




European Commission

From Horizon 2020 to Horizon Europe – EU R&I in agriculture and forestry to deal with climate change

Seminar – "Farming & forestry in a climate-neutral Europe: Bringing 6 years of research into action for climate"

2-3 March 2022

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European Commission

Agriculture and Rural Development

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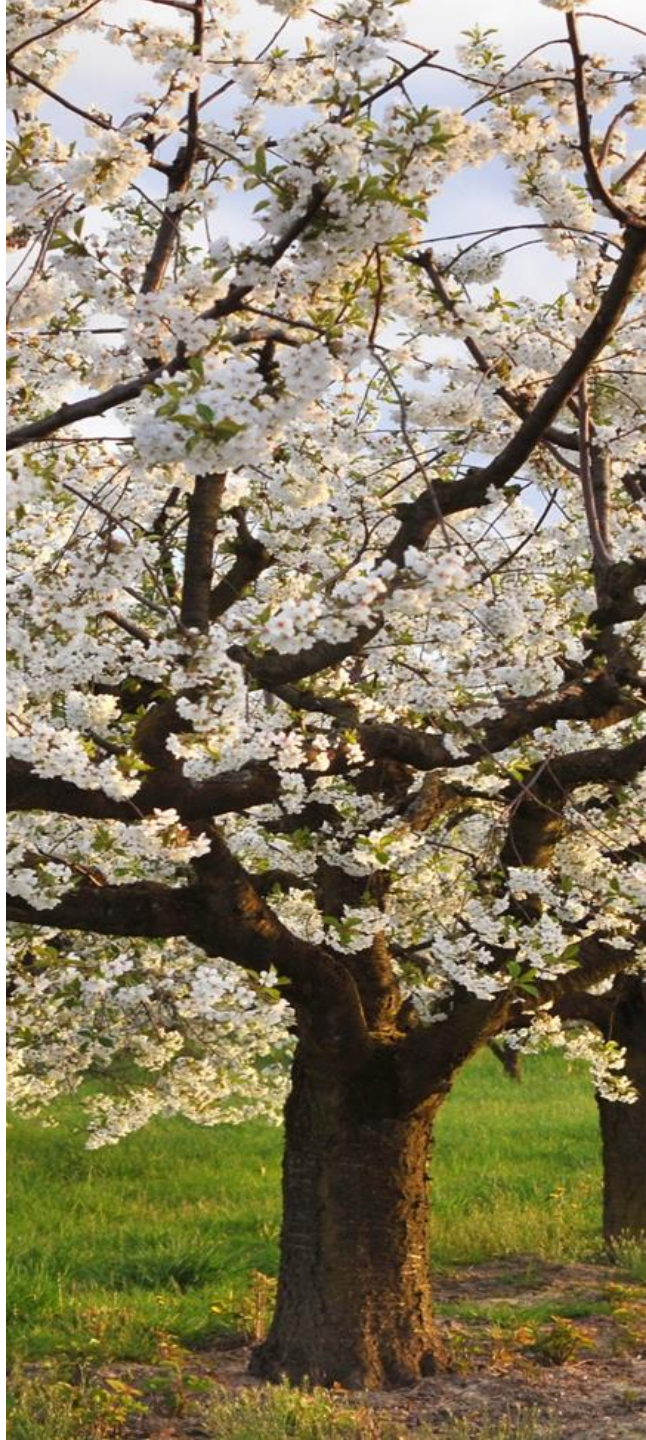
1. R&I in farming
2. Forestry
3. A soil deal for Europe – R&I mission
4. Cooperation at global level



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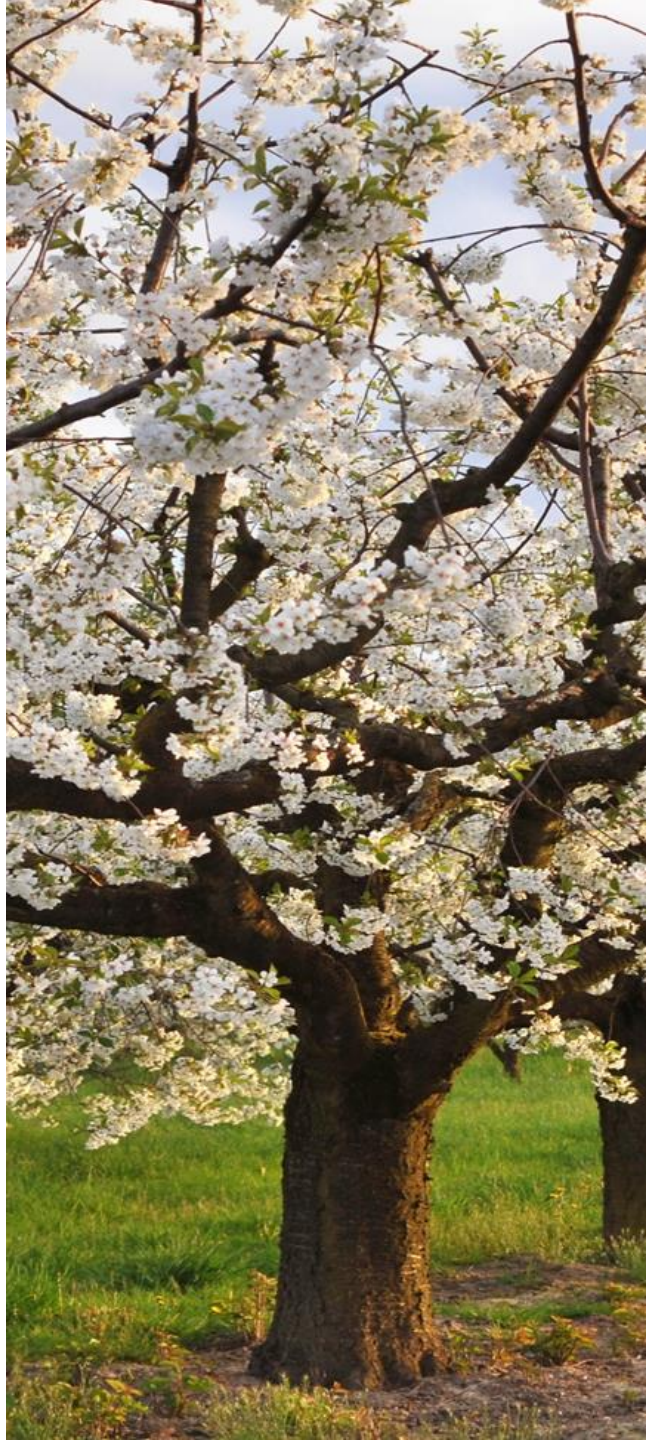

