

Contextual review of sustainability criteria

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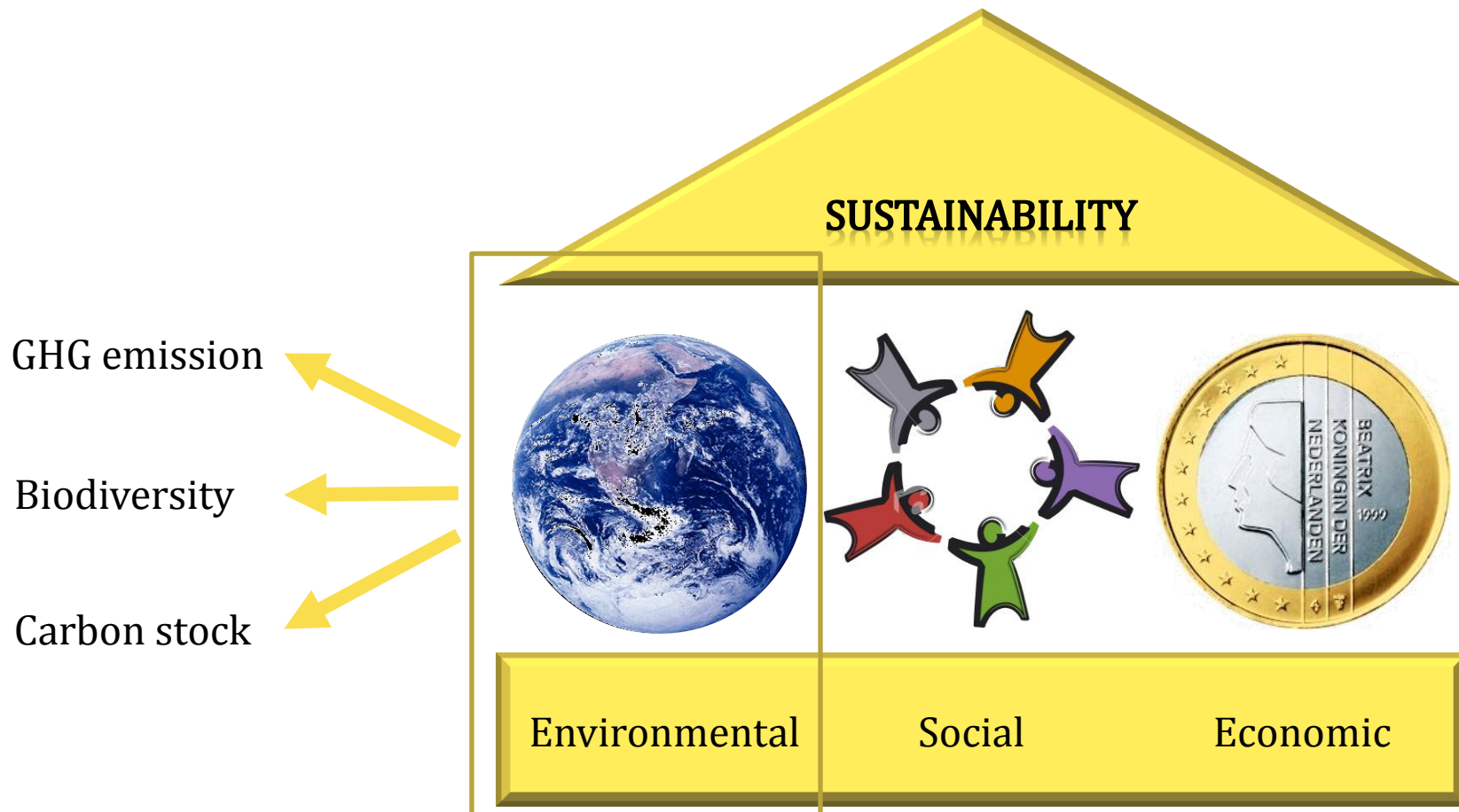
Training date

Training place



2 What is sustainability?

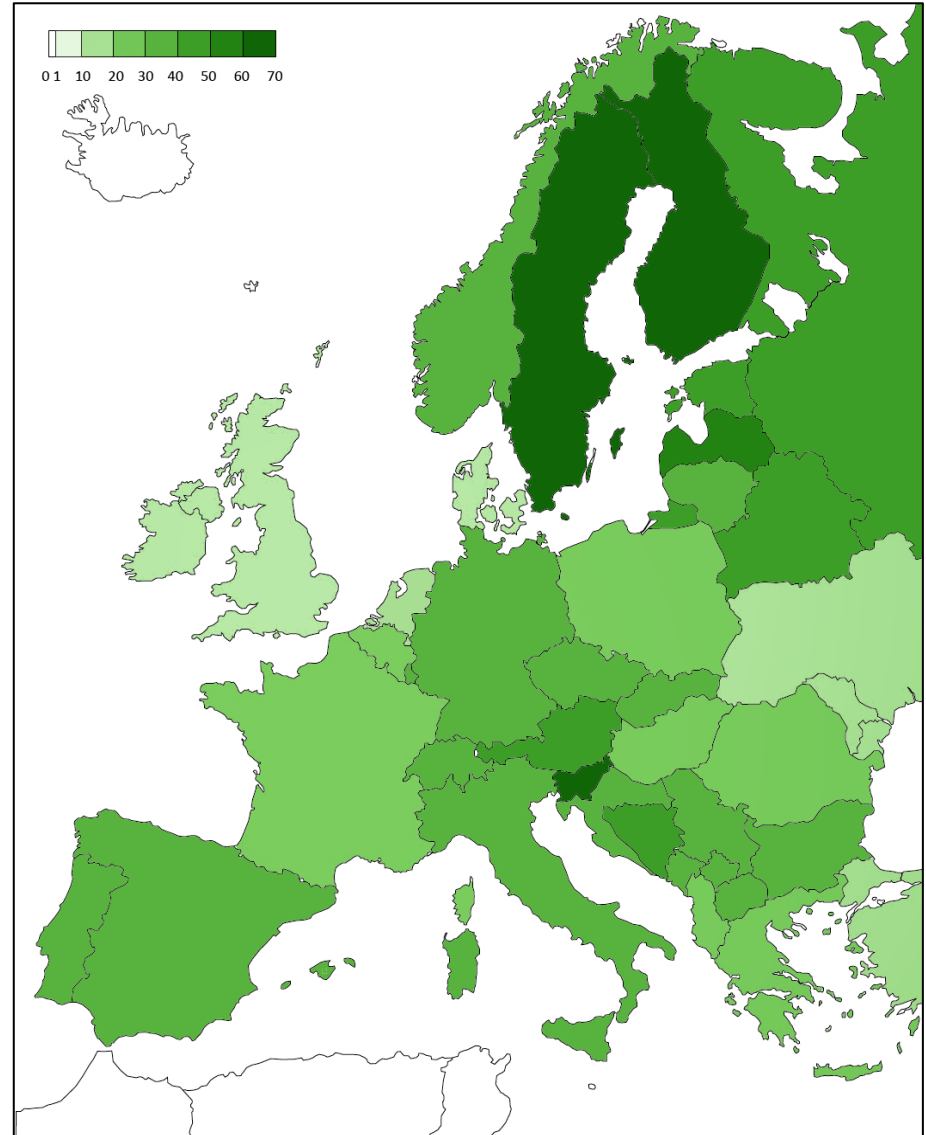
"development which meets the needs of current generations without compromising the ability of future generations to meet their own needs"
(The United Nation Brundtland Commission's report)



3 Distribution of forests

Distribution of forests in Europe and Turkey (percentage of forest per total land area).

