



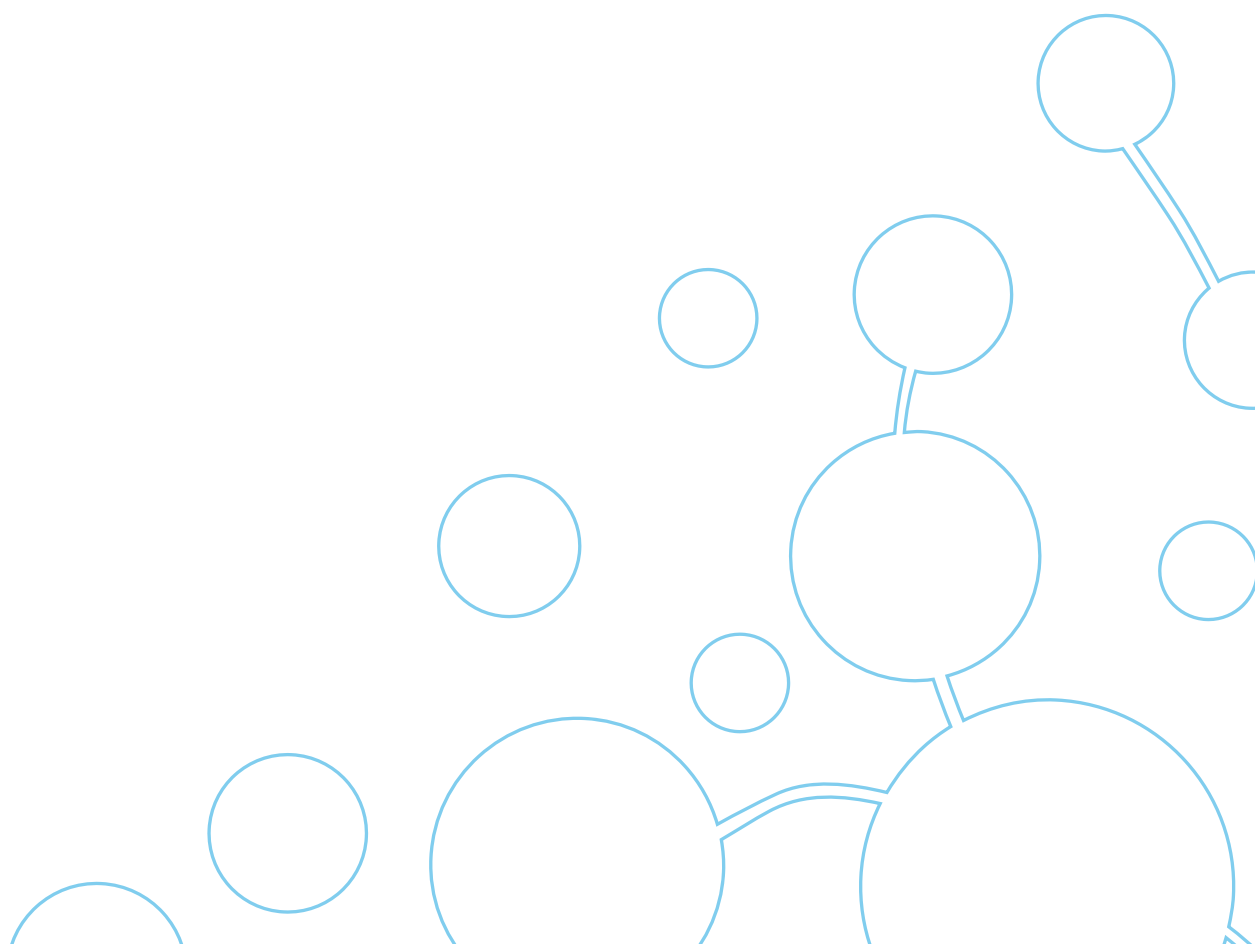
Meeting *the*
Goals for European Forests
and the *European 2020 Targets for Forests*

**Report on the MID-TERM EVALUATION of the
Goals for European Forests and the European 2020 Targets for Forests**

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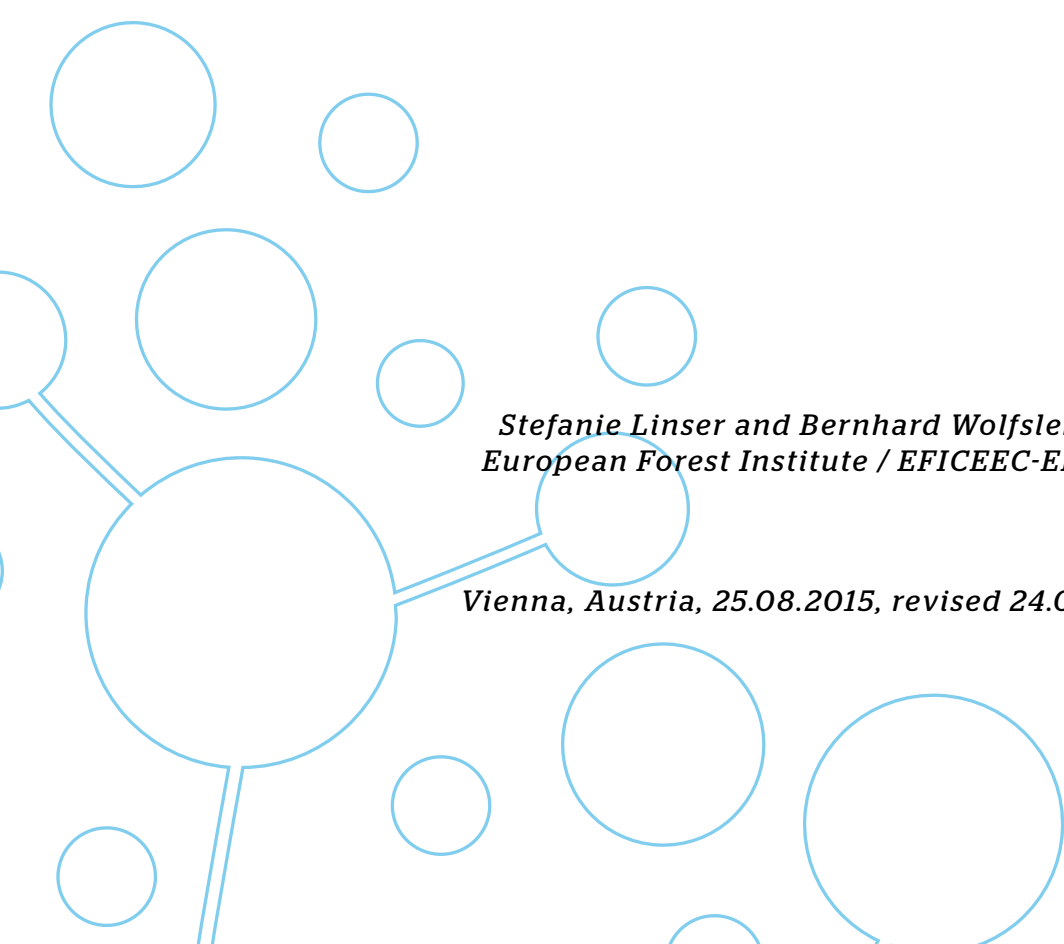


Meeting the
Goals for European Forests
and the **European 2020 Targets for Forests**

Report on the Mid-term Evaluation of the
Goals for European Forests and the European 2020 Targets for Forests

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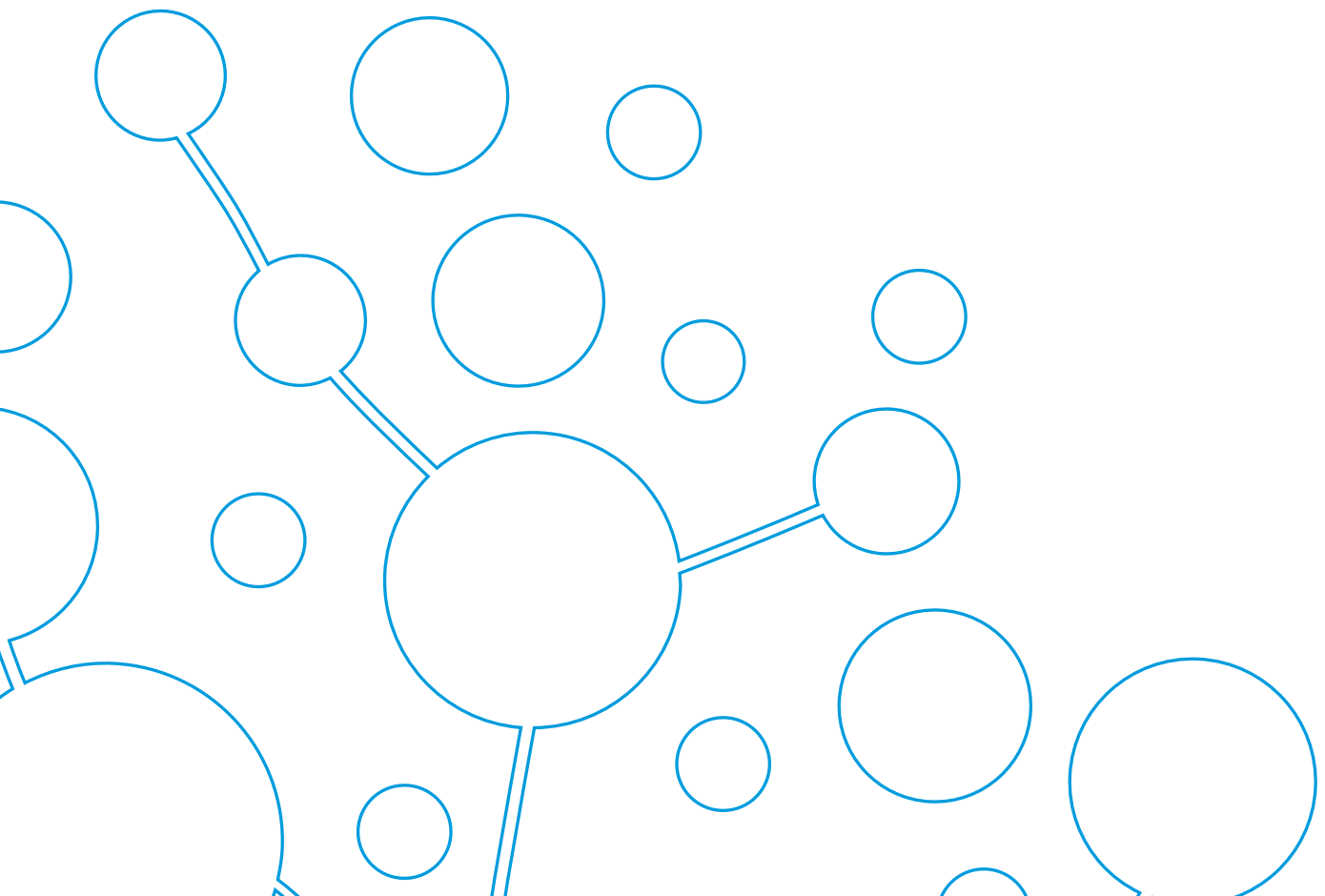


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Executive Summary

This report comprises a compilation and assessment of the available and required information for the reporting on the implementation and achievements of the eight “Goals for European Forests” and the nine “European 2020 Targets for Forests” which support the shared vision of the representatives of the Signatories of FOREST EUROPE:

To shape a future where all European forests are vital, productive and multifunctional. Where forests contribute effectively to sustainable development, through ensuring human well-being a healthy environment and economic development in Europe and across the globe. Where the forests' unique potential to support a green economy, livelihoods, climate change mitigation, biodiversity conservation, enhancing water quality and combating desertification is realised to the benefit of society.

Based on the outcomes of a preceding study (Linser & Wolfslehner, 2015) 29 of the 35 quantitative indicators and all qualitative Pan-European Indicators for Sustainable Forest Management are applicable for the monitoring, reporting and assessment on the implementation and achievements of the eight Goals for European Forests and nine European 2020 Targets for Forests.

The mid-term evaluation shows that Goal 1 (SFM ensures multiple forest functions and lasting provision of goods and services) and Target 2 (improved forest knowledge) are largely on track to achieving the respective goal or target. Nonetheless, the data and information base for Target 2 has to be improved for further in-depth evaluations.

The nine goals and targets which focus on national forest programmes, renewable raw material and energy, green economy, climate change mitigation and adaptation, socioeconomic and cultural benefits, illegal logging and associated trade are partially on track to achieving the goal or target. For three of those goals and one target the data and information base has, however, to be improved considerably to make further valid evaluations.

Finally, the six goals and targets on loss of biodiversity, combating desertification, value of ecosystem services, policies and measures on socio-economic and cultural benefits are largely not on track to achieve the goal or target, most often also due to information gaps which hamper a valid evaluation.

Introduction

Seeking the best way to enhance the role of European forests in contributing to solving the national and global challenges, the representatives of the Signatories of FOREST EUROPE adopted at the 6th Ministerial Conference on the Protection of Forests in Europe in 2011 in Oslo, Norway eight goals and nine targets for European forests to be achieved by 2020 in support of the shared vision for forests in Europe:

“To shape a future where all European forests are vital, productive and multifunctional. Where forests contribute effectively to sustainable development, through ensuring human well-being a healthy environment and economic development in Europe and across the globe. Where the forests’ unique potential to support a green economy, livelihoods, climate change mitigation, biodiversity conservation, enhancing water quality and combating desertification is realised to the benefit of society.” (FOREST EUROPE, Oslo 2011)

The Expert Level Meeting of the Ministerial Conference on the Protection of Forests in Europe (FOREST EUROPE), held on 14-15 February 2012 in Madrid, decided on the “further improvements in forest monitoring and reporting” (Item 2 of Work Programme). One of the

tasks of this item was to develop a monitoring and reporting scheme on the achievements on goals and 2020 targets, possibly integrated with the reporting on the State of Europe’s Forests.

As a direct follow-up, a mid-term evaluation on the achievements of the goals and 2020 targets by countries should be prepared for the Ministerial Conference in autumn 2015.

This mid-term evaluation is to be based on the latest data collected for the assessment of the Pan-European Indicators for Sustainable Forest Management and available FOREST EUROPE/UNECE/FAO data.

