transparency.

In the case of already well-established, industrial products (like cork and resin) that compete in global markets with cheap (frequently non-renewable) oil derivatives, the ability to supply raw material in quantity and quality is a limiting factor. Could it be that high labour costs and tight completion in the markets is the reason why limited cork or resin is produced in high-income countries like France or Italy?

It is, of course, a multifaceted problem that might require new approaches to achieve profitability, for example by combining NWFP production with wood and other goods or services, supported with Payments for Ecosystem Service type schemes such as in *dehesas* or *montados*. Is also about investing in research and development, promoting entrepreneurial attitudes and improved access to finance for forest bioeconomy start-ups.

Could non-wood forest products safeguard our future?

In the northern Mediterranean, forests are expanding as rapidly as villages are emptying and traditional agricultural activities are abandoned. There is little incentive and capacity to manage forests and, thus, to adapt actively to climate change and to better prevent the increasing risk of mega-fires. In southern and eastern Mediterranean countries, where rural areas are more densely populated, the lack of sustainable revenues from the forest leads to increased deforestation pressures that can be overcome by strong governmental policies. In both cases, society seems to have lost the capacity to generate sustainable value from forests. Being able to create more worth from forests by leveraging the potential of non-wood forest products in comprehensive, transdisciplinary strategies could provide the necessary economic engine to implement sustainable forest management and to help our forests, and our society, navigate the stormy waters of global change. ●



European Forest Institute Mediterranean Facility (EFIMED) promotes and conducts research, policy advice and networking on Mediterranean forests, forestry and forest products. EFIMED has a strong focus on capacity building on key scientific priorities identified for the Mediterranean region and brings a Mediterranean perspective to EFI's three strategic areas of focus: Bioeconomy, Resilience and Governance.

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Urban Forests Make Cities More Sustainable

WRITERS: MICHELA CONIGLIARO & SIMONE BORELLI

By 2050, it is estimated that cities will host an additional 2.5 billion urban dwellers. Such rapid urbanization is likely to have a tremendous impact on the health of inhabitants, surrounding resources and the environment. Urban forests offer an effective solution for making cities healthier, safer, and more sustainable places for all.



Cities consume around 80% of total energy produced in the world, emitting 75% of global carbon emissions and producing 70% of global waste. These figures are substantial considering cities only cover 3% of the Earth's surface. But by 2050, it is estimated that cities will host additional 2.5 billion people with most urbanization occurring in mid-sized cities of less developed regions, notably in Africa and Asia. While trees and forests are typically among the first resources affected by urbanization, their preservation and management are key to mitigating the costly effects of urbanization. [→](#)

Trees improve quality of life

Urban forests are invaluable for sustainable urban development, increasing the overall well-being of urban communities. A green city where trees and forests are grown and managed in harmony with the urban environment is a healthier and safer place to live. Trees act as natural filters, absorbing harmful air pollutants released from the burning of fossil fuels from both traffic and industry. In 2002, the 2.4 million trees in the center of Beijing, China, removed 1261.4 tons of pollutants from the air. Such pollutants—including gases and particulates—are the leading cause of the increasing prevalence of respiratory diseases among children and adults living in urban areas. According to the World Health Organization, these pollutants also cause the premature death of 3 million people every year, proving that trees are essential to the health of urban inhabitants.



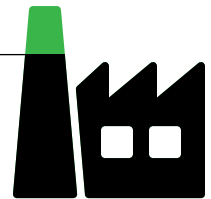
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Providing open space for recreational activities also promotes healthier lifestyles, decreasing the occurrence of obesity and cardiovascular disease, while the aesthetic appeal of green space is beneficial to mental health. Covering pedestrian pathways and recreational areas, trees also improve the climate of cities by offering shade during the heat of summer and shelter

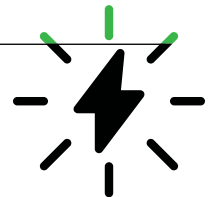
from heavy rains. Thanks to their screening and shading effects on buildings, properly placed trees may also save energy by reducing the need for heating and cooling, providing environmental and economic benefits. By increasing the health and well-being of urban dwellers, trees and forests indirectly lower the cost of health care, directly benefitting public administrations.

Urban forests contribute to increased social equity, promoting a sense of community that helps to ensure the preservation of local cultural values.