* North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: FAO, 2010)

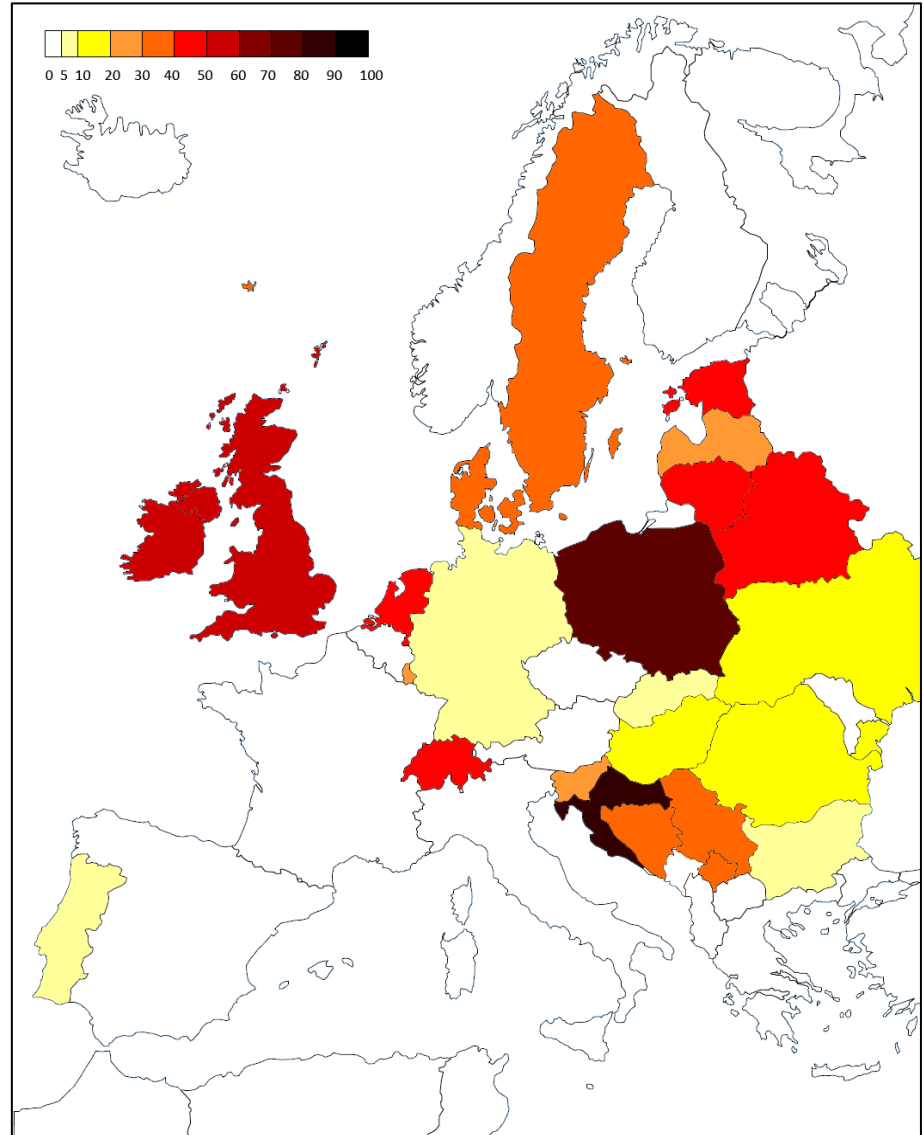


4 Coverage of FSC certification



Coverage of FSC in Europe and Turkey (percentage of certified forest per total land area).

* North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: FSC, 2012; Data as of June 2012)

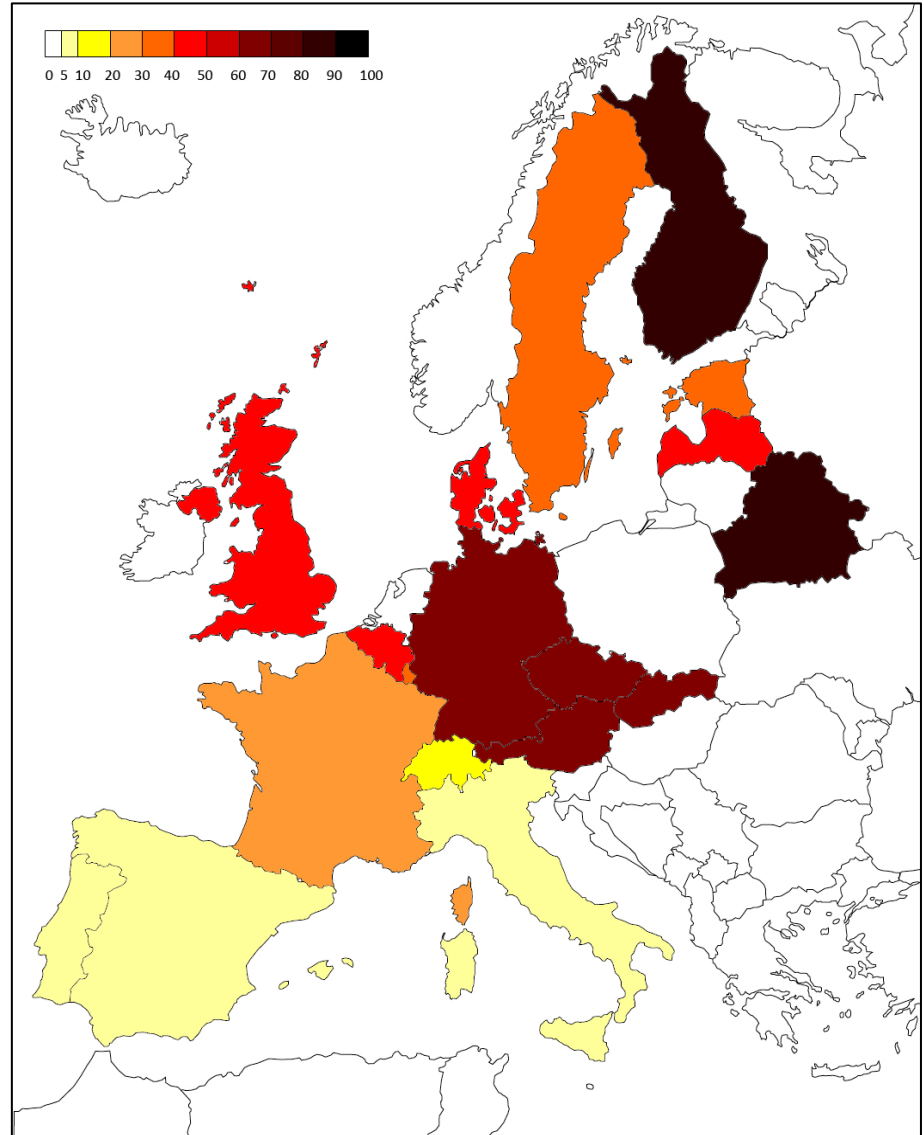


5 Coverage of PEFC certification



Coverage of PEFC in Europe and Turkey
(percentage of certified forest per total land area).

* North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: PEFC, 2012; Data as of June 2012)



6 Sustainability criteria for bioenergy



EC recommendation

1. Reduction in greenhouse gas emissions
2. Preservation of primary forest and other wooded areas
3. Preservation of protected areas
4. Preservation of grassland with high biodiversity values
5. Preservation of wetlands
6. Preservation of permanently wooded areas
7. Preservation of lightly wooded areas
8. Preservation of peatlands

