

SWG Forest

1. Presentation of SWG Forest

MISSION AND AIMS

- Strengthen transnational research and cooperation on forests and forestry in order to tackle climate change and other risks, to support biodiversity and ecosystem services, and to develop bioeconomy with regards to sustainability and competitiveness of the EU's forest-based sector.
- Promote forest-based system and value-chain approaches with consideration of other sectors and regions of the World.
- Be a source of advice for a coherent forest-based research and innovation area, and the elaboration of national and EU policies or strategies.

MAIN ACHIEVEMENTS

- It has been shown extremely important, for a fragmented forest-based sector (ownership, SMEs, public policies, research and innovation), to develop networking actions, private/public consortia, and partnerships between national funding agencies, with simple supporting instruments implemented with enough continuity.
- Digitalisation and robotisation appear to offer extraordinary opportunities for the forest-based sector where their use could and should be reinforced.
- System approaches have still clearly to be developed in the forest-based sector in order to meet global challenges.

CURRENT ACTIVITIES

- Support, develop and improve networking actions as well as research and innovation funding partnerships
- Contribute to defining priorities for the next National and European framework programs for research and innovation
- Broaden the scope of international cooperation in relation to agricultural issues and global challenges.
- Stay tuned to developments in public policies related to the forest sector to feed them as needed.

COMPOSITION

- Member states: AT, BE, CZ, DE, EE, ES, FI, FR, GR, HU, IE, IT, LV, LT, NO, PL, SE, SK, UK ...
- Other potential members (contacts): BG, PT, TR
- Observers: EU DG AGRI, EFI, INNOVAWOOD, IUFRO, FORESTVALUE

2. Domain covered by the working group

Forests and other wooded land cover about **44% of the EU land area**, that means slightly more than agricultural land. They include a **wide variety of ecosystems** from the boreal zones of Scandinavia to the outermost regions of the tropics, including continental, oceanic and Mediterranean areas. They constitute an exceptional reservoir of **biodiversity**, an irreplaceable element of the **landscape**, a huge and increasing **stock of carbon, wood and non-wood resources**. They offer a **large set of ecosystem services** (Common international classification of ecosystem services – CICES) from regulation (climate, water, soil, air and biodiversity) and provisioning (nutrition, materials, energy and genetic material) to cultural amenities (human interactions with natural environment). Although the proportion of the territory they occupy worldwide is slightly lower (around 30%), forests have the same importance at the planet level.

Because of its overall weight and provision of numerous fundamental services, the forest-based sector is essential for societies worldwide and particularly in Europe. It is a primary component of **environmental and societal wellbeing**, and makes a significant contribution to **local and national economies, rural development and individual livelihood**. It must all the more be considered that it is subject to **various major and increasing risks and opportunities**: climate change, biodiversity conservation, illegal timber logging, deforestation, social expectations, development of bioeconomy and ICTs, etc. These changes have a particular resonance due to the **length of forest cycles** to which they add to challenge the **resilience** and **sustainable management of forests**. The development of **bioeconomy** finds with forestry a strong ally producing services and goods, among which wood, that is to say of a renewable, natural, and energy-efficient resource, with singular properties in terms of aesthetics, insulation, acoustics, resistance, chemical compounds ...

However, the forest-based sector is **highly fragmented** among multiple and often non-professional forest owners (on the resource side) and mainly SMEs (on the industry side). It is also torn between several forest-related public policies or strategies that are partially linked but often lacking connections between them: biodiversity, rural development, climate, energy and bioeconomy, sustainable development, forest and timber and, of course, research and innovation.

3. Main facts, figures and trends regarding the domain covered by the working group, as regards Sustainable development goals.

Forests provide human societies with many benefits in the form of goods and services. They are concerned by almost all sustainable development goals (2015) as it is commented below.

(1) forests play an important role in the fight against **poverty** by providing livelihoods for the 820 million people living in the tropics near forests, 251 million of which are below the poverty line (40 % of people below the poverty line) and providing regulatory services to small-scale rural agriculture (FAO, 2018)²; this reality is subject to the rights of people to access, participate in and manage forests, while about three-quarters of the world's forests have national status; note that food consumption in developed countries influences deforestation in the tropics; deforestation in the World is mainly due to agriculture that explains 53% of causes and 70% of causes that can really be explained; a significant part (13%) of the products is consumed in developed countries after importation.