**Cities emit
75% of global
carbon
emissions**



**Cities consume
around 80% of
global energy**



**Cities produce
70% of global
waste**





1. Interlace building, Singapore. The building actually added greenery to the space: due to the rooftop gardens and other greenery added to the structures, they calculated there is now 112% greenery after construction! Photo: Klaus Tan

2. Summer Palace, Beijing. Photo: Francisco Delgado

3. Trees act as natural filters, absorbing harmful air pollutants released from the burning of fossil fuels from both traffic and industry. Such pollutants—including gases and particulates—are the leading cause of the increasing prevalence of respiratory diseases among children and adults living in urban areas. Photo: Liam Burnett

4. The 19-kilometer Fuzhou trails wind through five major mountain and forest parks in the urban area and is China's longest urban forest trail and a good place for citizens to get close to forests. Photo: Lennartbj

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Environmental benefits of urban forests

Trees also make cities safer places to live. Around 60% of urban dwellers live in areas at high risk of exposure to natural hazards, with flooding and droughts being most prevalent. Capturing rain, increasing the permeable surface of the city, retaining water, and stabilizing the soil, trees and forests lessen the likelihood of natural disasters occurring in urban communities. Successful afforestation projects have helped reduce the threat of landslides in urban areas worldwide, including Lima, Peru, demonstrating that planting trees can be the most cost-effective means to increase the safety of local communities.



What is an urban forest?

Urban forests can be defined as networks or systems comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas; they include, therefore, forests, street trees, trees in parks and gardens, and trees in derelict corners. Urban forests are the backbone of the green infrastructure, bridging rural and urban areas and ameliorating a city's environmental footprint.



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The contribution forests have within cities is also evident in terms of the products and income they generate. In many cities, urban forestry practices, such as the collection of edible plants, planting of fruit-bearing trees or establishing of multifunctional public parks, can contribute to the availability of food within cities. As many urban dwellers in developing countries still heavily rely on charcoal and fossil fuels for heating and cooking, forests and woodlands located around urban areas can also be planted and managed for timber and wood fuel, reducing the pressure on natural forests. In terms of economic benefits to cities, the management of trees and forests creates new job opportunities, while their presence increases property values and attracts business and tourism.

By maintaining an ecological continuum with surrounding rural areas, urban forests support the conservation of



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local ecosystems and biodiversity. Well maintained, healthy peri-urban forests are fundamental to ensuring the supply of quality water to cities and the protection of watersheds, maintenance of reservoirs, and filtering of pollution. By providing shade and cooling the environment, trees in urban areas support communities to adapt to

5. Urban reserve project, Bogotá, Colombia.
Photo: Alcaldía de Bogotá

6. Landslide near Cusco, Peru, 15 March 2018.
Photo: Ministerio de Defensa del Perú



Tree Cities of the World

Celebrating greener cities worldwide

Now more than ever, trees and forests are a vital component of healthy, livable, and sustainable communities around the globe. Urban forests help define a sense of place and well-being where people live, work, play, and learn.

We invite your community to become part of the Tree Cities of the World programme, an international effort to recognize cities and towns committed to ensuring that urban forests and trees are properly maintained, sustainably managed, and duly celebrated.

This is your opportunity to connect with cities around the world in a new network dedicated to sharing and adopting the most successful approaches to managing community trees and forests.

Standards for Recognition

Recognition through the Tree Cities of the World programme represents the first step toward achieving a green vision for the community. To receive recognition, a town or city must meet five core standards:

- **Standard 1: Establish Authority**
The community has a written statement by city leaders delegating responsibility for the care of trees within the municipal boundary to a staff member, a city department, or a group of citizens—called a Tree Board.
- **Standard 2: Set the Rules**
The community adopts policies, best practices, or industry standards for managing urban trees and forests. These rules describe how work must be performed, where and when they apply, and penalties for noncompliance.
- **Standard 3: Know What You Have**
The community has an updated inventory or assessment of the local tree resource so that an effective long-term plan for planting, care, and removal of city trees can be established.
- **Standard 4: Allocate the Resources**
The community has a dedicated annual budget for the routine implementation of the tree management plan.
- **Standard 5: Celebrate Achievements**
The community holds an annual celebration of trees to raise awareness among residents and to acknowledge citizens and staff members who carry out the city tree programme.

