universität freiburg

The political and socio-economic factors of forest resilience in Europe

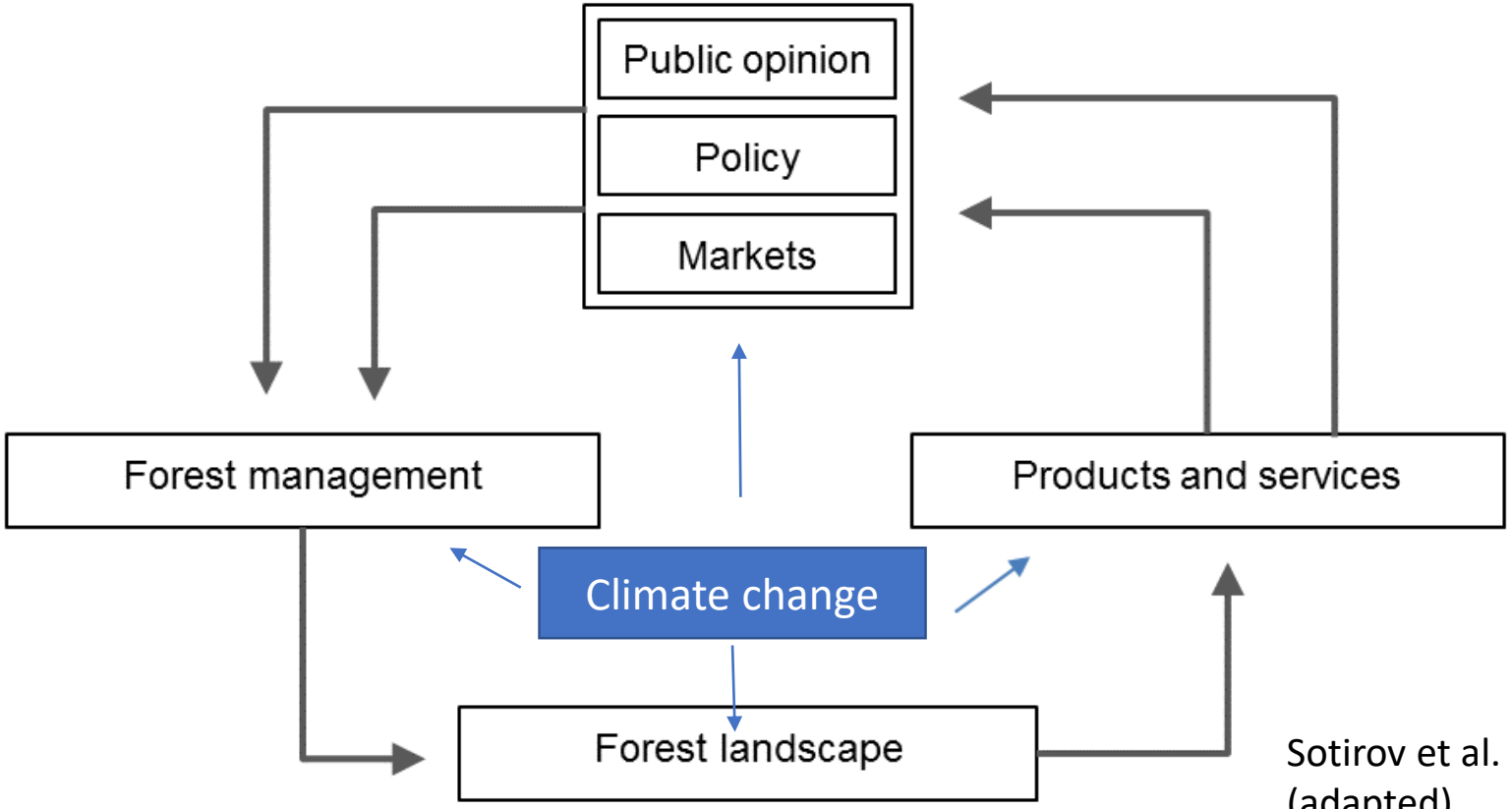
Metodi Sotirov

(with Špela Malovrh, Ragnar Jonsson, Florian Kraxner, Manfred Lexer, Anne-Christine Ritschkoff, Andreas Kleinschmit von Lengefeld)

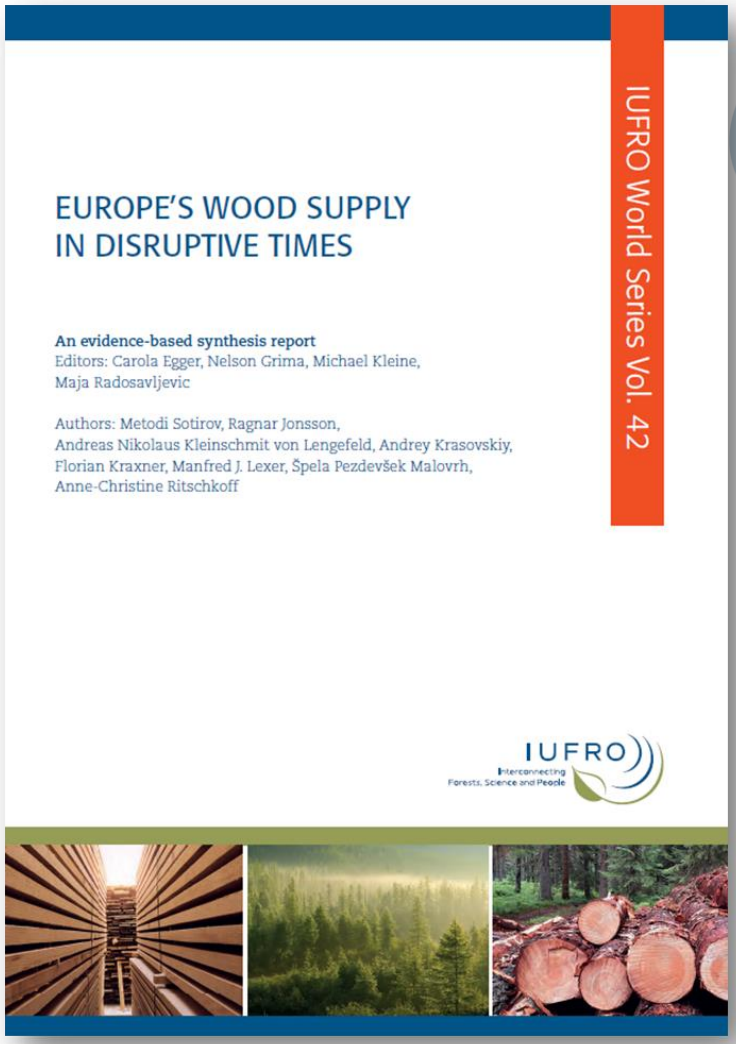
PEPR FORESTT: Session on Forest Resilience

18th September 2024, Bordeaux (online)

Introduction: forests as socio-ecological systems



Sotirov et al. 2019 (adapted)



