EN

Annex 9

Horizon Europe

Work Programme 2023-2024

9. Food, Bioeconomy, Natural Resources, Agriculture and Environment

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Introduction

The Horizon Europe mandate for Cluster 6 is to provide opportunities to strengthen and balance environmental, social and economic goals and to set human economic activities on a path towards sustainability. Therefore, the underlying paradigm of Cluster 6 is the need for a transformative change of the EU economy and society to reduce environmental degradation, halt and reverse the decline of biodiversity and better manage natural resources while meeting the EU's climate objectives and ensuring food and water security. It takes into account the evolving geopolitical context and the new research and innovation priorities focused on further strengthening the EU's open strategic autonomy in particular in the energy and food sectors.

Research and innovation (R&I) in this cluster will help meet to the long-term priority objectives to 2030 set out in the 8th Environment Action Programme[1]. In particular it will ensure that policy action is firmly anchored in **latest science and knowledge.** It will therefore contribute to the UN's Sustainable Development Goals (SDGs)[2] and accelerate the ecological transition required by the European Green Deal[3]. Of particular relevance will be: i) SDG 2 – zero hunger; ii) SDG 3 – good health and well-being; iii) SDG 6 – clean water and sanitation; iv) SDG 8 – decent work and economic growth; v) SDG 9 – industry, innovation, and infrastructure; vi) SDG 11 – sustainable cities and communities; vii) SDG 12 - responsible consumption and production; viii) SDG 13 – climate action, ix) SDG 14 – life below water and x) SDG 15 – life on land".

This cluster will also contribute to achieving the target of dedicating 7,5% of the MFF 2021-2027 to biodiversity as of 2024, and 10% in 2026 and 2027.

Activities in this work programme will contribute to all Key Strategic Orientations (KSOs) of the Strategic Plan[4], with orientations B and C contributing the most directly. These KSOs are:

1. promoting an open strategic autonomy by leading the development of key digital and enabling technologies, sectors and value chains to accelerate and steer the digital and green transitions through human-centred technologies and innovations;

2. restoring Europe's ecosystems and biodiversity, and managing sustainably natural resources to ensure food security and a clean and healthy environment;

3. making Europe the first digitally led circular, climate-neutral and sustainable economy through the transformation of its mobility, energy, construction and production systems;

1 https://ec.europa.eu/environment/strategy/environment-action-programme-2030_en.
2 THE 17 GOALS | Sustainable Development (un.org).
3 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
4 https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/3c6ffd74-8ac3-11eb-b85c-01aa75ed71a1.

4. creating a more resilient, inclusive and democratic European society, prepared and responsive to threats and disasters, addressing inequalities and providing high-quality health care, and empowering all citizens to act in the green and digital transitions.

To contribute to these programme-level KSOs, Cluster 6 will deliver on six specific expected impacts. In this work programme, each expected impact has been transformed into one or two specific destination(s) (see table below). This destination-based work programme structure follows a thematic centre-of-gravity approach, but activities in a given destination may be of a cross-cutting nature and will often contribute to several expected impacts. The specific contribution to the overall expected impacts is explained in the introductory text of each destination.

Expected impact (strategic plan)	**Destination (Cluster 6 work programme)**
Climate neutrality is achieved by reducing Green House Gas (GHG) emissions, maintaining natural carbon sinks, and enhancing the sequestration and storage of carbon in ecosystems, including by unfolding the potential of nature-based solutions, production systems on land and at sea as well as rural and coastal areas, where adaptations to climate change are also being fostered for enhancing resilience	Land, oceans and water for climate action
Biodiversity is back on a path to recovery, and ecosystems and their services are preserved and sustainably restored on land, inland water and at sea through improved knowledge and innovation	Biodiversity and ecosystem services
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	Circular economy and bioeconomy sectors Clean environment and zero pollution
Food and nutrition security for all within planetary boundaries is ensured through knowledge, innovation and digitalisation in agriculture, fisheries, aquaculture and food systems, which are sustainable, resilient, inclusive, safe and healthy from farm to fork.	Fair, healthy and environmentally friendly food systems from primary production to consumption
Rural, coastal and urban areas are developed in a sustainable, balanced and inclusive manner thanks to a better understanding of the environmental, socio-economic,	Resilient, inclusive, healthy and green rural, coastal and urban communities

behavioural and demographic drivers of change as well as deployment of digital, social and community-led innovations	
Innovative governance models enabling sustainability and resilience are established and monitored through enhanced and shared use of new knowledge, tools, foresight, and environmental observations as well as digital, modelling and forecasting capabilities	Innovative governance, environmental observations and digital solutions in support of the Green Deal

Activities under Cluster 6 will support the new innovation agenda for Europe and help accelerate the ecological transition required by the European Green Deal[5] in order to achieve climate neutrality by 2050. This will be done by preserving Earth's natural carbon sinks and stocks in ecosystems, including soils and plants, forests, farmed lands and wetlands and the marine environment. This will substantially reduce GHGs from the forestry and agricultural sectors and transform the food system. In addition, activities will foster innovation to develop the circular economy and exploit the potential of biological resources for renewable products. This will reduce the EU's dependence on non-renewable resources and help reduce emissions/waste from industrial processes by using more sustainable bio-based systems. At the same time, it will avoid trade-offs that could damage biodiversity and will promote synergistic measures to protect biodiversity. In addition to the EU's climate policy, R&I will support the objectives of:

- the EU biodiversity strategy for 2030[6];
- the EU's new circular economy action plan[7];
- the EU action plan "Towards a Zero Pollution for Air, Water and Soil[8] ('the EU zero pollution action plan');
- the EU industrial strategy;
- the bioeconomy strategy;
- the EU forest strategy;
- the EU soil strategy for 2030[9]
- the sustainable blue economy strategy;
- the chemicals strategy for sustainability; and
- the EU plastics strategy.

5 A European Green Deal | European Commission (europa.eu).
6 EUR-Lex - 52020DC0380 - EN - EUR-Lex (europa.eu).
7 EUR-Lex - 52020DC0098 - EN - EUR-Lex (europa.eu).
8 EUR-Lex - 52021DC0400 - EN - EUR-Lex (europa.eu).
9 EUR-Lex - 52021SC0323 - EN - EUR-Lex (europa.eu).

Protecting and restoring the integrity of ecosystems and their capacity to deliver a wide range of essential services, therefore putting Europe's biodiversity on a path to recovery by 2030, as required by the EU biodiversity strategy for 2030, is fundamental to achieving the European Green Deal objectives. Avoiding loss of biodiversity (from genes to species and ecosystems) could also help avoid threats to human health in the future. R&I will address challenges in this area, including by enabling transformative changes. This cluster will i) improve knowledge about the causes of biodiversity decline, the role of ecosystems and their services and ii) support their restoration. This cluster deals with i) agriculture, ii) forestry, iii) aquaculture and fisheries, iv) food and bio-based systems, and v) animal and human health, which all directly depend on ecosystem services. These sectors have profound environmental impacts and are also particularly affected by the global environmental changes. In particular climate adaptation and biodiversity needs will have to be considered for their transformation. R&I activities will include solutions addressing indirect drivers of biodiversity loss, which also affect the climate and our resilience to adapt to it.

Cluster 6 will steer and accelerate the transition to sustainable, healthy and inclusive food systems to effectively achieve the objectives of the farm to fork strategy. It will empower farmers, fishers and aquaculture producers to transform their production methods more quickly and efficiently and make the best use of nature-based, technological, digital and social innovations. This will deliver better climate mitigation and environmental results, increase climate resilience and reduce dependency on pesticides and antimicrobials. Furthermore it will also provide consumers with affordable, safe, nutritious, healthy and sustainable food. R&I will also stimulate i) practices at all stages of the food system from production to processing, ii) services, iii) the use and valorisation of waste and by-products and iv) surplus management. This will ensure safe and sustainable food and enable a shift to sustainable and healthy diets. R&I will also support the design, implementation and monitoring of the new common agricultural policy (CAP), the common fisheries policy (CFP) and the EU General Food Law.

Improved knowledge and innovations will be key to achieving the zero-pollution ambition of the European Green Deal to halt and prevent pollution, by addressing issues concerning fresh and marine waters, soils, nutrients as well as the environmental performance of processes. R&I will support EU environmental legislation and policies that target a higher level of protection for biodiversity, soil, water, air and marine resources, including i) the Birds Directive[10] and the Habitats Directive[11], ii) the EU pollinators initiative[12], iii) the EU Water Framework Directive[13], iv) the EU maritime policy and v) the EU Arctic policy.

The cluster will help develop resilient and vibrant rural, coastal, urban, and peri-urban areas in line with the Commission priority 'An economy that works for people' and the long-term vision for rural areas. It will help achieve thriving rural innovation ecosystems by supporting and/or establishing synergetic initiatives such as living labs, smart villages, start-up villages,

10 EUR-Lex - 32009L0147 - EN - EUR-Lex (europa.eu).
11 EUR-Lex - 31992L0043 - EN - EUR-Lex (europa.eu).
12 EUR-Lex - 52018DC0395 - EN - EUR-Lex (europa.eu).
13 EUR-Lex - 32000L0060 - EN - EUR-Lex (europa.eu).

EIP-AGRI operational groups and an S3 platform. It will develop new governance models to implement the European Green Deal initiatives, needed to ensure a fair and just transition and that no one is left behind. This cluster will help in the use, uptake and deployment of environmental observations and take advantage of digital solutions in line with the EU priority 'A Europe fit for the digital age'. The cluster will also take advantage of opportunities that the post-COVID-19 crisis recovery package offers to set the economy on a path to sustainable development in line with the UN 2030 Agenda.

To be more effective in achieving a positive impact, the proposals should be synergise with relevant initiatives funded at EU level, including the Knowledge and Innovation Communities (KICs) of the European Institute of Innovation and Technology (EIT). In particular, the innovation ecosystems created and nurtured by the EIT KICs can help build communities or platforms for coordination and support actions, sharing knowledge or disseminating and making best use of the project results. Where relevant those who draft proposals are encouraged to explore possible forms and means of service provisions distinct to the EIT KICs, in particular EIT Food and EIT Climate-KIC.

Furthermore, Horizon Europe is the R&I support programme in a system of European and national funding programmes that shares policy objectives. Through the programme, special attention will be given to ensuring cooperation between universities, scientific communities and industry, including small and medium-sized enterprises, and people and their representatives. This is in order to bridge gaps between genders, territories, generations and regional cultures, in particular to support women innovators and care for the needs of young people in shaping Europe's future. Calls could take the form of EU synergy calls, meaning that projects that have been awarded a grant under the call could also receive funding under other EU programmes, including relevant shared management funds. In this context, project proposers should consider and actively seek synergies with, and, where appropriate, possibilities for further funding from:

- other R&I-relevant EU, national or regional programmes (such as the European Regional Development Fund (ERDF);
- the European Social Fund Plus (ESF+);
- the Just Transition Fund (JTF);
- the European Maritime Fisheries and Aquaculture Fund (EMFAF);
- the European Agricultural Fund for Rural Development (EAFRD);
- InvestEU); and
- private funds or financial instruments.

The ERDF focuses among others things, on the development and strengthening of regional and local R&I ecosystems and smart economic transformation, in line with regional/national smart specialisation strategies. It can support investment in research infrastructure, activities

for applied research and innovation, including: i) industrial research, ii) experimental development and feasibility studies, iii) building research and innovation capacities; iv) uptake of advanced technologies and v) roll-out of innovative solutions from the Framework Programmes for research and innovation through the ERDF.

Throughout this work programme, synergies are also sought with the work of the European Space Agency (ESA), to ensure complementarity and mutual benefits regarding R&I actions conducted by ESA as well as actions within this cluster and Clusters 3, 4 and 5. Such synergies are also sought in order to contribute to the European Commission-ESA Earth System Science initiative. In this cluster this will be achieved – by bringing major ESA space information and science into Horizon Europe research projects to support significant breakthrough in food, bioeconomy, natural resources, agriculture and environment research. The collaboration with ESA is planned to be implemented in a proactive manner especially within 4 topics of this cluster through Destinations 1, 5, and 7. Collaboration with ESA is also encouraged within other topics of this work programme.

The EU's Recovery and Resilience Facility (RRF) currently available in all Member States aims to finance projects that directly tackle the economic and social impacts of the COVID-19 crisis and support the green and digital transitions. For project ideas that directly help meet these objectives it is advisable to check access to the RRF for fast and targeted support.

Research on a societal and political framework is necessary to achieve the transformation expected and R&I investments under Cluster 6 will therefore emphasise the role of the social sciences and humanities, gender, inter/transdisciplinary and systems approaches. R&I will build on existing research infrastructures.

The topics on food in this work programme are also the results of the work carried out in a project funded through the Horizon 2020 European Green Deal call, Other Action "9. Support to the engagement of European Citizens in the transition to the European Green Deal (EGD)". During this project the European Commission consulted the public, civil society representatives, research and education communities as well as national authorities through a series of engagement events across the 27 Member States to develop an EU roadmap for the climate transition.

Cluster 6 activities will sustain the EU's ambition in international fora in areas of paramount importance such as biodiversity, climate change, the management of natural resources, seas and ocean, zero pollution, sustainable agriculture, food safety and food and nutrition security. In line with the EU's global approach to research and innovation, the 2023-2024 work programme will remain almost completely open to non-associated third countries, so that they can participate in all topics. In support of the global gateway strategy, projects involving international partners should lead to increased scientific knowledge and transfer of technology among partner countries, enabling global challenges across the world to be addressed and sustainable growth and jobs to be created. Cooperation should take place in a value-based way, creating linkages, not dependencies. Legal entities established in China are not eligible to participate in Innovation Actions in any capacity. Please refer to the Annex B of the General Annexes of this Work Programme for further details.

For topics in this cluster, the consortia should consider their possible contribution to Joint Research Centre (JRC) relevant platforms for i) capitalising on the knowledge developed in their projects, and ii) becoming more policy relevant, contributing in terms of data, indicators and knowledge. For instance:

- Life Cycle Assessment (LCA) and its relevant application to value chain assessment, with reference to the European Platform on Life Cycle Assessment (EPLCA, https://eplca.jrc.ec.europa.eu/) and make reference to the Environmental footprint method when applying LCA (https://ec.europa.eu/environment/eussd/smgp/index.htm);
- raw materials, with reference to the Raw Materials Information System (RMIS, https://rmis.jrc.ec.europa.eu/);
- soil and soil related issues, with reference to the European Soil Observatory (ESO, https://ec.europa.eu/jrc/en/eu-soil-observatory);
- natural capital accounting, with reference to the Integrated Natural Capital Accounting (INCA) platform (https://ecosystem-accounts.jrc.ec.europa.eu);
- biodiversity, with reference to the EC Knowledge Centre for Biodiversity, (https://knowledge4policy.ec.europa.eu/biodiversity_en);
- food systems and food security, with reference to the EC Knowledge Centre for Global Food and Nutrition Security (https://knowledge4policy.ec.europa.eu/global-food-nutrition-security_en);
- bioeconomy, with reference to the EC Knowledge Centre for Bioeconomy (https://knowledge4policy.ec.europa.eu/bioeconomy_en);
- EU and African Union (AU) cooperation, with reference to the Africa Knowledge Platform (https://africa-knowledge-platform.ec.europa.eu);
- Earth and environmental observations, with reference to the EC Knowledge Centre on Earth Observation (https://knowledge4policy.ec.europa.eu/earthobservation_en).

Specific requirements for multi-actor projects:

Proposals submitted for topics, which include a request to follow the multi-actor approach must meet all of the requirements below. The multi-actor approach described here - a form of responsible R&I, aims to make the R&I process and its outcomes more reliable, demand-driven, shared and relevant to society. It also aims to have these outcomes shared more extensively. This entails more than just widely disseminating a project's results, or listening to the views of a board of stakeholders. A multi-actor project ensures the genuine and sufficient involvement of a targeted array of actors, which serves the objectives of the topic. These actors include: i) researchers, ii) farmers / farmers' groups and associations, iii) foresters / foresters' groups and associations, iv) aquaculture producers, v) fishers / fishers' groups and associations, vi) advisors, vii) food and bioeconomy businesses, viii) other businesses, ix)

consumer associations, x) local communities, xi) citizens, xii) civil society organisations including NGOs, and xiii) government representatives. Which key actors are relevant to participate depends on the objective of the proposal. They are essentially the (end-) **users**[14] **of the project results** who are backed up by any other useful intermediaries and actors who can contribute with further expertise and innovative ideas relevant to the topic's objectives, and support communication and dissemination. The genuine and sufficient involvement of such actors should take place **all over the whole course of the project**: from participation in development of the project idea, planning and experiments to implementation, communication and dissemination of results and to a possible demonstration phase. Building blocks for the project proposal are expected to come from science as well as from practice: it is a 'co-creation' process. Practitioners and (end) users are to be involved, not as a study-object, but to use their practical and local knowledge and/or entrepreneurial skills to develop solutions and create 'co-ownership' of results for (end-) users and practitioners. This will contribute to and speed up the acceptability and uptake of new ideas, approaches and solutions developed in the project.

Therefore, a **multi-actor project proposal must include the following elements**:

- It must demonstrate how the proposed objectives and planning are targeting the needs/problems/challenges of and opportunities for the (end-)users of the project results;
- It must demonstrate how the description of the project concept and in particular the composition of the consortium reflects a balanced choice of relevant key actors who have complementary types of knowledge (scientific, practical, etc.), and must ensure that project results which should be ready for practice are broadly implemented;
- It must demonstrate how the project intends to use existing practices and tacit knowledge. This should be illustrated in the proposal with a sufficient number of high-quality knowledge exchange activities outlining the precise and active roles of the different non-scientific actors in the work. The cross-fertilisation of skills, competencies and ideas between actors should generate innovative findings and solutions that are more likely to be applied on a wide scale;
- It must demonstrate how the project will facilitate the multi-actor engagement process by making use of the most appropriate methods and expertise;
- It must demonstrate the project's added value: how it will complement existing research and best practices;
- It must demonstrate how the project will result in practical and ready to use knowledge, approaches, tools or products, that are easily understandable and freely accessible;
- It must demonstrate how these outputs ready for practice will feed into the existing dissemination channels most consulted by the (end-) users of the project results in countries and regions.

[14] An "(end-) user" of project result is a person who is him/herself putting the project results into practice

In addition, to ensure EU-wide communication in all areas related to the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI)[15] and the common agricultural policy (CAP) specific objectives[16], in particular agriculture, forestry and rural development, this knowledge must also be summarised in an appropriate number of 'practice abstracts' in the common EIP-AGRI format[17].

For areas falling outside the remit of EIP-AGRI and CAP specific objectives, other similarly effective solutions ensuring dissemination at EU level should be sought.

Where applicable, it is strongly recommended that interactive innovation groups, such as EIP-AGRI Operational Groups funded under Rural Development Programmes, become involved.

15 For the areas covered by the EIP-AGRI see section 8 (pp.8-9) of the Commission Communication 2012(79) final: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0079&from=EN: Increased agricultural productivity, output, and resource efficiency, the bioeconomy, biodiversity, climate, ecosystem services and soil functionality, products and services for the integrated supply chain, and food quality, food safety and healthy lifestyles.

16 For areas covered by the CAP specific objectives see Article 6 of the Regulation (EU) 2021/2115 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2021.435.01.0001.01.ENG.

17 The EIP common format for "practice abstracts" is available at: https://ec.europa.eu/eip/agriculture/en/eip-agri-common-format.

Destination - Biodiversity and ecosystem services

The biodiversity and ecosystem services destination of the 2023-2024 Cluster 6 work programme will support R&I for the EU environment and biodiversity protection framework and the European Green Deal. It is based on the vision developed in the EU biodiversity strategy for 2030 and will support its implementation, furthering the orientations of the 2021-2022 work programme. It will also take into account new European Green Deal initiatives, notably i) the EU forest strategy for 2030[18], ii) the EU action plan: "towards zero pollution for air, water and soil", iii) the EU climate adaptation strategy and iv) the EU soil strategy for 2030. Connections are expected to be made with the EU proposal for a nature restoration law[19], which includes binding targets, and environmental reporting, and the new approach for a sustainable blue economy in the EU[20].

It will support R&I activities that help maintain ecosystems in good ecological condition and a clean and healthy environment for the EU, including water, soil and air. This will contribute to the implementation of relevant policies such as health, climate adaptation and mitigation, disaster risk reduction, sustainable circular bioeconomy and blue economy. The R&I activities will also reflect the strong interconnections between, e.g. the EU biodiversity strategy for 2030[21] and the farm to fork strategy[22], as well as the pollinators initiative[23].

R&I supported under this destination will ensure that mainstreaming biodiversity in society and the economy takes into account justice, fairness and global aspects. This is to ensure the "just transition" emphasised in the European Green Deal is achieved.

R&I activities supported by Cluster 6 will complement and ensure synergies with activities supported under several Horizon Europe partnerships, in particular: i) the European biodiversity partnership Biodiversa+; ii) the European partnership water security for the planet "Water4All"; iii) the European partnership on accelerating farming systems transition: agroecology living labs and research infrastructures; iv) the European partnership on animal health and welfare and; v) the European partnership for a climate-neutral, sustainable and productive blue economy. R&I activities should also specifically address the strong interconnections between biodiversity and the emergence of infectious diseases by complementing the activities of with the European partnership for pandemic preparedness and the European Partnership for One Health/AMR Antimicrobial Resistance (AMR).

Synergies will also be ensured with the following Horizon Europe missions: "Restore our ocean, seas and waters by 2030", "A soil deal for Europe" and "Adaptation to climate change".

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18 Communication COM/2021/572: New EU Forest Strategy for 2030

19 Proposal for a Regulation of the European Parliament and of the Council on nature restoration, COM(2022) 304 final, 22.06.2022

20 Communication COM/2021/240: on a new approach for a sustainable blue economy in the EU Transforming the EU's Blue Economy for a Sustainable Future

21 Communication: EU Biodiversity Strategy for 2030

22 Communication: Afarm to fork Strategy for a fair, healthy and environmentally-friendly food system

23 https://ec.europa.eu/environment/nature/conservation/species/pollinators/policy_en.htm

Projects supported under this destination are expected, where appropriate, to provide timely scientific contributions to major science-policy bodies such as the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES)[24], the Intergovernmental Panel on Climate Change (IPCC), and the Convention on Biological Diversity. They are also expected to cooperate with the Science Service project Bio-agora. Where appropriate, the following existing platforms and information-sharing mechanisms should be used for dissemination and exploitation: the EC Knowledge Centre for Biodiversity[25], Biodiversity Information System for Europe (BISE)[26], and Oppla[27].

This destination will also help achieve the twin green and digital transitions. Where relevant, advantage will be taken of the development and use of advanced digital technologies.

This destination will continue to support the EU leadership in the relevant international fora in line with the Commission priority “A stronger Europe in the world” and international cooperation will be key to addressing global challenges in many topics in this destination. The EU's outermost regions (defined in article 349 TFEU), where biodiversity is high and threats multiply, should be given special consideration.

Expected impact

Proposals for topics under this destination should set out a credible pathway resulting in the strategic plan having the following impact: "*Biodiversity is back on a path to recovery, and ecosystems and their services are preserved and sustainably restored on land, inland water and at sea through improved knowledge and innovation*". More specifically, one or more of the following impacts should materialise:

- **Direct drivers of biodiversity decline** will be understood and addressed – land and sea use change, natural resource use and exploitation, climate change, pollution, invasive alien species – as well as indirect drivers – demographic, socio-economic, technological, etc.

- **Protected areas** and their networks will be planned, managed and expanded and the status of species and habitats will be improved based on up-to-date knowledge and solutions.

- **Biodiversity, ecosystem services and natural capital will be mainstreamed in the society and economy**: e.g. they will be integrated into public and business decision-making; approaches for enabling transformative changes to tackle societal challenges will be built including by deploying nature-based solutions (NBS).

- **Practices in agriculture, forestry, fisheries** and **aquaculture will be developed and improved** to support and make sustainable the use of biodiversity and a wide range of ecosystems services.

24 https://ipbes.net/policy-support
25 https://knowledge4policy.ec.europa.eu/biodiversity_en
26 https://biodiversity.europa.eu/
27 https://oppla.eu/

- **Biodiversity research and support policies and processes will be interconnected** at EU and global levels, making use of advanced digital technologies and societal engagement where appropriate.

- **The biodiversity and health nexus will be understood, in particular at the level of ecosystems**. This will be achieved by using the one-health approach, in the context of climate change and globalisation and by addressing contributions and trade-offs.

The impacts have been revised compared with the 2021-2022 work programme in order to take into account R&I activities included in the 2021-2024 strategic plan, but that are yet to be addressed. This was the case, for instance, for several direct drivers of biodiversity loss. The new drafting of the impacts makes clear that they are within the scope of the work programme.

The following call(s) in this work programme contribute to this destination:

Call	Budgets (EUR million)		Deadline(s)
	2023	2024	
HORIZON-CL6-2023-BIODIV-01	184.00	30.00	28 Mar 2023
HORIZON-CL6-2024-BIODIV-01		76.00	22 Feb 2024
HORIZON-CL6-2024-BIODIV-02		36.00	22 Feb 2024 (First Stage) 17 Sep 2024 (Second Stage)
Overall indicative budget	184.00	142.00	

Call - Biodiversity and ecosystem services

HORIZON-CL6-2023-BIODIV-01

Conditions for the Call

Indicative budget(s)[28]

Topics	Type of Action	Budgets (EUR million)		Expected EU contribution per project (EUR million)[29]	Indicative number of projects expected to be funded
		2023	2024		
Opening: 22 Dec 2022 Deadline(s): 28 Mar 2023					
HORIZON-CL6-2023-BIODIV-01-1	RIA	22.00		Around 5.50	4
HORIZON-CL6-2023-BIODIV-01-10	RIA	5.00		Around 5.00	1
HORIZON-CL6-2023-BIODIV-01-11	RIA	5.00		Around 5.00	1
HORIZON-CL6-2023-BIODIV-01-12	CSA	4.00		Around 4.00	1
HORIZON-CL6-2023-BIODIV-01-13	RIA	12.00		Around 6.00	2
HORIZON-CL6-2023-BIODIV-01-14	RIA	10.00		Around 5.00	2
HORIZON-CL6-2023-BIODIV-01-15	CSA	7.00		Around 7.00	1

[28] The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.

[29] Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL6-2023-BIODIV-01-16	RIA	10.00		Around 5.00	2
HORIZON-CL6-2023-BIODIV-01-17	RIA	12.00		Around 4.00	3
HORIZON-CL6-2023-BIODIV-01-18	COFUND	30.00	30.00	Around 60.00	1
HORIZON-CL6-2023-BIODIV-01-2	RIA	7.00		Around 3.50	2
HORIZON-CL6-2023-BIODIV-01-3	RIA	6.00		Around 6.00	1
HORIZON-CL6-2023-BIODIV-01-4	RIA	8.00		Around 4.00	2
HORIZON-CL6-2023-BIODIV-01-5	RIA	18.00		Around 9.00	2
HORIZON-CL6-2023-BIODIV-01-6	IA	10.00		Around 10.00	1
HORIZON-CL6-2023-BIODIV-01-7	IA	10.00		Around 5.00	2
HORIZON-CL6-2023-BIODIV-01-8	CSA	3.00		Around 3.00	1
HORIZON-CL6-2023-BIODIV-01-9	RIA	5.00		Around 5.00	1
Overall indicative budget		184.00	30.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.

Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Understanding and addressing the main drivers of biodiversity loss

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-1: Better understanding of routes of exposure and toxicological and ecological impacts of chemical pollution on terrestrial biodiversity

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 22.00 million.
Type of Action	Research and Innovation Actions
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to two projects within the area A that is the highest ranked, and two projects highest ranked within the area B, provided that the applications attain all thresholds. Proposals shall clearly indicate the area they are applying to.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030, the EU zero pollution action plan and the EU pollinators initiative, projects results will contribute to the following impact of destination "biodiversity and ecosystem services": "Understand and address direct **drivers of biodiversity decline**…".

Project results are expected to contribute to all of the following expected outcomes:

- Routes of exposure, linked to ecosystem and biodiversity dynamics to chemicals are better understood,
- Issues raised by the contamination of biodiversity in the natural environment are better known, including risks linked to existing contaminations (legacy), chemicals of emerging concern and accumulations in nature,
- Environmental fate of new chemicals of emerging concern is better understood,
- Toxicological and ecological impacts of contaminants are better understood and risk assessments for relevant highly exposed species are strengthened,
- Prevention and mitigation measures are identified and developed.

Scope: According to IPBES global assessment report[30], pollution is one of the five main direct drivers of biodiversity loss. This topic focuses on chemical pollution, which has been increasing in the last decades with key differences by region and by type of pollution. Quantitative assessments include systematically monitored variables with certain emissions into the atmosphere, water bodies and terrestrial systems from industrial activities and households. However, pollution has and is still changing not only in quantitative but also qualitative terms and the monitoring of many dangerous substances, including ones of emerging concern, and knowledge on the way they impact biodiversity and ecosystem services are missing. This topic aims at better understanding the routes of exposure and toxicological and ecological impacts of chemical pollution (excluding industrial contamination) on terrestrial biodiversity and ecosystems[31] (Area A). According to the EU biodiversity strategy for 2030, pressures include the release of nutrients, chemical pesticides, pharmaceuticals, hazardous chemicals, urban and industrial wastewater and other waste including litter and plastics.