(2) forests contribute directly or indirectly to **food security**; directly, they produce dietary supplements to more than one in 10 people worldwide (FAO, 2016, Vira et al., 2015); indirectly, they very often provide the energy of cooking food and ecosystem services (pollination, water and soil protection ...) benefiting food crops around;

(3) the role of forests in **human health** is now well referenced; forests contribute to human health through food and medicinal plants; moreover, silvicultural experiences are increasing and the forest is in any case a privileged place for recreation and nature activities;

(4) forests participate in a quality **education** by constituting a real school of nature where can be observed and studied many animals and plants, some emblematic (great apes, ungulates ...) and the functioning of ecosystems;

(5) with forests, **women** have the opportunity to participate in the governance of natural resources, which is in line with a better gender balance; in developing countries, they are often responsible for managing the supply of fuelwood and non-timber forest products, including medicinal goods; they occupy more and more forestry jobs, both in developed and developing countries; but they must still progress in the hierarchy to assert their presence at the decision-making level;

(6) forests are essential in terms of **water** cycle and purification; they regulate water flows by favoring rainfall, allowing groundwater recharge and returning moisture to the atmosphere by evapotranspiration; they avoid soil erosion and promote the quality of the water they filter; more than three-quarters of the world's usable water supply would come from forest watersheds around the world (FAO, 2018) and more than half of the world's population would depend on them for domestic, agricultural, industrial and environmental purposes;

(7) forests provide basic **renewable energy** to about 2.4 billion people worldwide for cooking and heating; wood energy also supplies industries (including for electricity generation and cogeneration of heat and electricity, according to the international energy agency, renewable energies account for nearly 20% of primary consumption of energy, and wood accounts for about 40% of these renewable energies, as much as solar, hydroelectric and wind energy combined (FAO, 2018), by protecting the soil from erosion, forests also promote energy production. (FAO, 2018 citing FAO, 2014), however, woodfuel is criticized for polluting the air and not effectively combating the greenhouse effect because of the low efficiency of many households, which argues in favor of efforts to solve this problem, and the substitution of wood energy for fossil fuels is not a panacea to mitigate competition from other

uses of wood, especially in the form of material, more virtuous in their fight against the greenhouse effect;

(8) forests are at the base of **value chains** in the fields of timber and tourism; they contribute to the gross domestic product, the balance of the trade balance and employment (especially in rural areas) in a very significant way;

(10) by meeting the needs of the poor and those in remote rural areas, forests help to reduce **inequalities**;

(11) forests contribute to the security, resilience and sustainability of **cities**; In view of the large proportion (over 50%) and increasing proportion of the world's population living in cities, as well as climate change and the loss of biodiversity, urban and peri-urban trees and woodlands play an increasing role. landscape and relaxation space for urban dwellers, the fight against heat islands and air pollution, ecological corridor; forests therefore deserve to be integrated into urban planning projects from the earliest stages of their design; moreover, a considerable part of the city's drinking water comes from rural forest areas;

(12) The forest-based sector is based on renewable resources (timber and non-timber forest products) that can be used in multiple cascades that illustrate the concept of **sustainable production and consumption**, which does not exclude that progress can be made (what has been and is still the case) to enhance the value of by-products (eg for panels and the paper industry), to better recover and recycle waste paper and other wood products, and to produce energy preferably at the end of life; in particular, wood is an essential resource for a successful transition to the bioeconomy; over the past five decades, industrial roundwood harvesting has developed (Figure), particularly from 1970 to 1990 and since 2000, with a period of stagnation between the two; it is remarkable that an even faster evolution has taken place for sawnwood and panels, which reflects a better use of the material; in terms of population, the consumption of sawnwood and panels is not higher today than 50 years ago;