Experts

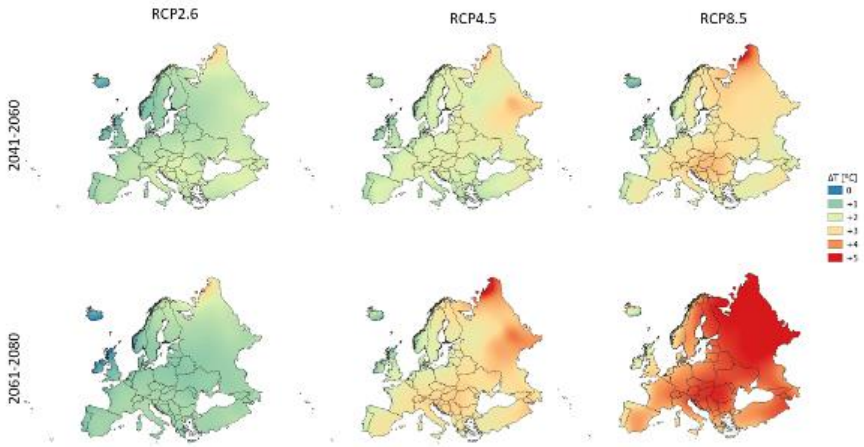
Manfred Lexer, BOKU
Florian Kraxner, IIASA
Andrey Krasovskiy ,IIASA

Current state of European forests

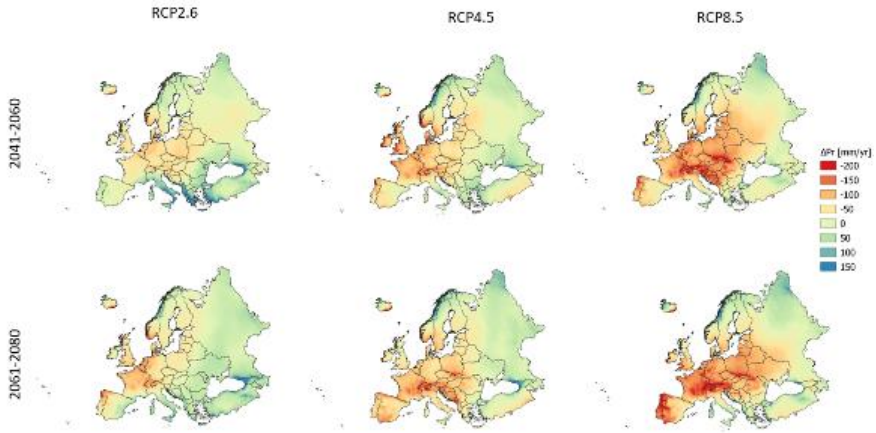
- 40% land area of EU27
- huge diversity of forest types
  - mono-species plantations
  - (mixed) semi-natural forests
- Six tree species genera represent 84% of growing stock:
  - pine (30%) & spruce (23%)
  - beech (12%) & oak (10%),
  - birch (6.6%) & fir (3.2%)
- 85% of forest area available for wood production
- increase in area and growing stock
- harvested volume per year
  ca. 450-500 mill. m^3 ub roundwood/yr