A preceding project report (Linser & Wolfslehner, 2015) dealt with the analysis of potential linkages of the pan-European indicators for SFM and the Goals for European Forests and the European 2020 Targets for Forests and the screening of other sets of Criteria and Indicators for Sustainable Forest Management. It also contains a selection of potentially suitable indicators for the further analysis of the goals and targets implementation as well as recommendations for additional indicators or amendments of existing indicators. Based on this, a mid-term evaluation of the Goals for European Forests and the European 2020 Targets for Forests has been performed and is presented in this document.

Methodology

In methodological terms, this report is based on a study (Linser & Wolfslehner 2015), which focused on the suitability of the quantitative and qualitative Pan-European Indicators for Sustainable Forest Management (SFM) to evaluate progress towards goals and targets for European forests. Based on the outcomes of that study 29 of the 35 quantitative indicators and all qualitative Pan-European Indicators for Sustainable Forest Management can be related for the monitoring and reporting on the implementation and achievements of the “Goals for European Forests” and the “European 2020 Targets for Forests. In addition, in case of information gaps other indicator sets have been screened as regards their potential to provide complementary information.

Based on this outcome recommendations for additional indicators or amendments of existing indicators, were derived, which were partly already considered in the FOREST EUROPE indicator improvement process.

The quantitative and qualitative data and information used in this report was collected through the Joint FOREST EUROPE/UNECE/FAO Questionnaire on pan-European quantitative indicators for Sustainable Forest Management and in a related questionnaire on the qualitative indicators in 2014. The related data is published in Output Tables included in the Annexes of the State of Europe’s Forest Report 2015, displaying the information reported on Quantitative Indicators by 35 signatory countries. It also includes information of 11 desk studies elaborated by the UNECE/FAO Forestry and Timber Section (Albania, Andorra, Greece, Holy See, Luxembourg, Malta, Monaco, Republic of Moldova, Serbia, The Former Yugoslav Republic of Macedonia) and the information reported by the Russian Federation for the previous edition of the State of Europe’s Forests report (2011). Given the lack of comparable current data from the Russian Federation and in order to keep the internal consistency of the report, the Russian information from 2011 is not included in the analysis, if it is not explicitly mentioned.

In methodical terms each goal and each target was assessed in the following way

- **Context:** This paragraph contains a clarification of the content of the respective goal or target, an identification of its scope and its system boundaries.

In some cases, it also contains major links to other goals or targets.

- **Status and trends:** This paragraph is based on the analysis of data collected through the most recent qualitative and quantitative Pan-European data and information surveys (FOREST EUROPE/UNECE/FAO, 2015). Trends addressing the respective goal or target are presented and assessed for available timelines. In some cases, an explanation of the desired direction of change as, the utility of the information provided by the indicator is included as well as pitfalls in interpretation and limitations are addressed.

If not cited explicitly, all qualitative and quantitative information provided and analysed in this report is based on the 2015 FOREST EUROPE/UNECE/FAO data.

- **Knowledge gaps:** In this paragraph information needs are listed, which arise from limited available data as provided by the FOREST EUROPE/UNECE/FAO data collection.

- **Recommendations:** This paragraph comprises information, which will be needed for a better future reporting and assessment in order to fully explain compliance with the goals and targets until 2020.

- **Conclusion:** This part of the analysis provides summary conclusions regarding the respective goal or target and identifies ways forward.

- **Indicative assessment of progress to goal/target**
The indicative assessments of progress to the goals or targets, presented in the following, are based on the pan-European Indicators for Sustainable Forest Management and on expert judgement of the authors. It comprises the following statements:

► Largely on track to achieving the goal/target

► Partially on track to achieving the goal/target

► Largely not on track to achieving the goal/target

► Reduced validity of assessment due to lack of information

Table 1 displays an overview on the Goals for European Forests and the European 2020 Targets for Forests. They will be evaluated one by one in the consequent sections. When goals and targets

are content-wise overlapping, the evaluation of the goal is mainly based on qualitative information and the evaluation of the target is primarily based on quantitative data.

Table 1: Overview on the Goals for European Forests and the European 2020 Targets for Forests

Goals for European Forests	
1.	Sustainable management of all European forests ensures multiple forest functions and enhances lasting provision of goods and services.
2.	European forests contribute to a green economy, including through increased provision of wood, other forest products and ecosystem services from sustainable sources.
3.	Forest management in Europe is being adapted to changes in climate, forests are healthy and resilient to natural hazards and protected against human-induced threats such as forest fires, and the productive and protective functions of forests are maintained.
4.	The potential of European forests to mitigate climate change, through carbon sequestration in trees and soils, carbon storage in forest products and substitution of non-renewable materials and energy sources, is utilised to minimise Europe's ecological footprint without harming the global carbon balance.
5.	The loss of forest biodiversity in Europe is halted and degraded forests are restored or rehabilitate
6.	The role of forests in combating the progress of desertification is strengthened.
7.	Socioeconomic and cultural benefits, especially for livelihoods, rural development and employment from European forests are optimised.
8.	Illegal logging and associated trade in wood and other forest products are eliminated in Europe.
European 2020 Targets for Forests	
1.	All European countries have developed and are implementing national forest programmes, or its equivalent, in line with the shared vision and goals and the pan-European approach to national forest programmes.
2.	In addressing emerging issues forest knowledge is improved through research, education, innovation, information sharing and communication.
3.	In response to political objectives on the use of renewable raw material and energy in Europe, the supply of wood and other forest products from sustainably managed forests has increased substantially.
4.	The full value of forest ecosystem services across Europe is being estimated with a view to using common valuation approaches, and that values are increasingly reflected in relevant national policies and market-based instruments such as payments for ecosystem services.
5.	All European countries include strategies for forests and climate change adaptation and mitigation in national forest programmes or equivalents and all other relevant national strategies.
6.	The rate of loss of forest biodiversity at habitat level is at least halved and where feasible brought close to zero, and measures are taken to significantly reduce forest fragmentation and degradation and to restore degraded forests.
7.	The role of forests in combating desertification is fully recognised and forests are also managed that end.
8.	All European countries have policies and measures which ensure a significant increase in socio- economic and cultural benefits, especially for human health, livelihoods, rural development and employment from forests.
9.	Effective measures are taken at regional, sub-regional and national levels to eliminate illegal logging and associated trade.

Goals for European Forests



Goal 1: Sustainable management of all European forests ensures multiple forest functions and enhances lasting provision of goods and services

Context

Forests and other wooded land ecosystems provide a multitude of functions and services on a renewable and sustainable basis, such as wood production, the protection of soil and water resources and protection from various hazards, climate regulation and carbon sequestration, recreation, use of non-wood forest products and maintaining biodiversity simultaneously. Thus, concepts and instruments that integrate the protection and protective requirements of forest area into management and production of forest goods and services are mandatory for sustainable forest management, which is to balance the provision of goods and services with the management of natural resources and ecosystem services.

Status and trends

The safeguarding of multiple forest functions and the provision of forest related goods and services are reasonably well depicted by pan-European data on sustainable forest management and reads as follows:

- Forests and other wooded land cover 251 million ha, together 38 % of Europe's land surface.
- The fellings are below the net annual increment all over Europe, except for Sweden, an indication that wood provision is on a sustainable basis.
- The provision of wood can be indicated by 445 million m³ of roundwood removals and 228 million m³ of marketed roundwood in 2010.
- Regarding the provision of non-wood goods it can be highlighted that among others in 2010 hides, skins and trophies have been marketed for 18 million Euros, wild honey and bee-wax for 277 million Euros and wild meat for 321 million Euros.
- The total amount of carbon sequestered in living biomass in European forests accounts with around 13 billion tonnes of carbon nearly almost equal as much as the carbon stored in soil and litter.
- About 70 % of the mostly semi-natural forest area is targeted for multi-purpose use and is located outside designated protected forest areas.
- Protected forest areas account for about 12 % of the forest area and human intervention is totally banned in 3,4 million ha (1,6 %).
- 25 million ha or 12 % of the forest area have protective functions for soil, water and other ecosystems. And 3,3 million ha of the forest area have protective functions for infrastructure and managed natural resources.
- In most countries the public can access over 90 % of the forest and other wooded land area for recreational purposes. The related intensity of use is high in Central Europe and particularly low in Southern Europe.

The following trends were observed:

- ▶ Between 1990 and 2015, the pan-European forest area has expanded by 17,5 million ha, with increases in every region, although a few countries reported a slight loss of forest area. In the same time period, the pan-European forest area available for wood supply increased only by 0,24 % due to other multi-purpose utilisations of the forest area.
- ▶ The ratio of felling to increment has increased from 51 % in 1990 to 67 % in 2010 in Europe. Exceptions are that in Northern Europe the percentages are higher (79%) and in the Russian Federation they are much lower at around 20 %.
- ▶ The roundwood removals have constantly increased from 369 million m³ in 1990 to 454 million m³ in 2005. In 2010 they amounted to 445 million m³. Recent statistics show an increase of wood production and wood products in 2013 and 2014 (UNECE, 2014).
- ▶ European forests are a significant carbon sink as the carbon stock in biomass, deadwood, soil and litter and their carbon stock changes show constantly rising stocks all over Europe.

- ▶ Strictly protected forest areas in Europe continuously increased between 1990 and 2015.
- ▶ Protective forest areas for soil, water and other ecosystem functions increased by about one third from 1990 to 2015. Protective forest areas for infrastructure and managed natural resources are five times as large in 2015 as they were in 1990.
- ▶ Public access for recreational purposes has increased since 1990 in most countries. The forest area with access to the public already exceeded 90 % in 1990, so the increase has generally been quite small.

Knowledge gaps

- A comprehensive overview on the state and trend of the provision of the numerous non-wood goods cannot be provided currently since quantitative data is only available for 27 countries providing only information about some of the marketed plant products or raw materials.
- Society receives multiple further benefits from forests in form of services such as clean water, soil conservation, and regulation of micro-climate, air pollution abatement or health and wellbeing. These kinds of services are not sufficiently covered by the Pan-European Indicators for Sustainable Forest Management and thus related data is not available.

Recommendations

For a better evaluation of the implementation of Goal 1 the following is required:

- ▶ A common approach to ecosystem services should be elaborated and applied by all countries in order to be able to collect comprehensive data.
- ▶ Trade-offs and conflicts among the various demands and uses of different forest products and forest services need to be explored in order to increase the evaluation of the implementation of Goal 1.

Conclusion

Goal 1 addresses a core component of sustainable forest management in Europe and its implementation since the 1990s. Hence, a clear progress can be observed in particular with the advancement of the FOREST EUROPE process over 20 years. However, new and emerging concepts and policies that touch upon sustainable forest management need to be addressed. For instance, the role of ecosystem service provision, the trade-offs and conflicts on the use of different forest products and forest services are currently not properly considered in a broader perspective (e.g. land use, green- and bioeconomy, sustainable development, etc.).

Indicative assessment of progress to goal:

- ▶ Largely on track to achieving the goal

Goal 2: European forests contribute to a green economy, including through increased provision of wood, other forest products and ecosystem services from sustainable sources

Context

The green economy concept emphasizes not only the role of biomass in moving towards a low carbon society, but also entails other renewable energy forms (e.g., hydro, solar, wind), as well as the need for resource efficiency in nurturing environmental and social well-being (EFI, 2014). At the same time, it is important to relate it to other up-coming concepts such as the bioeconomy or bio-based economy, which seem to favour a more technological and efficiency-oriented approach (Pülzl et al. 2014).

Status and trends

In Europe the forest sector presents already many thematic linkages to characteristics identified for a green economy:

- The forest sector represents a low-carbon releasing sector (cf. Goal 4).
- Wood, non-wood forest products and ecosystem services are central elements of the sector.
- The forest sector contributes to achieving social goals of a green economy, for instance providing green jobs.
- Occupational safety and health of the forest workforce are also still a cause of concern.
- The various forest functions are valued and payments for ecosystem services were established to a certain extent in at least 13 European countries (cf. also Target 4). Data on the value of marketed services on forest and other wooded was, however, provided only by one third of all European countries with a total value of 619 million Euros:
 - The highest share of 363 million Euros was reported for marketed social services like hunting or fishing licenses, renting of huts, as well as forest-based leisure, sports and outdoor activities and educational activities that are not free of charge to the consumers.

- The lowest share of 31 million Euros was reported for marketed ecological services which include those related to soil, water and other environmental functions as well as infrastructure and managed natural resources on a voluntary contractual basis with compensation or other payments from private or public bodies.
- 162 million Euros were reported for marketed biospheric services which include in situ or ex situ gene conservation of genetic resources as well as protected forest area including Natura 2000 sites.

- The forestry sector contributed to Gross Value Added (GVA) with 20,4 billion Euros in 2010. The sector's "manufacture of wood and articles in wood" and "manufacture of paper and paper products" contribute with 39 and 43,5 billion Euros to GVA in 2010.
- Policy tools such as National Forest Programmes, and indicator sets for sustainable forest management include considerations and refer to aspects of a green economy in many European countries. There has been an effort in Europe to define how the forest sector can contribute to the green economy, culminating in the Rovaniemi Action Plan for the Forest Sector in a Green Economy (UNECE/FAO, 2014).

The following trends were observed:

- ▶ Patterns of production and consumption of forest products are carbon neutral and sustainable in Europe, as the roundwood removals steadily increased or remained the same in 2005 and 2010, but the fellings never exceeded the increment. The share of consumption of forest products has increased from 1990 until 2005 and then slightly decreased due to the economic crisis of 2008.
- ▶ The total value of the marketed services decreased by 25 % as regards the last reporting period, however also the number of reporting countries decreased from 16 to 13. Due to the low data availability a detailed trend analysis is not credible.

- ▶ The contribution of the forestry sector to GVA steadily increased from 17,7 billion Euros up to 20,4 billion Euros in 2010. The GVA of the sector “manufacture of wood and articles in wood” reached its peak in 2008 and then decreased again in 2010 due to the economic crisis triggered in 2008.
- ▶ In terms of the production value “manufacture of paper and paper products” is still the most important forest product category with the highest GVA in 2000. It decreased, however, by more than 14 % until 2010. According to latest projections (EFI, 2014) the pulp and paperboard production in Europe will further decrease significantly until 2030.
- ▶ Declines in forest sector employment can be observed since 2005, while the average age of the forest workforce is growing. Even so that the figures are slightly declining, occupational safety and health is still an issue to be further improved.