The intensification of the loss of biodiversity in the EU is strongly influenced by the intensification of agriculture, through the high application of fertilizers and pesticides, changes in the species and management of crops, as well as mowing and grazing regimes, and the introduction of new production technologies. Currently, the excessive use of pesticides causes a reduction in the population of, among others, pollinating insects. To support the long-term sustainability of both nature and farming, the EU biodiversity strategy for 2030 works in tandem with the farm to fork strategy. The Commission has committed with both strategies to take action to reduce by 50% the overall use of - and the risk from – chemical pesticides by 2030 and reduce by 50% the use of more hazardous pesticides by 2030 in order to reverse the alarming decline of farmland biodiversity.

Successful proposals are expected to assess the effects and impact of chemical pollutants, in particular the most dangerous substances from agriculture, on the condition of the biodiversity and ecosystems in natural environment (this may include environmental and host associated

30 https://ipbes.net/global-assessment.

31 Freshwater ecosystems may be also addressed by proposals provided the main focus is on terrestrial biodiversity

microbiomes) and consequently on human health, and identify preventive and mitigation measures. It is important to pay special attention to the fact that the reduction in the population of pollinating insects caused, inter alia, by the excessive use of pesticides in EU agriculture also contributes to reducing the amount of food for birds, reducing the regulation of pests, diseases and invasive alien species. More knowledge is also needed on additional negative impacts from other contaminants of emerging concern, including pharmaceuticals such as hormones and antibiotics, veterinary products and persistent e.g., bio-accumulative substances.

In the context of the EU pollinators' initiative and the pesticide legislative framework[32], the EU has increased efforts in the last decade to address this problem. However, knowledge gaps still hinder development and implementation of essential testing methods for a scientifically robust risk assessment of pesticides on wild bees and other wild pollinating insects. This topic will provide a critical contribution to address those knowledge gaps as identified by the European Food Safety Authority (EFSA) and the Commission (Area B) and thereby support the implementation of the EFSA guidance on the risk assessment of plant protection products on bees (*Apis mellifera*, *Bombus spp.* and solitary bees) and the efforts on broadening the risk assessment safeguards to other wild pollinator species.

Proposals should address Area A or Area B as follows. The Area should be clearly indicated on the application.

Area A: better understanding the routes of exposure of the wild fauna and flora to chemical pollution

Successful proposals should:

- Choose case studies, based on an analysis of chemical contaminations from an environmental history perspective, with representative species on which analysis will be undertaken. Addressing trophic chains is encouraged,
- Develop a method to establish the routes of contamination with chemicals. Priority should be given to cases with potential contamination with chemical pesticides and their metabolites; contaminants of emerging concern, including pharmaceuticals such as hormones and antibiotics, veterinary products and persistent e.g., bio-accumulative substances, SVHC (Substance of Very High Concern) and emerging pollutants. Other substances in particular micro- and nano-plastics are not excluded. Existing contaminations of the environment (legacy) especially from pesticides should also be considered. However industrial contamination is not in the scope of this topic,
- Establish the routes of contamination of the chosen representative species with chemicals, in the case studies,

[32] https://ec.europa.eu/food/animals/live-animal-movements/honey-bees/pesticides-and-bees_en; https://ec.europa.eu/food/plants/pesticides/sustainable-use-pesticides_en

- Assess the risks resulting from such contaminations for species, for ecosystems and for the local environment, including development of effect-based approach to consider mixture effects and synergies,
- In particular, establish models to link chemical ecotoxicity stress to damages on (a) genetic diversity, (b) functional diversity, and (c) ecosystem services,
- Extrapolate to provide an assessment of risks associated with chemical contaminations of terrestrial wild biodiversity at a larger scale,
- Explore prevention and mitigation measures.

Targets groups for this Area are notably regulatory bodies, farmers and other land managers organisations, civil society, local and regional decision –makers.

Successful proposals are expected to cooperate with relevant projects supported by the mission “A Soil Deal for Europe".

Area B: pollinators and pesticides

Successful proposals should:

- Characterise sources and routes of pesticide exposure in the key pollinator groups (wild bees, butterflies, hoverflies and moths),
- Investigate sensitivity of pollinators to pesticides and identify for each pollinator group sensitive species that: i) are suitable as test organisms in the risk assessment and ii) require safeguards that would indirectly protect other species within the same group (“umbrella effect”),
- Improve prediction of the toxicity endpoints, toxic units for chemicals and data poor compounds (e.g., Quantitative structure-activity relationship (QSAR) models),
- Develop toxicokinetic and toxicodynamic data and models for single and multiple chemicals,
- Generate combined toxicity data (lethal and sublethal effects) of multiple chemicals, improving the availability of data in particular for: i) chronic combined toxicity that would make it possible to identify potential interactions that may lead to deviation from dose addition (potentiation, synergism) and ii) sublethal effects.
- Investigate synergistic effects of typical combinations of pesticides (e.g., based on residue data),
- Devise and test monitoring schemes for establishing the level of contamination of pollen/nectar/water/plant matrices/soil that can support benchmarking in a predictive risk assessment, development of risk indicators and a system-based risk assessment,

- Develop an open source curated database on pollinators and the use of pesticides which would include data and information on: i) exposure and hazard, ii) lethal and sublethal effects, toxicokinetics as well as other stressors (e.g., other chemicals, nutrition, etc.) that could amplify the adverse effects through interaction with pesticides,

- Develop methodologies for risk assessment in open-source tools including toxic units approaches using lethal and sublethal effects as well as validated *in silico* models applying dose addition as the default model or models integrating synergistic effects,

- Develop population models and landscape modelling for the risk assessment of multiple chemicals in pollinators with an aim to integrate hazard and exposure information,

- Develop environmental scenarios for the risk assessment of pollinators that takes into consideration different landscape characteristics and conditions.

Proposals should earmark the necessary resources for cooperation and networking activities. Collaboration with the European partnership on biodiversity Biodiversa+ should be explored, as needed. They should use existing platforms and information sharing mechanisms notably the EC Knowledge Centre for Biodiversity.

This topic should involve the effective contribution of Social Sciences and Humanities (SSH) disciplines.

International cooperation is encouraged.

HORIZON-CL6-2023-BIODIV-01-2: Impact of light and noise pollution on biodiversity

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 3.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Research and Innovation Actions
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to one project within the area A that is the highest ranked, and one project highest ranked within the area B, provided that the applications attain all thresholds. Proposals shall

	clearly indicate the area they are applying to.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030, projects will contribute to understand and address direct **drivers of biodiversity decline** in both terrestrial and aquatic environments.

Project results are expected to contribute to all following expected outcomes:

- The impact of light and noise pollution on biodiversity and ecosystem services is better understood and nature restoration activities as planned in the EU biodiversity strategy for 2030 are supported, contributing to the objective of "at least 30% of all protected species and habitats not currently in favourable conservation status should reach favourable status or at least show a strong positive trend by 2030",
- The awareness of private and public stakeholders about the impacts of light and noise on biodiversity is increased,
- Specific measures to assess, prevent and mitigate the negative impacts from light and noise on biodiversity are developed,
- Networking capacity on impacts of light and noise on biodiversity is built.

Scope: **Light pollution** is the alteration of natural lighting levels due to artificial light at night. It has been rapidly increasing, with the illumination level in developed countries increasing tenfold over the last 50 years. From 2012 to 2016, Earth's artificially lit outdoor area grew by 2.2% per year. Artificial light at night is a powerful environmental stressor which alters the biological rhythms of living organisms (fauna and flora), modifies species assemblages (e.g. fish in ports) and changes ecosystems at large. There is a broad scientific consensus that it poses a threat to biodiversity and this has led to growing concerns in recent years. Light pollution is specifically known to cause habitat fragmentation, impairing physiology and behaviour in fauna. It is notably thought to be a major factor in the gradual disappearance of insect and bird populations worldwide. Its effects seem to intensify with the use of LEDs (Light-Emitting Diodes) including outside cities. Another domain of light pollution is the horizontally polarised light reflection of certain artificial surfaces (e.g. roads and photovoltaic solar panels), posing significant threat to polarotactic insects that get trapped in search for water bodies.

Noise is an environmental factor which is also given growing attention. According to IPBES, noise's effects on nature are increasingly observed[33]. Expansion of human population, transport networks and extraction have a range of impacts upon species, depending on auditory capacities and noise wavelengths. **Underwater noises** that are due not only to shipping but also to pile drivers, sonars, seismic testing or windfarms are significant marine

[33] IPBES (2019): Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. https://doi.org/10.5281/zenodo.3831673.

pollutants. Noise can be particularly problematic for marine organisms. It has been shown for instance that it may modify behaviour and physiology of invertebrates and it is suspected to increase infection risks and alter spawning behaviour of affected species. It is suspected, for instance, to increase infection risks and spawning behaviour of affected species. Evidence of the impact of noise pollution on **ecosystems** is also growing, like the reduction of the presence of songbirds in cities.

EU policies integrate the **need to protect biodiversity from light and noise** in a limited extent, in particular:

- The **Habitats Directive** requires Member States to take the necessary measures to avoid significant disturbance of protected species in Natura 2000 sites, which, where relevant, is applicable to light pollution (Article 6.2).
- Noise is one aspect of the good environmental status defined in the **Marine Strategy Framework Directive** No 2008/56.

Light and noise pollution in general is addressed in a number of EU policies and directives: the Environmental Noise Directive, the Outdoor Noise Directive, the Environmental Impact Assessment Directive (85/337/EEC). Reducing noise pollution is among the objectives of the EU Action Plan: *'Towards Zero Pollution for Air, Water and Soil'*. Noise and light are defined as pollutants in Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, (‘*pollutant’ means a substance, vibration, heat, noise, light or other contaminant present in air, water or land which may be harmful to human health or the environment, which may result in damage to material property, or which may impair or interfere with amenities and other legitimate uses of the environment*). Light and noise pollution is included in one of the six thematic priority objectives of the 8th Environment Action Programme to 2030 (“*pursuing zero-pollution, including in relation to harmful chemicals, in order to achieve a toxic-free environment, including for air, water, soil as well as in relation to* ***light and noise pollution****, and protecting the health and well-being of people, animals and ecosystems from environment-related risks and negative impacts*”).

There is a need to **better understand the overall impact** of these pollution sources of emerging concern on biodiversity, in particular how the conservation status of species and habitats is affected, mechanisms at stake and how to monitor and mitigate adverse effects.

Targets groups for this topic are notably regulatory bodies, civil society, local and regional decision –makers.

Successful proposals should:

- provide a **comprehensive review on available knowledge** on the impacts of noise and light pollution on biodiversity and ecosystem services (from genetic to species levels) and their combined effects with other drivers of biodiversity loss including climate change and invasive species. The scope should cover terrestrial (both in urban and rural areas), fresh water and marine environments. Projects should build upon research

performed on the European level as well as by the Member States and Associated Countries,

- assess the **overall impacts of noise and light pollution on biodiversity and ecosystem services** in Europe and the magnitude of the problems. This should include a scrutiny of applicable policies and their impact as well as a contextualisation of the problems from an environmental history perspective,
- **improve understanding of mechanisms leading to biodiversity loss**, including effects of noise and light pollution on the behaviour of animals which can eventually affect population viability,
- investigate how noise and light pollution **affect the conservation status** of species and habitats, and identify measures to avoid significant disturbance,
- assess the need and ability of **specific measures to prevent negative impacts** of light and noise on biodiversity, including monitoring,
- assess links to other policies where light and noise management is at place or relevance and synergies can be explored (disaster management, noise mapping etc.),
- **explore innovative solutions** to prevent and mitigate the impacts of light and noise on biodiversity and ecosystem services. This should not be limited to technological solutions.

Proposals should address Area A: terrestrial biodiversity and ecosystems or Area B: aquatic (including marine) biodiversity and ecosystems. The area (A or B) should be clearly indicated on the application.

Cooperation with projects supported by the mission 'Restore our Ocean and Waters' is expected for Area B. Successful proposals under Area B are expected to strengthen the European contribution to the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

Proposals should earmark the necessary resources for cooperation and networking activities. Collaboration with the European partnership on biodiversity Biodiversa+ should be explored, as needed.

This topic should involve the effective contribution of SSH disciplines. Participatory approaches, such as citizen science, could be appropriate modes of research for this action.

International cooperation is encouraged.

HORIZON-CL6-2023-BIODIV-01-3: Interdisciplinary assessment of changes affecting terrestrial and freshwater ecosystems, building on observation programmes

Specific conditions

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 6.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).

Expected Outcome: The expected outcomes should feed in the implementation of the European Green Deal[34] and the post-2020 global biodiversity framework of the Convention on Biological Diversity (CBD)[35]. Project results are expected to contribute to the following impact of destination "Biodiversity and ecosystem services": "Understand and address direct drivers of biodiversity decline – land and sea use change, natural resource use and exploitation, climate change, pollution, invasive alien species – as well as indirect drivers – demographic, socio-economic, technological, etc."

Project results are expected to contribute to all of the following outcomes:

- Attribution of ecosystem changes to direct and indirect drivers, and monitoring of driver effects on ecosystems through time;
- Enhanced understanding of the adverse impacts of climate change on biodiversity and ecosystem functioning;
- Enhanced science base, leading to better design and monitoring conservation and restoration actions for terrestrial, freshwater, and transitional ecosystems, including the reduction of greenhouse gas emissions, and increase of carbon removals, and supporting nature-based solutions;
- Enhanced support to a better alignment of the objectives and priorities of the relevant EU directives (Habitat[36], Bird[37], WFD[38], Nitrates[39]);

34 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
35 https://www.cbd.int/conferences/post2020/post2020-prep-01/documents
36 https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm
37 https://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm
38 https://ec.europa.eu/environment/water/water-framework/index_en.html
39 https://ec.europa.eu/environment/water/water-nitrates/index_en.html

- Better and more transparent quantification of various uncertainties in ecosystem data and models, and propagation of these uncertainties into monitoring, spatial prioritization, and other applications.

Scope:

- These activities will foster a collective effort in the EU Member States and Horizon Europe Associated Countries to assess the status of terrestrial, freshwater, and transitional (land to sea) ecosystems (referred to as ecosystems hereafter) and prioritise conservation and restoration actions of these ecosystems including reduction of GHG missions and increases of carbon removals, with a special focus on the use of the wealth of Earth and Observation data available (remote-sensing, airborne, in-situ data).

- Use long-time series from the enhanced Earth Observation capacity in Europe (e.g. Copernicus) and in International Programmes together with other relevant sources of data to better understand the current and long-term dynamics and functioning of terrestrial and freshwater ecosystems in Europe under conditions related to global change

- Extensive use of ground based and/or airborne in-situ observation using, as appropriate, existing networks, novel observing systems, or citizen science, together with satellite data for assessing the impact of the main natural and anthropogenic pressures on the ecological processes of natural ecosystems, and on their dynamics and functioning (i.e., addressing individual and cumulative effects of multiple stressors), including in exploiting available high-resolution remote-sensing data.

- Assess the status and dynamics of these ecosystems, estimate their vulnerability to multiple stressors including anthropogenic and natural pressures, like climate change, and assess the impact of these stressors on the integrity and resilience of ecosystems

- Modelling of the ecological processes of natural ecosystems and of their interaction with the Earth System (i.e. biological, physical, and chemical processes, including primary production).

- Improving modelling of ecological processes and functional biodiversity under land-use and climate change that leads to ecosystem degradation (i.e. degraded, damaged, and destroyed ecosystems)

- Monitoring the status of natural ecosystems and assessment of the changes in relation to the underlying ecological processes.

- Integrate monitoring and modelling products into existing observatories supporting ecosystem management and conservation, to achieve better prioritisation, design and monitoring of terrestrial and freshwater ecosystem conservation and restoration actions”

This topic is part of a coordination initiative between the European Space Agency (ESA) and the European Commission (EU funded programmes) on Earth System Science. The ESA-EC

Earth System Science Initiative enables EC and ESA to support complementary collaborative projects, funded on the EU side through Horizon Europe and on the ESA side through the FutureEO programme[40]

In particular, ESA plans to complement, collaborate and coordinate with the action funded under this topic with dedicated scientific activities within the ESA Biodiversity Science Cluster (biodiversitysciencecluster.esa.int) which is part of Science for Society element of ESA FutureEO programme (eo4society.esa.int). ESA will also, to the extent possible, provide access to relevant resources (*e.g.*, virtual labs, digital platforms or 3rd party missions)

Proposals should address the collaboration with ongoing or future ESA projects and should towards this end include sufficient means and resources for effective coordination. Applicants are encouraged to enter in contact with the relevant ESA biodiversity science cluster projects and include in their proposals a work package/activities to ensure coordination with ESA relevant actions. The ESA biodiversity cluster focusses on the development, validation, and scientific analysis of novel satellite data products, the characterisation the structure and dynamics of terrestrial and freshwater ecosystems, the exploitation of the synergistic observation opportunities offered by the existing and coming Earth Observation missions (e.g., Copernicus sentinels, Earth Explorers, national missions) and advancing on the understanding of the response of ecosystems to different stressors using satellite technology.

Project activities shall fully exploit and build complementarities with the ongoing work regarding the establishment of the European Open Science Cloud and interact with relevant projects developing metadata standards and added value tools to ensure interoperability within and across fields of study.

Collaboration with the European Biodiversity Partnership (Biodiversa+) should be explored, as needed.

Biodiversity protection and restoration

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-4: Nature protection: Better methods and knowledge to improve the conservation status of EU-protected species and habitats

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative	The total indicative budget for the topic is EUR 8.00 million.

[40] The Programme will be available here: https://www.esa.int/Applications/Observing_the_Earth/FutureEO

budget	
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to one project within the area A that is the highest ranked, and one project within the area B that is the highest ranked, provided that the applications attain all thresholds. Proposals shall clearly indicate the area they are applying to.

Expected Outcome: In line with the objectives of the European Green Deal, the EU biodiversity strategy for 2030, and existing EU nature legislation (Birds and Habitats Directives), project results will contribute to the following impact of destination "biodiversity and ecosystem services": "to plan, manage and expand terrestrial and marine protected areas and improve the conservation status of species and habitats, based on up-to-date knowledge and solutions"**.** More specifically, project results will improve the setting of conservation objectives and measures for EU-protected habitats and species, thereby also ensuring that the network of Natura 2000 sites enable the maintenance or restoration of favourable conservation status**.**

Results of individual projects are expected to contribute to at least one of the following expected outcomes:

- Favourable conservation status for species and habitats covered by the EU Birds and/or Habitats Directives, and clarification of what is needed on an EU or biogeographical scale or other ecologically relevant scale (e.g., major basin, major flyway) in line with the relevant parameters and their values on the basis of which Member States define favourable conservation status.

- Better implementation of the EU Birds Directive specifically in relation to the 42 huntable bird species listed in Annex II of the directive which are not in a secure status, by filling scientific knowledge gap in relation to the amount and quality of habitat that is needed for these species (with a focus on their breeding habitats), and to ensure that their hunting is carried out sustainably.

Scope: Proposals should address Area A or Area B as follows. The Area should be clearly indicated on the application.

Area A: Improving the conservation status of habitats and species protected under the Habitats and/or Birds Directive.

Successful proposals should:

- improve the definition of "favourable conservation status" of groups of habitats and/or species protected under the EU Birds and/or Habitats Directives, provide guidance on how to improve the monitoring of habitats and species and/or the setting of favourable reference values and favourable reference conditions in Member States. The focus of this work should be on data-deficient habitats and species, on habitats and species in the worst status (conservation status and/or EU Red list status), or with declining trends[41] and/or on those species the recovery of which has created tensions with stakeholders (e.g., large carnivores, some geese species, cormorants, etc.). A specific focus could also be placed on habitats and species which depend on the maintenance of sustainable agricultural land management.

- ensure the recovery of habitats and/or species in unfavourable status and/or with a declining trend according to the reporting under the EU Birds and/or Habitats Directive (2019)[42] by providing methodologies and recommendations on how to identify recovery needs for populations or restoration needs for habitats, including with regard to geographical location, quantity and quality of habitat to be restored.

Area B: Improving the conservation status of huntable bird species listed in Annex II of the Birds Directive.

Successful proposals should:

- Identify habitat management and restoration needs for huntable bird species in non-secure status, with a focus on agricultural habitats, evaluate the impact of hunting and provide recommendations for an adaptive harvest management of these species, considering the available species-specific data on habitat quality and quantity impacting their fecundity and breeding success and survival rate for these species. Preparatory work done by the Commission Services should be taken into account[43].

Proposals should closely follow and ensure consistency with any ongoing or future relevant policy developments, with a particular focus on the voluntary EU targets for improving the

41 State of Nature in the EU: Results from reporting under the nature directives 2013-2018: State of nature in the EU — European Environment Agency (europa.eu) National summary dashboards - Habitats Directive – Art.17: National summary dashboards - Habitats Directive – Art.17 — European Environment Agency (europa.eu)National summary dashboards - Birds Directive – Art.12: National summary dashboards - Birds Directive – Art.12 — European Environment Agency (europa.eu)

42 Article 17 Reporting Habitats Directive: https://nature-art17.eionet.europa.eu/article17/Article 17 National Summaries: CIRCABC - MS National Summaries (europa.eu)Article 12 Reporting Birds Directive: https://nature-art12.eionet.europa.eu/article12/Article 12 National Summaries: CIRCABC - MS National Summaries (europa.eu)

43 habitats - Library (europa.eu)

status of species and habitats[44] and increasing the coverage of protected areas[45], as well as in relation to the upcoming Commission proposal for legally binding restoration targets.

Proposals should earmark the necessary resources for cooperation and networking activities. They are expected to link with relevant projects such as EuropaBON, LIFE Integrated Projects and LIFE Strategic Nature Projects as well as with relevant projects under Horizon Europe topics, such as HORIZON-CL6-2021-BIODIV-01-02: Biodiversity and Ecosystem Services Collaboration with the European partnership on biodiversity Biodiversa+ should be explored, as needed.

The possible participation of the JRC would help ensure that the methodologies proposed can support environmental compliance assurance, particularly by leveraging geospatial intelligence.

HORIZON-CL6-2023-BIODIV-01-5: Understanding and reducing bycatch of protected species

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 18.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030, the Birds, Habitats and Marine Strategy Framework Directives and the common fisheries policy, as well as the "Action plan to conserve fisheries resources and protect marine ecosystems", projects' results will contribute to improving the monitoring and assessment of the impact of bycatch in different fishing gears on protected and sensitive species, including in protected areas, defining and implementing effective mitigation and management tools, based on up-to-date knowledge and solutions. They will contribute to the following impacts of destination "Biodiversity and ecosystem services": "Understand and address direct drivers of biodiversity decline – land and sea use change,

[44] Guidance to Member States on how to select and prioritise species/habitats for the 30% conservation improvement target under the strategy: biodiversity_nature - Library (europa.eu)

[45] Commission Staff Working Document: Criteria and guidance for protected areas designations: biodiversity_nature - Library (europa.eu)

natural resource use and exploitation, climate change, pollution, invasive alien species – as well as indirect drivers – demographic, socio-economic, technological etc." and "Plan, manage and expand protected areas and improve the status of species and habitats based on up-to-date knowledge and solutions".

Selected proposals are expected to contribute to all following expected outcomes:

- Elimination or significant reduction of bycatch is achieved for marine mammals (e.g., up to 8500 dolphins killed each year in the Bay of Biscay), sea turtles (currently ~70 000 killed each year in EU waters) and seabirds (currently ~200 000 killed each year in EU waters) and sensitive or endangered fish species (e.g. elasmobranchs and sturgeons).

- Bycatch risks and reasons are well understood, including the spatial and temporal distribution of sensitive species.

- Information needed to improve Member States' monitoring programmes and implementation of management actions is acquired.

- Impacts of bycatches (rate of interactions, fate of individuals post-release, by gear and by fishery, impact on population abundance and sustainability) on the conservation status of species are assessed and understood.

- Interactions of bycaught species with fishing gears are minimised and where possible eliminated, and mortality following interaction is reduced.

- Member States are enabled to reach the target of the EU biodiversity strategy for 2030 to eliminate or reduce bycatch of sensitive species and to step up bycatch monitoring, as well as to fully and coherently implement the EU environmental and fisheries legislation and the Action plan to conserve fisheries resources and protect marine ecosystems and to protect marine ecosystems as required by the EU climate adaptation strategy.

- Member States are enabled to set criteria for Good Environmental Status under the Marine Strategy Framework Directive in relation to maintaining biodiversity and ensuring that all elements of marine food webs occur at normal abundance and diversity.

Scope: Proposals should work in one or more European regional seas and/or in other marine areas where EU fleet operates and should:

- Evaluate bycatch risk on a sea basin and/or local level (in particular for marine mammals, sea turtles, seabirds, and sensitive or endangered fish species such as e.g., elasmobranchs and sturgeons) by identifying the fishing activity of high-risk gear and comparing it with the spatial distribution/abundance of affected species, producing bycatch risk maps for all relevant species/gear interactions. Gather data and improve knowledge on the conservation status of bycaught species.

- Develop or improve tools for monitoring of bycatch, including long-term observation and surveying programmes, e.g. through extending the use of remote electronic

monitoring and artificial intelligence-based image recognition, enabling Member States to identify and implement adequate conservation measures as required by EU legislation.

- Close the knowledge gaps on the locations, precise extent (number of individuals, season and locations) and reasons for bycatch (relevant metiers and fisheries), focusing on species threatened by extinction or in a bad conservation status.

- Assess the effectiveness of existing bycatch mitigation methods (such as spatio-temporal closures or gear modifications) as well as of bycatch handling and safe release guidelines, and address their shortcomings, including through the development and testing of new approaches, focusing on high risk fisheries and most threatened species and areas.

- Engage relevant stakeholders and environmental and fishing authorities and operators in the research projects promoting co-design in the development and testing of new approaches.

This topic is expected to contribute to the conservation of whales, whose role in carbon sequestration in the ocean is now thought to be important, therefore this topic will indirectly contribute to carbon sequestration.

Proposals should earmark the necessary resources for cooperation and networking activities. Proposals should build on existing relevant projects, including funded under Horizon 2020 and LIFE programme, as well as relevant work done by the International Council for the Exploration of the Sea (ICES) and in Member States. They should also collaborate with Horizon Europe projects selected under topics on cumulative impact of stressors (i.e., HORIZON-CL6-2021-BIODIV-01-04: Assess and predict integrated impacts of cumulative direct and indirect stressors on coastal and marine biodiversity, ecosystems and their services) and marine/coastal observation & mapping (i.e., HORIZON-CL6-2022-BIODIV-01-01: Observing and mapping biodiversity and ecosystems, with particular focus on coastal and marine ecosystems). Additionally, they should collaborate with projects that will be funded under the Mission Restore our Ocean and Waters by 2030.

Concrete efforts shall be made to ensure that the data produced in the context of projects are FAIR (Findable, Accessible, Interoperable and Re-usable), particularly in the context of real-time data feeds, exploring workflows that can provide “FAIR-by-design” data, i.e., data that is FAIR from its generation.

International cooperation is encouraged, in particular with non-associated third countries participating in regional fisheries management organisations of EU interest.

The possible participation of the JRC in the project would consist in providing and analysing fisheries data as Member States upload some of the collected data to JRC databases.

HORIZON-CL6-2023-BIODIV-01-6: Restoration of deep-sea habitats

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 10.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Technology Readiness Level	Activities are expected to achieve TRL 5-6 by the end of the project – see General Annex B.

Expected Outcome: In line with the European Green Deal and, in particular with the objectives of the EU biodiversity strategy for 2030, the EU proposal for a nature restoration law[46] and the Birds and Habitats Directives, the Marine Strategy Framework Directive (MSFD), the Regulation 734/2008 on the protection of vulnerable marine ecosystems in the high seas from the adverse impacts of bottom fishing gears, the climate adaptation and mitigation strategies, the project should contribute to the destination impacts of aiming at bringing back biodiversity on a path to recovery, and preserving and sustainably restoring ecosystems and their services, planning, managing and expanding protected areas, mainstreaming biodiversity, ecosystem services and natural capital in the society and the economy, and addressing direct and indirect drivers of biodiversity decline. They should provide public authorities, as well as operators in marine ecosystem restoration, with solutions to plan and upscale restoration operations of deep-sea habitats based on up-to-date knowledge and solutions.

Projects results are expected to contribute to all of the following expected outcomes:

- Better prioritisation of sites for active restoration in EU and Associated Countries seas and definition of ecosystem functioning restoration targets, considering short to long timescales, and taking into account impacts of climate and other abiotic changes;

- Better decision making and contribution to policy formulation and implementation linked to protecting and restoring deep-sea marine biodiversity, ecosystem functioning

[46] EUR-Lex - 52022PC0304 - EN - EUR-Lex (europa.eu)

and ecosystem services and blueprints for the financing and the selection of tested active restoration approaches, tools and monitoring of their effects, taking into account cost-benefit analysis and integrating ecosystem services and natural capital accounting;

- Advanced knowledge on deep-sea ecosystems adaptation and demonstrated innovative and technically challenging active restoration of deep-sea habitats for climate change adaptation and mitigation.

Scope: Marine ecosystems usually have long recovery times. Climate change is adding risk factors. Effects of passive restoration (protection measures) may take multiple decades before benefits may be felt. This is even more the case for deep-sea ecosystems. They have low energy density, slower biochemical processes and assemble species with long life cycle / span. Active restoration should be explored to help accelerate the restoration.

Proposals should build on and capitalise on the knowledge base developed and lessons learnt from the Horizon 2020 MERCES project, notably its census of European marine key habitats maps, degraded habitats maps, key habitats restoration potential and its trials on deep-sea restoration, as well as from other national or EU relevant past or ongoing projects in the field of deep-sea ecosystems exploration from Horizon 2020, EEA Grants and Horizon Europe (notably in topic HORIZON-CL6-2021-BIODIV-01-03 and HORIZON-CL6-2022-CLIMATE-01-02).