A step-change in climate ambition

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Increasing the EU's Climate ambition for 2030 and 2050

- European '**Climate Law'** enshrining the 2050 climate neutrality objective in legislation by March 2020
- **Comprehensive plan** to increase the EU's climate target for 2030 to at least 50% and towards 55% in a responsible way by October 2020
- **Review and revise where needed all relevant legislative measures to deliver on this increased ambition** by June 2021

- A new EU **Strategy on Adaptation** in 2020/2021

The EU as a global leader

A European Climate Pact

Carbon farming initiative (Farm to fork strategy)

Carbon farming

- Climate
- Increase SOC in mineral soils and grasslands
- Protection/restoration of C-rich soils
- Increase storage in biomass

CAP

- **CAP Recommendation and Strategic Plans**
- **40% climate mainstreaming**
- **Incentives through CAP**
  - **'Green architecture'**
  - **Cooperation (EIP-AGRI)**
  - **Farm Advisory Service (+AKIS)**
  - **Synergies with R&I Soil Mission and Horizon Europe**

Certification of carbon removals

- **EU-wide standards for carbon removals**
- **Voluntary and regulatory carbon markets**
- **Nature-based and technological**
- **Other (e.g. product standards)**

Restoring sustainable carbon cycles (Communication)

European Commission

https://ec.europa.eu/clima/news/commission-sets-carbon-farming-initiative-motion_en

Examples of potential agricultural practices that eco-schemes could support

- **Agroecology**: crop rotations with leguminous crops; miex cropping – multi-cropping, etc.
- **Husbandry, animal welfare**: friendly housing conditions; feeding plans; practices increasing animal robustness; etc.
- **Agroforestry**: establishment and maintenance of landscape features; high-biodiversity silvo-pastoral systems
- **Carbon farming**: conservation agriculture; rewetting wetlands/peatland, paludiculture; appropriate management of residues; establishment, maintenance and extensive use of permanent grassland
- **Precision farming**: nutrient management plan; precision crop farming to reduce inputs; improving irrigation efficiency
- **Other practices related to GHG emissions**: feed additives to decrease emissions; improved manure management and storage
- …

Research and innovation needs

Improve monitoring, reporting and verification (use of remote sensing, field measurements and multisectorial integrated modelling, set standards for GHG accounting systems)

Ecosystem monitoring of GHG fluxes. Understand dynamics with future climate scenarios

Carbon in soil: Best practices to minimise Soil C losses; EU-wide maps of Organic soils; Appropriate management of grasslands to increase C storage and resilience; crop rotations, etc.

Push the reduction of emissions in the agricultural sector: feed additives; small scale biodigestors, precision agriculture, sustainable fertilisation, nutrient recovery, circular economy, agro-ecology, organic agriculture, agro-forestry

LCA and GHG calculators for farmers, foresters, and policy makers

Restoration and management of peatlands and wetlands

Carbon farming (how to reward for C sequestration), how to define C credits

Land use modelling for land availability and land dynamic > production of non-food crops

Enzimatic processes for the production of biofuels from lignocellulosic material

Understand drivers of biodiversity and halt losses

…

Recent Horizon 2020 projects

- **European Joint Programme EJP Soil** « towards climate-smart sustainable management of agricultural soils »

- The EU-funded EJP SOIL project aims to create an enabling environment to enhance the contribution of agricultural soils to key societal challenges such as climate change adaptation and mitigation, sustainable agricultural production, ecosystem services provision as well as prevention and restoration of land and soil degradation.

- Total budget €80 mio co-financed EU / MS

Recent Horizon 2020 projects – Green deal call

***ClieNFarms* - Climate Neutral Farms**

- Objective: 20 demonstration case-studies where **systemic innovative solutions for reducing GHG emissions** will be tested and evaluated. Solutions to be **co-designed with farmers** and the surrounding ecosystem (R&D, finance, supply chain, etc) in a living-lab like structure.
- Coordinator: INRAE, France - Total budget: €13.6 mio

***ENOUGH* - European food chain supply to reduce GHG emissions by 2050**

- Objective: identify **energy efficiency measures** and **new technologies** to achieve the maximum reductions in emissions in the food sector, examine how **social behaviour, policy and finance** can add to the GHG reductions target and **demonstrate promising technologies**.
- Coordinator: SINTEF OCEAN AS, Norway - Total budget: €11.5 mio

Horizon Europe work programme 2021/2022

CLUSTER 6

- Climate smart farming network of demonstration – 2021 to 2023
  - WP year 2021 – Pilot farms - ***Climate Farm Demo*** project selected
  - WP year 2022 – Advisers
  - WP year 2023 – Research stations
- WP year 2021 - Modeling land use/management and climate change – Project ***LAMASUS***
- WP year 2021 - EU agriculture within safe operating space and planetary boundaries – project ***BrightSpace*** – focus on climate change and biodiversity dimensions.
- WP year 2022 - Fostering resilience of agricultural production – from observation of change to resilience strategies

CLUSTER 5

- WP year 2021: restoration of natural wetlands, peatland and floodplains – three projects
- WP year 2022: social sciences for land use strategies in the context of climate change

European Partnership candidate on Accelerating farming systems transition: ‘agroecology living labs (LL) and research infrastructures (RI)’

Vision: Team-up and unlock the transition to agroecology (AE) so that farming systems are resilient, productive and prosperous, place-sensitive, climate, environment-ecosystem, biodiversity- and people-friend

General Objectives (GO):

- GO1: **Mainstream the principles of AE** to redesign farming systems across a diverse Europe
- GO2: . Build-up and expand **collaborations to co-create and share knowledge** and solutions that empower all actors to engage in the AE transition
- GO3: Contribute to fulfilling the **SDG and the Green Deal targets** by 2030 and climate neutrality in Europe by 2050