7 Reduction in greenhouse gas emissions



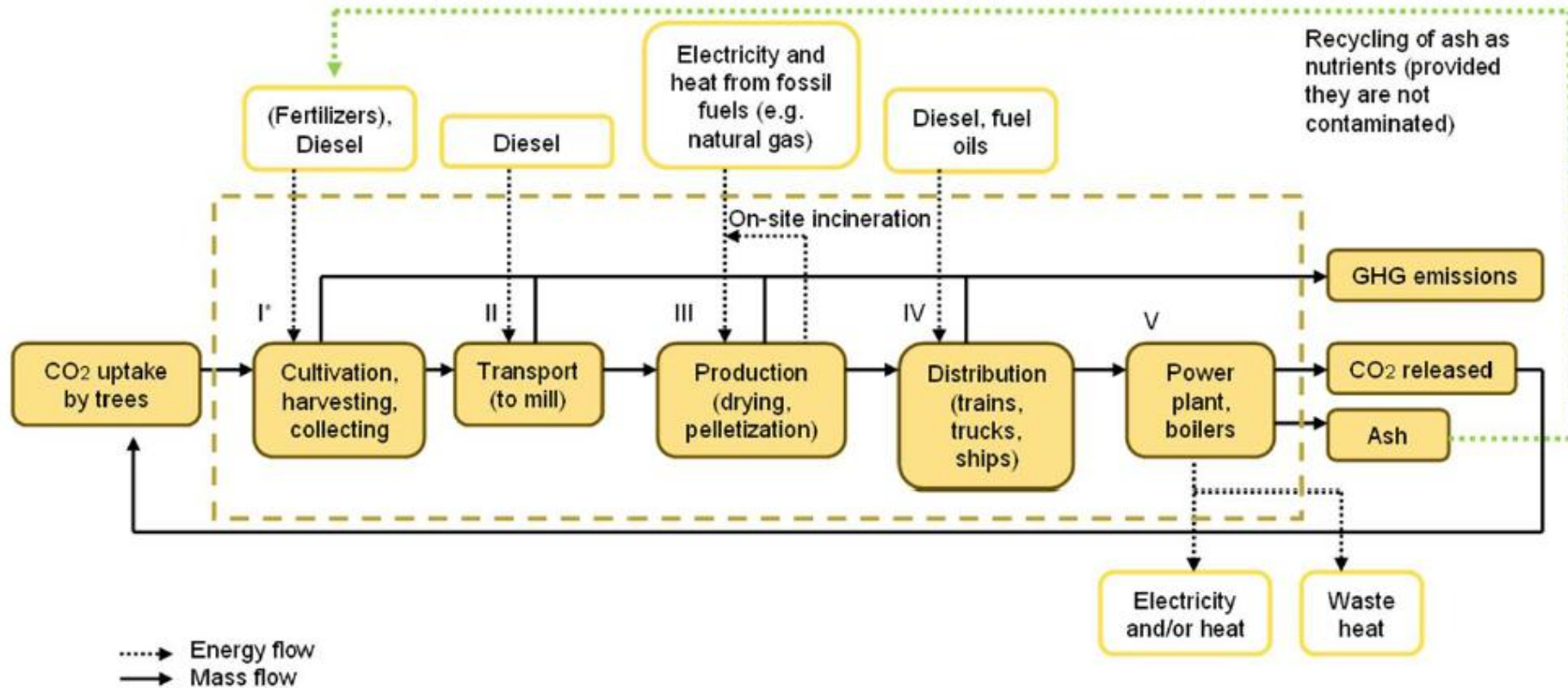
- Accounting of greenhouse gas emissions due to activity related to energy use and along the supply chain (waste management, agricultural production, and land use and forestry management) are required for reporting.
- These gases include CO₂, N₂O and CH₄. The following figure shows the flow chart of carbon emission along the bioenergy system compared with fossil energy system.
- There are various GHG calculation tools available for different sectors (or cross sectors) and different parts of the supply chain.
- The explanation for GHG and energy balances is adapted from another report of Solidstandards (Goh and Junginger, 2011). It is available at:
http://www.solidstandards.eu/images/modules/solidstandards_module-sustainability_eng.pdf

8 Reduction in greenhouse gas emissions



Emission and energy flow of a typical pellet chain and bioenergy power generation (* for energy crops only)

(Source: Solidstandards Sustainability Training Module)



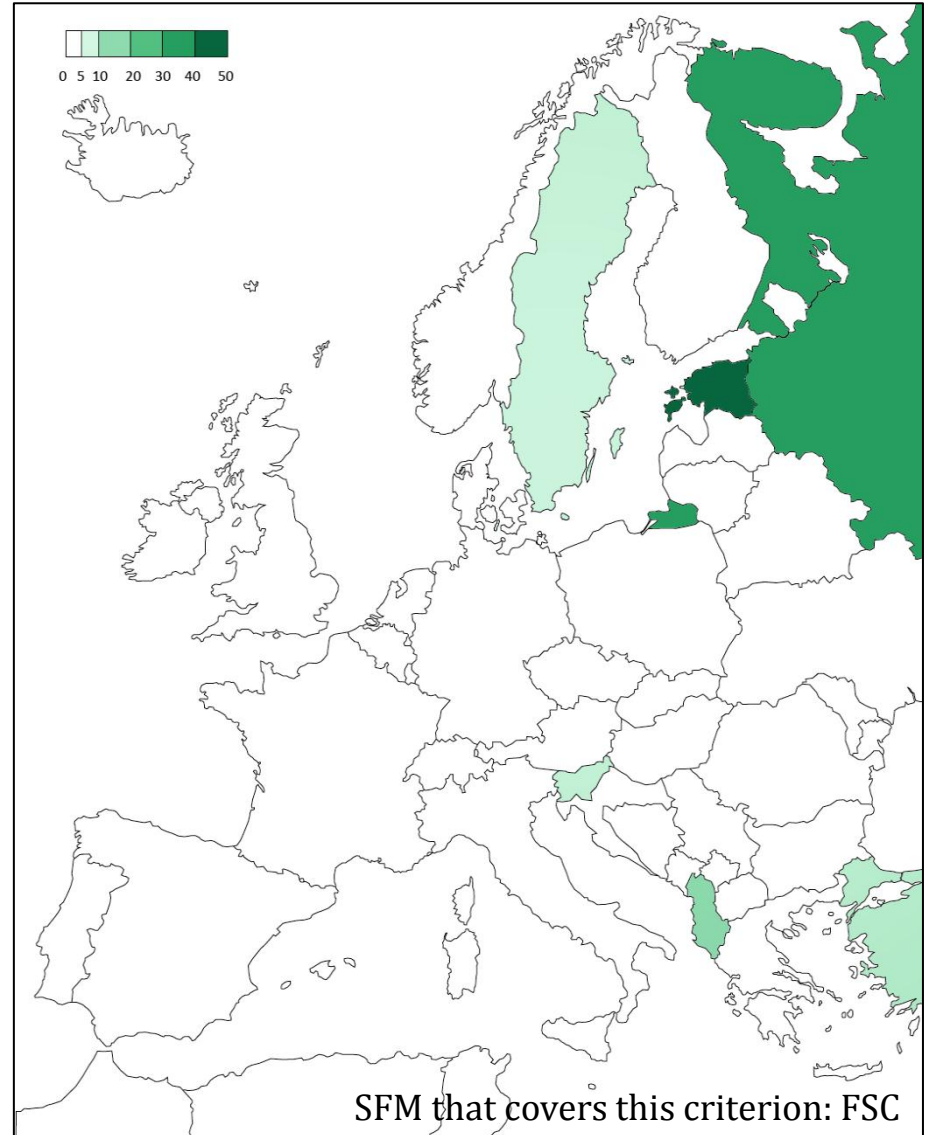
9 Preservation of primary forest and other wooded land

Distribution of primary forests in Europe and Turkey (percentage of primary forest area per total forest area)

(Source: FAO, 2010)

Countries	% of area / total forests area	
	Primary forests	FSC certified area
Estonia	43.5	24.5
Russia	31.7	1.7
Sweden	9.3	25.7
Slovenia	8.7	12.8
Turkey	8.6	0.1

- As examined in D5.1-2, FSC fully covers the preservation of primary forests.
- Although Estonia has the largest percentage of primary forest per total forest area, it is moderately covered by FSC.
- However, the country with second largest proportion of primary forest per total forest, i.e. Russia, has negligible area of forest certified.