Knowledge gaps

With regard to the implementation of new concepts of green economy or bioeconomy there is an overall knowledge gap, in particular this refers to:

- A sound concept regarding the valuation of forest ecosystem services is still missing; therefore data availability is low.
- Data and information on non-wood forest products and services are overly incomplete and still not available in many European countries.
- There is no information at all available on non-marketed forest products and non-marketed forest ecosystem services.

- Information on new, innovative products and services is missing.

Recommendations

To evaluate Goal 2 comprehensively, the following is seen as essential:

- ▶ The whole value chain for the various wood and non-wood forest products and ecosystem services needs to be well organized, structured and monitored in order to assess the full range of products and services that contribute to a green economy.
- ▶ Further monitoring and assessment approaches should go in line with the Rovaniemi Action Plan for the Forest Sector in a Green Economy (UNECE/FAO, 2014).
- ▶ Potential cross-linkages to the EU Bioeconomy Strategy and to other indicator sets such as Green GDP Indicators, Beyond GDP Indicators, or the Ecological Footprint should be explored.
- ▶ The relation and cross-implications of green economy and bioeconomy need to be clarified for the forest sector.

Conclusion

Green economy or bioeconomy are new concepts that imply a potentially strong proximity to sustainable forest management. Forest-based products and ecosystem services may provide a substantial contribution to these new, mainly economically-driven paradigms. However, the conceptual and practical implications of a green economy on the forestry sector are not fully clarified. For a valid assessment of Goal 2, novel, cross-sectoral instruments will be needed.

Indicative assessment of progress to goal:

- ▶ **Partially on track to achieving the goal**

Goal 3: Forest management in Europe is being adapted to changes in climate, forests are healthy and resilient to natural hazards and protected against human-induced threats such as forest fires, and the productive and protective functions of forests are maintained

Context

Climate change is projected to have significant impact on the distribution, structure, growing stock, and health of forests as well as on forest carbon stocks and fluxes, the prevalence of forest fires, disease and insect outbreaks as well as storm damages. Adaptive forest management practices are needed to countersteer climate change effects.

Status and trends

Due to the diversity of issues covered by this goal, the analysis below has been divided into three parts.

1. Forest management adapted to changes in climate

- The total growing stock of European forests presently comprises 35 billion m³. 84 % are available for wood supply. Central-East Europe has the highest volume of growing stock with more than 10 billion m³, followed by Central-West Europe with around 9 billion m³. Only 2,6 billion m³ are available in South-West Europe. In Europe, the average volume of growing stock is 163 m³/ha, but the country figures ranges from 10,2 m³/ha in Iceland to around 350 m³/ha in Switzerland and Slovenia.
- The total amount of carbon in living biomass in European countries accounts around 13 billion tonnes of carbon as almost equal to the carbon stored in soil and litter.
- Most forests in Europe are classified as semi-natural (87%). Forests undisturbed by man cover about 3% and plantations are established on 9 % of the forest area.
- In the wake of climate change and globalised trade, invasive alien species may form hazards for sustainable forest management. In Europe, 11% of the area of forest dominated by introduced tree species is occupied by invasive tree species; this share is particularly high in Central-Eastern Europe.

The following trends were observed:

- ▶ In all parts of Europe the average growing stock per hectare has been rising, as harvests remain well below increment (cf. Goal 1). This trend does not exclude the possibility of declines in growing stock in some forest areas, which suffer for instance from climate change induced droughts. Apparently this is compensated by increases in areas which benefit from increasing stocks in other regions.
- ▶ European forests represent a significant carbon sink as the carbon stock in biomass, deadwood, soil and litter and their carbon stock changes show constantly rising stocks all over Europe (cf. Goal 4).
- ▶ Alterations in naturalness classes have been low during the last 20 years. Although the area of planted forests has slowly increased particularly in Southern Europe, there is no information available whether these species are particularly adapted to a changing climate.
- ▶ The area of forest occupied by invasive tree species is nowadays nearly twice as large as in 1990. However, no correlation to favourable changing climatic conditions can be derived from the FOREST EUROPE data at hand.

2. Health and resilience

- The deposition of air pollutants currently varies across the different regions of Europe. Nitrogen is still high in Central-West Europe and in Southern Europe. In Northern Europe the deposition of nitrogen is generally lower than in other regions. The deposition of sulphur is equally high across Europe with the exception of Northern Europe with lower deposition. The input of calcium and magnesium is generally higher in the southern regions of Europe.
- In some European regions, forest health is also threatened by high levels of defoliation. Around 25% of the trees in Europe are classified as damaged or dead.

- The total area of burnt forests and other wooded land damaged 664 thousand hectares in 2010. About one third of the forest fires in the Mediterranean region are of anthropogenic origin.

The following trends were observed:

- ▶ Depositions of air pollutants, especially of sulphur have been reduced in the last two decades. Yet, emissions of nitrogen compounds are still high and increased in Southern Europe as well as in Central-East Europe. This results in acidification and eutrophication of forest soils particularly in these European regions. In Southern Europe also calcium depositions increased.
- ▶ Defoliation increased on 17,7% of the plots continuously monitored in the last 12 years. Defoliation decreased on only 15 %. There has been no change in defoliation indicated tree health on 60 % of the plots monitored.
- ▶ The number, size and severity of forest fires increased particularly in Central-Eastern and South-Western Europe and are likely to be linked to climatic change related droughts.

3. Productive and protective functions

- Forests available for wood supply cover 151 million ha, i.e. 23 % of Europe's land surface.
- The net annual increment is higher than the fellings all over Europe, an indication that wood is produced on a sustainable basis.
- The protective forest area for soil, water and other forest ecosystem functions amounts in Europe to 25,4 million ha. The protective forest area for infrastructure and managed natural resources covers 3,3 million ha.

The following trends were observed:

- ▶ The pan-European forest area available for wood supply increased from 1990-2015 only by 0,24 % due to other multi-purpose utilisations of the forest area like increasing protected forest areas.
- ▶ The ratio of felling to increment has been increasing by 16 % in the last 25 years up to 67 % in 2010 in Europe. Only in Northern Europe the ratio is higher (79 %), while in the Russian Federation much lower at around 20 %.
- ▶ The protective forest areas have constantly been increasing in Europe.

Knowledge gaps

- Information on forest management adapted to climate change is not available based on the Pan-European Indicators for Sustainable Forest Management.
- Additional qualitative information is needed about adaptive forest management strategies to relate management response and countercheck to changes in growing stock, in carbon stock or in naturalness.
- The available indicators on growing stock, carbon stock, naturalness and introduced tree species may give additional information about the impacts of climate change, but there is no direct relation between both.
- The indicator on introduced tree species focuses presently on their ecological characteristics, e.g. competitiveness, which may change the dynamics of forest ecosystems and may influence sites, species composition, structure and functional diversity. There

is no information about the reasons why introduced tree species have been chosen or are abundant. Also for the indicator on naturalness there is no information available as to why further plantations have been established.

- There is no information available on the exposure to forest fires and on forest fire prevention activities.

Recommendations

For a proper evaluation of Goal 3 the following should be considered:

- ▶ Climate change related adaptive forest management planning for multi-functional forests requires a solid information basis including additional information on climate change induced effects on growing and carbon stocks, naturalness, introduced tree species, and forest health. It further requires a distinguished health and damage monitoring or monitoring of the condition of forest areas with designated protective functions including means that the management goals are reassessed accordingly.
- ▶ To obtain related qualitative information systematically it is recommended to add a separate policy area

Climate change adaptation and mitigation with a particular sub-question on climate change adaptation and mitigation efforts to the indicator questionnaire.

- ▶ With regards to public engagement and commitment it is recommended to gather information on Public financial support and investments for forest adaptation.
- ▶ As damages caused by forest fires are most often related to climate change induced droughts information on exposure to forest fires is needed.

Conclusion

There is a multitude of political instruments that address climate change adaptation both on global, EU, and national levels. As well, research organisations and individual researchers are dedicating substantial resources to explore forest adaptation strategies. However, a systematic overview of the state of implementation of adaptation strategies and the adaptation potential of European forests is currently missing. Indicators on forest health and extreme events give insight into the temporal development, but provide little information on the dynamics and societal response.

Indicative assessment of progress to goal:

- ▶ **Partially on track to achieving the goal**
 - ▶ **Reduced validity of assessment due to lack of information.**

Goal 4: The potential of European forests to mitigate climate change, through carbon sequestration in trees and soils, carbon storage in forest products and substitution of non-renewable materials and energy sources, is utilized to minimize Europe's ecological footprint without harming the global carbon balance

Context

Forests and forestry play a key role in the long-term mitigation of and adaptation to climate change. Growing forests sequester carbon, while wood products continue to store carbon through their life time. Wood is an important source of renewable energy and can be a substitute for energy-intensive materials with higher greenhouse gas emissions. Sustainable forest management and its tools are essential for ensuring adaptation of forests to climate change, as well as optimising the contribution of forests and the forest sector to climate change mitigation.

Status and trends

Due to the diversity of issues covered in this goal the analysis below consists of four parts.

1. Carbon sequestration in trees and soils

- The total amount of carbon stored in living biomass in European forests amounts with around 13 billion tonnes of carbon nearly to the same carbon amount stored in soil and litter, mainly because large carbon stocks can be found in boreal peats and soils.

The following trends were observed:

- ▶ European forests are a significant carbon sink as the carbon stock in biomass, deadwood, soil and litter and their carbon stock changes show constantly rising stocks all over Europe. The carbon in living biomass in European countries constantly increased from 8,8 billion tonnes in 1990 up to nearly 13 billion tonnes of carbon in 2015. The carbon stored in deadwood rose from 125 million tonnes in 1990 up to 209 million tonnes in 2015. The carbon stored in soil and litter slowly increased from 12,6 billion tonnes in 1990 up to 13,4 billion tonnes in 2015.

2. Carbon storage in forest products

Suitable FOREST EUROPE indicators are not available for the monitoring and reporting of *carbon storage in forest products*. An increased wood consumption of forest products other than fuelwood indicates indirectly also that carbon is stored in those products. However, the consumption of forests products only steadily

increased in Central-Eastern and South-Eastern Europe. Other regions show a declining consumption rate since 2005.

3. Substitution of non-renewable materials and energy sources

The use of products and energy provided by forests to substitute non-renewable materials and energy sources contributes to climate change mitigation, although it is difficult to quantify the substitution effect.

- Wood used for energy supply amounted in 2011 to 2,6 billion metric tons dry matter. About 80 % of it originates direct from wood fibre sources. The remaining quantity represents co-products and residues of the wood processing industries, processed wood-based fuels, post-consumer recovered wood, or comes from unspecified sources.

The following trends were observed:

- ▶ In Europe the total energy supply from wood has increased from 2009 to 2011 in all regions. Long-term trends cannot be described so far as about 60 % more countries provided data for the most recent survey than in the past. However, in general an increased energy supply from wood is well in line with the most recent wood energy assessments of the UNECE/FAO Joint Wood Energy Enquiries¹.

4. The potential of European forests to minimize Europe's ecological footprint without harming the global carbon balance

The ecological footprint assessments have become increasingly popular indicators to measure human pressure on the environment although its methodology and application continue to be debated and data is often lacking. Methods were developed for various components of the ecological footprint like for instance carbon footprint or forest land footprint. The latter can be calculated according to the production quantities of 13 primary timber products and 3 wood fuel products. Trade flows include 30 timber products and 3 wood fuel products. However, so far there is no European data and analysis available on the potential of European forests to minimize Europe's ecological footprint without harming the global carbon balance.

¹ <http://www.unece.org/forests/jwee.html>.

Knowledge gaps

- Although the main goal of the Kyoto Protocol is to secure agreement on reducing emissions of greenhouse gases at source, it also recognises that carbon sequestration in forest ecosystems contributes to a reduction in the concentration of greenhouse gases in the atmosphere. However, not all European countries can so far provide high quality data for carbon stock.
- Figures on the total carbon stock of all carbon pools in forest ecosystems and their carbon stock changes comprise not only the carbon sequestration but also the forest-related carbon removals. Both, carbon stocks and carbon stock changes give a comprehensive picture on the forest carbon balance, thus not only the status and trends of carbon stocks but also the carbon balance should be a basis of climate change mitigation assessments.
- Suitable FOREST EUROPE indicators are not available for the monitoring and reporting of *mitigation of climate change through carbon storage in forest products*.
- Suitable FOREST EUROPE indicators are not available for the monitoring and reporting of *the potential of European forests to minimize Europe's ecological footprint without harming the global carbon balance*.

Recommendations

To evaluate Goal 4 satisfactorily the following is needed.

- ▶ Even so that surveys proof that sustainably managed forests absorb by far more carbon than they release a full picture is only provided, if the focus is on the carbon balance (pools and carbon stock changes). This carbon balance provides information about the total amount of carbon stored in forest ecosystems and it also describes carbon stock changes or carbon flows between forests and the atmosphere. A better understanding of these processes will aid the development of appropriate responses to the effects of climate change. Therefore, it is recommended

to further collect information on the total forest ecosystem carbon pools and carbon stock changes.

- ▶ If the role of forests is to be fully recognized in mitigating climate change, it is vital that forest's carbon accounting is clearly defined and easily implementable.
- ▶ To obtain information on the role that forest products play in storing, cycling and releasing carbon it is recommended to add new quantitative indicators on carbon stocks and carbon stock changes of carbon stored in forest products.
- ▶ The focus of the pan-European indicator on wood consumption should be broadened to consider also the carbon storage of the forest products.
- ▶ Avoided fossil fuel carbon emissions by increased woody material use needs to be assessed as it refers to substitution of fossil fuel by woody biomass as an element of a carbon-neutral bio-energy supply. This segment may include both harvested wood as well recycled wood and wood products. It should be monitored jointly with other SFM resource indicators in order to avoid trade-offs between strategic objectives and exploitation effects of woody biomass.
- ▶ It is recommended to explore the potential to obtain separate data on a Forest Land Footprint.

Conclusion

The recent data analysis shows that carbon stocks in European forests are steadily increasing and also building a major component for carbon sequestration. The role of forest products needs further attention in the future, also in the Pan-European Set of Indicators for Sustainable Forest Management to obtain adequate data. The assessment should be in line with international activities such as the UNFCCC. New approaches to demonstrate the role of European forests for climate change mitigation and adaptation are currently missing, this needs to be methodologically consolidated for reporting and assessment purposes.

