



Bioremediation in the EU R&I programmes

Horizon Europe and Circular Bio-based Europe Joint Undertaking

Silvia Maltagliati, Tomasz Calikowski

European Commission – DG Research&Innovation – Healthy Planet

R&I framework programmes

Horizon Europe Cluster 6
IA2 'Biodiversity and
Natural Capital', IA6 'Bio-
based innovation
system'



Horizon Europe
EU Mission: A



Circular Bio-based
Europe Joint
Undertaking



Circular
Bio-based
Europe
Joint Undertaking



Horizon Europe
EU Mission:
Restore our
Oceans and
Waters

Horizon Europe Cluster 6

Strategic Plan 2021-2024: expected impacts of Cluster 6

29. Sustainable and circular management and use of natural resources as well as prevention and removal of pollution are mainstreamed, unlocking the potential of the bioeconomy, ensuring competitiveness and guaranteeing healthy soil, air, fresh and marine water for all, through better understanding of planetary boundaries and deployment of innovative technologies and other solutions, notably in primary production, forestry and bio-based systems.

Cluster 6 will support in particular the following two Horizon Europe key strategic orientations and Impact Areas associated to them³¹



KEY STRATEGIC ORIENTATIONS FOR R&I

IMPACT AREAS

KSO B: **Restoring** Europe's ecosystems and biodiversity, and managing sustainably natural resources

Enhancing ecosystems and biodiversity on land and in waters

Clean and healthy air, water and soil

Sustainable food systems from farm to fork on land and sea

KSO C: Making Europe the first digitally enabled circular, climate-neutral and sustainable economy

Circular and clean economy

Horizon Europe Cluster 6 IA2 'Biodiversity and Natural Capital'

In the HE proposal 2018, and kept in HE Specific Programme (Council Decision 2021/764), IA2 has a narrative and 6 'broad lines'

Narrative

*Improved understanding of biodiversity and ecosystems, the multiple services they provide and planetary 'boundaries' as well as solutions harnessing nature's power and complexity..
..'Living well within the limits of our planet' by 2050 as laid down in the 7th EU Environmental Action Programme....*

Broadlines

- BL1. The state and value of biodiversity, terrestrial and marine ecosystems, natural capital and ecosystem services;
- BL. 2. Holistic and systemic approaches within a socio-ecological framework ..
- BL.3. Modelling of trends and integrated scenarios for biodiversity, ecosystem services and good quality of life a...
- BL.3. Ecotoxicology of compounds and new pollutants, ...
- BL.4. Mainstreaming biodiversity and ecosystem services in decision-making Frameworks..
- BL.5. **Adaptable and multi-functional nature-based solutions**, addressing challenges in cities, rural and coastal areas related to climate change, natural disasters, biodiversity loss, **ecosystem degradation**, **pollution**, and citizens' health and well-being;
- BL.6. Multi-actor living labs approaches..