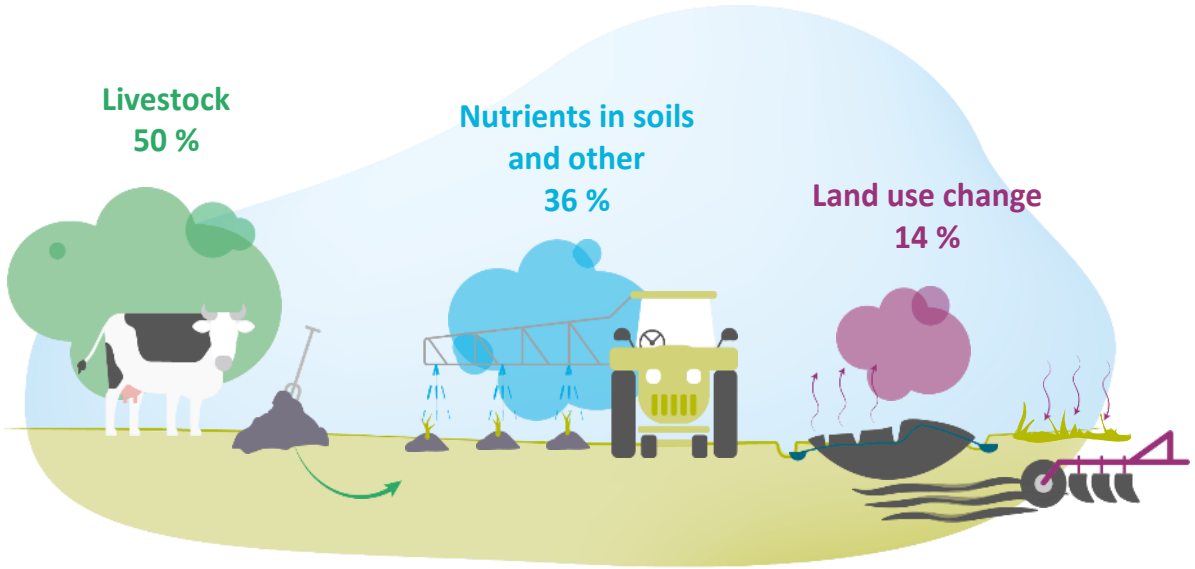
Specific Objectives (SO):

- SO1: Increase **research-based knowledge** on the benefits and challenges of AE and its potential for farming, food, climate, ecosystem services and environmental footprint reduction as well as resource use and societal impacts.
- SO2: **Develop and co-create innovations** to reduce and share the risks of transition for both individuals and collectives.
- SO3: Improve the **sharing and access to knowledge on AE** as well as reinforce the AKIS for AE across Europe
- SO4: Build a **monitoring and data framework** to measure progress of the AE transition and improve data valorisation and sharing.
- SO5: Exchange with **policy makers** (research and sectoral) and stakeholders to contribute to improved governance, policies, and institutions.

Operational Objectives (OO):

OO1 – OO8 covering R&I on challenges and potential of AE, creation and promotion of LL, networking, share of best practices, capacity building, access and use of services provided by RI, monitoring, communication, dissemination, science-policy dialogue.

Livestock impact: climate & environment



Mainly methane (CH_4) from

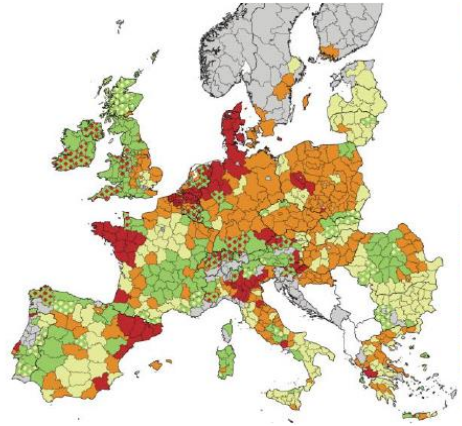
- feed digestion by cattle and sheep
- storage of cattle and pig manure

Mainly nitrous oxide (N_2O) from

- application of chemical fertiliser
- manure applied by farmers or deposited by grazing cattle

Mainly carbon dioxide (CO_2) from

- cultivation of drained organic soils (peatland)
- carbon sequestration on grassland and cropland



Low proportion of grassland in agricultural area, high animal density
High proportion of grassland in agricultural area, high animal density
High proportion of grassland in agricultural area, medium animal density
High proportion of grassland in agricultural area, low animal density
Low proportion of grassland in agricultural area, corps and animals
Low proportion of grassland in agricultural area, low animal density
Less than 20% of agricultural area in total area

	Agricultural area million ha	% total	Livestock population million LU	% total	Stocking rate (LU/ha)
	18.9	10.5	40.8	29.5	2.15
	12.0	6.7	20.1	14.6	1.70
	34.7	19.3	25.6	18.5	0.75
	12.2	6.8	2.9	2.1	0.25
	56.8	31.6	36.8	26.6	1.20
	44.9	25.0	11.9	8.6	0.30

Source: ECA based on the EU-27 greenhouse gas inventories in 2018 (EEA greenhouse gas data viewer, European Environment Agency (EEA)).

