

THE SLOVENIAN FORESTRY INSTITUTE'S WORK FOR A CLIMATE-RESILIENT FOREST SECTOR



Advancing sustainable forestry practices to combat climate change

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GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

CONTEXT: FORESTS AND CLIMATE CHANGE IN SLOVENIA



LOOKING BACK TO BETTER UNDERSTAND TODAY AND PLAN THE FUTURE

1. After the second world war

- Large harvesting areas
- Forests are covering less than 40%
- Low growing stock
- 1947 (prohibition of clear cuts, establishment of SFI)

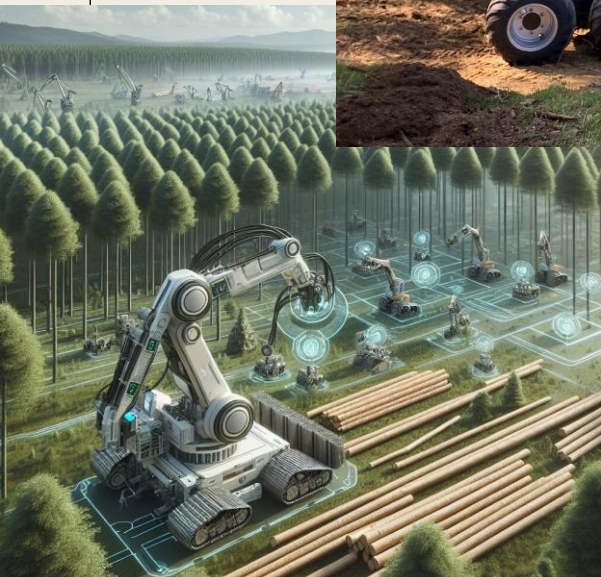
2. Today

- 44,6 % of forests are under Natura 2000
- Forests are covering nearly 60%

	Year 1947	Year 2025
Growing stock (m ³ /ha)	111	318
Increment (m ³ /ha)	2,71	7,48
Cut (mio m ³ /year)	4,5	5,1

-100 years

+100 years



FORESTS COVER OVER 58% OF SLOVENIA.

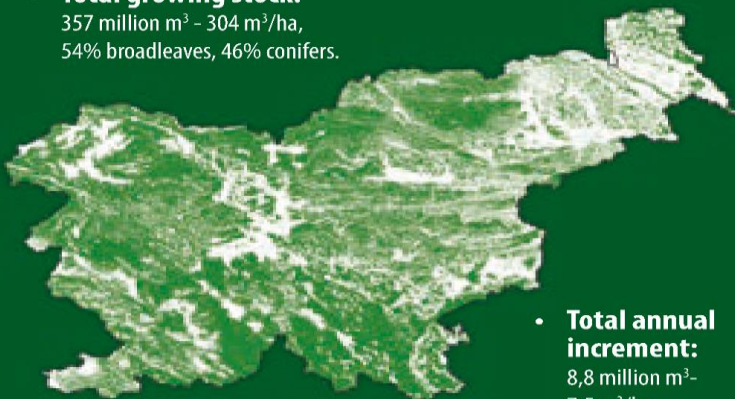
The total forest area is **1.176.069 ha**:

1.067.815 ha
OF MANAGED
FOREST

98.828 ha
OF PROTECTIVE
FOREST

9.426 ha
OF FOREST
RESERVES

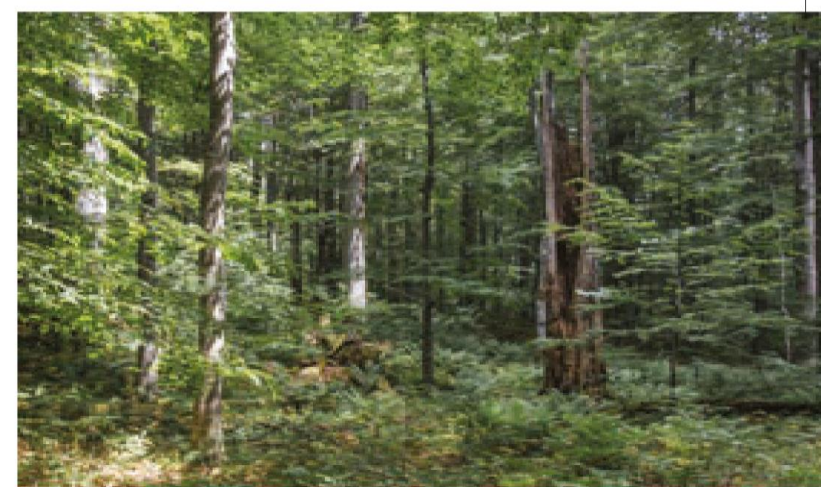
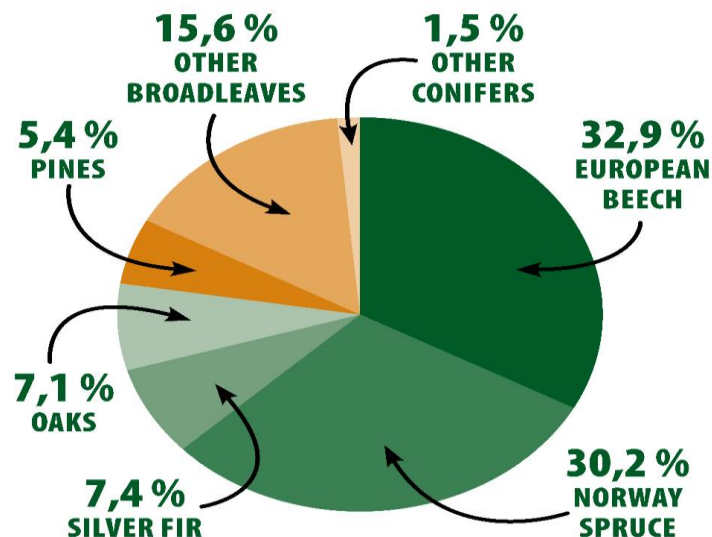
- **Total growing stock:**
357 million m³ - 304 m³/ha,
54% broadleaves, 46% conifers.



- **Total annual increment:**
8,8 million m³-
7.5 m³/ha

THERE ARE OVER 70 TREE SPECIES PRESENT IN SLOVENIAN FORESTS.

Tree species composition:



SLOVENIAN FORESTS – THE HOME OF BIODIVERSITY

- **Over 200 forest vegetation units** (forest associations) are the basis for Slovenian forest management planning.
- There are **171 forest reserves** in Slovenia with a total **area of 9,426 ha**.
- The **first forest reserve** in Slovenia was **declared in 1892** – **Rajhenavski rog** Forest reserve in the Kočevska region.
- **14 forest reserves** are **old-growth forests**, **2** are part of the **UNESCO world natural heritage**.
- **Natura 2000** areas comprise **nearly half of Slovenian forests**. Forests represent **over 70% of Natura 2000 areas** in Slovenia.
- The conservation of **43 animal species**, **5 plant species** and **11 forest habitat types** within the Slovenian Natura 2000 forests is of **European importance**.
- Slovenian forests are home to over **1000 bears**, **100 wolves** and **20 lynxes**. The populations of brown bear and wolf are in a favourable conservation status.



- **Annual potential (allowable) felling:**
7.1 million m³
- **Total felling in 2020:**
4.2 million m³ (2.4 million m³ **broadleaves** and 1.8 million m³ **conifers**)
- In 2020, the total felling amounted to **59% of potential felling**.
- **Sanitary felling** represented **42% of total felling** (2020).



There are **over 12,000 km of forest roads** in Slovenia.

Forest regeneration:

- **95%** of Slovenian forests **regenerate naturally**.
- In 2020, **1.9 million seedlings of 30 tree species** were planted in a forest area **greater than 700 ha**.
- **Forest tending** and regeneration works were performed in a forest area **greater than 2,283 ha**.