The restoration activities should take place in areas with degraded habitats, and where protection measures against the causes of their degradation are already in place.

Proposals should develop and test innovative and technically challenging active restoration of deep-sea habitats. For this reason, and the cost of accessing the deep-sea, only one project may be funded with the budget available. Proposals should integrate different disciplines and novel approaches for the restoration that consider connectivity (including migratory species & vertical connections) in space and time, ecosystem modelling, as well as on site access, observation, and monitoring.

The restoration focus should not be only on species traits targets (population, assemblage, genetic diversity, sex determination, etc.), but also on ecosystem functions including adaptation potential. The proposals should include abiotic changes due to climate impact scenarios in identifying niche and refuge niche.

Proposals should set up governance frameworks for the restoration by involving local and national relevant actors (those having an impact on the achievement of the restoration goals, those having an interest and those who are impacted by related actions) to enable acceptability, ownership and a mechanism for long-term commitment to the restoration that exceed typical business and political cycles on financing, managing, regulating, monitoring and enforcement. Some short-term objectives are required to allow for measurements of restoration impacts in a reasonably shorter time frame to get on the right trajectory, but then check on mid- to long- term (5-20 years) should be planned.

Proposals should advance the knowledge base on the socio-economic costs and benefits of deep-sea restoration: including addressing the socio-economic importance of deep-sea ecosystems; considering upscaling issues and costs with restoration of deep-sea habitats, and timescales considerations.

Proposals should identify and test additional protection and management measures of the areas, to support the active restoration interventions over the long time, and provide recommendations for their application for new protected areas.

The proposals should contribute to filling the gaps in assessing deep-sea biodiversity recovery valuing changes in ecosystem goods and services; and contribute to define a natural capital accounting for deep-sea habitats.

The projects funded under this topic should build links with other relevant projects and initiatives such as Horizon 2020 and Horizon Europe projects in the field of deep-sea ecosystems and with projects funded under the European Mission 'Restore our ocean and waters by 2030', in particular with the Mission activities under objective 1 – protect and restore marine ecosystems and their biodiversity, and with the Mission lighthouse activities and Blue Parks, as well as with the Mission implementation monitoring system that will be part of the Mission Implementation Support Platform for reporting, monitoring and coordination of all relevant implementation activities. Proposals should outline a plan on how they intend to collaborate with other projects and initiatives, by e.g. participating in joint activities, workshops, common communication and dissemination activities, etc. Applicants should allocate the necessary budget to cover the plan. Relevant activities of the plan will be set out and carried out in close cooperation with relevant Commission services, ensuring coherence with related policy initiatives.

In order to achieve the expected outcomes in integrating and coordinating these different scaled approaches, international cooperation is strongly encouraged. A strong linkage should be ensured with the ongoing activities under the All-Atlantic Ocean Research and Innovation Alliance. Actions under this topic will build upon and link with Horizon projects. All in-situ data collected through actions funded from this call should follow INSPIRE principles and be available through open access repositories supported by the European Commission (Copernicus, GEOSS, and European Marine Observation and Data Network (EMODnet). Where relevant, creating links to and using the information and data of the European Earth observation programme Copernicus, the Group on Earth Observations (GEO) and the Global Earth Observation System of Systems (GEOSS) is expected.

Collaboration with the relevant existing European Research Infrastructures is considered necessary.

HORIZON-CL6-2023-BIODIV-01-7: Demonstration of marine and coastal infrastructures as hybrid blue-grey Nature-based Solutions

Specific conditions

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 5-7 by the end of the project – see General Annex B.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [47].

Expected Outcome: In line with the European Green Deal and, in particular with the objectives of the EU biodiversity strategy for 2030, the EU proposal for a nature restoration law[48] and the Birds and Habitats Directives, the Marine Strategy Framework Directive (MSFD), the climate adaptation and mitigation strategies, the new approach for a sustainable blue economy, the EU guidance document on integrating ecosystems and their services in decision-making, the projects should contribute to the destination impacts of mainstreaming biodiversity, ecosystem services and natural capital in the society and the economy, and addressing direct and indirect drivers of biodiversity decline. They should provide public authorities, as well as related infrastructures operators in their design, engineering, construction, installation and exploitation, with nature centred solutions that are beneficial for biodiversity, ecosystem services and the original infrastructure purpose (renewable energy production, or coastal protection).

Projects results are expected to contribute to all of the following expected outcomes:

- Pave the way for a new level of ecosystem-based management, in which future marine and coastal infrastructures (e.g., protection of coastal and urban areas from climate change impacts, offshore windfarms, harbours, tourism development, bridges, etc.) are intentionally designed and actively used to support the restoration (where the term encompasses multiple approaches to actively rehabilitate, repair, reallocate or reinvent

[47] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

[48] EUR-Lex - 52022PC0304 - EN - EUR-Lex (europa.eu).

damaged biodiversity and ecosystem processes and services) of marine ecosystem health and services (including climate mitigation & adaptation), where nature-based solutions alone cannot be envisaged;

- Contribute to the development of a framework for "blue buildings" rating based on the model of the LEED[49] (Leadership in Energy and Environmental Design) green building rating system;

- Upscale Blueprints integrating the conception, installation, exploitation, maintenance of hybrid blue-grey infrastructures that are beneficial to ecosystem functioning and restoration;

- Mainstream biodiversity in marine and coastal infrastructures and activities.

Scope: Climate policies trigger the development of several-large scale infrastructures in the marine and coastal environment. In particular, the EU offshore renewable energy plan targets for 40 GW of EU wave and tidal energy by 2050 from the 13 megawatts (MW) operating today. Climate adaptation and impacts reduction strategies imply the increase of an already important development of coastal and urban protection from erosion, sea level rise and extreme events. Global trade is supported by enlarging or building new ports. They may cause trade-offs against endemic biodiversity and alter on-going natural eco-evolutionary responses. They may cause trade-offs against endemic biodiversity and ecology, but they could protect, restore or harbour functional ecosystems (even if mostly novel) providing critical functions and services opportunities to biodiversity by mimicking and integrating natural processes and features in their design.

Proposals should be large scale demonstration of hybrid nature-based solutions with built coastal and marine infrastructures to preserve ecosystems and/or support their restoration. The infrastructure purpose should be originally aiming at climate policy targets (e.g., hard and soft coastal or urban protection from climate change impacts – sea level rise, extreme events, erosion - , renewable energy farms or islands, maritime services and safety, etc.) and with the highest potential for being replicated, scaled-up and deployed. Proposals should also assess the putative impacts/secondary effects of these infrastructures, notably regarding cumulative impacts of the biodiversity drivers such as climate, land and sea-use change (infrastructures), invasive alien species, etc. The action should consider impacts and opportunities from ecological connectivity with neighbouring ecosystems.

Proposals looking at infrastructures serving several purposes (such as Low Trophic Aquaculture; educational and recreational purposes; support of fishery via creation of nursery habitats; bio filtration and bio depollution) are encouraged. Proposals should integrate the relevant results of other Horizon 2020 or national projects on multi-use of the marine space.

Proposals should look how nature benefits could be put at the centre of the infrastructures by addressing the selection or the development of materials for their construction, design, installation, and maintenance, to maximise the positive effects on natural processes and

[49] https://www.usgbc.org/leed

enable their preservation (if in good status) or restoration of the local marine ecosystems and their socio-ecological management.

Proposals should explore and improve co-creation approaches with the relevant actors (infrastructure owners, governance, civil society and end-users or beneficiaries) for the design, installation and management of these built infrastructures with nature centred design. Social innovation is recommended when the solutions are at the socio-technical interface and require social change, new social practices, social ownership or market uptake. Proposals should provide evidence and data of the multiple benefits and potential trade-offs of these hybrid solutions on short and long-term timescales and, in particular, for the purposes of marine biodiversity and ecosystems functions protection and restoration, but also for the blue economy and society as a whole.

In particular, for hybrid infrastructures aiming at protection against climate impacts, the proposals should provide evidence-based analysis of their efficiency compared to more usual infrastructure approaches, and to usual nature-based solutions, or as alternatives where "NBS alone" cannot be envisaged due to local environmental features. The projects funded under this topic should build links with projects funded under the European Mission 'Restore our ocean and waters by 2030', in particular with the Mission activities under objective 1 – protect and restore marine ecosystems and their biodiversity, and with the Mission lighthouse activities and Blue Parks as well as with the Mission implementation monitoring system that will be part of the Mission Implementation Support Platform for reporting, monitoring and coordination of all relevant implementation activities. Proposals should also connect with relevant projects under Horizon Europe topics, such as (HORIZON-CL6-2022-BIODIV-01-03), on support of development of policies, business models and market conditions to scale up and speed up the implementation of nature-based solutions.

Projects are expected to contribute to the New European Bauhaus (NEB) initiative[50] by interacting with the NEB Community, NEBLab and other relevant actions of the NEB initiative through sharing information, best practices, and, where relevant, results.

In order to achieve the expected outcomes in integrating and coordinating these different scaled approaches, international cooperation is strongly encouraged. A strong linkage should be ensured with the ongoing activities under the All-Atlantic Ocean Research and Innovation Alliance. Actions under this topic will build upon and link with Horizon projects. All in-situ data collected through actions funded from this call should follow INSPIRE principles and be available through open access repositories supported by the European Commission (Copernicus, GEOSS, and EMODnet). Where relevant, creating links to and using the information and data of the European Earth observation programme Copernicus, the Group on Earth Observations (GEO) and the Global Earth Observation System of Systems (GEOSS) is expected.

[50] See COM/2021/573 final on 'The New European Bauhaus - Beautiful, Sustainable, Together' and https://europa.eu/new-european-bauhaus/index_en

Collaboration with the relevant existing European Research Infrastructures is considered necessary.

Mainstreaming biodiversity in society and the economy

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-8: Addressing biodiversity decline and promoting Nature-based Solutions in higher education

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 3.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 3.00 million.
Type of Action	Coordination and Support Actions
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [51].

Expected Outcome: This topic aims to contribute to education, skills development and awareness raising about biodiversity loss, and how this can be addressed, notably with Nature-based Solutions (NBS), in the higher education sector. This is fundamental to further implement and upscale NBS and to mainstreaming biodiversity, ecosystem services, including carbon sequestration, climate resilience and pollution reduction, and natural capital in the society and economy. Through education and NBS, the topic contributes to the transformative change necessary to tackle societal challenges, notably addressing the EU biodiversity strategy for 2030 and the EU climate adaptation strategy.

Project results are expected to contribute to all of the following expected outcomes:

[51] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

- Improved and more coordinated education programmes and increased awareness about biodiversity loss and how this can be addressed together with climate change notably through NBS, in universities and technical schools.

- Increased awareness and development of skills among young people, teachers, professional organisations, on biodiversity, climate change and NBS.

- A transdisciplinary dialogue on inclusive NBS contributing to nature-based thinking and a nature-positive economy, drawing on inclusiveness, the pluralities of values and of knowledge.

- A sustainable recovery of society and the necessary transformative change through biodiversity-friendly actions, professional, collective and personal attitudes.

Scope: The European Green Deal communication puts forward a specific action for the Commission to prepare a European competence framework to help develop and assess knowledge, skills and attitudes on climate change and sustainable development. This competence framework should serve as a reference tool for the development and assessment of competences on environmental sustainability. Following the EU biodiversity strategy for 2030, the Commission proposed in 2022 a Council Recommendation on encouraging cooperation in learning for environmental sustainability, including biodiversity learning and teaching, which was accompanied by a competence framework.

Education plays indeed an essential role in addressing environmental sustainability by raising awareness and instilling the key competences needed for changing personal behaviours and empowering people to act in their respective communities, especially in the current context of economic recovery, biodiversity crisis and climate change.

Drawing on state-of-the-art science, including the results of EU-funded R&I projects on biodiversity and NBS, the selected project will develop and disseminate concrete guidance for higher education institutions. It will target vocational training, universities and technical schools, for greater involvement with citizens and professional organisations, to mainstream biodiversity and NBS into their learning, teaching and capacity building programmes.

Transdisciplinary collaboration is a fundamental prerequisite for mutual understanding of people working in different sectors when co-creating and co-implementing NBS. There is a need to go beyond tackling challenges individually and perceive the systemic complexity of challenges to be addressed by NBS, by working together across silos, sectors and epistemologies. This paradigm shift in education and skills development will contribute to the necessary transdisciplinary work for tackling both biodiversity and climate crises at different decision-making scales.

The successful proposals should:

- Develop networking and collaboration schemes on higher education curricula and programmes on NBS, as well as researcher mobility initiatives.

- Support and promote the teaching of NBS co-design and co-creation (considering biodiversity and ecosystem services as their fundamental building blocks) as part of high education degrees and further education qualifications. Explore ways of raising awareness and teaching the importance of biodiversity, including genetic, functional and taxonomic diversity, and ecosystem services, including carbon sequestration, climate resilience and pollution reduction, especially in those academic fields where this is still greatly lacking (e.g., economics, engineering, etc).

- Encourage holistic approaches centred on biodiversity and the interlinks with climate change; and assess and propose university curricula for NBS-related disciplines, as well as for universities of technology, engineering and other non-biodiversity focused studies that are relevant for NBS design, implementation, monitoring and maintenance.

- Develop collaboration, guidance, benchmarking and exchange of best practices on how the higher education sector can address its impacts on biodiversity when addressing climate change (e.g., in built infrastructure, consumption and other processes), including through NBS.

- Explore innovative ways of involving higher education institutions, their students and staff in tackling the biodiversity crisis, together with the climate crisis (e.g., through documentaries, awards, art interventions, campus improvements).

- Develop NBS capacity building and skills development programmes, in different EU official languages and knowledge transfer mechanisms, in coordination with the relevant professional organisations and building on the work developed on NBS standards and protocols, e.g. by the Horizon 2020 and Horizon Europe NBS project portfolio, or by the IUCN, so that new technical solutions and standards are used in the NBS supply market.

- In view of a just ecological transition, provide specific NBS vocational training and skills development programmes for the youth, long term unemployed or other social groups in need (including in most deprived regions), co-developed with the relevant professional training and social inclusion institutions.

- Explore innovative ways of ensuring a transdisciplinary dialogue on biodiversity, drivers of biodiversity change, climate and NBS among communities of practice and professional organisations, as well as in universities. In this respect, develop approaches to ensure the quality of transdisciplinary programmes and provide an innovative dialogue space ensuring transdisciplinarity and welcoming the pluralities of values and knowledge, in view of transformative change to tackle both climate and biodiversity crises.

- Outreach and cooperation activities between higher education institutions and citizens, the local and regional communities, businesses, research centres, or museums, supporting challenge-based and experiential learning with real-life applications, promoting nature-based thinking, public debate and a change of behaviour.

- Organise academic residences or summer schools with the relevant partners in Member States, where students can join interdisciplinary and multicultural discussions and witness, in person, the co-creation, co-implementation and co-monitoring of NBS, also in view of emancipatory action for transformative change.

Proposals should address all of the above points.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities. In particular, SSH should be involved in view of ensuring the understanding and inclusion of different values and perceptions of nature, biodiversity and NBS, as well as issues of knowledge creation, identity and culture shaping NBS co-creation and co-implementation.

Proposals should include specific tasks and allocate sufficient resources to collaborate with other projects selected in any other relevant topic, by participating in joint activities, workshops, as well as common communication and dissemination. In particular, the project should build on the existing outputs and create synergies with the relevant projects in Erasmus+, the Horizon Europe Missions (notably “Restore Our Ocean and Waters by 2030” and "Adaptation to climate Change”), as well as the Horizon 2020 NBS project portfolio and its task forces. The project should also foresee synergies with HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions; with the HORIZON-CL6-2021-COMMUNITIES-01-06: Inside and outside: educational innovation with nature-based solutions; and HORIZON-CL5-2023-D1-01-10: Improving the evidence base regarding the impact of sustainability and climate change education and related learning outcomes. Applicants should plan the necessary budget to cover these activities without the prerequisite to define concrete common actions at this stage.

Proposals should ensure that all evidence, information and project outputs are accessible through the Oppla portal (the EU repository for NBS).

HORIZON-CL6-2023-BIODIV-01-9: Biodiversity, economics and finance: unlocking financial flows towards reversing of biodiversity loss

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions

Expected Outcome: In line with the European Green Deal priorities and in particular with the EU biodiversity strategy for 2030 and the 2030 climate target plan, the successful proposal will help unlock financial flows needed for reversing biodiversity loss and help better implement the sustainable finance taxonomy, thus contributing to mainstream biodiversity, ecosystem services and natural capital in the society and economy and to build approaches for enabling transformative changes to face societal challenges, including through the deployment of nature-based solutions (NBS).

Project results are expected to contribute to all of the following expected outcomes:

- Mobilisation of mainstream finance to slow down, and reverse biodiversity loss in the broader context of environmentally sustainable development, by catalysing nature-positive investments such as nature-based solutions, and by promoting a more holistic approach that considers nature's essential contributions to other objectives such as those related to climate, health, food, and water security;

- New knowledge, methodologies, and tools to support the implementation of the EU strategy for financing the transition to a sustainable economy, with a view to reorienting financial flows towards activities that benefit protection, restoration and sustainable management and use of biodiversity and ecosystems, including information, tools, and metrics to better integrate biodiversity, ecosystem services and natural capital considerations in their decision-making processes;

- Better awareness, understanding and know-how of economic actors, the financial community, and key institutions, public and private, about the opportunities and barriers (knowledge gaps, skills gaps, etc.) associated with the implementation of the sustainable finance taxonomy[52] , including its technical screening criteria[53] and 'Do No Significant Harm' (DNSH) principle in regard of the environmental objective focusing on the protection and restoration of biodiversity and ecosystems[54]

- Contribution to the implementation of the EU biodiversity strategy for 2030 by helping to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people,

[52] Delegated Acts of the correlated Regulation (EU) 2020/852: one adopted Act, C/2021/2800 final, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=PI_COM:C(2021)2800 and the other one in draft stage, but to be adopted in 2022.

[53] Detailed technical screening criteria are being set out in Delegated Acts of the Taxonomy Regulation for relevant NACE activities to determine whether an economic activity 'Substantially Contribute' (SC) to the 5 environmental objectives as described in art. 9 of the Regulation, including the objective for the protection and restoration of biodiversity and ecosystems (2). Besides this, detailed technical criteria have been set up for relevant NACE activities to determine that an economic activity which substantially contributes to any of the other 5 environmental objectives as described in art. 9 of the Regulation, does not significantly harm (DNSH) the objective for the protection and restoration of biodiversity and ecosystems.

[54] For 'SC' through any of the following means: (a) nature conservation (habitats, species); protecting, restoring and enhancing the condition of ecosystems and their capacity to provide services; (b) sustainable land management, including adequate protection of soil biodiversity; land degradation neutrality; and the remediation of contaminated sites; (c) sustainable agricultural practices, including those that contribute to halting or preventing deforestation and habitat loss; (d) sustainable forest management.

climate, and the planet and by better measurement, monitoring, and management of biodiversity.

Scope: Nature provides all sorts of essential services to our societies: clean air and water, food, pollination, carbon sequestration and pollination, it sustains tourism and leisure activities, it contributes to mental and physical health and delivers many other functions. In many instances, nature is also the most effective insurance policy – protecting us from floods, landslides, fires, or extreme heat.

However, we are facing an unprecedented crisis of biodiversity loss, posing a serious threat to our future welfare. 75% of the land-based environment and about 66% of the marine environment have been significantly altered by human actions. Nearly 1 million species are at risk of extinction from human activities. The loss of clean air, drinkable water, pollinating insects, forests, and species pose as big a threat to species survival as climate change. The loss of biodiversity increases the challenge of limiting climate change**,** as healthy ecosystems naturally absorb carbon from the atmosphere.

At the same time, Research findings [55] indicate that the conservation and effective management and guardianship of at least 30% of the planet in the most important places for biodiversity could protect up to 80% of plant and animal species, and secure 60% of the planet's carbon stocks and 66% of the planet's clean water. The latest IPCC report complements this statement: conservation of approximately 30% to 50% of the planet will also be key in maintaining the resilience of biodiversity and ecosystem services at a global scale. UNEP report on the State of Finance for Nature[56] states that investments in NBS need to triple by 2030 and to quadruple by 2050[57] if the world is to meet its climate change, biodiversity and land restoration targets. As underlined in the same report, more research is needed on how private financing can be strengthened and what are the low-hanging investment opportunities.

The EU sustainable finance taxonomy and other similar initiatives are underway with the aim to help guide investments towards more sustainable outcomes, in line with the objectives of the European Green Deal. They constitute a unique opportunity for ramping up investments in natural capital and projects that substantially contribute to biodiversity, as well as to other challenges, such as nature-based solutions and ecosystem restoration contributing to climate mitigation and adaptation**.**

Mobilising private investment, in particular to support the scaling up of NBS and the market for NBS in the European Union is key, in the context of a market characterised by smaller scale projects predominantly grants funded by the public sector.

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55 Jung, M., Arnell, A., de Lamo, X. *et al.* Areas of global importance for conserving terrestrial biodiversity, carbon and water. *Nat Ecol Evol***5,** 1499–1509 (2021). https://doi.org/10.1038/s41559-021-01528-7 and IPCC report 'Climate Change 2022: Impacts, Adaptation and Vulnerability'

56 State of Finance for Nature | UNEP - UN Environment Programme.

57 To amount to USD 8.1 trillion, and will be over USD 536 billion annually. USD 133 billion currently flows into nature-based solutions annually, with public funds representing 86% and private finance only 14%.

The project(s) should**:**

- Co-identify, analyse, and explore solutions to address potential barriers and hurdles in the implementation of the Taxonomy Regulation, for example related to the interpretation and the collection of data for biodiversity relevant technical screening criteria. The project(s) could address the technical criteria 'Substantially Contribute' to climate change mitigation and adaptation while following the 'Do No Significantly Does Harm' in terms of the protection and restoration of biodiversity and ecosystem; as well as the criteria 'Substantially Contribute' to the protection and restoration of biodiversity and ecosystem, especially for activities related to land management, restoration of ecosystems and remediation;

- More particularly, identify for which criteria/sectors there are practical implementation barriers and gaps, for example through analysis of case studies, when collecting the remaining Research and Innovation gaps;

- Building on the existing community's engagement in relevant Horizon 2020 and LIFE projects[58], engage the relevant stakeholders from the financial and biodiversity and NBS community involved in the implementation of the regulations in this analysis, and in the exploration and co-development of solutions in order to close the implementation gaps. This includes for example academics, regulatory bodies, financial institutions, civil society, industry and NGOs having co-developed relevant standards, protocols and certification schemes;

- Analyse the investment landscape in relation to protection and restoration of biodiversity and ecosystems, identifying best-practice case studies and evaluating the leverage potential of the EU taxonomy and its key success factors. Explore pathways for the future development of the taxonomy that could generate the most positive biodiversity outcomes;

- Provide the necessary guidance, training, and tools both for financial entities and for entrepreneurs engaged in "nature positive" activities, for the interpretation and collection of data of the technical screening criteria for determining whether an economic activity substantially contribute (SC) to one or more objectives, as set in the Regulation. It should also guide the interpretation of the technical screening criteria for determining whether an economic activity does significant harm (in relation to the DNSH principle) to the protection and restoration of biodiversity and ecosystems, as set in the Regulations. This should support compliance with related reporting and disclosure regulations;

- Identify potential skill gaps and propose a capacity building strategy to tackle them;

- Provide economic actors such as investors including Investment Fund Managers, corporates and financial institutions with tools, guidance, and methodologies to gather

[58] Such as LIFE PACTA which engage 'financial institutions, retail investors, financial regulators and civil society' and LIFE FinACTION.

reliable, consistent and standardised data to enable incorporation of biodiversity considerations into their investment decisions and risk management processes;

- Involve actively and co-create with the end-users and stakeholders (non-financial corporations, financial institutions, governments etc.) to fully account for their respective views and needs;

- Issue recommendations at EU as well as other levels on enabling conditions for biodiversity-focused sustainable finance and accounting principles, exploring synergies with other EU initiatives, such as the Non-Financial Reporting Directive (NFRD)[59] and the Corporate Sustainability Reporting Directive[60], as well as with relevant 'biodiversity-friendly' labels and standards.

Actions should bring together from the start multiple types of scientific expertise in social sciences and humanities, in particular in economics and finance, as well as scientific expertise in biodiversity and natural capital.

Actions should envisage clustering activities with the project(s) of the same topic and relevant topics on sustainable finance and valuation of ecosystem services[61]. To this end proposals should foresee dedicated tasks and appropriate resources for coordination measures, foresee joint activities and joint deliverables.

HORIZON-CL6-2023-BIODIV-01-10: Build up of knowledge on Nature Positive Economy and supporting its scale-up

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions

59 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0095. Adopted by the Commission in April 2021, a new proposal will extend the scope of the NFRD to all large companies and all companies listed on regulated markets (except listed micro-enterprises) and will introduce more detailed reporting requirements that are coherent with the Taxonomy's concept of SC and DNSH. https://eur-lex.europa.eu/legal-content/EN/HIS/?uri=CELEX:52021PC0189.

60 https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en.

61 Notably Horizon Europe projects 'SELINA' and'Invest4Nature and projects resulting from the calls: 'HORIZON-CL6-2021-BIODIV-01-07: Ecosystems and their services for an evidence-based policy and decision-makin','HORIZON-CL6-2022-COMMUNITIES-01-05: Assessing the socio-politics of nature-based solutions for more inclusive and resilient communities' , 'HORIZON-CL6-2024-BIODIV-01-4: Biodiversity, economics and finance: Understanding macro-financial risks associated with biodiversity loss',' HORIZON-CL6-2023-BIODIV-01-10: Build up of knowledge on Nature Positive Economy and supporting its scale-up'.

Expected Outcome: In line with the European Green Deal priorities, in particular the EU biodiversity strategy for 2030 and the revised climate targets, the successful proposal will support the development of policies and market conditions to scale up and accelerate the implementation of nature positive economic activities with particular focus on Nature-based Solutions (NBS). It will promote mainstreaming of biodiversity, ecosystem services and natural capital valuation in the society and economy.

Project results are expected to contribute to all of the following expected outcomes:

- Increased clarity of concepts around nature positive economy and its components, with better understanding of the synergies and trade-offs with other sustainable economic activities, such as a circular and sustainable bioeconomy[62], and the interactions with the EU sustainable finance taxonomy;
- New knowledge and increased expertise of relevant stakeholders in both public and private sectors, including economic and financial decision makers, on the market and determinants of nature positive activities with NBS at the core;
- Creation of an EU community of 'nature-based enterprises' as a basis for promoting EU global leadership;
- New enabling policy, regulations, support, tools, and capacity building measures, addressing market barriers, and leading towards better integration of innovative nature-based entrepreneurship and nature-based solutions in the current economic and financial system;
- Support to the implementation of the EU biodiversity strategy for 2030, the new EU climate adaptation strategy, the new EU sustainable finance strategy, and increased synergies with other key policy areas in support of European Green Deal priorities.

Scope: The EU biodiversity strategy for 2030 states that "industry and business have an impact on nature, but they also produce the important innovations, partnerships and expertise that can help address biodiversity loss". From the perspective of the private sector, integrating natural capital and biodiversity considerations into their decision-making processes makes economic sense as it can enhance corporate resilience and minimise investment risks. At the same time, economic activities that aim at reversing of biodiversity loss can create positive outcomes for the society such as job creation and sustainable economic growth in rural, post-industrial and disadvantaged areas and strengthen resilience against environmental and climate stressors, contributing to a fair and green transition and recovery in line with the European Green Deal. According to the World Economic Forum, a nature-positive recovery "can unlock an estimated $10 trillion of business opportunity by transforming three economic

[62] Cf. EU Bioeconomy Strategy| European Commission (europa.eu) and its progress report 'Stocktaking and future developments: report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions'.

ecosystems that are responsible for almost 80% of nature loss and create 395 million resilient jobs by 2030 in the process"[63].

Nature-based solutions (NBS) can play a particularly key role in leveraging of the economic and societal potential of nature with the development of existing and new market sectors with 'nature-based enterprises' (NBEs) at the core. Such innovative NBEs use nature (and ecosystem services) as an input to deliver nature positive outputs - products, services and jobs that are sustainable, future-oriented, and more resilient. By definition, they constitute a backbone of the bioeconomy.

However, nature-positive economy where such NBEs can thrive is still at its infancy and enabling framework conditions are required to improve market conditions and to unlock investment. The market is encountering many specific difficulties due to market fragmentation, early stage of development and difficulty in assembling the required knowledge, skillset, and governance structures for supplying and maintaining "living solutions" such as nature-based solutions. There is a need at the same time to increase manyfold the investment in NBS[64].

The action should:

- On Concept: Undertake in-depth research into the key concepts underpinning nature positive economy, establishing synergies and trade-offs with other policies, strategies, and business models such as bioeconomy related, and exploring the role of nature positive activities and NBS in promoting transformative change to provide holistic solutions that address global challenges such as climate, biodiversity, and pollution crisis;

- On Market Knowledge: Building on the work of Horizon 2020 projects and their taskforces, identify barriers and analyse market potential in different economic sectors, at European and national level when possible, for each sector, identify the stakeholders of the different value chains for the different types of nature positive economic activities, estimating the net job creation potential with a view to supporting the framing of nature positive economy narrative. This work should include identification and analysis of representative case studies and reflections on positioning towards nature positive economic activities as defined by the Sustainable Finance Taxonomy[65];

- Foster collaboration between nature-based entrepreneurs, research and technical organisations, policy makers, financiers and investors, business development bodies through, for example, participatory arrangements and spaces, to close the Science Policy Implementation gap;

63 https://www3.weforum.org/docs/WEF_The_Future_Of_Nature_And_Business_2020.pdf.