Gain Worldwide Recognition

Join this new, global network of communities recognized as leaders in the sustainable management of urban trees and forests. You may already be using innovative practices that keep city trees healthy and growing. Now you can share your successes in planting and tending the urban forest of your community and learn from others around the world.

A Programme Partnership Between the Arbor Day Foundation and the Food and Agriculture Organization of the United Nations (FAO)

The Arbor Day Foundation inspires people to plant, nurture, and celebrate trees in order to solve some of the world's biggest challenges: poverty, hunger, clean water and air, climate change, and species loss.

FAO supports the development of urban and peri-urban forestry actions, projects, and strategic planning tools that promote a sustainable and resilient model for city development around the world.

www.arborday.org/programs/tree-cities-of-the-world



Food and Agriculture
Organization of the
United Nations



climate change. Lastly, on a grand scale, trees in and around cities contribute to climate change mitigation by absorbing carbon dioxide and reducing global carbon emissions.

The benefits of urban forests are manifold and cities should strive to integrate forests and trees fully into urban planning. Doing so in an inclusive manner — by involving all stakeholders in the planning, design and management of urban forests from the very beginning—would ensure the optimization of these very benefits.

7. Forests and trees should be integrated into urban planning. City model of Shanghai in the Urban Planning Museum of Shanghai (China). Photo: Ekrem Canli

8. Proceedings available, visit: www.wfuf2018.com

9. www.arborday.org/programs/tree-cities-of-the-world/

The first World Forum on Urban Forests (WFUF)⁸ organized by FAO and other partners in Mantova (Italy) in November 2018 gathered together more than 600 experts from 70 countries to share experiences, knowledge and lessons learned on urban forestry implementation around the world. One of the main outcomes of the event was the *Call for Action* – a document intended to provide a reference for cities that aim to develop communities where urban and peri-urban forests help to achieve the Sustainable Development Goals (SDGs) and are recognized for the wide range of benefits they provide. The achievement of such an ambitious goal is supported by the *Tree Cities of the World*⁹ program, which is an international scheme developed by Arbor Day Foundation and FAO that aims to acknowledge the efforts



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The ZERO BRINE project (www.zerobrine.eu) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 730390.

made by cities in implementing concrete actions to enable the environment for urban forests and green spaces to be managed efficiently. The program is also aimed at encouraging cities that are more advanced in the management of their urban forests to share lessons learned those who are just moving the first steps, both within the same country but also through regional and international cooperation. ●



Food and Agriculture
Organization of the
United Nations

Established in 1945, the Food and Agriculture Organization of the United Nations (FAO), is a Specialized Agency of the United Nations system that leads international efforts to defeat hunger. The Organization is comprised of 194 Member States, 2 associate members and 1 member organization – the European Union. Its aim is to raise levels of nutrition and standards of living for all people in FAO member countries, to secure improvements in the efficiency of production and distribution of food and agricultural products, to ensure the sustainable management of natural resources and to contribute towards expanding the world economy and ensure humanity's freedom from hunger. FAO is present in over 130 countries. Visit: www.fao.org



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This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement N° 768921.



Climate Change: Catastrophe or Opportunity?

WRITER: **VANESSA VIVIAN WABITSCH**

We have all heard of climate change, but we are not really aware of the repercussions. What does it truly mean and what can we do to mitigate and adapt to its effects? Adaptation of our energy system is essential and provides plenty of growth possibilities for society, economy and environment.

The Earth is at the tipping point – human activity is changing the planet more than all other natural forces combined. Our legacy will be human-induced climate change. Many people talk about the current geological epoch as the “Anthropocene Era” in which humans are the primary cause of permanent planetary change. I have read a lot about climate change, but it was when I was hiking up the Franz-Josef glacier,

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New Zealand, that I commenced to understand its true impact. Instead of walking on glacial ice – as it used to be, we were climbing up grey rocks next to a river of melting water flowing down. Reaching the last bit of this once impressive glacier after a couple of hours, the questions arose: “Am I truly aware of the impact of climate change and are we doing enough to limit the irreversible and seemingly irrevocable consequences?”