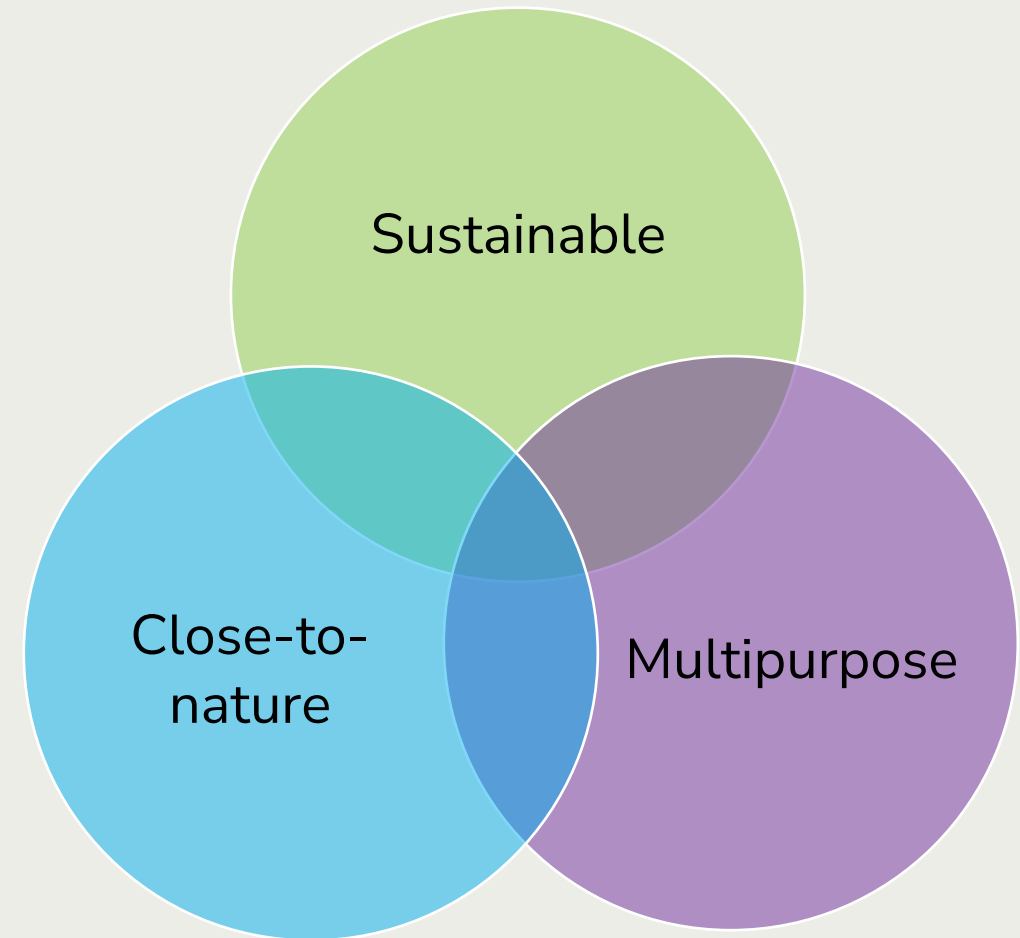
Every fifth Slovenian is a forest owner.

Forest ownership:

- **75 %** privately owned
- **21 %** state owned
- **4 %** local communities

Close-to-nature forest management – more than 50 years

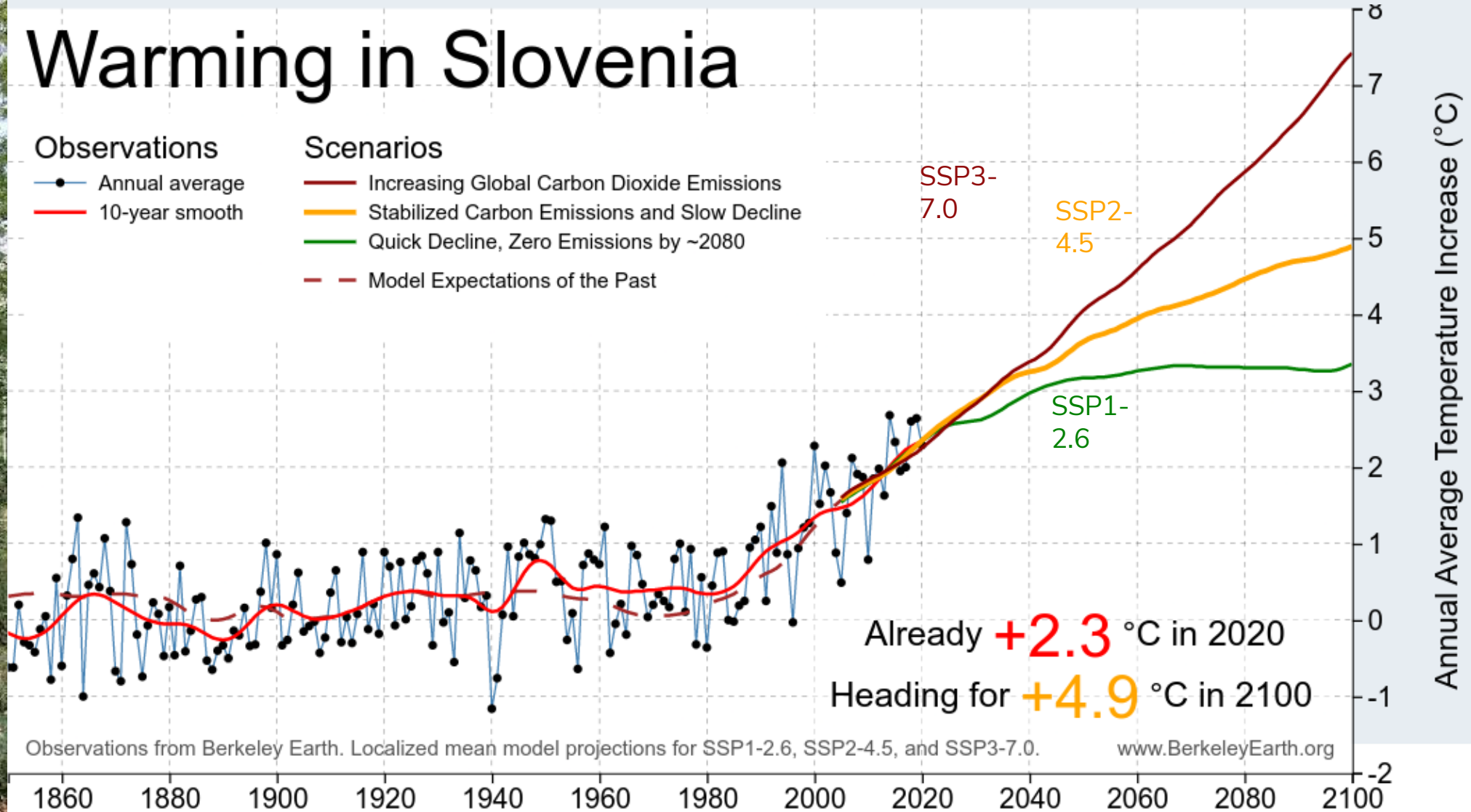
- Forest management take into account natural processes in forest ecosystems.
- forest structure and tree species composition are adapted to the site conditions, respecting also climate changes



All three main principles of forest management must be respected in all forests, irrespectively of ownership.