64 According to UNEP State of Finance for Nature 2021, by 2030 if the world is to meet its climate change, biodiversity and land degradation targets, the investment will need to triple, unlocking in particular private finance (only 14% of the current investment).

65 That is to say the criteria 'Substantially Contribute' in regards of the protection and restoration of biodiversity and ecosystems

- On Indicators: Building on previous research, notably natural capital valuation methods including both monetary and non-monetary economic valuation approaches for nature-based solutions[66], deliver progress towards standardised, widely accepted economic indicators, reflecting wider socio-economic, biodiversity and natural capital benefits;

- On Market development: using the collaborative and participatory arrangements, develop and pilot strategies, measures (both market and non-market) and approaches for scaling and speeding up the implementation of nature positive economic activities, including Nature-based Solutions (NBS), both from supply and demand side perspective to boost nature-based market development, innovation, and job creation in EU and beyond. This may comprise for market supply economic, finance and governance innovations, capacity building and training;

- Explore and facilitate synergies and interconnection with different EU, MS and Horizon Europe Associated Countries initiatives, such as: EU and national Business and Biodiversity platforms, national restoration plans, Business Acceleration Services, Climate KIC, Smart Specialisation Strategies, Recovery Plans, the EU Biodiversity Partnership, Circular Bio-based Europe Partnership, European Bioeconomy Policy Forum, for more coordinated actions and aggregated impact on NBS and nature positive activities;

- Set up and/or collaborate with relevant marketplaces and similar initiatives at the relevant scales, so that potential project partners, entrepreneurs, investors, and innovation stakeholders can match supply, demand and expertise on designing, implementing, managing, monitoring, valuing, financing NBS, ecosystem services and nature positive activities;

- On Standardisation: support the engagement of the relevant communities (including the communities engaged in the relevant Horizon 2020, Horizon Europe and LIFE projects) in contributing to the development of sector-specific standards and/or certification schemes;

- Build on and/or establish synergies with the relevant work by initiatives/projects/studies including, but not limited to the EIB led study on facilitating access to finance for Nature-based solutions, the EC publication 'The vital role of NBS in the Nature-Positive Economy'[67], the World Economic Forum's New Nature Economy Report Series, The Economics of Biodiversity: The Dasgupta Review, The State of Finance for Nature 2021[68];

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66 The published EC Handbook on evaluating the impact of NBS provides a comprehensive reference point on how to measure different types of impact. There are also many Horizon 2020 and Horizon Europe projects on Natural Capital, as well as LIFE projects (e.g. LIFE Transparent).

67 The vital role of nature-based solutions in a nature positive economy | European Commission (europa.eu)

68 State of Finance for Nature | UNEP - UN Environment Programme.

- Actions should bring together from the start multiple types of scientific expertise in social sciences and humanities, in particular in economics and finance, as well as scientific expertise in biodiversity and natural capital.

Other conditions:

Actions should envisage clustering activities with the projects with the Horizon 2020 and Horizon Europe Natural Capital Accounting and NBS project portfolio and respective task forces as well as any Horizon Europe relevant projects on NBS[69] and Bioeconomy. To this end proposals should foresee dedicated tasks and appropriate resources for coordination measures, foresee joint activities and joint deliverables.

HORIZON-CL6-2023-BIODIV-01-11: Biodiversity loss and enhancing ecosystem services in urban and peri-urban areas

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In line with the European Green Deal, in particular with the objectives of the EU biodiversity strategy for 2030 and the EU proposal for a nature restoration law[70], projects will contribute to the following impact: "to mainstream biodiversity, ecosystem services and natural capital in the society and economy"**.**

They should address all of the following outcomes:

69 notably coordinate with Horizon Europe projects resulting from: HORIZON-CL6-2022-COMMUNITIES-01-05: Assessing the socio-politics of nature-based solutions for more inclusive and resilient communities; HORIZON-CL6-2022-BIODIV-01-04: Natural capital accounting: Measuring the biodiversity footprint of products and organizations; HORIZON-CL6-2021-BIODIV-01-05: The economics of nature-based solutions: cost-benefit analysis, market development and funding; HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions; s, and the 2 topics HORIZON-CL6-2023-BIODIV-01-9 and HORIZON-CL6-2024-BIODIV-01-4.

70 Proposal for a Regulation of the European Parliament and of the Council on nature restoration, COM(2022) 304 final, 22.06.2022.

- Better implementation and delivery of the EU proposal for a nature restoration law and the EU biodiversity strategy for 2030, particularly through new resources and knowledge to support the deployment across EU of urban (and peri-urban) greening plans;

- Increased capacity and skills in cities to work 'at the right scale' of the challenge and across policies, measures, strategies, including spatial planning capacity, so as to help deliver and assess the urban greening plans, green infrastructure strategies and more widely transformative change towards more sustainable and resilient cities to implement the EU climate adaptation strategy;

- Better understanding on how and under which conditions spatial planning can help optimise the ecosystem services of the solutions, strategies and actions, such as ecosystem restoration/creation and connectivity, Nature-based Solutions (NBS), blue and green infrastructure while addressing social equity and spatial justice aspects; operating this new knowledge into new pathways and methodologies;

- New tools and solutions for better integration of nature-based objectives in investments in infrastructure and other urban systems as well as better investment cases for renaturing the urban and peri-urban areas and maintain NBS in the long-term thanks to new and innovative governance and finance models;

- Better understanding on how to manage the tension between biodiversity protection, urban development pressure and fair access to nature for the urban citizen, identifying the relevant scale and timeframe while considering the long-term impact of spatial planning strategies;

- New approaches, tools and good practices for decision-making processes supporting municipal planning structures in co-creation of policies and plans for NBS through the lens of social equity and environmental fairness.

Scope: Cities with their peri-urban areas have a vital role in protecting and enhancing nature and nature contribution to people in urban areas across EU, such as health, well-being, and climate resilience. They are also key in delivering global and EU biodiversity objectives and policies, as recognised both in the 'post-2020 Global Biodiversity Framework (GBF) Draft 1'[71] and in the 'EU biodiversity strategy for 2030'[72], as well as in the proposal for a nature restoration law[73] which sets targets for urban and peri-urban ecosystems.

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71 Cf. enabling conditions: 'The implementation of the global biodiversity framework requires integrative governance and whole-of-government approaches to ensure policy coherence and effectiveness, political will and recognition at the highest levels of government. It will require a participatory and inclusive whole-of-society approach that engages actors beyond national governments, including subnational governments,citiesand other local authorities (including through the Edinburgh Declaration)' and CBD/SBI/3/INF/25 as well as future CBD Decision on the updated plan of action on subnational governments, cities and other local authorities for biodiversity'.

72 Measure on bringing back nature to cities and their peri-urban areas, with greening plans to be developed by cities of more than 20 000 inhabitants.

73 Proposal for a Regulation of the European Parliament and of the Council on nature restoration, COM(2022) 304 final, 22.06.2022

Cities are at the same time pledging for a recognition of their pivotal role(s) in delivering an ambitious GBF, with more than 200 sub-national authorities having signed the Edinburgh Declaration[74]: as decision makers and regulators for land-use and urban development through their statutory role in spatial planning; as land and infrastructure (grey and green) owner, manager or shareholders, such as brownfields and public spaces, including natural and protected areas; as co- initiators and co-funders of local green initiatives, from urban gardening to depaving doorsteps and to the implementation of large-scale NBS.

There is however a lack of knowledge and know-how on:

- how to assess ecosystem condition and services in urban and peri-urban areas, and their contribution to the challenges of the cities,
- how to best plan and prioritise the protection, renaturing, and reconnecting of the NBS and green and blue infrastructure so as to optimise the ecosystem services and address the policy priorities of the city while 'leaving no one behind' as stressed by the European Green deal (e.g., promote urban and regional resilience, while addressing spatial justice to avoid increased inequality),
- how to combine, connect and manage different re-naturing actions and interventions and the scales of these actions- from an individual intervention to an urban and functional urban area in order to minimise the trade-offs and disservices and optimise the benefits in a cost effective and efficient manner.

The successful proposal should:

- Building on the work of Horizon 2020 projects and their task forces, take stock of the **state** the existing urban and peri-urban ecosystems and their services and identify direct (urban development pressure etc.) and indirect drivers of loss of biodiversity and ecosystem services at local level (policy, spatial regulations, financial incentives, land management practices, etc.);
- Develop a replicable methodology for cities and urban areas across Europe to co-design pathways, a shared long-term vision, an integrated strategy with policies and an action plan (e.g., with responsibilities, timeline and financing) towards the urban ecosystem restoration targets as formulated in the Commission proposal for a nature restoration law[75];
- Include in the methodology the necessary mapping and assessment methods, economic and co-creation governance models to co-develop and prioritise i. combination of **cost** effective and efficient solutions that will enable to co-implement the strategy and to co-monitor the delivery; ii. innovative solutions and governance models to integrate systematically the strategies in the public, private and people decision making processes,

[74] Edinburgh Declaration on post-2020 global biodiversity framework, available at: https://www.gov.scot/publications/edinburgh-declaration-on-post-2020-biodiversity-framework/.

[75] Proposal for a Regulation of the European Parliament and of the Council on nature restoration, COM(2022) 304 final, 22.06.2022

such as public procurement, transport and climate policies, spatial regulations, land management decision, market incentives, etc; iii. innovative financing and business models;

- Co-develop and test the methodology in a representative sample of cities across EU with local stakeholders from the whole society that will enable the uptake of the models and tools developed across EU and EU regions, thus supporting EU territorial cohesion;

- Engage in the testing cities different departments of local authorities, local research and technical organisations, big urban/ land managers or users, including farmers, citizen, including vulnerable groups, SMEs such as nature-based enterprises, etc. Citizen science approach could be used for this purpose;

- Identify the skills and building capacity needs at the local and regional levels, the potential for job creation as well as existing capacity building programmes, with an eye at the inclusion of marginalised communities and at the gender dimension;

- Propose how urban greening plans and spatial planning, including regulations and building code, can act as enablers of the development of NBS market;

- Disseminate outcomes and capacity building activities across EU, connecting with the relevant platforms such as recommended in the EU guidance for urban greening plans, as well as with the "Cities with nature platform"[76];

Proposals should also:

- Build on existing methods and data from the Urban Greening Plan guidance and toolbox, including JRC MAES urban, EPSON studies, EEA data on green infrastructure;

- Build on the outcomes of the relevant EU-funded projects of the Horizon 2020 and LIFE Programmes[77], including further testing and developing of the EU Impact Evaluation Framework for NBS[78] and similar highly relevant protocols and guidelines;

- Envisage clustering activities with the relevant Horizon 2020 NBS projects and respective task forces as well as with relevant Horizon Europe projects[79] and relevant

[76] The formally constituted Advisory Committees to the CBD on Local Governments and Biodiversity has ICLEI as the Secretariat. The committees' main objectives are to coordinate the contribution and participation of all levels of subnational government in processes under the CBD and to act as an advocacy platform for enhanced cooperation between CBD Parties and all levels of subnational government. One of the implementation-orientated platforms is "Cities With Nature", which act as multi-stakeholder platforms at the local level for learning, measuring and commitments, as well as tracking and reporting on these commitments.

[77] Such as 'LIFE UrbanGreeningPlans'.

[78] The EC Handbook on evaluating the impact of NBS provides a comprehensive reference point on how to measure different types of impacts.

[79] Such as Horizon Europe project NaturaConnect (Horizon-CL6-2021-BIODIV-01-08) and projects stemming from the calls: 'HORIZON-CL6-2022-BIODIV-01-07: Ecosystems and their services for an evidence-based policy and decision making', 'HORIZON-CL6-2022-COMMUNITIES-02-02-two-stage: Developing nature-based therapy for health and well-being', 'HORIZON-CL6-2021-BIODIV-01-05: The economics of nature-based solutions: cost-benefit analysis, market development and

successful projects resulting from calls of the EU Missions "Climate-Neutral and Smart Cities" and "Adaptation to Climate Change";

- The use of social science and humanities methods and of social innovation is encouraged to encounter also different perceptions, values, experiences, practices, and social production across all stages of urban planning and to contribute to the empowerment of citizens.

HORIZON-CL6-2023-BIODIV-01-12: Reinforcing science policy support with IPBES and IPCC for better interconnected biodiversity and climate policies

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: Legal entities established in non-associated third countries may exceptionally participate in this Coordination and support action in a capacity other than as an associated partner. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [80].

funding', 'HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions'; HORIZON-CL6-2024-BIODIV-02-2-two-stage: Demonstrating the potential of Nature-based Solutions and the New European Bauhaus to contribute to sustainable, inclusive and resilient living spaces and communities'.

[80] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

Expected Outcome: In line with the Commission priority 'A stronger Europe in the world', a successful proposal will step up EU science policy support to biodiversity policy at EU and international level, and in particular the interconnections with climate policies[81]. This will require the contribution to processes triggered by the EU and global biodiversity knowledge centres, IPBES and IPCC to achieve targeted impacts on biodiversity-relevant policies, and to integrate structured policy input into the research cycle. Projects should deliver the following outcomes:

- EU projects and initiatives are aware of and use the knowledge generation, policy support and capacity building functions of IPBES, including the recommendations issued by task forces of IPBES and IPCC (where relevant for biodiversity);

- Contribution of and uptake by research projects and initiatives reinforcing the evidence base of EU biodiversity and climate policy by promoting synergies and avoiding conflicts, as well as taking into account the knowledge generation, policy support and capacity building functions of IPBES, in line with the recommendations issued by the task forces of IPBES and IPCC;

- Address shortcomings in the uptake of IPBES and IPCC findings and conclusions in sectorial policy making other than for biodiversity, and business decisions at European, national and local level;

- Better support from EU research for policy requests to the EU and global Knowledge Centres for Biodiversity and to the European contribution to IPBES.

Scope: In line with the Commission's priority 'A stronger Europe in the world', the European Union must take and demonstrate leadership in this field, notably by increasing its support to the EU and global biodiversity knowledge centres[82] and to IPBES – and to elevate it to the same level as the IPCC.

- Besides economic support, this also includes networking efforts to reinforce synergies and cooperation of the work of EU services, scientists and practitioners with CBD, IPBES, regional Multilateral Environmental Agreements, UN organisations and programmes, and other relevant research communities to underpin the implementation, monitoring and review of the post 2020 global biodiversity framework.

- This action delivers targeted support to areas of specific interest for European research policy by using as well as contributing to IPBES outputs. It also helps European scientists, in particular those from southern, central and eastern EU countries, and those from the Western Balkans, Central Asia, and from Africa [83], who remain underrepresented, due to a lack of capacity to participate in meetings, networking or science input at global level, to play their role by contributing to EU and global regular

81 Considering Horizon Europe Cluster 5 – Destination 1 "Climate Science and Responses".

82 The EU Knowledge Centre for Biodiversity is available at https://knowledge4policy.ec.europa.eu/biodiversity_en.

83 Europe and Central Asia form one region for IPBES purposes. Cooperation with Africa is a priority for the policy agenda of the European Union.

assessments (EU ecosystem assessment, IPBES global assessments, Gap and Stocktake Reports, global biodiversity outlook). Major functions of IPBES still need to be further developed to achieve a proper level of uptake in Europe: knowledge generation, policy support and capacity building functions, including the task forces.

The project should cover all of the following points:

- providing assistance to the EU and Associated Countries, to central Asian and to African scientists, knowledge holders and local communities for reinforcing the input into the EU and global biodiversity knowledge centres, IPBES and IPCC on biodiversity;
- translating IPBES and other relevant research outputs for policy and decision-making into a language targeted to a wider readership by the EU public, interest groups, research and innovation projects, policy makers and businesses, and into (a set of) EU languages;
- networking and facilitating synergies through cooperation between IPBES, IPCC and amongst scientists and relevant scientific bodies of other regional Multilateral Environment Agreements, such as the United Nations Economic Commission for Europe (UNECE) Air Convention;
- proposing standards for EU-funded biodiversity projects to apply the relevant outcomes of the IPBES data and knowledge task force;
- supporting European negotiators at IPBES plenary meetings and inter-sessional work as well as at the scientific body meetings of CBD and other biodiversity-related MEAs of relevance to IPBES. This includes back-office support to the EU IPBES and IPCC negotiation teams and to delegations of Member States and Associated Countries in need of assistance in synthesizing scientific evidence of relevance for IPBES and IPCC plenary work.

The project should detail a plan on how the work can be further financed and governed over the medium- and long-term and secure commitments that enable the work to continue after the funding of this topic ends.

Proposals should not develop any new platforms but ensure that all relevant evidence, data and information is accessible through e.g., the Oppla portal and cooperate with existing networks of national platforms[84]. They should also prepare the inclusion of their results in the EC Knowledge Centre for Biodiversity, hosted by the Joint Research Centre (JRC), according to an agreed format, and cooperate with the Science Service project ‘Bio-Agora’.

The project is to set a clear plan on how it will collaborate with other projects selected under related topics of the Cluster 6 Work Programmes 2021-245, and with the Biodiversity Partnership Biodiversa+. This includes links to ESFRI research infrastructures, to test whether they could host predictive models, visualization and analysis of their platform's early warning systems, to respond to IPBES and IPCC assessments and to CBD requests, by participating in

[84] The network of national platforms in Europe & Central Asia for the IPBES, http:\\www.ipbes.eu.

joint activities such as workshops, scientific deliverables, or joint communication and dissemination measures. Proposals should include dedicated tasks and allocate sufficient resources for coordination measures and indicate the necessary flexibility to react to requests stemming from future IPBES and IPCC work programme development.

Proposals should involve the contribution from the social sciences and humanities disciplines.

Biodiversity friendly practices in agriculture, forestry and aquaculture

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-13: Crop wild relatives for sustainable agriculture

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: Activities under this topic seek to preserve biodiversity and thereby contribute to the objectives of the EU biodiversity strategy for 2030 and the upcoming post 2020 global biodiversity framework. By increasing agrobiodiversity, activities will contribute to food security, adaptation of the agricultural production to the effects of climate change, and thereby support implementation of the farm to fork strategy, the common agricultural policy and the EU climate policy under the European Green Deal.

Projects funded under this topic are expected to contribute to all of the following outcomes:

- More effectiveness measures for the conservation of Crop Wild Relatives (CWR) due to increased knowledge and systematic monitoring and documentation of the diversity, the threats and the conservation status of CWR;

- Conservation of CWR is improved due to a) better coverage of CWR in gene banks, b) the establishment of genetic reserves for in situ conservation, and c) enhanced genetic characterisation of CWRs;

- Knowledge on valuable traits, such as tolerance to biotic and abiotic stresses or nutritional properties is more easily available to breeders and accelerates the breeding of more resilient crop varieties;

- Greater use of CWR in pre-breeding and breeding activities, both in formal and on-farm crop improvement programmes;

- Farmers are more aware of the value of CWRs and have improved access to varieties and cultivars with high resilience and/or adapted to marginal lands.

Scope: Crop Wild Relatives (CWR) – also referred to as the wild cousins of cultivated crops - are a key asset for agrobiodiversity, sustainable agriculture and food security overall. CRWs contain genes for a multitude of useful traits such as tolerance to pest and diseases, resource efficiency and adaptability to more extreme weather conditions or nutritional quality. Their inherent genetic diversity together with the associated diversity of microbiota is a vast resource for developing more productive, nutritious and resilient crop varieties and for diversifying farming systems.

Despite their value, a wide range of CWRs are threatened and face pressures, e.g., from intensive agriculture, urbanisation, pollution and the effects of climate change. At the same time, the conservation and use of CWRs in breeding lags significantly behind the one of main crops. It is estimated that for about 30% taxa associated with 63 crops, no germplasm accessions exist and that about 95% of CWR taxa are underrepresented in genetic resources collections. As a consequence, knowledge is lacking about the diversity that exists and precisely how that diversity may be used for crop improvement and in farming.

More systematic efforts are needed to improve the conservation of CWR in –situ and ex-situ and increase their use in plant breeding and farming.

Proposals should:

- review and increase our knowledge on the diversity, the conservation status (both in situ and ex situ), the threats, monitoring and the utilization of CWR in Europe; due account should be taken of the local knowledge of farmers, e.g., as regards the specific attributes of CWR resources, their integration in agro-ecosystems and methods for their management on-farm;

- promote the breath of taxa and genetic diversity of CWR in gene bank collections and improve their description and geno- and phenotypic characterisation;

- set-up pilots of genetic reserves for CWR under different types of management regimes and pedo-climatic conditions, and develop models for their long-term viability;

- unravel the genetic basis of valuable traits of CWR such as the resilience to different biotic and abiotic stresses or nutritional quality;

- develop high-quality genomic resources to promote the use of CWR in pre-breeding and breeding activities of formal and on-farm crop improvement programmes;
- promote the on-farm management and conservation of CRW genetic resources taking into account the adaptation of CWR to local conditions;
- carry out training activities and increase awareness of breeders, farmers, consumers and the various actors in value chains (e.g., the agri-food industry) about the value of CWR, including by carrying out on-farm demonstrations.

Work under this topic should be carried out in various pedo-climatic zones[85] and benefit both conventional and organic farming as reflected in the expertise of the consortia. Proposals must implement the "multi-actor approach", and build partnerships across research, conservation, breeding, farming and business sectors, considering a balanced representation of partners from within the EU and Associated Countries. They should also demonstrate a sound representation of SSH disciplines.

HORIZON-CL6-2023-BIODIV-01-14: Biodiversity friendly practices in agriculture – breeding for Integrated Pest Management (IPM)

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: In line with the objectives of the European Green Deal, the EU Climate Policy, EU biodiversity strategy for 2030 and the farm to fork strategy, a successful proposal will contribute to the transition to more sustainable practices in agriculture by reducing the need for external inputs, notably chemical pesticides [86], and support biodiversity in agroecosystems.

Projects are expected to contribute to all of the following outcomes:

[85] https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2

[86] The farm to fork strategy sets the target to reduce by 50% the overall use and risk of chemical pesticides and reduce use by 50% of more hazardous pesticides

- Enhanced knowledge of relevant traits for resistance and/or tolerance (resilience) to biotic stresses;

- Enlarged availability and access to plant varieties which can better cope with increased pest and diseases pressure;

- Increased knowledge, knowledge transfer, and capacity of farmers and agricultural advisers to implement Integrated Pest Management with plant varieties that can better cope with plant pests and that are adapted to the local environmental and pedo-climatic conditions (e.g., terroir effects, soil health status, local disease pressures, positive interactions with biological control) and farming practices (e.g., intercropping, crop rotation, carbon farming).

Scope: The European Green Deal has set ambitious targets to reduce by 2030 the use and the risk of chemical pesticides and fertilisers, reduce nutrient losses and increase organic farming[87]. Plant breeders need to consider more systematically characteristics that respond to these demands and contribute to crop resilience and adaptation, particularly to increasing biotic and abiotic stresses, in particular in the context of climate change.

Breeding for integrated pest management (IPM) aims to boost the development of plant varieties with tolerance of or resistance to relevant pest(s)[88] and diseases, adapted to local environmental and pedo-climatic conditions, and diversification approaches with the goal of reducing reliance on chemical pesticides.

Proposals should:

- Contribute to a better understanding of crop-specific genetic characteristics and crop-environment management (GxExM) interactions underpinning tolerance to pest pressure;

- Identify useful traits/combination of traits and progress in the development of plant varieties with increased resistance or tolerance to plant pests and adapted to local conditions;

- Embark in breeding activities for pest-tolerant or pest-resistant varieties making use of all type of breeding approaches and allow for participatory breeding with involvement of farmers;

- Promote the deployment of resistant plant varieties in combination with the range of tools available for integrated pest management such as crop diversification, soil and crop management (e.g., crop residue management), biological control agents (e.g., micro- and macro-organisms), the preservation and enhancement of natural enemies of plant pests

[87] European Green Deal farm to fork and biodiversity strategies with 2030 targets: reduce by 50% the overall use and risk of chemical pesticides and reduce use by 50% of more hazardous pesticides; reduce nutrient losses by at least 50% while ensuring no deterioration in soil fertility; reduce the use of fertilisers by at least 20%; achieve at least 25% of the EU's agricultural land under organic farming.

[88] A pest is defined here as any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (EU legislation, Regulation 2016/2031)

(e.g., beneficial insects/mites/nematodes/antagonistic, symbiont microorganisms, beneficial endophytes);

- Support capacity building, training and education enabling farmers/growers to adopt sustainable agricultural practices in pest management following the integration of tolerant plant varieties;

- Increase general awareness of the benefits of IPM and the adoption of resistant plant varieties for consumers and in the value change.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of researchers, the breeding sector, farmers, advisors and other relevant actors of the value chain. The topic is open to all types of farming systems (e.g., arable farming, horticulture, fruit trees). Proposals should cover various biogeographical regions[89] with a balanced coverage reflecting the various pedo-climatic zones in Europe in a representative way. Result of activities should benefit both conventional and organic farming.

Proposals should specify how they plan to collaborate with other proposals selected under this and other relevant topics, for example by undertaking joint activities, workshops or common communication and dissemination activities. Proposals should allocate the necessary resources to cover these activities.

HORIZON-CL6-2023-BIODIV-01-15: Integrative forest management for multiple ecosystem services and enhanced biodiversity

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: Legal entities established in non-associated third countries may exceptionally participate in this Coordination and support action in a capacity other than as an associated partner. The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

[89] https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2

	The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [90].

Expected Outcome: In line with the European Green Deal, EU climate policy, and the EU forest and biodiversity strategies, this topic promotes research-based and evidence-based forest conservation and management approaches that apply an understanding of the structure, function, and dynamics of natural and sustainably managed forest ecosystems to achieve integrated environmental, economic, and social outcomes.

Project results are expected to contribute to all of the following outcomes:

- Intensive collaboration, mutual learning and sharing of knowledge among the conservation and forestry bodies, forest managers, research institutions and other interested stakeholders to exploit synergies and minimise trade-offs in forest management.
- Contribution to the development of computer models to be used as operational tools for examining the effects of climatic change on forest functioning.
- Practical recommendations and guidelines addressing multiple, possibly conflicting objectives of forest management, to promote forest conservation and resilience and mitigate the impacts of various forest disturbances, while supporting the socio-economic goals of forests through the support of an efficient utilisation of forest resources and services.
- Contribution to the achievement of EU forest related policy targets (biodiversity, bioeconomy, climate mitigation and adaptation).
- Diversification of forest management methods and their mutual balance and appropriate use in the given context ("context-dependent integrative forest management") through the combination of different scientific disciplines, strong involvement of practitioners, researchers and advisors, biodiversity monitoring systems based on expert taxonomic knowledge combined with technologies, decision support tools and sustainability

[90] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

indicators. Application of context-dependent and site-appropriate, multi-stakeholder participatory and interdisciplinary methods.

- Enhanced knowledge on ecological forestry practices and their impacts on climate change adaptation and biodiversity conservation/restoration.

Scope: This topic addresses integrative forest management strategies that optimise actively managed forest ecosystems in such a way that the ecological and socio-economic functions are sustainable and economic viable.

The aim is to achieve a better understanding how integrative forest management concepts (e.g. close-to-nature forestry, continuous cover forestry, retention forestry, etc.) are currently applied in Europe, their implications on the environment and biodiversity, society, and forest-based economy as well as to accelerate the implementation of innovative approaches through targeted and evidence-based guidelines and tools.

Proposals should:

- Provide an in-depth analysis of current concepts and principles of integrative forest conservation, management and utilisation strategies and assess their socio-economic and ecological impacts;
- Establish a network of living labs for integrative forest conservation, management and utilisation approaches inspired by best practices and covering different socio-cultural and bio-geographical conditions;
- Develop applicable evidence-based guidelines and tools for the upscaling of integrative forest conservation, management and utilisation approaches;
- Consider a strong stakeholder involvement and supportive policies;
- Support exchange of knowledge, dialogue and good practices among stakeholders and institutions, including science-based dialogues.

The project must implement the multi-actor approach and ensure an adequate involvement of the primary production sector and the wider forest-based value chain.

Due to the scope of this topic, international cooperation is strongly encouraged, in particular with China. This topic is within the scope of the Administrative Arrangement between the European Commission and the Ministry of Science and Technology of the People's Republic of China on a Co-funding Mechanism for the period 2021-2024 to support collaborative research projects under the Food, Agriculture and Biotechnologies (FAB) and the Climate Change and Biodiversity (CCB) flagship initiatives.

Actions will contribute to implementing the EU-China Food, Agriculture and Biotechnology (FAB) flagship initiative, which aims to ensure sustainability of agri-food systems, catering for the needs of a growing population, the reduction of food and agricultural losses and waste, and the provision of safe and healthy foodstuffs. Interaction with other actions developed

under the EU-China Climate Change and Biodiversity (CCB) Research Flagship and the Flagship on Food, Agriculture and Biotechnologies (FAB) is encouraged if relevant.

JRC is available for sharing and taking up results and findings on the monitoring of the forest ecosystem multifunctionality in the EU Observatory for Deforestation, Forest Degradation and Associated Drivers and JRC Big Data Analytics Platform.

HORIZON-CL6-2023-BIODIV-01-16: Valorisation of ecosystem services provided by legume crops

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: In line with the European Green Deal priorities, the farm to fork strategy, the EU biodiversity strategy for 2030 and the EU zero pollution ambition, the successful proposal will promote sustainable, productive, climate-neutral, environment-friendly and resilient farming systems, which would provide consumers with affordable, safe, traceable, healthy and sustainable food while increasing the provision of ecosystem services.

