

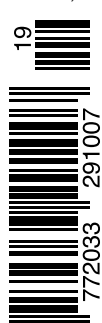
REVOLVE

 N°19 | SPRING 2016



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Repurposing Waste 7 | Soil: A Dirty Word? 60 | Liter of Light 68



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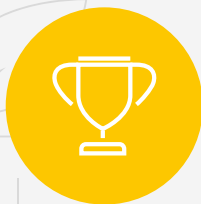
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**SUSTAINABLE
ENERGY WEEK
13-17 June 2016**

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Water Reports:



Country Reports:



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Guido Viale ('The Birth of Waste', p. 76) a sociologist and essayist, worked for research, advisory and designing companies in the economic, social and environmental fields and has collaborated as a freelance journalist. He dealt with waste for Amici della Terra association, Enea and the Ministry for the Environment. As an expert, he writes for the most important national newspapers on the environment, economy and development models.

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Visit our website: revolve.media

Cover image: Sonian Forest, Brussels.
Source: Michel Petillo.



The forest will answer you
in the way you call to it.

(Finnish proverb)

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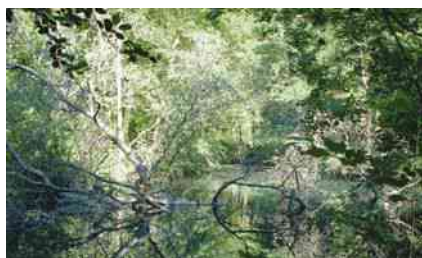
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Wieteke van Schalkwijk. Source: Michel Petillo



Introducing the Forest City Project

Writer: Wieteke van Schalkwijk

We are excited to share the first edition of our new public information campaign: the Forest City Project. Starting symbolically on March 21 – the first day of spring and the International Day of Forests – the cubes of the exhibition are first on the Esplanade of the European Parliament and then go to Square de Meeûs in the heart of the European Quarter in Brussels.

For this exhibition we touch on the vast subject of forests with a local focus on the Sonian Forest also known in Belgium as “la Forêt de Soignes” in French and “het Zoniënwoud” in Flemish. This is a forest that covers an area of 4,400 hectares and is located around southern-eastern Brussels overlapping the three regions of Belgium: Flanders, Brussels-Capital and Wallonia.

With our project we aspire to communicate the value of forests and to create greater awareness and interaction with the green areas that are surrounding us. Throughout the seasons over the last year our photographer Michel Petillo has made numerous trips to the Sonian Forest and captured the beauty of this forest. From a great variety of photos, we have made a unique selection that we exhibit together with facts and figures that may surprise and inform you.

The Forest City Project is the result of a co-creation process whereby our partners are actively part of making the exhibition and campaign a success. Different ideas were explored during the different stages. We thank our strategic and knowledge partners for their invaluable input and sharing their expertise with us.

While for the photo exhibition the focus is on the Sonian Forest, in this spring issue of Revolve Magazine the scope is broader. You will find articles written by our partners on forest-related topics such as sustainable forest management, the importance of forest certification systems, ecosystem services, forests around the world, and how soil fits into the picture.

We hope you learn as much as we did and look forward to your feedback for follow-up work on the value of forests. Feel free to contact me below. Happy reading and enjoy the Forest City Project! ☺

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#ForestCityProject @RevolveMediaCo



REPURPOSING

Brands + Sustainability

Innovative start-ups from around the world are recycling and reusing waste to make new products. By incorporating sustainability into their brands, they can provide eco-friendly products that consumers can buy with a clear conscience. *Revolve* looks at three brands that repurpose the old to create something new.

Deux Mains

www.deuxmains.com

In Port-au-Prince, Haiti, old discarded tires litter the streets, clog drainage systems, and are regularly burned as a method of waste disposal, releasing dangerous toxins into the air. Tires that avoid any of these fates end up in the ocean.

To combat this harmful practice, ethical and eco-friendly fashion brand, *deux mains designs* collects tires from the streets and bring them to their workshop where craftsmen and women who receive dignified and dependable employment, transform them into handmade sandals, totes and accessories.

Founded in 2015, *deux mains designs* has already attracted the attention of activist and designer Kenneth Cole. Together, they created the Love-Haiti Sandal line, sold online and at select Kenneth Cole retailers.



deux mains

deux mains designs sandals are handcrafted with genuine leather and have upcycled tire soles that are guaranteed to last through all of your adventures!

As *deux mains'* product line expands, so do the ways in which they incorporate environmentally conscious practices into their production. All leather used in the beautiful products is locally sourced, as are the wood, clay, and other natural materials that are used to accent products that target eco-conscious, fashion forward consumers. Many of the accessories are crafted from scrap leather found in their workshop, ensuring no material goes to waste!

A mix of city sophistication and Caribbean charm, *deux mains* craftily integrates environmentally responsible practices with high-fashion design, all the while advancing its mission to fight poverty in Haiti through fashion and dignified employment. Every *deux mains* product carries a story and every purchase turns poverty into prosperity. **Shop *deux mains* today and take your first step to ending poverty!**

Instagram: @deuxmainsdesigns

Waste
www.waste-lb.com

Starting operations in 2006 In Beirut, Lebanon, WASTE turns advertising banners into handcrafted bags, accessories and furniture. Reusing discarded canvases is a way to doing business and of caring for the environment.



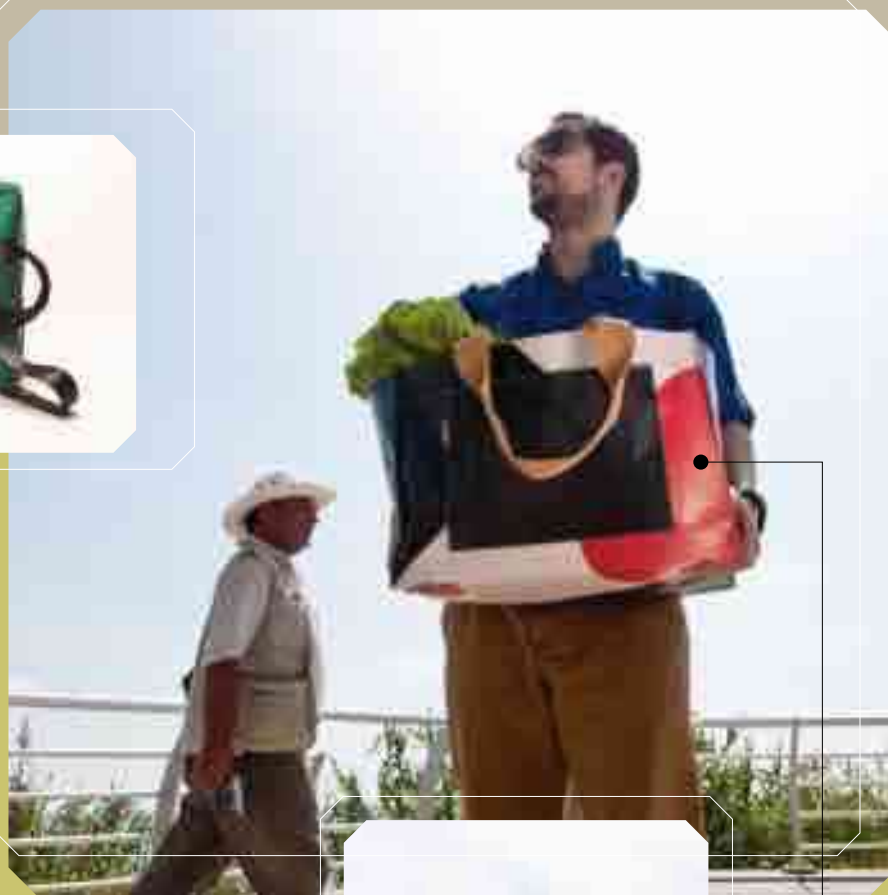
Bike Bag

It always goes your way whatever the weatherman says. With a capacity of 7.5 liters it fits comfortably on the front or back of your bicycle and was additionally designed to be carried as a shoulder bag. Handmade from water repellant banner material with uniquely selected visuals.



Business Bag

Carries your daily essentials and computer. Converts into a backpack which also makes it a great travel companion. Outer shell from water repellant advertising banners and inner tubing.



Ipad Sleeves

Not just a sleeve, this one is smart enough to turn off the iPad as it slides in while a seatbelt strap comfortably pulls it out turning it back on again. Water repellant body from reused banners.

Kees es-Souk

Your must have daily bag for carrying anything from groceries to beach-wear with an external pocket that fits an iPad. Durable and water repellant body from reused banners and heavy duty straps from seatbelts.

“Up-fuse” is an Egyptian based social enterprise promoting an ethical and eco-conscious lifestyle. We design and produce bags with a design edge, carrying journeys that connect our customers to our producers. Being handmade, every product is unique in term of colours and patterns; created with a touch of love and individualism. Every material we use in our products is either environmentally friendly or locally produced, promoting the skills and talents of local artisans in Egypt and valuing social responsibility.

Currently we are collaborating with a local NGO called “Roh El Shabab” in the Garbage City of Cairo, where we teach students the upcycling technique as a craft to encourage them to finish their education while generating an income to support their families and work in healthy conditions. A part of our revenue goes back to the NGO to support youth to engage in a co-education curriculum.

up fuse
www.up-fuse.com

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Managing European Forests Responsibly

– for People, Climate and Nature

More than 1/3 of Europe is covered by forests, providing a wealth of natural resources, delivering important economic, environmental and social values for the benefit of all Europeans and an enormous potential to mitigate climate change. Up to 1/3 of Europe's forests are owned by States, which means that they belong to the citizens of Europe! State Forest Management Organizations look after Europe's forests and practice multifunctional and sustainable forest management of the highest standards for the benefits of all.

Writer: Gerd Thomsen





God is big, but the forest is bigger.
(Brazilian proverb)



State Forests Deliver

Economic Value

- Acting as a cornerstone of Europe's bioeconomy by producing over 1/3 of the EU's timber harvest
- Creating and maintaining economic prosperity and jobs, especially in Europe's rural areas
- Serving as reliable partners for research and innovation in the forest-based sector
- Leading the way in providing the necessary conditions for Europe to move towards a bio-based green economy

A photograph of a forest. In the background, several tall, thin, light-colored tree trunks stand vertically. The foreground is filled with dense, low-lying vegetation, including ferns and other plants, many of which have turned vibrant shades of orange, red, and yellow, indicating autumn. The lighting is soft, suggesting a slightly overcast day or filtered sunlight.

Environmental Value

- > Acting as forerunners in the use and development of ecologically sound silvicultural methods of sustainable forest management that allow forest ecosystems to adapt to climate change
- > Maintaining a home for biodiversity and protecting endangered species through the management of most of Europe's Natura 2000 network and other protected areas
- > Helping to regulate and control changes in the climate by providing carbon sinks and carbon-neutral raw materials
- > Supporting fundamental natural processes such as nutrient and water cycles and protecting the soil
- > Maintaining forest infrastructures to make them resilient to diseases, flooding, erosion, and fire hazards

Social Value

- > Offering a significant number of ecosystem services and other non-material benefits for the general well-being of all Europeans
- > Provisioning of clean air and water supplies
- > Creating and maintaining recreational areas open to the general public for hiking, wildlife observation and other outdoor activities
- > Maintaining scenic and natural heritage areas of cultural value
- > Provisioning of wild food and game

Sustainable Forest Management – a Pan-European Story

Managing forests sustainably means to manage and use the forests in such a way that future generations will benefit from forests as much as, and possibly even more than, we do now. Their biodiversity, productivity, regeneration capacity and vitality are maintained while leaving all interconnected ecosystems intact. Forests that are man-

aged sustainably will maintain their potential to fulfill relevant ecological, economic and social functions.

