Centenary of the Faculty of Forests (SGGS)

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THE FUTURE OF FOREST EDUCATION IN LIGHT OF PRESENT FOREST AND SOCIETAL CHALLENGES

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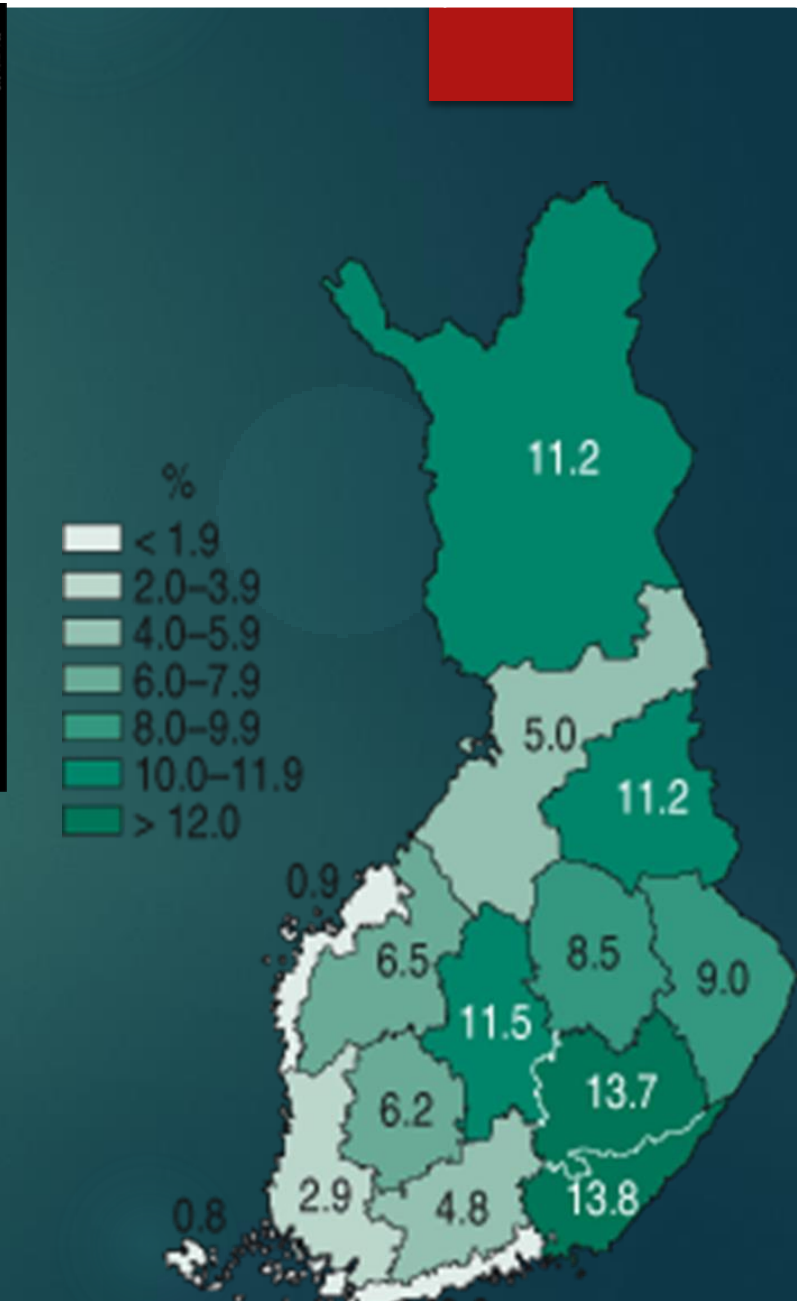
The legacy of Rio+20