The farm to fork strategy states that '[a] key area of research will relate to (…) increasing the availability and source of alternative proteins such as plant, microbial, marine and insect-based proteins and meat substitutes'. The ambitious targets in the farm to fork strategy on the reduction of fertilizer use by at least 20% by 2030 and on reaching at least 25% of EU agricultural land under organic farming by 2030 will also create a favourable environment for the development of EU-grown protein plants which naturally enrich the soil reducing the need for synthetic fertilisers. Most recently, the Versailles declaration [91] also highlighted the importance of increasing EU plant-based proteins as a means of reducing the EU's dependency on key imported agricultural products and inputs and improving food security.

The new common agricultural policy (CAP) put into practice eco-schemes that can provide support for longer rotation cycles with environmentally beneficial crops such as leguminous

[91] 20220311-versailles-declaration-en.pdf (europa.eu)

crops. Other instruments that benefit protein crops under the new CAP are sectoral interventions, investment subsidies under rural development programmes and coupled income supports.

Activities will also support the implementation of the action plan for the development of organic production.

Proposals results are expected to contribute to all of the following expected outcomes:

- Improved quantification, in environmental and economic terms, of the ecosystem services provided by legume crops, including those related to soil biodiversity and fertility.
- Increased knowledge and capacity of farmers and agricultural advisers to include minor and major legume crops in their cropping schemes with a positive ecological and economic impact.
- Diversified farming practices throughout the EU and Associated Countries, where legume crops contribute to healthier and sustainable diets, resilience to climate change and increase of agrobiodiversity.

Scope: The European Union and Associated Countries' arable agricultural systems are often characterised by short rotations or monocultures, leading to problems such as higher pest pressure, soil erosion, loss of soil fertility or loss of biodiversity. As a result, there is an imperative need to reveal the full potential of diversification of cropping systems, with the aim of improving productivity, and supporting the development of resource-efficient and sustainable value chains. Protein-rich plants, and in particular legumes, play a key role in cross-cutting issues related to crop rotation, sustainable soil management and closing nutrient cycles. They have the potential to enable the environmental sustainability, productivity, climate neutrality and resilience of farming systems, by increasing the provision of ecosystem services while restoring and enhancing biodiversity and generating fair economic returns for farmers.

The environmental, nutritional and economic benefits that leguminous crops bring to all players of the value chain, provide an opportunity for further developing the leguminous crop sector in the EU and Associated Countries. This could eventually contribute to reducing the EU's dependency on imports of nitrogen fertilisers and protein crops for feed, while support meeting the objectives of farm to fork strategy.

While the direct benefits of legume crops as food and feed are usually recognized, their environmental and economic benefits derived from the increase of the provision of the ecosystem services they provide, are less understood and not valorised. The focus of this proposal is on the economic and environmental benefits of the production of legume crops, regardless their cultivation purpose is for food or for feed uses.

Proposals should:

- Increase knowledge on the different and complementary benefits from the use of legume crops (both annual and perennials) in the provision of ecosystem and environmental services, such as the value of the nitrogen transfer to succeeding or companion crops (including in grassland systems), the efficiency of different legume varieties to fix nitrogen in the soil in function of specific conditions (e.g., soil type, established rhizobia consortia), the role of legume crops for wind protection, water runoff or other erosion control strategies.

- Explore new synergies between combinations of legume crops and other crops that can benefit from nitrogen fixation, in systems like crop rotations, intercropping, mixed cropping, cover cropping or agroforestry.

- Evaluate the global competitiveness of legume crops cultivation in different contexts of the EU and Associated Countries (considering relevant economic, social or environmental aspects) through a cost-benefit analyses and life-cycle environmental assessment, versus imports from third countries.

- Develop tools or methods that allow to measure and quantify in economic terms the value of the nitrogen transfer between various crops, for different crop combinations, in relation to environmental aspects such as the reduction of use of nitrogen fertiliser, carbon emissions, pollution, nitrogen losses, reduced GHG emissions, pest/weed/disease management and increased crop and microbial diversity.

- Identify and remove the barriers to crop diversification or to crop rotation. Provide indicators so that farmers and advisors are better equipped to evaluate the benefits of growing legumes, including for weed management, as well as recommendations to strengthen crop diversification and longer rotation cycles with environmentally beneficial crops.

- Promote the engagement of downstream actors in new value chains based on crop diversification. This should facilitate the market penetration of leguminous crops, linked to market outlets and consumers demand and influence the transition towards more sustainable and healthy food and feed systems.

- Include minor or underutilised legume crops (mostly perennial but also annual varieties) that are not the frequent objects of research activities. Consider their potential for enhancing the ecosystem and economic services not only due to their key role in sustainable soil management and closing nutrient cycles (likewise major legume crops) but also due to their adaptation to agroecological niches/marginal area and capability to withstand abiotic and abiotic stress and climate change.

- Generate capacity building material, organize trainings or knowledge sharing activities, including the development of guidelines (e.g. booklets, decision-support tools) to foment the dissemination, uptake and upscale of results.

Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this or other topics (i.e. but not limited to projects funded under topic HORIZON-CL6-2021-FARM2FORK-01-02 and HORIZON-CL6-2022-BIODIV-02-02-two-stage), and ensure synergy with relevant activities carried out under other initiatives in Horizon Europe such as the upcoming partnership on agroecology[92] and the Mission "A Soil Deal for Europe"[93]. Proposals should also seek potential synergies with and capitalise on the results of past or ongoing projects both in the EU and beyond (e.g., Horizon 2020 projects LegValue[94] and TRUE[95], the thematic network 'Legumes Translated'[96] or SusCrop ERA-NET project[97]).

Proposals should benefit both the conventional and the organic farming sectors.

In order to achieve the expected outcomes, international cooperation is encouraged. This topic should involve the effective contribution of social sciences and humanities (SSH) disciplines.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Biodiversity and health

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-17: Interlinkages between biodiversity loss and degradation of ecosystems and the emergence of zoonotic diseases

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the

92 'European Partnership accelerating farming systems transition: agroecology living labs and research infrastructures' at: https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/european-partnerships-horizon-europe/candidates-food-security_en

93 https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/soil-health-and-food_en

94 www.legvalue.eu

95 www.true-project.eu

96 www.legumestranslated.eu

97 https://www.suscrop.eu/projects-first-call/legumegap

	consortium selected for funding.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030, projects will develop knowledge on the links between the degradation of ecosystems with its associated biodiversity loss and the exposure to, emergence and spread of zoonotic diseases to humans. This will compliment other initiatives by addressing the biodiversity and health nexus with a focus on the effects of biodiversity loss and degradation of ecosystems on the emergence of zoonotic diseases in the context of climate change and globalization**.**

Proposals are expected to contribute to all of the following expected outcomes:

- Better understand the relation between the degradation of ecosystems with its associated biodiversity loss, including both macro-organisms (e.g. insects, animal and plants) and environmental and host-associated microbiomes (e.g. micro algae, fungi, bacterial and virus) and the emergence of zoonotic diseases, focusing on how human drivers for biodiversity loss, such as illegal wildlife trade, land use change in biodiversity hot-spot regions, food consumption, use of antimicrobial agents, etc. interact with the spread of zoonotic diseases.

- Understand under which conditions and at what scale the protection of biodiversity and the restoration of ecosystems can contribute to mitigate the emergence and spread of zoonotic diseases.

- Better understand the socio-economic and behavioural factors that will lead to the development and implementation of improved policies on mitigating the risk of emergence and spread of zoonotic diseases. This should also include the ecology and behavioural traits of those animals which play a role in the spread of zoonotic diseases.

- Based on this knowledge, propose practical strategies to minimize the emergence and spread of zoonotic diseases through addressing biodiversity loss.

- Better understand the biodiversity – health nexus and identify biodiversity relevant parameters and propose the necessary monitoring schemes for further integration into the One Health approach with specific focus on emerging zoonotic diseases. This monitoring should contribute to the establishment or improvement of early detection and warning systems on risks of emerging zoonotic diseases.

- In collaboration among the projects to be funded, create a knowledge platform for a) sharing information on relevant research activities and results concerning the prevention of zoonotic disease emergence in relation to biodiversity; and b) reinforcing the communication and coordination between academics, innovators, end-users, researchers, public health and environmental authorities and citizens in order to create the strong system needed for the prevention of the emergence of zoonotic diseases. This platform should be a joint deliverable between the projects to be funded and will be expected to coordinate the research activities which aim to understand and mitigate the risks of

zoonotic disease emergence in relation to the degradation of ecosystems with its associated biodiversity loss, allowing closure of current gaps and break down of existing silos. Proposals should dedicate appropriate resources to develop this joint deliverable in cooperation with the other project/s funded under this topic.

Scope: Zoonotic diseases, which result from cross-species transmission of pathogens between animals and humans, appear to emerge more frequently and pose significant threats to the health and welfare of people across the planet. Without the necessary scientific information and evidence on the underlying causes and drivers of this more frequent emergence, the only way of responding to them is after their emergence and spread.

Over the last decades, research has indicated that biodiversity loss and the linked degradation of ecosystems could simultaneously increase human exposure to existing pathogens, as well as increase of the probability of the emergence and spread of infectious diseases. Unsustainable exploitation of biodiversity, land-use change, illegal wildlife trade and consumption, together with the impacts of climate change and use of antimicrobial agents, increase the contact between humans and wildlife that consequently lead to the more frequent occurrence of emerging infectious diseases, of which around 75% are of zoonotic origin.

The high risks of these infectious diseases demonstrate the need for a real paradigm shift: preventing the emergence and spread of infectious zoonotic diseases by focusing on the root causes and underlying mechanisms potentially linked to biodiversity loss and degradation of ecosystems and improving their prediction and early detection.

This topic aims to identify and understand better the interlinkages between biodiversity loss with the linked ecosystem degradation and the emergence of zoonotic diseases. Further research is needed to better understand how the different drivers that lead to biodiversity loss and ecosystem degradation, and how the protection of biodiversity and the restoration of ecosystems may influence the emergence and spread of zoonotic diseases. Also better understanding is needed on how the conservation of animal and microbiome genetic resources may influence the emergence of zoonotic diseases.

The better understanding of these interlinkages will help to establish better prediction and early detection systems, will enhance the coordination between all relevant stakeholders, ensure fast information sharing and early response and hence reduce the spread of zoonotic diseases.

The topic should contribute to better understanding the biodiversity – health nexus and help towards an enhanced integration of biodiversity parameters and monitoring with the One Health approach.

The development of methods and identification of indicators to monitor the relevant biodiversity parameters will be essential as well as the establishment of baselines of these parameters.

The mitigation strategies in relation to biodiversity loss and ecosystem degradation to be proposed should take into consideration all the aforementioned information and findings. The

better understanding of the socio-economic and behavioural factors, as well as the involvement of local communities and environmental, animal and human health stakeholders is crucial for the preparation of these strategies.

Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under the same field and ensure synergy with relevant activities carried out under other initiatives in Horizon Europe, such as:

- HORIZON-CL6-2021-BIODIV-01-11: What else is out there? Exploring the connection between biodiversity, ecosystem services, pandemics and epidemic risk;
- HORIZON-CL6-2021-FARM2FORK-01-18: One Health approach for Food Nutrition Security and Sustainable Agriculture (FNSSA);
- HORIZON-HLTH-2021-ENVHLTH-02-03: Health impacts of climate change, costs and benefits of action and inaction.

To achieve the expected outcomes, the following also need to be ensured:

- Coherence and coordination with the European Partnership for pandemic preparedness, the European Partnership for One Health/AMR Antimicrobial Resistance (AMR) and the European Partnership for Animal Health and Welfare (PAHW).
- Opportunities for cooperation with relevant European or international Agencies and initiatives, such as European Food Safety Authority (EFSA), European Economic Area (EEA), European Centre for Disease Prevention and Control (ECDC), Health Emergency Preparedness and Response Agency (HERA), One Health High-Level Expert Panel (OHHLEP), One Sustainable Health, EU4Health actions (in particular One Health Surveillance), Preventing Zoonotic Disease Emergence (PREZODE), Ecohealth Alliance, etc.

The proposals should take up relevant knowledge assessed by major science-policy bodies such as the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC), and by the Convention on Biological Diversity. They should also take into consideration and build up on the results of the request made to EKLIPSE on Biodiversity and Pandemics. Proposals should show how their results and outcomes could provide timely information to the work of these and further relevant global initiatives.

The proposals should foresee cooperation with the European partnership on biodiversity Biodiversa+ and the Science Service “Bio-agora” and use existing platforms and information sharing mechanisms relevant to the topic. They should also contribute knowledge to the EC Knowledge Centre for Biodiversity.

In order to achieve the expected outcomes, international cooperation is strongly encouraged.

Coordination with Member States and Associated Counties should be sought out.

This topic should involve the effective contribution of social sciences and humanities disciplines (SSH).

Interconnection of biodiversity research and policies

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-BIODIV-01-18: Additional activities for the European Biodiversity Partnership: Biodiversa+

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 60.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 60.00 million.
Type of Action	Programme Co-fund Action
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The proposal must be submitted by the coordinator of the consortium funded under HORIZON-CL6-2021-BIODIV-02-01: European partnership rescuing biodiversity to safeguard life on Earth. This eligibility condition is without prejudice to the possibility to include additional partners. If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used).
Procedure	The procedure is described in General Annex F. The following exceptions apply: The evaluation committee will be composed partially by representatives of EU institutions. If the proposal is successful, the next stage of the procedure will be grant agreement amendment preparations. If the outcome of amendment preparations is an award decision, the coordinator of the consortium funded under HORIZON-CL6-2021-BIODIV-02-01: European partnership rescuing biodiversity to safeguard life on Earth will be invited to submit an amendment to the grant agreement, on behalf of the beneficiaries.

Legal and financial set-up of the Grant Agreements	This action is intended to be implemented in the form of an amendment of the grant agreement concluded pursuant to topic HORIZON-CL6-2021-BIODIV-02-01. For the additional activities covered by this action: • The funding rate is 30% of the eligible costs. • Beneficiaries may provide financial support to third parties (FSTP). The support to third parties can only be provided in the form of grants. • Financial support provided by the participants to third parties is one of the primary activities of this action in order to be able to achieve its objectives. The EUR 60 000 threshold provided for in Article 204(a) of the Financial Regulation No 2018/1046 does not apply. • The maximum amount of FSTP to be granted to an individual third party is EUR 7 000 000. This amount is justified since provision of FSTP is one the primary activities of this action and it is based on the extensive experience under predecessors of this partnership. • The starting date of grants awarded under this topic may be as of the submission date of the application. Applicants must justify the need for a retroactive starting date in their application. Costs incurred from the starting date of the action may be considered eligible (and will be reflected in the entry into force date of the amendment to the grant agreement).
Total indicative budget	The total indicative budget for the duration of the partnership is EUR 165 million.

Expected Outcome: The second instalment of the partnership is expected in continuation to contribute to expected outcomes specified in topic HORIZON-CL6-2021-BIODIV-02-01: European partnership rescuing biodiversity to safeguard life on Earth, for continuation of the activities and the continuation of already agreed outcomes.

Scope: The objective of this action is to continue to provide support to the European Partnership Biodiversa+ identified in the Horizon Europe Strategic Plan 2021-2024 and first implemented under the topic HORIZON-CL6-2021-BIODIV-02-01: European partnership rescuing biodiversity to safeguard life on Earth, and in particular to fund additional activities (which may also be undertaken by additional partners) in view of its intended scope and duration, and in accordance with Article 24(2) of the Horizon Europe Regulation.

The consortium which applied to and received funding under HORIZON-CL6-2021-BIODIV-02-01: European partnership rescuing biodiversity to safeguard life on Earth is uniquely placed to submit a proposal to continue the envisioned partnership. Not only did this consortium submit the proposal leading to the identification of the partnership in the Horizon Europe strategic planning 2021-2024, it has also implemented the partnership through co-funded calls in years 2021 and 2022 based on this planning and further to topic HORIZON-CL6-2021-BIODIV-02-01. In this context, the current consortium has particular expertise in relation to the objectives of the Partnership, the activities to be implemented in particular FSTP calls or other calls/scope of calls clearly required/envisioned pursuant to initial proposal/partnership, and other relevant aspects of the action. In practice, another consortium could not continue the activities of the Partnership underway without significant disruption to the ongoing activities, if at all.

The scope of the application for this call on the European partnership for Biodiversity Biodiversa+ should focus on the flagship programmes 2023-27 according to the partnership's co-created strategic research and innovation agenda for seven years, which includes calls for research projects, biodiversity- and ecosystems monitoring and science-based policy advisory activities, and all horizontal activities to allow the Partnership to operate and to achieve its five specific objectives.

It is expected that the partnership continues to organise joint calls on an annual base and therefore it should factor ample time to run the co-funded projects. It should build on, and widen, the data availability in European Research Infrastructures federated under the European Open Science Cloud.

The partnership should collaborate closely with the EC 'Knowledge Centre for Biodiversity' and with the Science Service project 'Bio-Agora', and seek to collaborate with EU space programmes (Copernicus, Galileo) to foster the use of emerging or operational space technologies for policy development. Moreover, the partnership should describe specific activities foreseen in order to strengthen the synergies with other related Missions and Partnerships.

While the award of a grant to continue the Partnership in accordance with this call should be based on a proposal submitted by the coordinator of the consortium funded under HORIZON-CL6-2021-BIODIV-02-01 and the additional activities (which may include additional partners) to be funded by the grant should be subject to an evaluation, this evaluation should take into account the existing context and the scope of the initial evaluation as relevant, and related obligations enshrined in the grant agreement.

Taking into account that the present action is a continuation of topic HORIZON-CL6-2021-BIODIV-02-01 and foresees an amendment to an existing grant agreement, the proposal should also present in a separate document the additional activities and additional partners, if any, to be covered by the award in terms of how they would be reflected in the grant agreement.

The partnership should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties.

The Commission envisages to include new actions in future work programme(s) to continue providing support to the partnership for the duration of Horizon Europe.

Call - Biodiversity and ecosystem services

HORIZON-CL6-2024-BIODIV-01

Conditions for the Call

Indicative budget(s)[98]

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[99]	Indicative number of projects expected to be funded
		2024		
Opening: 17 Oct 2023 Deadline(s): 22 Feb 2024				
HORIZON-CL6-2024-BIODIV-01-1	IA	12.00	Around 6.00	2
HORIZON-CL6-2024-BIODIV-01-2	IA	16.00	Around 8.00	2
HORIZON-CL6-2024-BIODIV-01-3	RIA	13.00	Around 6.50	2
HORIZON-CL6-2024-BIODIV-01-4	RIA	5.00	Around 5.00	1
HORIZON-CL6-2024-BIODIV-01-5	RIA	4.00	Around 2.00	2
HORIZON-CL6-2024-BIODIV-01-6	RIA	6.00	Around 6.00	1
HORIZON-CL6-2024-BIODIV-01-7	RIA	5.00	Around 5.00	1
HORIZON-CL6-2024-BIODIV-01-8	RIA	12.00	Around 6.00	2

98 The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.

99 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

HORIZON-CL6-2024-BIODIV-01-9	RIA	3.00	Around 3.00	1
Overall indicative budget		76.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Understanding and addressing the main drivers of biodiversity loss

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-BIODIV-01-1: Invasive alien species

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply:

	The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to one project within the area A that is the highest ranked, and one project highest ranked within the area B, provided that the applications attain all thresholds. Proposals shall clearly indicate the area they are applying to.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030, projects will contribute to the following impact of destination "Biodiversity and ecosystem services": "Understand and address direct **drivers of biodiversity decline…** invasive alien species…".

Project results are expected to contribute to all of the following expected outcomes:

- The establishment of alien species accidently introduced in the EU environment is minimised and where possible they are eradicated,
- Early warning systems to inform relevant stakeholders of the introduction of invasive alien species, building upon EASIN,
- The introduction of invasive alien species is effectively prevented and established ones are systemically managed,
- Public awareness, literacy and engagement, on invasive alien species monitoring and management are supported and improved,
- Pressure on species on the Red List threatened by invasive alien species is reduced, contributing to the following key commitment of the EU biodiversity strategy for 2030 " a 50% reduction in the number of Red List species threatened by invasive alien species".

Scope: Invasive alien species are one of the five main direct drivers of biodiversity loss. Besides inflicting major damage to nature and the economy, many invasive alien species also facilitate the outbreak and spread of infectious diseases, posing a threat to humans and native wildlife. The rate of new introductions of invasive alien species has increased in recent years. Without effective control measures, risks to our nature and health will continue to rise. Climate change and land-use changes facilitate the spread and establishment of many alien species and create new opportunities for them to become invasive. This topic is therefore contributing to the adaptation to climate change.

Regulation (EU) 1143/2014 on invasive alien species (IAS) entered into force on 1 January 2015. It establishes a list of Invasive Alien Species of Union concern (the Union list). The IAS Regulation provides for a set of measures to be taken across the EU in relation to invasive alien species included on the Union list. EASIN (European Alien Species Information Network) facilitates information on Alien Species and officially supports the EU Regulation 1143/2014.

Successful proposals should:

- Develop models based on dynamic data, accessible to end users, to prioritise species, manage pathways and sites most vulnerable by the introduction of invasive alien species;
- Develop methods for the identification, early detection and surveillance of invasive alien species, such as sensors for biophysical signals (sounds, ultrasounds, volatile organic compounds, thermal etc.), DNA-based including barcoding and application of environmental DNA, artificial intelligence, sentinel plants in ports, airports, railway stations, and logistics platforms. The use of robotics (both aerial and non-aerial), especially in marine environments, could be considered.

Proposals should address Area A: terrestrial ecosystems or Area B: aquatic (including marine) ecosystems. The Area should be clearly indicated on the application.

Proposals should build synergies with on-going projects supported under Horizon 2020 and other projects supported under Horizon Europe. The project "Natural Intelligence for Robotic Monitoring of Habitat" could provide hints about the usage of mobile robotic sensors.

Cross-articulation with the other data spaces, and notably with the European Open Science Cloud shall be foreseen, exploiting synergies and complementarities of the different approaches.

Participatory approaches, such as citizen science, could be appropriate modes of research for this action.

In area B in particular, projects results funded under the following topics should be considered: HORIZON-CL6-2021-BIODIV-01-03: Understanding and valuing coastal and marine biodiversity and ecosystems services, Topic HORIZON-CL6-2021-BIODIV-01-04: Assess and predict integrated impacts of cumulative direct and indirect stressors on coastal and marine biodiversity, ecosystems and their services and HORIZON-CL6-2022-BIODIV-01-01: Observing and mapping biodiversity and ecosystems, with particular focus on coastal and marine ecosystems. In addition, in area B, projects should coordinate their activities with objective 1 of the Mission "Restore our ocean and waters".

Proposals should include specific tasks and allocate sufficient resources to coordinate with existing platforms and information sharing mechanisms, in particular the EC Knowledge Centre for Biodiversity. Collaboration with the European partnership on biodiversity Biodiversa+ should be explored, as needed.

This topic should involve contributions from the social sciences and humanities disciplines.

The possible participation of the JRC in the project would ensure that the approach proposed is compatible with the IAS policy implementation and that data and information generated is shared through EASIN.

International cooperation is encouraged.

Biodiversity protection and restoration

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-BIODIV-01-2: Digital for nature

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If projects use satellite-based earth observation, positioning, navigation and/or related timing data and services, beneficiaries must make use of Copernicus and/or Galileo/EGNOS (other data and services may additionally be used). The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.
Procedure	The procedure is described in General Annex F. The following exceptions apply: To ensure a balanced portfolio, grants will be awarded to applications not only in order of ranking but at least also to one project within the area A that is the highest ranked, and one project highest ranked within the area B, provided that the applications attain all thresholds. Proposals shall clearly indicate the area they are applying to.

Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Purchases of equipment, infrastructure or other assets specifically for the action (or developed as part of the action tasks) may be declared as full capitalised costs.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030 projects' results will contribute to the following impacts of the destination "biodiversity and ecosystem services": "Plan, manage and expand **protected areas** and improve the conservation status of species and habitats based on up-to-date knowledge and solutions"; "to understand and address **drivers of biodiversity decline** and "mainstream **biodiversity, ecosystem services,** including through the development of **Nature-based Solutions".**

The projects results are expected to contribute to all of the following expected outcomes:

- A better monitoring (in terms of the number of species and habitats, more exhaustive territory coverage, more frequent in time, more accurate and cost-effective) of biodiversity in the EU by high-throughput methods (for example environmental DNA, sound/image/spectral analysis, lidar, usage of mobile platforms, space technologies, etc.), leading to a better implementation of the nature directives.

- A better understanding of the state of nature and of the drivers of biodiversity loss (linked to direct human activity, to climate change, etc…) and of the state of conservation of nature through a better usage of existing data, and through the bridging of data gaps in order to support the implementation of the EU biodiversity strategy for 2030 and therefore to reverse biodiversity loss and to restore and protect ecosystems.

- A more complete view of the state of nature and its evolution which is needed to support policy implementation and policy making, including the Member States' reporting obligations, supporting the definition and implementation of prevention and restoration measures and the monitoring of the achievement of their objectives, the extension of protected areas, the monitoring of invasive alien species, and the implementation of Nature based solutions and the assessment of their performance.

Scope: As quoted in a recent paper in Nature Communications, the growing amount of the collected environmental data is not optimally used: "there is a mismatch between the ever-growing volume of raw measures (videos, images, audio-recordings) acquired for ecological studies and our ability to process and analyse this multi-source data to derive conclusive ecological insights rapidly and at scale"[100]. In the European Union, there is already a range of group of experts monitoring species and habitats, including in the view of reporting under the Birds and Habitats directives. However, the generated datasets are not sufficiently accessible (too many small, isolated communities of practice, different servers, different data access

[100] Tuia, D., Kellenberger, B., Beery, S. *et al.* Perspectives in machine learning for wildlife conservation. *Nat Commun***13,** 792 (2022) https://doi.org/10.1038/s41467-022-27980-y.

methods, different formats, rarely accessible through web-services) and too often not well known or advertised outside of their original circle of experts: the access to the results (consolidated data, statistics, maps) of these field surveys should be significantly concentrated behind single entry points. Also, the access to modern technologies (*e.g.*, image recognition, sound analysis, high-throughput DNA-based techniques, usage of AI, usage of space, etc.) too often represents an important effort for each group of experts, beyond their environmental expertise. As a result, the technological developments remain an important effort for each group, while the solutions should better be provided as a service (to be configured to the need of each group) and mutualised. The natural domain being very large and sometimes difficult to access, the existing databases are still not dense enough, in terms of spatial and temporal coverage: many species and habitats are insufficiently covered (and sometimes not monitored at all), resulting in information gaps. Also, scarce samplings do not allow to distinguish non-presence from a lack of/insufficient/inadequate fields visit. A massive use of automated, and potentially mobile, sensor technologies (such as, but not limited to, images, video, sounds/ultra-sounds recording, spectral signatures, structure description by lidar, environmental DNA sampling, etc.) the use of remote sensing technologies (e.g. to over large areas, monitor environmental condition) and associated with processing algorithms (in particular, but not limited to, deep learning and AI processing algorithms) is therefore needed. The goal of this topic is to facilitate the access to data, encourage the usage of automated/robotic/space data collection systems for data collection, encourage community approaches for the exchange of data and good practices (in particular for data processing).

Proposals should address Area A or Area B as follows. The Area should be clearly indicated on the application.

- Area A: a project focussing on data harvesting through high-throughput methods (as described in the introduction, e.g. environmental DNA, sound/image analysis, lidar, spectrometry, usage of mobile platforms, remote-sensing, etc.), analysis and interoperability solutions, with the goal of concentrating the information in a single access point, and lowering the technical hurdle for the biologist and managers of natural sites, offering the best solutions in a ready-to-use form;

- Area B: a project focussing on new robotic solutions, including mobile, to improve the efficiency of biodiversity related solutions, allowing to improve the performance of the field campaign, with denser information of species and habitats.

Area A: data harvesting, analysis and interoperability solutions

The successful proposal is expected to address the needs in terms of IT solutions, to increase information density, in terms of species and habitats sampled, territory coverage, timeliness, and accuracy.

As a result, much denser data collections should be available through a common data portal. The successful proposal should demonstrate the feasibility to combine different sources of information, for example to assess the conservation status of habitats or species. In that respect, several approaches could be tested, from data combinations defined by expert rules,

and data storage formats, to machine learning or data-mining technologies. Such digital solutions could support the definition of conservation measures and management plans, and the monitoring and forecast (though model ingesting in-situ observations) of their progress to their objectives, at site, regional and national levels. Furthermore, the results could be used by member states for their formal monitoring and reporting obligations, or to check and enhance the performance of Nature Based Solutions.

The successful proposal should:

- Ensure interoperability of available data, enabling EU-scale information systems by developing solutions to connect and harvest data from already existing data bases. This will guarantee information fusion and support third party usage of the data.

- Develop cost-effective and easy-to use tools and software to collect and analyse different existing data sources and formats (in vivo data, photographs, sound recordings, lidar, spectrometry, eDNA, satellite images etc.), to facilitate cost-effective data analysis, map and link existing databases and provide algorithms to better analyse them.

- Develop data hosting and data processing solutions to extract information on populations (such as diversity, counts, trends), habitats (such as identification, area covered, and area change in time), assessment of conservation status and trend, information of species and habitats health conditions, degradations, and destructions (natural or human-driven). The accumulation of information should allow synoptic analysis of species and habitats, allowing to detect hot spot of issues and trends. Innovative solutions, such as data mining, remote-sensing and AI approaches need to be considered.

- Develop a solution to host, process, analyse and search available data in relation to protected habitats and species (including protected sites management information, their conservation objectives and measures, and restoration actions).