The European Ministers responsible for forests have defined Sustainable Forest Management (SFM) through the following six pan-European criteria:

1. Maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles
2. Maintenance of forest ecosystems' health and vitality
3. Maintenance and encouragement of productive functions of forests (wood and non-wood)
4. Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems
5. Maintenance, conservation and appropriate enhancement of protective functions in forest management (notably soil and water)
6. Maintenance of other socioeconomic functions and conditions

[...] future generations will benefit from forests as much as, and possibly even more than, we do now.



Multifunctional Forestry

The functions of forests are manifold and often the same forest area needs to provide a mix of functions simultaneously. Forests are habitats for many plants and animals and they provide a very high degree of biodiversity. At the same time, they are beautiful places for recreation, such as hiking and jogging, for observing nature and for children to play and explore. They deliver oxygen and filter the air, their roots store and filter water. Growing trees absorb CO₂ and thereby mitigate climate change. The forest is a working place for many people. The harvesting, processing and use of the wood from forests contribute to rural development and jobs. The above are just some examples of the many functions our forests provide and why sustainable forest management is an essential part of achieving Europe's economic, environmental and social objectives.

Forest management practices are adapted to diverse policy goals and social expectations. These vary from one forest to another. In forests close to cities, for example, forest managers will pay special attention to the need for recreation areas whereas in forests with very high diversity and rare species, conservation is especially important. Other forests are valued

for their high productivity or the role they play in controlling erosion. The main focus of a forest's function does not mean that other essential functions are neglected. Sustainable multifunctional forest management, as applied in European state forests, aims to balance the complex and sometimes conflicting sets of demands on forests, for the benefit of all.

Images: (pp.10-11) Young elk in a Polish state forest. Source: Karol Zalewski. (pp.12-13) In the thick of the forest, Poland. Source: Krzysztof Pawlowski. (left): The hart of wilderness, Poland. Source: Marcin Scelina. (below): Hut in mountain spruce forest in the winter. Austria. Source: ÖBf/S. Gamsjäger. (p.16): Sustainable and multifunctional forestry is creating and maintaining jobs and acts as a major supplier of renewable raw material for a green European bioeconomy, Poland. Source: Robert Antosz





In addition to being a renewable raw material, wood has a great potential to store carbon in numerous wood-based products that can replace energy-intensive materials. After a tree is harvested, it continues to act as a carbon store when it is used in such traditional industries as construction, furniture, pulp and paper, as well as the many new bio-based industries which have emerged in recent years. According to scientifically proven estimates, every cubic meter of wood used as a substitute for other building materials reduces CO₂ emissions to the atmosphere by an average of 1.9 tons of CO₂ equivalent.

Use Wood! Mitigate Climate Change!

Forests play a key role in the mitigation of carbon emissions. It is estimated that EU forests and the forest sector currently contribute with an overall climate change mitigation impact that amounts to about 13% of total EU emissions. Forests and good forest management are the most cost-effective options to reduce emissions and contribute to the goals of the ambitious Paris Agreement that aims to limit the global temperature increase to well below 2°C above pre-industrial levels by the end of the century.

Growing trees take up carbon dioxide from the air through photosynthesis and store carbon in their woody structure during the growth period of their life cycle. As a tree matures, its rate of growth slows down, and the amount of CO₂ sequestration decreases until the rotting wood of

a dead tree releases CO₂ back into the atmosphere.

The ideal time for harvesting varies mainly in function of the intended use of the wood and the lifetime of a tree which can range between approximately 50 years for fast growing species such as birch to more than 200 years for slow growing species such as oak. Forest managers are able to regulate the harvesting and the regeneration of trees through adjusting appropriate silvicultural techniques, boosting the CO₂ sequestration rate of forests while maintaining the many other social, cultural, economic and environmental services they are expected to provide. They contribute to reducing fossil emissions and strengthening low-carbon economic growth. As long as forests are managed sustainably, the overall CO₂ balance on a landscape scale will be positive.

Woody biomass from forests and residues is the largest source of renewables in Europe. Bioenergy currently represents 60% of the EU's total consumption of renewables. Using modern wood-based energy carriers (liquid, gas, wood chips or pellets) made from harvesting and industrial residues from sustainably managed forests is climate smart compared to the use of fossil energy. The majority of bioenergy is generated from biomass that originates from sustainably managed forests. It can be used for heating, electricity generation and transport fuels. Wood for use as an energy source comes not only in the form of residues from final tree harvesting but also from thinning and other sustainable forestry practices. Wood for energy use can also be derived as a by-product from the downstream processing of wood by manufacturing, for example in the form of off-cuts, trimmings, sawdust, shavings, wood chips or by-products of the pulp industry. End-of-life wood and paper products can also be used as a source of energy.

A Boost to the Bioeconomy

Managing forests, harvesting trees, processing timber and manufacturing wood products provide jobs to many people thereby playing an important role in the economic development, employment and prosperity of Europe, particularly in rural areas.

EUSTAFOR members harvest around 1/3 of the 400 million m³ timber logged annually in the EU. But more than 800

million m³ of wood is used in the EU every year. European state forests have a significant unused resource since only approximately 60-70% of the annual growth in state forests is made available for wood supply. They therefore have a great potential to contribute towards building a resource efficient and green European economy.

Increasing the use of domestically pro-

duced biomass can help diversify Europe's energy supply, providing energy security, create economic growth and jobs and lower greenhouse gas emissions. A wise, sustainable utilization of Europe's forests is key to finding solutions to major issues within the EU and worldwide. European forests have a role to play in working towards achieving the goals set out by the European Commission in its Bioeconomy Strategy (2012) and 2050 Low-Carbon Economy Roadmap.

A Haven for Biodiversity

Europe has a rich forest treasure which offers some of the most biodiversity-rich habitats in Europe, offering a home to many rare and threatened species. European forests range from Mediterranean mixed oak and coniferous forests, to Central European mixed forests with a large variety and high volumes of soft and hardwood trees, to coastal forests of the Atlantic and finally the vast forests of Northern Europe. Some European forests evolved into ecologically specialized landscape forests, such as those in river plains or mountainous areas, where they provide vital environmental services in flood plains and on erosion-prone slopes. There is an endless variety of forest types throughout Europe, with each region hosting a different composition of tree species.

Apart from a few rare exceptions, forests in Europe have, throughout the centuries, been influenced by human activity. Sustainably managing these semi-natural forests can provide an even higher degree of biodiversity than natural forests at times. In most cases, forest management is not only compatible with the conservation of biodiversity, but actually actively contributes to its maintenance and enhancement. Harvesting and thinning operations open up the forest canopy, allowing more light to reach down through the lower levels of the forest, encouraging dormant seeds to germinate, providing light for plants to grow and flower and warmth for cold-blooded animals. This type of forest management mimics natural dynamics and promotes tree species that would otherwise not have a chance to thrive. There are always some trees that

are excluded from harvesting because they serve as habitat trees for birds, beetles and other animals that live in their holes. Some trees are allowed to decay in order to provide the rotten wood necessary for the survival of wood pickers and stag beetles.

It cannot be overstated how important Europe's forests are for biodiversity. European state foresters have a wide experience of integrating biodiversity conservation into their forestry practices. This is reflected in the fact that around half of the total area of the European Natura 2000 network – the largest network of protected areas in the world – consists of forests, most of them in state forests. The Natura 2000 network protects Europe's most valuable and threatened species and habitats and almost 40% of European state forests are protected and protective forests. 🌿



European State Forest Association (EUSTAFOR) represents State Forest Management Organizations that have sustainable forest management and sustainable wood production as their major concerns. The Association currently has 30 members in 22 European countries. EUSTAFOR's members apply sustainable biomass production patterns, which derive from their national legislations on sustainable forest management and multifunctional forestry. The high-quality forest management practices in European state forests are based on long-term forest management plans and their high environmental standards are further endorsed by global forest certification systems.



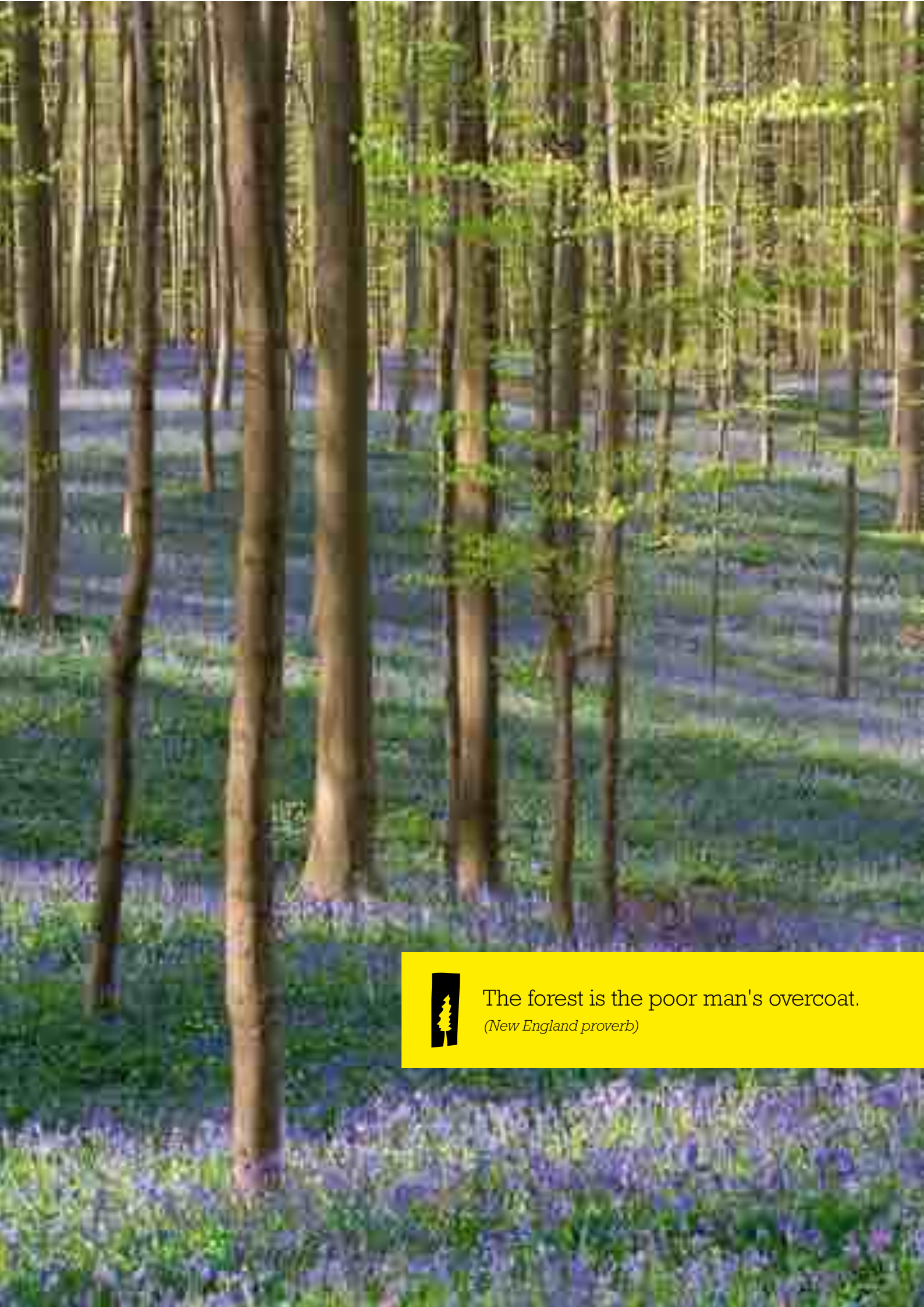
Read our **exclusive Q&A** with Member of the European Parliament, **Paul Brannen** on **The Value of Wood in Construction:** www.revolve.media

How Forest Certification Works

If forests are to continue to deliver the full range of benefits that people and nature depend on, they need to be preserved and managed sustainably. Forest certification allows forest managers to demonstrate that their practices are sustainable and that their forests meet both our needs and those of future generations.