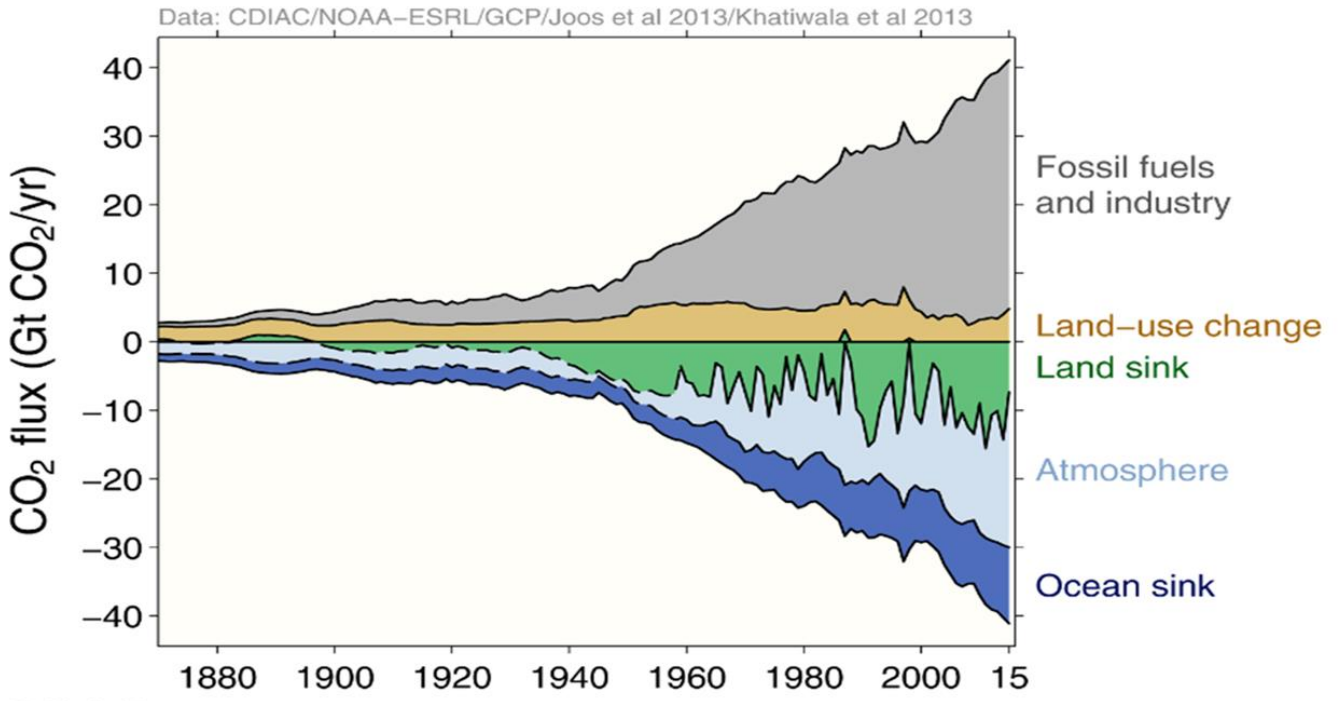
1 No poverty	Livelihoods (food, self-supplies) and income in disadvantaged areas, value chain, tourism, exports, emergency resources (markets, fodder)	**H**
2 Zero Hunger	1% food comes from forests, nutritional aspects, fodder, fertilization, pollination, supplies for agriculture, firewood for cooking (1/3 Humankind), water for irrigation	**M**
3 Good health and well-being	Key contribution for physical and mental health and good being provided by urban forests and green spaces, active live styles, medicinal plants	**L-M**
4 Quality education	Urbanization asks for reconstructing the linkages to rural areas heritage and nature: forests as key educational resources	**L**
5 Gender equality	Engage woman actively in rural areas becomes crucial for their demographic continuity and reconversion taking advantage from new tertiary opportunities	**L-M**
6 Clean water and sanitation	Hydrological regulation, water quality, prevention of silting of dams and natural disasters, green filters (forests included in Target 6.6)	**H**
7 Affordable clean energy	1st renewable domestic energy source (6%) globally and at EU level and without significant incentives, low technological requisites, thermic use	**H**
8 Decent work and economic growth	10 M formal Jobs along the value chain globally (3 M in the EU), x4 real at global level, concentration in disadvantaged areas, 1% GDP but much higher in disadvantaged areas, endogenous economic engine	**M**

9 Industry, innovation and infrastructure	Foundation of one of the key industrial sectors (10%) and one of the few renewable and carbon-neutral ones + located in disadvantaged areas (Bioeconomy)	**H**
10 Reduce inequalities	Potential contribution ion overcoming the growing urban-rural divide, adequate tenure as requisite, SME & middle class	**M**
11 Sustainable cities and communities	Key contribution to physical and mental well being of urban forests and Green spaces, active life styles, integration of forests in school curricula, strategic renewable and carbon neutral supply of building materials (green building)	**M-H**
12 Responsible consumption and production	Forests products most advanced in sustainability and carbon-neutrality, certified, legal guaranties contributing to overcome spatial inequalities	**M**
13 Climate action	Single manageable C-sink crucial for climate C balance (as much C in atmosphere than vegetation) through reducing and reverting deforestation, increasing permanent and temporary stocks and substituting non renewable raw materials with high C footprint and fossil energies	**H**
14 Life below water	Reducing solid materials + preserving functioning river ecosystems & mangroves	**L-M**
15 Life on land	Preserving, restoring and sustainable managing forests, active biodiversity preservation considering its social dimension, preserving and recovering soils, restoring landscapes, energizing of mountain areas	**H**
16 Peace, justice and institutions	Renewal of function and form of public agencies, strengthening public-private cooperation, favoring meditation and partnerships, policy and law coherence, rural-urban equality, emergency role in crisis	**M**