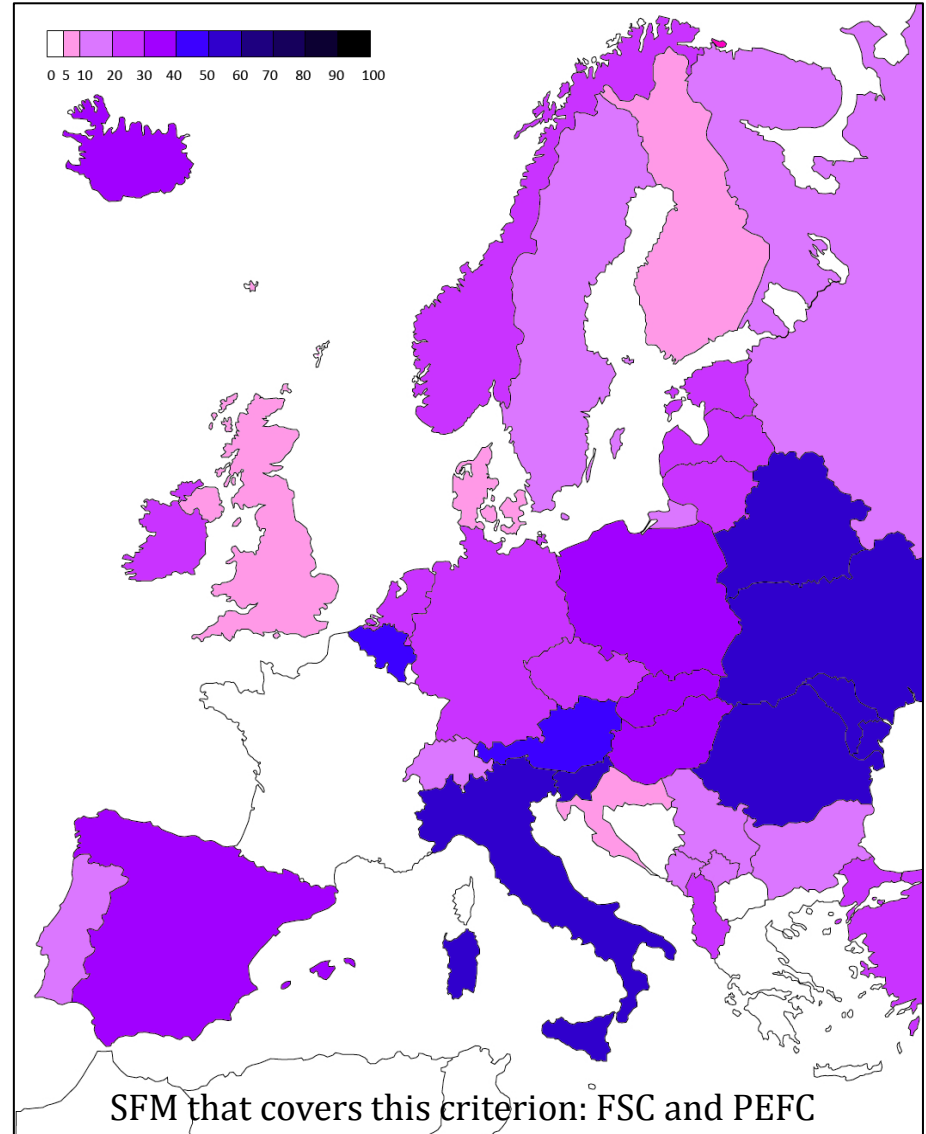
10 Preservation of protected areas

Distribution of forest area designated for protection of soil and water, conservation of biodiversity, and social services in Europe and Turkey (percentage of protected forest area per total forest area)

* North Africa, Cyprus and countries smaller than Luxembourg are not included

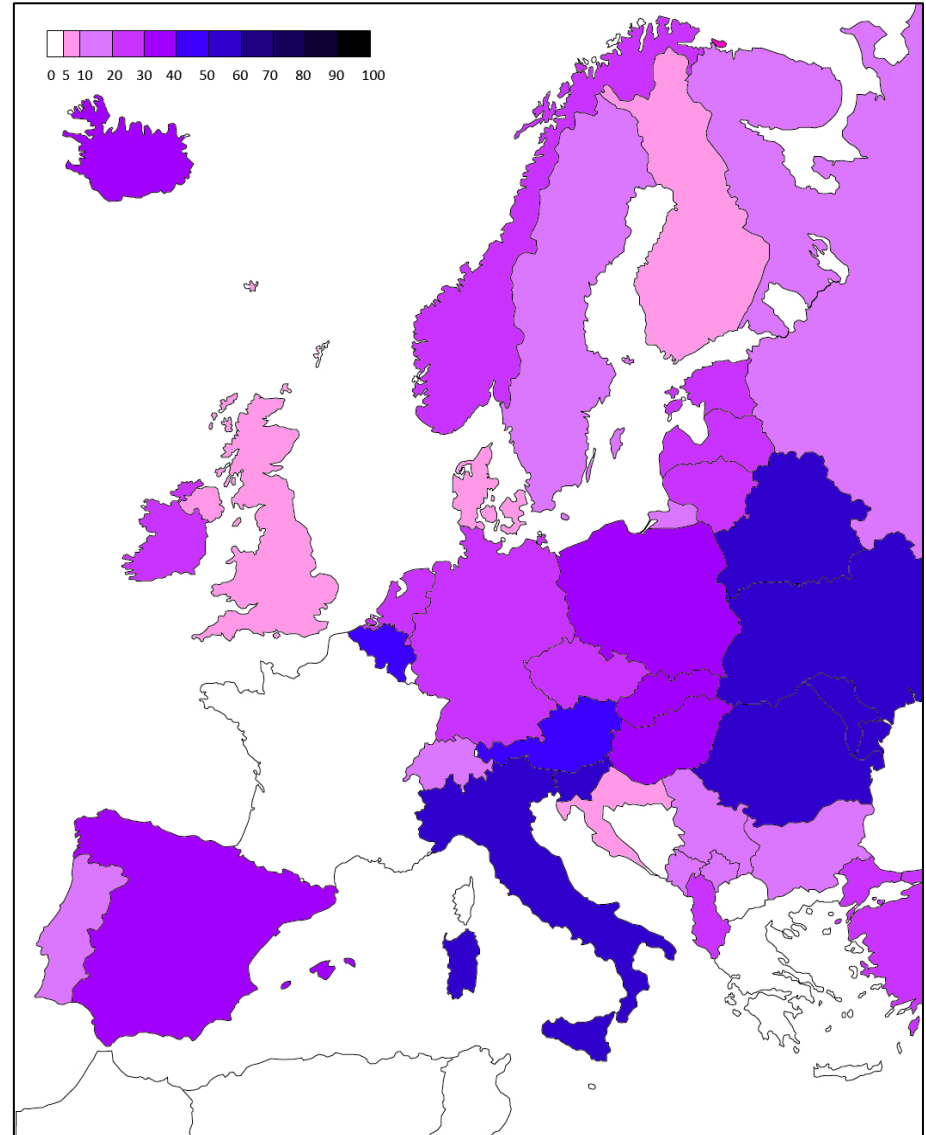
(Source: FAO, 2010)

Countries	% of area / total forests area		
	Protected forests	FSC certified area	PEFC certified area
Slovenia	58.0	20.3	0.0
Italy	56.0	0.5	7.0
Ukraine	54.0	14.9	0.0
Moldova	53.0	0.0	0.0
Belarus	50.0	40.5	90.3
Romania	50.0	10.6	0.0
Belgium	46.0	2.8	40.9
Austria	41.0	0.0	63.7



11 Preservation of protected areas

- Italy, Moldova, Ukraine and Romania have relatively large percentage of protected forests but not well covered by the schemes.
- Some protected forest areas in Europe are designated to conserve forest biological diversity without direct human intervention (MCPFE class 1.1). These are often primary forests and wilderness areas in Eastern and Northern Europe, especially in Sweden, Slovakia and Bulgaria.
- Some protected forests designated for the conservation of forest biological diversity are managed allowing a minimum of human intervention (MCPFE class 1.2). These characteristics often apply to core zones of national parks. The largest areas of these protected forests are located in Northern as well as Eastern Europe.
- Most of the protected forest areas are actively managed to conserve biological diversity (MCPFE class 1.3), covering 79% of Europe's protected forests (MCPFE, 2011).