Future climate in Europe

Increase in temperatures



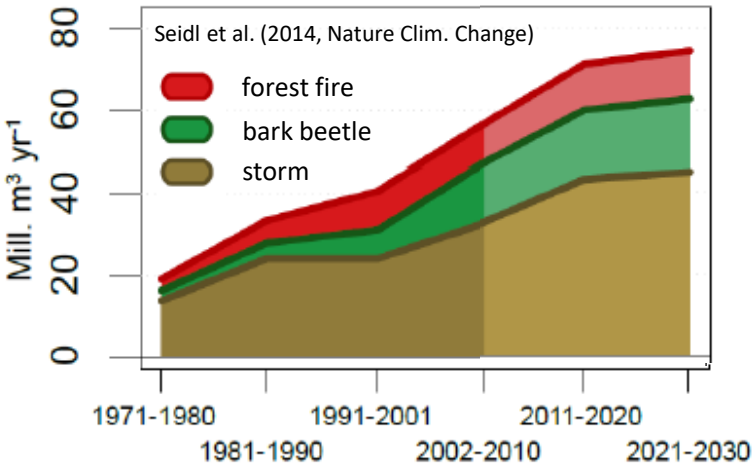
Changes in precipitation

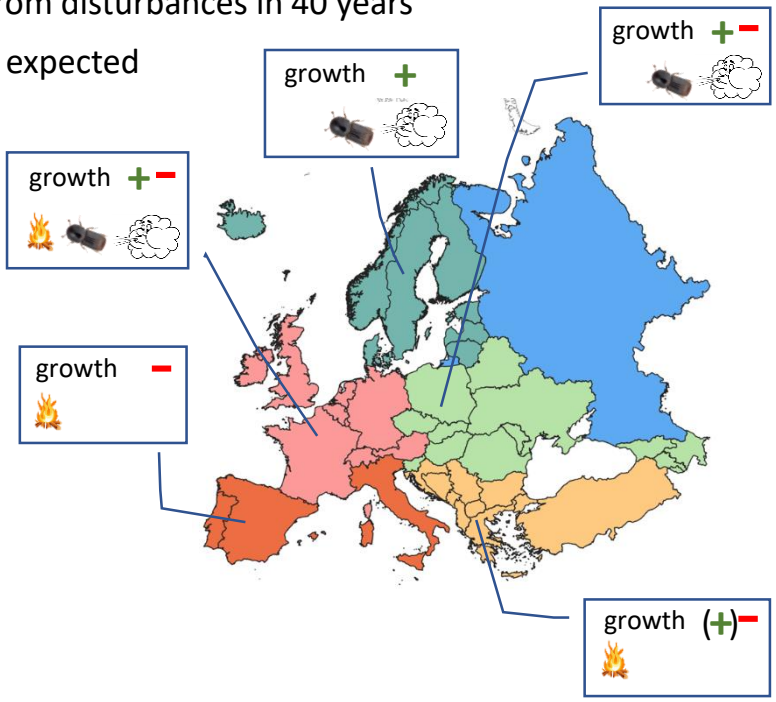


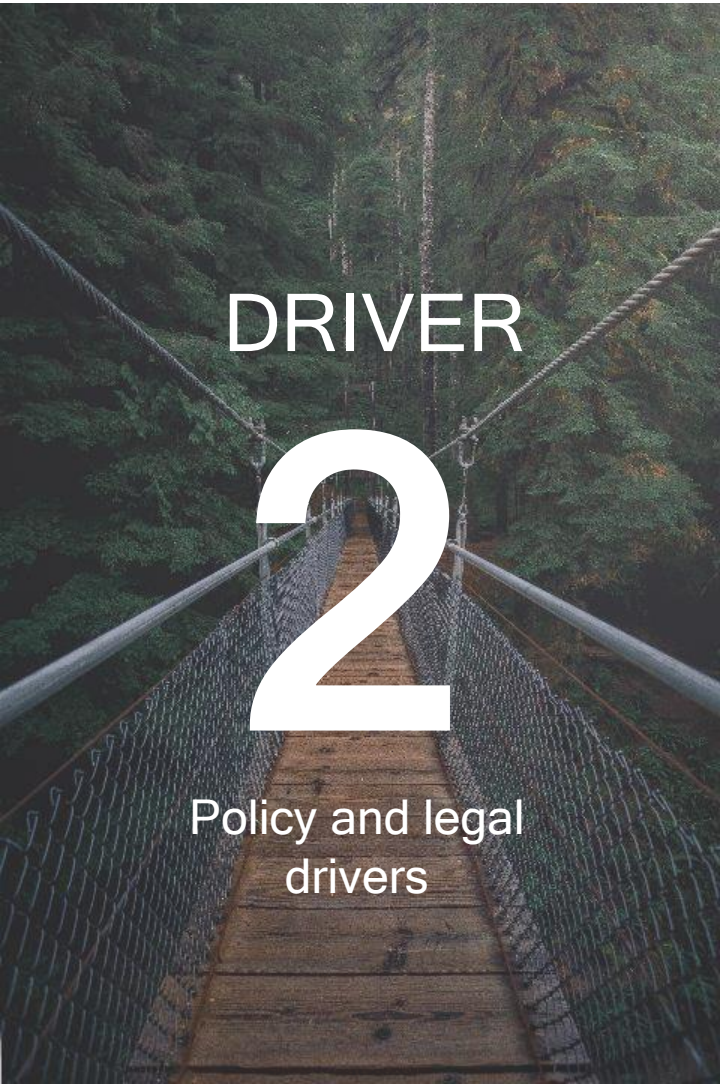
Source: IIASA, Krasovskiy and Kraxner, 2023; based on CHELSA (Brun et al., 2022)

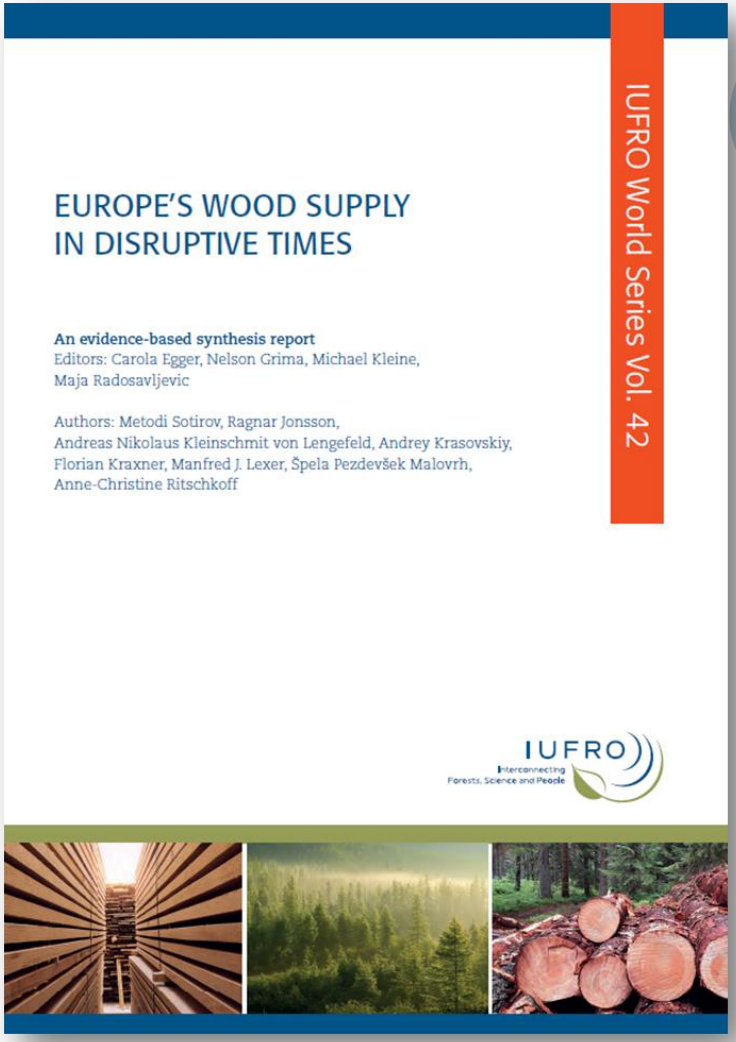
Impacts of climate change on forest resilience

- Mortality rise in European forests driven by drought (George et al. 2022)
- Previous decade had highest damages from disturbances in 40 years
- Further increase of appr. 1 mill. m^3/yr is expected
  - main driver is climate change