Writer: Xavier Noyon





The forest is the poor man's overcoat.
(New England proverb)

Origins

Forest certification is crucial in providing evidence of sustainable forest management. Increasingly, this proof is a prerequisite for doing business and certified forest materials are requested more and more in procurement policies around the world. In turn, forest certification has a direct economic and social impact on the communities that depend on these forests for their livelihoods.

Forest certification arose in response to concerns about the preservation of the world's forests. It developed as a result of the 1992 United Nations Conference on Environment and Development (UNCED) in Brazil, which defined 'sustainable development' as a common goal of human development. The preamble of the 'Forest Principles' – one of the five outcome documents – stated that "forests are essential to economic development and the maintenance of all forms of life." But governments were unable to agree on the specifics of sustainable forest management

at the UN level, and so forest certification arose as a process and a mechanism to bring people together to define it. Today, forest certification is seen as a tried and tested mechanism to provide evidence for sustainable forest management, and assists producers in bringing product assurances to the market.

Certification in Forests and Companies

Sustainable forest management is promoted through the certification of forests and the products that come from them. This is done through two separate but linked processes:

- Sustainable Forest Management (SFM) certification assures that forests are managed in line with challenging environmental, social, and economic requirements.





Forest certification has a direct economic and social impact on the communities that depend on forests for their livelihoods.

- Chain of Custody certification tracks wood from sustainable sources to the final product. It demonstrates that each step of the supply chain is closely monitored through independent auditing to ensure that unsustainable sources are excluded.

Sustainable Forest Management Certification

Forests are highly diverse, from evergreen eucalyptus forests in Tasmania to tropical rainforests in South America and the Congo Basin and boreal forests in Canada. Similarly, their management differs greatly, along with local traditions, cultural and spiritual expectations, average property sizes and support structures such as forest owner associations.

As framework conditions may vary vastly from country to country, we must address this diversity when defining sustainable forest management requirements in forest certification standards. We must ensure that these requirements are tailored to the needs of the specific forest ecosystems, the legal and administrative framework, the socio-cultural context and other locally relevant factors.

Sustainable forest management creates outcomes that are economically viable, ecologically sound, and socially just. These three pillars of sustainability cannot be separated, compartmentalized or addressed individually. Without all three, forests will not be protected, forest dependent communities and rural economies cannot thrive, illegal logging will not be abated, and development opportunities will not be captured.

Chain of Custody

Forest certification, while crucial in maintaining the valuable services forests provide, does not in itself establish the link from the forest to the market. This link is established through Chain of Custody certification, which tracks forest-based products from sustainable sources to the final product. It closely monitors each step of the supply chain through independent auditing to ensure

that certified, sustainable material reaches the consumer while unsustainable sources are excluded.

Chain of Custody certification provides evidence that wood contained in a product originates from certified forests, and requires all companies along the supply chain to be Chain of Custody certified. As long as this is

the case, products are considered certified and can use the certification label.

In addition to enabling companies to sell and label sustainably sourced, certified wood, Chain of Custody certification also offers an efficient mechanism for companies to demonstrate alignment with the EU Timber Regulation (EUTR).

Chain of Custody:



The PEFC System

The Programme for the Endorsement of Forest Certification (PEFC) is an international non-profit, non-governmental organization dedicated to promoting sustainable forest management through independent third-party certification. It works throughout the forest supply chain to promote good practice in the forest and to ensure that timber and non-timber forest products are sourced with respect for the highest ecological, social and ethical standards.

Based in Geneva, Switzerland, PEFC is a member organization which comprises more than 60 institutions including national certification systems, NGOs, labor unions, businesses, trade associations and forest owner organizations committed to promoting sustainable forest management through forest certification.

The organization is well placed to expand forest certification globally through its unique

bottom-up approach to certification, developed by and for smallholders, and nowadays providing evidence for responsible management of forests of all sizes.

PEFC is an umbrella organization that endorses national forest certification systems developed collaboratively by all interested stakeholders and tailored to local priorities and conditions. It recognizes that while the concept of sustainable forest



management is global in nature, its implementation is local. This is why we work with local organizations to advance responsible forestry and endorse national forest certification systems that have demonstrated compliance with our globally recognized Sustainability Benchmarks. National forest management standards must be tailored to country-specific priorities and conditions and developed through multi-stakeholder, consensus-driven processes.

Each national forest certification system undergoes rigorous third party assessment against PEFC's unique Sustainability Benchmarks. These Benchmarks are based on broad consensus by society, expressed in globally respected international and inter-governmental processes and guidelines for

the promotion of sustainable forest management. The Benchmark criteria are regularly revised through multi-stakeholder processes to include new scientific knowledge, societal change, evolving expectations and the latest best practices. Today, PEFC has recognized certification systems in over 40 countries that account for over 267 million hectares

Sustainable forest management creates outcomes that are economically viable, ecologically sound, and socially just.

Images: (pp.18-19): Spring produces a purple carpet of bluebells in the Halle wood, Belgium. Source: Luc Viatour. (pp.20-21): Sustainable forest management gives a future to our forests. Source: PEFC Germany. (p.20) A German forester marking his PEFC certified timber. Source: PEFC Germany. (above): Any wood product can carry the PEFC label. Source: Luc Gordts. (next page): A board indicating that this walloon forest is PEFC certified. Source: M. Clajot.

of certified forest (2/3 of all certified forest area worldwide), making it the world's largest forest certification system.

Each national forest certification system must demonstrate compliance with PEFC's unique Sustainability Benchmarks in independent assessments.

Sustainable Forest Management Requirements

PEFC's requirements build and expand upon the most widely accepted principles, criteria and guidelines defining sustainable forest management, developed by international and intergovernmental bodies such as Forest Europe, the International Tropical Timber Organization (ITTO), the International Union for Conservation of Nature (IUCN), and the African Timber Organization (ATO). During the standard setting processes, these references have been further evolved, adapted and strengthened to take account of the latest scientific knowledge, experiences on the ground, and changing societal expectations.

PEFC was the first global forest certification standard to require compliance with all fundamental International Labor Organization (ILO) Conventions and to include references to the UN Declaration on Indigenous Peoples' Rights and the ILO Convention 169 on Indigenous and Tribal Peoples. Today, PEFC is the only global forest certification system requiring all standards to be set with the open participation of all interested parties at national level in a consensus-driven decision-making process.

•

As a globally trusted mark, the PEFC label assists consumers, businesses, governments, forest owners and managers, and other stakeholders in identifying, buying and promoting products and goods from forests that are managed sustainably. In fact, governments and companies from around the world require

this certification within their procurement policies thereby rewarding responsible forest owners and creating an incentive for uncertified forest owners to obtain certification.

Conclusion

There are many opportunities to engage with the forest certification in a personal or professional capacity. These range from giving preference to products bearing the distinctive "green trees" logo when shopping to contributing your professional expertise during a forest management standard setting process. This means all of us interested in safeguarding forests – responsible businesses, public authorities, organizations and consumers alike – can use our purchasing power to support the sustainable management of the world's forests.

Sustainable Forest Management Requirements

Healthy Forests

- Maintain and increase the health and vitality of forest ecosystems biodiversity
- Protect ecologically important forest areas, wildlife, waterways, and soil
- Prohibit genetically modified trees and chemicals
- Prevent unauthorized activities such as illegal logging

- Involve forest communities, forest-dependent people in forest management
- Recognize indigenous people's rights, including free, prior and informed consent
- Protect sites with recognized specific historical, cultural or spiritual significance
- Safeguard areas fundamental to meeting the basic needs of local communities

Source: tree.es/1cWow60

Healthy Work

- Comply with all fundamental ILO conventions, plus safe working conditions
- Consideration of new opportunities for employment

Healthy Communities

- Promote the long-term health and well-being of forest communities
- Respect forests' multiple functions, give due regard to the role of forestry in rural development



41 NATIONAL MEMBERS (WITH 36 ENDORSED NATIONAL CERTIFICATION SYSTEMS)

AND 23 INTERNATIONAL STAKEHOLDER MEMBERS HAVE JOINED FORCES UNDER THE PEFC UMBRELLA TO COLLABORATIVELY PROMOTE SUSTAINABLE FOREST MANAGEMENT.

MORE THAN 260 MILLION HECTARES OF FOREST AREA

(OR 650 MILLION ACRES) ARE MANAGED IN COMPLIANCE WITH PEFC'S INTERNATIONALLY ACCEPTED SUSTAINABILITY BENCHMARK. THAT'S CLOSE TO **TWO-THIRDS OF ALL CERTIFIED FORESTS GLOBALLY** ARE CERTIFIED TO PEFC.

AROUND 16,000 COMPANIES AND ORGANIZATIONS ARE COVERED BY PEFC CHAIN OF CUSTODY CERTIFICATION.

PEFC CERTIFICATION IS A STANDARD OF CHOICE FOR PUBLIC TIMBER PROCUREMENT POLICIES

IN, FOR EXAMPLE, BELGIUM, GERMANY, JAPAN, NETHERLANDS, THE UNITED KINGDOM, AND IN THE EUROPEAN UNION GREEN PUBLIC PROCUREMENT TOOLKIT, AS WELL AS NUMEROUS PRIVATE TIMBER PROCUREMENT POLICIES.

Four examples:

Sustainable Wood and Paper

Bridport House and the Kingsgate House

London is one of the first cities to take advantage of cross-laminated timber (CLT) with both the Bridport House and the Kingsgate House built from PEFC-certified CLT. The Kingsgate House even achieved PEFC project certification. The Bridport House pushed the boundaries of timber engineering. This project was the first time that CLT has been used in the UK for the construction of an entire multi-storey structure, including the ground floor, which is normally constructed from concrete.

World's Highest Wooden Observation Tower

The opening of the Pyramidenkogel in Carinthia, Austria, sets another milestone for the promotion of sustainable forestry. Imposing, this almost 100 meter high observation tower spirals into the air, making it the world's highest wooden observation tower. Yet the Pyramidenkogel does not only offer breathtaking views – the main structure is made entirely of wood originating from PEFC-certified, local forests.