17 Partnership for the goals	Strengthening forest presence and activities in international and development agenda	M




Sp1
50.9 °C
Sp2
39.8
56.7
Sp1
Sp2
FLIR
29.1


Data: CDIAC/NOAA–ESRL/GCP/Joos et al 2013/Khatiwala et al 2013
CO2 flux (Gt CO2/yr)
40
30
20
10
0
−10
−20
−30
−40
1880
1900
1920
1940
1960
1980
2000
15
Fossil fuels and industry
Land–use change
Land sink
Atmosphere
Ocean sink

The legacy of Rio+20

- **SDGs**:
  - Forest key for many important SDGs (6/17 high)
  - Key **unknown or underestimated** contributions (albedo, social dimension of biodiversity)

- **Cross-sectoral challenges: Progress in sectoral but poor results in crosscutting challenges**

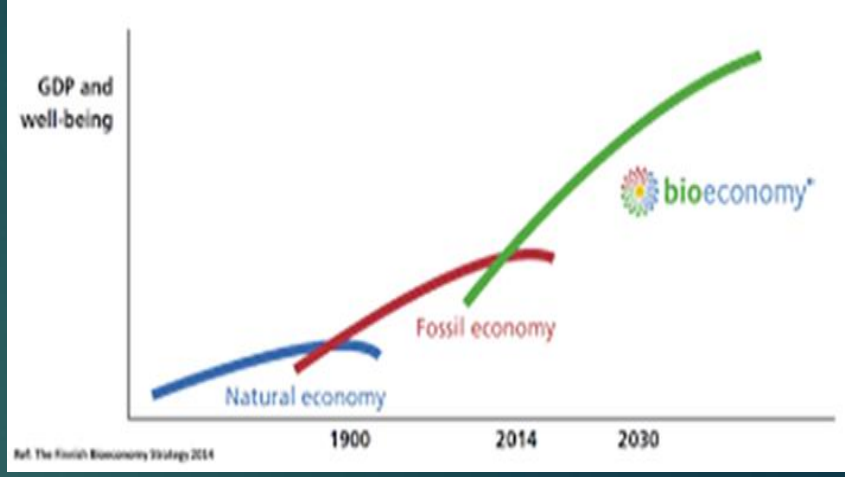
Singularities of forests and forestry

- Huge spatial and temporary dimension in an accelerating and digital society (nanotechnologies)
- Forests located in the woods (far and disadvantaged areas): spatial cohesion crucial role

Bioeconomy as an historical opportunity

- Overcoming poverty & achieving the climate targets cannot me met just with energy saving, renewable physical energies and circular economy:
  - energy storage
  - inefficiencies shift from and to thermic vs. electric
  - daily and seasonal changes in light, wind or rainfall
  - limits to physical renewable energy production (dams, sealing)
  - embedded investments or mining
- We need to keep in mind other societal needs that should not be set aside:
  - relevance of living quality provided by environmental services
  - distributional effect on rural-urban balance and SME