The reason for the rising temperature on Earth is the thickened atmosphere caused by carbon emissions due largely from burning fossil fuels. “The energy trapped by global warming pollution is now equivalent to 400,000 Hiroshima atomic bombs per day 365 days per

year”, says James Hansen, former Director of NASA Goddard Institute for Space Studies. The effects of the changing temperature are visible everywhere across the world and appear differently from region to region, ranging from air pollution to extreme temperatures, to heat waves and natural disasters that affect society, economy and the environment. Air pollution alone kills some 7 million people per year; in Poland, it causes the premature death of 50,000 people every year, according to the World Health Organization. Heat waves occur across the globe leading to drought, water and food scarcity in the heat belt of the planet. “In the future, the climate in large parts of Middle East and North Africa could [...] render some regions uninhabitable, →



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1. Franz-Josef glacier, New Zealand. Photo: Matt Palmer

2. Pasterzen Glacier and Großglockner, Austria. Comparison between the glacier position in 1995 and today. Photo: H.Raab

3. Air pollution alone kills some 7 million people per year; in Poland, it causes the premature death of 50,000 people every year, according to the World Health Organization. Photo: Desmond Simon

which will surely contribute to the pressure to migrate”, says Jos Lelieveld from the Max Planck Institute for Chemistry. Looking at the economy, it is no longer profitable to stick to the old system. In 2017, overall losses from world-wide natural catastrophes totaled \$330 billion dollars, up from \$184 billion in 2016.



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Looking at Europe, climate change leaves its marks as well. Extreme weather is significantly more frequent, including heat waves, higher river floods and forest fires in the continental region. For example, May 2018 was the hottest on record in Sweden and United Kingdom. Extreme heat leads to droughts, competition for water, more energy needs and heat casualties. Mountainous areas have to deal with the impact of rising temperatures affecting the environment and economy. For instance, there is a higher risk of forest pests and species extinction; and less snow and melting glaciers leads to a decrease of ski tourism. The Bavarian State of Ministry for the Environment flags that most of the Bavarian glaciers will likely disappear within the next 20-30 years.



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Climate change triggering growth

As dire the situation, as thrilling are the solutions. In fact, climate change and limited natural resources are a change agent to move away from an outdated economy and energy system like the linear economy and non-renewable energy supply. Transforming a linear to a circular economy and a non-renewable

to renewable energy scheme offers tremendous economic and social growth opportunities in greater harmony with the environment.

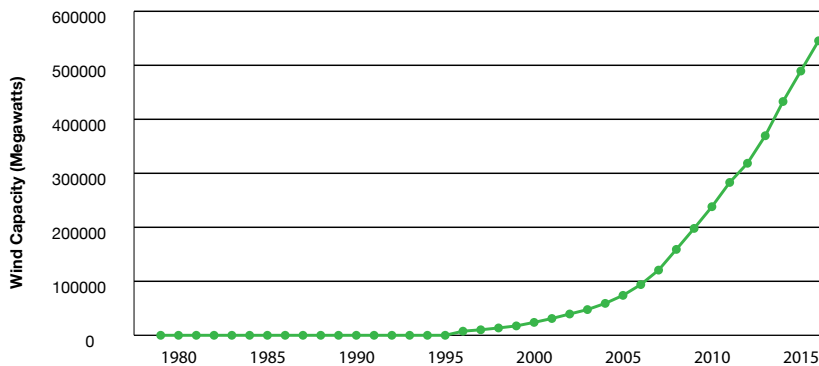
Renewable energy (particularly wind and solar) has shown exponential growth. What was once a niche technology is now firmly in the mainstream and renewables will capture 2/3 of global investment in power plants by 2040 as they are for many countries the least cost-energy generation source according to the International Energy Agency World Energy Outlook 2017. The cost of onshore wind turbines has fallen dramatically in the last decades. Meanwhile, wind power is the cheapest energy to produce in 

**Wind could supply 40 times
all the electricity used by our
global economy.**



8

Global Wind Energy Capacity (1980–2107) ⁽⁹⁾



4. A father carries his daughter on the shoulders as residents flee rising waters in search of shelter, after heavy rains caused by tropical storm "Noel" flooded their homes in Cité Soleil, Haiti. Photo: UN/Logan Abassi.