World Expo 2015

Certified wood took center stage at the World Expo 2015 in Milan, as larch, spruce and fir all played their part in forming the basis of many of the Expo pavilions. Several countries, including Austria, Belgium, China, France and Thailand, as well as companies such as Slow Foods and Lindt, chose PEFC-certified wood for their walls, roofs, railings and entire structures.

The Compy bread-bag

The company ACE Packaging has created a brand new concept – the Compy bread-bag. This new bread-bag is entirely compostable and recyclable, and is entirely made of PEFC-certified fibers originating in sustainably managed forests. "Ours is an environmentally-friendly and affordable alternative to the traditional bread-bag," says the producer. Large retailers such as Colruyt and Carrefour are using the Compy bread-bags, along with bakery groups such as La Lorraine. ACE Packaging is present in Belgium, France, Tunisia and Turkey.



The **Programme for the Endorsement of Forest Certification (PEFC)** is an international non-profit, non-governmental organization dedicated to promoting Sustainable Forest Management (SFM) through independent third-party certification. PEFC works throughout the entire forest supply chain to promote good practice in the forest and to ensure that timber and non-timber forest products are produced with respect for the highest ecological, social and ethical standards. Thanks to its eco-label, customers and consumers are able to identify products from sustainably managed forests. With more than 270 million hectares of certified forests, PEFC is the world's largest forest certification system.

Forest Ecosystem Services

Forests are some of the planet's richest ecosystems in terms of biodiversity and the important services they provide. They offer an array of natural resources and can serve as a vital means of mitigating climate change. But human-induced pressures are threatening their existence. How can we balance the needs of our growing populations and economies without further threatening these environments?

Writer: Luc Bas





Ecosystem services can be defined as “the benefits humans derive from ecosystems”. These services or goods they provide include food, wood and other raw materials. However, plants, animals, fungi and micro-organisms also provide essential regulating services such as pollination of crops, prevention of soil erosion, purification of water and a number of cultural and health services, like recreation and sense of place.

Source: Millennium Ecosystem Assessment.
(www.maweb.org)



The forest has ears, and fields have eyes.
(Danish proverb)

Forests provide crucial services for human well-being and economic development. They provide food, freshwater and fuel, support soil information, regulate floods, climate and diseases, and can fill educational, medicinal, aesthetic and spiritual needs. In addition, they stabilize ecosystems, play an integral part in the carbon cycle, support livelihoods, and supply other goods and services that drive sustainable growth. It is evident there are a number of reasons for valuing forests and landscapes.

A third of the planet is covered by forests providing a home to 80% of the world's terrestrial biodiversity. In terms of economic value, it is estimated that forests provide \$75-100 billion per year in goods and services. In fact, the natural capital of forests dwarfs the value of timber: the World Forum on Natural Capital calculated that the value of conserving forests, simply in order to cut greenhouse gas emissions, amounts to \$3.7 trillion, whereas the global timber industry is valued at \$0.4 trillion.

Undeniably, forests are a stabilizing force for the climate. This is most visible through their role in sequestering carbon from the atmosphere, as estimates show that the amount of carbon “locked” in forests is currently greater than the carbon present in the atmosphere. Forests and landscapes also mitigate climate change through their adaptive capacity. There are numerous examples of how mangroves and wetlands can aid in flood risk prevention and storm protection by protecting coastlines and dissipating waves – an ever-increasing need due to global warming and sea-level rise. In Malaysia, for example, the value of intact

coastal mangrove forests was estimated at \$300,000 per km, equivalent to the cost of replacing them with rock walls.

Yet, forests are under stress from overexploitation, pollution, population pressure and the expansion and intensification of agricultural practices. With the additional impacts of climate change, forests are further threatened, and these adverse events may further impact land quality – leading to biodiversity loss, food insecurity, increased pests, reduced availability of clean water and increased vulnerability to environmental changes.

1/3 of the planet is covered by forests
providing a home to 80% of the
world's terrestrial biodiversity.

Images: (pp26-27): Sjeverni Velebit, NP Source: Sjeverni Velebit Archive (below): Baranja. Source: A. Maricevic. (right): Erosion in Mamberamo river, Papua. Source: IUCN.





Forest Landscape Restoration

Over the last 200 years, more than half of the planet's forest cover has been cleared to meet the needs of a growing population. Today, 30% of global forest cover has been completely removed and a further 20% has been degraded. The Global Partnership on Forest and Landscape Restoration (GPFLR) estimates that there are more than 2 billion hectares of deforested and degraded landscapes worldwide – an area the size of South Africa, directly affecting 1.6 billion people – where opportunities for restoration may be found.

The potential and returns of restoring these forest landscapes are tremendous. Healthy, fertile landscapes offer habitats for wildlife and support human life, provide food, clean water and materials for shelter. Sustainably cultivated and farmed woodlands yield fuel and raw materials that can be worked or

processed for trade, stimulating local industry and creating jobs. Trees in agricultural landscapes improve soil moisture and fertility and boost food production. And responsible tourism and other services can be developed as part of the rehabilitation mix.

All these forms of sustainable entrepreneurship can inject new income and new life into threatened communities, relieving poverty and funding improvements in education. Increasing forest restoration is also extremely important in limiting global warming. Halting the loss and degradation of natural systems and promoting their restoration has the potential to contribute over 1/3 of the total climate change mitigation that scientists say is required by 2030. Regenerating and revitalizing forests as part of landscape restoration projects would give us back some of that capacity to sequester carbon and slow down

climate change. The environmental rewards of landscape rehabilitation therefore are huge. So, what is being done to restore these crucial ecosystems?

Forest landscape restoration (FLR) is a long-term process of regaining ecological functionality and enhancing human well-being across deforested or degraded forest landscapes. FLR focuses on both current and future needs: reinstating the goods, services and ecological processes that forests provide at the broader landscape level, rather than simply promoting increased tree cover at a particular location. It has the potential to mitigate the underlying conditions of erosion, soil degradation, and nutrient depletion, and enhance the opportunity for obtaining greater output from degraded land. Overall, FLR promotes the sustainable use of natural resources, enhances the resilience of ecosystems, and protects and restores the landscape – not only forests, but also agriculture, agroforestry, mangroves and more, that sustain the lives of urban and rural communities.

The Bonn Challenge

The International Union for Conservation of Nature (IUCN) is helping to increase the capacity of policy-makers, practitioners and land owners around the world to engage with FLR. One such intervention is the Bonn Challenge; a global goal that aspires to restore 150 million hectares of the world's deforested and degraded lands by 2020 and 350 million hectares by 2030. Launched in 2011 by the German government and IUCN, it aims to restore ecological integrity as well as improve human well-being through multi-functional landscapes.

The Bonn Challenge was born from and serves as an implementation delivery platform for several existing international commitments. The target of 150 million hectares is no coincidence; it comes from the Convention on Biological Diversity (CBD) Aichi Biodiversity Target 15, which calls for restoration of 15% of degraded ecosystems.

Restoring 150 million hectares could capture about 1/6 of the carbon necessary to close the emissions gap. Reaching 350 million hectares by 2030 would result in an estimated 0.6-1.7 Gt CO₂e (gigatons of carbon dioxide equivalent) absorbed per year, totaling 11.8-33.5 Gt CO₂e between 2011 and 2030.

Currently, 27 governments, enterprises and alliances have made pledges to the Bonn Challenge. The most recent pledges were made at the Climate COP21 in Paris by, amongst others, the governments of Burundi, Honduras and India, bringing the total to more than 86 million hectares. One country that has fully committed to the Bonn Challenge is Rwanda. It has pledged to undertake border-to-border restoration, regaining 2 million hectares of forests and landscapes within the next 25 years. This amounts to 3/4 of its land, an area that

only recently began to re-grow after being almost completely lost following years of civil conflict and economic instability.

Restoration efforts outside the boundaries of “typical” forested areas are also appearing around the world. The forests in the watershed of China's Miyun Reservoir in Beijing are in poor health due to restrictive policies limiting the proper management of the forests' resources. Additionally, unsustainable fuel wood collection has prevented the forests from developing and maturing into productive and biodiverse ecosystems. However, the State Forestry Administration of China (SFA), IUCN and other partners are collaborating with the Beijing Forestry Society to show the benefits of FLR, including how this can help secure the water supply for China's megacities.

Despite these impressive commitments





from Rwanda, China and other countries, there exist significant barriers to implementing FLR at the scale and over the time period required for success. In many countries, there is a lack of crucial biophysical and socioeconomic data for landscape planning and evaluation. In other countries, enabling conditions for restoration, such as supportive national policies, have yet to be put in place.

The amount of carbon ‘locked’ in forests is currently greater than the carbon present in the atmosphere.

Image: (left): Bear Creek Flowing. Source: Gavin Emmons. (top): Dabarski kukovi, Velebit. Source: NP Archive.

National Land Engagement

IUCN offers a means to operationalize promises of restoration through the Restoration Opportunities Assessment Methodology (ROAM). Developed by IUCN and the World Resources Institute, ROAM is an approach to rapidly identify and analyze FLR potential and locate specific areas of restoration opportunity at a national and sub-national level, helping countries build

appropriate restoration programs and landscape-level strategies. In this way, ROAM supports nations in fulfilling the Paris Agreement and other international commitments such as the Aichi Biodiversity Targets and the EU Biodiversity Strategy (with the goal to halt the loss of biodiversity and ecosystem services in the EU by 2020).



In addition to ROAM, the Mapping and Assessment of Ecosystems and their Services (MAES) process under the EU Biodiversity Strategy helps determine the state of ecosystems and their services with the intention of integrating natural capital into planning and decision making. MAES and ROAM are therefore useful tools for strengthening the commitment to restoration. They aid in mapping out sites for immediate action, which supports the implementation of environmental legislation. They also facilitate the integration of natural capital into sectoral policies and move one step closer to stopping biodiversity loss and restoring our landscapes.

However, even with these existing support tools, all the entities that have committed to the Bonn Challenge are from outside Europe. Although most restoration oppor-

tunities lie in tropical and temperate areas, with such considerable climate mitigation potential, why have so few European countries and sub-national governments joined the Bonn Challenge? Improving the condition of forests in Europe – which could be recognized globally as Bonn Challenge contributions – should be a priority for European nations.

Over the last 200 years, more than half of the planet's forest cover has been cleared to meet the needs of a growing population.

Image: (left): Agroforestry in Chinantla, Mexico. Source: IUCN.

Tailored Solution Needed

The COP21 commitments to limit global temperature increase to less than 2°C and to restore ecosystems will hopefully trigger governments and the private sector to restore more deforested and degraded landscapes, both in Europe and around the world. It is crucial, however, that these engagements do not detract from equally important efforts to cut greenhouse gas emissions.

As forests and forested landscapes are such major carbon sinks, restoring their functionality could be construed as a way to address the current EU Target of 40% reduction in greenhouse gas emissions by 2030 agreed upon by all EU member

States in March 2015. But FLR is only a complement to the crucial efforts we still need to undertake in the energy, agriculture and transport industries and we cannot allow a reduction of these efforts. Forest landscape restoration can certainly help to mitigate climate change, but it should also be implemented for the array of other benefits it provides.