Climate projections – Slovenia

Warming in Slovenia



DISASTERS IN THE LAST 10 YEARS

Ice break (2014)



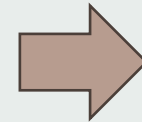
Wind break (2017)



Forest fire (2022)



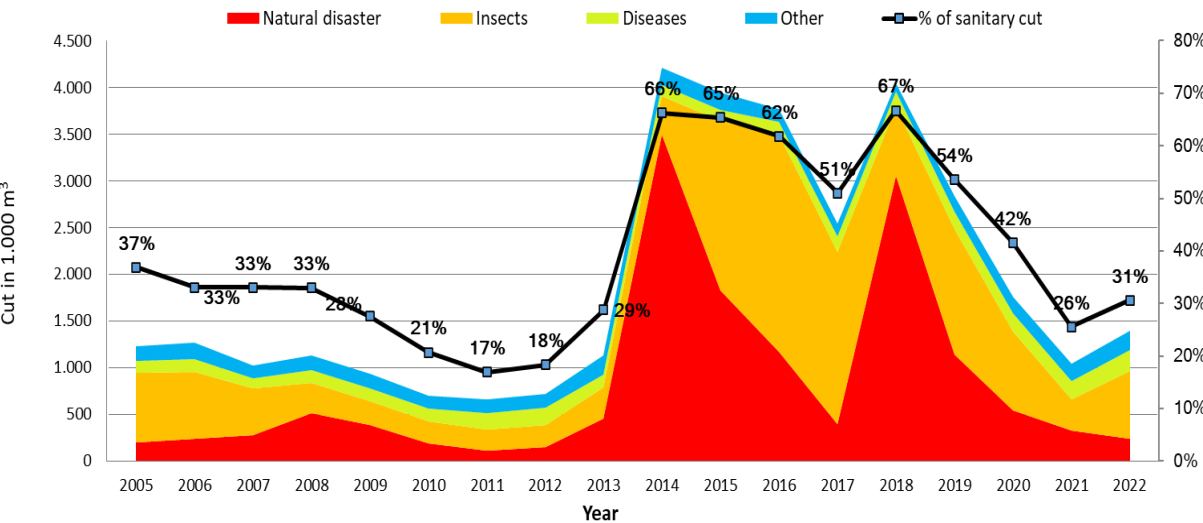
Floodings (2023)



IMPACTS ON FORESTS?



Sanitary cut as % of total cut in period 2005-2022



Gg CO₂ eq

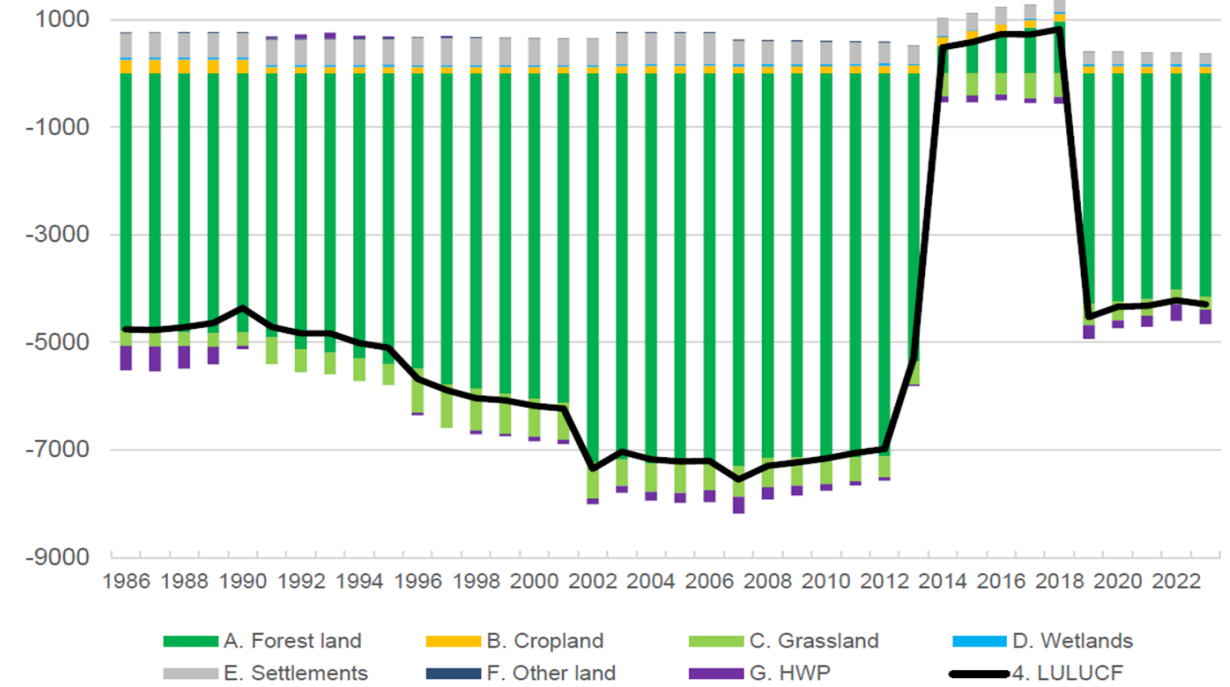


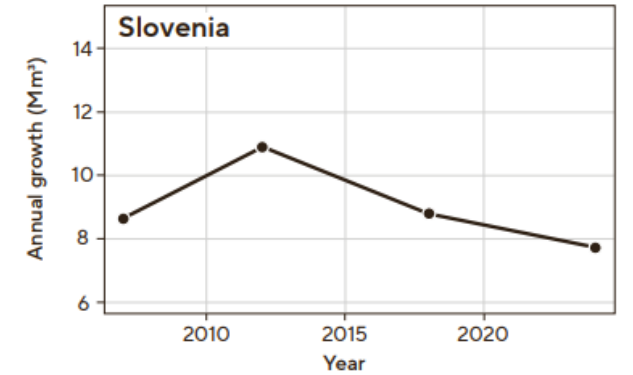
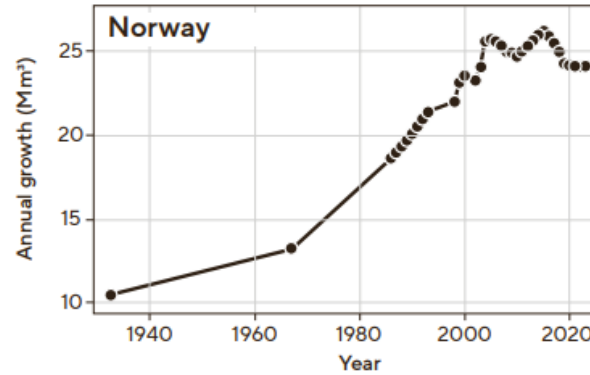
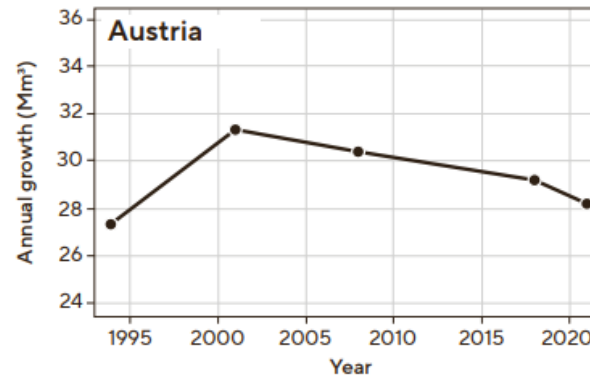
Figure 6.1.1: Net emissions and removals in the LULUCF sector from 1986 to 2023



POTENTIAL AND LIMITS OF EUROPEAN FORESTS IN CLIMATE CHANGE MITIGATION

The LULUCF sector has been a sink for greenhouse gases since the beginning of the emission reporting in 1990 (Figure 1). During recent decades, forest land and harvested wood products (HWPs) fully compensated for emissions from other land uses, like agriculture.