(13) the forest-based sector makes a remarkable contribution to the fight against **climate change**, in various forms: carbon sequestration in the forest by growing trees; storage in living biomass, then dead biomass and soil organic matter, finally in products, after logging and transfer to the economic sphere; saving fossil energy during the processing of wood, which generally requires less energy for processing than most of its competitors (cement, clay, ceramics, glass, metals, etc.); also direct substitution of bio-energy with fossil fuels for the production of heat, electricity, fuel ...; therefore, reducing deforestation, afforestation and sustainable management of existing forests (sources of wood material and energy risk-resilient) are actions that contribute to mitigating climate change;

(14) Forests also contribute to the protection of **aquatic fauna and flora**, including riparian formations that prevent soil erosion and provide a filter for runoff water;

(15) Forests play a crucial role in the protection of **terrestrial fauna and flora** in the context of sustainable forest management, which is in line with the Sustainable Development Goals above.

(17) The above scan shows the strong contribution of the forest to most of the **global objectives**, at least 14 of the 16 above objectives; the basic forestry issue is to take into account each aspect to find the best possible compromise between them in liaison with the various stakeholders; it therefore requires appropriate governance.

4. Analysis of the main emerging issues in the domain covered

In this section emerging environmental, social, economic, health, ethical issues characterizing the domain should be analysed in light of Sustainable Development Goals.

Forest research got quickly a good comprehension of changes, risks and uncertainties which, however, question the way in which medium and long-term projections are constructed from past observations and experiments. In addition, the field of research is expanding and evolving towards **more interdisciplinarity to fully integrate change, risk and uncertainty management into decision support.** (SDG13)

Ecosystem services are now better analyzed than in the past when wood production was mainly under consideration. Nevertheless, **analyses on multiple and interacting ecosystem services should be better coordinated with more attention on synergies and trade-offs between them at different spatial scales.** (SDGs 1, 3, 6, 7, 8, 11, 12, 14, 15)

Bio-based activities showed a real ability to organize networks at the European level and their high potential for innovation. But much **more efforts are necessary to create and market new products** (be they goods or services), increase productivity, use all the resource potential, promote wood against other materials and energies, and add socioeconomic to technical considerations. (SGDs 7,8, 12, 13)

Overall, there is a need to support the forest-based sector in its difficulty **to act simultaneously on its decisive contributions to major issues such as biodiversity, bioeconomy or resilience that cannot be treated separately. Such overall coherence is all the more needed as these issues are intensifying.**



5. Contribution of the working group to the three transitions

Analysis should address the following questions:

5.1 Target 1: Healthy and sustainable food for all

Forests and forestry are mainly concerned through:

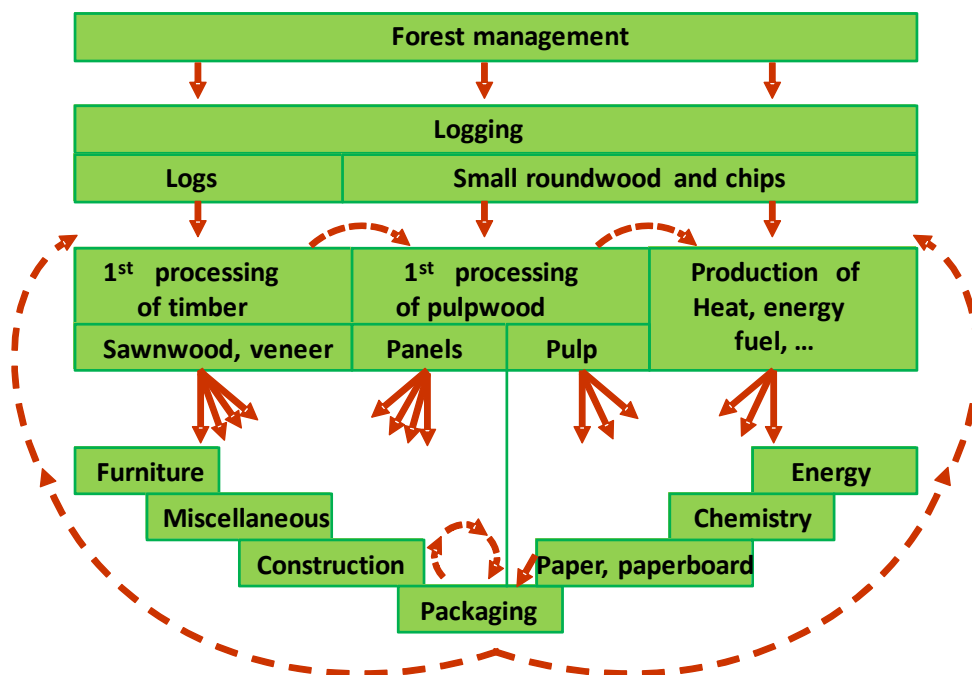
- Picking of mushrooms and berries; in Europe, it is generally more a goal for recreation than a true contribution to food.
- Production of honey, much of which comes from forests.
- Hunting game; in Europe, hunting is also a leisure activity but it provides some quantity of meat that is likely to be valued at about 1 billion €/year; regarding particularly large ungulates, the population of whom is increasing everywhere, there is a potential to increase the hunting board with several effects.
 - Target: increase hunting of ungulates; it will contribute to food provisioning and, in the same time, to silviculture (prevention of browsing or fencing), on adaptation to climate change (larger set of potential species), on the health of wild animals and on the health of domestic animals that could be contaminated (see for example the case of the African swine fever); the target cannot be set very easily and depends on species and local conditions; but a significant increase is needed in many places;
 - Enablers: the number of interests beyond food could help to reach the target.
 - Barriers and risks: hunters generally prefer to manage a lot of game and maintain high levels of populations; the number of hunters tends to diminish in Europe; a large part of society also prefer to see as many deer as possible.
- Water quality can be improved by good forest practices, for example around catchments; in some cases, reforestation is also a way to limit erosion, to facilitate infiltration and to lead to a better water quality.
- Agroforestry is a way to find a synergy between agricultural productions and trees. Its benefits are threefold. Agroforestry protects crops better than a conventional agricultural system. Crops benefit from trees' microclimate and suffer less from drought or frost. Trees grow better because of their spacing and their wood quality is given by large and regular ring width. Lastly, agroforestry is also a way to fight against climate change. Trees modify the functioning when associated to crops, and sequester more carbon in the soil. Then, agroforestry promotes crops resilience, maintains crops production and participates to carbon sequestration.
- "Imported deforestation": in that case, the problem is linked with consumption behaviors in Europe that are partly responsible of deforestation in the tropics; last July, The European Commission published a communication to the European Parliament, the Council, the European economic and social Committee and the Committee of the Regions in order to step up EU Action to protect and restore the World's Forests;
 - Target: the objective is to halt global forest cover loss by 2030; it needs improvements in terms of land use change monitoring, trade modelling, certification schemes.
 - Enablers: consumer associations that can make a pressure on firms to avoid deforestation, firms that are encouraged to look after consumers; regulations, tax systems and certification schemes that promote good practices.
 - Barriers and risks: Leakage is a potential risk to transfer the problem elsewhere.

5.2 Target 2: Safe and just circularity of food systems

Circularity is an important concept for forestry as a source of materials and energy. Here, the link with food systems is still tenuous but twofold:

- The marketing of food products uses packaging that comes largely from the forest-based sector (wooden crates, cheese boxes, and pallets; paper sheets or bags and paperboards...); agriculture also uses (and could use more) forest products for fences, buildings...
- The forest-based sector is based on biomass that is also a by-product of food systems (and sometimes a product): it is complementary to the agricultural sector.

The figure shows schematically the forest-based sector with the main elements of circularity that are implemented: sawmill residues are used as pulpwood or for energy; some products are recycled such as wooden pallets that are reused and recycled; more and more product are processed again at their end of life, following the example of waste papers; end-use of end-of-life products may finally be energetic.



In Europe, there is a potential for a better use of forest resources because the felling rate is much below the level that could be reached under sustainable forest management.

- Target: development of the use of wood as a material, for example in construction: sawnwood, plywood and veneer sheets, other wood-based panels using silviculture and first processing residues, recycled products, new products from recovery of end of life products; a secondary target is to adapt the production of paper, paperboard, chemistry and energy to the demand in the frame of sustainable forest management.
- Enablers: the biological nature of wood, its renewable nature, and its sobriety in terms of carbon emissions that make it a major candidate to develop bioeconomy.
- Barriers: the difficulty for a sector made of many SMEs to be organised facing the competition with other materials such as concrete, glass, iron, plastics...