Forest productivity, biodiversity and watershed functions can all recover without compromising the livelihoods of the local population. Indeed, long-term success is largely dependent on the extent to which restoration plans recognize the rights and interests of forest communities and help

to improve and sustain their livelihoods. With nearly 2 billion hectares of degraded and deforested lands across the world that can potentially be restored through a wide range of FLR interventions, initiatives such as the Bonn Challenge are key to catalyzing large-scale changes and generating a united commitment to global forest and landscape restoration.

Forest landscape restoration is not just about planting trees, it is about tailoring the solution to the context to bring back or improve the productivity of landscapes and forest ecosystems so they can sustainably meet the needs of human beings both now and in the future.



The **International Union for Conservation of Nature (IUCN)** helps the world find pragmatic solutions to our most pressing environment and development challenges. IUCN's work focuses on valuing and conserving nature, ensuring effective and equitable governance of its use, and deploying nature-based solutions to global challenges in climate, food and development. One of IUCN's global thematic programs is the IUCN Forest Conservation Program whose mission is to influence, encourage and assist societies throughout the world to conserve biological diversity in forests and tree-dominated landscapes and ensure that the use of forest resources is equitable and ecologically sustainable.

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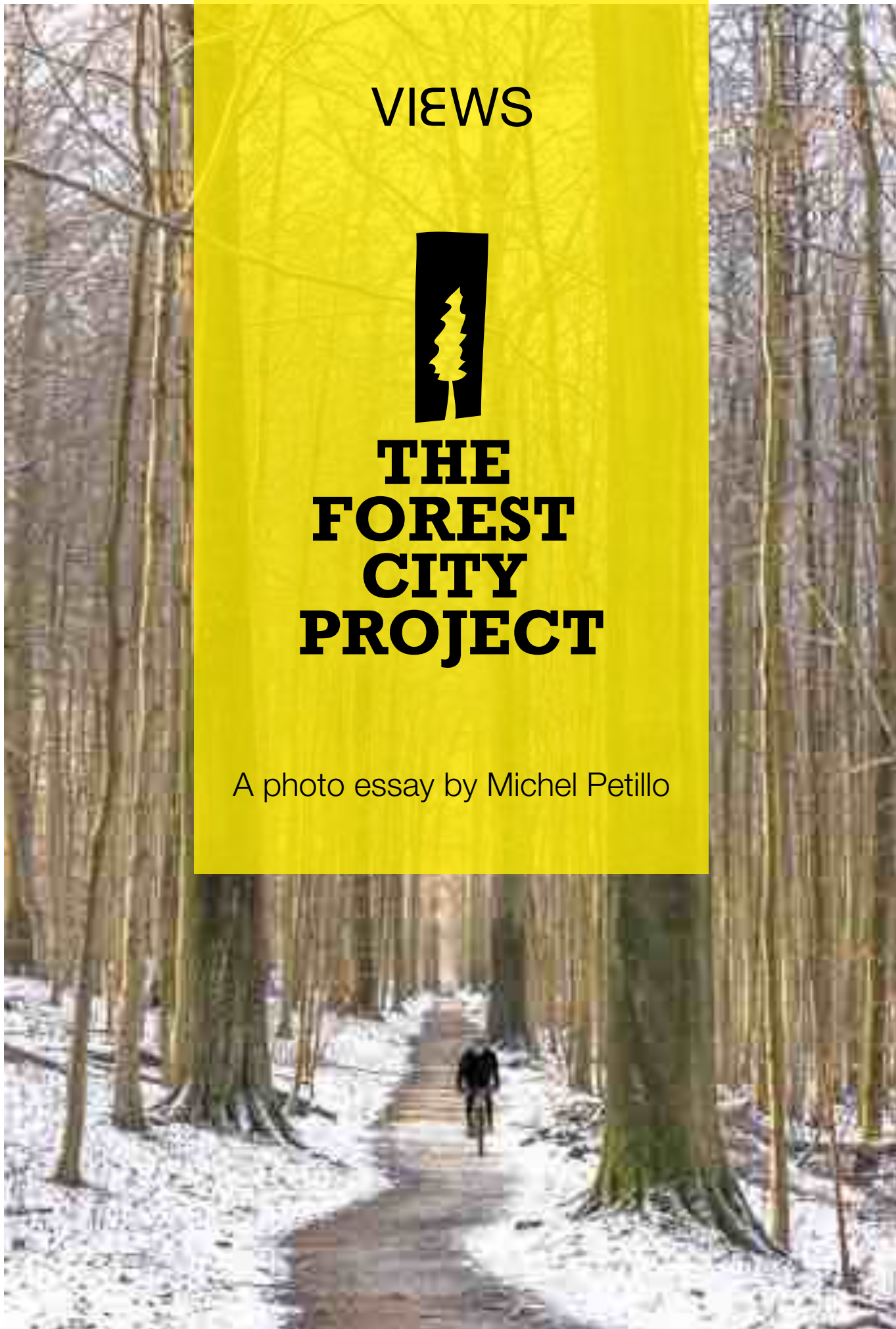


IEWS



**THE
FOREST
CITY
PROJECT**

A photo essay by Michel Petillo





The Forest City Project was an opportunity to explore the Sonian forest and to discover its grandeur. The Sonian forest, originally an oak-rich forest, was turned by the nobility of its time into a mighty beech tree cathedral in the 18th century. Currently, it's on the tentative list for consideration to become a UNESCO World Heritage Site.

Over a period of approximately one year, I took my camera into the woods. Photographing the Sonian's flora and fauna throughout the different seasons, I learned to appreciate the green lung of Brussels. Due to snow falling merely for a few days this year, my job as a photographer became a

bit of a challenge given this small window for exploring the woods covered in snow!

On the following pages you will find a small selection of the different photos, a larger selection is available on revolve.media. The outdoor photo exhibition will start on the Esplanade of the European Parliament (21 March) and will continue thereafter on Square de Meeûs (5 April).

Michel Petillo
photos.petillo.eu





























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Forests are for Everyone

Remembering our roots is important, today more than ever, so we can stand tall in our increasingly hectic urban lives. Get involved in your local communities, learn more about nature and plant trees!

Writer: Tim Christophersen





Even if thin, the elephant remains
the king of the forest.

(African proverb)

In peoples' childhoods and in collective memories and traditions, forests and nature are places of magic and wonder where our imagination could run free. During endless summer days in the woods, we would build tree houses and forts, fight epic battles, and discover mountains of hidden treasure. With urbanization, this familiarity with nature has been diminished. Every child in the world should have an opportunity to let nature open and form their hearts and minds. Luckily, most cities in Europe

have urban trees and green spaces so that even children who grow up far away from a forest can experience the powerful inspiration trees can provide. But over time, many of us lose touch with our natural roots.

The Forest City Project aims to re-connect city dwellers with forests and give everyone the opportunity to discover their emotional and spiritual connection with nature. Remembering our roots is important, today more than ever, so we can stand tall in our

increasingly hectic urban lives. Europe is blessed with abundant forests, providing a source of inspiration and relaxation. We should make good use of this rich natural heritage, and manage it with care. And as Europeans, we have a responsibility for forests far beyond the borders of the European Union. By choosing what we buy, we influence whether forests in the tropics can prosper or whether they are turned into fields and pastures to produce beef, soy, palm oil and other commodities for import into the EU.





Advice from a Tree:

Stand tall and proud
Sink your roots into the Earth
Be content with your natural beauty
Go out on a limb
Drink plenty of water
Remember your roots
Enjoy the view!

- Ilan Shamir



Why Forests Matter

Forests cover almost 1/3 of all land, and there are an estimated 3 trillion trees in the world, equivalent to about 400 trees for every person on the planet. These 400 trees meet essential needs for each of us: they provide clean air, clean water, wood for our houses and our furniture, the paper for our books, and many of the fruits we eat. We often take these 'ecosystem services' for granted, but they are under threat. The area of forests world-wide is decreasing by more than 3 million hectares every year, an area the size of Belgium. In particular, tropical forests are being replaced to make way for agriculture. That means, for each of us, there are almost two trees less every year. Many more hectares of forests are severely degraded through over-use. International trade fuels this trend: the main commodities produced on former

forest land are palm oil, beef, soy, coffee, cocoa and rice. Much of this is destined for export, including into the European Union. We are all part of the 'deforestation economy' and the ecological footprint of the EU is immense. The European institutions have recently started to address this issue, and there are an increasing number of large multi-national companies who have pledged to ensure that all their supplies are sourced deforestation-free by 2020.

Europe is blessed with
abundant forests, providing
a source of inspiration
and relaxation.

Images: (pp. 52-53) Weaverbirds. Samburu National Park, Kenya. Source: Karen Hoyer. (pp. 54-55) Central Park, N.Y. Source: Karen Hoyer.



Why We Can Be Optimistic About Forests

The landmark agreement at the UN Framework Convention on Climate Change at the summit in Paris in December 2015 clearly recognizes the central role forests play for successfully combating and adapting to climate change. It finalized a mechanism known as REDD+ (Reducing Emissions from Deforestation and Forest Degradation), which encourages developing countries to better manage, conserve or restore their forests. Financial incentives can be paid if countries are successful in reducing deforestation. The United Nations is already working with 64 developing countries to initiate sweeping reforms on land-use to successfully reduce deforestation and forest degradation.

Moreover, a growing global movement to restore resilient and productive forest

landscapes has started, based on ambitious targets in the new 'Sustainable Development Goals' of the UN, agreed to by all countries in the world. The target is to restore and reforest degraded lands by the year 2030. More specifically, the 'New York Declaration on Forests', signed in September 2014 by 189 nations, companies and organizations, commits to restore 350 million hectares of degraded forest landscapes by 2030. This is an area the size of India. If this goal is reached, it could lift millions of rural people out of poverty, and sequester an additional 1 Gigaton of carbon from the atmosphere, eliminating more emissions than all cars in the world combined

The area of forests world-wide is decreasing by more than 3 million hectares every year, an area the size of Belgium.

Images: (above) Tea plantations intertwine with primeval forest in Kericho, Kenya. Source: Karen Hoyer. (right) Sonian Forest, Brussels, Belgium. Source: Karen Hoyer. (pp. 58-59) A giraffe seeks shade under an acacia in Hells Gate National Park, Kenya. In the background, a streak of smoke emanates from a geothermal power station at Olkaria. The park, relatively close to Nairobi, is popular for mountain biking, rock climbing and short camping trips. Source: Karen Hoyer.

Forest Values

Beyond the cultural, spiritual and emotional value that forests and nature hold for many of us, there are plenty of arguments why we should take maintain and restore forests:

> Forests absorb carbon dioxide and pollutants from the air and produce clean air for us to breathe: a mature beech tree takes only 20 minutes to emit enough oxygen for an adult human to breathe for a full day, and it can sequester over two tons of CO₂ in its branches, trunk and roots, equivalent to the emissions of driving a car for 10,000 kilometers.

> Forests are home to more animal and plant species than any other ecosystem: more than half of all species that live on land have their home in forests, most of them in moist tropical forests. A single hectare of tropical rainforest can contain up to 300 different tree species, more than in the entire European Union.

> Forests provide us with the clean water we drink: 2/3 of all major cities in the world rely on forested watersheds as their main source of drinking water, including many European cities like Brussels, which relies on the forests of Wallonia to filter, clean and store billions of liters of water.