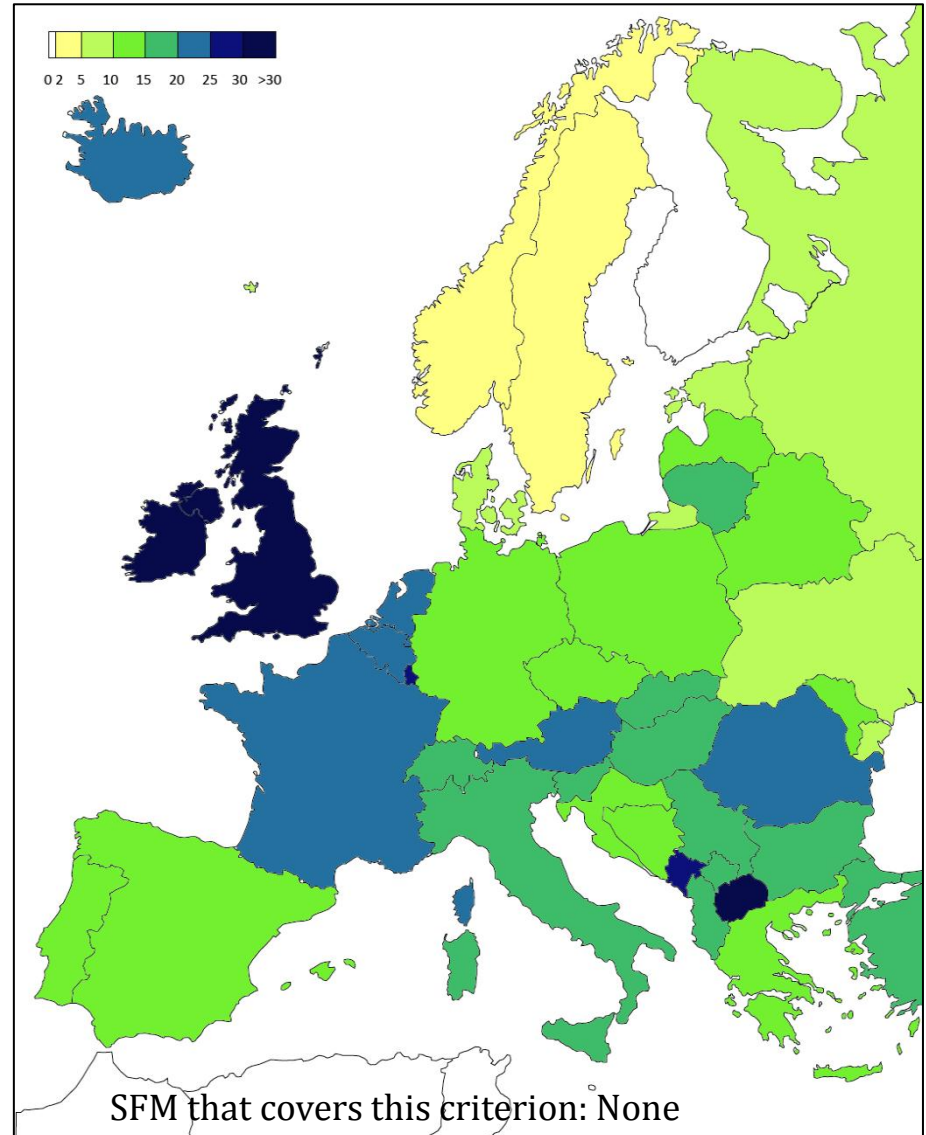


12 Preservation of grassland with high biodiversity value

Distribution of grasslands (permanent and temporary) in Europe and Turkey (percentage of total grassland per country land area)

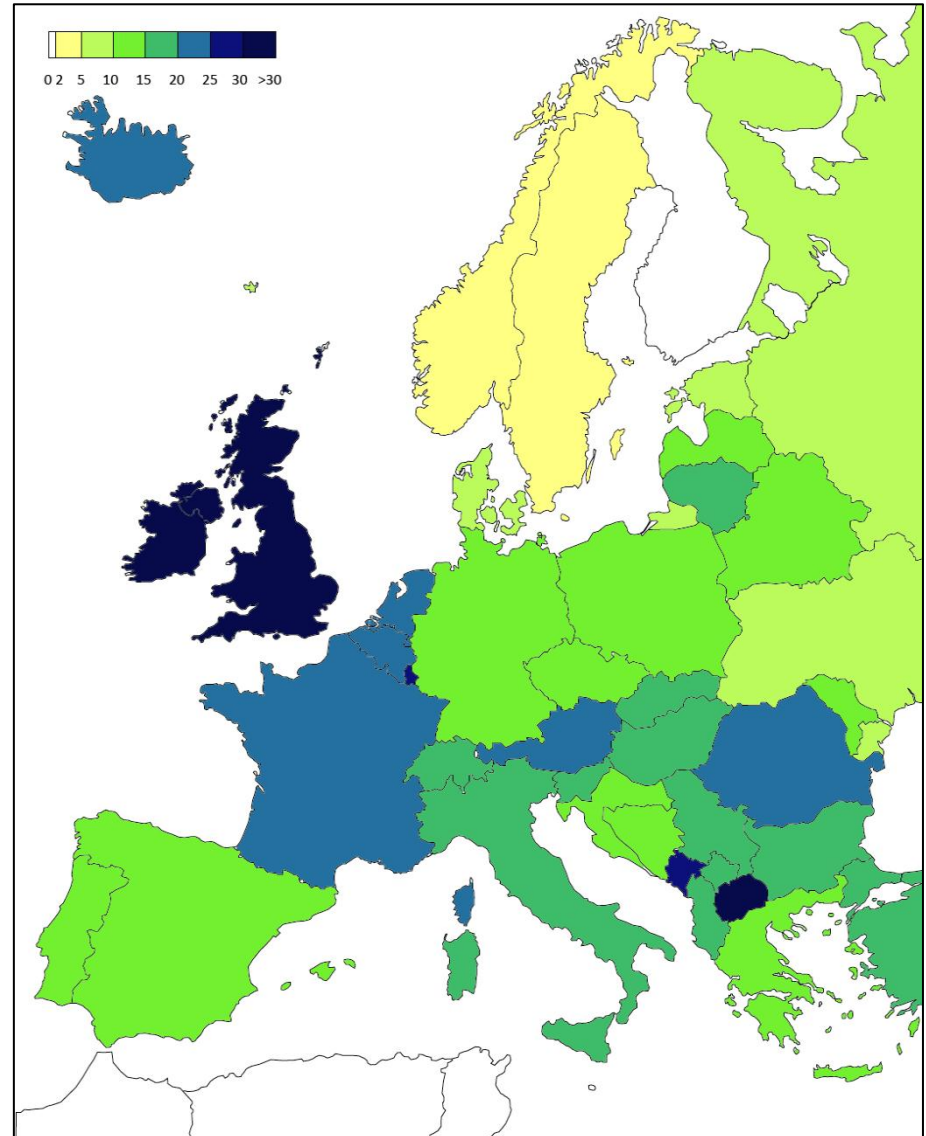
North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: Smit et al., 2008)

Countries	Grasslands area / total land area (%)	Grasslands area (million ha)
Russia	5.53	94.50
Turkey	17.4	13.6
France	23.2	12.7
United Kingdom	45.6	11.2
Spain	14.1	7.1
Ukraine	8.9	5.4
Germany	14.9	5.3
Romania	20.7	4.9
Italy	16.0	4.8
Ireland	56.1	3.9
Poland	12.4	3.9



13 Preservation of grassland with high biodiversity value

- The RED criterion has the purpose to preclude the establishment of plantation forest on land that was previously grasslands with high biodiversity, and therefore it is not relevant to natural production forest.
- However, none of the forest management schemes assessed cover this criterion.
- Russia, Turkey, France, and the United Kingdom have large area of grasslands.