Indicative assessment of progress to goal:

- ▶ **Partially on track to achieving the goal**
 - ▶ **Reduced validity of assessment due to lack of information.**

Goal 5: The loss of forest biodiversity in Europe is halted and degraded forests are restored or rehabilitated

Context

The United Nations Convention on Biological Diversity (CBD) in 1992 stressed the urgent need for measures to avoid or minimize the reduction or loss of biological diversity. In this line, the Forest Europe process has aimed at translating international goals into pan-European ones via its political resolutions on biodiversity and related indicators. On the other side, the European Commission has adopted in 2011 the EU Biodiversity Strategy to 2020. Goal 5 is in line with the EC 2020 headline target: "Halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020". The protection of forest biodiversity has also been addressed by the new EU Forest Strategy 2013 and the CBD Aichi biodiversity targets. Degraded forests are both addressed by the CBD Aichi biodiversity targets and in the United Nations Convention to Combat Desertification. This Goal is closely linked to Target 6.

Status and trends

This goal covers two different areas; therefore the analysis below consists of two parts.

1. The loss of biodiversity is halted in Europe

Out of a quite broad range of nine FOREST EUROPE indicators part of Criterion 4 (Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems), only the indicators on threatened forest species and protected forests can help assess aspects of the loss of biodiversity explicitly:

- Substantial losses of species and habitats were reported: For instance, five forest tree species are extinct in the wild, 42 forest tree species are critically endangered and 107 forest tree species are endangered in Europe. Most threatened forest tree species have been monitored in Central-Eastern Europe. Only 5 countries reported that they have no threatened tree species.
- Tree species show the lowest total numbers of extinct forest species. However, organisms with higher species richness show higher rates of extinction, in particular fungi.
- Protected forest areas, with the main management objective of biodiversity (according to the MCPFE Assessment Guidelines for Protected and Protective

Forest and Other Wooded Land in Europe, categories 1.1-1.3) account for 12,2 % of the forest area and human intervention is totally banned from only 1,5 % of the forest area (3,1 million ha).

The following trends were observed:

- ▶ More countries provided recent information on threatened forest species, but due to the fact that the data are very heterogeneous and sometimes fragmented, reliable trends cannot be presented.
- ▶ Successful response actions include an increasing designation of protected forest areas with main management objective of biodiversity in the last 15 years. The strictly protected forest areas, according to MCPFE class 1.1, increased however only little in the last reporting period, which may be explained by countries already protected the most important rare and vulnerable forest areas before.

With regard to the national implementation of the political requirements on the protection of forest biodiversity, the majority of reporting countries has specifically stated that legal, technical and economic preconditions for an active, differentiated care on forest biodiversity should be created, in particular highlighting that:

- Biodiversity conservation has to be integrated into national forest laws, national forest programmes, afforestation plans, forest development plans, forest management plans, action plans, strategic programmes or guidelines.
- Protected forest areas should be further increased as well as new forest reserves or Natura 2000 on forest area should be designated.
- Payments should be provided to improve the management of privately owned designated forest areas.
- Different action plans for the protection of threatened forest species, combatting invasive alien species and the protection of forest genetic resources should be developed and implemented.
- The ecosystem approach should be systematically introduced into forest management

- The monitoring and inventory of forest biodiversity should be based on the pan-European indicators for sustainable forest management to obtain comparable data.

2. Restoration or rehabilitation of degraded forests

Forest land degradation is an emerging issue in the FOREST EUROPE process and is so far not covered by suitable quantitative or qualitative indicators. According to UNCCD, forest land degradation refers to reduction or loss in arid, semi-arid and dry sub-humid areas of the biological or economic productivity and complexity of forest and woodlands resulting from land use or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (1) soil erosion caused by wind and/or water; (2) deterioration of the physical, chemical and biological or economic properties of soil, and (3) long term loss of natural vegetation. Hence, measuring the restoration or rehabilitation of degraded forests is a very complex multi-faceted problem.

- Comprehensive information on degraded and - in response - restored forests and other wooded land areas are presently not available via the FOREST EUROPE/UNECE/FAO reporting system, only secondary aspects of degradation like decreasing growing stock or information on forest damages.
- As regards restoration and rehabilitation there is only some qualitative information available, which is not requested systematically.

Knowledge gaps

- The data on threatened forest species are very heterogeneous and sometimes fragmented. Trends cannot be derived from this data base.
- The available data on protected forest areas do not provide information as to whether all forest ecosystem types are properly covered by the protected forest areas and if forest biodiversity is actually maintained or not.
- There are 7 more indicators that are assigned to the Criterion 4 Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems. However, they are not suitable for general pan-European assessments to identify

as to whether the loss of forest biodiversity in Europe is halted; they are rather suitable for national biodiversity related statements providing context and background information.

- Rehabilitation or restoration of forest land degradation is an emerging issue in the FOREST EUROPE process, but is so far not covered by indicators. Therefore, related data have not been collected.
- Several countries reported on the definition of policy objectives with regard to Goal 5, but there was no particular request built into the questionnaire, and hence no documentation on the implementation and related effects is currently available.

Recommendations

For a comprehensive evaluation of Goal 5 the following aspects should be considered:

- ▶ To be able to assess the loss of forest biodiversity in a consistent, comprehensive and comparable way, the collection of quantitative data and qualitative information with a focus on loss of forest biodiversity is needed; particularly the definition and implementation of related policy objectives shall be reported.
- ▶ Explore the possible adaptation of biodiversity-related indicators under Criterion 4 to gain more information on the related loss of forest biodiversity.
- ▶ A new prototype indicator on forest land degradation has recently been developed within the FOREST EUROPE process. Highlighting the role of forests in recovering degraded land, its adoption is encouraged along with the related monitoring.

Conclusion

While the maintenance of biodiversity is mentioned in several policy documents, the actual, quantified rate of forest biodiversity loss cannot be evaluated based on the data collected for the Pan-European Indicators for Sustainable Forest Management. For this purpose, new or adapted indicators should be developed. Furthermore, compliance shall be sought with forest-related biodiversity tools of the CBD and the related Aichi biodiversity targets, and respective monitoring instruments.

Indicative assessment of progress to goal:

- ▶ Largely not on track to achieving the goal.
- ▶ Reduced validity of assessment due to lack of information.

Goal 6: The role of forests in combating the progress of desertification is strengthened

Context

Desertification, along with climate change and the loss of biodiversity, was identified among the greatest challenges to a sustainable development at the UN Conference on Environment and Development (UNCED) in Rio, 1992. The United Nations Convention to Combat Desertification (UNCCD) was adopted subsequently, highlighting among other aspects that dry forests play an important role in preventing desertification. This was directly and indirectly reiterated by the global forest dialogue United Nations Forum on Forests (UNFF) and translated through the inclusion into ministerial resolutions of the FOREST EUROPE process. Goal 6 is closely linked to target 7.

Status and trends

As a consequence of climate change, in Europe extreme meteorological events such as drought and reduced rainfalls are likely to increase in frequency and intensity. Forest land productivity, soil stability and forest health are directly affected by these extremes thus progressing forest land desertification.

- Information on policies, institutional, legal or regulatory frameworks as well as financial instruments or informational means to strengthen the role of forests in combating the progress of desertification are rarely available for European countries, as such information is not particularly requested in the respective FOREST EUROPE/UNECE/FAO reporting system.

- Only two countries reported about national action programmes and plans to combat desertification according to the UNCCD.
- The financial instruments to combat desertification comprise resources from the United Nations Development Programme, EU and national budgets. There is no specific pan-European financial instrument, but for instance the EU additionally funds the EU REDD Facility. The EU REDD Facility also supports efforts of the EU to address drivers of deforestation and forest degradation, and foster sustainable forest management in developing countries. The UN REDD Facility is financially supported by Denmark, the European Union, Japan, Luxembourg, Norway and Spain.

Knowledge gaps

- Some qualitative information is available about the UNCCD related programmes and financial instruments to combat desertification. But there is no explicit question included in the questionnaire regarding the issue of deserted forest areas and related efforts to combat desertification in Europe, and whether it is addressed in National Forest Programmes or similar and related forest policies. Thus, there is no detailed information available, whether the role of forests in combating the progress of desertification is strengthened.

Recommendations

For a proper evaluation of Goal 6 the following steps are seen as important:

- ▶ A policy area on “Combating desertification” should be introduced in the questionnaire on the qualitative indicators.
- ▶ Explore linkages to the UNCCD, in particular the feasibility of a pan-European forest-related reporting of the indicator S-9 “Development policies and measures address desertification/land degradation and mitigation of the effects of drought” (UNCCD progress indicator S-9, which has to be reported from 2016 on).
- ▶ Explore the feasibility of a pan-European forest-related reporting of the UNCCD indicator S-83 “Increase in the level and diversity of available funding for combating

desertification/land degradation and mitigating the effects of drought” (UNCCD progress indicator S-83, which has to be reported from 2016 on).

- ▶ A new indicator on forest land degradation including desertification was recently developed within the FOREST EUROPE process. Its adoption and the related monitoring are encouraged.

Conclusion

Desertification with regards to European forests has not been prominently addressed so far. Not at least due to climate change effects, increasing concern is noted in countries of arid and semi-arid zones. While Europe is active in combating desertification globally, most notably in REDD programmes, the role of forests and forest management in Europe has to be clearly defined to evaluate this goal.

Indicative assessment of progress to goal:

- ▶ **Largely not on track to achieving the goal.**
 - ▶ **Reduced validity of assessment due to lack of information.**

Goal 7: Socioeconomic and cultural benefits, especially for livelihoods, rural development and employment from European forests are optimized

Context

While the production of wood as a renewable resource is still an important economic activity in forestry, other socioeconomic and cultural benefits of forests also have economic value along the value chain with the potential to create income for forest owners and to further improve rural development. Goal 7 is related to target 8.

Status and trends

The majority of the reporting countries have specifically stated policy objectives to optimize socioeconomic benefits. Those include:

- To secure and increase income sources of private forest owners as well as of the whole forest sector through institutional support, valuation and marketing of wood and non-wood goods, services and benefits.
- To ensure that biomass and conventional forest industries can co-exist with regards to sustainable timber supply.
- To maintain or increase employment and entrepreneurship in the forest sector and related ecotourism by improving forest workforce education as well as working conditions to ensure safety and health. Related lessons learned should focus on the demand for skilled workforce and the need to create

new green jobs in the forest sector considering also equity and gender issues.

- To promote the forest sector and the use and consumption of its goods, services and benefits.

Nearly half of the reporting countries have specifically stated policy objectives in relation to cultural benefits, which focus on:

- To include traditional forest-related knowledge into an innovative sustainable forest management.
- To preserve cultural heritage landscapes, sites or monuments of cultural interest in forest areas.
- To develop and manage the eco-touristic and recreational use of forests.

Knowledge gaps

Knowledge gaps exist in particular in the unclarified role of forests for rural development and the contribution to rural livelihood. This entails in particular:

- Socio-economic indicators with a special focus on the impacts of forestry and the forest-based sector on rural development are not very well covered through the set of Pan-European Indicators for Sustainable Forest Management; therefore data availability ranks low although most countries have developed related policy objectives.

- Information on rural development projects and initiatives in forestry, and comparison to other sectors is incomplete.
 - Optimisation implies a cross-sectoral dialogue on the future of European land use, and priorities set to harmonise land-use forms are not yet clear, since this information is not available. Both forestry and land-use are cross-sectoral topics without clear policy and planning competence in the European Union and most Pan-European countries.
 - To fully address socio-economic benefits, sustainability impact assessment approaches are lacking.
 - The data availability of the only indicator related to cultural benefits (Ind. 6.11 Number of sites within forest and other wooded land designated as having cultural or spiritual values) is rather low, and comparability of the data is weak.
- ▶ It is suggested to further develop and employ indicators that support the monitoring of Goal 7, but to also strengthen information on social aspects related to SFM.
 - ▶ Socioeconomic indicators which enable the assessment of change in rural development are also not well covered through the set of Pan-European Indicators for Sustainable Forest Management.
 - ▶ Inventories of cultural heritage landscapes, sites and monuments are needed for improving proper assessments.

Conclusion

Forests, covering 38 % of the European surface, play a substantial role in land use, farm family income, economic value creation along a long value chain, rural development, and provision of cultural services and benefits. However, the quantification of these effects is incomplete. For an evaluation of Goal 7 it is required to develop cross-sectoral approaches to compare the role of forests and the forest-based sector with others land-use sectors, and unravel the contribution of forests to meta-concepts such as rural development.

Recommendations

To evaluate Goal 7 properly, the following should be considered:

Indicative assessment of progress to goal:

- ▶ **Partially on track to achieving the goal**

Goal 8: *Illegal logging and associated trade in wood and other forest products are eliminated in Europe*

Context

Illegal logging and related trade is a major problem in many timber producing countries. In the FOREST EUROPE Vienna Resolution 2 – Enhancing Economic Viability of Sustainable Forest Management in Europe – the Signatory States and the European Community commit themselves to adjusting policy and legal frameworks and instruments to support sound enabling conditions for sustainable forest management that encourage investment and economic activity in the forest sector, including effective measures for forest law enforcement and combating illegal harvesting of forest products and related trade. By now the European Union has developed related legislation to halt illegal logging and related trade (e.g. FLEGT Action Plan and related Voluntary Partnership Agreements as well as the EU Timber Regulation). Goal 8 is closely linked with target 9.

Status and trends

The following status and trends in combatting illegal logging can be observed:

- Over the past decade, significant progress has been made in fighting illegal logging, and other unsustainable practices, inside and outside Europe. Access to the European market has become much more difficult for illegally produced forest products, notably as a consequence of various EU regulations.

In 2003, the EU developed the FLEGT (Forest Law Enforcement, Governance and Trade) Action Plan, which provides a number of measures to exclude illegal timber from markets, improve the supply of legal timber and increase the demand for wood products from legal sources.

The two main elements of the Action Plan are the EU Timber Regulation, and the Voluntary Partnership Agreements (VPAs). VPAs are trade agreements with timber exporting countries that help to prevent illegal timber from being placed on the European market. Under the EU Timber Regulation (EUTR), wood carrying a FLEGT licence, or a CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) permit, is considered to comply with the EUTR.