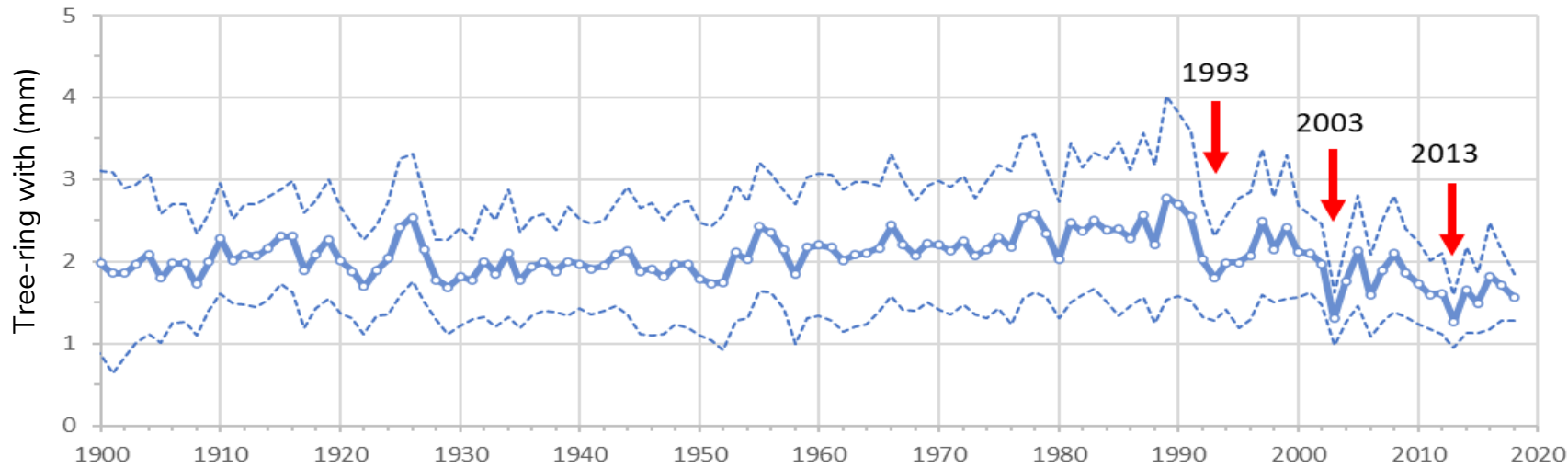
Forests grew well in Central and Northern Europe, due to improved forest management, nitrogen deposition, and warming. Only recently, abrupt declines have been reported (Figure 2), which is reflected as a decreasing sink strength of Forest land („LULUCF“, Figure 1).



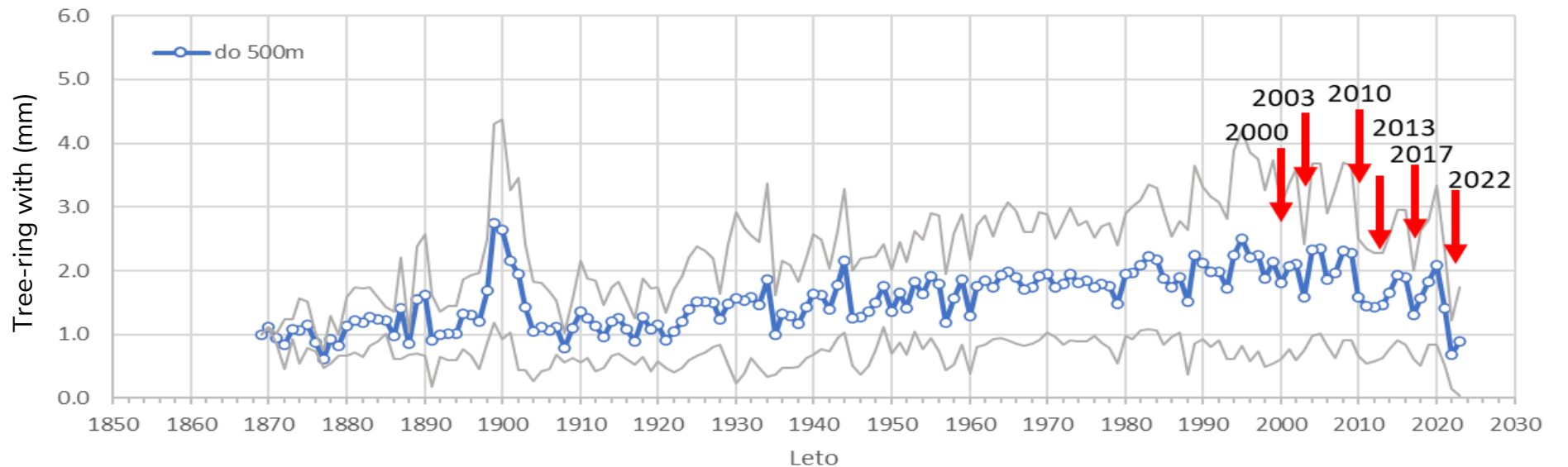
The data are derived from National Forest Inventories



The effect of drought on the growth of spruce in Slovenia



The effect of drought on the growth of European beech in Slovenia



Data from NFI – Slovenian forestry institute

Vision

To maintain, enhance, and expand the role of a leading, distinguished, and independent national research organization in the field of forestry and related disciplines.

We continue to serve as a valued cornerstone of Slovenian scientific and professional excellence, supported by a team of competent, responsible, and passionate individuals.

Mission

Through committed and forward-thinking research, we advance key scientific questions to deepen society's understanding of the forest as a complex ecosystem and vital source of diverse, socially significant resources.

SLOVENIAN FORESTRY INSTITUTE (SFI)



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE

SLOVENIAN FORESTRY INSTITUTE

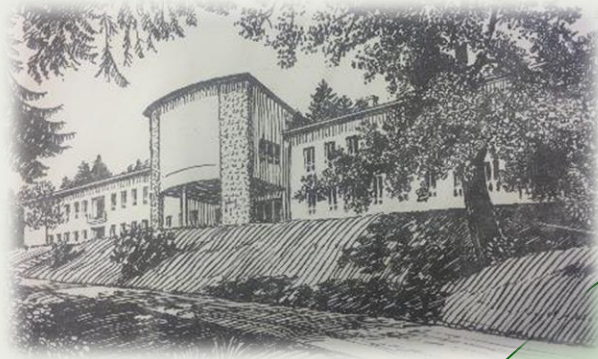
- The Slovenian Forestry Institute is a **public research institute of national importance**,
- We conduct **basic and applied research on forests and forest landscapes**, forest ecosystems, wildlife ecology, hunting, forest management, and other uses of the resources.



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE



1947-2026: 79 years



1947:
establishment of
the Forestry
Institute

1956: construction
of building was
completed

18th IUFRO World
Congress, 2100
delegates, 1986

1993/1994: new state of
Slovenia, act supported by
Slovenian Government &
Ministries of Science &
Agricultural-forestry
Slovenian Forestry
Institute

2007 - 2012

Partial renovation of the
institute, renovation of
laboratories SFI, new
laboratory equipment



2020- 2026
Building a new center with
laboratories



AREA OF OUR ACTIVITIES



GOZDARSKI INŠTITUT SLOVENIJE
SLOVENIAN FORESTRY INSTITUTE



DEPARTMENT
OF FOREST
ECOLOGY



DEPARTMENT
OF
FOREST
PHYSIOLOGY
AND GENETICS



DEPARTMENT
OF FOREST
PROTECTION



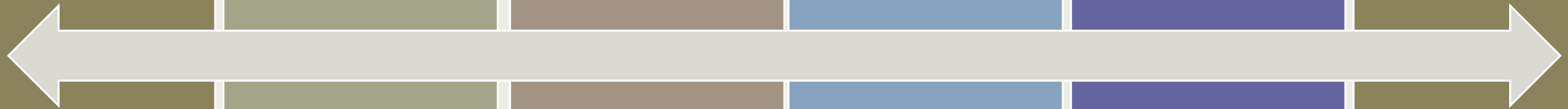
DEPARTMENT
OF
FOREST
TECHNIQUE
AND
ECONOMICS