5. Dried-up watering hole, Arizona, USA. Photo: Joshua Brown

6. Severe flood in the town of Bingley, UK, 2015. Photo: Chris Gallagher

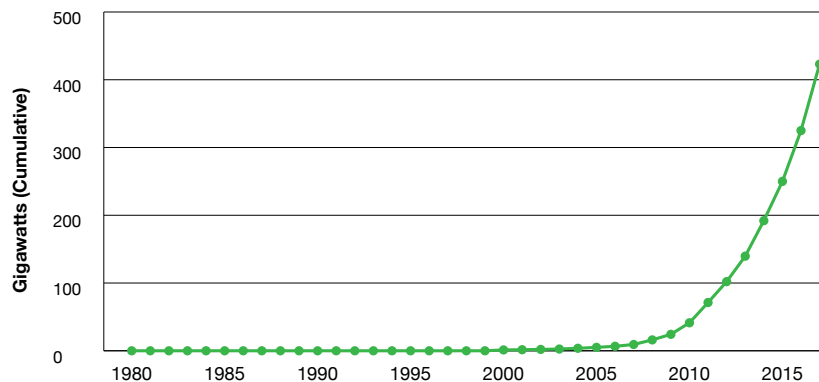
7. Cessnock Bush Fire, Australia, 2013. NSWRF & FRNSW responded numerous appliances to a bushfire burnign for the second day around the Cessnock town of Aberdare. Photo: Quarrie Photography

8. Contracted workers clean Heliostats at the Ivanpah Solar Project, owned by NRG Energy, Bright Source Energy, Bechtel and Google. Over 300,000 software-controlled mirrors track the sun in two dimensions and reflect the sunlight to boilers that sit atop three 459 foot tall power towers. The facility employs over 65 operations and maintenance workers and over 2,600 jobs during it's 3 year construction period. Photo: Dennis Schroeder/NREL

9. Data: Earth Policy Institute/Bloomberg New Energy Finance

10. Data: Earth Policy Institute/BP, *Statistical Review of World Energy June 2014* (London: 2014); Bloomberg New Energy Finance

World Solar PV Installations (1980–2107) ⁽¹⁰⁾



Germany and the United Kingdom even without subsidies. The prices can even go below zero, meaning consumers are paid to use electricity because of surplus supply of energy. Germany experienced negative electricity prices more than 100 times in 2017. Furthermore, renewable electricity supply now meets more countries' needs for energy – this was the case in Germany, Portugal and Denmark in 2018. Wind could supply 40 times of all the electricity used by our global economy.

Key to a successful energy transition is storage that is growing exponentially as well. According to Bloomberg New Energy Finance, the global energy storage market is projected to double six times between 2016 and 2030, rising to a total of 125 gigawatts/305 gigawatt-hours. This is similar to the remarkable expansion that the solar industry went

through from 2000 to 2015, in which the share of photovoltaics as a percentage of total generation doubled seven times. The combination of batteries, solar, other renewables and storage systems is going to cause a dramatic transformation in the world's energy markets – moving from a centralized to a decentralized system that empowers consumers.

The successful implementation of clean energy around the globe requires climate action at policy, business and consumer levels, which means a parallel bottom-up and top-down approach. At the UNFCCC Climate Conference COP24 in December 2018, nearly 200 governments agreed on rules to put the climate agreement into action, a strong push towards decarbonization not achieved to that point. China and India are both on track to overachieve



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their Paris Agreement commitments. China and India are projected to reduce global carbon emissions by roughly 2-3 billion tons by 2030 due largely to significant reduction of their coal use in both countries – something that nobody could have imagined 5 years ago. Yet, observations show they are now on the track to overcoming this challenge. The European Union agreed to increase their binding renewable energy target to 32% by 2030, up from the previous goal of 27%, this agreement will be revisited in 2023.

China and India are both on track to overachieve their Paris commitments.