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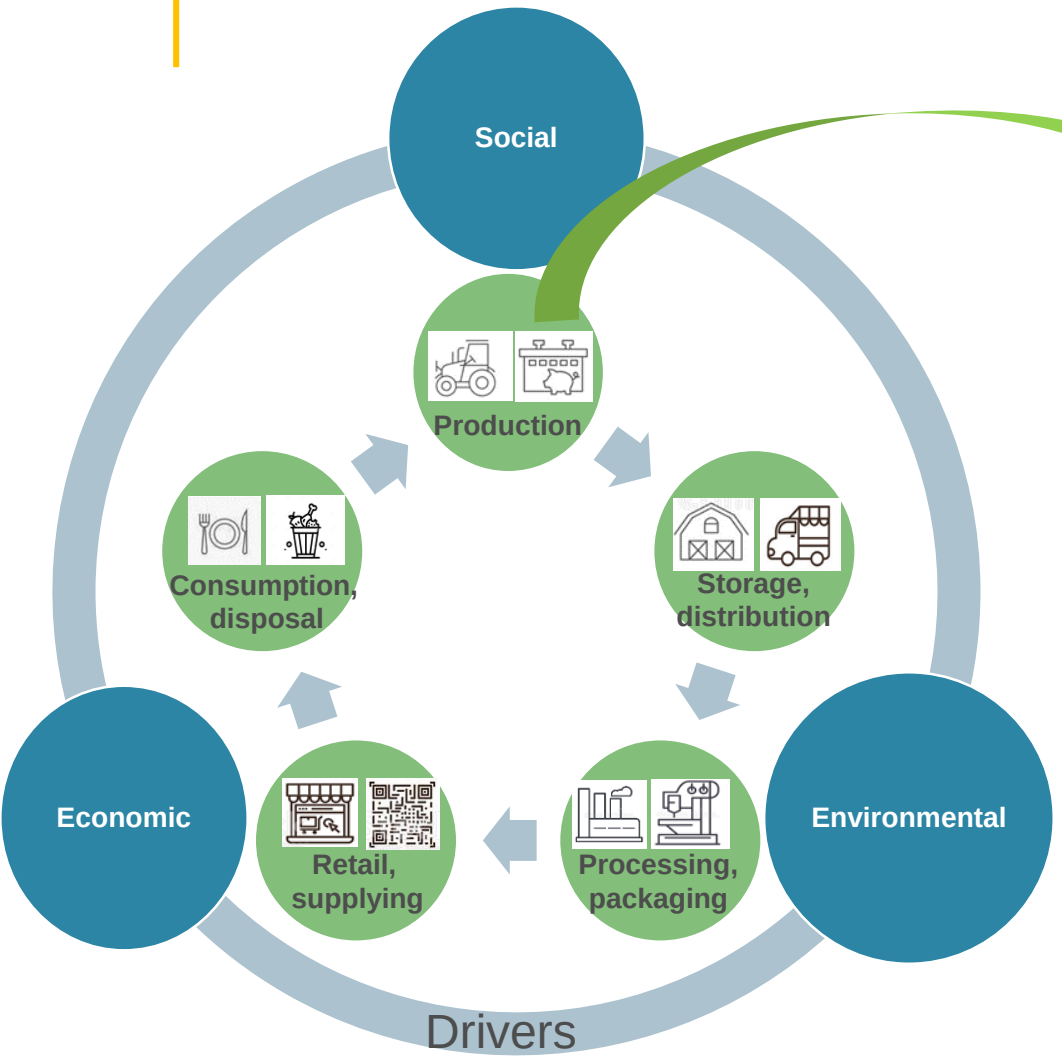
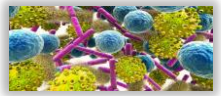
Sustainable livestock in AGRI R&I strategy



Reducing emissions, excretion			Breeding, Genetics
Alternative source of proteins			Feeding techniques
Microbial ecosystems			Antimicrobials
Grazing			Legume production
Animal Health & Welfare			Manure management and storage

Mitigation

- Feed production
- Manure management
- Fertilizer management
- Herd size
- Precision farming
- Shifting human dietary trends
- ….

Adaptation

- Land resource management
- Animal feeding strategies
- Promote market and trade
- …..

- Land use & management
- Mixed crop-livestock systems
- Agroforestry
- Animal feeding strategies
- Animal species / Breeding
- Disease control
- ……

On-going projects on sustainable husbandry*

- **PATHWAYS** : *Pathways for transitions to sustainability in livestock husbandry and food systems* *https://cordis.europa.eu/project/id/101000395* (9M€, 01/09/2021-31/08/2026)
- **Code Re-farm**: *Consumer-driven demands to reframe farming systems* (6M€; May 2021 – Oct 2024)
- **INTAQT**: *INnovative Tools for Assessment and Authentication of chicken meat, beef and dairy products' QualiTies* https://cordis.europa.eu/project/id/101000250 - (RIA, 6M €, 01/06/2021-31/05/2026)
- **mEATquality:** *Linking extensive husbandry practices to the intrinsic quality of pork and broiler meat* (RIA, 6M€; 01/10/2021 – 30/09/2025)
- **MIXED** *Multi-actor and transdisciplinary development of efficient and resilient MIXED farming and agroforestry-systems* *https://cordis.europa.eu/project/id/862357* (RIA, 7M€; 01/10/2020 - 30/09/2024)
- **R4D**: *Resilience For Dairy*. https://cordis.europa.eu/project/id/101000770 / https://eurodairy.eu/ (CSA, 2M€, 01/01/2021-31/12/2023)
- **SmaRT**: *Small Ruminant Technology - Precision Livestock Farming and Digital Technology for Small Ruminants* (CSA, 2M€; 01/01/2021 – 31/12/2023)
- **SEASOLUTIONS** : *Seaweeds and seaweed-ingredients to reduce enteric methane emissions from pasture based sheep, cattle and dairy cows*. https://seasolutions.ie/ - (2M€, 02/01/2020-05/01/2023)
- **BovINE** *Beef Innovation Network Europe* https://www.bovine-eu.net/ (CSA, 2M€; January 2020 - December 2022)
- **SMARTER** *SMAll RuminanTs breeding for Efficiency and Resilience* www.smarterproject.eu/ (RIA, 7M€; 01/11/2018- 31/10/2022)
- **MilKey**: *Decision support system for sustainable and GHG optimised milk production in key European areas*. https://www.milkey-project.eu/ - (2M€, 01/01/2020-31/12/2022)
- **FarmSustainaBl**: *Enabling Smart Livestock Farming Technologies for Environmental Sustainability using Blockchain*. https://www.farmsustainabl.eu/ - (675k€, 01/10/2019-30/09/2022)

FACCE-JPI ERA-GAS projects: CEDERS, CCCFarming, FarmSustainBl, GrassToGas, GrASTech, M4Models, MELS…