Experts

Metodi Sotirov, ALU
Špela Pezdevšek Malovrh, UL

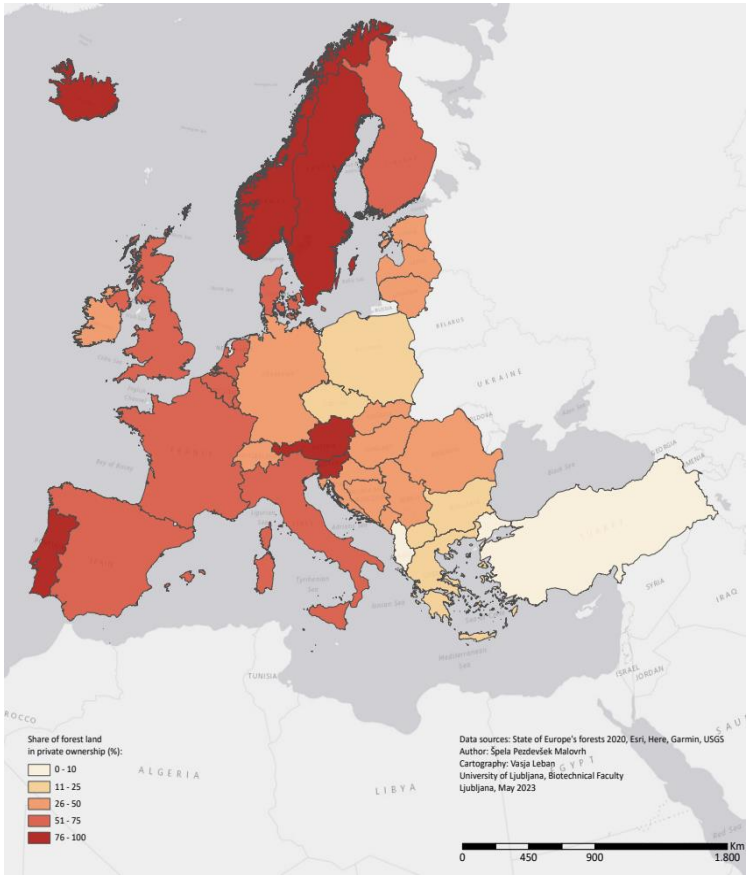
Forest policy and legal framework

Increase in wood use ⟵ ⟶ **Decrease in wood use**

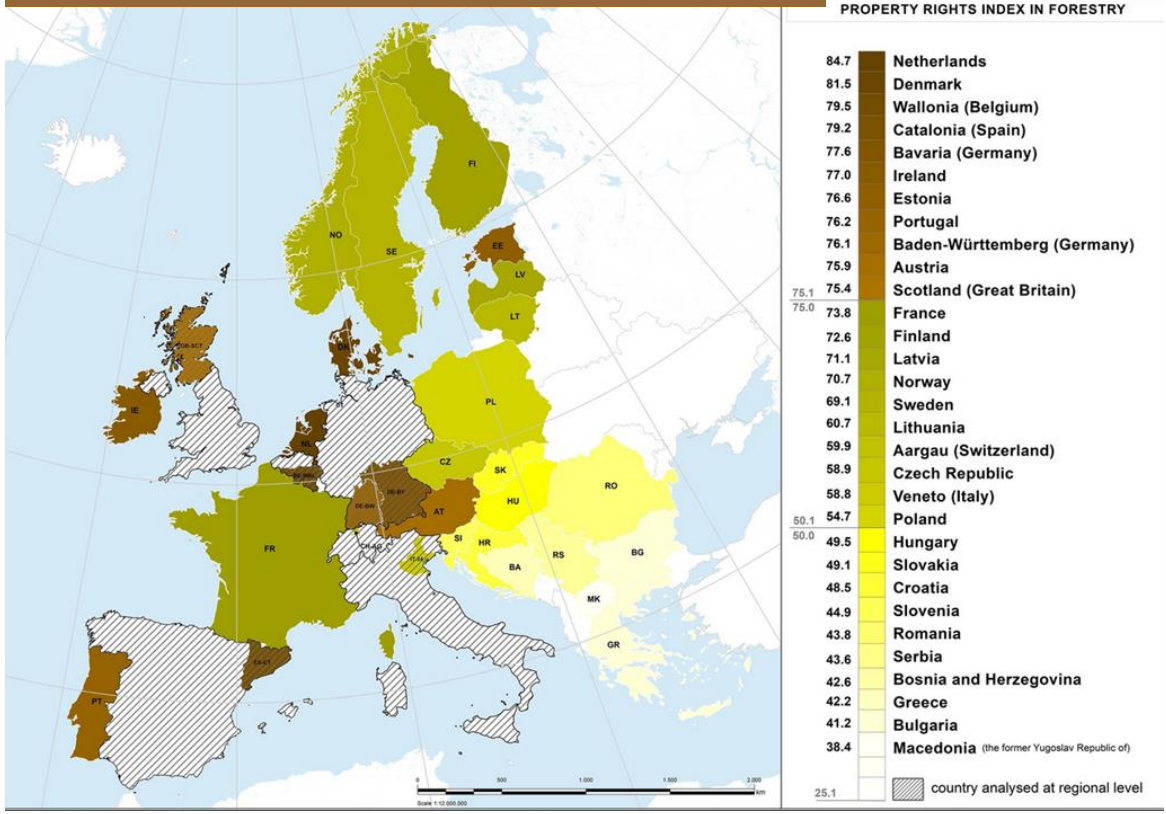
Priority / *Level*	**Bioenergy and Carbon (HWP) Forestry**	**Wood Yield Forestry**	**Multi-Purpose Forestry**	**Carbon Forest Management (Forest Sinks)**	**Forest Biodiversity Conservation**
Global		(ITTO, FLEGT)	UNFF / IAF FSC/PEFC	UNFCCC (REDD)	CBD
Pan-Europe			Forest Europe SFM C&I		
European Union	Renewable Energy Directive Bioeconomy Strategy (LULUCF)	(Bioeconomy Strategy) (EUTR/FLEGT)	CAP Rural Development Regulation (Forest Strategy)	Green Deal LULUCF Regulation Fit for 55 (Bioeconomy Strategy)	(Forest Strategy) Biodiversity Strategy Nature Restoration Law Habitats Directive Birds Directive Deforestation Regulation
National	Forest policy and law in North, Central and Eastern Europe	Forest policy and law in North & Eastern Europe	Forest policy and law in Central & Eastern Europe	Forest Policy and law in Western Europe	Forest policy and law in Western and Southern Europe

Winkel & Sotirov 2016; Sotirov & Storch 2018; Sotirov et al. 2020; Wolfslehner et al. 2020; Lindahl et al. 2023; Sotirov et al. 2024