- Analyse and define infrastructure solutions, that would let biologists and managers of natural sites quickly create a dedicated working framework, furbished with all data harvesting, processing, sharing solutions. In this approach, the future European Green Deal data space should be considered as a potential common solution, or part of the solution.

- Develop tutorials for practitioners, based on academics and industry knowledge, on how to best use existing databases and data harvesting, data analysis and data sharing solutions. The tutorials should help the users to quickly set up and use their working environment.

- Propose easy-to-use solutions to utilise robotic sensors and Internet of Things (IoT): automated sensors, automated sampler, including mobile sensors (terrestrial, aerial and under-water) and animals tagging solutions, data sharing through wireless communication systems, to support a systematic data collection. Such approach should

help better mapping the known/unknown and significantly increase the density of collected data, spatially and temporally.

- Analyse the conditions under which data, raw data acquired from sampling, data coming from existing databases and data resulting from processing can be shared. A clear data sharing framework, accommodating special needs, simple to use in practice, supporting open data policies, and enabling the broadest usage whilst encouraging the largest community to contribute, should be defined. Special attention will be paid to endangered species and sensitive species (in the sense of the Birds and Habitats Directives) for which the shared data needs to be controlled, and methods for effective detection of invasive species by high throughput search would be encouraged.

- Enable EU Member States, Associated Countries, and accession countries to coherently set conservation objectives, preparing management plans, manage shared habitat types and species, deal with similar conflicts and socio-economic dimensions, permitting procedures, spatial planning, with a focus on implementing the Birds and Habitats Directives and their Natura 2000 network.

- Fully exploit and build complementarities with the ongoing work regarding the establishment of the European Open Science Cloud and interact with relevant projects developing metadata standards and added value tools to ensure interoperability within and across fields of study.

- Contribute to a web of FAIR data and supporting services that enable an interconnected disciplinary ecosystem that allows stakeholders to share digital objects and build on them in a seamless fashion.

- The architecture for a unified EU web-GIS with all the data collected from the Directives should be considered. In that matter, the proposed system should allow the member states sharing their habitats and species maps, and in particular the habitats maps used to designate their Natura 2000 sites, as well as subsequent updates. Also, the platform should help collecting information to update habitats and species maps, in order to obtain a common knowledge database about habitats and species, and their evolution, in relation to the Birds and Habitats Directives. The platform should as well foster the implementation of open data best practices at European level and across boundaries.

- Automatic translation functions should be offered by the platform to better connect EU Member States, Associated Countries and Accession Countries to support them in the implementation of the legislation on nature protection (such as the Birds and Habitats directives, the Invasive Alien Species regulation or the Marine Strategic Framework Directive).

Proposals should consider the possibilities offered by the future “Green data spaces” (CNECT). The DEP CSAs on the “preparatory actions for the European Green Deal Data Space” (exploring cloud-to-edge solutions, platforms and initiatives for data storage, exchange, and analysis as good practices for setting up the data spaces) are expected for Q4

2022-Q2 2024 and the "data spaces support centre" will start delivering on architectural blueprints in late 2023 and onward.

Proposals should earmark the necessary resources for cooperation and networking activities. Proposals should link to other relevant Horizon 2020 and Horizon Europe projects and initiatives, such as BiCIKL, EuropaBON, BioDT and connect to existing European Biodiversity data infrastructures including DiSSCo, eLTER and LifeWatch, where relevant. Proposals should also connect with relevant projects under Horizon Europe topics, such as HORIZON-CL6-2021-BIODIV-01-01: European participation in global biodiversity genomics endeavours aimed at identifying all biodiversity on Earth.", HORIZON-CL6-2021-BIODIV-01-02: Data and technologies for the inventory, fast identification and monitoring of endangered wildlife and other species groups, HORIZON-CL6-2021-BIODIV-01-07: Ecosystems and their services for an evidence-based policy and decision-making and HORIZON-MISS-2021-OCEAN-02: Protect and restore marine and fresh water ecosystems and biodiversity. Projects using satellite data should link to HORIZON-CL6-2021-GOVERNANCE-01-14: User-oriented solutions building on environmental observation to monitor critical ecosystems and biodiversity loss and vulnerability in the European Union.

The possible participation of the JRC would help ensure that the methodologies proposed can support environmental compliance assurance, particularly by leveraging geospatial intelligence.

Collaboration with the European partnership on biodiversity "Biodiversa +" should be explored, as needed.

Area B: new robotic sensors for biodiversity

To increase the density of species and habitats observations across the EU territory, new robotic, and possible mobile, solutions need to be developed.

The proposed innovative solutions should:

- Be ready to use, easy to deploy and operate in natural environment.
- Consider automated solutions, and mobile platforms (land, air, water and under water) carrying sensors (such as, but not limited to, image, sound, lidar, spectrometry, eDNA, etc.) should be designed with fields campaigns in mind, in particular in terms of autonomy (energy, autonomy of moving and sampling decisions). Improvements in terms of species tagging, and species-carried tracking or telemetry devices should also be considered.
- The project should focus on innovative sensors that would allow significantly increasing knowledge in biodiversity, or bringing new information about the species and habitats conservation status, and increase spatial and temporal coverage, and to facilitate access to environments that are difficult to sample.

- Propose a large degree of data collecting automation and compatibility with the system described in project 1.
- The project should generate at least 1 innovative prototype of robotic/automated sensor and 1 innovative prototype of mobile solution, demonstrating improved performances compared to the currently available solutions.
- The project should analyse the conditions and costs of the production of the robotic system, as well as the conditions and costs of its usage and maintenance.

The project "Natural Intelligence for Robotic Monitoring of Habitat" could provide hints about the usage of mobile robotic sensors.

International cooperation is encouraged.

Mainstreaming biodiversity in society and the economy

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-BIODIV-01-3: Dependence of society and the economy on pollinators

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.50 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 13.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: In line with the European Green Deal and in particular with the objectives of the EU biodiversity strategy for 2030 and the EU pollinators' initiative, projects will contribute to mainstream **biodiversity in society and the economy.**

Project results are expected to contribute to all following expected outcomes:

- Direct and indirect dependences of our society and the economy on pollinators are better understood and quantified;

- Monetary and non-monetary valuation of ecosystem services provided by pollinators are advanced, and used to improve ecosystem accounting;

- Tools for mainstreaming pollinator conservation into the food, health, energy, materials and land management sectors are developed, tested and promoted with public authorities, businesses and the general public;

- Risks of reversible and irreversible cascading effects in natural and modified ecosystems due to pollinator decline, and their impacts on human wellbeing, are better understood and forecasted, and integrated into models for participatory scenario planning.

Scope: The importance of pollinators for humankind is common knowledge, featuring prominently outside of the scientific realm in popular culture and arts. Yet, even well-known benefits provided by pollinators such as crop pollination are still inadequately understood. Other benefits remain for the most part obscure, and thus unacknowledged, due to the lack of research targeting the complexity of pollinator niches and plant-pollinator networks. Amid the dramatic decline of pollinating species in Europe, these gaps hinder understanding of the character and full magnitude of threats to human wellbeing. Moreover, the gaps hinder mainstreaming of the conservation of pollinators, and more broadly biodiversity, in the public and private sector and thereby impede an effective societal response. This topic aims to address fundamental knowledge gaps in functional roles of pollinators in natural (natural plant-pollinators networks) and human-modified ecosystems (e.g. agro-ecosystem), and building on that i) advance research on far reaching consequences of their decline and scenario planning and ii) develop and disseminate tools that enable systematic mainstreaming in key sectors.

The proposed projects should build on the Assessment Report on Pollinators, Pollination and Food Production of IPBES[101], the first ever EU-wide Ecosystem Assessment 2020[102], the INCA project[103], the European Red List assessments[104], and knowledge and experience gained through past projects supported under the EU Framework Programme for Research and Innovation[105]. Furthermore, the projects should liaise with relevant ongoing projects under Horizon Europe[106] and EU funded monitoring initiatives[107].

The proposals should show how their results would contribute to the EU policies, as well as to the global sustainable development agenda (UN Sustainable development Goals.

Proposals should include specific tasks and envisage sufficient resources to develop joint deliverables (e.g., activities, workshops, as well as joint communication and dissemination) with all projects funded under this topic and to facilitate cooperation with the European

101 https://ipbes.net/assessment-reports/pollinators
102 https://publications.jrc.ec.europa.eu/repository/handle/JRC120383
103 https://ec.europa.eu/eurostat/documents/7870049/12943935/KS-FT-20-002-EN-N.pdf/de44610d-79e5-010a-5675-14fc4d8527d9?t=1624528835061
104 https://ec.europa.eu/environment/nature/conservation/species/redlist/
105 https://wikis.ec.europa.eu/display/EUPKH/Research+and+innovation
106 https://wikis.ec.europa.eu/display/EUPKH/Horizon+Europe
107 https://wikis.ec.europa.eu/display/EUPKH/Monitoring+initiatives

biodiversity partnership Biodiversa+[108] and other platforms such as the EC Knowledge Centre for Biodiversity[109].

For the implementation of the eligibility condition on the 'multi-actor approach', proposals should ensure adequate involvement of researchers, farmers and other land managers, businesses involved in the food, medicine, energy and/or materials sectors, decision-makers at local and/or regional level, civil society organisations and other relevant actors.

Successful proposals should:

- Investigate essential functional roles of pollinators in natural and human-modified ecosystems, and associated ecosystem services. This should encompass ecosystem services underpinned by pollinators both directly and indirectly;

- Fill knowledge gaps on animal pollination ecology (what pollinates what, how much, where and when) and investigate the full spectrum of animals that pollinate wild and cultivated plants in Europe, going beyond the well-known insects (bees, hoverflies, butterflies, moths). The structure and functionality of plant-pollinator networks should be analysed. The research scope should include the European continent as well as EU overseas territories;

- Build a platform that will serve one-stop shop for information on animal pollination ecology. A database with systematised information on plan-pollinator interactions, including the spatial dimension of plant-pollinator networks, should be part of the platform. The platform should build on what already exists and should be devised in close collaboration with researchers and other potential users. Options to integrate this deliverable into the already existing platforms should be explored, with a view to ensure its long-term viability;

- Assess the dependency of society and the economy on ecosystem services underpinned directly and indirectly by pollinators, quantify and map the risks associated with pollinator decline. Monetary and non-monetary valuation of those ecosystem services should be advanced, including their tangible and less tangible elements, and utilised to improve ecosystem accounts and scale up their use in the public and private sector;

- Investigate biomass supply chains dependent on pollinators, build tools for businesses to assess their vulnerability to pollinator decline and improve guidelines on how they can help to reverse the decline and thereby mitigate future risks. This should in particular cover the food (including production of plants with mandatory cross-pollination), medicine, energy and materials sectors;

- Build tools for land managers and planners to support spatial decision-making with regard to the conservation of pollinators and protection of the local flow of ecosystem services that they deliver, e.g., digital atlases, maps, applications. In particular, tools for

108 https://www.biodiversa.org
109 https://knowledge4policy.ec.europa.eu/biodiversity_en

farmers should be developed, enabling assessment of impacts on their income and overall business performance of farms, early warning of pollination-deficit as well as social impacts on farming communities;

- Investigate the dependency of sustainable nutrition on pollinators and potential risks due to their decline. Particular attention should be paid to food with invaluable and irreplaceable properties for human health (e.g. with regard to micronutrients);

- Investigate risks of cascading effects in natural (natural plant-pollinators networks) and human-modified ecosystems due to pollinator decline and their impacts on human wellbeing, and undertake scenario forecasting towards 2050 in the case of an unmitigated pollinator decline. Uncertainty and irreversibility of the effects should be well integrated in the build-up of models.

HORIZON-CL6-2024-BIODIV-01-4: Biodiversity, economics and finance: Understanding macro-financial risks associated with biodiversity loss

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions

Expected Outcome: In line with the European Green Deal priorities and in particular with the EU biodiversity strategy for 2030 and the EU strategy for financing the transition to a sustainable economy, the successful proposal(s) will help unlock financial flows needed for reversing biodiversity loss, and contribute to mainstreaming biodiversity, ecosystem services and natural capital in the society and economy.

Project results are expected to contribute to all of the following expected outcomes:

- New knowledge to accelerate the ecological transition and socioeconomic transformation towards nature-positive economy across EU, in a context of erosion of natural capital and degradation of ecosystems and their essential services;

- Enhanced understanding and quantification of the macroeconomic significance of biodiversity and implications of its loss at EU level as a basis for more coordinated and better organised responses by key economic actors and institutions, including key policy making processes (e.g., EU semester);

- Information, tools and metrics to better integrate biodiversity and its loss into mainstream macro-financial analytical frameworks, risk assessment and management methods as a basis for enhancing natural capital and NBS;

- Development of more comprehensive and more robust environmental risk management in the financial sector;

- Mobilisation of mainstream finance to slow down, and reverse biodiversity loss in the broader context of environmentally sustainable development by catalysing nature-positive investments contributing to the objectives of the European Green Deal;

- Evidence base to support the implementation of the EU strategy for financing the transition to a sustainable economy.

Scope: The erosion of natural capital combined with the collapse of ecosystems entails potentially far-reaching economic and financial implications, including risks for macroeconomic and financial stability of key institutions, countries and regions. The decline of ecosystem services poses physical risks for economic and financial actors that depend upon those services, while socioeconomic transformations could trigger transition risks. As more than half of the world's GDP relies on nature[110], it is estimated that the risks triggered by ecosystem degradation to human societies could be at least as high as those imposed by climate change. Furthermore, these risks are growing as biodiversity is declining at unprecedented rates in human history, which calls for improved understanding, assessment and risk management approaches by key economic actors such as corporates, governments, central banks and financial supervisors. However, a wide range of challenges, including the complexity of ecosystem processes, uncertainty about tipping points and valuation problems, make it very difficult.

Actions should improve the state-of-art knowledge on the relationships between biodiversity, economy and the financial system including better understanding of the nature and degree of risks associated to biodiversity loss, how these risks interact with each other and are likely to evolve over time.

In particular, actions are expected to:

- Expand the evidence base on the dependence of the EU economy and its financial sector on nature, including by producing relevant macroeconomic indicators, e.g., assessing the share of the EU GDP and employment that depends on nature and evaluate implications of biodiversity loss. As much as possible, research should also extend to country level analysis and/or prepare the ground for future more in-depth studies with increased geographical resolution.

110 Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy | World Economic Forum (weforum.org).

- Develop scenarios tailored to financial risk assessment, including identification of assets under highest risk from being stranded and sectors that represent the highest risk exposure.

- Co-design principles for a more comprehensive and more robust environmental risk management in the financial sector, develop innovative methodologies and tools to support risk assessment that can better capture the specificities of nature and ecosystems.

- Explore tools to assess the alignment of corporates and financial institutions with major European and global biodiversity-related goals, including by leveraging of the EU Taxonomy on Sustainable Finance.

- Investigate how biodiversity loss interacts with climate change and other socio-environmental challenges in regard of macro-financial stability and how different risks can reinforce each other.

- Identify possible response options and issue recommendations for EU institutions and Member States, investors, companies and other financial market participants about macro-financial risks of biodiversity loss.

In their research, actions should investigate various possible risk categories including both physical and transition ones, their transmission channels and cascading effects through sectors and supply chains, as well as adaptive capacity of economic and financial agents/institutions, with particular focus on the EU, its Member States and Horizon Europe Associated Countries. The analysis should extend to worst-case scenarios and include low-probability but high-impact biodiversity-related tail risks.

Actions should build on and/or establish synergies with the relevant work by initiatives/projects/studies including, but not limited to, the World Economic Forum's New Nature Economy Report Series[111], Network for Greening the Financial System[112], Taskforce on Nature-related Financial Disclosures[113], The Finance for Biodiversity (F4B) initiative Accounting for ecosystems and their services in the European Union (INCA)[114] and EU Member States (MAIA)[115] projects, Indebted to Nature report[116] and the working paper 'A "Silent Spring" for the Financial System? Exploring Biodiversity-Related Financial Risks in France'[117].

Actions are expected to involve and co-create with the end-users (financial institutions, non-financial corporations, governments etc.) to fully account for their respective views and needs. Actions should bring together from the start multiple types of scientific expertise in social

111 https://www.weforum.org/reports/new-nature-economy-report-series
112 https://www.ngfs.net/en
113 https://tnfd.global/
114 https://ec.europa.eu/eurostat/documents/7870049/12943935/KS-FT-20-002-EN-N.pdf/de44610d-79e5-010a-5675-14fc4d8527d9?t=1624528835061
115 https://maiaportal.eu/about
116 https://www.dnb.nl/en/general-news/2020/indebted-to-nature/
117 https://publications.banque-france.fr/en/silent-spring-financial-system-exploring-biodiversity-related-financial-risks-france

sciences and humanities, in particular in economics and finance, as well as scientific expertise in biodiversity and natural capital.

Actions should envisage clustering activities with projects funded under this topic as well as with other relevant Horizon Europe and Horizon 2020 projects working on links between biodiversity and sustainable finance and economics of biodiversity[118]. To this end proposals should foresee dedicated tasks and appropriate resources for coordination measures, joint activities, and joint deliverables.

HORIZON-CL6-2024-BIODIV-01-5: Transformative action of policy mixes, governance and digitalisation addressing biodiversity loss

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Research and Innovation Actions

Expected Outcome: In line with the European Green Deal priorities, in particular with the EU biodiversity strategy for 2030 and the 2030 climate pact, successful proposals will develop knowledge and tools to understand the role of transformative change for biodiversity policy making, address the indirect drivers of biodiversity loss, and initiate, accelerate and upscale biodiversity-relevant transformative changes in our society. They will also help understanding the impacts of and the opportunities offered by digital transformation, new emerging technologies, and social innovation on biodiversity. Successful proposals will contribute to the following expected impact: mainstream biodiversity, ecosystem services and natural capital in the society and economy: integrate them into public and business decision-making; build approaches for enabling transformative changes to face societal challenges including through the deployment of Nature-Based Solutions (NBS).

Projects should address all of the following outcomes:

- Foresight on society well-being based on realistic assumptions on careful use of natural capital and analysis of the consequences in terms of economic growth.
- Evaluation of feasibility and limits of decoupling economic activities from natural capital use.

[118] Notably Horizon Europe projects Invest4Nature and projects resulting from the calls: “H HORIZON-CL6-2023-BIODIV-01-10: Build up of knowledge on Nature Positive Economy and supporting its scale-up”.

- Knowledge and understanding of the transformative changes needed to address the indirect drivers of biodiversity loss underpinned by societal values and behaviours, better design of policy mixes and governance.

- Operational knowledge available to, and used by policymakers, on indirect drivers of biodiversity loss that are underpinned by societal values and behaviours, and on the transformative changes that are necessary to tackle these indirect drivers.

- Improved and new systemic, sustainable policy mixes and governance approaches developed to enable biodiversity-relevant transformative change, based on a range of policy tools, economic research, instruments or regulations.

- Methods and tools promoting win-win solutions for biodiversity and socio-economic objectives, the use and mainstreaming of 'green over grey' approaches and the application of the 'do no harm' principle are available and taken up across the policy spectrum, planning and investment decisions, business and finance, and civil society.

- Approaches to facilitate the application of such methods and tools are identified and used, while factoring in societal and political processes (such as citizen engagement, political campaigns, science denialism). Solutions can include stocktaking of good practice, standards, agreements, charters, commitments, regulations, engaging society and incorporating lifelong learning.

- A better understanding of the impacts on, risks and opportunities for biodiversity of digital transformation (for example data-driven technologies, artificial intelligence, robotics, automation, miniaturised sensors, citizen science applications, crowd sourcing), new materials (e.g., for biomimicry), the energy sector (e.g., through energy/electricity infrastructure), and new and emerging technologies.

- Identification and assessment of how system-level change affecting biodiversity through social innovation happens.

- Testing active intervention by R&I policy and sector policies (niche creation, reformulation of governance), also by empowering and endowing communities.

Scope: In line with the EU biodiversity strategy for 2030, successful proposals will develop:

- operational knowledge and understanding of transformative change needed to address the indirect drivers of biodiversity loss underpinned by societal values and behaviours, which is available to, and used by policy makers.

- improved and innovative governance tools and policy mixes that can effectively initiate, accelerate and upscale such biodiversity-relevant transformative changes in our society.

- help understanding the impacts of and the opportunities offered by digital transformation, use of data and sensors, emerging technologies such as AI and robotics and social innovation on biodiversity.

- Proposals should look at key indirect drivers of biodiversity loss (including production and consumption patterns, human population dynamics and trends, trade, technological innovations and local through global governance), the kind of transformative changes necessary to tackle these societal drivers, effective governance approaches, tools and policy mixes to enable these changes, and how to further mainstream biodiversity into policy making, science, and governance within and beyond socio-economic, climate and environmental agendas.

- Proposals should generate knowledge on how to tackle biodiversity loss linked to technological and social innovation, which includes digitalisation. Proposals should explain how changes by technological/social innovation are impacting biodiversity – for example by bringing in new and emerging technologies, new production processes, consumer products, regulations, incentives, or participatory processes.

- Proposals should produce case studies on what transformative change means in practice and a collection of good and failed examples of developing and implementing policy tools, best practices and instruments, and on impacts of digitalisation, which could feed into the just transition process and inform and inspire transformative change through learning, co-creation and dialogue.

- Proposals should develop methodologies to assess the impacts of their proposed solutions on policy and its decision making. This includes impacts from energy/electricity infrastructure related to digitalisation, on democracy and on trust in science on environmental, social and economic systems. Such assessments should focus on the direct and indirect effects of digital developments on biodiversity, intertwined with climate change and health.

- This topic should involve contributions from the social sciences and humanities disciplines, as well as social innovation.

- The proposals should build their analysis upon the synergies of multiple Sustainable Development Goals, to deliver direct and indirect biodiversity benefits, and of the role of biodiversity in reaching the set of Sustainable Development Goals, considering the importance of policy mixes, governance and digitalisation.

- Proposals should include specific tasks and allocate sufficient resources to develop joint deliverables (e.g., activities, workshops, joint communication and dissemination) with all projects from the same topic and the portfolio of all projects on transformative change related to biodiversity funded under this destination since 2021.

- Proposals should use or interoperate with existing platforms and information sharing mechanisms relevant for transformational change and on biodiversity knowledge.

- Projects are expected to cooperate with the European partnership on biodiversity, Biodiversa+, and the Science Service project Bio-agora. Proposals should show how their results and outcomes could provide timely information for major science-policy

bodies such as the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC), and the Convention on Biological Diversity.

- Where relevant, projects are expected to create links to and use information, data and impact-related knowledge from the European Earth observation programme Copernicus, the ESA EO4SD initiative, the Group on Earth Observations (GEO) and the Global Earth Observation System of Systems (GEOSS).

Biodiversity friendly practices in agriculture, forestry and aquaculture

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-BIODIV-01-6: Promoting pollinator friendly farming systems

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 6.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: In line with the EU biodiversity strategy for 2030, the farm to fork strategy, the EU climate policy under the European Green Deal, successful proposals will promote a pollinator friendly agriculture, contribute to the transition to more sustainable practices in agriculture, and support biodiversity in agroecosystems.

The project results are expected to contribute to all of the following expected outcomes:

- Farming systems are more pollinator-friendly and support (agro)biodiversity;
- Pollinator-friendly varieties, rotations and combination of crops are promoted;
- Farmers are more aware of the importance of pollinator-specific planning and measures available to enhance pollination services;
- Breeding sector is adapted to develop varieties adapted to pollinator-friendly farming.

Scope: The production of many crops depends on pollinators. Different types of measures are needed to tackle the causes of pollinator decline, enhance crop pollination, and promote pollinators in agriculture. Many crops have specific traits, which have been identified to enhance crop–pollinator interactions. The development of crop varieties with specific traits to attract and reward pollinators is an appealing strategy to address needs of agriculture and pollinators. This could also improve crop yields, nutritional resources for pollinators and promote a pollinator-friendly agriculture.

Pollination activities are also impacted by variety (genotype), environment, and management practices (GxExM). Pollinator-specific planning needs to consider temporal and spatial crop management and other strategies of management (e.g., field margin composition and structure) to enhance pollination services.

Proposals should:

- Increase the understanding of the crop-farming system-pollinator relationship in combination with the interaction between crop, environment and management (GxExM);
- Identify crop traits that enhance crop-pollinator interactions, engage in breeding activities and contribute to the development of pollinator-friendly varieties;
- Identify, test and demonstrate farming systems that take into consideration temporal and spatial diversification of crops as well as landscape features to match pollinators needs;
- Promote and facilitate the uptake of farm-pollinator friendly practices;
- Support capacity building, training and education enabling farmers/growers to adopt sustainable agricultural practices;
- Develop strategies to create value of pollinator friendly approaches along the value chain.

Proposals should build on the results of relevant projects funded under Horizon 2020 and ensure collaboration with projects funded under the following call in Horizon Europe work programme 2021-2022: *HORIZON-CL6-2022-BIODIV-02-01-two-stage: Maintaining and restoring pollinators and pollination services in European agricultural landscapes.*

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of researchers, the breeding sector, farmers, agricultural advisors and other relevant actors. The topic is open to all types of farming systems (e.g., arable farming, horticulture, fruit trees) in various geographical and pedo-climatic conditions. Result of activities should benefit both conventional and organic farming.

HORIZON-CL6-2024-BIODIV-01-7: Reintroduction of landscape features in intensive agricultural areas

Specific conditions

Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In supporting the implementation of the European Green Deal, the EU biodiversity strategy for 2030, the farm to fork strategy and the common agricultural policy, successful proposals will contribute to develop and improve practices in agriculture to support and make sustainable use of biodiversity and a wide range of ecosystems services.

Projects results are expected to contribute to all of the following expected outcomes:

- Drivers and challenges for the re-introduction of landscape features in intensive farming areas are better identified.
- Strategies to reintroduce landscape features in intensive agricultural areas for national and regional policy- and decision-makers are built, contributing to the following key-commitments of the EU biodiversity strategy 2030: “At least 10% of agricultural area is under high-diversity landscape features”; and “Three billion new trees are planted in the EU, in full respect of ecological principles”.
- Solutions for climate change adaptation and to provide ecosystem services, in particular carbon sequestration, are developed for areas of intensive agriculture.
- The ground for possible future demonstration projects is prepared.

Scope: According to the EU biodiversity strategy for 2030, “to provide space for wild animals, plants, pollinators and natural pest regulators,10% of agricultural area should be brought back under high-diversity landscape features, including, inter alia, buffer strips, rotational or non-rotational fallow land, hedges, non-productive trees, terrace walls, and ponds”. These should help enhance carbon sequestration, prevent soil erosion and depletion, filter air and water, and support climate adaptation. In addition, more biodiversity often leads to more agricultural production over the medium and long term.

In the EU there are large agricultural intensive areas where nature has almost disappeared. There is a need to reintroduce nature to improve the state of the environment by delivering ecosystem services and as a contribution to climate mitigation and adaptation. In particular it is needed to achieve ecological corridors, in conjunction with other multifunctional Nature-

based Solutions. Landscape features may also be included as remedial measures to protect soil; their biogeochemical functions may counteract the spread of chemical pollutants from agriculture to groundwater and open waters, especially those derived from natural and mineral fertilizers.

The new common agricultural policy (CAP) may offer specific tools to support farmers who dedicate space for biodiversity rich landscape features, such as dedicated eco-schemes or area related interventions (such as agri-environmental interventions) or non-productive investment interventions (one-off costs arising from establishing landscape features such as hedges, ponds, wetlands or stone walls). The agri-environment interventions under CAP Strategic Plans will continue to be implemented on a voluntary basis. They have been used in a quite limited extent until now to promote the reintroduction of biodiversity-rich landscape features in areas of intensive agriculture. Eco-schemes are new tools to support farmers in the first pillar of the CAP (direct payments) in the form of incentives to farmers to adopt more environment-friendly practices. They may cover the reintroduction of biodiversity rich landscape features, but this will depend on a number of factors, notably the implementation choices of Member States in their CAP Strategic Plans and the level of support.

This topic intends to look into key-factors which may lead to the reintroduction of landscape features in areas of intensive agriculture beyond financial incentives.

Proposals should:

- assess the increase of the environmental and economic value and the potential for land productivity linked to the increase of biodiversity rich landscape elements on agricultural land with intensive organization of production. They should address the valuation (monetary and social benefits) of the ecosystem services of landscape features, based on existing R&I projects, and assess the perception of land managers/owners of this value increase. Proposals could notably build on available knowledge on Natural Capital Accounting[119].

- investigate into possible business models which can combine the reintroduction of landscape features with rewarding economic activities including possibly recreational ones. This could build on positive experiences with productive trees part of arable land agroforestry systems. Projects should address the need to build green corridors and consider where and why reintroducing landscape features makes sense for this. The need to restore water systems through the restoration of streams and small rivers should be included.

- assess the decision-making process of land owners/managers which can lead to the reintroduction of landscape features in areas of intensive agriculture and analyse enabling mechanisms. This assessment should go beyond analysing available financial incentives and should include in particular factors such as social, generational and gender aspects, awareness about the intrinsic value of biodiversity and the importance of

[119] Natural Capital Accounting - Environment - European Commission (europa.eu)

agricultural land for maintaining biodiversity in the natural landscape matrix in the context of climate change and persistent landscape fragmentation, the type of land exploitation (land in private ownership or lent, legal form of holdings…), etc,

- identify possible pathways towards more diversified business models involving nature and what could be the right incentive(s) (beyond financial incentives) to lead to change.
- formulate strategies to reintroduce landscape features in areas of intensive agriculture.

The topic is open to all types of farming systems (e.g., arable farming, horticulture, fruit trees) in various geographical and pedo-climatic and conditions.