ERA-NET SusAn projects: SusSheP, SusPig, Sustainbeef, SusCatt, SusTradeOff…

*Not exhaustive list

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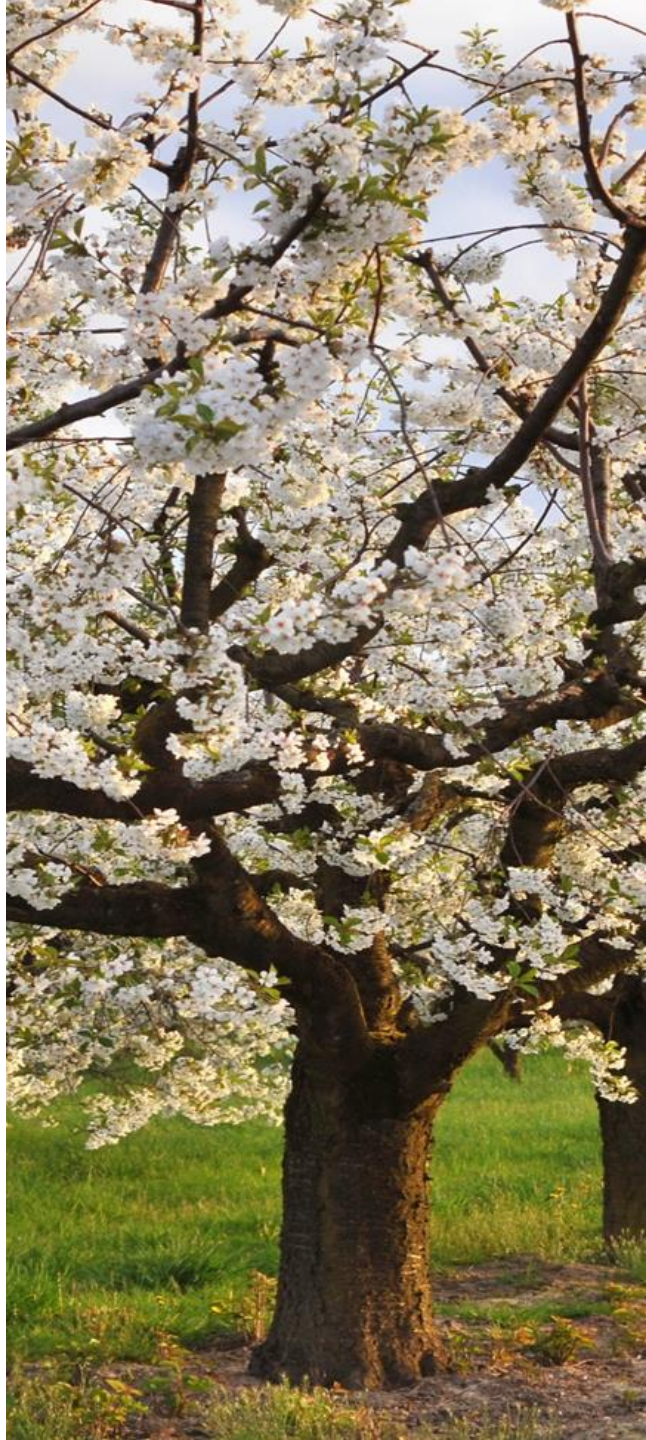
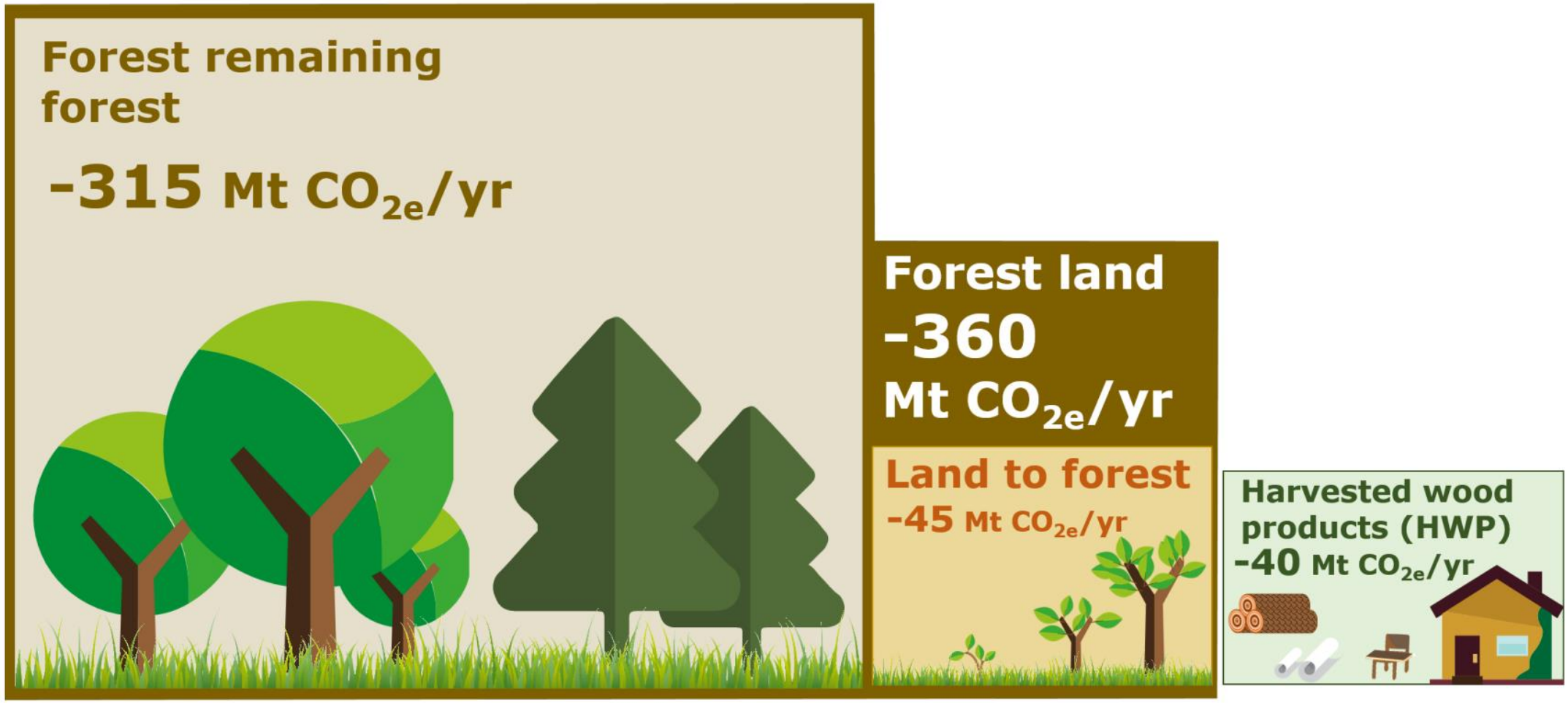