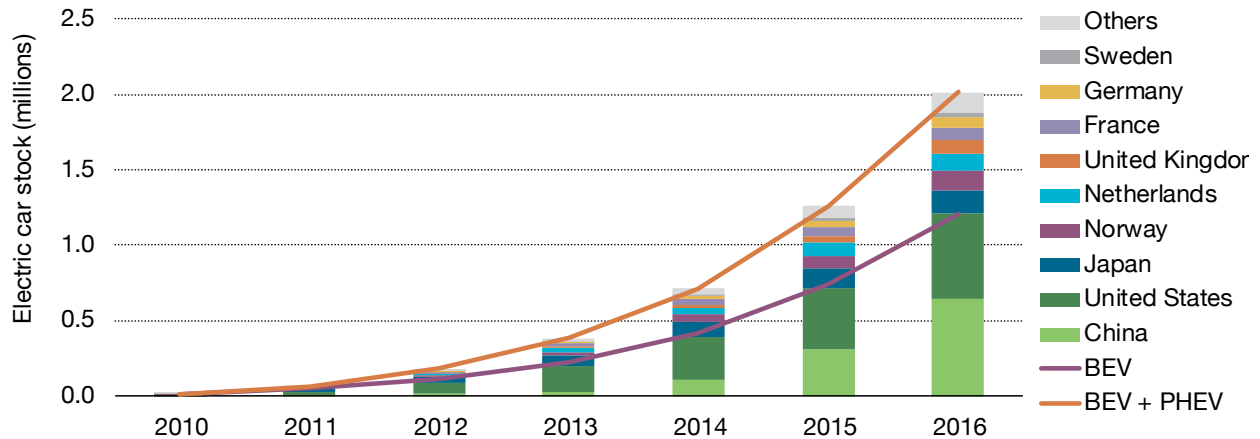


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Evolution of the global electric car stock, 2010-16 ¹⁴



Towards the new business as usual

Political support combined with available technologies and consumer demand opens plenty of economic opportunities. Over 120 of the world's leading businesses commit to 100% renewable electricity used across their operations and join RE100 – a global initiative uniting the world's largest companies such as Google and Coca-Cola. Car companies like BMW, Toyota, General Motors or Mercedes invest in electric vehicles in order to stay competitive – Volvo went one step further and announced that new models will be only electric or hybrid as of 2019. These developments show that if a company wants to stay competitive it needs to integrate clean technologies in their business model. Globally, more than 10 million people now work directly or indirectly in the renewable energy sector, with Europe counting more than 1 million people, according to IRENA.

The reality is that our climate is changing at a faster pace than we can see with tremendous impacts on society, economy and environment. To avoid the damage of further catastrophes such as shifting societies and migration caused

Climate Reality Project:

The Climate Reality Project is a non-profit organization focusing on education, advocacy and communication related to climate change. The Climate Reality Project came into being in July 2011 as the consolidation of two environmental groups – the Alliance for Climate Protection and the Climate Project – both of which were founded by Al Gore. Among its activities, the Climate Reality Project hosts an annual event called 24 Hours of Reality, the network Climate Reality Leadership Corps of 10,000+ Climate Reality leaders worldwide and, in 2013, launched Reality Drop, a climate change news aggregator and social media tool.

by natural forces, it is essential to switch to a more renewable energies and more circular economy business models. This transformation provides growth opportunities on socio-economic and environmental levels – people have more jobs, businesses stay competitive and nature stays in balance – which again is the condition for healthy societies and economies. Let's take this tipping point as a chance and choose socio-economic growth attuned to nature. ●

11. Two young Alaskans working on a wind turbine component. Photo: Alaska Center for Energy and Power

12. Coal power plant in China. Significant reduction of their coal use in both China and India should reduce global carbon emissions by roughly 2-3 billion tons by 2030. Photo: Tobias Brox

13. A young boy complete his homework by solar-powered lamp, Zambia. Photo: Patrick Bentley/SolarAid

14. Source: Global EV Outlook 2017

The Essence of Communicating Climate Change

REVOLVE talked with climate change communication expert George Marshall at COP24 in Katowice, Poland about how to better engage people in acting on climate solutions.

In your book *Don't Even Think About It*, you state that people are aware of climate change but then why are we reluctant to take action?

The reality is that we are designed to ignore things – to block things out. Normally that is balanced by an internal system that makes dangerous things impossible to ignore. The problem with climate change is that it does not send those signals. It is something that we intellectually can understand but it does not have those alarming signals. It is something we can understand intellectually as a threat, but emotionally we don't get it. It has many qualities that we are good at ignoring – for example, things in the future, are things we don't pay much attention to.