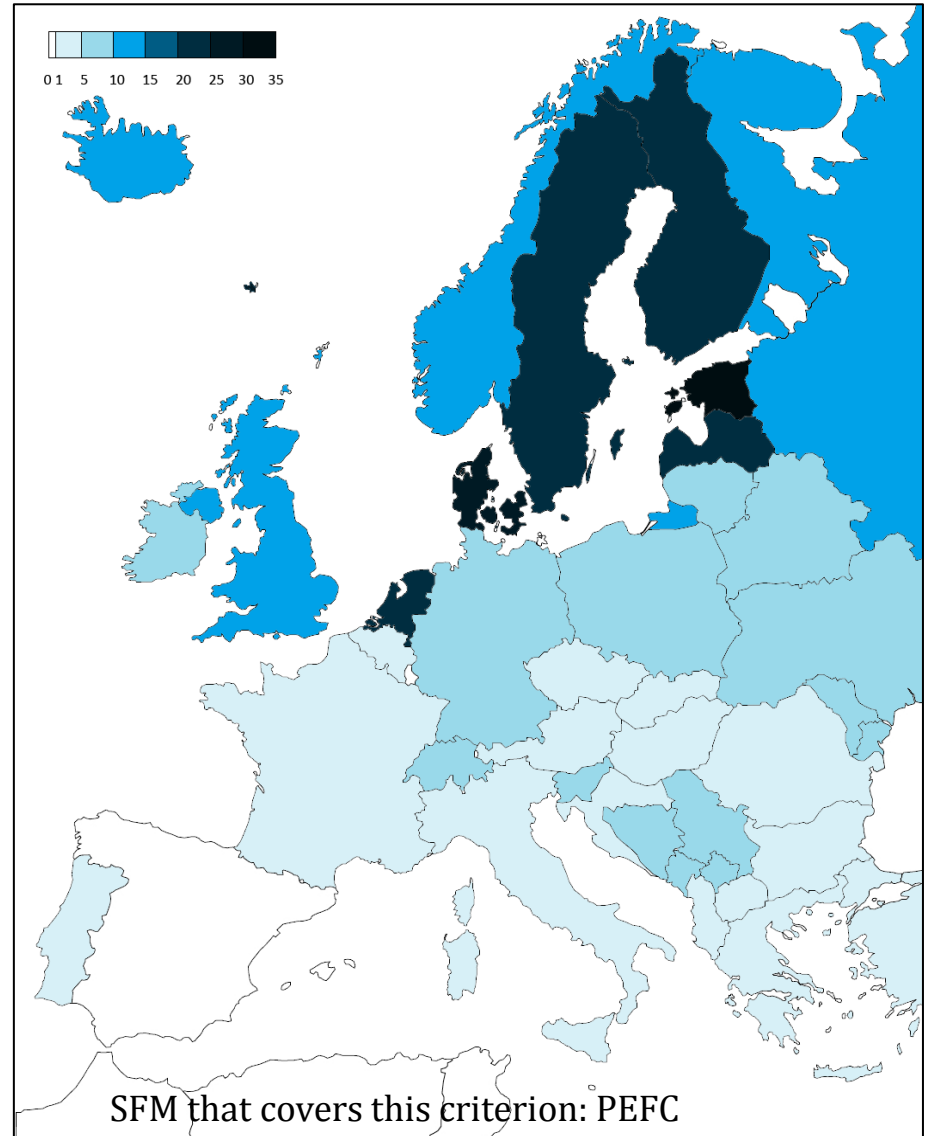
14 Preservation of wetlands



Distribution of wetlands in Europe and Turkey (percentage of wetlands per country total land area)

* North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: Nivet & Frazier, 2004)

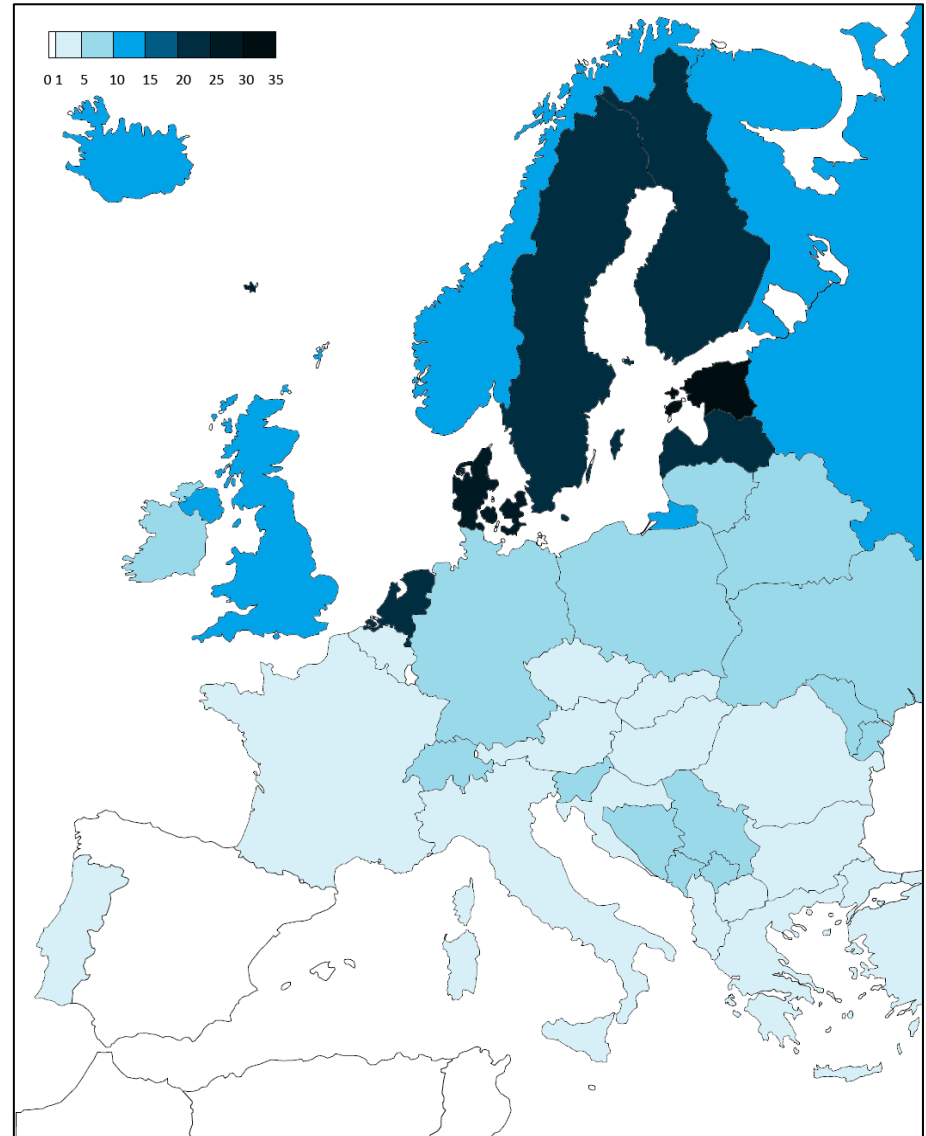
What are wetlands? Wetlands are areas where water is the primary factor controlling the environment and the associated plant and animal life....



15 Preservation of wetlands

Countries	Wetlands area (million ha)	Wetlands area per total land area (%)	PEFC certified forests (million ha)
Russia	218.7	12.8	0.6
Sweden	11.1	24.6	11.0
Finland	8.4	24.8	21.1
Norway	3.5	10.7	9.1
Ukraine	3.2	5.3	0
United Kingdom	3.0	12.3	1.3
Turkey	2.3	2.9	0
Germany	2.2	6.0	7.4

- According EEA, 49% of the change in wetland areas between 2000 and 2006 was due to forest creation and management (in 25 European countries)
- In Europe, large part of wetlands are forested – they are forested peatland Ramsar sites with boreal systems, mainly in Estonia, Finland and Sweden (Blumenfeld et al., 2009).
- Countries around the Baltic sea have large area of wetlands. Nevertheless, the coverage of PEFC (which is considered that it includes the wetlands conservation criteria) in this region is relatively low.