This topic should involve the effective contribution of social sciences and humanities (SSH) disciplines.

Proposals should build on the results of relevant EU-funded research projects. They should use existing platforms and information sharing mechanisms notably the EC Knowledge Centre for Biodiversity.

The JRC may provide expertise on landscape features identification, typology, quantification in the frame of EU policy.

HORIZON-CL6-2024-BIODIV-01-8: Conservation and protection of carbon-rich and biodiversity-rich forest ecosystems

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In line with the EU biodiversity and climate objectives, successful proposals will support the protection of biodiversity-rich forest ecosystems, at the species'

distribution rear edges and margins that are at high risk of collapse in light of a rapidly changing climate.

Project results are expected to contribute to all of the following outcomes:

- Improved knowledge on the cross-impacts between biodiversity and climate change: drivers of biodiversity loss and the interrelation with forest-based adaptation and mitigation needs; impacts of climate change on forest biodiversity and forest species migration; and links between forest species diversity and forest resilience to climate change.

- Identification of win-win management practices (including non-intervention, climate-smart forestry) and development and implementation of ecosystem protection and restoration methods and tools for resilient, carbon rich and biodiversity supportive forests.

- Better understanding of the drivers and barriers for natural co-migration of forest communities and development of approaches and guidelines to foster co-migration.

- Improved tools and indices for the joint monitoring of biodiversity and climate aspects on forests.

- Empirical analysis of the current forest management and conservation practices in European forests of high ecological value, including governance (regulations and their impact), management responses to climate change and an assessment of drivers that determine management on the ground.

- Strict protection of primary and old-growth forest in Europe by 2030.

Scope: Biodiversity-rich forest ecosystems, in particular at the species' distribution edges, are at a high risk in light of a rapidly changing climate. When not being in their optimal climate conditions, they are more fragile to biotic and abiotic damages and do not provide ecosystem services in an optimal manner.

While for tree species assisted migration and assisted gene flow is considered as a possibly solution in actively managed forests, the dependent forest communities (e.g., plants, fungi, insects, soil microorganisms etc.) might fail to follow the speed of habitat shifts what in turn may result in a loss of biodiversity. In addition, migration failure of mutualistic species (fungi, mycorrhiza) can jeopardize the success of tree migration.

Protected areas without the option for assisted migration, will particularly depend on the larger landscape context for community migration and adaptation, as many of them have not been designed to account for the long-term and large-scale dynamics.

Proposals will:

- Set up case studies in European forests or tropical forests; particularly targeting forests of high ecological value, such as primary and old-growth forests, Mediterranean forests, peat swamp forests or mangroves.
- Improve existing or develop new predictive models of biodiversity changes, advance the understanding of species connection with the forest habitat, and analyse to what extent species can survive in a changed and fragmented habitat with a view to establishing protected forest networks.
- Analyse directions of assisted tree migration to maximize dynamic gene conservation (as form of ex situ conservation)
- Assess the risk for biodiversity loss in protected areas and develop protection strategies that consider the larger landscape and regional context to allow for natural species and community migration.
- Develop approaches and guidelines for forest managers and conservationists in a context of forest ecosystem migration and map scenarios of potential forest ecosystem migration routes.
- Connect with relevant institutions at regional, national and EU-level as well as relevant stakeholders to regularly disseminate the research results.
- Improve monitoring techniques, including remote-sensing and field-data methods integrating technologies such as AI, IoT, robotics or blockchain, to better assess biodiversity and climate aspects of forests.

Due to the scope of this topic, international cooperation is strongly encouraged.

The project must implement the multi-actor approach and ensure an adequate involvement of the primary production sector and the wider forest-based value chain.

JRC will contribute with dataset on forest tree species distribution and support the development of satellite monitoring of forest metrics.

HORIZON-CL6-2024-BIODIV-01-9: Selective breeding programme for organic aquaculture

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 3.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 3.00 million.
Type of Action	Research and Innovation Actions

Technology Readiness Level	Activities are expected to achieve TRL 3-5 by the end of the project – see General Annex B.

Expected Outcome: In line with the European Green Deal priorities and in particular with the EU biodiversity strategy for 2030 and the 2030 climate target pact, a selective breeding programme for organic aquaculture will be developed contributing to the impact "develop and improve practices in agriculture, forestry, fisheries and aquaculture to support and make sustainable use of biodiversity and a wide range of ecosystems services".

The selected project is expected to contribute to all of the following outcomes:

- Contribution to a non-toxic environment, to a high level of biodiversity (including genetic diversity) and to high animal welfare standards meeting the species-specific behavioural needs;
- Significantly boost in the quality of aquaculture products, improving traits of economic and welfare importance;
- Increased feed efficiency that will also result in a reduced environmental impact through the minimization of feed residues in the natural environment;
- Less disease outbreaks through genetic progression, i.e. greater disease resistance, increased feed efficiency, faster growth and improved traits of economic and welfare importance;
- Increased knowledge and acceptance of organic aquaculture and its products in the general public through true stakeholder and consumer involvement.

Scope: Regulation (EU) 2018/848 lays down detailed production rules for organic aquaculture and requires the use of organic juveniles for on-growing purposes. Breeding under organic conditions is essential to achieve the objectives of organic aquaculture and respect its principles. Breeding is at the same time essential to allow the farmers to reach good productive results and efficient use of the resources under organic production conditions.

Proposals should plan breeding programs under organic aquaculture for the main European aquaculture finfish species, i.e. seabass, seabream, trout and salmon. They should breed organic juveniles under organic production conditions respecting high animal welfare standards (as set in regulation 2018/848 and Implementing Regulation 2020/464) and should aim to improve species resilience, diseases resistances and feed efficiency satisfying nutritional needs using as much as possible alternative feed materials to increase production sustainability.

Proposals should work on different species and/or different climatic areas tailored to the specificity of the organic aquaculture production and carefully analyse each solution not only in terms of performance but also in terms of the welfare of the farmed animals. They should work on preserving genetic diversity and adaptive potential by developing selective breeding programmes considering interactions between genotypes and rearing systems.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Call - Biodiversity and ecosystem services

HORIZON-CL6-2024-BIODIV-02

Conditions for the Call

Indicative budget(s)[120]

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[121]	Indicative number of projects expected to be funded
		2024		
Opening: 17 Oct 2023 Deadline(s): 22 Feb 2024 (First Stage), 17 Sep 2024 (Second Stage)				
HORIZON-CL6-2024-BIODIV-02-1-two-stage	IA	16.00	Around 8.00	2
HORIZON-CL6-2024-BIODIV-02-2-two-stage	IA	10.00	Around 5.00	2
HORIZON-CL6-2024-BIODIV-02-3-two-stage	RIA	10.00	Around 5.00	2
Overall indicative budget		36.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General Annex B.

120 The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.

121 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Mainstreaming biodiversity in society and the economy

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-BIODIV-02-1-two-stage: Demonstrating Nature-based Solutions for the sustainable management of water resources in a changing climate, with special attention to reducing the impacts of extreme droughts

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 16.00 million.
Type of Action	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: In addition to the standard eligibility conditions, proposals must include demonstration activities to be carried out in at least four different Member States or Associated Countries. At least one of the proposed

	demonstrations must take place in a region eligible for Cohesion funds.
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: In line with the European Green Deal priorities, notably the EU biodiversity strategy for 2030, as well as the EU climate adaptation strategy and the EU's climate mitigation ambition for 2030 and 2050, the successful proposals will support the development of Nature-based Solutions (NBS) contributing to the sustainable management of water resources in a changing climate, with a special attention to reducing the impacts of extreme droughts.

Project results are expected to contribute to all of following expected outcomes:

- Cost-effective ways of implementing NBS at large scale for integrated water management are ready to use for relevant stakeholders and widely replicated;
- Consolidated evidence of the contribution of NBS to sustainable water management and of NBS' cost and resource efficiency, notably concerning the reduction of impacts of droughts;
- Enhanced implementation of EU policies, notably for water management (Water Framework Directive, as well as the Floods Directive, when relevant), climate adaptation (Article 5 of the European Climate Law, EU strategy for climate change adaptation), the EU biodiversity strategy for 2030 and the EU soil strategy for 2030.

Scope: Due to the changing climate, many European regions are already facing more frequent, severe, and longer lasting droughts. Extreme droughts can have cascading effects; e.g., they reduce water levels in rivers and ground water, stunt tree and crop growth, increase pest attacks, favour the occurrence of sand drifts and storms and fuel wildfires. Moreover, impacts of extreme droughts accumulate over time across large areas, and the effect can linger for years. In areas with an intense demand for water supply, the impacts of droughts add up to the stress imposed to water systems by human activities.

In Europe, most of the losses caused by extreme drought (~EUR 9 billion/year) affect agriculture, forestry the energy sector and the public water supply. Extreme droughts in western and central Europe in 2018, 2019 and 2020 caused considerable damage. With global climate change deepening, the impacts will be even more severe in the future, including decreasing quality, occurrence and availability of standing and running water.

By deploying systemic thinking NBS utilise an understanding of the structure and functioning of local ecosystems over time to address a broad range of societal challenges, including having enough water of good quality, both in surface waters and in ground water. They also contribute to restoration of biodiversity and help carbon sequestration in the soil. As such,

NBS are highly adaptable to respond to changing local conditions and are often more cost and resource efficient than purely technological approaches in the longer term.

The 2021 EU climate adaptation strategy underlines that NBS represent multipurpose, "no regret" solutions, with environmental, social and economic benefits and help build climate resilience. They can have an essential role in land-use management and infrastructure planning to reduce costs, provide climate-resilient services, and improve compliance with Water Framework Directive (WFD) requirements.

However, evidence on the cost-efficiency of these measures remains dispersed and incomplete, and do not address the whole catchment area in a holistic approach. River basin management plans are still limited in the recognition of NBS capacity to contribute to drought resilience. Furthermore, we are still missing more and longer-term evidence of the combined effects of different designs and combinations of NBS operating in different contexts (urban, peri-urban and rural) and/or at different scales and/or different climatic zones, in what regards the sustainable management of water resources to reduce the impacts of extreme droughts. At the same time, the co-benefit that these NBS may bring to reduce hydrogeological risks such as flood peaking and stabilising hydrographs for both droughts and floods is still to be demonstrated.

The successful proposals should:

- Demonstrate innovative, systemic and locally attuned NBS (as single interventions or as a combination of them), for the management of catchment water resources and the reduction of extreme drought risks, in areas that are heavily impacted by temporary or lasting water scarcity and areas that are being increasingly exposed to this risk with the deepening of climate change.

- Be incorporated into an integrated design concept for land and water management at the appropriate scales (preferably at landscape level, integrating water, soil and ecosystems as a whole), in accordance with WFD objectives, considering longitudinal connectivity of water flows, lateral connectivity with floodplains and adjacent grounds, and connections between surface- and groundwater.

- Plan, co-design and co-deploy solutions in a transdisciplinary multi-stakeholder and participatory context with due consideration and integration of social and cultural aspects and climate change effects.

- Building on the work of Horizon 2020 projects and their taskforces, develop an advanced monitoring programme for the demonstrated solutions and test and further develop as needed the EU Impact Evaluation Framework for NBS to assess the economic, social and ecological benefits of NBS and provide quantitative evidence, including positive and negative synergies, and analysis of trade-offs, for higher performance.

- Identify and assess barriers related to: functional conflicts in land-use; NBS technical, commercial, social and cultural acceptance (e.g., farmers perceptions and values, the role of private landowners); and policy regulatory frameworks (e.g., the role of the common agriculture policy, urban, rural and regional development plans) - and propose ways to overcome them (for example through new business cases and governance approaches).

- Develop methodologies and tools, adapted to end-users (e.g., farmers, forest owners, local authorities, engineers, spatial planners), enabling the replication and up-scaling of NBS.

- To provide a long-term evidence as ambitious as possible, new interventions should be complemented with the analysis of established NBS. In this respect, opportunities to build up from relevant initiatives should be explored (e.g., LIFE, INTERREG, national funded projects, etc).

- Develop protocols and standards for the design, operation and maintenance of NBS, building on existing work, considering:

- The best solutions for different soil characteristics (as these determine the type and impact of droughts) and soil health, relief and geo-morphological conditions, including urban conditions;

- The resilience of NBS, considering present and future climatic conditions and water regimes;

- The ecological performance and resilience of NBS, to deal with both natural and human-induced hazards, such as extreme weather events, desertification, forest fires, plant- and animal diseases (pests), other human activities and socio-political approaches that could have an impact on land-use;

- The long-term maintenance of NBS: also in relation to the adequate management of biomass, synergies with other approaches that affect the management of ecosystems like agroforestry, etc.

Proposals should address all of the above points.

Because of the substantial investments that might be necessary for implementing the NBS, additional or follow-up funding (private or public) should be sought, considering the EU taxonomy, including from relevant regional/national schemes under the Recovery and Resilience Fund, the European Structural and Investment Funds (ESIF), or other relevant funds. Please note, however, that reference to such additional or follow-up funding will not lead automatically to a higher score in the evaluation of the proposal.

This topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities. This means proposals should bring together from the early start multiple types of

scientific expertise in both natural sciences (e.g., ecology, climate, pedology) and social sciences and humanities (e.g., economics, geography, sociology) together with a variety of urban and/or rural community representatives, farmers, businesses, civil society organisations and citizens.

Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.

Proposals should set out a clear plan on how they will collaborate with other projects selected under this topic and any other relevant topic/call, by participating in joint activities, workshops, as well as common communication and dissemination activities. This includes notably the Horizon 2020 NBS project portfolio, including the European Green Deal Call, and its task forces; Horizon Europe projects Invest4Nature and Naturance and HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions. Applicants should plan the necessary budget to cover these activities without the prerequisite to define concrete common actions at this stage.

Proposals should ensure complementarity and foresee synergies with the activities of the Horizon Europe missions "A Soil Deal for Europe", "Restore our Ocean and Waters by 2030" and "Adaptation to Climate Change", as well as with the partnerships Biodiversa+ and Water4All.

Proposals should ensure that all evidence, information and project outputs will be accessible through the Oppla portal (the EU repository for NBS). Where relevant, proposals should consider creating links, contributing to and using the information and data of other platforms such as NWRM, Climate-ADAPT, BISE and the European Drought Observatory.

HORIZON-CL6-2024-BIODIV-02-2-two-stage: Demonstrating the potential of Nature-based Solutions and the New European Bauhaus to contribute to sustainable, inclusive and resilient living spaces and communities

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms,

	logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Procedure	The procedure is described in General Annex F. The following exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.
Evaluation Procedure	To ensure a balanced portfolio covering demonstration activities in diverse geographical areas of the European Union and Associated Countries, grants will be awarded first to the highest ranked application according to the standard procedure described in Horizon Europe General Annexes D and F, followed by other applications that are the highest ranked among those that ensure the most complementary geographical coverage, provided that the applications attain all thresholds. When assessing geographical coverage, the evaluation will take into account the location of the application's demonstration activities, not the location of the application's participants/beneficiaries.

Expected Outcome: In line with the European Green Deal priorities and the EU climate adaptation strategy, as well as the EU's climate ambition for 2030 and 2050 and the EU biodiversity strategy for 2030, the successful proposals will support the development of Nature-based Solutions (NBS) contributing to the resilience and the sustainable, balanced and inclusive development of urban, peri-urban and rural areas.

The overall aim of this topic and associated R&I activities is to leverage the New European Bauhaus (NEB) core values of sustainability, inclusion and aesthetics in Nature-based Solutions (NBS), in light of a wider transformation to enable a more sustainable, inclusive and resilient society.

Project results are expected to contribute to all of following expected outcomes:

- A transdisciplinary integration of NBS and the NEB is demonstrated in different contexts, contributing to the transformative change needed to tackle the climate and biodiversity crises, and drawing on inclusiveness and the pluralities of values, knowledge, cultural diversity and cultural heritage.

- High quality, multifunctional, co-created public spaces that enhance sustainability, resilience and the well-being of communities, through the combination of NBS and the NEB, with digital, social and cultural innovation.

- Greater understanding of the links between NBS and the NEB and how to better make these two approaches compatible and integrated in places and buildings, landscapes, industrial systems, policies and communities.

- Communities benefit from the implementation of a new societal vision encompassing sustainability, resilience, health, well-being and inclusion, based on the demonstration of the combination of the NEB with NBS.

Scope: NBS can be an integral part of our living spaces that contribute to our well-being, promote togetherness and connect to our cultural heritage. There is growing evidence that NBS are a valuable entry for transforming behaviour towards sustainability, while contributing with multiple benefits that help communities address different societal challenges – from microclimate regulation to climate change, water management, green job creation, tourism opportunities, urban regeneration, health and well-being.

The NEB aims to make the European Green Deal a positive and tangible experience for citizens, connecting it to our daily lives and living spaces. It is a bridge between the world of science and technology, art and culture and is about leveraging our green and digital challenges to transform our lives and society. By integrating the values of sustainability, inclusion and aesthetics/quality of experience, the NEB supports the development of holistic solutions to global challenges through a place-based, participatory, and transdisciplinary approach.

The systemic integration of social, cultural, digital and nature-based innovation in the design, development and governance of public space has a tremendous potential to transform these spaces into diverse, accessible, safe, inclusive and high-quality areas that increase well-being and health and deliver a fair and equitable distribution of the associated benefits.

It becomes important to analyse the potential of NBS in view of the NEB initiative and conceptualise and demonstrate how to link these two approaches, avoid trade-offs, and enhance synergies and complementarities, through local demonstration. In this regard, proposals should focus on the first transformation of the NEB (places), while also integrating, when possible, the other two transformations (ecosystem of innovation; diffusion of new meanings) in the process.

The successful proposals should:

- Deliver visionary and integrated solutions combining nature-based innovation and social, cultural, or digital solutions, with the NEB approach, in order to increase sustainability and resilience of communities and citizens' well-being. These solutions should address environmental, social, cultural, economic determinants of resilience and well-being and support communities in reducing their exposure to climate-related risks, pollution (including noise) and social tensions.

- Demonstrate how the integration of NBS and NEB in solutions for innovative land-use management, urban design and planning could enhance ecosystem services, foster equitable access to public spaces, enhance their quality and use, or promote sustainable mobility.

- Considering the existing NBS portfolio, further demonstrate NBS, enriched with the new elements brought by the NEB (e.g., aesthetics, quality of experience), as well as with concerns on the circularity, ecodesign, origin and sustainability of materials used. These solutions should be applied in innovative configurations, e.g., in protected areas, eco-tourism sites, transport infrastructure, educational and cultural buildings, etc, notably contributing to urban regeneration, tourism opportunities, green job creation, social inclusion, or health and well-being.

- Considering that NBS inherently should always enhance biodiversity, explore the connections and possible trade-offs (and propose ways to overcome them) between biodiversity targets in NBS and the NEB, including in what concerns functionality and aesthetics/quality of experience.

- Propose solutions that involve innovative ways to make NBS compatible with built cultural heritage (e.g., cultural landscapes), and explore the possible role of NBS in increasing built cultural heritage's resilience to climate change and natural disasters.

- Propose and test guidelines and innovative tools for the implementation, maintenance, monitoring and evaluation of NBS integrating the NEB approach (e.g., addressing issues of design/ergonomics or quality of experience), as well as the necessary business and governance models for their implementation and upscaling (e.g. local incentives for NBS in public and private spaces; exploring different forms of engagement, inclusion and stewardship, etc).

- Building on the approach of the NEB, develop place based NBS with strong citizen engagement (e.g., youth, elder, vulnerable communities), through social innovation, and the necessary tools for citizen participation and the co-creation of solutions.

- Incorporate outreach, dissemination and cooperation activities with local communities, industry, educational institutions, research centres, professional organisations or museums and other cultural organisations, supporting challenge-based and experiential NBS with real-life NEB applications, promoting public debate and a change of behaviour.

- Engage, through sustainable transdisciplinary collaborations, communities of practice that very rarely work together (e.g., architects, landscape architects, designers, artists, ecologists, spatial planners, psychologists, economists, or engineers), bridging epistemological gaps, while also contributing to the breaking up of silos in local/regional administrations.

- Explore the role of NBS and NEB in transformative change to provide holistic solutions to address global challenges (climate, biodiversity, water, economic, demographic, etc), including through transformative and contemporary arts.

Proposals should address all of the above points.

For wider impact, proposals should ensure a diversity of demonstration contexts (e.g., urban, rural, protected areas) and geographical representation, as well as the inclusion of a diversity of actors for local demonstration: local and/or regional authorities, business, academia, and civil society.

Other than the critical role of ecological sciences, this topic requires the effective contribution of SSH disciplines and the involvement of SSH experts, institutions as well as the inclusion of relevant SSH expertise, in order to produce meaningful and significant effects enhancing the societal impact of the related research activities. The involvement of disciplines such as psychology, behavioural science, economics, geography, anthropology, sociology, architecture, arts, cultural heritage, or design studies, is considered essential to the diffusion of new meanings, enhance social learning and promote the role of social and cultural innovation in transforming public spaces, with particular attention to inclusion, quality of experience and cultural perceptions of nature.

Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership, or market uptake.

Because of the substantial investments that might be necessary for implementing the NBS, additional or follow-up funding (private or public) should be sought, including from relevant regional/national schemes under the Recovery and Resilience Fund, the European Structural and Investment Funds (ESIF), or other relevant funds.

Projects should envisage clustering activities with the projects of the same topic and with the Horizon 2020 NBS project portfolio and respective task forces and notably coordinate with Horizon Europe projects resulting from: HORIZON-CL6-2022-COMMUNITIES-01-05: Assessing the socio-politics of nature-based solutions for more inclusive and resilient communities; HORIZON-CL6-2022-COMMUNITIES-02-02-two-stage: Developing nature-based therapy for health and well-being; HORIZON-CL6-2022-BIODIV-01-03: Network for nature: multi-stakeholder dialogue platform to promote nature-based solutions; and HORIZON-CL6-2023-BIODIV-01-8: Addressing biodiversity decline and promoting Nature-based Solutions in higher education. Collaboration with the European Biodiversity Partnership (Biodiversa+) should also be explored. To this end, proposals should foresee dedicated tasks and appropriate resources for coordination measures, foresee joint activities and joint deliverables.

Proposals should build on existing outcomes of the Horizon 2020 and Horizon Europe NBS project portfolio and other NEB related projects funded in Horizon Europe and ensure the proposed activities are complementary. Complementarity should also be sought with Horizon Europe Missions, notably “100 Climate-Neutral and Smart Cities by 2030”, “Restore our Ocean and Waters by 2030” and “Adaptation to Climate Change”.

Projects are expected to contribute to the NEB initiative by interacting with the NEB Community, NEBLab and other relevant actions of the NEB initiative through sharing information, best practice, and, where relevant, results.

Proposals should ensure that all evidence, information, and project outputs will be accessible through the Oppla portal (the EU repository for Nature-based solutions).

In the context of this topic, geographical areas of the European Union and Associated Countries are NUTS level 1 regions of European Union Member States and of Associated Countries for which they are defined. In the case of Associated Countries without NUTS classification, the country as a whole is to be considered as one geographical area:

- List of Associated Countries not defined by NUTS level 1: Armenia; Bosnia and Herzegovina; Faroe Islands; Georgia; Kosovo[122]; Israel; Moldova; Tunisia; Ukraine.
- List of countries not defined by NUTS level 1 with which association negotiations are being processed or where association is imminent: Morocco.

Biodiversity friendly practices in agriculture, forestry and aquaculture

HORIZON-CL6-2024-BIODIV-02-3-two-stage: Promoting minor crops in farming systems

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Admissibility conditions	The conditions are described in General Annex A. The following exceptions apply: Applicants submitting a proposal under the blind evaluation pilot (see General Annex F) must not disclose their organisation names, acronyms, logos, nor names of personnel in Part B of their first stage application (see General Annex E).
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: The proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Procedure	The procedure is described in General Annex F. The following

[122] This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

	exceptions apply: This topic is part of the blind evaluation pilot under which first stage proposals will be evaluated blindly.

Expected Outcome: In line with the objectives of the farm to fork and biodiversity strategies, successful proposals will promote diversification in agriculture as a means to increase the resilience and sustainability of the sector vis-a-vis challenging environmental, climatic and economic conditions. By increasing agrobiodiversity, activities will contribute to food security, adaptation of the agricultural production to the effects of climate change, and thereby support implementation of the farm to fork strategy, the common agricultural policy and the EU climate policy under the European Green Deal.

Successful proposals will contribute to the following outcomes:

- Increased evidence of the environmental benefits of minor crops;
- Farmers make use of a wider range of crops, and combination of crops;
- Minor crops are integrated in farming systems promoting their environmental benefits;
- Increased resilience and climate adaptation of farming systems vis-a-vis biotic and abiotic stresses;
- Feed and food industry make use of minor crops;
- Creation of new avenues for farmers and value chains through a wider range of products.

Scope: Farmers face increasing pressure to shift production towards lower input systems, while continuing to ensure sufficient supplies of food and non-food products. The European Green Deal in particular has set ambitious targets to reduce by 2030 the overall use of chemical pesticides and fertilisers, reduce nutrient losses and increase organic farming[123]. Activities shall release the value of minor crops and promote their broader use in breeding, farming and in food/non-food value chains. For the purpose of this topic, minor crops are defined as underutilised and/or genetically diverse crops [124] (including landraces and varieties).

- Promote the access to minor crops engaging in breeding activities;
- Improve agronomic management practices for minor crops;

123 European Green Deal farm to fork and biodiversity strategies with 2030 targets: Reduce by 50% the overall use and risk of chemical pesticides and reduce use by 50% of more hazardous pesticides; reduce nutrient losses by at least 50% while ensuring no deterioration in soil fertility; this will reduce use of fertilisers by at least 20 %; achieve at least 25% of the EU's agricultural land under organic farming.

124 Applicants are expected to explain and justify the choice of crops (including tree and other perennial crops) in relation to the proposal's and topic's ambition.

- Explore the effects and benefits of minor crops and demonstrate the ecosystems services supported by farming system diversification and the integration of minor crops (if applicable, including novel crop rotations).

- Identify and test avenues for marketing and processing of more diverse farming outputs across the value chain;

- Promote the uptake of minor crops through the development of guidelines and wide-spread practical demonstrations taking into account a range of farming systems, pedo-climatic conditions and value chains;

- Support capacity building, training and education enabling farmers/growers to adopt sustainable agricultural practices.

The topic is open to all types of farming systems (e.g., arable farming, horticulture, fruit trees) in various geographical and pedo-climatic conditions. Result of activities should benefit both conventional and organic agriculture.

Activities must implement the multi-actor approach, thus ensure an adequate involvement of researchers, farmers, advisors, food industry, and other players in the value chain and consumers. Communication and outreach to a wide range of stakeholders is essential. This topic should include the effective contribution of SSH disciplines.

Where relevant, proposals should seek complementarities and synergies, while avoiding duplication and overlap, with relevant actions funded under Horizon 2020[125]. Proposals should specify how they plan to collaborate with other proposals selected under this and other relevant topics, for example by undertaking joint activities, workshops or common communication and dissemination activities. Proposals should allocate the necessary resources to cover these activities.

In this topic, the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

[125] Projects from topic Horizon 2020 SFS-01-2020 - Biodiversity in action: across farmland and the value chain: RADIANT (Grant agreement ID: 101000622), CROPDIVA (Grant agreement ID: 101000847), DIVINFOOD (Grant agreement ID: 101000383) and BIOVALUE (Grant agreement ID: 101000499)

Destination - Fair, healthy and environment-friendly food systems from primary production to consumption

National, EU and global food systems are facing sustainability challenges, from primary production to consumption that could jeopardise food and nutrition security. The farm to fork strategy, and its follow-up initiatives, aim to address these challenges and supports transition to more resilient and environmentally, socially and economically sustainable food systems on land and at sea that provide healthy diets for all and respect planetary boundaries. It is key to ensuring that the fit for 55 package[126] and the European Green Deal[127] are successful and the UN Sustainable Development Goals (SDGs)[128] are achieved. Research and innovation (R&I) under this destination will steer and accelerate the transition to sustainable, safe, healthy and inclusive food systems from farm to fork, ensuring food and nutrition security for all and delivering co-benefits for the environment, health, society and economy.

Sustainable, climate neutral and biodiversity friendly farming systems provide economic, social (including health), environmental and climate benefits, and are the main prerequisite for food and nutrition security. For farmers, who are the backbone of food systems and principal managers of natural resources, the new common agricultural policy (CAP) and the European Green Deal set ambitious targets and objectives concerning the sustainability and safety of feed, food and non-food production. These targets and objectives are included in the core European Green Deal policy priorities, in particular the farm to fork strategy, the EU biodiversity strategy for 2030, zero pollution ambitions and climate action, and their follow-up initiatives. R&I in line with the strategic approach to EU agricultural research and innovation[129] will be key enablers for achieving these ambitious targets and objectives.

The **partnership on 'Accelerating farming systems transition: agroecology living labs and research infrastructures'** will unlock the potential of agroecology to make agri-food systems environmentally friendly and regenerative, climate-neutral, inclusive, competitive and resilient. It will enable farmers and value chain actors to successfully apply agroecology principles thanks to: i) a stronger R&I system integrating science and practice; ii) increased knowledge on the benefits, challenges and potential of agroecology for farming, food and society; iii) improved sharing of and access to knowledge, place-based tailored solutions and innovations; and iv) improved and transformative governance and policies.