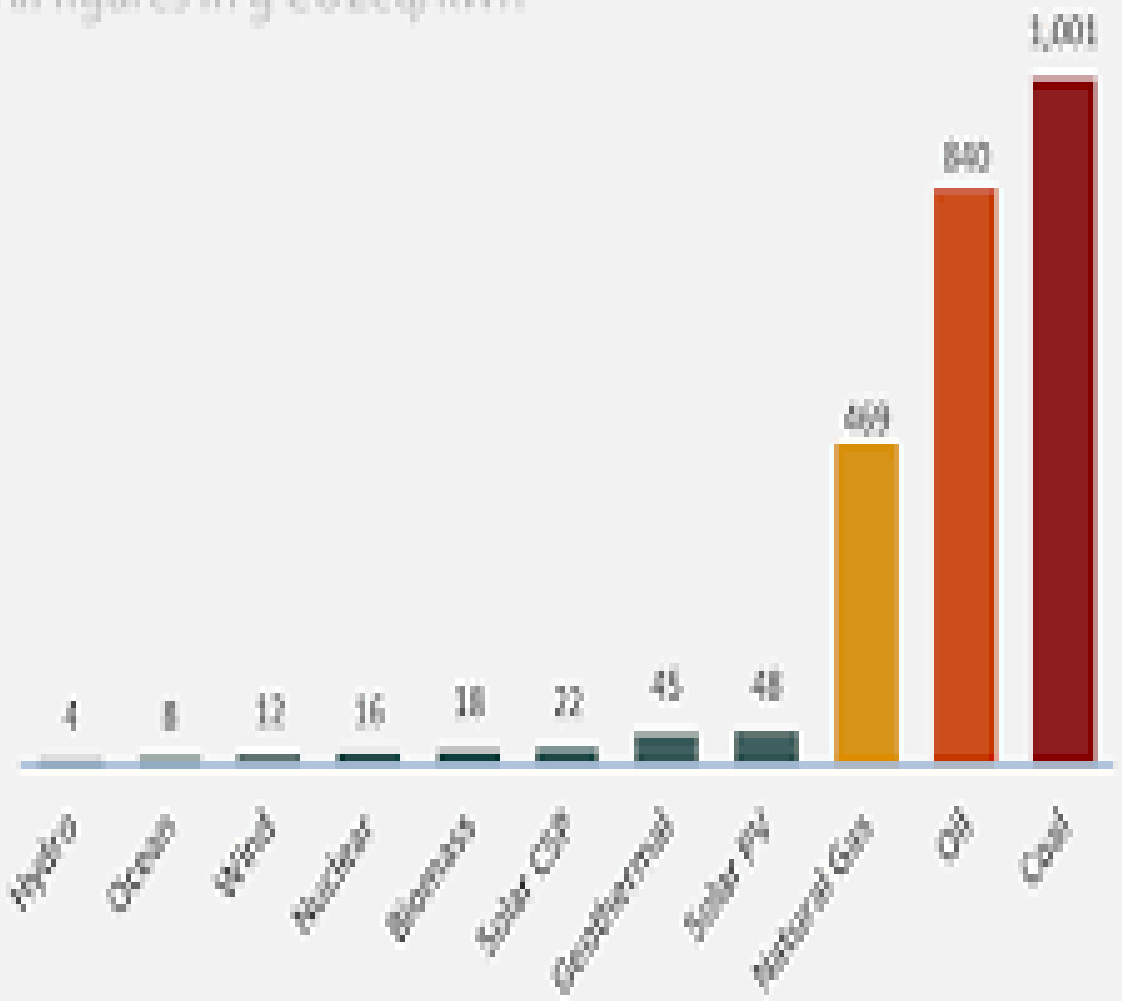
Bioeconomy as an historical opportunity



- **Bioeconomy's inclusiveness**:
  - includes agriculture, forestry, see, organic (residues) and biotechnology
  - recognizes environmental services and disaster risk reduction (fires, soil protection, erosion)
  - focuses on the embedded carbon emissions caused by non renewable raw materials (plastics, iron, concrete, glass, aluminum,..)
  - creates much more opportunities for rural areas (**mission**)
  - help to construct more equal societies (SME)
  - earthquake resistance (wood, bamboo)
  - can contribute to the micro-plastic challenge (increasing supply of biological fiber)