GEORGE MARSHALL

George Marshall has 30-years experience at all levels of communications and advocacy – from community level protest movements, to senior positions in Greenpeace and the Rainforest Foundation, to advisory roles for governments, businesses and international agencies. He is an award-winning documentary-maker and writes regularly on climate change issues including articles for *The Guardian*, *The New Statesman*, *New Scientist* and *The Ecologist*. He has written two books: *Carbon Detox (Hamlyn Gaia, 2010)* which addresses personal behaviour, and *Don't Even Think About It: Why our Brains are Wired to Ignore Climate Change (Bloomsbury US, 2014)*.

important. Here for example in Katowice, there are 1000s of events, 90% are technical, policy, science and impacts. Only 5 events specifically talk about communicating climate change. People who are acting on climate change believe and accept the science. They think it is easy – but they forget that nothing, no policy can work until people understand it. What we have been doing wrong is we have been depending on just information. We need to recognize that climate change is a very big issue and means different things to different people. We need to talk to people in ways that is carefully tailored to who they are, what they care about and what makes them who they are. **The big thing is that we have to stop calling climate change an environmental issue, because then the only people who listen are those who care about the environment.**

What is the problem with climate change communication and what is the best way to communicate climate solutions?

One problem is that people still don't understand that communication is so

**With climate change,
we have to make decisions
now in expectation of a threat
in the future.**

What is the role of media in communicating about climate change?

Let's open up the idea of media. Now the media is very distributed – what is important is that each aspect speaks differently to different audiences – a lot of media is now social media too. This is a challenge and an opportunity – the challenge is that people who are not talking about climate change they will never get exposure to climate change, because in their social media world nobody is talking about it. A big problem is that for a large part of the population there is complete silence. The challenge is how to feed a conversation into these groups so that people are starting to have a conversation. In some places that works very effectively. For the big news media, the problem is that they

think of this as a big international environmental story and they fail to make a connection. There are organizations around the world that help with that and make the big media talk about climate change in a much more local way. The real opportunity lies with social media.

What are the 20% that will do 80% more effective climate change communication?

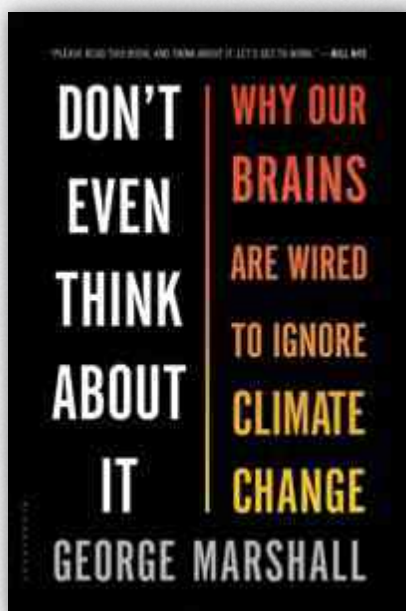
The first thing is that we have to break the silence and start talking about it. We have to talk about climate change silence the same way we talked about racism, gender issues – all areas where we had silence. Often the big changes happened because people were breaking the silence. Next, we have to support and encourage a much wider range of

voices. Too much of this is coming from one place: it is coming from people like me – well-educated middle-class environmentalists. That's what's happening here – COP24 is thousands of very well-educated policy people. We have to find other people to talk. We have to find coal miners, farmers, mayors, car workers, priests to talk about climate change. The people only trust the problem, if they trust the communicator. The big issue with climate change is that people don't trust the communicator. **Also, we have to talk about adapting and preparing for the new conditions that climate change brings to your community rather than changing the way of life because of climate change.** ●

Read the full interview on revolve.media



Climate Outreach was set up in 2004, with a mission to help people understand climate change in their own voice and has since become Europe's leading climate communication organization. Their team of social scientists and communication specialists support partners in communicating climate change in ways that resonate with the values of their audiences and create the types of climate conversations that lead to action. Climate change demands a response across society, from people of all ages, faiths, nationalities and sides of the political spectrum. Climate Outreach's mission is to engage people with climate change from their perspective – in ways that go beyond photographs of polar bears and complicated graphs.



Don't Even Think About It: Why our Brains are Wired to Ignore Climate Change (Bloomsbury US, 2014).