HORIZON-CL6-2023-BIODIV-01-9

**Biodiversity, economics and finance: unlocking
financial flows towards reversing of biodiversity loss**

Research and Innovation Action

**Call closed
28 March 2023**

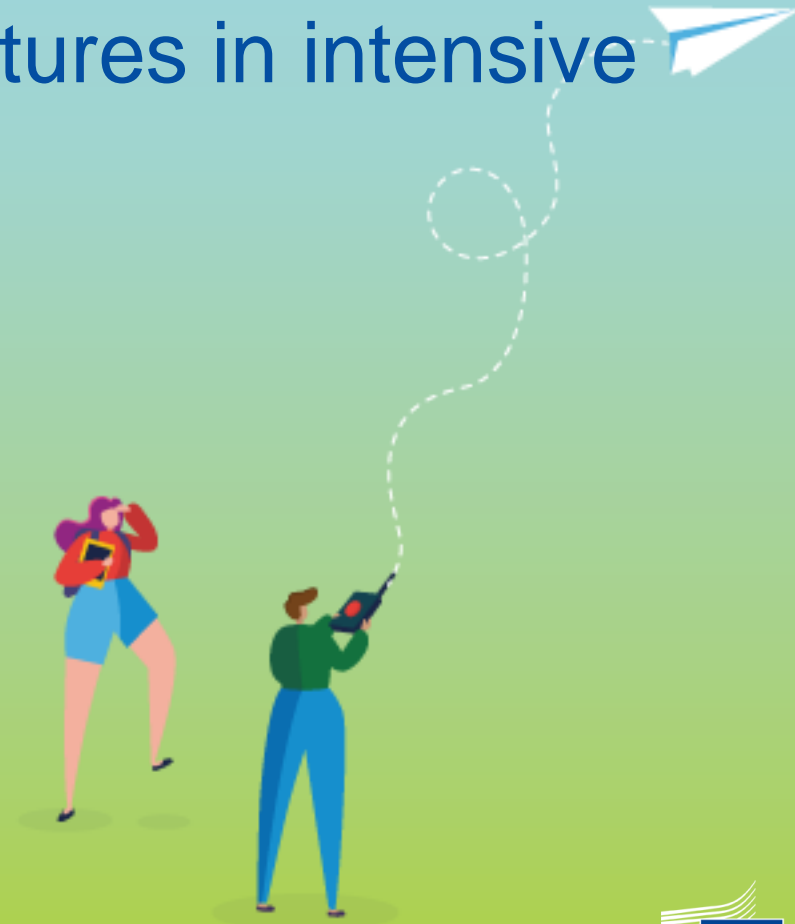


HORIZON-CL6-2024-BIODIV-01-7

Reintroduction of landscape features in intensive agricultural areas

Research and Innovation Action

***CLUSTER 6 INFO DAYS
28-29 September 2023***



Horizon Europe Cluster 6 IA6 'Bio-based innovation systems'

In the HE proposal 2018, and kept in HE Specific Programme (Council Decision 2021/764), IA6 has a narrative and 7 'broad lines'

Narrative

Bio-based innovation lays the foundations for the transition away from a fossil-based economy by encompassing the **sustainable sourcing, industrial processing and conversion of biomass from land and sea into bio-based materials and products**. It also capitalises on the **potential of living resources, life sciences and industrial biotechnology** for new discoveries, products and processes. **Bio-based innovation, including technologies, can bring new economic activities and employment to regions and cities, contribute to revitalising rural and coastal economies and strengthen the circularity of the bioeconomy.**

Broadlines

BL1. Sustainable biomass sourcing, logistics and production systems...

BL2. Life sciences and their convergence with digital technologies...

BL3. Bio-based value chains, bio-based materials, including bio-inspired materials, chemicals, products, services and processes with novel qualities...

BL4. Biotechnology, including cross-sectoral cutting-edge biotechnology...

BL5. Circularity of the bio-based sector within the bioeconomy through technological, systemic, social and business model innovation to radically increase the value generated per unit of biological resource...

BL6. Inclusive bioeconomy patterns...

BL7. Increased understanding of the boundaries, metrics and indicators of the bioeconomy....

HORIZON-CL6-2021-ZEROPOLLUTION-01-10

Environmental services: improved bioremediation and revitalization strategies for soil, sediments and water