- In the EU, the implementation of the EUTR is still a major challenge. While some countries are well advanced in the implementation process, others are still at the beginning (EFI, 2015)
- Since 2011, 14 European countries have reported changes, particularly in relation to the adoption of new laws and provisions for implementing the EU FLEGT and EU Timber Regulations.
- Only nine countries reported national action programmes and plans to eliminate illegal logging and associated trade.

- Certification schemes are operational all over Europe (UNECE/FAO, 2015).

Knowledge gaps

- Suitable qualitative FOREST EUROPE indicators for the monitoring and reporting of Goal 8 are not available.
- There are no explicit requests concerning illegal logging and trade in the questionnaire on the qualitative Pan-European Indicators for Sustainable Forest Management.

Recommendations

For a detailed evaluation of Goal 8, the following is recommended:

- ▶ Add new requests under the qualitative indicators to be able to monitor the development of forest law

enforcement and trade more closely and to develop lessons learnt that could be shared with countries that face the same challenges.

- ▶ Develop indicators to monitor related good governance and forest law enforcement activities to ensure that timber traded within or into FOREST EUROPE signatories' derives from legally harvested forest.

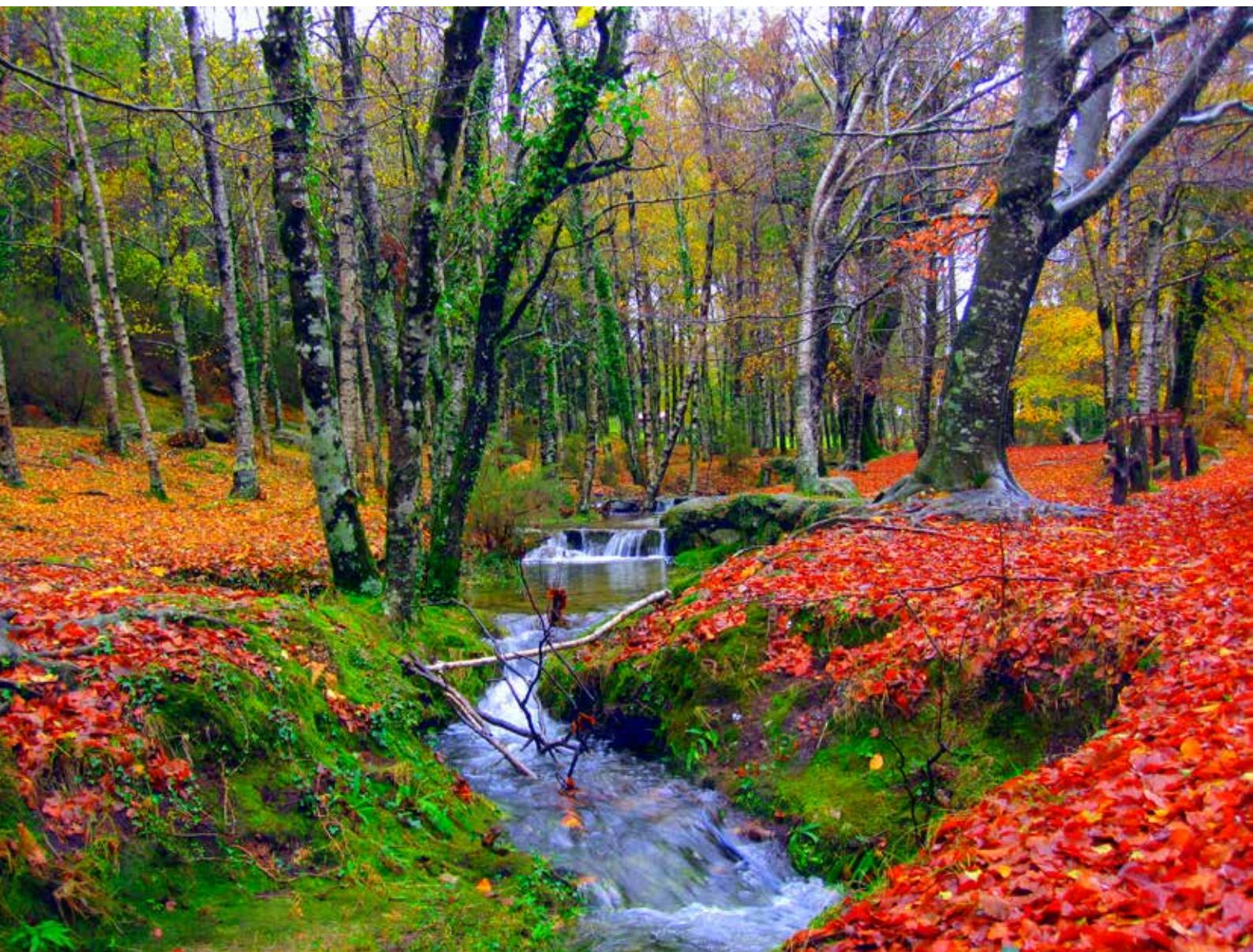
Conclusion

Illegal logging has been increasingly recognised as a severe problem and tackled in the past years, in particular by the EU in introducing the FLEGT Action Plan and the EU Timber Regulation. This has specific effects on international trade and forest imports also from outside the EU and Europe. A systematic overview on illegal logging in Europe is however missing and currently not addressed by Pan-European reporting system and thus not available for an evaluation of Goal 8.

Indicative assessment of progress to goal:

- ▶ **Partially on track to achieving the goal**
 - ▶ **Reduced validity of assessment due to lack of information.**

European 2020 Targets for Forests



Target 1: All European countries have developed and are implementing national forest programs, or its equivalent, in line with the shared vision and goals and the pan-European approach to national forest programs

Context

FOREST EUROPE has developed a Pan-European Approach to National Forest Programmes (NFP) to strengthen coherence and synergies within the forest sector as well as between policies aimed at sustainable forest management and other relevant policies (Vienna Resolution 1 with Annex). These programmes constitute a participatory, holistic, inter-sectorial and interactive process of policy planning, implementation, monitoring and evaluation at the national level in order to proceed towards the further improvement of sustainable forest management.

Status and trends

The current status is that:

- 18 of the 32 reporting countries have developed and are implementing a formal NFP process. Additionally, 7 countries reported about a process explicitly guided by the FOREST EUROPE NFP approach, and five countries reported to have a similar process in place.

The following trends were observed:

- ▶ Already prior to the adoption of an NFP approach for Pan-Europe all 15 EU member countries had presented NFPs or equivalents to the European Commission in order to access related forestry funding within the context of the former rural development regulation (1257/1999). This explains why EU member countries rank high in the NFP implementation. However, up to now more countries (including EU members) actually implemented NFPs also following the NFP Approach.
- ▶ The last State of Europe's Forest Report (FOREST EUROPE/UNECE/FAO, 2011) reported five more countries to have a NFP or a similar process in place. This decrease in NFPs may be related to incomplete or varying response rates to the indicator questionnaire.
- ▶ Several countries have also started to revise their NFPs revising their aims to take new developments (e.g. EU Forest Strategy, bioeconomy) into account and to involve also sectors outside forestry.

Knowledge gaps

- No systematic information is available on how shared visions and goals as defined by the pan-European NFP approach and especially by equivalent programmes are implemented by all FOREST EUROPE member countries.
- The cross-sectoral coordination and alignment of NFPs with other policies as well as the inter-sectoral coordination of NFPs with wider land use programmes and strategies require further attention and improvement in most countries.

Recommendations

To perform an accurate evaluation of the implementation of Target 1, the following is deemed necessary:

- ▶ Perform a systematic European assessment of NFPs in place as well as those in development and evaluate also as to how equivalent processes address shared visions and goals. This can lead to a lesson drawing exercise and further improvement of its implementation.

Conclusion

National forest programmes have proven to be an important policy-making tool for promoting sustainable forest management as they were implemented in a large number of European countries as instrument of choice. For an accurate evaluation of the implementation of Target 1, a full coverage of all countries is, however, not given at the moment. The way and means as to how countries have actually implemented NFPs as compared to the FOREST EUROPE approach is unclear as this has not been scientifically assessed so far. In addition, only a smaller number of countries have continuously updated their NFPs. As well, existing ones also need to be adapted, for instance, towards new emerging issues such as climate change, bioenergy, ecosystem services, or bioeconomy aspects, and the progress is to be assessed.

Indicative assessment of progress to target:

- ▶ **Partially on track to achieving the target**

Target 2: In addressing emerging issues forest knowledge is improved through research, education, innovation, information sharing and communication

Context

Through studying so-called emerging issues (e.g. climate change, biodiversity conservation and sustainable use of forest resources, green/bio-economy, payments for forest ecosystem services, forest governance and illegal logging etc.) forest-related knowledge has been further developed and reinforced through means of research, education and training, innovative action as well as information sharing and communication. This means that studying of emerging issues improves forest-related knowledge as learning from (science) and through others (education) and the development of best practices (information sharing and training) as well as means of communication is strengthened. Universities, research and educational institutes as well as private companies and individual researchers are indirectly called upon to strengthen research, education and communication, while interest organisations, business actors and governments can improve information sharing and communication.

Status and trends

Due to the diversity of issues covered in this target the analysis below consists of three parts.

1. Research, training and education

The majority of countries, reporting to the qualitative indicator survey of FOREST EUROPE, have specifically stated the following objectives in relation to research, training and education:

- Promote research and strengthen research capacities, and promote technology development.
- Provide active and continuous support for forest education and training.
- Strengthen modern knowledge management like monitoring, data management, research, education and vocational training, public relations etc.

The implementation of the objectives is meant to be facilitated by:

- anchoring objectives into national forest programmes, national forest law, strategies and plans,

- the provision of grants, subsidies, research programmes and projects,
- the EU Framework Programme for Research and Innovation Horizon 2020 and the European Innovation Partnerships (EIP) also addressed by the new EU Forest Strategy (EC, 2013a).

European and international research institutes (e.g. European Forest Institute - EFI or International Institute for Applied Systems Analysis - IIASA), national state research centres as well as international forest-related research networks (e.g. International Union of Forest Research Organizations - IUFRO) and individual researchers within research organisations, universities and applied forest-related institutes all address emerging issues that have implications for national or local contexts and for the pan-European region.

EFI through its periodic What Science Can Tell Us publications and policy briefs as well as IUFRO through its time-bound global forest expert panels (GEFP) and related publications both aim at providing thematic scientific assessments to a broader audience including policy-makers, stakeholders, scientists and citizens. Since the state of the art is comprehensively analysed in those assessments, it clearly supports the improvement of forest-related knowledge sharing.

2. Information sharing and communication

Based on the analysis of qualitative data (FOREST EUROPE 2015) information sharing and communication activities take place in the following form:

- National reports on the status of SFM exist in the majority of reporting countries.
- Almost all reporting countries informed that there is public access to forest inventory data in their countries. In general, the results of the forest inventories are published on national websites. In a few countries, the data is with limited access and available only on demand. Only two countries have reported no access to forest inventory data.
- Several countries have based their national reports on the Pan-European Criteria and Indicators for Sustainable Forest Management.

- Countries have made considerable investments in improving national information and monitoring systems on SFM and supporting international data-sharing infrastructures:
 - The European Forest Data Centre of the Joint Research Centre and EUROSTAT offer free access to forest-related data.
 - The European Forest Institute offers a number of online databases providing data and information regarding different aspects of European forests, forestry and forest research.
 - The Global Forest Information Service (GFIS) led by IUFRO, and now being an initiative of the Collaborative Partnership on Forests (CPF), is a coordinated effort of forestry institutions and data providers worldwide to share forest-related information through a single gateway.
- Nearly half of the reporting countries stated that a written forest related outreach and communication strategy exists (in different forms, e.g. strategies, annual reports, campaigns, etc.) and is often available on the government websites. In several countries, the communication strategy is part of their National Forest Programmes.
- The UNECE/FAO Forest Communicators Network and the education-focused Forest Pedagogics Network provide both support for cross-sector communication and offer platforms for improved activity coordination.
- Successful initiatives, such as the European Forest Week, underlined that planned, coordinated, and constant communication is possible across the forest sector and can be very effective.

EFI with its ThinkForest activities has aimed at providing a unique platform for communication and information sharing between scientists, members of the European Parliament, the European Commission, EU Member States, key stakeholders and other states outside traditional policy-making fora. IUFRO with its large global forest research network has developed a number of targeted communication products, such as policy briefs and IUFRO Spotlights that aim at sharing the latest scientific outcomes with a broader audience.

3. Innovation

Based on the analysis of qualitative data (FOREST EUROPE 2015) innovation activities take place in the following form:

- Various countries reported that they started to use new technologies such as Geographic Information System (GIS) and remote sensing to acquire accurate, comparable and timely forest related data which is shared through web based application tools.

A Europe 2020 Initiative has recently proposed an Innovation Output Indicator to measure the innovation performance of a country and its capacity to derive economic benefits from innovation, capture the dynamics of innovative entrepreneurial activities, and be useful for policy-makers at EU and national level. The proposed indicator will support policy-makers in establishing new or reinforced actions to remove bottlenecks that prevent innovators from translating ideas into products and services that can be successful on the market (EC, 2013b).

Knowledge gaps

- Even so the target seems to be rather well met through various national and international activities, much data and information remains inaccessible and capacity is lacking to improve this situation in many countries.
- Criteria and indicator sets are important tools for sustainable forest management at several levels; they are however rather complex as information and assessment tools and cannot simply be “applied” or “implemented” to achieve sustainable forest management, or indeed to measure progress at the national level. Methods for the evaluation of the management of forests need to include agreed threshold values or targets, to identify areas of key concern, and actions taken.
- Innovative communication strategies and approaches are needed to reach all stakeholders, particularly those from outside the forest sector, and the broader public
- A comprehensive overview of the state of forest related knowledge is not available due to its complexity and the multitude of researchers engaged in the activities.
- The knowledge transfer from research to applications and related publicity seems to be comparably weak.
- There is no systematic reporting on the recognition and application of innovations in forestry.

Recommendations

To evaluate Target 2 in depth, the following is recommended:

- ▶ Establish a culture of shared expertise, robust common data standards, policies and incentives for data mobilization and sharing, and a system of persistent storage and archiving of data.
- ▶ Forest data collection is huge, is often cross-sectoral, hence the use of data should be targeted at efficient data collection and multiple use for different

purposes to ensure resource-efficient and consistent data management.