> Forests biodiversity is the source of thousands of commercial products: this includes the basis for one in four pharmaceuticals sold in the EU. Also, much of the world's energy comes from forests. Africa, for example, sources 80% of its energy for cooking and heating from wood fuel.

> Forests support the livelihoods of an estimated 1.6 billion people in the world and provide over 14 million jobs. And there are around 300 million people in indigenous and local communities who rely on forests for most of their daily needs.



are producing. This sounds like a daunting commitment, but it is very feasible if it is supported by a concerted global effort.

At the same time, we are getting much better at monitoring the world's forests. Global platforms like Global Forest Watch (www.globalforestwatch.org) provide near real-time, satellite based information about deforestation across the world, even in the most remote tropical regions. These systems are set to improve even further as the EU launches the next gen-

eration of their 'Sentinel' satellites, which will provide even better forest data. Once these satellites are up and running, projected in the course of 2016, the data will be accessible free of charge, and the criminal networks that are behind illegal logging will not be able to hide, even on a cloudy day.

We are all part of the
'deforestation economy' and
the ecological footprint of the
EU is immense.



What You Can Do

There are a few simple things we all can do to ensure that forests both inside and outside of the EU can continue to exist and grow:

Reconnect with nature. Spend time in nature. Learn the names of some of the species living there – and share it with a child. Instilling a deep appreciation for nature in all of us is our best hope in our fight to maintain a healthy environment. Take a walk in the forest, it is a great antidote to stress and fatigue!

Consume with care. The simple phrase of ‘reduce, reuse, recycle’ has evolved into a sustainable lifestyle approach which now also includes healthy eating habits. For example, producing just one kilogram of beef requires up to 20,000 liters of water, and the soy to feed European cows and pigs is often produced on land that used to be tropical forest. Thus, eating less meat is one of the key measures all of us can take to reduce our global ‘foodprint’. And almost one third of all food that is produced globally goes to waste, almost 1.3 billion tons of food worth 1 trillion Euros. It is thrown away before ever reaching a human stomach, either before reaching markets, or after purchase by consumers. Being conscious of the amount of food we waste, and trying to reduce the waste can help to save forests, and it will definitely save you money. Also, the way you shop can make a difference. Many multinational companies such as Unilever have pledged a ‘zero deforestation’ policy. Be alert as a consumer to certification labels for food and for forest products, such as the FSC label for sustainable timber.

Take an interest. Implementing the Sustainable Development Goals and protecting the world’s forests is predominantly the task of governments. However, they will only act in your and your children’s best interest if we take an active interest in the policies that affect nature and land-use, not only in your own country, but also in the way the EU interacts with the world through trade. Support efforts such as certification schemes, and bans on the import of illegal timber into the EU. On websites such as the ‘Forest 500’ (www.forest500.org) you can learn which companies have the largest footprint on deforestation, and what can be done to improve policies and law enforcement for better forest protection.

And finally, plant a tree: find a spot where you can plant an indigenous tree, sourced from a reliable tree nursery, or plant a seedling you have grown yourself from an acorn or another tree species in a local forest. Organize tree-planting events together with your community, your urban green space authority, your school, or your local forester. It will not only provide you with a lifelong memory, but it is also great fun for the whole family. 🌳

Learn More:

www.globalforestwatch.org
www.un-redd.org
www.unep.org



The **UN-REDD Program** is the United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The Program was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Program (UNDP) and the United Nations Environment Program (UNEP). The Program provides support to 64 developing countries, covering almost 60 per cent of the world’s tropical forests.

Soil:

A Dirty Word?

Soil is vital for the survival of all life on earth: 95% of our food is directly or indirectly produced on our soils and without healthy soils, humans, plants and animals will slowly die out.

Writer: Balázs Horváth





The rain follows after the forest.
(Hawaiian proverb)

Soil or dirt. Whether you prefer the British or the American word, the connotation is the same. We talk of something being “soiled”, of using “dirty money” or “digging up the dirt”. None of these expressions conjure up positive images, indeed they do quite the reverse. Yet soil, or dirt, is the foundation of life. “For all things come from earth, and all things end by becoming earth,” as Greek philosopher Xenophanes of Colophon is quoted as having said. However, worldwide soil is being at best neglected, at worst destroyed. We are familiar with images of desertification in Africa, but the situation is not that much better in many European countries. One of the main reasons for this neglect is that while the European Union has legislation to protect water and air, soil, despite concerted efforts from environmental NGOs, is left to defend itself, as the Euro-

pean Environmental Bureau (EEB) explains.

Soil is vital for the survival of all life on earth. Ninety-five per cent of our food is directly or indirectly produced on our soils and without healthy soils, humans, plants and animals will slowly die out. Indeed, soils host over one quarter of all biodiversity on Earth and just one single gram of healthy soil contains millions of organisms. However, 10-20% of land globally is already in bad shape, with over half of agricultural land worldwide moderately or severely affected by soil degradation, meaning that less food is likely to be produced on it than would otherwise be the case.

We are familiar with images of desertification in Africa, but the situation is not that much better in many European countries.

Images: (pp. 60-61) Soil as it should be. Source: Brian Boucheron. (below) Rich earth full of life. Source: USDA Natural Resources Conservation Service. (right/top) Holding healthy earth. Source: Riverford. (right/bottom) Healthy soil means healthy food. Source: Riverford.



Lack of Action

Aware of such facts, in 2002, the European Commission decided it was time for action, publishing a communication entitled "Towards a Thematic Strategy for Soil Protection". This paper was then followed by a broad two year consultation on the issue aimed at providing the EU executive with the views and information needed to create an EU soil protection policy. For a number of years, "difficult and sensitive" political discussions took place, according to a Commission paper. However, political agreement on the issue was never found as member states took increasingly entrenched political positions. In 2014, after eight years of political stalemate, the Commission decided to withdraw its proposal in favour of an "alternative initiative," which is still to see the light of day.

Meanwhile, as policy-makers spent years spouting plenty of hot air about the need to protect Europe's soil, the situation underfoot was getting rapidly worse. This was underlined by the European Environment Agency's State of the Environment report in 2015. This highlights continuing soil degradation across Europe and suggests that without action the situation will get worse. Land take, which most frequently means the urbanisation of farmland and forests, is



the worst culprit and has many damaging effects on fertile agricultural soils, while also threatening biodiversity and increasing the risk of floods and water scarcity. As farmlands and woodlands are concreted over, the important services provided by soils such as the storing, filtering, and transforming of substances like nutrients, contaminants, and water delivery are impaired. And land take is a long-term change, which is difficult or costly to reverse; even if a decision is taken to dig up some of the concrete slabs, the damage has been done.

This lack of action is all the more frustrating given that EU policy-makers from

the Commission, Parliament and Council agreed via the 7th Environmental Action Plan, which entered into force on 1 January 2014, to tackle soil degradation. The 7EAP sets ambitious goals on soil and states that "The Union and Member States should also reflect as soon as possible on how soil quality issues could be addressed using a targeted and proportionate risk-based approach within a binding legal framework".

The EU had the perfect opportunity to start turning these fine words into concrete proposals in 2015, which was deemed by the United Nations as the International Year of Soils. Yet, nothing happened. It seems that



for now at least member state vested interests are continuing to win out over the scientifically proven need to protect Europe's soils. It is as if soil has become a dirty word in the EU. This is a strange situation to be in when the facts speak for themselves. As highlighted by the 7EAP, more than 25% of the EU's land is affected by soil erosion by water, causing the types of problems mentioned earlier in this article. Indeed, according to recent research, Britain has only 100 harvests left in its farm soil, while the soil in more than half a million sites across the EU are thought to be contaminated and until they are identified and assessed they will "continue to pose potentially serious environmental, economic, social and health risks," states the 7EAP. "Every year more than 1000 km² of land are taken for housing, industry, transport or recreational purposes" in Europe, it adds.

The recent floods in the UK are proof enough, if it were needed, of the real-life dangers of leaving soil to the mercies of

urbanization, intensive farming and deforestation. The Guardian columnist George Monbiot, for example, has written about how "rain that percolates into the soil is released more slowly than rain that flashes over the surface" thus reducing the risk of flooding. He insists that the proposed European Soil Framework Directive, which as we previously stated was withdrawn in 2014, would have "reduced flooding by preventing the erosion and compaction of the soil".

Even the links between climate change and soil seem to be being ignored by policy-makers looking to grab the headlines with big announcements about energy and infrastructure. Soil may be dirty, but it can play a big role in helping to clean up our carbon emissions and can therefore potentially

play an important role in climate change mitigation by storing carbon and decreasing greenhouse gas emissions in the atmosphere. Indeed, there is more carbon stored in soil than in the atmosphere and in vegetation combined. A release of just 0.1% of the carbon contained in European soils would be equal to the annual emissions of 100 million cars. And in the context of climate change adaptation, soils bare also a massive help, as indicated above with the example of flooding.

As farmlands and woodlands are concreted over, the important services provided by soils and water delivery are impaired.

Images: (above) Reaping the rewards. Source: Soil Association. (right) Arid soils in Mauritania, crops have failed and the region faces a major food crisis. Over 700,000 people are affected in Mauritania and 12 million across West Africa. Source: Pablo Tosco / Oxfam.

SOIL

Over one quarter of our planet's biodiversity is found in soil and that a single gram of healthy soil contains millions of organisms.



1g
=

millions of organisms

95% of our food is directly or indirectly produced on our soils.

12 million hectares of soil are lost each year from desertification and drought alone,



whereas

20 million tons of grain could have grown instead.

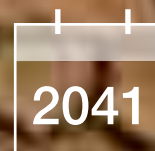
10-20% of land globally is already degraded.



52%

of agricultural land worldwide is moderately or severely affected by soil degradation.

Over the **next 25 years**, land degradation could reduce global food productivity by as much as 12%, leading to a 30% increase in world food prices.



A Global Concern

Soil-related problems are a global issue. Erosion carries away 25 to 40 billion tonnes of topsoil every year, thereby significantly reducing crop yields. Indeed, annual cereal production losses due to erosion have been estimated at 7.6 million tonnes each year. If action is not taken to reduce erosion, a total reduction of over 253 million tonnes of cereals could be projected by 2050. This yield loss would be equivalent to removing 1.5 million square kilometres of land from crop production – or roughly all the arable land in India. Furthermore, lack of soil nutrients is the greatest obstacle to improving food production and soil function in many degraded landscapes. In Africa, all but three

countries extract more nutrients from the soil each year than are returned through use of fertilisers, crop residues, manure, and other organic matter. Indeed, those closest to the soil, namely farmers, are unfortunately often complicit in its destruction. In Europe, subsidies from the Common Agricultural Policy (CAP) - to the tune of 50 million euros per year - have pushed farmers to embrace pollution-heavy production methods based around fertilisers and heavy machinery that, respectively, contaminate and compact the soil.

There is a slight glimmer of hope in this gloomy picture. Last September, all coun-

tries of the world signed up to the UN Sustainable Development Goals, which included a commitment by 2030 to “ensure sustainable food production systems and implement resilient agricultural practices” that among other things “progressively improve land and soil quality”. Likewise, the goals call on signatories to, by the same date, “substantially reduce the number of deaths and illnesses from” various threats including “soil pollution” and to “combat desertification, restore degraded land and soil [...] and strive to achieve a land degradation-neutral world”.