DEPARTMENT
OF FOREST AND
LANDSCAPE
PLANNING AND
MONITORING

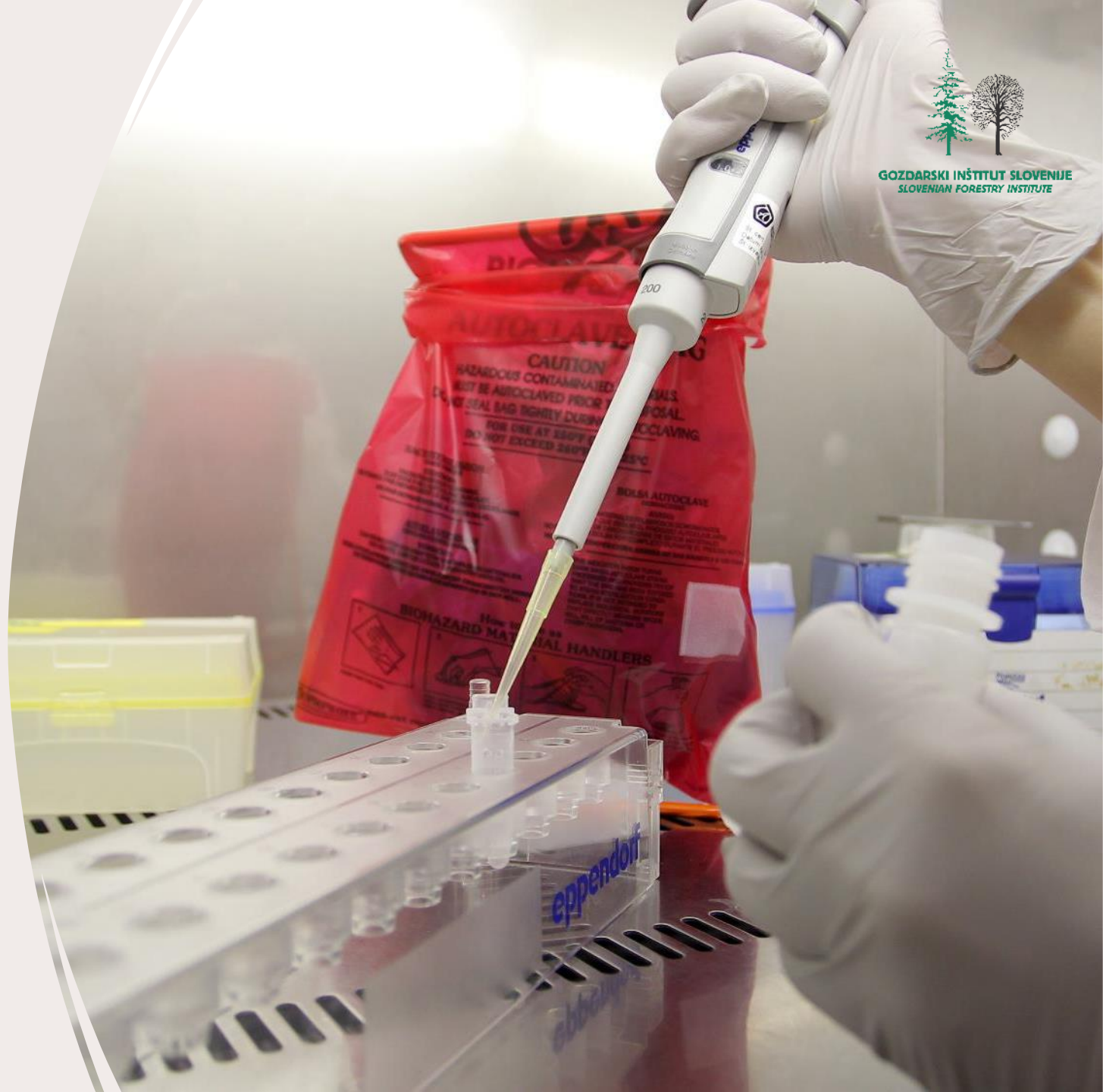


DEPARTMENT
OF FOREST
YIELD AND
SILVICULTURE



RESEARCH PROGRAMME & INFRASTRUCTURE

- 13 different laboratories
- Permanent research infrastructure in forests
- Data basis
- Forest genetic reserves, experimental plantations and live archives



NEW CENTRE FOR FOREST RESTORATION AND PROTECTION



September 2024

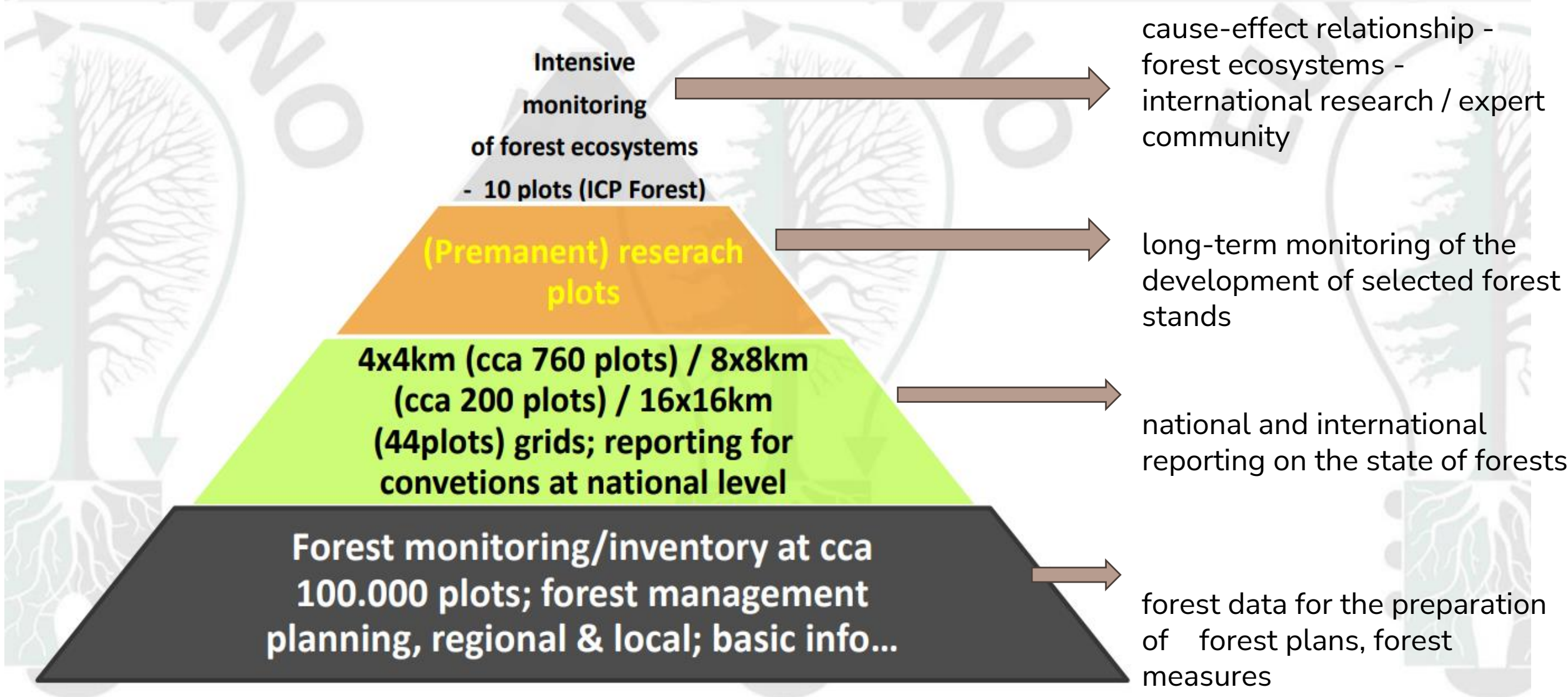


Today



Financira
Evropska unija
NextGenerationEU

Pyramids of different levels of monitoring of the condition of Slovenian forests, at different levels, intensity and purposes as part of Slovenian forestry information system





UNCERTAINTIES IN FOREST MANAGEMENT AS RESEARCH CHALLENGES

- **Data gaps** (forest and environmental monitoring, invasive species, genetic diversity, emerging diseases and pests, ...)
- **Uncertainties in models and scenarios** (dynamic processes, process complexity, ...)
- The importance of **interdisciplinary/international expert assessments**
- **Cooperation** among researchers, professionals and coordination of interests of different stakeholders influencing forest management



HOW TO MANAGE FORESTS FOR RESILIENCE UNDER CLIMATE STRESS

Principles of Climate-Resilient Management

Slovenian Forest School principles guide sustainable, multifunctional forest management for climate resilience.