The Carbon Intensity of Electricity Generation

All figures in g CO2eq/kWh

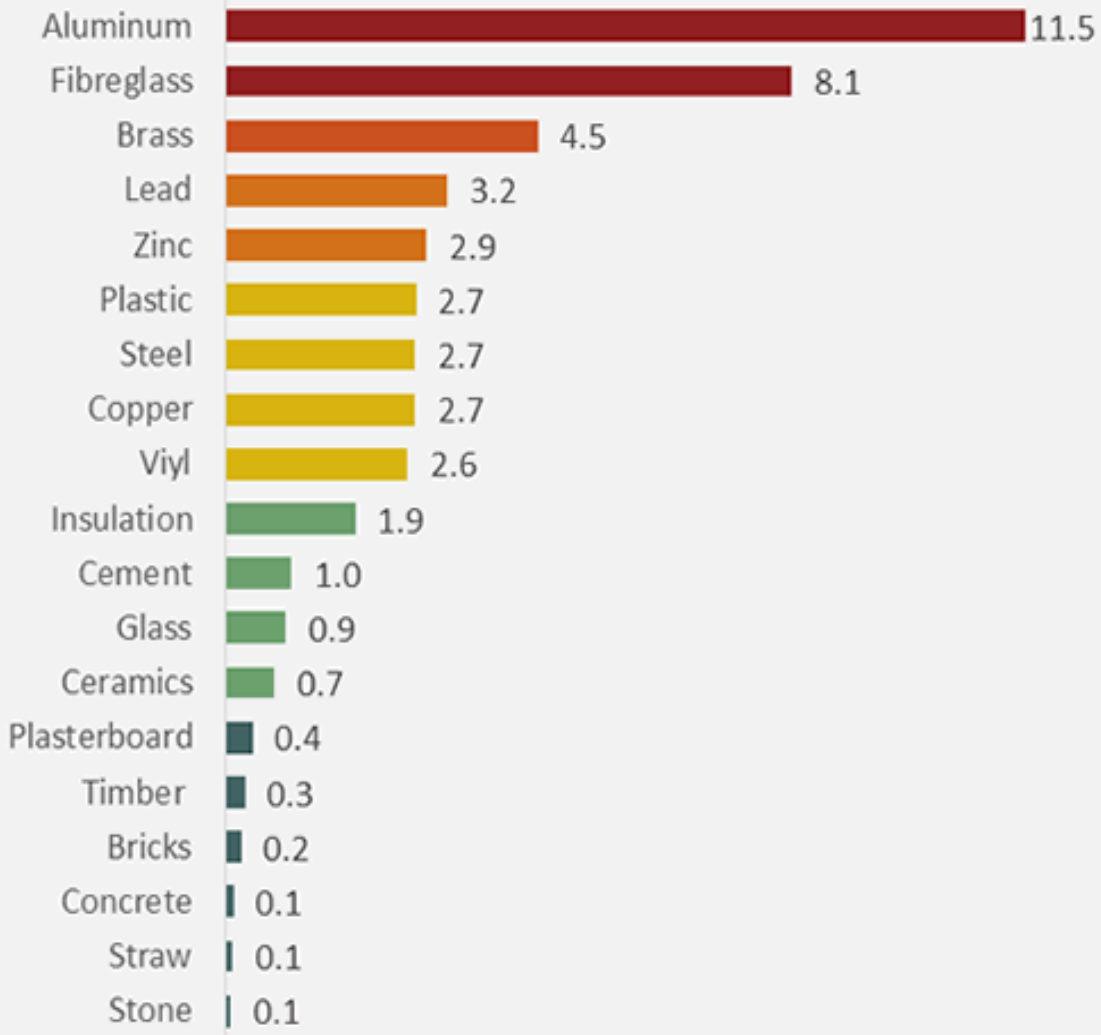


Note: Data is the 50th percentile for each technology from a meta study of more than 50 papers
Source: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation

shrinkthatfootprint.com

The Embodied Carbon of Building Materials

All figures in kg CO2/kg of building material



Note: This figure is intended as a beginners guide. Detailed estimation involves considerable complexity for each product. Figures for metals assume virgin material.

Source: **Inventory of Carbon & Energy (ICE) database.**
Download: http://www.circularecology.com/ice-database.html