Committing to actions to achieve these goals would result in huge benefits for people, the environment and the economy. A report by the Economics of Land Degra-



dition forecasts that over the next 25 years, land degradation could reduce global food productivity by as much as 12%, leading to a 30% increase in world food prices. This would likely result in greater hunger and violence as happened when world food prices increased dramatically in 2007-2008 sparking riots around the world. The EEB in

conjunction with its partners in the People-4Soil NGO coalition will, therefore, continue to push for EU legislation to protect soils and for Europe to lead international efforts to protect soil. As UN Secretary General Ban Ki-Moon said on World Soil Day last December: "Together, we can promote the cause of soils, a truly solid ground for life".

The recent floods in the UK are proof enough of the real-life dangers of leaving soil to the mercies of urbanization, intensive farming and deforestation.

Image: (below) Growing well. Source: Soil Association.



Rural migration due to degradation can exacerbate urban sprawl, and can bring about internal and cross-boundary social, ethnic, and political conflicts. Land issues have played a major role in at least 27 major conflicts in Africa since 1990.

Agriculture, forestry and other land uses are estimated to be responsible for about one quarter of anthropogenic GHG emissions. There is significant potential to reduce these emissions, largely through reduced CO₂ emissions from agriculture, avoiding deforestation and forest degradation, creating net carbon sequestration in soils, and the provision of renewable energy through sustainable land management.

The annual economic losses due to deforestation and land degradation were estimated at €1.5–3.4 trillion in 2008, equaling 3.3–7.5% of global GDP in 2008. This includes a startling loss of grain worth \$1.2 billion annually.

On a global scale, an estimated annual loss of 75 billion tons of soil from arable land as consequence of degradation is assumed to cost the world about \$400 billion per year, with the USA alone expected to lose \$44 billion annually from soil erosion. Land degradation is a top driver of deforestation: 13 million hectares of the world's forests continue to be lost each year. 🌱

Sources: The European Commission, the FAO, European Environment Agency, Economics of Land Degradation

Learn More:
www.people4soil.eu



The **European Environmental Bureau (EEB)** is the largest federation of environmental citizens' organizations in Europe. It currently consists of over 150 member organizations in more than 30 countries, including a growing number of European networks, and representing some 15 million individual members and supporters. They stand for environmental justice, sustainable development and participatory democracy. Their aim is to ensure the EU secures a healthy environment and rich biodiversity for all.

The Liter of Light Initiative

“Sometimes it’s not the big things that matter, but the small things, replicated in the millions, that make the biggest difference.” Hundreds of thousands of people around the world can attest to the truth in that statement, made by Illac Diaz, the social entrepreneur founder of Liter of Light, under the My Shelter Foundation. Since being launched in the Philippines in 2011, Liter of Light has been installed in millions of homes around the world and has garnered international attention – including gaining the support of one of the world’s largest food and beverage companies, PepsiCo – by using simple technology and local entrepreneurship to literally shed light on some of the world’s poorest communities.





According to a 2014 International Energy Agency report, globally there are more than 1.3 billion people who are without access to electricity, more than 95 per cent of whom live in either sub-Saharan Africa, or in developing Asia. Eight in 10 live in rural areas. Electricity is taken for granted in developed parts of the world, and while we rely on it for lightning, cooling, heating and more at the touch of a button, it's hard to understand the value of electricity in the process of economic empowerment.

Many homes in the indigent villages that suffer from energy poverty are poorly constructed, and lack adequate light to perform basic household activities, such as preparing meals and, more importantly, for doing homework, or for working on entrepreneurial projects - both of which are critical for communities, if they are to become economically

empowered. Even during daylight hours, these homes are without light, leading families to turn to unsafe alternatives such as kerosene lamps, or fires fuelled by coal or biomass, including wood, crop waste, and animal dung.

Given the situation and the stakes, a solution was badly needed.

Electricity is taken for granted in developed parts of the world, [...] it's hard to understand the value of electricity in the process of economic empowerment.

Images: (pp. 68-69) Philippines. Source: PepsiCo. (below) Philippines. Source: PepsiCo. (right) Philippines. Source: PepsiCo.





Enter the partnership between PepsiCo and Liter of Light, which brings cost effective solar lighting solutions to communities in need while recycling plastic bottles.

The concept behind Liter of Light is simple - **taking plastic bottles**, the type used by soft drinks manufacturers, and **filling them with water and bleach**, and **affixing it through a roof using a small piece of corrugated metal**.

Liter of Light's solar bottle bulbs use natural sunlight to refract up to 60 Watts of clear light across a 40 square meter room.

And all without the use of electricity! The bottle lights are low cost, they are easily constructed, and they can be installed by community volunteers in about 30 minutes, with minimal training required.

Illac Diaz launched the Liter of Light as a social enterprise in the Philippines in 2011, under the MyShelter Foundation. "The purest form of charity is to make yourself obsolete and through this people's technology, supported by PepsiCo, it shows that empowering the bottom of the pyramid, by putting the power of solar in human hands and multiplying it by hundreds of thousands could be the greatest energy solution of all," says Illac Diaz.

Illac Diaz recognized the potential of the enterprise to help people in his home country, the Philippines, and so he launched the

initiative as a local entrepreneur business model. According to Diaz, through Liter of Light "we can change the lives of millions of people around the world, who are strug-

gling from one of the greatest challenges – energy poverty. Just for an hour or two of your time, you can light up a family's house, practically forever."

"we can change the lives of millions of people around the world, who are struggling from one of the greatest challenges – energy poverty. Just for an hour or two of your time, you can light up a family's house, practically forever."

– Illac Diaz



Not only did this enable thousands of underprivileged families to have a safe and reliable source of light in their houses, but it provided members of such communities with the means to install the Liter of Light apparatus for a small income. In the early months of the initiative, 15,000 solar bottle bulbs were installed in homes in 20 cities and provinces in the Philippines, which began to inspire similar needy communities around the world.

"[Doing this] gives people some kind of normalcy; they can live in their houses during the day, without having to bring the kerosene to the kitchen table," says Diaz.

With Liter of Light's solar bottle bulbs made from recycled plastic beverage bottles, it was only natural that PepsiCo got involved in the initiative in 2011, by partnering with Illac's My Shelter Foundation.

Liter of Light fits ideally within PepsiCo's business mandate, Performance with Purpose, which aims to deliver top-tier financial performance while creating sustainable growth and shareholder value. In practice, Performance with Purpose means providing a wide range of foods and beverages from treats to healthy eats; finding innovative ways to minimize its impact on the environment and reduce operating costs; providing a safe and inclusive workplace for its employees globally; and respecting, supporting and investing in the local communities where we operate. "We live in an era in which CSR and business are mutually beneficial. CSR is not about simply

"Sometimes it's not the big things
that matter, but the small things,
replicated in the millions, that make
the biggest difference."

— Illac Diaz

about donating money to a good cause, it is about helping communities to thrive through sustainable approaches that tackle specific issues," says Noha Hefny, Director of Communications, PepsiCo Middle East and North Africa.

"Illac is an inspiration; he is one man, turning his dream into reality by empowering millions of underprivileged families in some of the world's poorest communities. Liter of Light is the perfect example of what can happen when motivated individuals, with a passion for making society a better place, are given the tools to realize their ambitions while bringing low cost innovative solutions to some of the world's most important challenges," she adds.

With PepsiCo's support, the Liter of Light is already lighting up villages in the Philip-



pires, Pakistan, Mexico and Columbia and Egypt. In 2015, PepsiCo took the initiative global when its largest beverage brand, Pepsi, adopted Liter of Light as part of a global marketing strategy, #PepsiChallenge. Over the course of the year, every time Pepsi consumers around the world used the #PepsiChallenge hash tag on public Instagram, Facebook, Twitter or YouTube profiles, Pepsi donated \$1 to Liter of Light to help bring light to people around the world who need it most. The partnership helped communities in more than 18 countries. It has been extended to include a solar-powered battery, which enables homes to have light during the night, too. Outdoor installations are also being used to provide public lighting, illuminating streets and more.

Pepsi and Liter of Light also collaborated on 'Ignite the Light' Tour to raise awareness around the world as part of the 2015 Pepsi Challenge campaign. The Tour is an international journey of creative, large-scale, mixed media art installations created by artists from around the world, in order to bring attention to communities that lack both

electricity and basic lighting solutions. The 'Ignite the Light Tour' enables us to use fun and excitement to raise global awareness of a very serious need.

The PepsiCo and liter of light collaboration has been impactful particularly in some rural communities in Egypt where up to 15% of

With Liter of Light's solar bottle bulbs made from recycled plastic beverage bottles, it was only natural that PepsiCo got involved in the initiative in 2011, by partnering with Illac's My Shelter Foundation.



the population live below the poverty line (less than \$2 per day), according to a World Bank statistic. In 2014, Liter of Light began providing solar bottle bulbs to some disadvantaged communities in an effort to help them overcome the electricity deficiency.

Over the course of the year, every time Pepsi consumers around the world used the #PepsiChallenge hash tag on public Instagram, Facebook, Twitter or YouTube profiles, Pepsi donated \$1 to Liter of Light to help bring light to people around the world who need it most.

PepsiCo has been an advocate of the program, helping two ways – firstly, to install Liter of Light's solar bottle bulbs in three villages in Sohag and Assiut in Upper Egypt, and secondly, to drive local entrepreneurship by encouraging the production of 100 percent Egyptian-made batteries. By using locally-made batteries for the night lights, Egyptian communities benefit from more than just Liter of Light installations, the price of which is reduced as parts no longer need to be imported – they have the opportunity to generate income by making and selling the batteries.

PepsiCo Egypt also launched a competition with GESR labs, part of Misr El Kheir Foundation, to find an innovative design for producing solar batteries in Egypt. The competition was held across 26 Governorates and garnered more than 100 entries. The

winning innovators were provided with working mechanisms, funding, training and the support needed to successfully manufacture the battery. "This is about teaching people how to convert the sun to light," says Illac Diaz about the PepsiCo initiative in Egypt. As the saying goes, give a man a fish and you feed him for a day, but teach a man to fish and you feed him for a lifetime. In this case, we are giving a man the means to make a solar bottle bulb to illuminate his life, day and night. It also goes beyond that man's life to help the local community too."

PepsiCo Egypt invested in the initiative to bring it to life, as one of the company's major social responsibility programs in Upper Egypt. The partnership is one of the most successful and impactful examples of a collaboration between a private company and a social enterprise. "It is just a start that Liter of Light is being installed in houses around the world, [in the homes of] people who need it desperately. People that maybe I have never met, but it still makes the same difference," says Illac.

Together with PepsiCo, Liter of Light is making the world a brighter place, one solar bottle bulb at a time. ☀️



The Birth of Waste

In pre-urban cultures, waste was a continuum between humans and their environment that integrated natural biological cycles. Today, we search for “empty spaces” to dump our waste and nature is seen as a “reservoir” of resources to be exploited for production.