Enhancing Diversity for Resilience

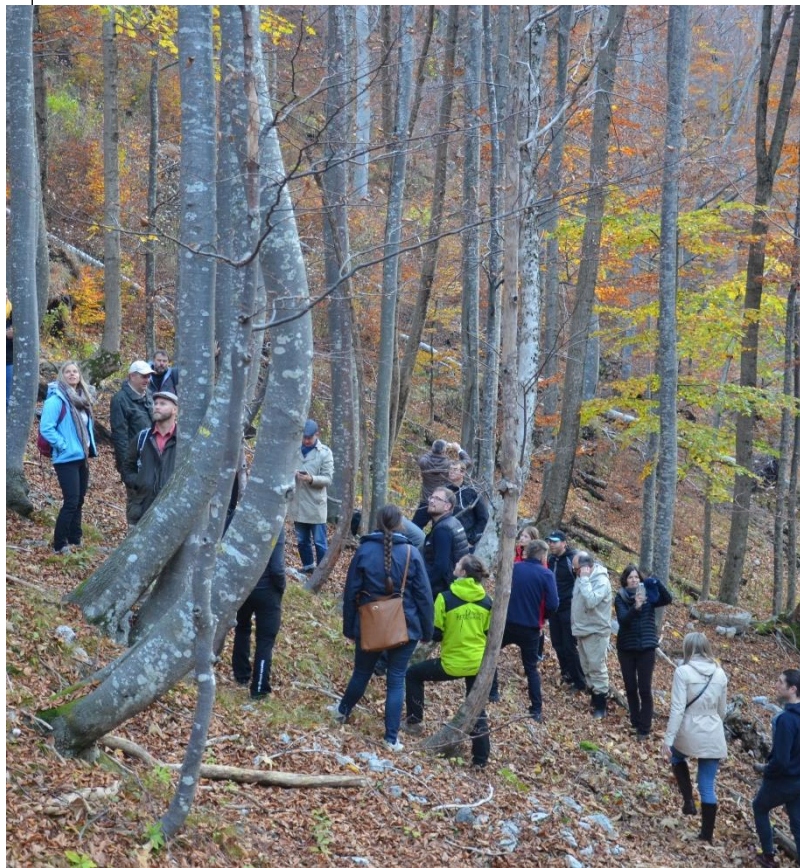
Increasing species and structural diversity improves forest resistance to wind, pests, and drought.

Soil Health and Adaptation

Protecting soil structure and organic carbon is vital for tree growth and water regulation.

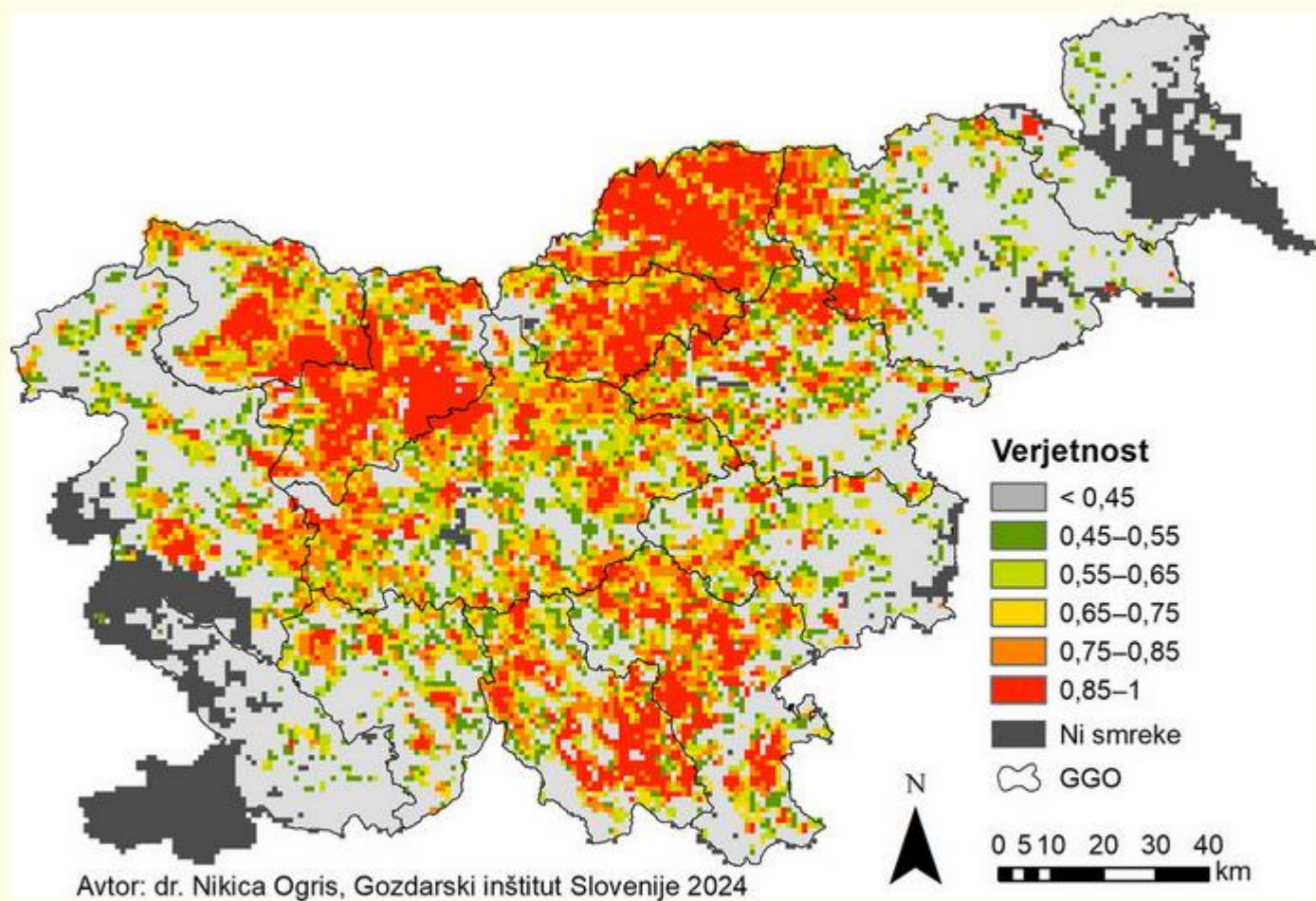
Timely Disturbance Response

Rapid removal of damaged wood prevents pest outbreaks and supports forest recovery.



**TRANSFER OF
KNOWLEDGE TO END
USERS**

Phenological model for European spruce bark beetle

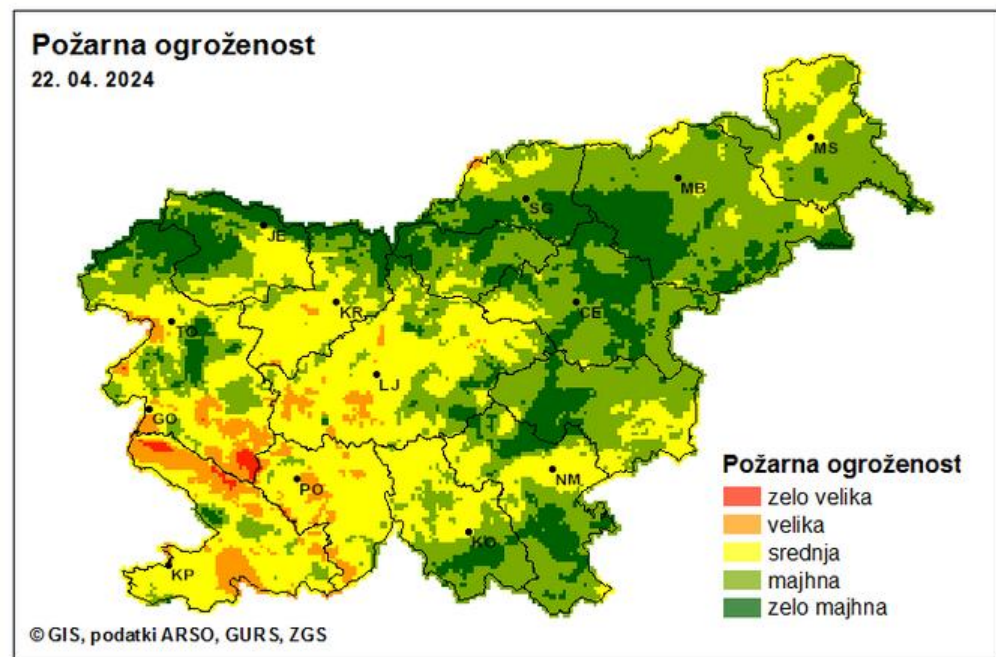


Slika 1: Verjetnost sanitarnega poseka smreke zaradi podlubnikov v letu 2024 (območja z verjetnostjo večjo kot 0,45)

