Background information

The development and improvement of the Pan-European Indicators for Sustainable Forest Management (SFM)

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Stefanie Linser holds a PhD in natural sciences and an MSc in forestry sciences. She has been working for 16 years in national and international forest policy issues and is a recognised expert on indicators for sustainable forest management. She has compiled data and provided input and indicator expertise to national and international organisations such as FOREST EUROPE, FAO, EUROSTAT, EEA, EC DG Agri and DG Research and focused in various earth observation projects on forest related data needs which could not be fulfilled via in situ measurements. She is since many years also nominated to the UNECE/FAO Team of Specialists (ToS) on Monitoring of Sustainable Forest Management. In 2014-15 she was also an expert of the EC ad hoc Working Group on SFM C&I as well as of the FOREST EUROPE expert group to propose improvements in tools for SFM. In 2014 she launched and coordinates now the IUFRO Working Party 9.01.05 on Research and Development of Indicators for Sustainable Forest Management. Her present focus of work is on the further development of forest related indicators or indicators for sustainable forest management and related monitoring, reporting and assessment.

The genesis of the pan-European criteria and indicators for SFM

In Europe, the corresponding forest policy process for the sustainable management of the pan-European forests is called FOREST EUROPE (formerly named MCPFE – Ministerial Conference for the Protection of Forests in Europe). It was founded in 1990 as a regional political initiative and has developed to a political discussion forum for a European, international forest policy. It develops common strategies for its 46 member countries and the European Union on how to protect and sustainably manage forests.

Since 1990 seven Ministerial Conferences for the Protection of Forests in Europe have been conducted. Based on the signed Resolutions of the various Ministerial Conferences, which can be seen as a common policy frame, all European countries have started initiatives to guarantee, monitor, assess and report a sustainable forest management in Europe.

Already in the early nineteen-nineties the FOREST EUROPE process has developed a first pan-European C&I set which was revised several times in the meanwhile, due to new fields of interest and emerging issues. By now, the pan- European set has served as the basis for assessments in State of Europe's Forests Reports in 2003, 2007, 2011 and 2015 and provided the basis for regional and national policy formulation, analysis and monitoring. The pan-European C&I set for SFM is the only set of criteria and indicators world-wide that is supported by political commitment on ministerial level by the participating governments of the FOREST EUROPE process. However, the pan-European C&I set faces several shortcomings and the need to adapt to emerging issues which have so far been neglected (Linser, Wolfslehner & Pülzl, 2015).

National uptake of the pan-European C&I framework

The pan-European C&I set has since its first development served as a guidance framework for monitoring and reporting as well as for communication on sustainable forest management in

Europe (Pülzl & Mayer, 2015). Four State of Europe's Forests reports have so far been published which were based on the pan-European C&I. A recent study on the implementation of criteria and indicators in Europe (EFI, 2013) showed that the pan-European C&I have been used as a basis for the development of national level indicators in 38 of the 46 signatory states. Most of the remaining countries are also planning or have in the meanwhile developed national indicators. 33 signatory states already use indicators to assess sustainable forest management nationally. It was also highlighted that the pan-European C&I framework has had an impact on the improvement of national forest inventories, monitoring systems and forest data in terms of availability, data quality and comparability. Despite this success of the national uptake of the pan-European C&I, it was suggested to again revise the indicators to open the forest centric focus of the indicators and to make them fit even better to emerging needs and changing realities by increasing their intersectoral relevance regarding energy, climate change, agriculture, biodiversity or bioeconomy issues.

Improvement of the pan-European indicators for SFM

In the light of major global problems and/or emerging challenges for sustainable forest management the pan-European Criteria and Indicators for Sustainable Forest Management have been improved and amended in several rounds:

Development/ revision period	Year of adoption	Number of criteria	Number of quantitative indicators	Number of qualitative indicators	Related reports pubished in	
1993-1994	**1994**	6	27	-	1995	1998, 3rd MCPFE
1994-1995	**1995**	6	27	101	1996	
2001-2002	**2002**	6	35	17	2003, 4th MCPFE 2007, 5th MCPFE 2011, 6th MCPFE 2015, 7th MCPFE	
2014-2015	**2015**	6	34	11	-	

In a further revision there are several related recent processes to be considered like the European Commission Standing Forestry Committee Ad-Hoc Working Group on SFM Criteria and Indicators following the new Forest Strategy, a global project on SFM indicators run by FAO, the development of indicators for the Sustainable Development Goals (SDG) and various national activities (for example in Austria, France and Sweden).