Research and Innovation Action

NYMPHE SYMPIOREM BIOSYSMO

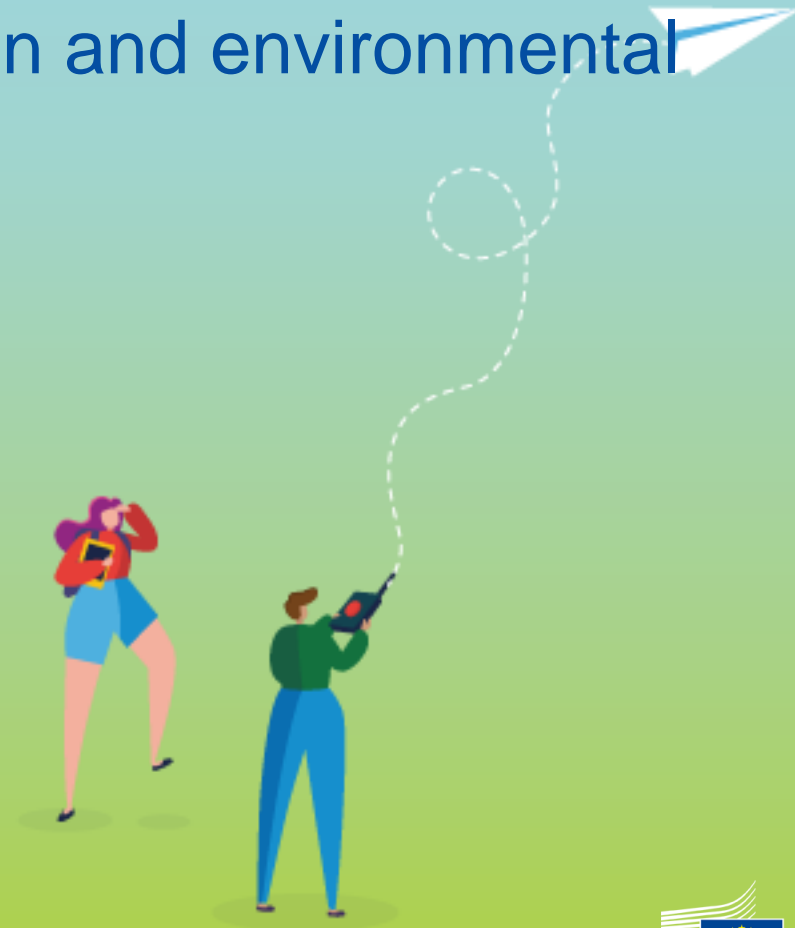


HORIZON-CL6-2021-CIRCBIO-01-07

Microbiomes for bio-based innovation and environmental applications

Innovation Action

MIBIREM





EUROPEAN UNION



EU MISSIONS

RESTORE OUR OCEAN & WATERS

Concrete solutions for our greatest challenges



#EUmissions #HorizonEU #MissionOcean



Mission objectives and targets

Restore our Ocean and Waters by 2030

PROTECT AND RESTORE MARINE AND FRESHWATERS ECOSYSTEMS AND BIODIVERSITY

- Protect at least 30% and strictly protect 10% EU's sea areas
- Restore 25.000 km free flowing rivers
- **Marine nature restoration targets (incl. degraded seabeds, coastal ecosystems)**

PREVENT AND ELIMINATE POLLUTION OF OUR OCEANS, SEAS AND WATERS

- Reduce by at least 50% plastic litter
- **Reduce by at least 30% microplastics**
- Reduce by at least 50% nutrient losses, chemical pesticides

MAKE THE BLUE ECONOMY CARBON- NEUTRAL AND CIRCULAR

- Net zero maritime emissions
- Zero carbon aquaculture,
- Low carbon multipurpose use of marine space

ENABLERS

Digital Ocean and Waters Knowledge system

Public mobilization and engagement

Zero pollution Portfolio of projects

Objective 2

2021

Lighthouse CSA - 3M€

BlueMissionMed - Lighthouse coordinating and supporting the innovation ecosystem for a Healthy Pollution free Mediterranean Sea

Actions to prevent, minimise and remediate litter and plastic pollution, IA – 16M€

SeaClear2.0 - Scalable Full-cycle Marine Litter Remediation in the Mediterranean: Robotic and Participatory Solutions

REMEDIES - Co-creating strong uptake of REMEDIES for the future of our oceans through deploying plastic litter valorisation and prevention pathways

Marine litter and pollution – Smart and low environmental impact fishing gears, IA - 10M€

SEARCULAR- Circular solutions for fishing gears

NETTAGPlus- Preventing, avoiding and mitigating environmental impacts of fishing gears and associated marine litter

2022

Prevent and eliminate litter, plastics and microplastics: Innovative solutions for waste-free European rivers, IA – 10M€

UPSTREAM- Circular and Bio-Based Solutions for the Ultimate Prevention of Plastics in Rivers Integrated with Elimination And Monitoring Technologies

INSPIRE- Innovative Solutions for Plastic Free European Rivers

Actions to prevent, minimise and remediate chemical pollution, IA - 17M€

RHE-MEDIation- Responsive Hub for long term governance to destress the Mediterranean Sea from chemical pollution

iMERMAID- Innovative solutions for Mediterranean Ecosystem Remediation via Monitoring and decontamination from Chemical Pollution

2023

Missions Ocean & Soil – Joint demonstration of approaches and solutions to address nutrient pollution in the landscape-river-sea system in the Mediterranean sea basin, IA - 8M€

Call deadline for WP2023 topics: 20/09/2023



EUROPEAN UNION



EU MISSIONS

SOIL DEAL FOR EUROPE



© European Union, 2021

#EUmissions #HorizonEU #MissionSoil

Disclaimer: This presentation is intended to provide a non-comprehensive and feasible overview of the topic; for legally binding information, please, see the [Funding and Tender Portal](#)