Writer: Guido Viale



In all pre-urban cultures, waste – or rather excrements and waste generated by the manipulation of everyday objects – did not pose a big problem. This was because its amount and, above all, the fact that it was made up of organic or inert material, determined a sort of ontological continuum between man and his environment: a close integration between cycles that promoted social expansion and those characterizing the natural world. The first break of this continuity was probably the burials that man used for his deceased, instead of giving the bodies back to the environment.

The problem of taking away waste from everyday environment started with urbanization and only in so far as cities' streets, irrigation ditches and gardens were not able to absorb waste more naturally – something that pre-industrial city-dwellers probably understood too late. Nevertheless, the advent of industrial society marked a general metamorphosis of this problem:

a) it drastically increased the number of people generating waste. Population growth characterizing the modern world is a recent phenomenon. It began in the Western world thanks to the increased availability of food starting in the mid-18th century.

b) it also increased the pro-capita waste generation. This is first taken from the environment and it is then given back as waste: the epoch-making transformation caused by the industrial revolution does not affect only resource extraction but also, more or less with the same intensity and with a time gap destined to shorten over time, the use of the environment to dump discarded materials and products.

c) it changed waste composition. For thousands of years man used, and thus discarded, organic materials that nature was perfectly able to re-introduce in its biological cycles; or inert materials that did not alter the balance neither before or after man's

use. But starting with the development on industrial scale of metallurgy first and of carbon chemistry and petro-chemistry later and eventually of new synthetic and composite materials – the performance of these materials is mainly linked to the irreversibility of the processes through which they are produced – have caused a reduction of the organic fraction of the total amount of waste in favor of the non-biodegradable fraction.

d) goods are no longer totally used: capital goods, that is means of production, are characterized by an obsolescence period that does not coincide with their wear-and-tear cycle. Above all, consumer goods have undergone a radical transformation, increasingly pushing them towards the “disposable” realm.

To accommodate all this waste, we need space, but it must be “empty” space – land,



WASTE IS THE OBSCURE SIDE OF GOODS.

We produce to replace but the implicit assumption of such behaviour is that everything that is replaced can and must be thrown away.

Image: (p.77) Adriana Varella and Nilton Malz, *Digital DNA*, Palo Alto (California), 2005. (Graphic elaboration).

Source: Wonderlane. (left) Power house mechanic working on steam pump, 1920. Source: Lewis Hine. (this page) Chicken. Source: Michela Lazzaroni. (pp. 80-81) Digital camera.



water or air – where we can dump everything we do not want to see. The common thread of both responsible (through specific technologies) and irresponsible (that is simply “abandoning” waste, counting on natural processes, such as rain, wind, currents and spontaneous biological processes to get rid of it) waste disposal is that the environment is seen and can be used as an empty space available to society for dumping what it deems no longer possible or useful to keep or use.

This way of looking at the environment is as widespread, rooted and characteristic of the modern spirit as the notion that the world is a mine of resources available for the development of productive forces. This is why waste, before clogging and fouling the external world, polluted the mind as the phenomenology of spirit. In addition, it has taken over because it equates to an approach to the world characterized by the development of technological domination in the modern world: this is exactly what has happened to the progressive transformation of nature into a mere reservoir of resources.

In reality, resources and waste are strictly complementary: waste and its infinite growth potential is fed by the same infinite availability of natural resources. And vice versa: the transformation of nature in resources – that is the availability of all reality to be used in new ways – would

never have reached such universal proportions in the modern world if it had not been guaranteed a privileged way in goods for human activities and as way out from this realm once they have lost their usefulness. As proof, suffice it to look at the way the world of waste has progressively expanded to include anything not seen as a resource.

First, waste – the excrements of society – has attracted in its orbit biological excrements and not vice versa. This first involved human dejecta, in the past used as fertilizer

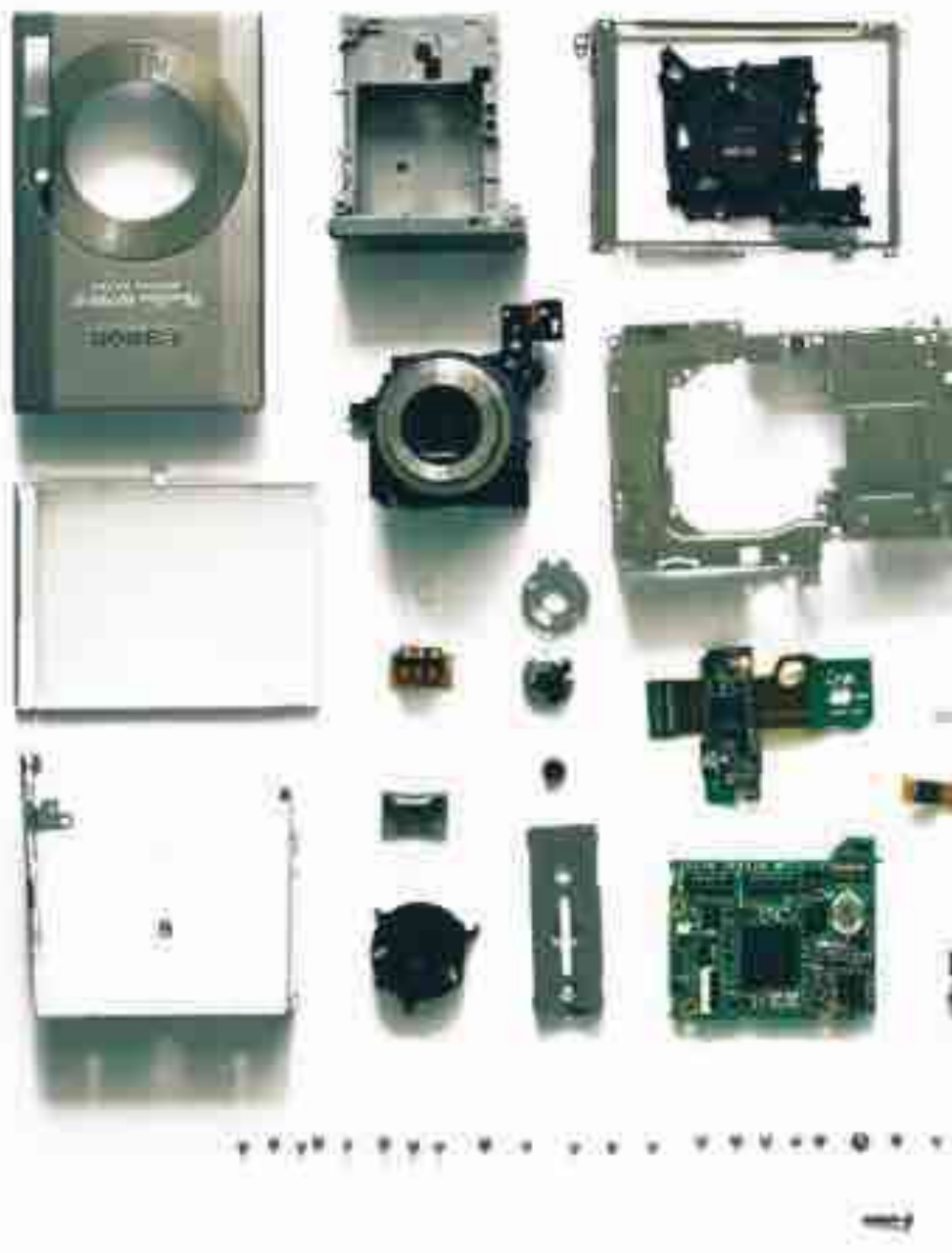
or collected in septic tanks where they were converted into humus and given back to the environment. However, with the introduction of sewage systems, and above all of flushing, they have been dumped into rivers and eventually seas, counting on their ability to contain them all. Nevertheless, the process of transforming excrements into waste has gone further, including most of animal dejecta that are dumped into rivers and are now amongst the factors contributing to eutrophication in many lakes and seas. In this change, a vision of the environment as a mere available empty space where what is no longer economically viable to treat or use can be dumped, has replaced the concept of excrements as an essential link in the interexchange between organisms and the environment.

Secondly, it has become natural that all goods produced are not made to last. We produce to replace but the implicit assumption of such behaviour is that everything that is replaced can and must be thrown

away. The throwaway society – the result of consumerism, that is a social organization perpetuated through the proliferation of goods, because without such increase the links (trade) binding it together would disappear and through the means with which it guarantees its members' livelihood (occupation as a privileged access to income) – is based both on the assumption of infinite resource extraction and that of endless accumulation of waste.

Finally, with the progressive extension of the resource realm from produce to the whole creation, including man who expected to dominate this process in the name of his right to use nature (this is why we refer to "human resources"), the realm of waste

The throwaway society is based both on the assumption of infinite resource extraction and that of endless accumulation of waste.



WHAT SOCIETY IS NOT ABLE TO RECOGNIZE

also progressively expanded, including not only what in the past was not waste because it belonged to the "natural" relations of exchange between man and his environment, but man himself, who invented the notion of waste. In different historical eras, the words "human waste" or "social waste" were used to isolate and remove from

society and its processes all those individuals that the dominant culture no longer considered, or was no longer able to see, as resources, that is criminals, the handicapped, the antisocial, and the long-term unemployed. The history of this process is the other side of a general notion of social relations that selects and values individu-

als on the basis of their ability to produce and their contribution to production. In this case as well, we are faced with a unique process: to increase productivity, we have deeply tapped indiscriminately into human faculties, selecting and using them according to pre-established objectives – the very essence of exploitation – because there



ered the forerunners of the realm of waste, that is goods and their production. This is even more so if we go back to the dawn of the reflection on the world of goods. It is the essential nature and destiny of goods, and not of waste, “to be left to their own devices,” that is to the free play of demand and supply and the process of social and physical circulation.

Laissez-faire, laissez-passer are the mottos printed on the flags of market idolizers according to whom independence within civil society and legal regulations is achieved through the production of goods, in a period when the market is imposing itself as the privileged environment for social development. No one would ever dream, or has ever dreamt, to claim the same mottos for the production of waste, even if, in reality, this has been and still is a widespread practice. De facto and legal freedom enjoyed by the market and the circulation of goods in society, the autonomy of trading relationships, as a means of social cohesion no longer based on blood or community ties, do not tally exactly with the restrictions and the rules governing waste. It can no longer be “abandoned” without obstructing and making unusable both the physical and social space where the freedom of goods takes place.

Waste is the obscure side of goods. Legislators subject waste to ever more rigorous rules in an attempt to keep as unchanged as possible the freedom of those who legally enjoy goods. And vice versa: goods produce an immense amount of waste on which legislators must intervene, because the law and above all the market ideology allow its production. Legislators intervene on waste,

AND ACCEPT AS PART OF ITS FUNCTIONING.

is the possibility, when they are no longer usable, of throwing them away, together with the individuals, the wretched vessels of such faculties.

However, what has happened to waste since we developed technologies to treat it, to make it harmless, to recycle it and no

longer leave it to itself as it happened for many years and it is still happening in many parts of the world? Those technologies, and the laws that supported their development and adoption, have transformed waste into the privileged recipient of a generalized “management.” The same detailed directions do not apply to what can be consid-

followed by hordes of experts, conventions, authorized and illegal treatment plant builders and thousands of profiteers of what society is not able to recognize and accept as part of its functioning. Waste, however, is just the perceptible manifestation – to the eye, to the touch, to the nose and so on – of the freedom enjoyed by goods. 

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