- ▶ The data should be collected only once, but used by different stakeholders also from outside the forest sector for various forest related reports and assessments.
- ▶ Forest research is performed in a diversified landscape of funding schemes, but is insufficiently gathered and processed to inform the policy-making community. For a more targeted transfer of knowledge and information, these interfaces have to be fostered and systematic compendia of the current state of research encouraged.
- ▶ Encourage public campaigning and concerted activities across Europe as regards improving the knowledge base of citizens and the general public

at large including policy-makers from outside the forestry community.

- ▶ Explore the suitability of the Innovation Output Indicator to obtain and assess forest related information.

Conclusion

Forest research, information and communication in Europe are rich, but fragmented. Consequently, there is little synthesis about research outputs that are relevant for forests. A better screening and systematic conveyance of relevant evidence is needed to guarantee an effective knowledge transfer from science to policy or practice. In terms of information and communication, progress is needed to facilitate data availability, compliance and cross-sectoral exchange.

Indicative assessment of progress to target:

- ▶ Largely on track to achieving the target.
- ▶ **Reduced validity of assessment due to lack of information.**

Target 3: In response to political objectives on the use of renewable raw material and energy in Europe, the supply of wood and other forest products from sustainably managed forests has increased substantially

Context

Wood is gaining an increasing role as renewable raw material and energy source in Europe. Within the forest-based sector wood is the most important economic product as it is used for sawn wood, panels, plywood, and pulp. Due to new bioenergy policies in Europe, the use of wood resources has been put under scrutiny in recent years. There is an ongoing discussion about how to best use wood and how to satisfy increasing demand for wood for energy purposes, while increasing the material use in wood products simultaneously (EFI, 2013).

Status and trends

There are various political objectives on the use of renewable raw material and energy to be considered in Europe:

1. Renewable raw material

- The European Commission presented in 2008 the Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan. It includes a series of proposals on sustainable consumption and production that are meant to contribute to improving the environmental performance of products and increase the demand for more sustainable goods and production technologies.
- The 6th Environmental Action Programme of the European Union identified the sustainable use of natural resources and management of wastes as one of its priority areas.
- The Thematic Strategy on the Sustainable Use of Natural Resources aims at reducing the negative environmental impacts generated by the use of natural resources in a growing economy – a concept referred to as decoupling. For renewable resources this means also staying below the threshold of exploitation.
- Several EU countries have adopted national policies related to the sustainable use of resources.

2. Energy

- The EU's Renewable Energy Directive sets a binding target of 20 % final energy consumption from renewable sources by 2020. To achieve this, EU countries have committed themselves to reaching their own national renewables targets ranging from 10 % in Malta to 49 % in Sweden. They are also bound to have at least 10 % of their transport fuels come from renewable sources by 2020.

All EU countries have adopted national renewable energy action plans showing what actions they intend to take to meet their renewables targets.

- The Central-Eastern and South-Eastern region as well as the Ukraine implement the Directive 2009/28/EC as well.
- Renewables will continue to play a key role in helping the EU meet its energy needs beyond 2020. EU countries have already agreed on a new renewable energy target of at least 27% of final energy consumption in the EU as a whole by 2030. This target is part of the EU's energy and climate goals for 2030.

The following trends were observed:

- ▶ In Europe 369 million m³ of roundwood were harvested in 1990, about 445 million m³ of roundwood were harvested in 2010. The recently reported decreasing amounts are due to the economic crisis, while having recovered after the reporting period (UNECE, 2014).
- ▶ 201 million m³ of roundwood were marketed in 1990, in 2010 marketed roundwood accounted for 226 million m³. The highest amounts were also reached in 2005 (241 million m³) before the economic crisis hit Europe in 2008.
- ▶ The total energy supply from wood accounted for 2326 million metric tonnes dry matter in 2009 and increased up to 2654 million metric tonnes dry matter in 2011.

Knowledge gaps

- The pan-European indicator set only allows collecting information about roundwood; regarding the production of wood fuel also other wood products, for instance fire wood, pellets or wood chips exist, where the collection of related data should be referred to other statistics such as from UNECE.
- In addition to the indicator on roundwood, there are no further pan-European indicators or categories of Ind. 3.2 and therefore respective data is only available regarding the amount of industrial roundwood, which is the largest European wood resource.
- The Thematic Strategy on the Sustainable use of Natural Resources is based on the life cycle approach. It therefore encourages the application of life cycle thinking in the development and assessment of existing and future EU and national policies that might have a direct or indirect impact on resource productivity or the environmental impact of resource consumption. However, related data for an assessment are not available so far.

Recommendations

For a comprehensive evaluation of Target 3, the following is required:

- ▶ Information on trade-offs between material and energetic use is needed to inform policy-making.
- ▶ More realistic approaches to wood mobilisation in particular with respect to the huge amount of non-industrial small-scale forest owners are required.
- ▶ Life Cycle Assessment approaches are encouraged to fully understand the dimensions of different uses of wood material.
- ▶ Cascade use chains shall be analysed with regards to their sustainability effects of wood material chains.
- ▶ Information is needed on displacement effects of European bioenergy strategies to outside Europe.

Conclusion

Wood mobilisation programmes have gained increasing importance in recent years to contribute to bioenergy targets and increased use of natural resources to substitute non-renewables. To fully assess the effects addressed in Target 3, the trade-offs in wood use and the displacement consequences to outside Europe have to be addressed more intensively.

Indicative assessment of progress to target:

- ▶ **Partially on track to achieving the target**

Target 4: The full value of forest ecosystem services across Europe is being estimated with a view to using common valuation approaches, and that values are increasingly reflected in relevant national policies and market-based instruments such as payments for ecosystem services

Context

Ecosystem services comprise a new concept, which was firstly promoted by the Millennium Ecosystem Assessment and which is now also referred to forest ecosystems. In contrast to forest functions and services, ecosystem services are based on a comprehensive meta-approach. The value of forest ecosystem services is difficult to comprehend and widely realised by society and market-based economies. Marketable ecosystem services comprise, among others, biodiversity conservation, soil conservation, protection against natural hazards, water management and purification, stabilization of micro-climates, carbon sequestration or air pollution abatement. The extent to which these services are important varies according to location and management objectives. However, many of these services do not have a well-recognised monetary value and forest owners receive no income from them. This may lead to a distortion of management choices, as owners give priority to those functions which create income.

Status and trends

Quantitative information on ecosystem services in Forest Europe is currently gathered by means of two indicators:

- 13 countries have provided quantitative information on the value of various marketed services on forest and other wooded land.
- 28 countries have reported government expenditures for forest services.

The following trends were observed:

- ▶ Presently, there is a growing interest in implementing schemes of payments for ecosystem services as a means to compensate for public goods and benefits of SFM to their producers through various mechanisms. Most of the existing schemes focus on the compensation of lost economic benefits arising from conserving, maintaining or providing

ecosystem services in specific local conditions, where these ecosystem services have particularly high societal values.

- ▶ A growing recognition of the values and benefits of ecosystem services is observed among European countries.
- ▶ 25 countries reported recently specifically stated policy objectives in relation to the valuation of ecosystem services. These countries have developed or are presently developing national valuation schemes or approaches within their national rural development programmes, research programmes and projects, national forest programmes, biodiversity programmes, action plans and strategic programmes.
- ▶ On a pan-European level there is also work ongoing on a common, transparent and objective valuation approach, for instance in the FP7 funded research project NEWFOREX "New Ways of Valuing Forest Externalities", in the EC-JRC MAES pilot on forest ecosystems and their services and in CICES, the Common International Classification of Ecosystem Services. The development of valuation approaches for ecosystem services also contributes to the transition towards a green or bio-economy.

Knowledge gaps

- Suitable quantitative or qualitative FOREST EUROPE indicators are not available for the monitoring and reporting of Target 4.
- The indicator 6.4 Expenditure for services focuses only on government expenditures and revenues for forest related services. Private funding schemes are not covered.
- Related qualitative information was non-systematically reported under various policy areas and was therefore difficult to compile and to compare.

- Information on payment for (forest) ecosystem services is not comprehensively gathered and systematised. Currently, only indicator on forest services (3.4) and public expenditures for services (6.4) are addressing this aspect partially.
- The conceptual linkages of ecosystem services and sustainable forest management are not fully clarified, nor prepared for adequate monitoring and assessment.

Recommendations

For an evaluation of Target 4 the following should be considered:

- ▶ To support national governments, forest owners and forest stakeholders the development and establishment of a common, pan-European efficient, transparent and objective system of evaluating forest ecosystem functions and services is necessary.
- ▶ Synergies have to be explored to bring together

the concepts of ecosystem services, and forest functions and services. Respective progress has to be considered in Pan-European SFM reporting and assessment.

- ▶ The role of both public and private financing instruments for ecosystem services has to be monitored to facilitate a valid assessment of target 4.
- ▶ Information on payments for ecosystem services and the greening of national accounts should be requested and monitored according to a common Pan-European approach.

Conclusion

The concepts of ecosystem services and payments for ecosystems services are neither conceptually nor practically implemented as pan-European tools for sustainable forest management. It is therefore required to seek links to respective initiatives and indicator frameworks to enrich information for an evaluation of Target 4.

Indicative assessment of progress to target:

- ▶ Largely not on track to achieving the target.
- ▶ Reduced validity of assessment due to lack of information.

Target 5: All European countries include strategies for forests and climate change adaptation and mitigation in national forest programs or equivalents and all other relevant national strategies

Context

Climate change is seen a major driver for future change with wide consequences on sustainable forest management in Europe. Strategies for climate change adaptation, i.e. the adaptation of forests and forest management, and mitigation, i.e. the role of forest management to combat climate change, need respective reference in forest policy instruments such as national forest programmes.

Status and trends

Climate issues have been increasingly recognized by national forest legislations across the countries and included in national forest policy documents, in particular in relation to the adaptation of forests to climate change and carbon accounting. Some planned adaptation to climate change is already occurring on a limited basis.

- According to the very few respondents, strategies and related objectives for forests and climate change adaptation and mitigation are only included into three National Forest Programmes.
- The European Commission adopted an EU Strategy on Adaptation to Climate Change in April 2013. The related EU adaptation actions include mainstreaming of climate change (mitigation and adaptation) into EU sector policies and funds, including forestry (EC, 2013c).

Knowledge gaps

- Within the set of qualitative Pan-European Indicators for Sustainable Forest Management there is no policy

area on climate change adaptation. Nevertheless, some countries provided information in relation to climate change mitigation and adaptation under the policy areas on land use and forest area as well as on the policy area on carbon balance. A synthesis is hard to derive from these unsystematic replies.

- There is no pan-European wide synthesis or information available whether the national climate change adaptation strategies cover forest-related climate change adaptation and mitigation issues.

Recommendations

For an evaluation of Target 4 the following should be considered:

- ▶ It is recommended to add a policy area on climate change adaptation and mitigation in the set of qualitative indicators to obtain comparable information.
- ▶ The consideration of strategies for forests and climate change adaptation and mitigation in forestry-relevant documents such as national forest programmes as well as in national climate change adaptation strategies need to be investigated.

Conclusion

Actually, several European countries have developed climate change adaptation and mitigation strategies, mostly complying with the EU Strategy on Adaptation to Climate Change and the Climate Change Convention Adaptation Framework. Whether the role of forests and the implications for forest policy and management are clearly elaborated is not well known. For a proper evaluation of this target, further, more specific forest-related information will be required.

Indicative assessment of progress to target:

- ▶ **Partially on track to achieving the target.**
- ▶ **Reduced validity of assessment due to lack of information.**

Target 6: The rate of loss of forest biodiversity at habitat level is at least halved and where feasible brought close to zero, and measures are taken to significantly reduce forest fragmentation and degradation and to restore degraded forests

Context

The loss of biodiversity is a main item on the international agenda. Habitat conversion and degradation are the primary drivers of biodiversity loss in forest ecosystems. The conservation of biodiversity aims to maintain the natural diversity within species, between species and of ecosystems and is an essential element of the sustainable management of all types of forests. This Target is closely linked with Goal 5.

Status and trends

Due to the diversity of issues covered in this target the below analysis consists of three parts.

1. The rate of loss of forest biodiversity at habitat level is at least halved and where feasible brought close to zero:

Only two indicators on threatened forest species and protected forests focus per se on the loss of biodiversity (cf. Goal 5), some more FOREST EUROPE indicators provide additional, related information:

- Substantial losses of species and habitats are apparent from recent pan-European data. For instance, five forest tree species are extinct in the wild, 42 forest tree species are critically endangered and 107 forest tree species are endangered in Europe. Most threatened forest tree species have been monitored in Central-East Europe. Only 5 countries reported no threatened tree species. Tree species have the lowest total numbers of extinct forest-occurring species. Fungi as well as invertebrates show the highest numbers of extinct forest-occurring species.
- Protected forest areas, with the main management objective biodiversity (according to the MCPFE Assessment Guidelines for Protected and Protective Forest and Other Wooded Land in Europe, categories 1.1-1.3), account for 12,2 % of the forest area, while human intervention is totally banned on only 1,5 % of the forest area.
 - In the pan-European region, the MCPFE Assessment Guidelines were created especially for European conditions, where protected forest areas are often small and are protected with various management options and regimes. Within the EU countries there is also Natura 2000, a network,

which focuses on the conservation of habitats and species covering presently about 9 % or 38,2 million ha of the forest and other wooded land area in the EU-28. It is not a classification system per se and does not exclusively focus on protected forest areas, but also includes multi-functional forest areas. The conservation status is, however, still only favourable for 15 % of habitats and 26 % of species in the Natura 2000 areas in woodlands and forest ecosystems (EEA, 2015).

- Although forests currently cover 33 % of Europe's territory, only 4 % of these forests are considered to be undisturbed by man. Thus, the share of old-growth stands, which have a high conservation value and which are crucial for many forest species, is critically low. The semi-natural forests which are influenced by human interventions, but to a certain extent maintaining the natural characteristics, include a broad range of forests with different levels of naturalness and biodiversity and cover 87 %. Plantations are at 9 % of relatively small magnitude, but nevertheless significant in a few European countries.
- Deadwood plays a major role for the conservation of saproxylic species. The weighted average volume is about 11,5 m³/ha for the reporting countries, with a minimum of 3,9 m³/ha in the United Kingdom and a maximum of 40,6 m³/ha in Slovakia. In general, in Central Europe countries the amount of deadwood is considerably high. Depending on the forest type, deadwood quantities ranging from 20 to 50 m³/ha have been identified as a threshold to maintain the majority of critically endangered saproxylic species (Lachat, 2013). Standing and lying deadwood quantities higher than 20 m³/ha occur in more than one quarter of the reporting countries.
- Invasive alien species may also contribute to loss of habitat biodiversity. In Europe, 11 % of forest area dominated by introduced tree species is occupied by invasive tree species, the share is particularly high in Central-Eastern Europe.