Forest ownership and land tenure rights

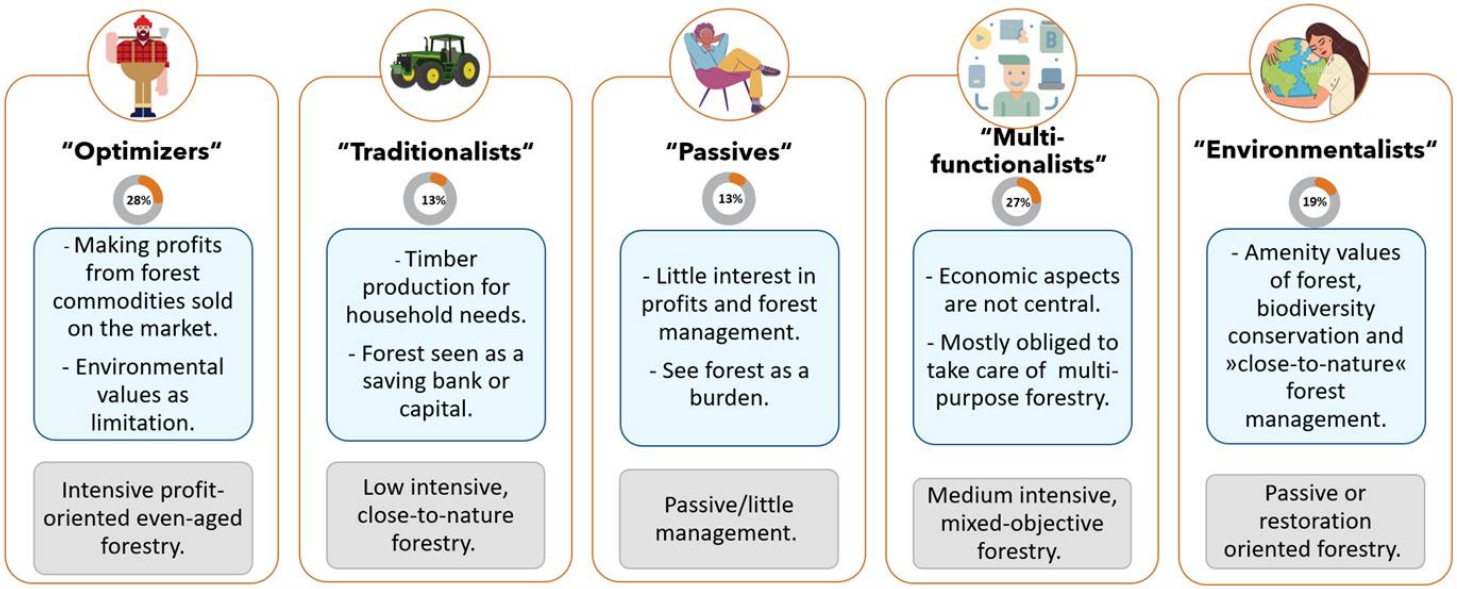


Higher emphasis on voluntary and market-based regulation

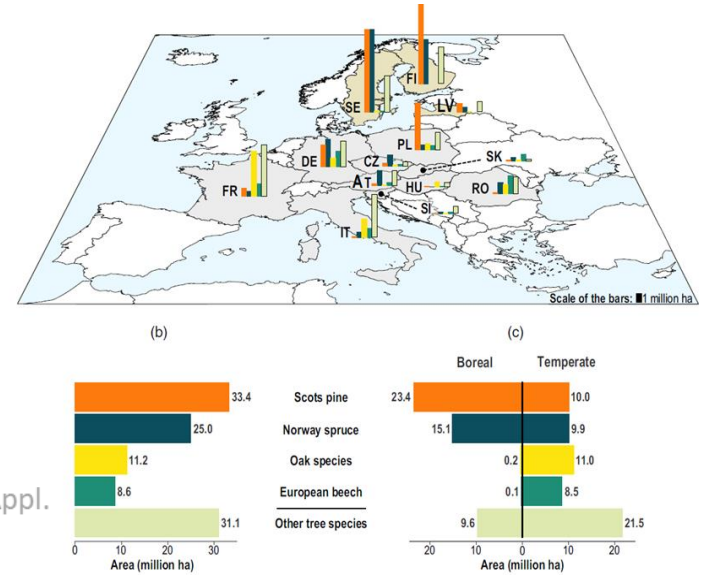


Strong adherence to governmental norms and **regulations**

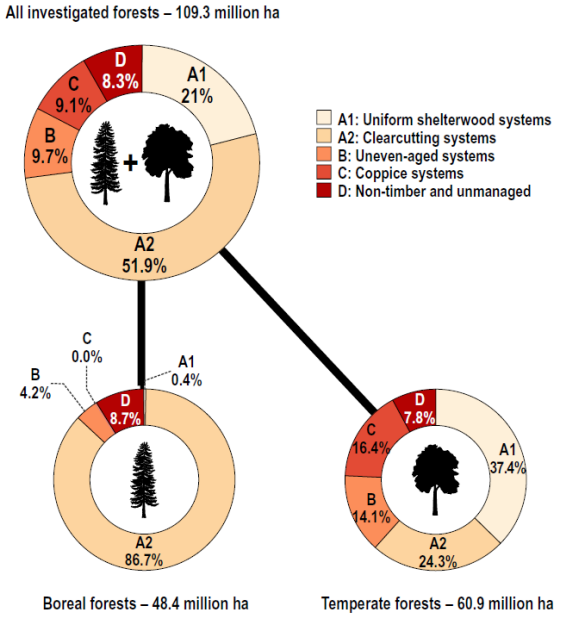
Forest owner types and management behaviour

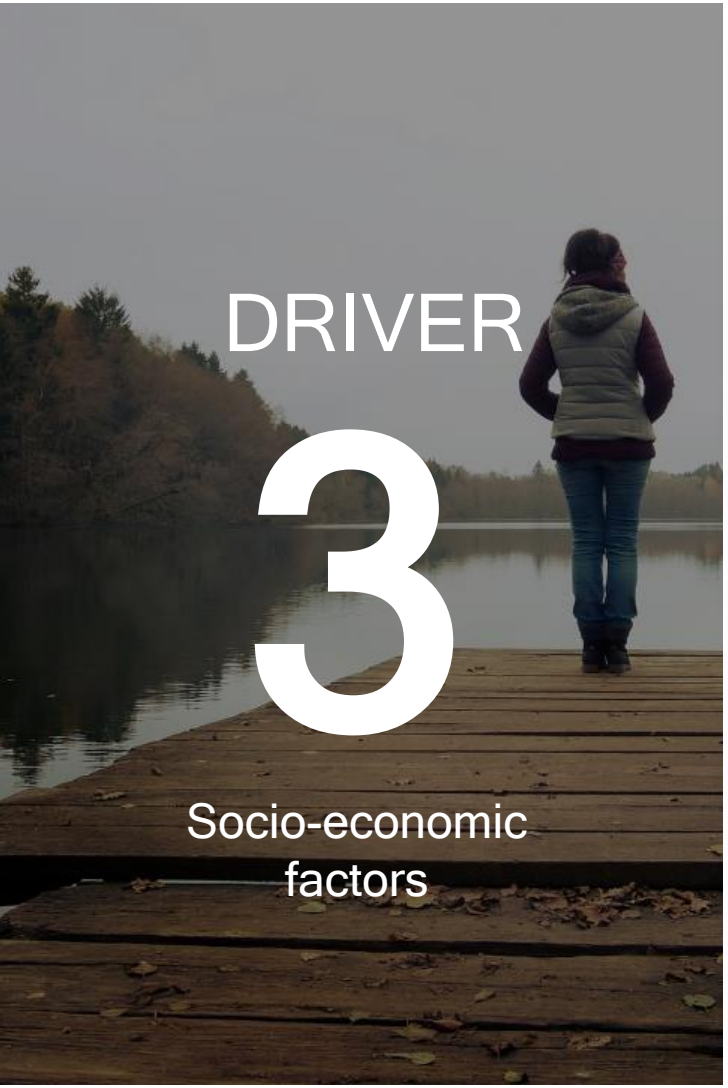


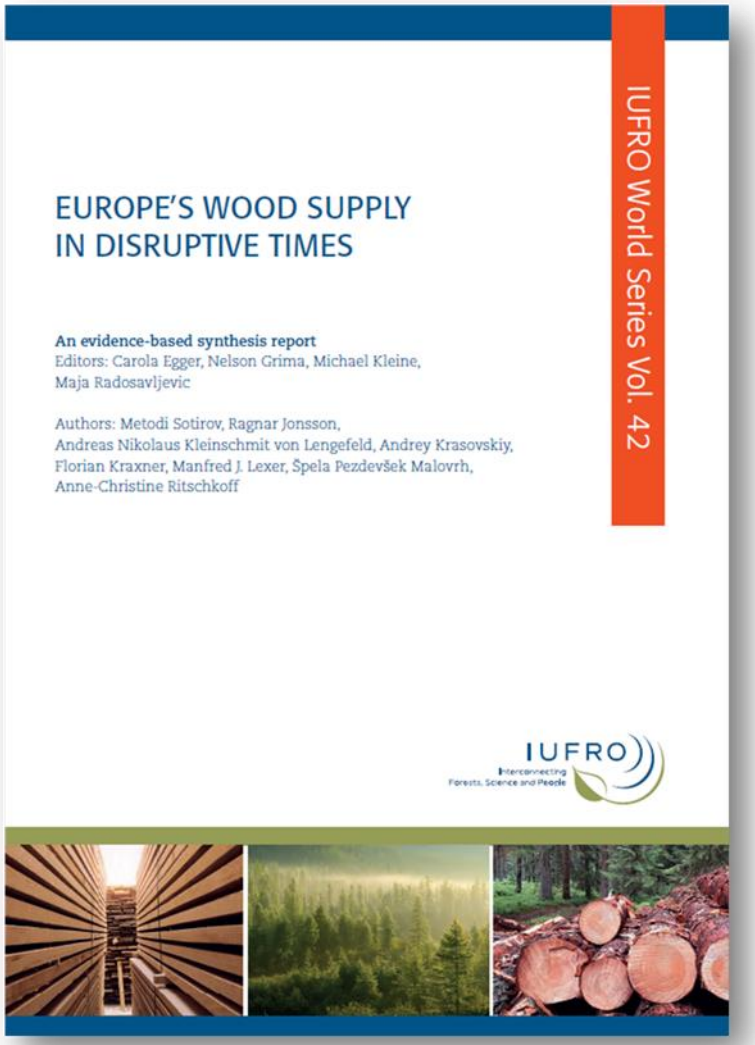
Deuffic et al. 2018
Sotirov et al., 2019
Sotirov et al. 2024



Aszalós et al. 2022, Ecol. Appl.