Phenological model for risk of forest fire

Karta požarne ogroženosti gozdov

Leto: 2024



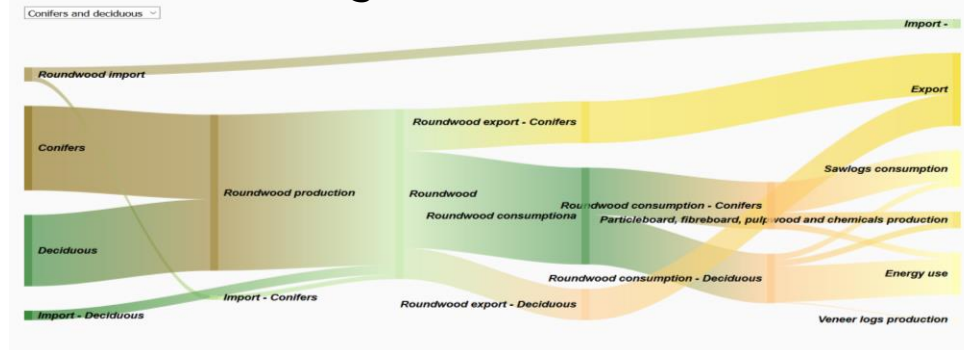
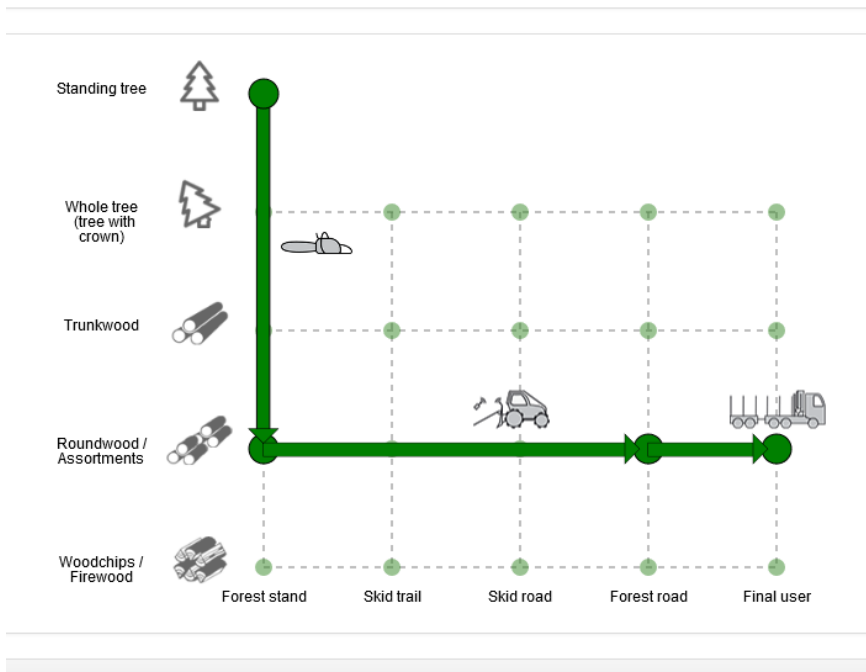
jan feb mar apr maj jun jul avg sep okt nov dec jan



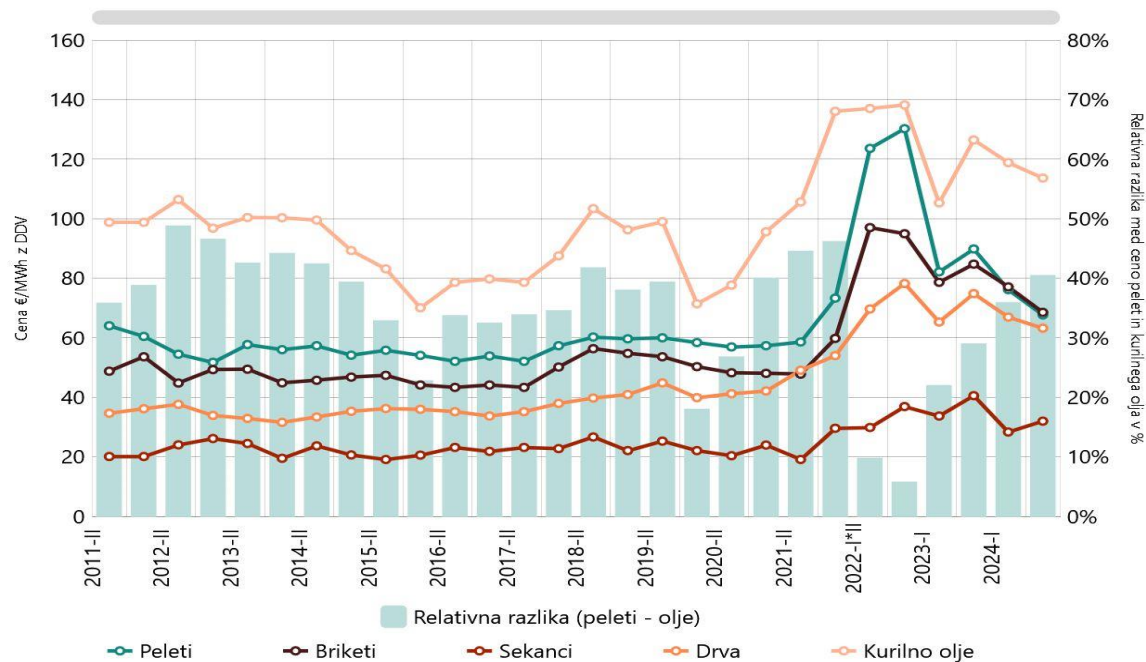
PORTAL FOR FOREST OWNERS: WOODCHAINMANAGER

<http://wcm.gozdis.si/>

Wood flows and other information about wood market



Monitoring of wood fuel and round wood prices on the market



Vizualizaion of production chains and cost calculation

News and practital information for forest owners



WHERE ARE WOMEN?

FEM4FOREST + FEM2FORESTS PROJECTS



Fem4Forest: Forests in women's hands

Starting date: 1.07.2020 **Ending date:** 31.12.2022

Fem2forests: Innovative pathways for efficient involvement of girls and young women in the forestry sector - **Women in forest's hands**