The following trends were observed:

- ▶ Rather successful responses include an increasing designation of protected forest areas with main

management objective biodiversity according to the MCPFE Assessment Guidelines for Protected and Protective Forest and Other Wooded Land in Europe, now covering 12,2 % of the forest area.

- ▶ Changes between the naturalness classes have been low during the last 20 years period. However, the area of planted forests has slowly increased particularly in southern Europe.
- ▶ The forest area dominated by invasive tree species has doubled since 1990.
- ▶ The amounts of deadwood in European forests are rising steadily and have tripled from 1990 to 2010.

2. Measures are taken to significantly reduce forest fragmentation

- In Europe the human influence on forests is long-lasting and the population density is very high. Overall, and apart from Northern Europe and mountainous regions, forest areas are highly fragmented in the landscape and reach out to patches surrounded by agricultural land and urban areas. Large forest areas are also fragmented by roads and the railway system. Harmonised, quantitative information is however not available via the FOREST EUROPE/UNECE/FAO reporting system.
- Only few reporting countries have developed particular policy objectives to reduce forest fragmentation. The existing ones can be found in national plans regarding green infrastructure (e.g. EU green infrastructure strategy). Several countries do not consider fragmentation an important issue.

3. Measures are taken to significantly reduce degradation and to restore degraded forests

Land degradation on forests and other wooded lands, understood as a persistent reduction or loss of land biological and economic productivity, adversely affect the multiple provisions of forests ecosystem goods and services. Causes and consequences of land degradation have multiple characteristics and vary within space, scale and context. Forest land degradation is an emerging issue in the FOREST EUROPE process. However, it is so far not covered by quantitative or qualitative indicators. Even so, several reporting countries have informed that they have developed policy objectives to reduce degradation and to restore or rehabilitate degraded forest and other wooded land and to also particularly to enhance the protective functions of forests. This comprises for instance clearance and reforestation of calamity sites, activities to prevent or slow the spread of insects, or programmes to remove land mines.

An indicator related to forest areas affected by land

degradation and related restoration is of broad interest. Preventing forest degradation is part of one of the UNFF Global Objectives on Forests.

Knowledge gaps

- The conservation of biodiversity is an essential component of sustainable forest management in Europe and is addressed by 9 related indicators under Criterion 4 (Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems). The information is rich, but not directly related to evaluate the loss of biodiversity.
- The data on threatened forest species are very heterogeneous and sometimes fragmented. Trends cannot be derived from this data base. However, a statement about whether the rate of loss of forest biodiversity is halved can only be made based on the assessment of timelines.
- Birds are very sensitive to environmental changes and can therefore act as proper indicators for the state of nature and of the sustainability of land use and environmental health. The occurrence of common breeding bird species related to forest ecosystems was recently selected as an additional adequate indicator to the set of Pan-European Indicators for Sustainable Forest Management. However, data for European forest birds were so far not analysed by the respective international data providers.
- There is no qualitative information available regarding the impact of protected areas on biological diversity.
- There is also no information available as to which extent the different forest ecosystem types are properly protected.
- There are some more indicators included under Criterion 4 Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems. However, they are not suitable for general pan-European statements on whether the rate of loss of forest biodiversity at habitat level is at least halved, but rather suitable for national biodiversity related statements (For instance, tree species composition is in general lower in Northern Europe, the indicator on genetic resources focuses only on area related information and does not inform about loss or maintenance of variations).
- There are no biodiversity indices or comprehensive data sets with time series available to fully respond on whether the loss of forest biodiversity in Europe is at least halved.
- No data and information is available on degradation and related restoration.

- No qualitative information was requested and is available on related policy responses like the adoption of policies and actions for managing invasive alien species.

Recommendations

For a detailed evaluation of Target 6 the following is recommended:

- ▶ Improve the monitoring and reporting of the related quantitative indicators to obtain time series for adequate assessments of threatened forest species, genetic resources or degradation.
- ▶ Improve the reporting for the qualitative indicators to request information relevant for this target, for instance regarding impacts of protected areas, managing invasive alien species.

- ▶ Explore the development of a Biodiversity Index which facilitates an evaluation of this goal.
- ▶ Further develop the recently proposed indicator on degradation, also regarding related restoration and rehabilitation of the degraded forest areas.

Conclusion

Forest biodiversity is a major segment of biodiversity in European ecosystems. The Pan-European reporting on sustainable forest management gives insight into elements that are deemed important from a sectoral point of view and demonstrates how biodiversity is implemented in national policy frameworks. An evaluation whether the loss of forest biodiversity at habitat level is at least halved cannot be based on the available indicators but needs further assessment tools. It has to be considered that forest biodiversity is also effected by trade-offs of future use of European forest land.

Indicative assessment of progress to target:

- ▶ Largely not on track to achieving the target.
- ▶ Reduced validity of assessment due to lack of information.

Target 7: The role of forests in combating desertification is fully recognised and forests are also managed to that end

Context

Desertification comprises land degradation in arid, semi-dry and dry sub-humid areas resulting from various factors, including climatic variations and human activities. The United Nations Convention to Combat Desertification (UNCCD) addresses specifically the arid, semi-arid and dry sub-humid areas where some of the most vulnerable ecosystems can be found. However, forest areas are not considered in particular. Target 7 is closely linked to Goal 6.

Status and trends

Status information on target 7 is limited.

- Desertification on forests and other wooded lands, understood as a reduction or loss of forest land biological and economic productivity, adversely affect the multiple provisions of forest ecosystem goods and services. In arid and semi-arid European regions degradation occurs. This has been reported as an issue by some Southern European countries, but further information is not available.
- Dry forests play an important role in preventing land degradation and desertification, conserving biodiversity and providing ecosystem goods and services and mitigating and adapting to climate change and the impacts of drought. However, there is also no information available on specific sustainable forest management strategies to maintain dry forests and to combat desertification.

Knowledge gaps

- The size of forest areas affected by or threatened by desertification is unknown, as respective data is not requested via the FOREST EUROPE/UNECE/FAO, nor the UNCCD reporting system.
- No information is available on forest management to combat desertification.

- There is no FOREST EUROPE indicator available which directly addresses the issue of desertification. The FOREST EUROPE indicators 1.1 Forest area, 2.4 Forest damage and 4.2 Regeneration do so far not provide any relevant information for Target 7. However, all three indicators could provide relevant information, if the measurement units would consider separate data for semi-arid and arid zones.
- All information on the UNCCD progress indicators is requested for land cover or total area. No forest specific information will be made available. So far, data are not available at all since the UNCCD progress indicators will be used for the first time during the second term of the fifth reporting process in 2016.

Recommendations

To be able to evaluate Target 7, the following is necessary:

- ▶ An indicator related to forest area affected by desertification should be elaborated. An adequate interpretation of such an indicator in combination with national forest inventories or other available information, for instance from remote sensing can help to monitor and assess the overall health and vitality state of forests in Europe. While highlighting the role of forests in recovering desert forest area, such an indicator would also emphasize that sustainable forestry activities can make a difference in recovering degraded land.
- ▶ The UNCCD decided in 2013 to establish a set of 6 global progress indicators for measuring progress in seeking their strategic objectives. In order to reduce the reporting burden of the countries, the measurement of the indicators adopted should be based on available global data sets and proved methodologies. One of the indicators selected in order to measure the impact of the implementation of the "Strategic Objective 2: To improve the condition of

affected ecosystems” was “Trend in land productivity” which will be covered by the newly proposed Pan-European Indicator for Sustainable Forest Management 2.5 “Forest land degradation”, which includes aspects of desertification. However, further information on the restoration and management of deserted forest areas is needed for an assessment of this European 2020 Target 7 for Forests.

Conclusion

Analogous to Goal 6, desertification is currently not prominently placed in the Pan-European discussion on sustainable forest management. Only little systematic knowledge exists on the threats and responses to future desertification in Europe, and the role of forests (loss of forests, afforestation) therein.

Indicative assessment of progress to target:

- ▶ Largely not on track to achieving the target.
- ▶ Reduced validity of assessment due to lack of information.

Target 8: All European countries have policies and measures which ensure a significant increase in socio-economic and cultural benefits, especially for human health, livelihoods, rural development and employment from forests

Context

In analogy to Goal 7, the diversity of socio-economic benefits of forestry and the forest-based sector is at stake. In addition, human health shows up on the political agenda as an increasing concern in an aging society. It has to be demonstrated, however, how forest resources such as timber, forest products and services contribute to societal welfare in terms of socio-economic and cultural benefits.

Status and trends

In recent decades the perception of the benefits of European forests has broadened towards socio-economic and cultural benefits. This is reflected in the progressive request of gaining and maintaining socio-economic and cultural benefits next to timber revenue, which is well addressed for instance in the EU Common Agricultural Policy (CAP) and in the related rural development policies and programmes as well as in several national rural development programmes.

- Rural development programmes are crucial as the forest sector's contribution to GVA in Europe has declined from 2,97 % to 2,84 % over a decade, reaching only 2,29 % in 2005.
- Due to an increased mechanisation, declines in forest sector employment can be observed since 2005, while the average age of the forest workforce is growing.
- Occupational safety and health of the forest workforce are also still a cause of concern.
- The public can access over 90 % of the forest areas for recreational purposes in Europe.

A growing recognition of the socio-economic and cultural benefits is observed among the pan-European countries. Reported qualitative information on new policy objectives comprises, among others, the

promotion of entrepreneurship based on ecotourism and business based on processing of non-wood goods, the commercial utilization of the ecosystems services, and the facilitation of well-being and recreational values, at the same time balancing the different requirements on forests.

Knowledge gaps

- There is considerable overlap between certain benefits considered under economic, social and environmental headings. As a result, many forest policies aim to preserve or enhance multiple and often competing benefits; activities targeted specifically or exclusively to social values are relatively rare. While consistent data tracking on social benefits are scarce, these benefits often are placed prominently in policy debates, especially when they arise in conflict with resource extraction interests. While the measurement of social benefits is difficult from a practical and a theoretical standpoint, the importance of these and closely related environmental benefits are widely recognized.
- The FOREST EUROPE questionnaire on qualitative indicators asks for quantified targets in national policies and measures in relation to non-wood forest products, production and use of wood, employment, economic viability, cultural and spiritual values. The replies on the related policy areas, in particular the relevant policies, can contribute with information to Target 8. However, there is no information for human health, livelihoods and rural development.
- Even so that the positive impacts of forests on human health are increasingly promoted and that various research activities are ongoing, next to the pan-European indicator on occupational safety and health of the forest workforce, there are no tools nor systematic pan-European overview available on forest related policies and measures to increase human-health of people living close to forests.

Recommendations

For a detailed evaluation of Target 8 the following should be considered:

- ▶ In general, the increasing recognition and incorporation of socio-economic and cultural benefits into forest planning processes, public or private, is the best way to ensure the ongoing provision of these benefits and the related data provision in future questionnaires.
- ▶ It is recommended to establish the acquisition of data and information on socio-economic and cultural benefits with a direct relation to Target 8.

- ▶ Qualitative and quantitative information on forest related impacts on human-health should be considered in the pan-European reporting tools.

Conclusion

Similar to Goal 7, cross-sectoral aspects and competing overlaps are not addressed by the Pan-European reporting system hamper a valid evaluation of this target. Human health as an additional aspect is not at all addressed in the reporting and assessment instruments for sustainable forest management so far, while it is frequently mentioned as emerging issues for the future.

Indicative assessment of progress to target:

- ▶ **Largely not on track to achieving the target.**

Target 9: Effective measures are taken at regional, sub-regional and national levels to eliminate illegal logging and associated trade

Context

Illegal logging and trade of illegally harvested timber have detrimental effects on the forest sector. They undermine legal trade and pose severe environmental, social and economic threats (EFI, 2015). In 2011, the Ministers responsible for forests and forestry in Europe were concerned about the negative impacts of illegal logging and related trade on society, the environment and markets, and highlighted the need to further strengthen efforts to improve forest law enforcement and governance. Target 9 is closely linked with goal 8.

Status and trends

Information on the state of “illegal logging” and “trade in illegally logged material” can be found from various sources, but little systematically. Governmental organisations, NGO’s, research organisations and mass media use to publish information on the issue.

The country reports presented at the “UNECE/FAO Workshop on illegal logging and trade of illegally-derived wood products in the UNECE Region”, held on 16-17 September, 2004 in Geneva, Switzerland are valuable sources of information. 26 European Country Reports were presented (including the Russian Federation). Illegal logging was an issue of concern in the Baltic States, the Balkan region and to a lesser extent, in some central-eastern European countries. However, no recent information is available.

Knowledge gaps

Based on the status, the following knowledge gaps can be observed:

- Suitable quantitative FOREST EUROPE indicators on timber volume or forest area affected for the monitoring and reporting of Target 9 are not available.
- Also other quantitative information like lost revenues, degraded forest areas or on certification schemes is not available via the FOREST EUROPE/UNECE/FAO reporting system.

Recommendations

For a more detailed evaluation of Target 9, the following is required:

- ▶ For the monitoring of illegal logging all European countries should be requested to report relevant information in the qualitative Pan-European Indicators for SFM such as investments on combating illegal logging, criminal statistics.
- ▶ Qualitative information on national policies addressing combat of illegal logging has to be fostered in the Pan-European reporting.
- ▶ The exploration of remote sensing techniques to uncover illegal logging in Europe should be investigated.

Conclusion

While information on illegal logging dimensions are still scarce (cf. also Goal 8), sincere progress can be documented on EU level in terms of the implementation of the EU Timber Regulation. Care has to be taken that relevant activities can be secured for the Pan-European level as well.

Indicative assessment of progress to target:

- ▶ Partially on track to achieving the target.
- ▶ Reduced validity of assessment due to lack of information.