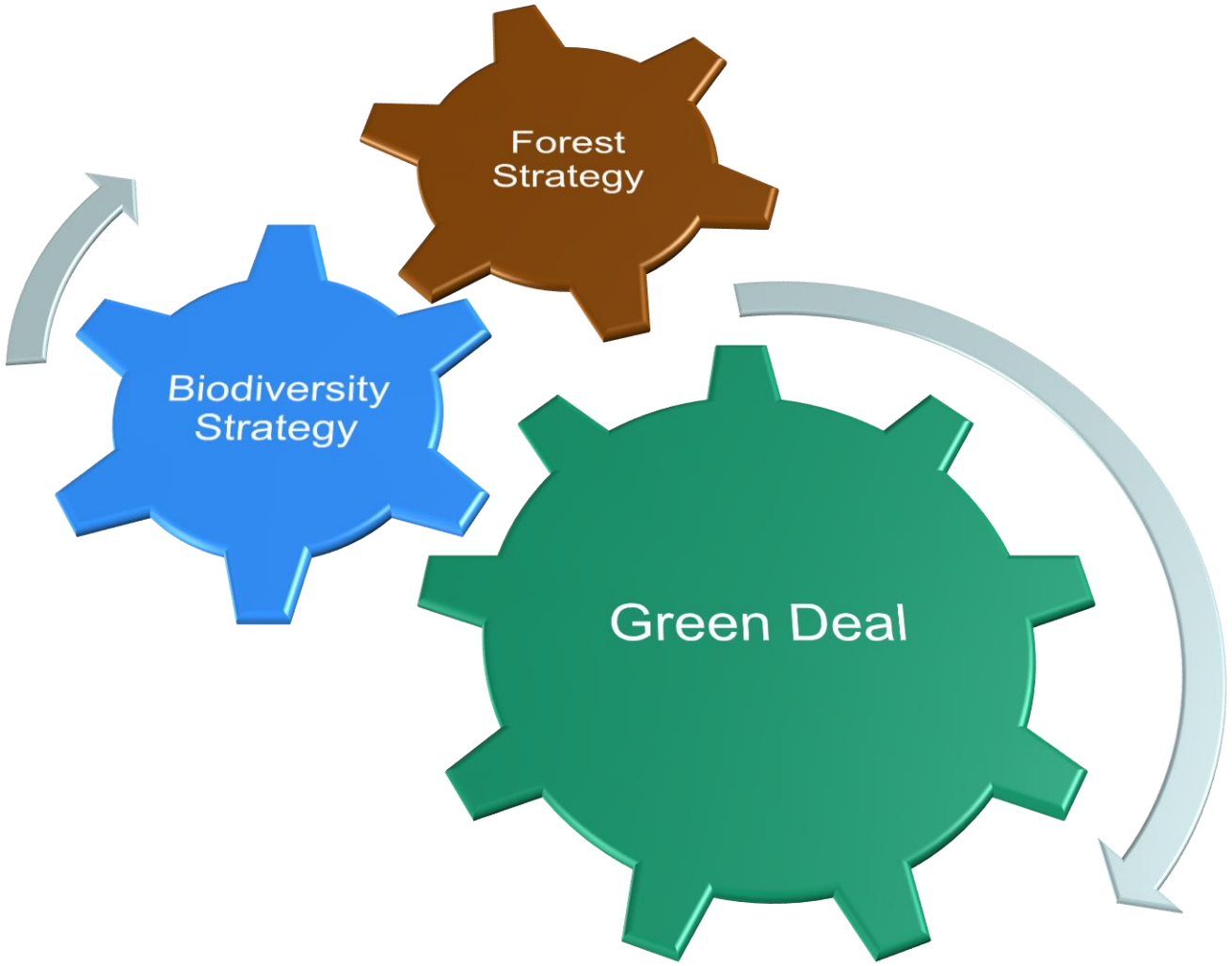
Role of the forest-based bioeconomy in mitigating climate change through carbon storage and material substitution



Approximate average net carbon sinks in the EU-27 during the period 2016-2018, source: European Commission

European Commission

EU Forest Strategy 2030



As a flagship initiative of the European Green Deal and building on the 2030 biodiversity strategy, the Commission adopted the new EU forest strategy for 2030, covering the whole forest cycle and promoting the many services that forests provide.

It sets out a vision and concrete actions to improve the quantity and quality of EU forests and strengthen their protection, restoration and resilience. It aims to adapt Europe's forests to the new conditions, weather extremes and high uncertainty brought about by climate change. This is a precondition for forests to continue delivering their socio-economic functions, and to ensure vibrant rural areas with thriving populations.

It builds on best available scientific evidence and will be implemented in respect of subsidiarity and better regulation principles.

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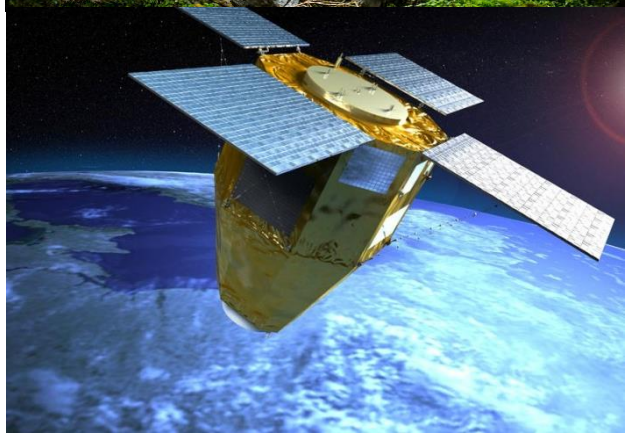
At the core of the EUFS: the economic, social and environmental functions of forests

- the multi-functional role of forests
- the contribution of foresters and the entire forest-based value chain for achieving by 2050 a sustainable and climate-neutral economy
- ensuring that forest ecosystems are restored, resilient, and adequately protected.
- Adequate forest monitoring and strategic planning for the future



ENABLING ELEMENTS

A strong research and innovation agenda

Inclusive and coherent EU forest governance framework

Stepping up implementation and enforcement of existing EU acquis

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Research & Innovation (selection)

- Enhance the knowledge on climate change impacts, contribute to a greater diversity of forests and genetic resources, and provide **evidence-based and practically feasible guidance for climate change mitigation and adaptation** in line with biodiversity objectives.

- **Add more value on sustainable and multifunctional forests** to maximise the benefits for society (e.g. carbon farming, etc.).

- Support the **design and implementation of forest restoration strategies** with engagement of the society and in different ecological and socio-economic settings, including through the mission 'A Soil Deal for Europe'.

- Improve the understanding of **primary and old-growth forests** and of their biodiversity and climate functions.

- Innovative and resource efficient bio-based products to **substitute non-renewable materials**, increase the competitiveness of the forest-based sector and boost rural economies by enhancing skills, knowledge and innovation.

- Develop a "**Planning our Future** Forests" research and innovation agenda together with Member States and stakeholders by jointly identifying research gaps and future priorities for forestry and the forest-based sector.

- **Enhance EU cooperation** by proposing a Research and Innovation partnership on forestry, including flagships for testing and demonstrating solutions on selected key strategic domains.