5.3 Target 3: Substantial increase of biological, social, and economic diversity

Diversity is a crucial driver of the forest-based sector for many reasons:

- forests are home to a major part of terrestrial biodiversity, which is also important to ensure the stability, the productivity and the resilience of forest stands;
- the length of forest cycles creates some uncertainty on the future of resources; but diversity is a way to prevent ecological and economic risks or uncertainties;
- climate change is an additional issue that reinforces the need for diversity; the forest-based sector can mitigate climate change partly but effectively if, and only if it is adapted enough to resist to impacts such as drought, wild fires, pest outbreaks, windstorms. Forest adaptation to climate change is a difficult task that still needs to be analyzed. There is much uncertainty about the future because the climatic scenario that a tree will experience depends, due to the long life-cycle of trees, on the future actions that will be taken outside of the sector in order to mitigate climate change.

One main objective of sustainable forest management is to implement, maintain and improve a forest multifunctionality that ensures that ecological, social and economic issues are taken into account.

- Target: increase sustainable and multifunctional forest management
- Enablers: payments for environmental services will facilitate the implementation of a balanced forest multifunctionality and allow to support common or public goods such as many forest ecosystem services
- Barriers and risks: Many actors see forests under one dimension only and could consider that forests are an adjustment variable for their own strategy:
 - When and where there is deforestation, farmers and developers often consider forests first as a land reserve.
 - Some actors from the forest-based sector see forests as a wood resource only.
 - Energy specialists expect energy wood from forests and would like to increase the share of renewable energies (but another way to increase this share is to save energy consumption, which is why solid or reconstituted wood products can perform very well).
 - Hunters would like that we consider mainly the game populations.
 - Naturalists are in favor of the development of biodiversity and often think that biodiversity will increase with some limitations on the roundwood harvest
 - People in charge of climate change mitigation would like to manage carbon first, and sometimes to store carbon in forest and to decrease fellings (that would reduce jobs and income, and increase imports or the demand of other materials than wood, and thus increase carbon emissions and climate change impacts).

Once multifunctionality is organized, diversity may be developed in many other ways

- Stand and tree diversity (species, ages), potentially with an insurance system.
 - Target: maintain or increase tree species and ages diversity in stands (climate change reduces the set of possible species that should then be considered more broadly).
 - Enablers: natural regeneration or plantations with accompanying vegetation; possibility to make decisions at the local level; a sufficient level of fellings is necessary;
 - Barriers and Risks: to increase or adapt the age and species diversity of a stand may need a whole forest rotation (cycle), that means several decades and often one century or more: the risk is that this rhythm could be insufficient in the face of climate change; beyond this technical risks, a question is what changes society is able to accept, or adopt.
- New forest products in order to increase the set of production options.
 - Target: develop new products.
 - Enablers: wood is a complex material (physical structure, chemistry) that has not yet been completely covered.
 - Barriers and risks. Powerful concurrent sectors of wood. Time required to obtain authorizations and put a new product on the market.

6. Policies for the achievement of the targets

The forest-based sector is a part of multiple public policies, and particularly the following ones:

- the biodiversity strategy that has been elaborated in Europe in 1998, after the Council Directive on the conservation of natural habitats and of wild fauna and flora (1992) and the UN Convention on Biological Diversity (1992), then renewed for the period 2011-2020; it is about halting the loss of biodiversity and ecosystem services, controlling invasive alien species, developing green infrastructure, enhancing the sustainability of agriculture and forestry;
- the bioeconomy, climate and energy strategies that follow the UN Framework Convention on Climate Change (1992) and its Paris Agreement (2015) with targets in terms of reduction of greenhouse gas emissions, an increase of the share of renewable energy in energy consumption, and an improvement in energy efficiency;
- the Common Agricultural Policy “second pillar” aiming at the development of rural territories and considering forestry measures contributing to sustainable development;
- the forest strategy of the EU partially compensates for the lack of a forest policy as such (that is let to EU members); it calls for a holistic vision and a multifunctional forest that contributes to both rural development, business, environment, bioenergy and climate protection, supported by research and development;