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NC PARTNERING

Non-renewable vs. bio-based

Scale difference

Oil

Gas

Oil
4000 Mt

Gas
3000 Mt

Biofuels
120 Mt
(≈ 3% of total fuels)
CAGR 6%

Petro-chemicals
500 Mt

Biochemicals
5 Mt
(3-4% of total)
CAGR <10%

Plastics
< 300 Mt

Bio-plastics
1 Mt
(≈ 0,5%)
CAGR >20%

Textiles
80 Mt

Viscose
6 Mt
(≈ 7%)
CAGR ≈ 4%

Paper Products
> 400 Mt
(100%)
GAGR ≈3%

Concrete

Concrete
3000 Mt

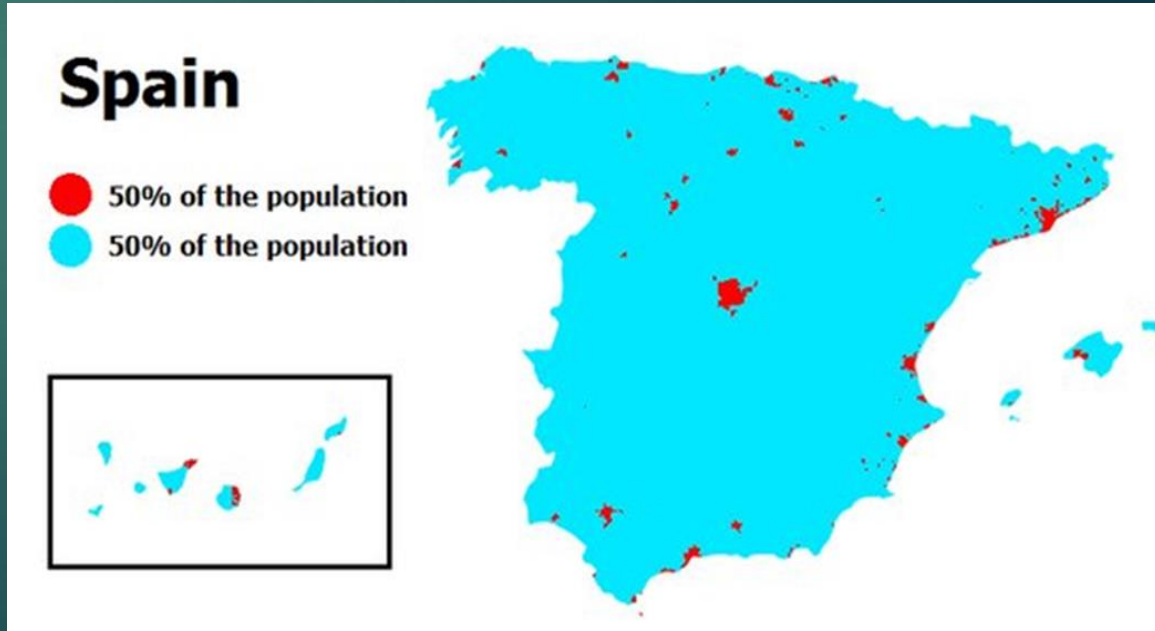
Iron and steel Construction
350 Mt

Wood Construction
100 Mt
CAGR >3%

Shaping the Biofuture

Bioeconomy as an historical opportunity

- Significant win-win by tackling cross-sectoral challenges:
  - sustainable building
  - smart and affordable clothing
  - rural-urban equity
  - social equity and SME
  - fossil fuels and minerals inequities
  - affordable and clean energy
  - high quality water resources
  - preservation of forests and biodiversity