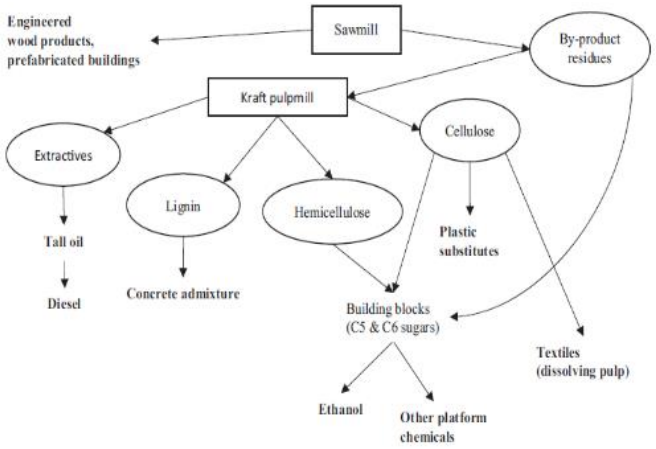


Experts

Špela Pezdevšek Malovrh, UL
Ragnar Jonsson, SLU
Anne-Christine Ritschkoff, VTT
Andreas Kleinschmit von Lengefeld, Homo Silvestris

Market trends in the wood based bioeconomy

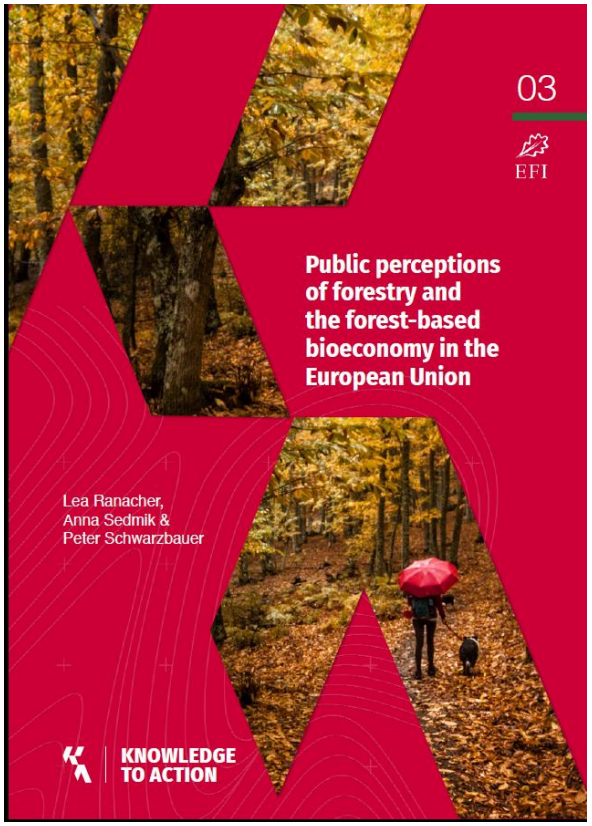
Product	Growth trend	Turnover + employment implications	Market situation
Paper	decreasing	big	Mature products
Packaging materials	stable growth	big	Mature and new products
Sawn timber + Veneer	slow growth	big	Mature and new products
Engineering products (CLT)	fast growth	small	New products
Bioenergy	growth	significant	Established products
Biofuels	growth	small	New products
Biochemicals	growth	small	Established and new products
Textiles	fast growth	small	Established and new products



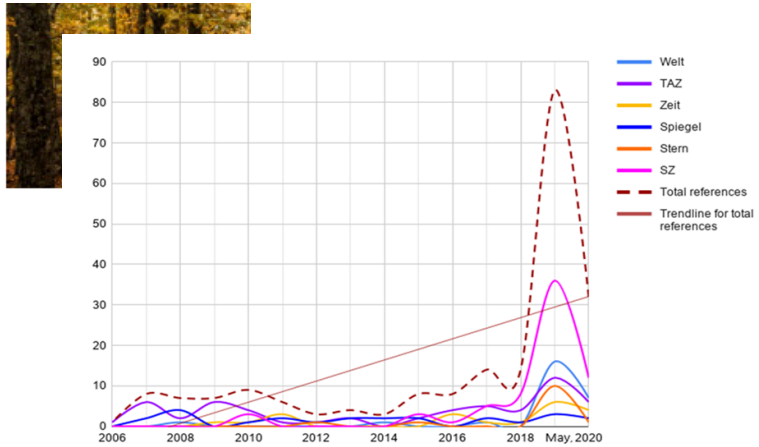
Source: Hetemäki, 2020

- Growing global demand for forest-based products and services
- Diversified industrial use of forest-based biomass can change market structure
- Increasing role of novel and innovative wood-based products

Public opinion on forests and the forest sector



Public perceptions of forestry and the forest-based bioeconomy in the European Union



What are the key drivers of forest management behavioural responses to climate related stress and disturbances today?

-> **insights** from Germany, Poland, Slovenia and Sweden

	Focus groups in 2023	**Online forest owners survey in 2023**
Participants	National-level stakeholders (N > 60)	Forest owners and managers (N > 1.200)
Goal	Evaluation of identified key driving factors from literature review Ranking exercise	Assessment of the importance of drivers for shaping forest management decisions Multiple choice questions
Results	**The most important** one is **#1** **least important** one is **#N**	Likert 5-point scale: **1 - not important at all** **5 - very important**

Sectoral policies

1st FOCUS GROUP

Policy coherence

Political category

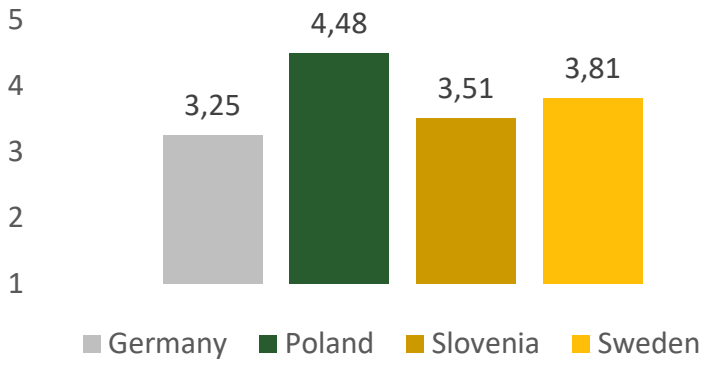
Country	Ranking
Germany	1/6
Poland	1/6
Slovenia	1/6
Sweden	1/6

The lower the rank is, more important is driving factor.