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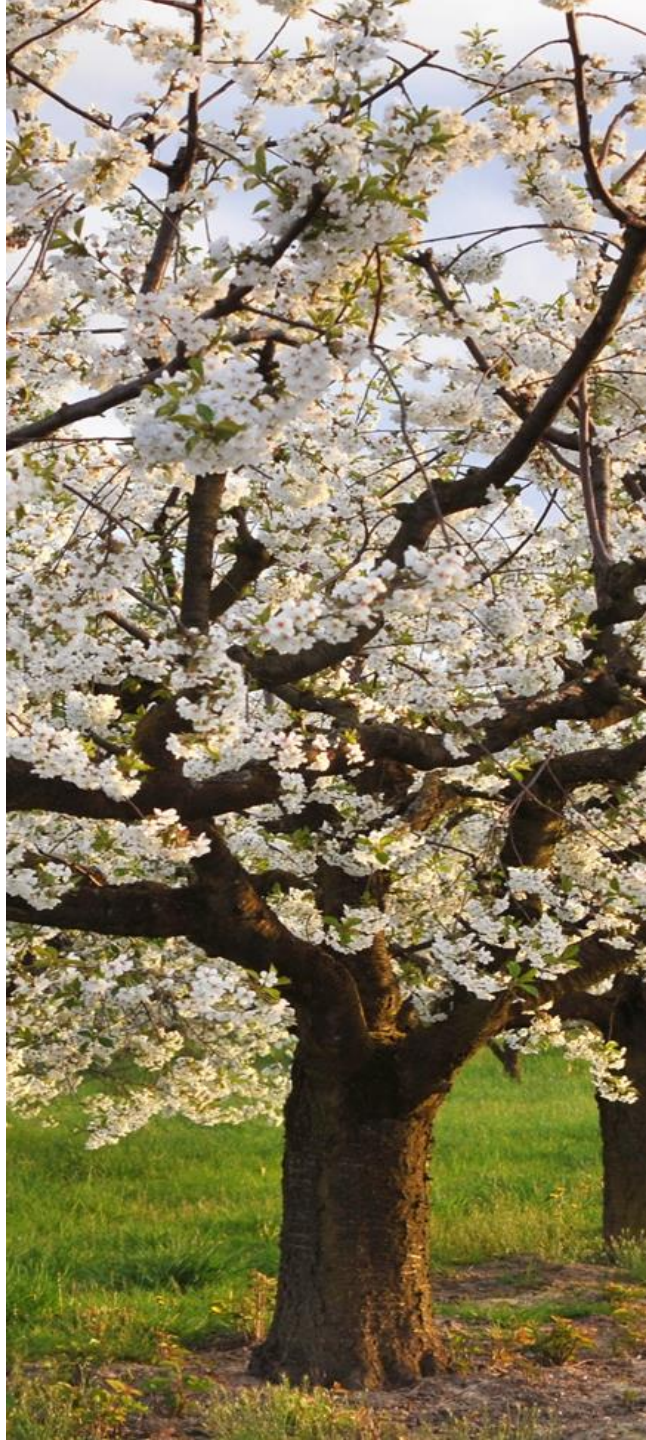

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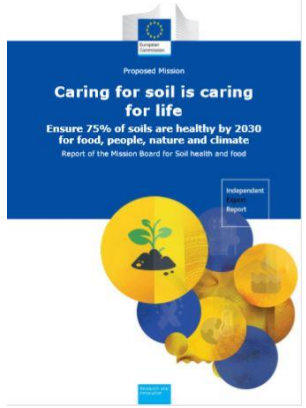
EU MISSIONS
SOIL DEAL FOR EUROPE

Developing the mission



R&I days 2020
the Mission Board hands over its report **"Caring for soil is caring for life"**

September 2019 | until September 2020 | September 2020 | until June 2021 | 29 Sept 2021

R&I days 2019
creation of the Mission Board Soil health and food

Mission board develops its recommendation for a mission. **More than 60 events to promote and co-create the mission**

Commission services prepare the **mission implementation plan**

Official launch of the missions through a **Commission Communication**

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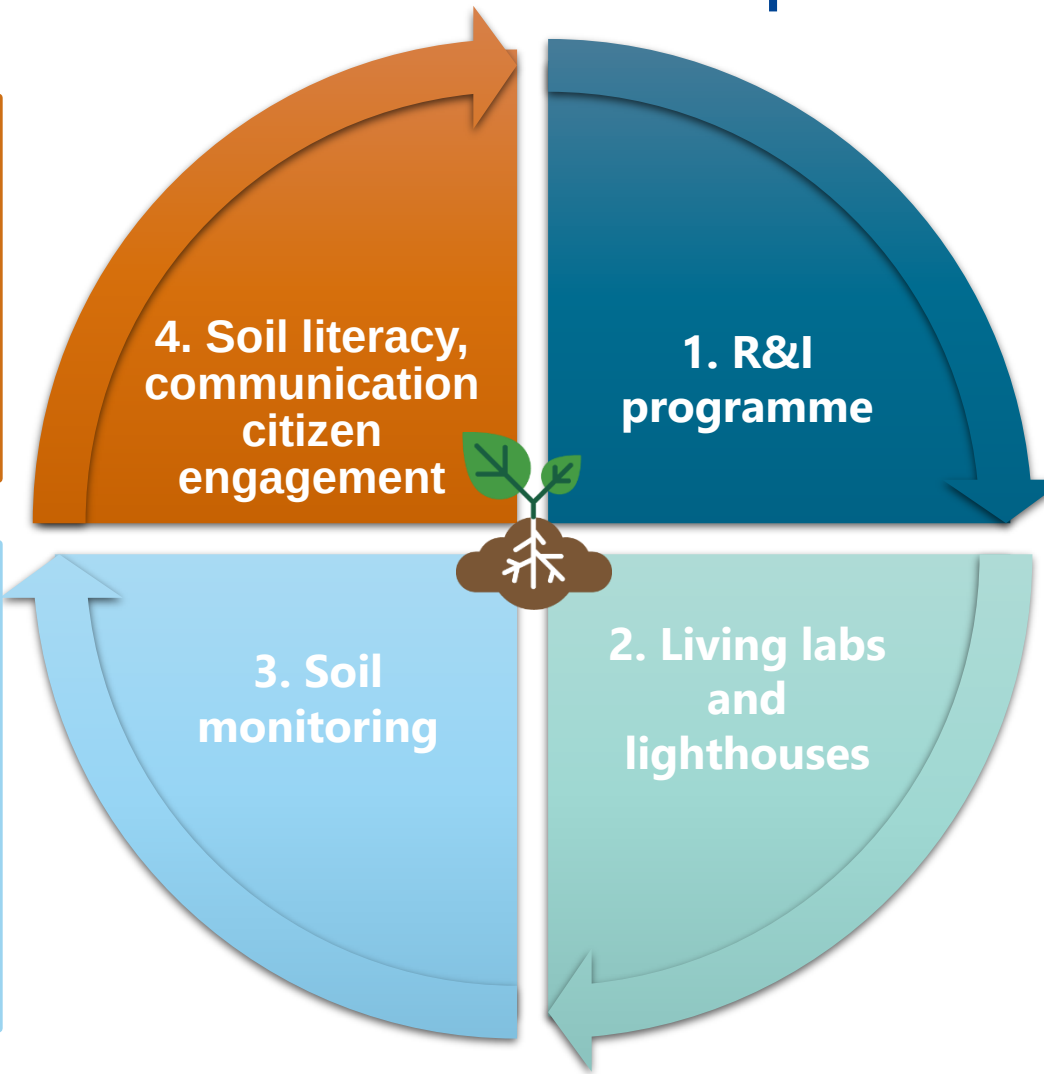
How will the mission be implemented?