A prerequisite: dealing with social legitimacy

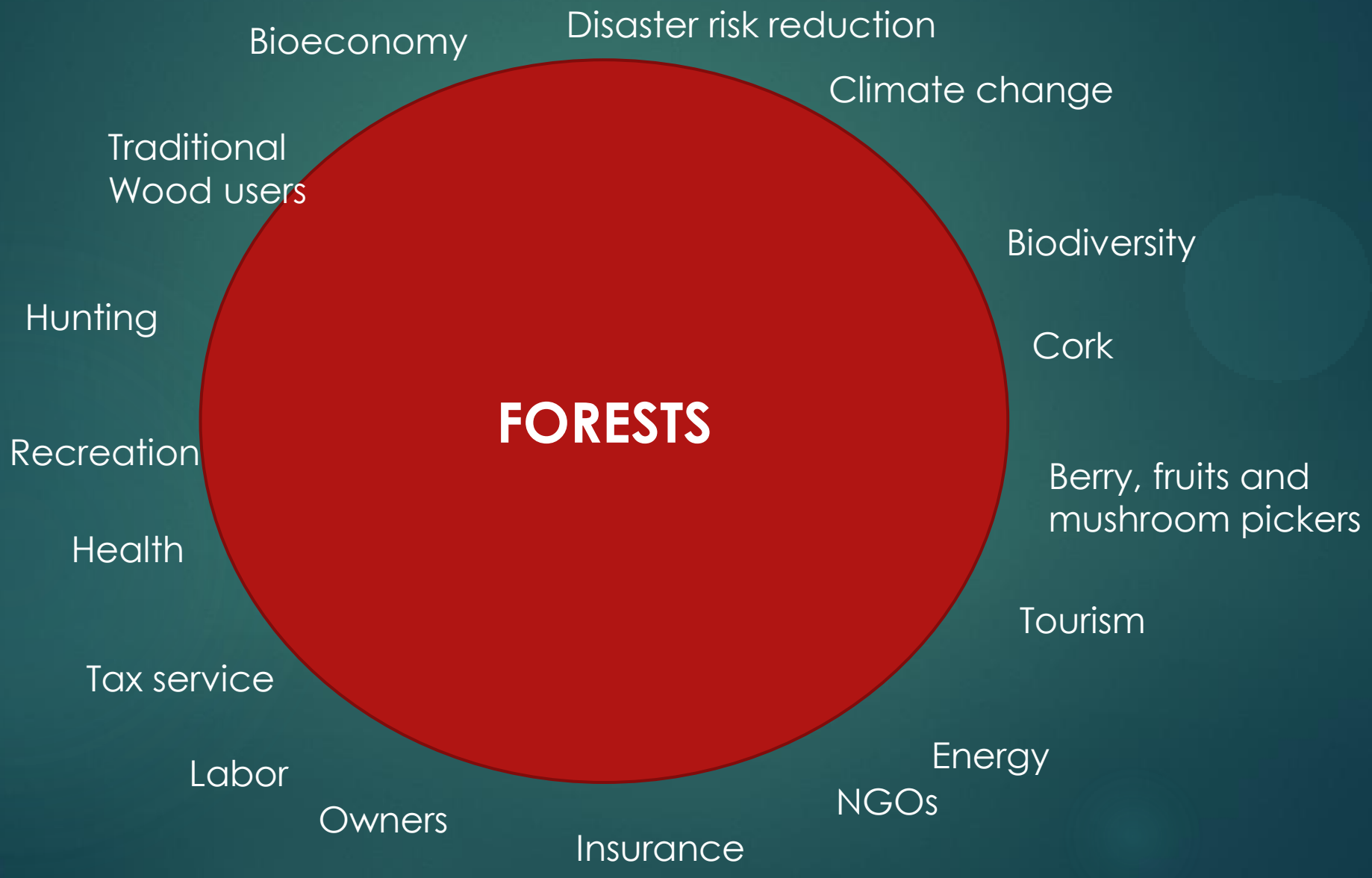
- Foresters might be convinced about the 200 years+ sustainability heritage that we implement daily, if society ignores or even challenges it, we'll lack the needed social legitimacy (wilderness debate)

- **Gratwanderung-syndrome:** permanent risk to fall

Economics, short term profit mono-oriented business, reduce forest fire risk

Virgin environment, rejection of economics on nature, precautionary principle, vegan

Opportunities for forest education

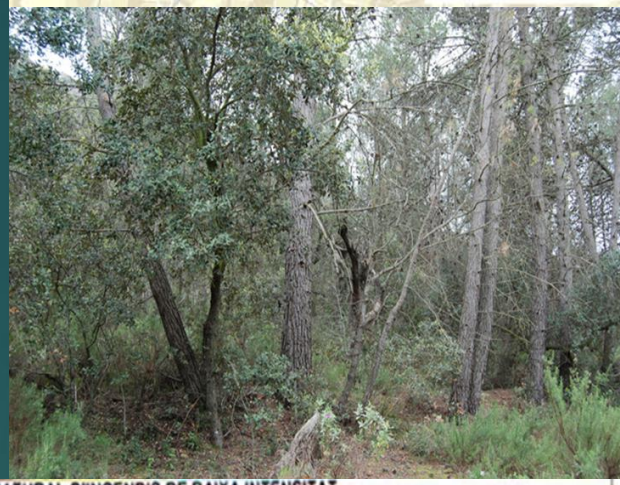


Opportunities for forest education

- Forests are such a cross-cutting issue that no single profession can deal with it
- In order to achieve coherent outcome: dual demand for generalist and specialized foresters (BSc. and MCs.)
- Border of forestry in the labor market is diluting: if enrolment, education and professional skills competitive > than
- Communication and capacity to integrate other disciplines will be key like in brick construction
- Generalist foresters will need considerable sociological bakcground (mediation & communication)

Opportunities for forest education

- Building forest information systems from different sources, reliability, complementary surveys, big data, **user oriented**
- Deep knowledge on the effects of different forest management options regarding soil, water, carbon balances, biodiversity, perturbations, landscape values, costs, etc.
- Urban forestry
- Agro-forestry and landscape approaches
- **Disaster risk reduction**: fire, avalanches, land slides, erosion, …



Opportunities for forest education

- Bioenergy
- Green building (wood, bamboo): material, engineering, …
- Biorefineries: plastics, chemicals, textiles, ….
- Tenure and rural development
- Integrated land use planning
- Gender
- Reform of public agencies
- Historical reconstruction of landscape uses