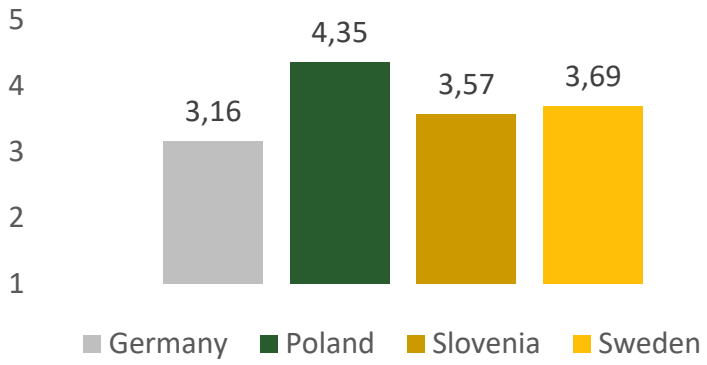
Sectoral policies

FOREST OWNERS AND MANAGERS SURVEY

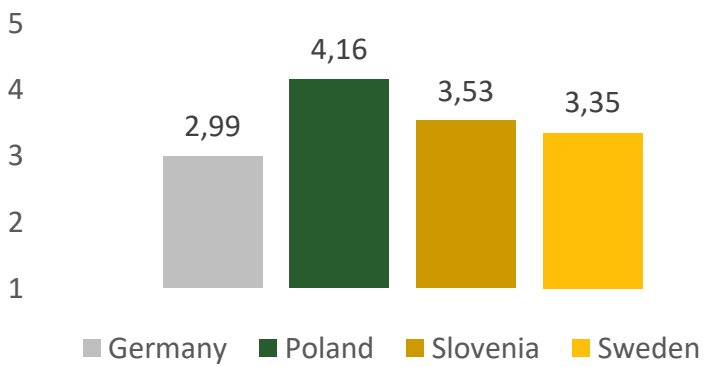
Forest policy



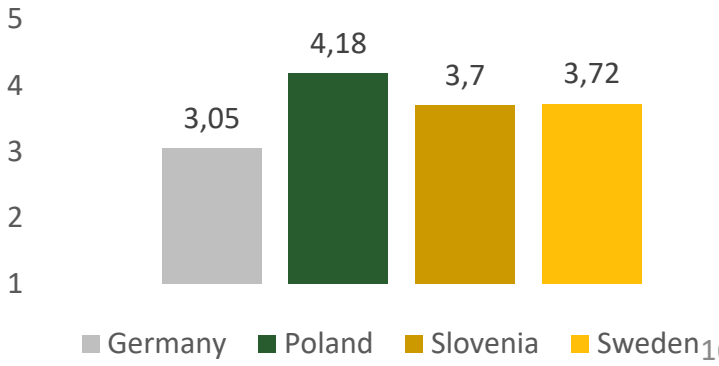
Biodiversity policy



Climate policy



Water policy



1 – not important at all, 5 – very important

Timber market

1st FOCUS GROUP

Timber market I – Reduced timber price

Economic category

Country	Ranking
Germany	2/5
Poland	5/5
Slovenia	2/5
Sweden	4/5

Timber market II – Changed market conditions

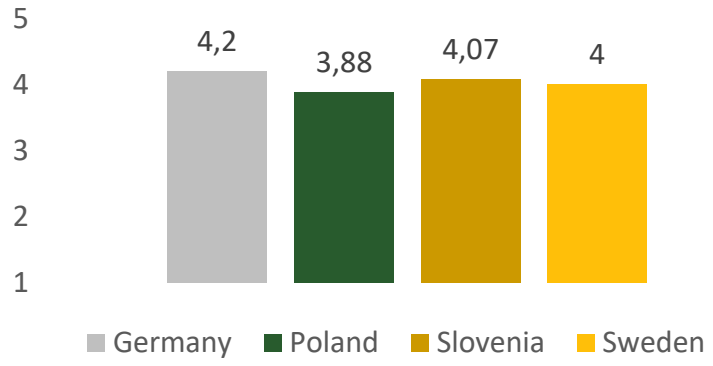
Economic category

Country	Ranking
Germany	2/5
Poland	3/5
Slovenia	4/5
Sweden	5/5

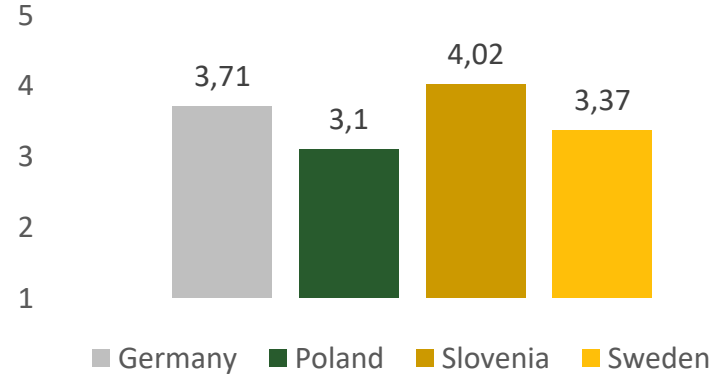
The lower the rank is, more important is driving factor.

FOREST OWNERS AND MANAGERS SURVEY

Timber price



Energy wood prices



1 – not important at all, 5 – very important

Economic instruments

1st FOCUS GROUP

Incentives

Economic category

Country	Ranking
Germany	1/5
Poland	1/5
Slovenia	3/5
Sweden	1/5

Forest management and restoration costs

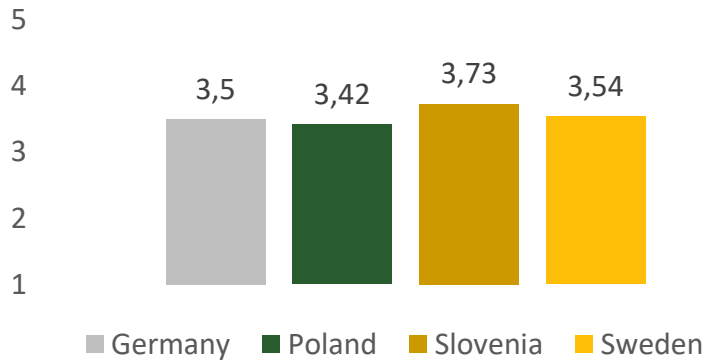
Economic category

Country	Ranking
Germany	2/5
Poland	2/5
Slovenia	1/5
Sweden	2/5

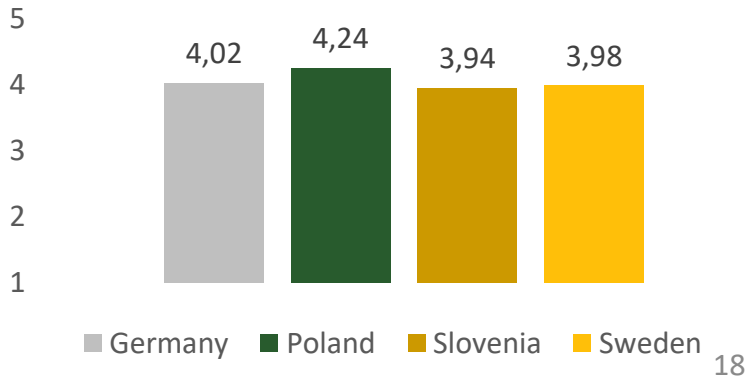
The lower the rank is, more important is driving factor.