Summary Conclusions

The Pan-European Goals and Targets have been endorsed in 2011 by the 6th Ministerial Conference on the Protection of Forests in Europe in Oslo. For a mid-term evaluation of the progress made towards them, the Pan-European Indicators for Sustainable Forest Management are expected to play a vital role. However, this set has not been originally designed to measure such progress, and is hence limited in its capacity to comprehensively answer the questions of progress. Given these constraints, the criteria and indicators can still provide information on many aspects addressed by the goals and targets, allowing for a mid-term evaluation and a critical review of positive and negative developments, and evidence of knowledge gaps for assessing them in a valid manner.

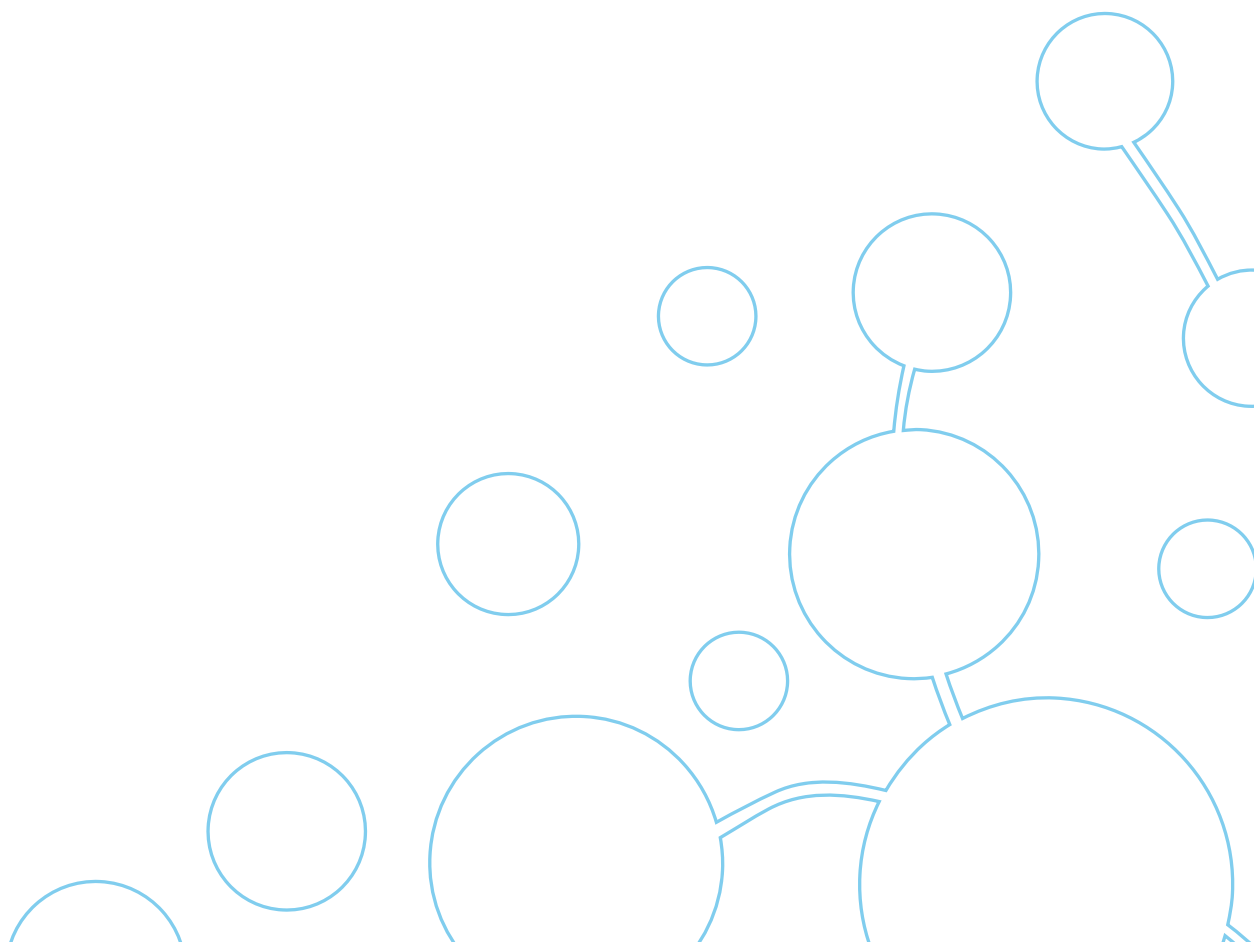
Table 2 summarises the main findings of the report. It can be concluded that for only one Goal and one Target a largely comprisal towards the objectives can be solidly stated. For the major parts, a partially directional advancement can be already documented. On the other hand, for two goals and four targets, a significant deviation from the desired direction must be assumed. These mid-term results fall under the disclaimer, that for a majority of goals and targets, data and information sources provided by the Pan-European Indicators for Sustainable Forest Management are not fully adequate to respond to assessment demands. This foremost implies that compliance with other data sources have to sought, cross-sectoral boundaries to be overcome, and conceptual discrepancies with other addressed concepts to be solved.

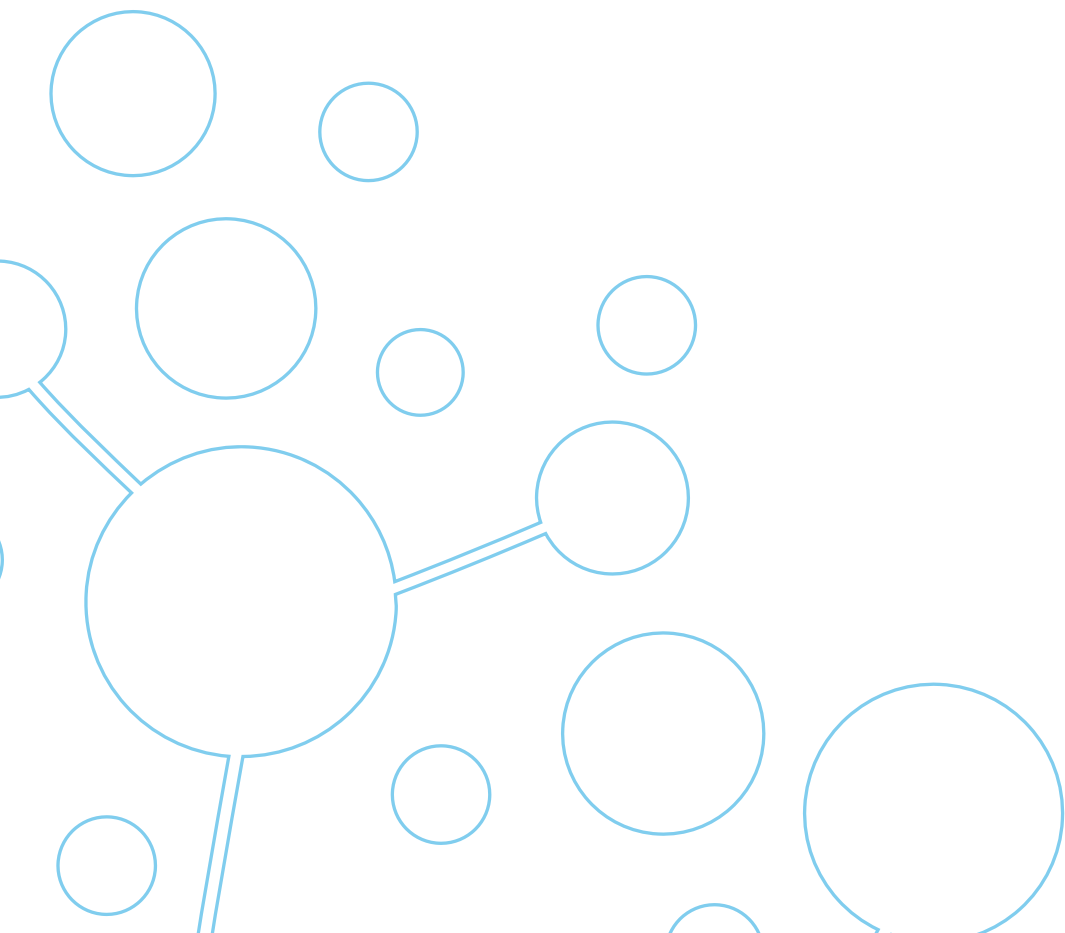
Table 2: Overview on the Goals for European Forests and the European 2020 Targets for Forests: Content-wise relation of goals and targets; Summary of the evaluation of the goals and targets (legend: **green** - largely on track to achieving the goal/target; **orange** - partially on track to achieving the goal/target; **red** - largely not on track to achieving the goal/target; white letters - lack of data and information)

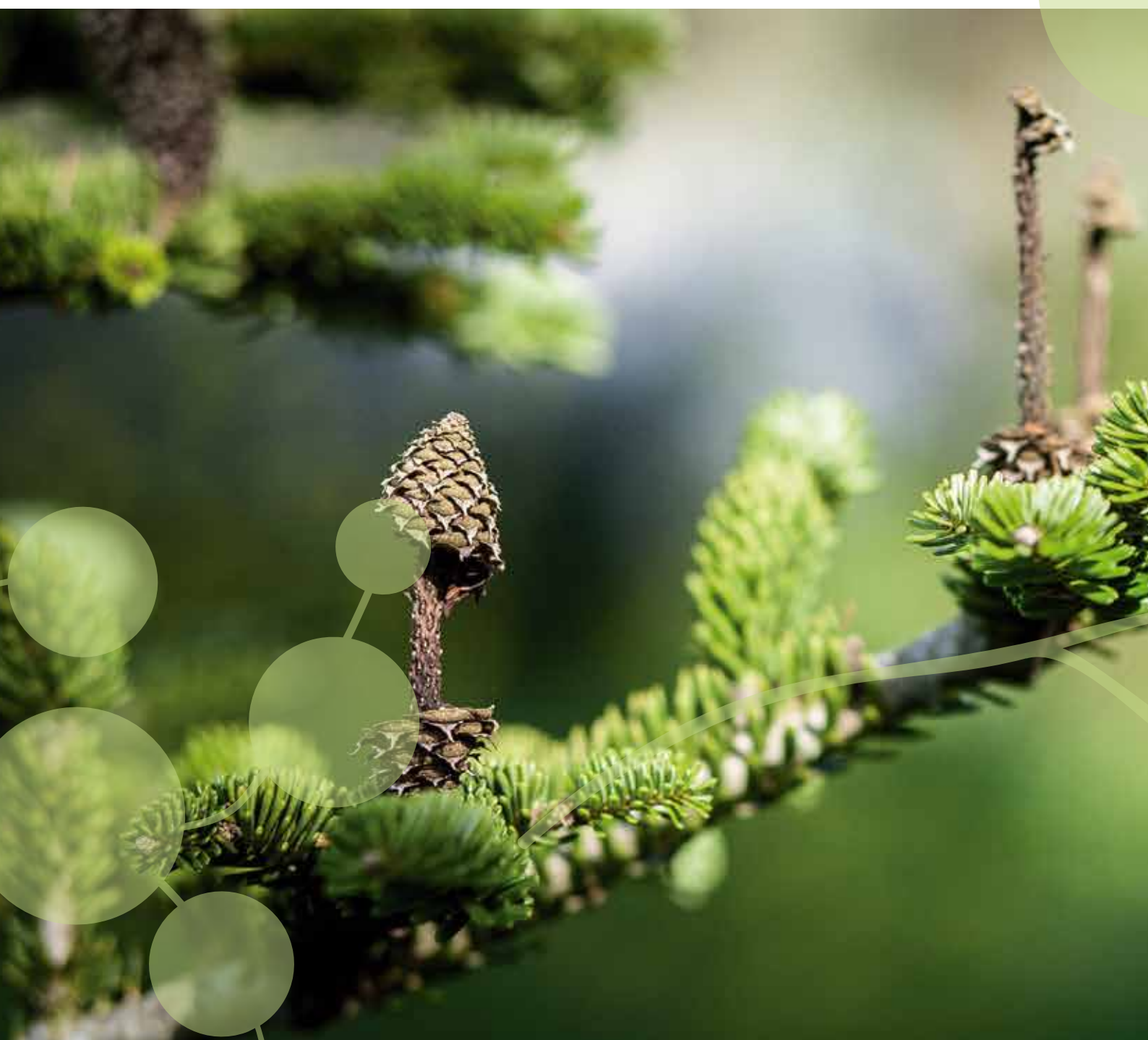
Goals for European Forests	European 2020 Targets for Forests
	1. All European countries have developed and are implementing national forest programs, or its equivalent, in line with the shared vision and goals and the pan-European approach to national forest programs
	2. In addressing emerging issues forest knowledge is improved through research, education, innovation, information sharing and communication
1. Sustainable management of all European forests ensures multiple forest functions and enhances lasting provision of goods and services	3. In response to political objectives on the use of renewable raw material and energy in Europe, the supply of wood and other forest products from sustainably managed forests has increased substantially
2. European forests contribute to a green economy, including through increased provision of wood, other forest products and ecosystem services from sustainable sources	4. The full value of forest ecosystem services across Europe is being estimated with a view to using common valuation approaches, and that values are increasingly reflected in relevant national policies and market-based instruments such as payments for ecosystem services
3. Forest management in Europe is being adapted to changes in climate, forests are healthy and resilient to natural hazards and protected against human-induced threats such as forest fires, and the productive and protective functions of forests are maintained	5. All European countries include strategies for forests and climate change adaptation and mitigation in national forest programs or equivalents and all other relevant national strategies
4. The potential of European forests to mitigate climate change, through carbon sequestration in trees and soils, carbon storage in forest products and substitution of non-renewable materials and energy sources, is utilized to minimize Europe's ecological footprint without harming the global carbon balance	
5. The loss of forest biodiversity in Europe is halted and degraded forests are restored or rehabilitated	6. The rate of loss of forest biodiversity at habitat level is at least halved and where feasible brought close to zero, and measures are taken to significantly reduce forest fragmentation and degradation and to restore degraded forests
6. The role of forests in combating the progress of desertification is strengthened	7. The role of forests in combating desertification is fully recognised and forests are also managed to that end
7. Socioeconomic and cultural benefits, especially for livelihoods, rural development and employment from European forests are optimized	8. All European countries have policies and measures which ensure a significant increase in socio-economic and cultural benefits, especially for human health, livelihoods, rural development and employment from forests
8. Illegal logging and associated trade in wood and other forest products are eliminated in Europe	9. Effective measures are taken at regional, sub-regional and national levels to eliminate illegal logging and associated trade

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