Mission goal

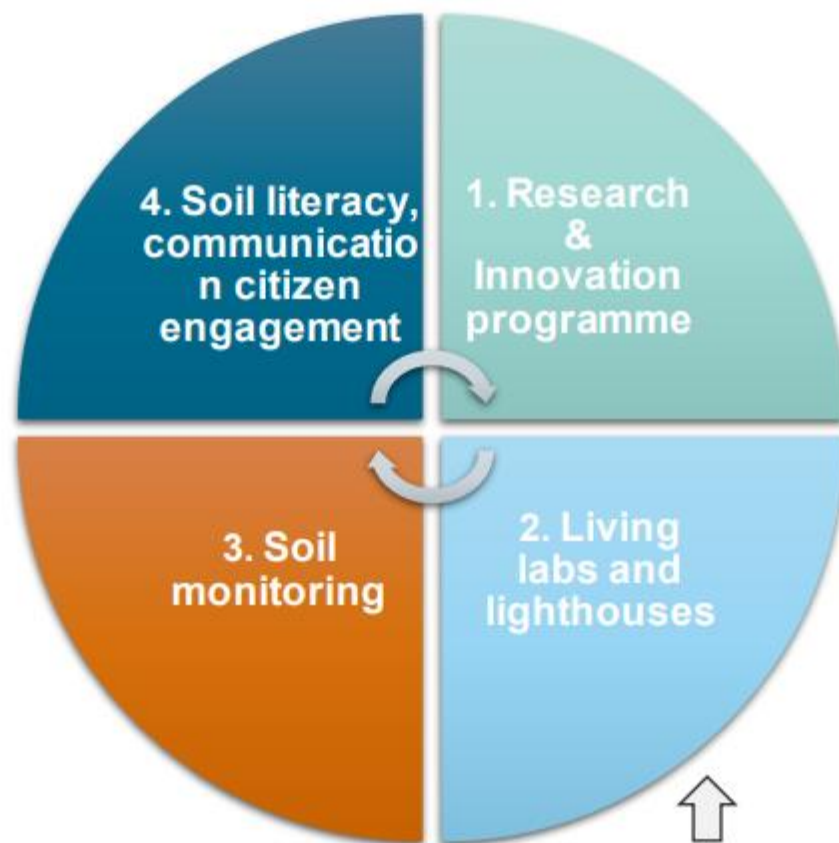
100 living labs and lighthouses to lead the transition towards healthy soils by 2030

Specific objectives



Objectives apply to **all types of land use** and **all territories** and are relevant for a **range of sectors**.

Building blocks



Main vehicle for addressing the diversity of conditions and generating locally adapted solutions



EUROPEAN UNION

ARAGORN
EDAPHOS
ISLANDR



EU MISSIONS

SOIL DEAL FOR EUROPE

HORIZON-MISS-2022-SOIL-01-04

Remediation strategies, methods and financial models for
decontamination and reuse of land in urban and rural areas

Research and Innovation Action

#EUmissions #HorizonEU #MissionSoil



Horizon Europe Cluster 6: 2025-2027

Strategic Plan 2025-2027: potential gaps from the SP analysis

Agriculture, Forestry and Rural Areas:

challenges for soil, water, nutrient and biodiversity: integrated nutrient management plans, **soil decontamination** and carbon removal, research on the sublethal effects of pesticides on pollinators, water pollutants and their impact on environmental health and air pollution.

Seas, oceans and inland waters

- i) **restoration methods for European lakes and freshwater** ecosystems and reservoirs -linkage with climate change and invasive species- regulating ecosystem services
- ii) monitoring, assessing and mitigating the cumulative effects of pollution in ocean and waters,
- iii) accurate mapping and improving global governance of plastic pollution in a one health approach

Bio-based innovation Systems in the Unions - bioeconomy

- i) biodiversity protection, **restoration and enhancement**, and zero pollution in the bio-based sector, including through NBS
- ii) biotechnology approaches incl. on environmental accidents / **pollution detection and remediation**

Circular Systems

- i) knowledge and innovation on micropollutants in water systems,
- ii) strategies and technologies **to reduce biocides in water systems**,
- iii) identification and characterisation of microplastics and nanoplastics in the environment

Circular Bio-based Europe Joint Undertaking <https://www.cbe.europa.eu/>

- **EUR 2 billion** institutionalized European **partnership** between the [European Union](#) and the [Bio-based Industries Consortium \(BIC\)](#) that funds projects advancing competitive circular bio-based industries in Europe, established under [Council regulation \(EU\) 2021/2085](#) of 19 November 2021 (only institutionalized partnership in HE)
- CBE JU operating under the rules of [Horizon Europe](#), for the 2021-2031 period. The partnership is building on the success of its predecessor, the [Bio-based Industries Joint Undertaking \(BBI JU\)](#), while addressing the current challenges facing the industry.

Strategic Research and Innovation Agenda – SRIA

<https://www.cbe.europa.eu/system/files/2022-06/cbeju-sria.pdf>

Co-drafted by EC (RTD/AGRI/GROW) and BIC. Consultation with EC services. Published June 2022

Annual Work Programme – AWP

<https://www.cbe.europa.eu/system/files/2023-03/CBE-JU-Annual-Work-Programme-Budget-2023.pdf>

AWP 2022 (120 M EUR),
AWP 2023 (215.5 M EUR), call open 26 April 2023, deadline 20 September 2023
AWP 2024 in preparation

Co-drafted by EC (RTD/AGRI/GROW) BIC and CBE Programme Office. Consultation with EC services.