Communication material, training curricula for different target groups and **specialised "soil advisors"**



Data infrastructures and platforms; **knowledge** to support management practices, business models, technologies

Harmonisation of indicators, measuring and reporting for soil health across Europe; contribution to **European Soil Observatory**

A network of **real-life sites for testing, demonstrating and upscaling of solutions;** due attention to balanced representation across regions

Activities under the four building blocks to address soil health and drivers of soil health

Who will act?

Co-implementation of mission by: researchers, land managers, regions, businesses, policy makers, citizens and international partners

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Implementation of the Mission

First call for proposals under the mission in the area of Soil health and food

Horizon Europe Mission Work-Programme 2021

- **Topic HORIZON-MISS-2021-SOIL-01-01: "Preparing the ground for healthy soils - building capacities for engagement, outreach and knowledge"** Action to identify regional "soil needs" and monitoring requirements, map existing living labs and lighthouses and help to create a one-stop shop for soil information.
- Proposals are under evaluation

Update of Horizon Europe Mission Work Programme 2021:

- 8 topics open since 22 December 2021
- deadline for submission of proposals: end of March 2022

Mission Work Programme 2022

- more substantial number of topics to initiate the mission
- publication of Work Programme planned for mid May 2022

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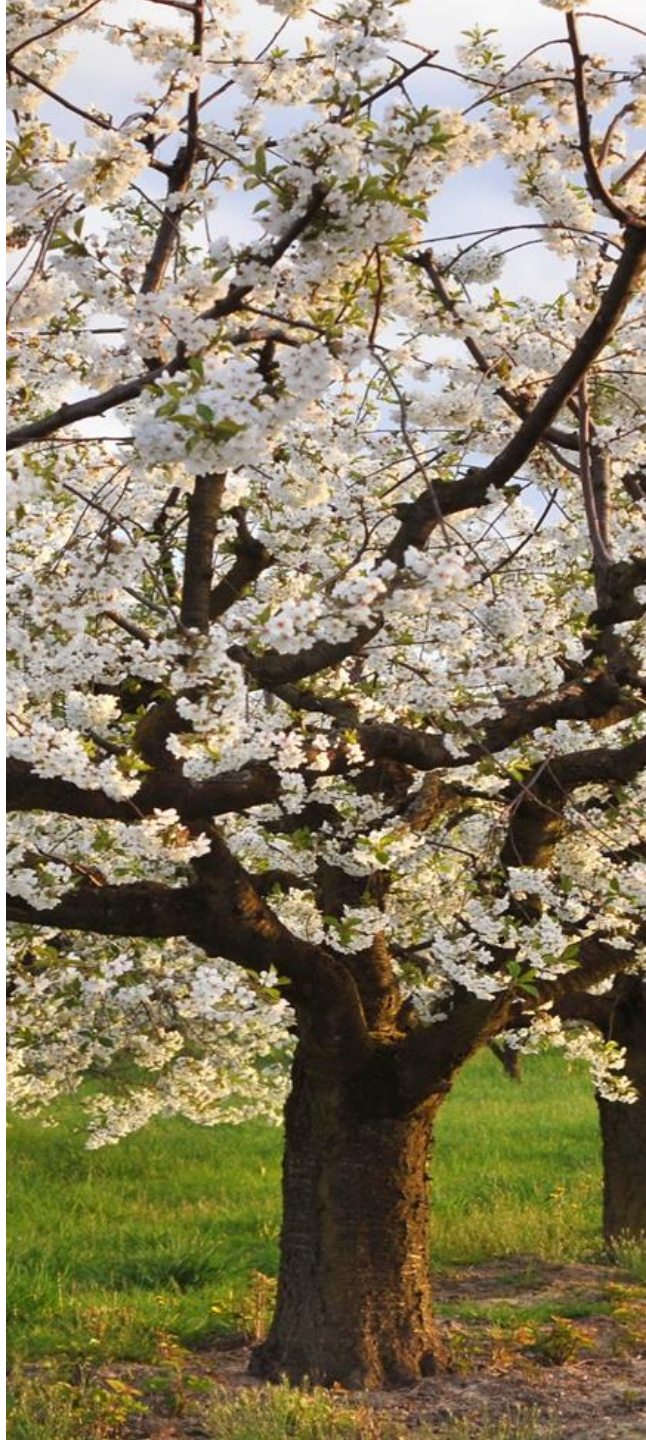

Working together at global level is key

- **International Research Consortium** in the making on **soil and carbon** (prepared by project Circasa)
- The European Commission is associated partner to the **Global Research Alliance on GHGs**
- The European Commission became government member of the joint UAE-USA initiative « AIM for Climate »
- Partnership with **Africa Food and nutrition security and sustainable agriculture** (FNSSA) takes resilience and climate change challenges at heart
- Mission on **soil health expected** to contribute to R&I globally including on climate change

Africa-EU partnership

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Many thanks for your attention!

Innovation in action

http://ec.europa.eu/eip/agriculture/

Agriculture and Rural Development