FOREST OWNERS AND MANAGERS SURVEY

Economic instruments (incentives, compensation payments, taxes)



Forest management costs and revenues



1 – not important at all, 5 – very important

New technologies and data availability

1st FOCUS GROUP

Research and development

Technological category

Country	Ranking
Germany	3/5
Poland	2/5
Slovenia	5/5
Sweden	3/5

Technological innovations

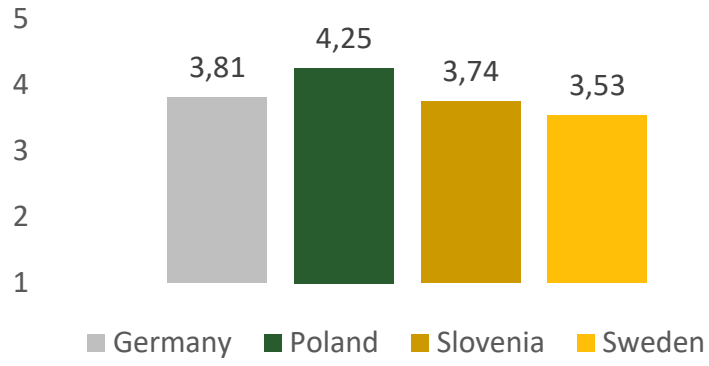
Technological category

Country	Ranking
Germany	1/5
Poland	3/5
Slovenia	2/5
Sweden	2/5

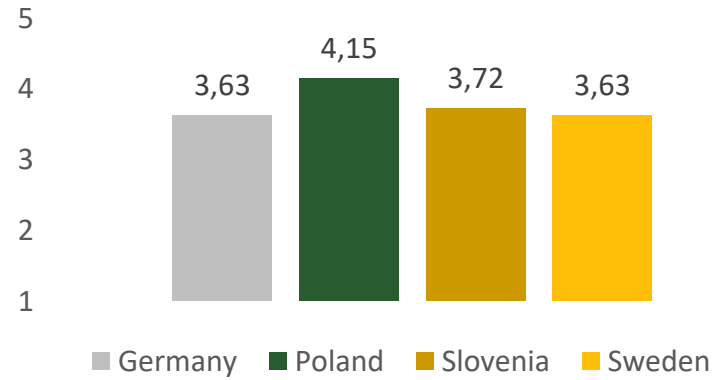
The lower the rank is, more important is driving factor.

FOREST OWNERS AND MANAGERS SURVEY

Technologies and innovations



Monitoring, assessment and availability of data



1 – not important at all, 5 – very important

Knowledge and information

1st FOCUS GROUP

Forest owners/managers knowledge and skills

Socio-cultural category

Country	Ranking
Germany	4/9
Poland	2/9
Slovenia	4/9
Sweden	3/9

Knowledge exchange, sharing information

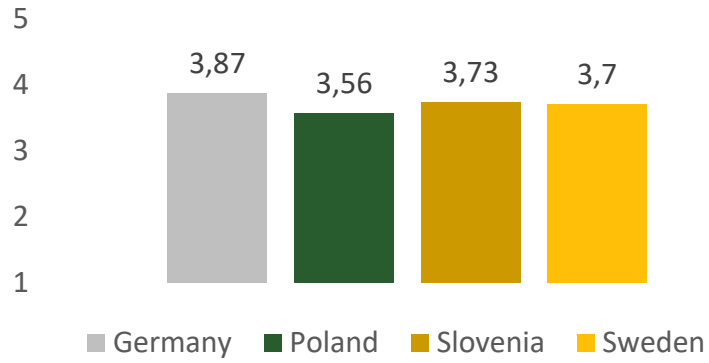
Political category

Country	Ranking
Germany	5/6
Poland	4/6
Slovenia	5/6
Sweden	2/6

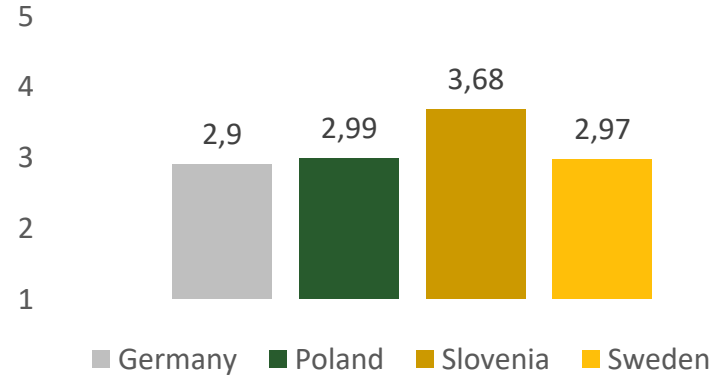
The lower the rank is, more important is driving factor.

FOREST OWNERS AND MANAGERS SURVEY

Informational instruments (advisory services, knowledge, research and know-how transfer)



Advice from consultant, forest owner association that I am member of



1 – not important at all, 5 – very important

Post-disturbances policy debates about forest resilience in Germany, 2018-2022

Mindset	„Sustained yield“	„Multipurpose forestry“	„Ecosystem management“
Causes	External extreme climate events	External extreme climate events	Forestry failures of climate prone monocultures
Future vision	- Healthy commercial forests - Economically viable forestry	- Multifunctional forests - Resilient climate-adapted forests	- Old growth and set aside forests rich in deadwood and structures - Mixed decidous forests
Course of action	Climate mitigation by: - Sanitary clearcuts - Reforestation (coniferous, mixed, climate adapted exotic tree species) - Active timber use - Carbon pools in timber products	Climate adaptation and mitigation by: - Forest reconstruction - Climate adaptive, close-to-nature and sustainably managed mixed forests - Site adaped coniferous and decidous trees - Reduction of large scale forest calamities‘ risks - Carbon sequestration in mixed forests and products	Climate adaptation: - No clearcutting and no reforestation of forests of damaged forests - Natural regeneration - Forest reconstruction - Mixed decidous trees - Close-to-nature forest management - Biodiversity conservation - Carbon sequestration in standing natural forests

Summary of main insights

- Forest owners/managers find forest, biodiversity, climate and water policies as **important driving factors** that influence their forest management decisions.

- National-level stakeholders find cross-sectoral policy coherence as **most important driver** of forest owners and managers behaviour.

- **Technological innovations** were found **influential** on forest owners and managers by **both**, national-level stakeholders and forest owners/managers.

- **Timber prices** were **found as an important driving** factor by forest owners/ managers, but **some** national-level stakeholders find this factor **less important.**

- Incentives are perceived as **important driving factor** by national-level stakeholders but **less important** for private forest owners/managers. **Vice versa** is with forest management and restoration costs.

Conclusions

- Most drivers of forest resilience can be assigned to **national and the EU level** in the domains **'Policy', 'Economy' and 'Society'**
- '**Policies and laws**' and '**Forest ownership**' are the key drivers that are very likely to exert a high influence on forest resilience in the future; they can be addressed as leverage points
- '**Timber market**', '**Public Opinion**' and '**Climate change**' are important drivers for the future, but they can hardly be changed by the forest sector
- Forest resilience will most likely be shaped not only by **climate change**, but also and mainly by **national and EU policy and legal frameworks**, incl. national and EU policy strategies and funding, as well as by the behavioral responses by **forest owners and forest managers**

Thank you so much!

Metodi Sotirov

Chair of Forest and Environmental Policy

University of Freiburg, Germany

Phone: 0049-761 2033749

Email: metodi.sotirov@ifp.uni-freiburg.de