16 Preservation of permanently wooded areas



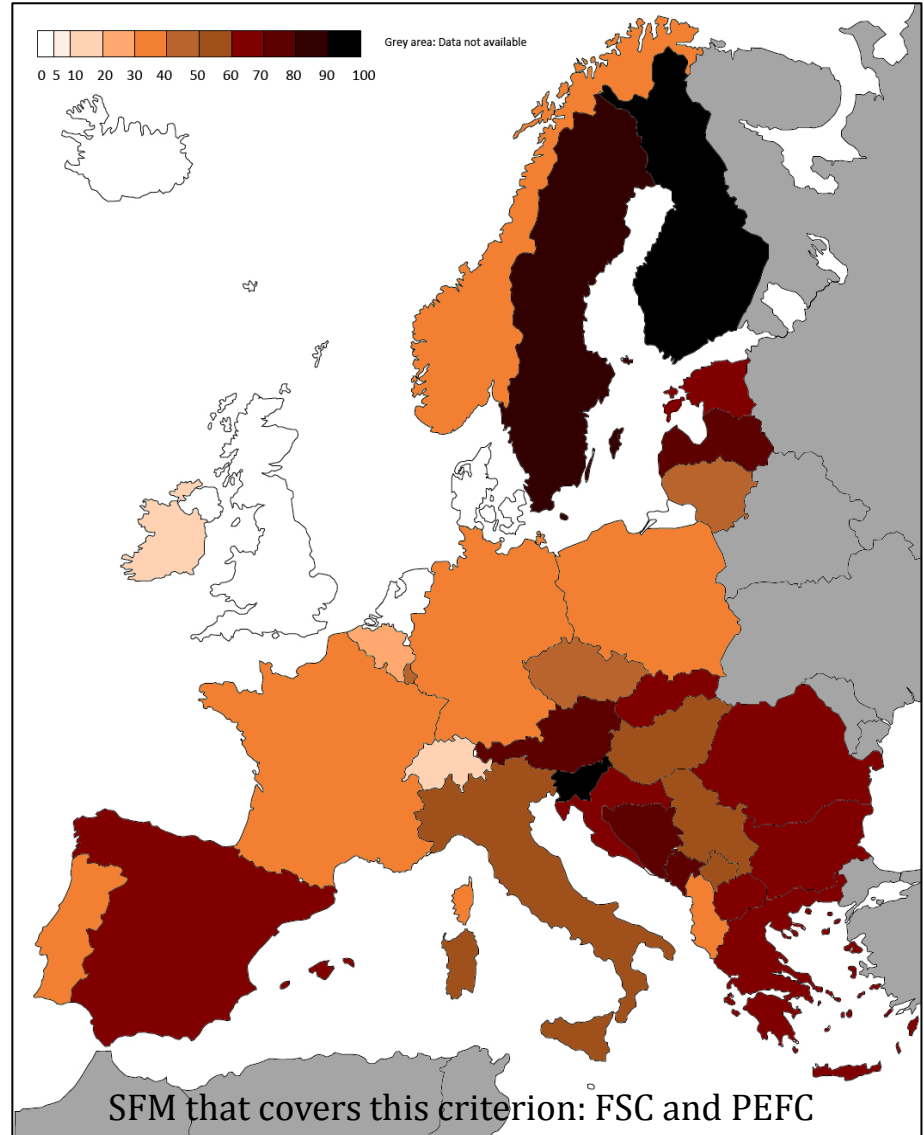
Distribution of forests in Europe and Turkey with excluding area with less than 25% forest coverage per km2 (percentage of forest per total forest area)

* North Africa, Cyprus and countries smaller than Luxembourg are not included

(Source: Constructed based on Fig. 1 and Fig. 15)

Note: This figure is made only for indication and does not intend to give exact values. Data for lightly wooded area with 25 – 30% canopy cover are not available.

	Forests area with coverage >25% per km ² (million ha)	Percentage per total forest area (%)	FSC certified area per total forest area (%)	PEFC certified area per total forest area (%)
Sweden	24.7	87.6	25.7	24.4
Finland	20.2	91.1	1.2	62.3
Spain	10.9	60.2	0.3	3.0
France	6.1	38.0	0.0	7.8
Italy	5.2	56.6	0.2	2.5
Romania	4.5	68.6	3.0	0.0
Germany	4.2	37.7	1.8	20.7
Poland	3.6	39.0	22.3	16.1
Norway	3.4	33.8	0.9	28.2

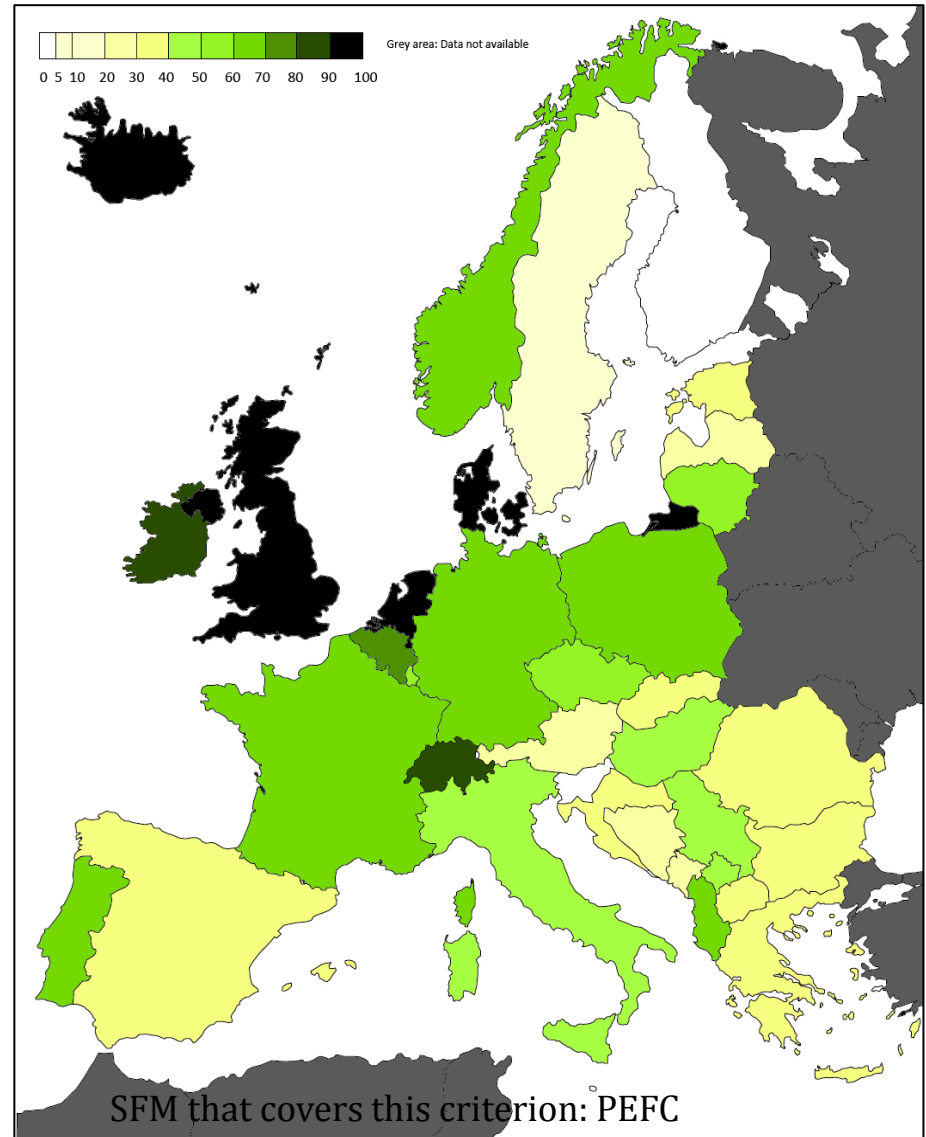


17 Preservation of lightly wooded areas

Distribution of lightly wooded area (10 – 25% forest per 1 km²) per total forest area

*North Africa, Cyprus and countries smaller than Luxembourg are not included
 Note: This figure is made only for indication and does not intend to give exact values
 (Constructed based on data extracted from EEA (2009))

Countries	Area of lightly wooded forests (10-25% per km ²) (million ha)	Percentage per total forest area	PEFC certified area per total forest area (%)
France	9.9	62.0	7.8
Spain	7.2	39.8	3.0
Germany	6.9	62.3	20.7
Norway	6.7	66.2	28.2
Poland	5.7	61.0	16.1
Italy	4.0	43.4	2.5
Sweden	3.5	12.4	24.4
United Kingdom	2.9	100.0	5.3
Portugal	2.1	60.8	2.3
Romania	2.1	31.4	0.0