Opportunities for forest education

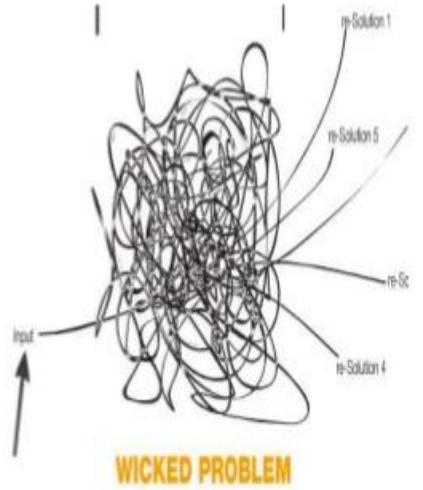
The forest fire challenge:

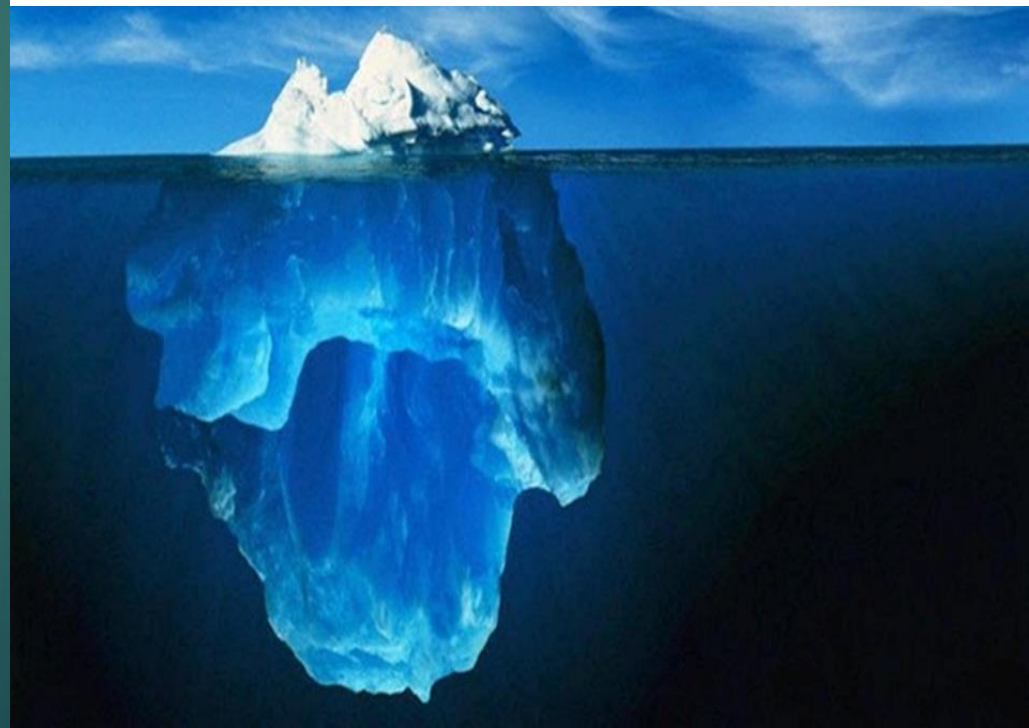
- Confuse direct response with the **solution**
- Fail in the **diagnosis**: we are loosing the forests
- Bet all into **technology**: it will suck all thinkable resources without solving the problem
- Lack of **humility**: the limits of suppression capacity
- The **fire paradox**: the more efficient we are in suppression, the higher the risk of few huge fires
- Fires have been historically determinant of our vegetation and will keep it being: we have to learn coexist with them **building resilience landscapes** by adjusting the fuel loads (aboriginal cultural heritage) + providing rural areas with a **new mission**
- Not different as the **health** challenge: priority not in more ambulances but healthier life styles!

What is a Wicked Problem?

A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons:

- incomplete or contradictory knowledge,
- the number of people and opinions involved,
- the large economic burden, and the
- interconnected nature of these problems with other problems.





Conclusions

- Increasing evidence and science based decisions
- Cascading and integration of agriculture, forestry, see & water and biological residues
- Efficient communication to the outside world
- Internal & external networks
- Overcoming comfort zones
- Shaping the agendas
- Recovery of social leadership!

Thanks for your attention!
dziękuję!