Starting date: 1.01.2024 **Ending date:** 30.06.2026

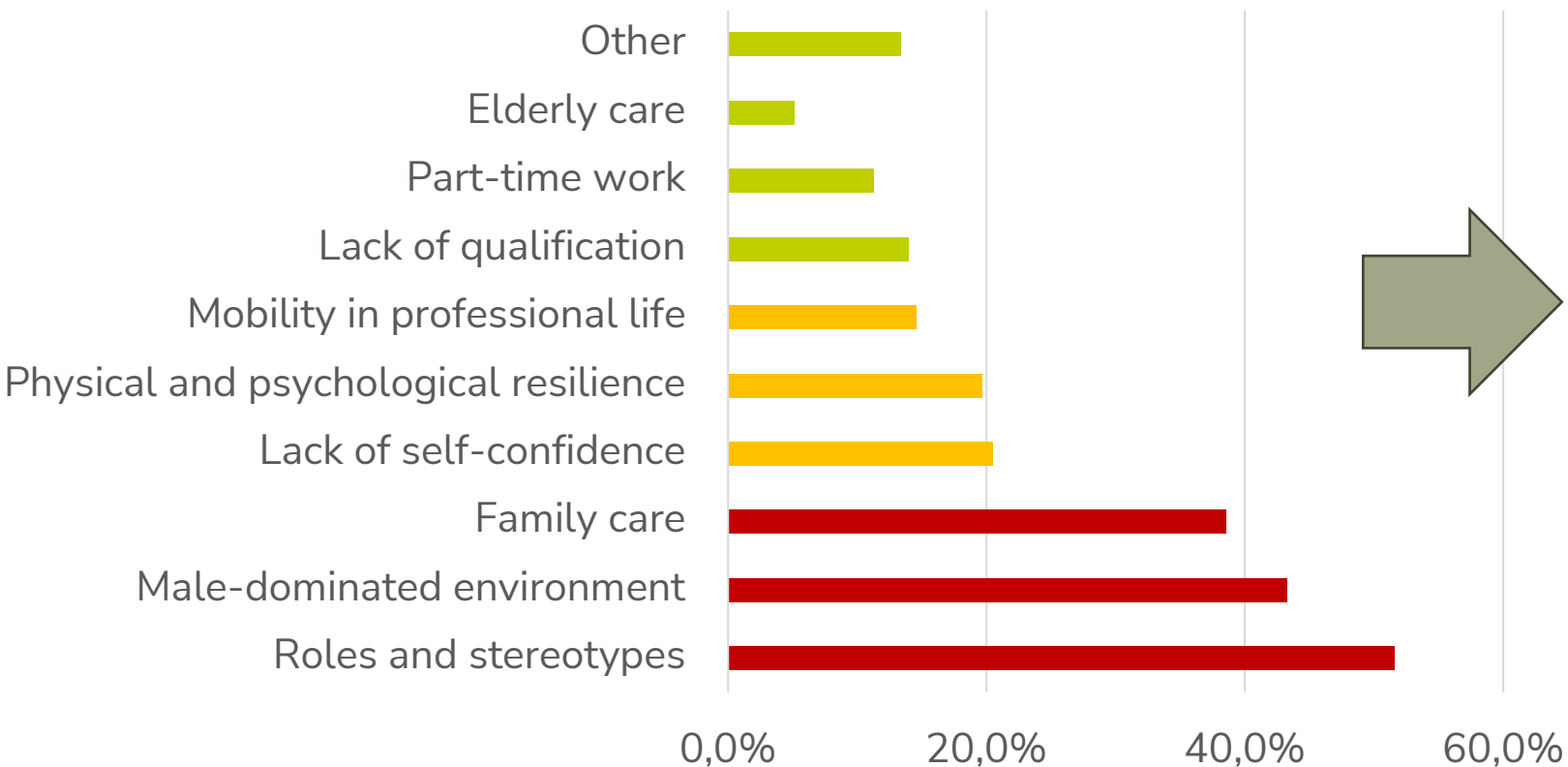
Partnership: 14 partners, from 10 countries

Fem4Forests: Main objective is to strengthen the capacity of forest sector at local, regional and interregional levels through **increased involvement and skills of women actors supporting their equal presence and competences at the labour and timber markets** in the DR.

Fem2forests: main objective is to increase the share of women in the forestry sector by 2030 by **empowering, supporting and accompanying girls and young women to develop career paths** in the forestry sector.

Report “Collected needs of women and wider gender perspectives in forestry sector”

Challenges that women are facing to pursue their careers



INSPIRING FEMALE FORESTRY PIONEER

Mentors, Role models, Ambassadors

GOOD PRACTICE EXAMPLES OF CAREER ORIENTATION IN FORESTRY

Awareness-raising efforts

WOMEN'S COOPERATIVE MEETING

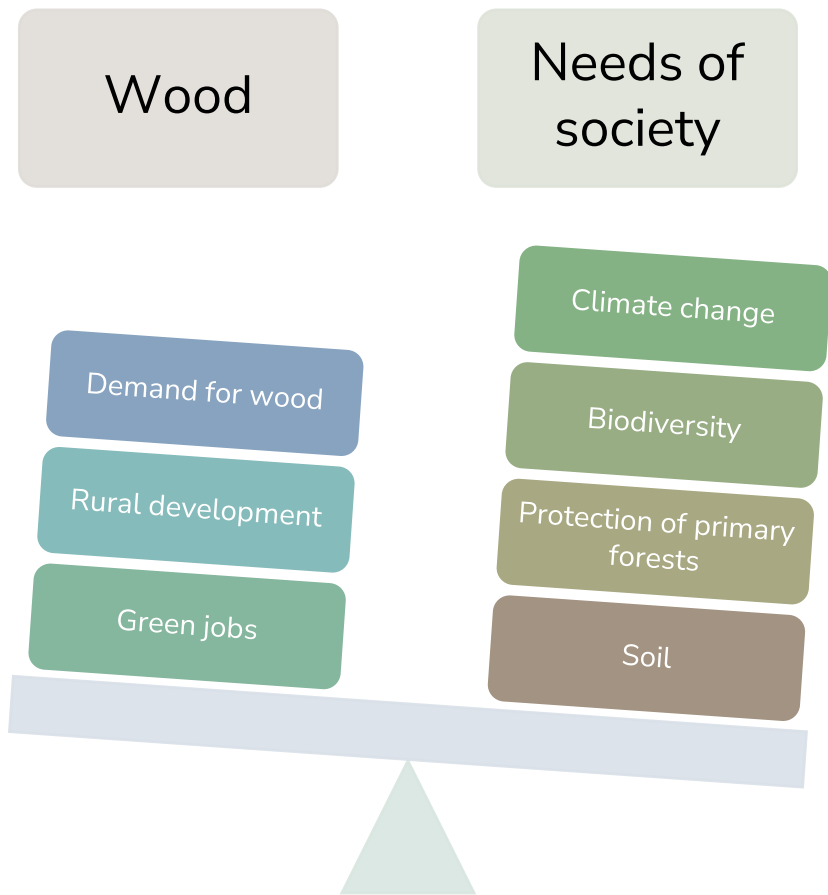
National/regional associations, WOFO International

WHY WOMEN IN FORESTRY?

- Forestry still struggles with workforce shortages and ageing structure
- If we want to bring more young peoples into forestry, we have to change the image of forestry
- Women are bringing new perspectives in forestry



FUTURE CHALLENGES IN THE FORESTRY SECTOR IN SLOVENIA?



- I. HOW TO BALANCE ECONOMIC, SOCIAL AND ENVIRONMENTAL FUNCTIONS OF FORESTS
- II. DIGITALIZATION OF ALL PROCESSES
- III. HOW TO INSURE LONG TERM STABILITY IN WOOD SUPPLY
- IV. HOW TO SUPPORT FOREST OWNERS AND ENSURE PAYMENT FOR ECOSYSTEM SERVICES
- V. CONSERVATION OF NATURE VS. WOOD PRODUCTION

VI. FUTURE STRATEGIES FOR RESILIENCE:

What are the best systems for the future: AgroForestry?
Which functions/services of the forest will be the most important – dual use of forests?



BUILDING NETWORKS OF KNOWLEDGE

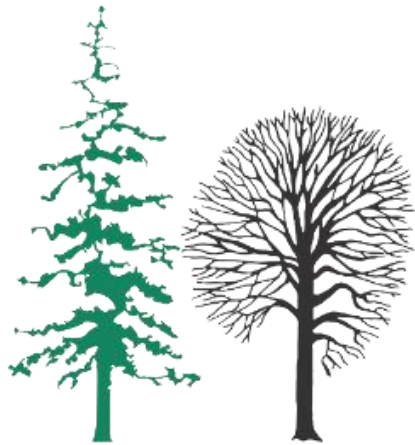
IUFRO, FAO, OECD TG Forest seeds and planting material, COST, EUFORGEN, EUFGIS, EVOLTREE, GEO BON, ISS, IMS, IAWA, ECCF, FESPB, FLEGT, IMS, International Poplar Commission, GTTN, and others.

EFSA scientific networks, EPPO panels and COST Actions, ensuring alignment with EU plant-health, biosecurity and forest policy frameworks

WOFO – WOMEN IN FORESTRY INTERNATIONAL

ForForest policy group, ICP Forest, BIOEAST initiative

At the moment we are working in 35 different EU project (Horizon Europe, Interreg, LIFE, Erasmus+, Bilateral projects,.....)



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Thank you