It has become evident that the C&I set served well as a framework for dialogue and communication, an adequate tool for monitoring and reporting SFM, facilitate the development and adaptation of national policy instruments, but failed partly or substantially as a tool for assessing progress towards sustainable forest management and particularly in stipulating cross-sectoral information exchange and collaboration (Linser, Wolfslehner & Pülzl, 2015).

For the assessment of the implementation of the European Goals for Forests and the European 2020 Targets for Forests it was also seen a necessity to complement the set of indicators as they address issues which were so far not covered by the set such as climate change mitigation and adaptation, illegal logging, desertification, forest knowledge or innovation (Linser & Wolfslehner, 2015a and b). Further work on the Pan-European indicators for SFM will be initiated by FOREST EUROPE end of 2016/beginning of 2017.

Outlook

Over the past 25 years, C&I for SFM have developed as powerful tools and are well-known for playing a central role in the implementation of SFM. Ever since their introduction in sustainability sciences, indicators have been deemed to be more than just simple data carriers. They are intended to draw and communicate a picture of a certain problem by providing a selection of key

information which refers to the user's information needs. In a changing society information needs and requirements necessarily also need to be changed or adapted.

With regard to the whole forest sector-based value chain and particular with regard to bioeconomy it is obvious that the pan-European indicator set is very forestry-centred focussing mainly on the sustainable management of forests. However, bioeconomy does not only concern the primary production of forest resources, but also the use of wood and non-wood material, the provision of forest ecosystem services, as well as energy production and material use during recycling processes. Therefore, a broadening of the current forest indicator set is required. According to recent analysis (Wolfslehner et al., 2016) relevant indicator gaps along the forest-based value chain relate to topics such as:

- Forest ecosystem services
- Social services regarding health and wellbeing
- Illegal logging
- Certification
- Carbon storage in wood products
- Carbon footprint
- Environmentally sound processing
- Innovation in processes and products
- New markets
- Diversification of forest-related products
- Secondary or value-added forest products
- Bioenergy, biorefineries
- Forage and feed for livestock
- Green jobs
- Sustainable construction
- Recycling
- Green public procurement
- Sustainable transport from the forest road to the factory
- Sustainable transport from the factory to the consumer
- Green infrastructure

Therefore, Criteria and Indicators for Sustainable Forest Management as an information tool for reporting and assessments about SFM, have to be regularly revised and adapted to meet the changing or upcoming information and assessment needs from inside and outside the forest sector (Linser et al., 2015).

References and further readings

EFI (2013): Implementing Criteria and Indicators for Sustainable Forest Management in Europe. 128 p. http://www.efi.int/files/attachments/publications/efi_c-i_report_implementing_criteria_net_final.pdf

LINSER, S.; WOLFSLEHNER, B.; PÜLZL, H. (2015): The genesis of the pan-European criteria and indicators and their further development towards emerging policy needs. XIV World Forestry Congress (WFC) Forests and People: Investing in a Sustainable Future. Sub-theme Monitoring forests for better decision-making. http://www.fao.org/about/meetings/world-forestry-congress/programme/technical-papers/en/

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PÜLZL, H., MAYER, P. (2015): Assessment of the achievements and added value of the Forest Europe Process. Unpublished report presented at the FOREST EUROPE Expert Level Meeting in Santiago de Compostela, Spain, 20-22 January 2015.

WOLFSLEHNER, B., LINSER, S., PÜLZL, H., BASTRUP-BIRK, A., CAMIA, A., MARCHETTI, M. (2016): Forest bioeconomy – a new scope for sustainability indicators. From Science to Policy 4. European Forest Institute. http://www.efi.int/portal/policy_advice/publications/from_science_to_policy/

Annex:

The recent set of Pan-European indicators for SFM, adopted in 2015

It is presented in the framework of the existing Criteria and is structured following a linkage between the qualitative and the quantitative indicators.

More detailed information on rationales, international data providers, measurement units, current periodicity of data availability as well as underlying definitions is given in the supplementary documents “Background Information for the Updated Pan-European Indicators for Sustainable Forest Management” and "Relevant Definitions Used for the Updated Pan-European Indicators for Sustainable Forest Management" (See http://www.foresteurope.org/sfm_criteria/criteria).