- the strategies regarding forests outside Europe are also important for the European Union; they aim at preventing illegal logging with the FLEGT program (Forest Law Enforcement, Governance and Trade, 2003) and its EU timber regulation (2013); they could also prevent deforestation (often caused by agricultural extension) after the EC Communication for Stepping up EU Action to Protect and Restore the World's Forests (2019);
- the approach to sustainability that follows the UN sustainable development goals (2016-2030) and claims to consider all the previous aspects together.

These policies or strategies provide a good basis for a transition to sustainable and multifunctional forest management. These policies or strategies provide a good basis for a transition to sustainable and multifunctional forest management. Their harmonization is however not easy and must be organized all the time. In addition, some pitfalls must be avoided, including the following:

- an exit from the era of fossil energies emphasizes the development of renewable energies; as for wood, an interesting strategy is to first develop the use of wood material rather than that of wood energy as one might think; indeed, the use of wood material saves energy compared to the competitors of the wood, thus reduces the denominator of the fraction which makes it possible to calculate the share of the renewable energies and thus increases this one mechanically; in addition, the wood material can be used for energy purposes at the end of life;
- Biodiversity protection justifies combating deforestation, but does not necessarily preclude either increasing timber removals when these are lower than the net biological increment of forests, or increasing hunting when the density of large ungulates exceeds the carrying capacity of a resilient and productive forest;
- The reduction in wood removals, which a part of society tends to claim, favors either imports of wood products or products from more energy-intensive industrial processes than the forest-based sector, and thus leads to greenhouse gas emissions to enhance climate change when it needs to be mitigated;
- Although the long-term goal of Paris Agreement is to keep the increase in global average temperature to well below 2°C above pre-industrial levels and if possible to about 1.5°C, forest adaptation should be managed taking into account a range of other scenarios because setting mitigation goals does not necessarily guarantee that they will be achieved;
- High biodiversity is a good ally in the face of climate change, but is not necessarily enough to withstand it, depending on the climate scenario that the forests will have to undergo.

Finally, a good way to harmonize forest-related public policies is to consider that, apart from a network of a few well-distributed protected areas ensuring the entire ecosystem cycles, the search for a quality production objective, providing many ecosystem services and wood material of appropriate size for industrial uses contributes to a high level of biodiversity, landscape, regulation of biogeochemical cycles, economic wealth and resilience to risks.

7. Challenges for research

Research has to overcome some difficulties encountered by the forest and forestry domain:

- the complexity of the forest-based sector in the ecological field (long life cycle, ecosystem functioning and diversity, spatial variability, interface between the soil and the atmosphere, in the middle between cultivated and natural assets), in the socioeconomic sphere (multiple forest owners and SMEs, many and strong social expectations) and the policy arena (many forest-related policies including biological diversity, climate and energy, bioeconomy, rural development, trade...);
- the need for coherence, improving synergies and minimizing trade-offs between all these dimensions (biodiversity, bioeconomy, resilience, societal expectations) that could conflict with each other in a counterproductive way;
- global change that comes in addition to long forest life-cycles and increase the uncertainty about the future and the difficulty to support decision making;
- the fragmentation of research to deal with a very multidisciplinary field.

Some directions for future research are thus based on the following principles:

- the development of system approaches in order to find consistent solutions;
- the need for interdisciplinarity and transdisciplinarity;
- the support from a high potential for innovation and progress in forest management (monitoring, delivery of ecosystem services, sustainable wood mobilisation) and forest industries (new resource-, energy-efficient and environmentally sound processes and products, advanced wood-based materials and chemicals, new value-chains; incl. among other things dedicated R&I initiatives addressing hardwoods and dedicated R&I adopting and advancing digitalisation);
- the development of trans-national collaborations that will speed up the innovation process, make it more efficient, and will foster the development of the forest-based sector;
- the need to intensify exchanges between science and policy and to develop also communication between scientists, experts, decision-makers, professionals, stakeholders and the general public.