Strategic Research and Innovation Agenda – SRIA

<https://www.cbe.europa.eu/system/files/2022-06/cbeju-sria.pdf>

- Chapter 1 - Legal and Policy Context
- Chapter 2 - Building on the Success of BBI
- Chapter 3 - The Way Forward: CBE Partnership
- Chapter 4 - Strategy for Operation of CBE Partnership
- Chapter 5 – Governance
- Chapter 6 - Financing the CBE Partnership

- Specific types of actions for R&I grants (RIAs, IAs including flagships, CSAs, PCPs)
- Other (potential) actors/instruments

Scope: industrial sectors of the bioeconomy (food, feed, bio-based chemicals, materials, energy and services); bio-based products EXCEPT biofuels and bioenergy, food and feed (food and feed ingredients and soil nutrients are in the scope), pharmaceuticals, medical devices

GO 1 accelerate the innovation process and development of bio-based innovative solutions

GO 2 accelerate market deployment of the existing mature and innovative bio-based solutions

GO3 ensure a high level of environmental performance of bio-based industrial systems

Strategic priority 1.3.1 - Protect and enhance biodiversity and ecosystem services in bio-based feedstock supply systems

Action on «Innovative bio-based solutions for monitoring and remediation of impacts on ecosystems due to primary and secondary bio-based feedstock exploitation for industrial use.»



Synergies and complementarities between Mission - CBE JU

- R&I activities in relevant areas such as **nutrient management, fertilisers and soil improvers, plastic biodegradation, pesticides, paludiculture**, etc.).
- Activities to build capacities and the knowledge base for soil stewardship in areas of “innovation hotspots”: **carbon farming, soil pollution and restoration, soil biodiversity**, and **circular economy solutions**
- Activities to building the innovation ecosystem: Strategies and solutions for **valorisation of waste and by-products for soil health via circular approaches** incl. urban-rural synergies, nutrient and biomass recovery and short value chains. Develop strategies and business models for enhancing waste valorisation and spreading of good practices with stakeholders at all levels (companies, civic organisations, regional authorities)
- Cooperation on adoption of **circular principles for soil management**, e.g. through alignment of roadmaps
- Network of **Soil Mission living labs** that will create and test solutions for improving soil health
 - need to be complemented by additional projects piloting specific thematic areas or working at different geographical level (for instance at crossborder level or groups of regions sharing similar conditions). Those projects will be working in parallel to living labs or using some of their results and they will need to be supported by grants due to the need of proof-of-concept or due to low bankability.

| | |
|-----------------------------|--|
| Type of Action: RIAs | Topic Budget: 10 M€ |
| end TRL: 5 | EU contribution per project: 5 M€ |

HORIZON-JU-CBE-2023-RIA-01: Phyto-management; curing soil with industrial crops, utilising contaminated and saline land for industrial crop production

Scope : Cultivation and production of high-yielding and resilient **industrial crops** to restore **contaminated** lands or remediate **salt-affected** soils /**Case studies** assessing resource efficient pathways / Active **role of the farmers** in economic viable value chains

Expected outcomes

- Better knowledge **-on sustainable options** to extract, recover added value compounds, processing of the biomass into high value products – **on characteristics and quality of biomass grown** on contaminated and salt-affected soils.
- Improved environmental condition of post-industrial and other relevant areas affected by soil contamination or salinity, in view of their **future reconversion to other uses** (agriculture, recreation etc).

Other elements:

- The **high biomass yield (productivity)** is an important aspect of the topic
- Synergies with **soil Mission** including a dedicated task

**Call deadline:
20 September 2023**

Circular Bio-based Europe Joint Undertaking – Annual Work Programme

2.2.3.1 Specific requirements for the CBE JU Call 202X

- Feedstock sourcing (eligibility condition)
- Feedstock sustainability requirements
- Environmental performance: ex-ante assessment + Environmental sustainability and circularity: Ex-post assessment
- Recommendations to stakeholders
- Economic viability
- Business case and business model; business plan
- Multi-actor approach



CLIMATE CHANGE MITIGATION

BIODIVERSITY PROTECTION

ZERO POLLUTION AMBITION

WATER RESOURCES PROTECTION

Thank you



© European Union 2020

Unless otherwise noted the reuse of this presentation is authorised under the [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/) license. For any use or reproduction of elements that are not owned by the EU, permission may need to be sought directly from the respective right holders.