	No.	Indicator
Forest policy and governance	1	National Forest Programmes or equivalent
	2	Institutional frameworks
	3	Legal/regulatory framework: National (and/or sub-national) and International commitments
	4	Financial and economic instruments
	5	Information and communication

Criteria	No.	Indicator	Full text
Criterion 1: Maintenance and Appropriate Enhancement of Forest Resources and their Contribution to Global Carbon Cycles	C.1	Policies, institutions and instruments to maintain and appropriately enhance forest resources and their contribution to global carbon cycles	
	1.1	Forest area	Area of forest and other wooded land, classified by forest type and by availability for wood supply, and share of forest and other wooded land in total land area
	1.2	Growing stock	Growing stock on forest and other wooded land, classified by forest type and by availability for wood supply
	1.3	Age structure and/or diameter distribution	Age structure and/or diameter distribution of forest and other wooded land, classified by availability for wood supply

Criteria	No.	Indicator	Full text
	1.4	Forest carbon	Carbon stock and carbon stock changes in forest biomass, forest soils and in harvested wood products
Criterion 2: Maintenance of Forest Ecosystem Health and Vitality	C.2	Policies, institutions and instruments to maintain forest ecosystem health and vitality	
	2.1	Deposition and concentration of air pollutants	Deposition and concentration of air pollutants on forest and other wooded land
	2.2	Soil condition	Chemical soil properties (pH, CEC, C/N, organic C, base saturation) on forest and other wooded land related to soil acidity and eutrophication, classified by main soil types
	2.3	Defoliation	Defoliation of one or more main tree species on forest and other wooded land in each of the defoliation classes
	2.4	Forest damage	Forest and other wooded land with damage, classified by primary damaging agent (abiotic, biotic and human induced)
	2.5	Forest land degradation	Trends in forest land degradation
Criterion 3: Maintenance and Encouragement of Productive Functions of Forests (Wood and Non-Wood)	C.3	Policies, institutions and instruments to maintain and encourage the productive functions of forests	
	3.1	Increment and fellings	Balance between net annual increment and annual fellings of wood on forest available for wood supply
	3.2	Roundwood	Quantity and market value of roundwood
	3.3	Non-wood goods	Quantity and market value of non-wood goods from forest and other wooded land
	3.4	Services	Value of marketed services on forest and other wooded land
Criterion 4: Maintenance, Conservation and Appropriate Enhancement of Biological Diversity in Forest Ecosystems	C.4	Policies, institutions and instruments to maintain, conserve and appropriately enhance the biological diversity in forest ecosystem	
	4.1	Diversity of tree species	Area of forest and other wooded land, classified by number of tree species occurring
	4.2	Regeneration	Total forest area by stand origin and area of annual forest regeneration and expansion
	4.3	Naturalness	Area of forest and other wooded land by class of naturalness
	4.4	Introduced tree species	Area of forest and other wooded land dominated by introduced tree species
	4.5	Deadwood	Volume of standing deadwood and of lying deadwood on forest and other wooded land
	4.6	Genetic resources	Area managed for conservation and utilisation of forest tree genetic resources (in situ and ex situ genetic conservation) and area managed for seed production
	4.7	Forest fragmentation	Area of continuous forest and of patches of forest separated by non-forest lands
	4.8	Threatened forest species	Number of threatened forest species, classified according to IUCN Red List categories in relation to total number of forest species

Criteria	No.	Indicator	Full text
	4.9	Protected forests	Area of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements, according to MCPFE categories
	4.10	Common forest bird species	Occurrence of common breeding bird species related to forest ecosystems
Criterion 5: Maintenance and Appropriate Enhancement of Protective Functions in Forest Management (notably soil and water)	C.5	Policies, institutions and instruments to maintain and appropriately enhance of the protective functions in forest management	
	5.1	Protective forests – soil, water and other ecosystem functions - infrastructure and managed natural resources	Area of forest and other wooded land designated to prevent soil erosion, preserve water resources, maintain other protective functions, protect infrastructure and managed natural resources against natural hazards
Criterion 6: Maintenance of other socioeconomic functions and conditions	C.6	Policies, institutions and instruments to maintain other socioeconomic functions and conditions	
	6.1	Forest holdings	Number of forest holdings, classified by ownership categories and size classes
	6.2	Contribution of forest sector to GDP	Contribution of forestry and manufacturing of wood and paper products to gross domestic product
	6.3	Net revenue	Net revenue of forest enterprises
	6.4	Investments in forests and forestry	Total public and private investments in forests and forestry
	6.5	Forest sector workforce	Number of persons employed and labour input in the forest sector, classified by gender and age group, education and job characteristics
	6.6	Occupational safety and health	Frequency of occupational accidents and occupational diseases in forestry
	6.7	Wood consumption	Consumption per head of wood and products derived from wood
	6.8	Trade in wood	Imports and exports of wood and products derived from wood
	6.9	Wood energy	Share of wood energy in total primary energy supply, classified by origin of wood
	6.10	Recreation in forests	The use of forests and other wooded land for recreation in terms of right of access, provision of facilities and intensity of use

Σ 34 quantitative indicators + 11 qualitative indicators (total 45 indicators)