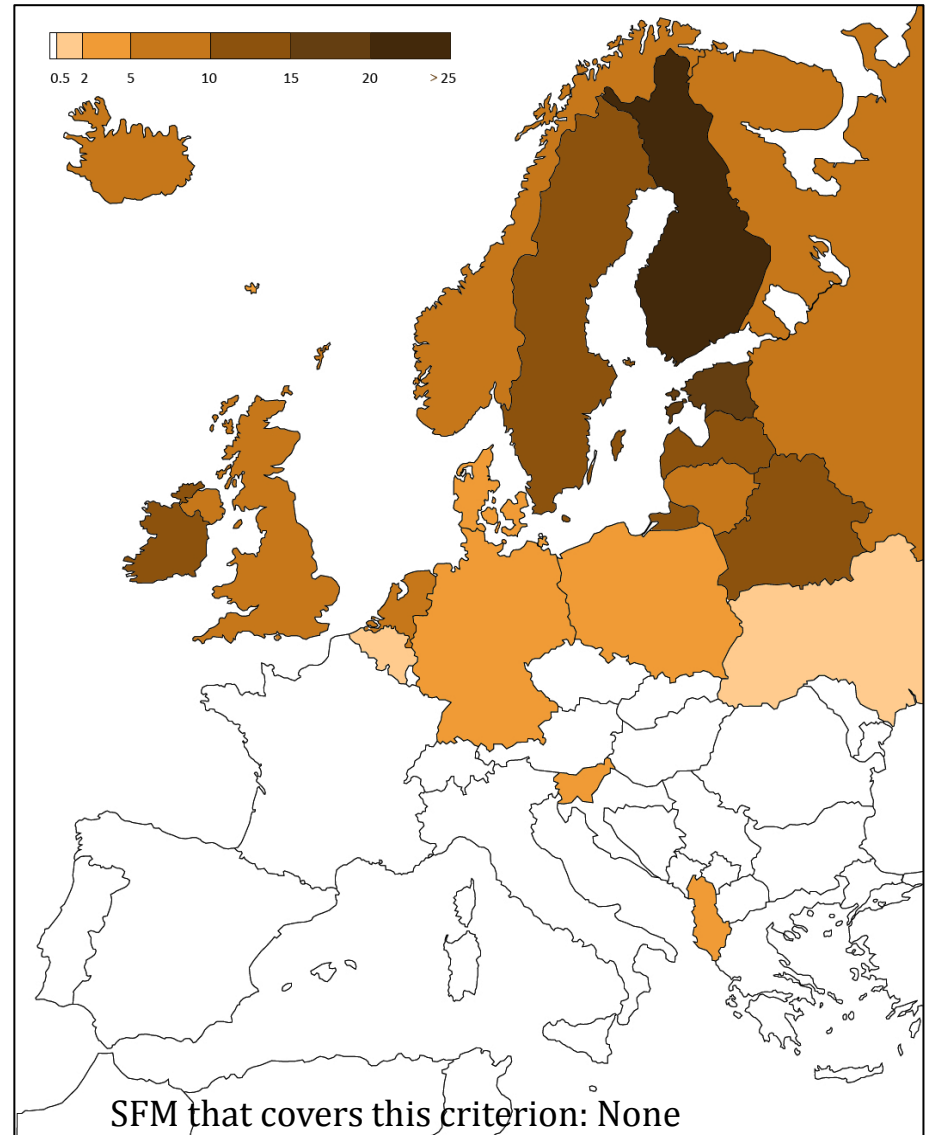


18 Preservation of peatlands

Distribution of peatlands in Europe (percentage of peatlands per country total land area)

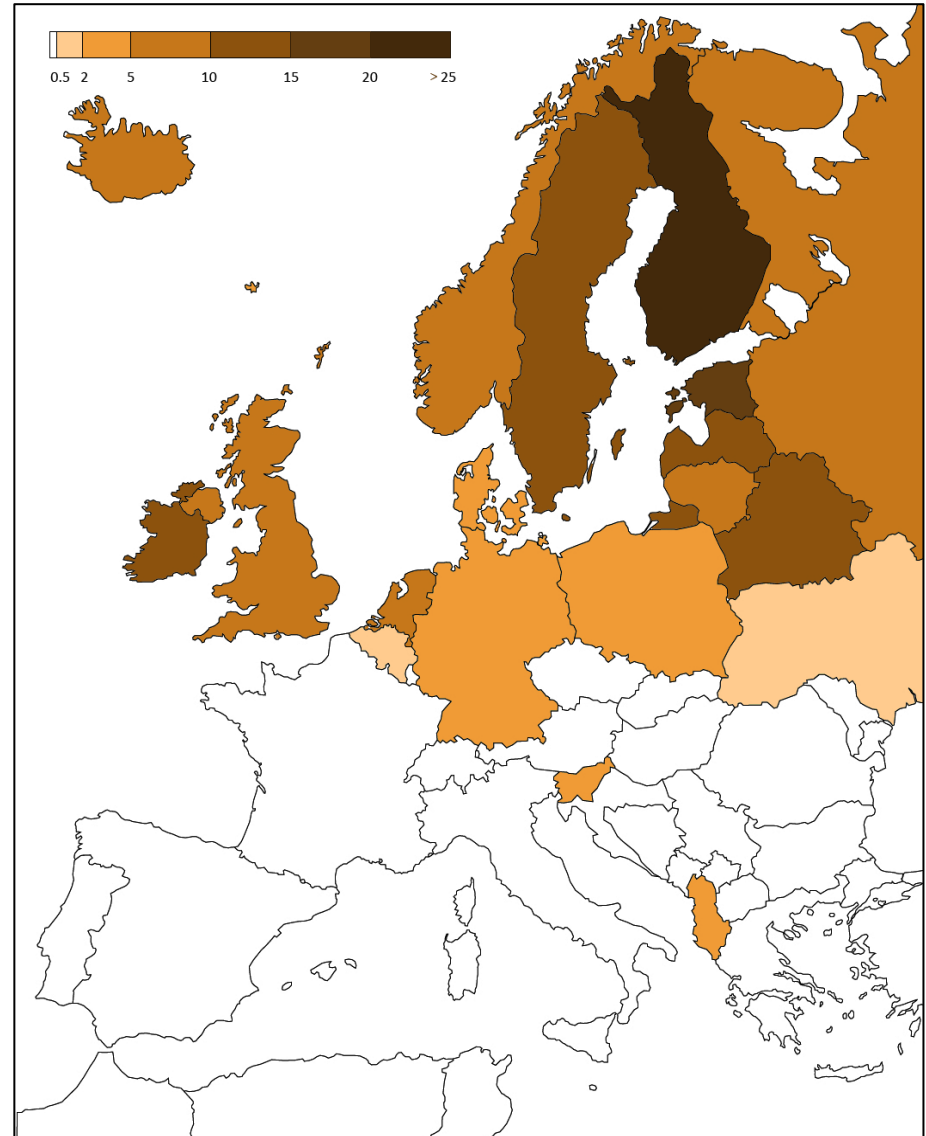
*North Africa, Cyprus and countries smaller than Luxembourg are not included
(Source: Parish et al., 2008; IPS, 2012a; cross-checked both references and the largest values taken)

Countries	Peatlands area / total land area (%)	Peatlands area (million ha)
Russia	5 - 10	85.38 - 170.75
Netherlands	5 - 10	0.21 - 0.42
Ireland	>10	> 0.70
Latvia	>10	> 0.64
Finland	26.3	8.9
Sweden	14.2	6.4
Belarus	11.6	2.4
Norway	7.4	2.4
United Kingdom	7.1	1.75
Germany	3.9	1.4
Poland	3.8	1.2
Iceland	9.7	1
Estonia	19.9	0.9



19 Preservation of peatlands

- Peat is a heterogeneous mixture of more or less decomposed plant (humus) material that has accumulated in a water-saturated environment and in the absence of oxygen.
- A peatland is an area with or without vegetation with a naturally accumulated peat layer at the surface (IPS, 2012b). Therefore, the distribution of peatlands is closely related to that of wetlands.
- Countries surrounding the Baltic Sea are bestowed rich resources of peatlands. In fact, peats have been used as solid fuels over the years.



Thank you

Kindly refer to Solidstandards WP D5.1-3 for more details, including the full data set.

Deliverables: Solidstandards WP5 D5.1-4
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