Recycled Sail Design

STATEMENT BY
CAMILLA MORELLI

From my experience, all the cloths that are used for making sails and sailing boats – that are considered a fair means of transport – are made with polyester, so they are really very harmful for the environment. The life of a sail can be between 3 to 10 years, maximum 15 years so most often the sails are thrown away because they are damaged or not useful anymore. A sail of 20 square meters or more has often many portions

of cloths that are still good and strong, so I decided to recycle them to make bags from reused sail. Directly in the sail-making loft I recycle the small parts of cloths that are discarded from new sails and with them I create small items such as wallets, cardholders, and wristlets. I have a small business, but I think it is important to develop more and more the idea of recycling in the nautical branch as well as in all small

businesses, because often in Italy the nautical industry is made from small business that cooperate with buildings boats and sails. Higher respect for the environment is necessary in a production system that involves polluting products as polyester and fiberglass. ●

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2



3



4



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1



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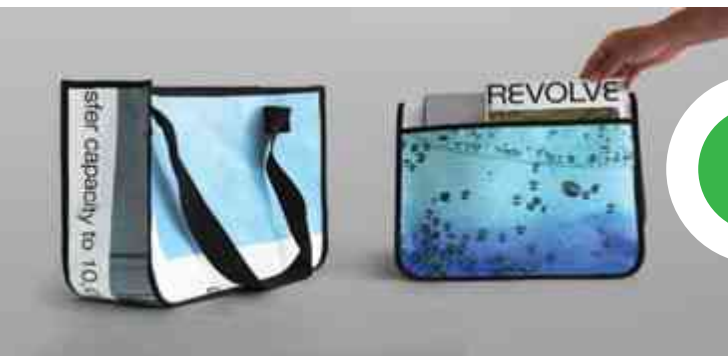
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2

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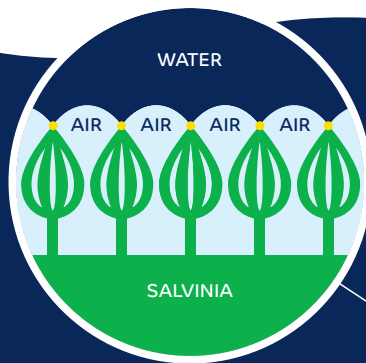
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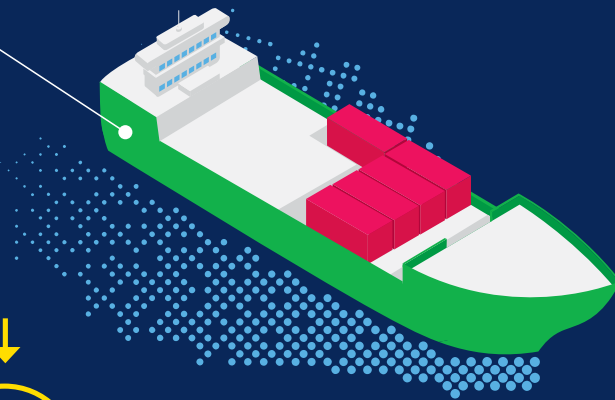
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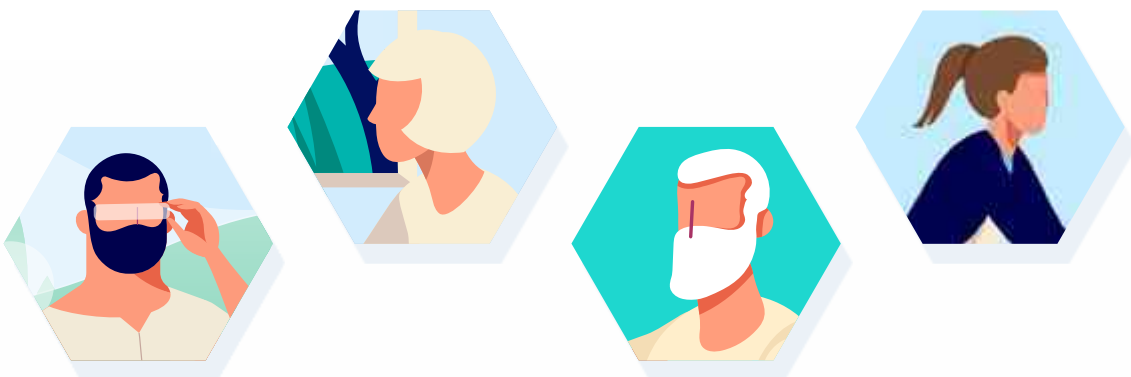
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