Besides the partnership, R&I under the destination will help farmers in monitor and manage natural resources (e.g. soil, water, nutrients, biodiversity, etc.) in innovative, sustainable ways by, among other things, boosting organic food and farming in line with the action plan for the

126 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN
127 EUR-Lex - 52019DC0640 - EN - EUR-Lex (europa.eu)
128 THE 17 GOALS | Sustainable Development (un.org)
129 https://ec.europa.eu/programmes/horizon2020/en/news/final-paper-strategic-approach-eu-agricultural research-and-innovation

development of organic production[130]. New knowledge and innovative solutions will also promote plant health, reduce farmer's dependency on pesticides and reverse biodiversity loss.

Through the **partnership on** '**Animal health and welfare**', farmers and other actors will be better equipped to protect animals against infectious diseases, including zoonoses, and to improve animal welfare, while reducing the dependency on antimicrobials, maintaining productivity, improving food safety and quality, and protecting the environment and public health. In addition to the partnership, sustainable livestock production will be enhanced by improved knowledge on nutritional requirements and innovative on-farm practices and technologies for optimised production and use of local feedstuffs. A common EU approach to optimise the management of the co-existence of outdoor livestock systems and wildlife will be implemented by integrating science, local knowledge and practice on the preservation, protection and valorisation of wildlife and agro-pastoral systems.

Synergies will be created with other destinations and instruments. Under the Mission 'A Soil Deal for Europe', 100 living labs and lighthouses will be established to lead the transition towards healthy soils by 2030[131]. Thanks to R&I, farming systems will also maximise the provision of a wide range of ecosystem services from more sustainably managed EU agro-ecosystems and landscapes and help reverse the loss of biodiversity while ensuring resilient primary production (Destination '*Biodiversity and ecosystem services*'). R&I under the Destination '*Land, ocean and water for climate action*' will better equip farmers to make a significant contribution to climate-neutrality and become more resilient to climate change. Farmers will be empowered and interconnected by means of advanced digital and data technologies (e.g. AI, IoT, and robotics) that support sustainable farming approaches (Destination '*Innovative governance, environmental observations and digital solutions in support of the Green Deal*'). New sustainable business models and strengthened EU quality schemes will improve the position of farmers in value chains and enable them to seize opportunities provided by the green transition (Destination '*Resilient, inclusive, healthy and green rural, coastal and urban communities*'). Effective agricultural knowledge and innovation systems (AKIS) will speed up innovation and the uptake of R&I results from farm to fork (Destination '*Innovative governance, environmental observations and digital solutions in support of the Green Deal*').

Better evidence-based knowledge and analytical capacity will help policymakers develop and implement effective policies, in particular the CAP post 2027, the contingency plan and sustainable food systems framework law, enabling farmers to transition to sustainable and resilient farming and food systems (Destination '*Innovative governance, environmental observations and digital solutions in support of the Green Deal'*). Furthermore, knowledge and innovative solutions generated under Horizon Europe will be circulated and tested in local innovation projects and networks that are financed by rural development programmes, and

130 https://eur-lex.europa.eu/resource.html?uri=cellar:13dc912c-a1a5-11eb-b85c-01aa75ed71a1.0003.02/DOC_1&format=PDF

131 https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/soil-health-and-food_en

which are managed by the European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI).

Sustainable fisheries and aquaculture contribute directly to environmentally friendly, resilient, inclusive, safe and healthy food production by providing highly nutritional proteins, lipids and micronutrients for a healthy diet. Sustainable aquatic production can and should account for a much bigger proportion of our overall food consumption. Following the farm to fork strategy, production methods should make the best use of nature-based, technological, digital and space-based solutions, optimising the use of inputs (e.g., nutrients and antimicrobials), therefore increasing climate-neutrality and resilience and safeguard aquatic biodiversity. R&I in fisheries and aquaculture will contribute to the relevant Food 2030 pathway for action 'food from oceans and freshwater resources'[132]. It will support the 'strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030', that propose specific actions on, e.g. i) access to space and water, ii) human and animal health, iii) environmental performance, iv) climate change, v) animal welfare, vi) the regulatory and administrative framework, and vii) communication on EU aquaculture. In addition, the new EU algae initiative - to unlock the full potential of sustainable algae-based food and alternative feed sources - can support the transition to sustainable food systems. R&I will also contribute to the success of the common fisheries policy and deliver compliant, inclusive, diversified ecosystem-based fisheries approaches to allow fisheries management to adapt to different realities, including in the international context. The destination will also support the new policy initiative on the sustainable blue economy and its offshoot initiatives, including the Sustainable Blue Economy Partnership.

R&I will help fisheries and aquaculture become more precise, technologically advanced, and fully embedded in the natural and socio-ecological context including by reducing the footprint on aquatic biodiversity. It will better equip fisheries and aquaculture to become more resilient to the adverse consequences of climate change and to make a significant contribution to climate neutrality. It will enable the European aquaculture industry to achieve its full potential to ensure global food security in terms of volume, methods, variety of species, aquatic species welfare, safety and quality of products and services.

R&I will help to provide a better understanding of the impacts of climate change in terms of habitat change and ecological functioning and the consequent repercussions on stock shifts, species composition, health, and altered growth and reproduction rates. This will help in the adaptation of fishing vessels, fishing gear and catch methods to reduce their carbon footprint as well as help in their adaptation to the changing climate regime. It will also enable aquaculture to: i) become more sustainable – by using resources in a highly efficient manner - and climate-neutral; and ii) adapt to a changing climate and its consequences, such as temperature rise, acidification, altered water quality and availability, extreme weather events, and other emerging risks, notably in geographical areas particularly vulnerable to climate change impacts such as the EU's outermost regions (defined in article 349 TFEU).

[132] https://op.europa.eu/en/publication-detail/-/publication/86e31158-2563-11eb-9d7e-01aa75ed71a1

Sustainable, healthy and inclusive food systems rely on systemic, cross-sectoral and participatory, multi-actor approaches and on integration between policy areas at all levels of governance. Food systems are to be understood as covering, 'from farm to fork', all the sectors, actors and disciplines relevant to and connecting i) environment protection requirements, ii) natural resources, iii) primary production on land and at sea, iv) food processing and packaging, v) food distribution and retail, vi) food services, vii) food consumption, viii) food safety, ix) nutrition and public health, and x) food waste streams. An important driver for transforming food systems should be the integration of sectors, actors and policies[133]. This should occur in order to better understand the multiple interactions between the actors and components of current food systems, the lock-ins and potential leverage points for synergistic changes and of the interdependencies of outcomes (linkages between nutritional climate and sustainability outcomes). Such implementation/approaches can provide solutions that maximise co-benefits with respect to the four priorities of the Commission's Food 2030 R&I initiative:

- nutrition and health, including food safety;
- climate and environmental sustainability;
- circularity and resource efficiency;
- innovation and empowering communities.

This destination will deploy solutions to the 10 Food 2030 pathways for action[134] and will help build innovation ecosystems to bring together relevant public and private sector actors, researchers and society. R&I will provide food-related businesses, including those involved in food processing and packaging, retail, distribution, and food services, with opportunities and incentives to stimulate environmentally friendly, healthy, circular and diversified practices, products and processes that are biodiversity-friendly, climate-neutral and less reliant on fossil fuels. It will also help devise tools and approaches that enable the shift to healthy, sustainable diets and responsible consumption for everyone, boosted also by social innovation, technology, behavioural change and marketing standards, and by inclusively engaging with different consumers, citizens and communities. R&I will accelerate the transition to sustainable, healthy and inclusive food systems by:

- eradicating micronutrient deficiencies in vulnerable population groups;
- developing new high quality, healthy, minimally processed and sustainable food products and processes;
- assessing innovative and novel foods based on sustainable alternatives sources of proteins;

133 Scientific Advice Mechanism, Towards a sustainable food system - Publications Office of the EU (europa.eu)

134 https://op.europa.eu/en/publication-detail/-/publication/86e31158-2563-11eb-9d7e-01aa75ed71a1

- preventing and reducing food loss and waste to tackle environmental and climate challenges, including through improved marketing standards;
- unlocking and maximising the potential of the microbiome to improve food safety, fight food waste and develop alternative sources of proteins;
- networking and exchanging knowledge on food fraud and food safety and exploring the influence of climate change on food safety;
- developing new strategies and detection methods on products derived from new genomic techniques, and strengthening the resilience of European food systems;
- promoting citizen science and creating smart tools to improve diets.

R&I will also:

- reduce the environmental impacts of and pollution from food value chains (see Destination '*Clean environment and zero pollution*');
- help transform urban food systems, including via the use of nature-based solutions in the context of the New European Bauhaus initiative (see Destination '*Resilient, inclusive, healthy and green rural, coastal and urban communities*'); and
- improve the governance of food systems and further develop digital and data-driven innovation ecosystems for sustainable, healthy and inclusive food systems (see Destination '*Innovative governance, environmental observations digital solutions in support of the Green Deal*').

In addition, R&I under the **partnership on 'Sustainable food systems for people, planet and climate'** will accelerate the transition towards sustainable, healthy and inclusive food systems in Europe and beyond via EU-wide targeted research and innovation. It will help to close knowledge gaps, increase health and food literacy, and deliver innovative solutions, e.g. social innovation, which provide co-benefits for nutrition, the environment, climate, circularity and communities. It will also leverage investments and align multiple actors towards common goals and targets and help further build up the European Research Area in order to support the transformation of sustainable food systems at various scales from local to global.

The EU also aims to promote a ***global transition to sustainable food systems***. It's relationship with Africa is a key priority. Targeted R&I activities, in particular under the EU-Africa Partnership on Food and Nutrition Security and Sustainable Agriculture (FNSSA) and global initiatives involving international research consortia, will help achieve this ambition and contribute to the AU-EU High Level Policy Dialogue (HLPD) on Science, Technology and Innovation.

In line with the farm to fork strategy, and its promotion of global transitions on sustainable food systems, a comprehensive and integrated response to current and future challenges

benefiting people, nature and economic growth in Europe and in Africa will be provided. Advances will be made particularly in the following key areas: agroecology, including agroforestry, food safety and fair trade.

In encouraging multi-actor approaches and to be more effective in achieving impact, the proposals in this destination shall, where relevant, be complementary or build on synergies with the activities of the EIT Knowledge and Innovation Communities, such as EIT Food.

Where appropriate, proposals are encouraged to cooperate with actors such as the European Commission Knowledge Centre for Global Food and Nutrition Security[135] and the Africa Knowledge Platform[136], also for the purpose of dissemination and exploitation of results.

Expected impact

Proposals for topics under this destination should set out a credible pathway contributing to **fair, healthy, safe, climate- and environment-friendly, sustainable and resilient food systems from primary production to consumption, ensuring food and nutrition security for all within planetary boundaries** in Europe and across the world.

More specifically, proposed topics should contribute to one or more of the following impacts:

- enable **sustainable farming systems** that i) provide consumers with affordable, safe, healthy and sustainable food, ii) increase the provision of ecosystem services, iii) restore and strengthen biodiversity, iv) minimise pollution and pressure on ecosystems and greenhouse gas emissions, v) foster plant, animal and public health, vi) improve animal welfare, and vii) generate fair economic returns for farmers;

- enable **sustainable fisheries and aquaculture,** in marine and inland waters**,** increasing aquatic multi-trophic biomass production in a way compatible with the protection of aquatic ecosystems and biodiversity, and the diversification of fisheries and aquaculture products, for fair, healthy, climate-resilient and environment-friendly food systems with a lower impact on aquatic ecosystems and improved animal welfare;

accelerate the transition to **sustainable, healthy and inclusive food systems,** delivering co-benefits for climate change mitigation and adaptation, environmental sustainability and circularity, sustainable healthy diets and nutrition, food poverty reduction, empowered citizens and communities, and flourishing food businesses, while ensuring food safety and the economic sustainability of EU food systems during the transition.

The following call(s) in this work programme contribute to this destination:

Call	Budgets (EUR million)		Deadline(s)
	2023	2024	

135 https://knowledge4policy.ec.europa.eu/global-food-nutrition-security_en
136 https://africa-knowledge-platform.ec.europa.eu/

HORIZON-CL6-2023-FARM2FORK-01	196.50	92.50	12 Apr 2023
HORIZON-CL6-2024-FARM2FORK-01		95.00	22 Feb 2024
HORIZON-CL6-2024-FARM2FORK-02		69.00	22 Feb 2024 (First Stage) 17 Sep 2024 (Second Stage)
Overall indicative budget	196.50	256.50	

Call - Fair, healthy and environmentally-friendly food systems from primary production to consumption

HORIZON-CL6-2023-FARM2FORK-01

Conditions for the Call

Indicative budget(s)[137]

Topics	Type of Action	Budgets (EUR million)		Expected EU contribution per project (EUR million)[138]	Indicative number of projects expected to be funded
		2023	2024		
Opening: 22 Dec 2022 Deadline(s): 12 Apr 2023					
HORIZON-CL6-2023-FARM2FORK-01-1	COFUND	30.00	30.00	Around 60.00	1
HORIZON-CL6-2023-FARM2FORK-01-10	RIA	9.00		Around 9.00	1
HORIZON-CL6-2023-FARM2FORK-01-11	RIA	10.00		Around 5.00	2
HORIZON-CL6-2023-FARM2FORK-01-12	CSA	2.00		Around 2.00	1
HORIZON-CL6-2023-FARM2FORK-01-13	RIA	7.00		Around 7.00	1
HORIZON-CL6-2023-FARM2FORK-01-14	RIA	10.00		Around 5.00	2
HORIZON-CL6-2023-	RIA	8.00		Around	1

137 The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.

138 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

FARM2FORK-01-15				8.00	
HORIZON-CL6-2023-FARM2FORK-01-16	IA	10.00		Around 5.00	2
HORIZON-CL6-2023-FARM2FORK-01-17	CSA	4.00		Around 4.00	1
HORIZON-CL6-2023-FARM2FORK-01-18	CSA	4.00		Around 4.00	1
HORIZON-CL6-2023-FARM2FORK-01-19	IA	7.00		Around 7.00	1
HORIZON-CL6-2023-FARM2FORK-01-2	COFUND	20.00	40.00	Around 60.00	1
HORIZON-CL6-2023-FARM2FORK-01-20	RIA	10.00		Around 5.00	2
HORIZON-CL6-2023-FARM2FORK-01-3	CSA	8.00		Around 4.00	2
HORIZON-CL6-2023-FARM2FORK-01-4	CSA	1.00		Around 1.00	1
HORIZON-CL6-2023-FARM2FORK-01-5	RIA	12.00		Around 6.00	2
HORIZON-CL6-2023-FARM2FORK-01-6	RIA	5.00		Around 5.00	1
HORIZON-CL6-2023-FARM2FORK-01-7	IA	12.00		Around 6.00	2
HORIZON-CL6-2023-FARM2FORK-01-8	IA	5.00		Around 5.00	1
HORIZON-CL6-2023-FARM2FORK-01-9	COFUND	22.50	22.50	Around 45.00	1
Overall indicative budget		196.50	92.50		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General Annex A.
Eligibility conditions	The conditions are described in General

	Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Enabling sustainable farming systems

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-FARM2FORK-01-1: European partnership on accelerating farming systems transition – agroecology living labs and research infrastructures

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 60.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 60.00 million.
Type of Action	Programme Co-fund Action
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: The funding rate is 50% of the eligible costs. This is justified by the pooling of proposers' in-kind contributions and in-house activities and by the nature of activities to be performed. Beneficiaries may provide financial support to third parties. The support

	to third parties can only be provided in the form of grants. As financial support provided by the participants to third parties is one of the primary activities of the action in order to be able to achieve its objectives, the EUR 60 000 EUR threshold provided for in Article 204(a) of the Financial Regulation No 2018/1046 does not apply. The maximum amount to be granted to each third party is EUR 10 000 000 for the whole duration of Horizon Europe.
Total indicative budget	The total indicative budget for the duration of the partnership is EUR 150 million.

Expected Outcome: In line with the European Green Deal, this partnership will contribute to the objectives and targets of the new common agricultural policy (CAP), and of the EU farm to fork strategy for a transition to fair, healthy, environmentally-friendly and more resilient food systems from primary production to consumption, and in particular pursuing the ambition to boost agroecology. Moreover, the Commission Communication 'Safeguarding food security and reinforcing the resilience of food systems'[139] highlights innovation through agroecology as one of the tools that can mitigate pressure on input costs without hurting production capacity, leading to long-term progress in productivity. Agroecology is a dynamic and holistic approach that contributes positively to healthier ecosystems and biodiversity, including in soils. Agroecology aims at supporting the transition of agri-food systems towards more sustainable practices by connecting science, practice and society and by triggering the adoption of a set of policies to promote sustainable agricultural practices. Given the potential of agroecology to deliver positive impacts for the transition towards environmental, climate, economic and social sustainability of Europe's farming systems, the partnership will deliver solutions that will support the implementation of several other European Green Deal strategies and initiatives, notably: the EU biodiversity strategy for 2030; the action plan for the development of organic production; the EU zero pollution action plan; the 2030 climate target pact; the EU soil strategy for 2030, the sustainable carbon cycles, and the EU bioeconomy strategy. The partnership will constitute a unique instrument that will help connect agroecological research across Europe. Its expected outcomes will contribute to the impacts of various Destinations under Cluster 6 of Horizon Europe, notably Destination 'Fair, healthy and environmentally-friendly food systems from primary production to consumption', as well as to the Sustainable Development Goals (SDGs), in particular SDGs 2, 3, 6, 12, 13 and 15.

The partnership's activities are expected to contribute to all of the following expected outcomes:

- Increased capacities of farmers and actors of the land-based primary production value chains across Europe to implement agroecological practices that contribute to sustainable

139 https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/safeguarding-food-security-reinforcing-resilience-food-systems.pdf

ecological, climate, environmental and productivity impacts, and to inclusive, competitive and resilient agri-food systems.

- A Europe-wide network of existing and new agroecology living laboratories and research infrastructures is set. Knowledge sharing and multi-stakeholder co-creation of agroecological innovations at various scales is ensured. A framework for data management, indicators, and tools to monitor agroecology transition is put in place.

- A robust European R&I system for agroecology integrating science and practice is put in place. The direction for expanding existing and building up new collaborations, boosting knowledge creation and sharing, and co-creating place-based and tailored solutions through agroecology living laboratories ('living labs') and research infrastructures is set. The understandings of the technical and socio-economic performance and the uptake of agroecology in Europe are improved.

- The science-policy dialogue on agroecology is strengthened. Scientific support and technical demonstrations for the development, implementation, monitoring and evaluation of relevant EU policies is provided. Evidence-based, systems-oriented and transformative governance and policy-making are supported.

- EU and national/regional agroecological research and innovation agendas from the EU and Member States and Associated Countries are complementary, leading to the co-creation and implementation of a long-term pan-European strategic research and innovation agenda.

Scope: The European partnership on 'Accelerating farming systems transition: agroecology living labs and research infrastructures' is one of the actions included in the farm to fork strategy, which calls for the promotion of agroecology as one of the sustainable farming approaches with capacity to help meet the European Green Deal objectives in relation to agri-food systems. Living laboratories are multi-stakeholder, real-life settings that place the user at the centre of innovation and operate as instruments for farmers, research organisations, companies, citizens, local and regional authorities, etc., for the co-creation of solutions following a multi-method approach. Agroecology living labs are characterised by very strong local embeddedness, multi-stakeholder involvement by a large diversity of origins, and knowledge intensiveness in the pursuit of and the innovations needed and produced. They can operate at different scales: typically farm, landscape or regional levels. Research infrastructures provide a wide range of services for research communities working in a long-term perspective.

The partnership should coordinate research and innovation programmes on agroecology between the EU and its Member States and Associated Countries and trigger combined actions. It should mobilise key partners and stakeholders, including ministries, funding agencies, research performing organisations, regions, local authorities, research infrastructures, living laboratories, farmers, advisors, industry, consumers, etc.

The partnership's co-created Strategic Research and Innovation Agenda (SRIA) should include calls for research projects and activities to boost place-based and multi-stakeholder co-creation of solutions. As such, it should boost fundamental research on agroecology through to applied research, and should give rise to ready-to-use solutions for scaling up in real-life environments. The partnership should cover issues pertaining to the transition to agroecology in all agricultural production systems, including but not limited to conventional agriculture, organic farming, agroforestry, permaculture, regenerative agriculture, urban farming, etc. Ultimately, the partnership should significantly contribute to filling existing knowledge gaps on agroecology, addressing geographical/territorial specificities in the EU and Associated Countries.

Delivering on the partnership's ambitions requires the implementation of the following portfolio of activities to be achieved during the partnership's lifetime:

- Support transnational research and innovation activities, as defined in its SRIA, on the challenges and potential of agroecology in addressing biophysical, climate, social and economic dimensions of sustainability, as well as for reducing environmental impact and resource use, at farming, local environment and broader societal levels. This should include supporting research in and on agroecology living labs as tools to foster agroecology transition.

- Build a European network of new and existing living labs and research infrastructures for knowledge sharing and co-creation of agroecology innovations, at various scales. The network will constitute a key platform for the development and co-creation of innovations to address the technical, economic, institutional and policy-related challenges of agroecology transition for both individuals and collectives across Europe.

- Improve access to and use of services provided by research infrastructures and other relevant initiatives, for long-term measurement, observation and experimentation in support of agroecology.

- Improve the sharing and access to knowledge and innovation on agroecology, and improve the capacities of farmers and actors of the agri-food chain to take up agroecology innovations, as well as reinforce the agricultural knowledge and innovation systems for agroecology across Europe, considering culture, gender, and youth aspects.

- Build a monitoring and data framework with indicators and tools to monitor and measure the progress of agroecology transition, its social, economic, environmental and climate performances and impacts, and improve data valorisation and sharing.

- Put in place robust mechanisms for science-policy dialogue to support the development, implementation, monitoring and evaluation of policies (research and sectorial) with a view to contributing to improved governance and policies, as well as institutions that are better equipped to support agroecological transition.

- Design and implement communication, knowledge sharing and dissemination activities to improve stakeholder and wider public engagement in agroecology transition.

The partnership is open to all EU Member States, as well as to Countries Associated to Horizon Europe. Partners are expected to provide financial and/or in-kind contribution, in line with the level of ambition of the proposed activities. The partnership should be open to include new partners over its lifetime. Its governance should allow for engaging a broad range of stakeholders, together with the full members of the partnership. Guidelines, standards and legislation in the field should be taken into consideration, to facilitate the marketing of the methods and products developed in the partnership.

To ensure that all work streams are coherent and complementary, and to leverage knowledge and innovation investment potential, the partnership is expected to foster close cooperation and synergies with the Horizon Mission 'A Soil Deal for Europe', with the existing European Partnership Biodiversa+, and with other relevant future partnerships, in particular Sustainable food systems, Agriculture of data, and Animal health and welfare.

Cooperation with the JRC may be envisaged, in particular for actions related to monitoring and measuring progress of agroecology transition, as well as for improving data valorisation. The JRC may provide expertise on EU-wide data and indicators to monitor agroecology transition.

The partnership should allocate resources to cooperate with existing projects, initiatives, platforms, science-policy interfaces, and/or institutional processes at EU level, and at other levels where relevant to the partnership's goals.

Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties. The partnership will provide financial support to third parties as one of the means to achieve its objectives. To explore the full range of financing options available under Horizon Europe, the general annexes of the main Work Programme setting out the general conditions applicable to calls and topics for grants should be considered.

To achieve the international cooperation objectives, and given the global dimension of agroecology, collaboration with strategic third country partners with proven added value in the field of agroecology transition is strongly encouraged. In particular, the participation of legal entities from international countries and/or regions, including those not automatically eligible for funding, is encouraged in the joint calls and/or in other activities of the partnership. Cooperation with international organisations may be considered.

Applicants are expected to describe in detail how they would carry out this collaborative work in practice.

Efforts should be made to ensure that the data produced in the context of this topic is FAIR (Findable, Accessible, Interoperable and Re-usable).

This topic should involve the effective contribution of social sciences and humanities disciplines.

In order to enhance the societal impact of the activities, the approach should empower citizens to contribute to the co-design/co-creation/co-assessment of research and innovation agendas/contents/outcomes.

Cross-articulation with the other data spaces, and notably with the European Open Science Cloud should be foreseen, exploiting synergies and complementarities of the different approaches.

The Commission envisages to include new actions in future work programme(s) to continue providing support to the partnership for the duration of Horizon Europe.

The expected duration of the partnership is seven to ten years.

HORIZON-CL6-2023-FARM2FORK-01-2: European partnership on animal health and welfare

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 60.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 60.00 million.
Type of Action	Programme Co-fund Action
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: The funding rate is 50% of the eligible costs. This is justified by the pooling of proposers' in-kind contributions and in-house activities and by the nature of activities to be performed. Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. As financial support provided by the participants to third parties is one of the primary activities of the action in order to be able to achieve its objectives, the EUR 60 000 EUR threshold provided for in Article 204(a) of the Financial Regulation No 2018/1046 does not apply. The maximum amount to be granted to each third party is EUR 10 000 000 for the whole duration of Horizon Europe.
Total indicative budget	The total indicative budget for the duration of the partnership is EUR 180 million.

Expected Outcome: In line with the European Green Deal, this partnership will contribute to the objectives and targets of the new common agricultural policy (CAP) and the EU farm to fork strategy, for a transition to fair, healthy and resilient animal production systems, including the reduction of anti-microbial usage and improvement of animal welfare. A successful proposal will support research and innovation to help policy makers, animal health industry and other relevant actors to provide society with reassurance on the prevention and control of infectious animal diseases with appropriate means, where antimicrobials are prudently used, where animal welfare is respected and improved, thus contributing to sustainable animal farming and harvesting and the protection of public health and the environment.

The expected outcomes of the topic will also contribute to other impacts of Destination 'Fair, healthy and environmentally-friendly food systems from primary production to consumption', as well as to the Sustainable Development Goals (SDGs), in particular SDGs 2, 3, to the One Health approach and to the CAP. It will contribute to the climate adaptation strategy, by fostering adaptation to climate change of livestock production.

The partnership is expected to contribute to all the following expected outcomes:

- Animal health and welfare research and innovation agendas from the EU and Member States and Associated Countries are complementary, leading to the co-creation and implementation of a long-term pan-European strategic research and innovation agenda, strengthening the European Research Area in the area of animal health and welfare.
- A robust European R&I system for animal health and welfare is put in place. The direction for expanding existing collaborations and building up new ones, boosting knowledge creation and sharing, is set.
- The animal health and welfare research community at large benefit from and use an improved comprehensive knowledge framework integrating relevant EU, national/regional data and information infrastructures to improve transnational research.
- Preparedness against upcoming and emerging threats to animal health, including zoonoses and vector-borne diseases, is strengthened for both animals and humans.
- Animal welfare is promoted and strengthened, including adaptation to climate change.
- Farmers, the veterinary profession and other actors in animal production have increased access to innovative methodologies and products for animal infectious diseases and animal welfare monitoring and control.
- Increased evidence-base is provided to animal health and welfare policymakers.

Scope: The partnership should coordinate research programmes and activities on animal health and welfare between the EU and its Member States and Associated Countries and trigger combined action.

It should mobilise key partners and stakeholders, including ministries, funding agencies, research performing organisations, research infrastructures, farmers, industry, etc.

The partnership should address terrestrial livestock and aquatic animals. Wildlife and companion animals will be addressed when there is a potential threat to public health or health of production animals.

The partnership's co-created strategic research and innovation agenda should include calls for research projects, as well as integrative activities. As such, it should boost fundamental research through to applied research, and should give rise to ready-to-use solutions, seek uptake of results and provide science-based policy advisory activities.

Delivering on the partnership's ambitions requires the implementation of the following portfolio of activities to be achieved during the partnership's lifetime:

- To support transnational research and innovation activities, as defined in its Strategic Research and Innovation Agenda (SRIA).
- To facilitate the cooperation between all major actors on the monitoring, prevention and control of animal infectious diseases and on animal welfare issues. Actions will be undertaken to strengthen alignment of research and innovation programs and joint integrative activities among research performing organisations and other actors and stakeholders to organise education and training activities, mobility schemes, networking; to optimise research infrastructures and resources, including networking.
- To boost research and to increase the evidence-base to develop products, indicators and tools for monitoring, control and improvement of animal health and animal welfare from farming to slaughtering, notably through joint research activities organised both among research performing organisations in the partnership and through launching open joint calls.
- To support surveillance, detection, risk assessment and alert communication, prevention, including selective breeding for relevant phenotypes and feeding supporting health and welfare, interventions including vaccines and treatments, socio-economic assessment on animal health and welfare.
- To enhance cross-sector cooperation and collaboration to prevent the spill-over of pathogens between animals, food, the environment and humans in a One Health perspective. The partnership will contribute to a multidisciplinary approach across sectors dealing with animal health and animal welfare, public health, food safety and the environment, including adaptation to climate change, in particular regarding zoonoses and antimicrobial resistance.
- To ensure general and targeted communication on the outputs of the partnership and dissemination of its deliverables to partners, policymakers, national and international stakeholders, and all other possible users, to stimulate their uptake and implementation.

- To regularly update the partnership vision and strategy, in particular to address new needs, for instance emergencies, policy implementation, stakeholders' interests, societal demands.

The Partnership is open to all EU Member States, as well as to countries associated to Horizon Europe. Partners are expected to provide financial and/or in-kind contribution, in line with the level of ambition of the proposed activities. The Partnership should be open to include new partners over its lifetime. Its governance should allow for engaging a broad range of stakeholders, together with the full members of the Partnership.

Guidelines, standards and legislation in the field should be taken into consideration, to facilitate the marketing of the methods and products developed in the partnership.

Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties. Financial support provided by the participants to third parties is one of the means of this action to achieve its objectives.

To ensure that all work streams are coherent and complementary, the partnership is expected to foster close cooperation and synergies with the existing European Partnership Biodiversa + and with relevant future European Partnerships, in particular 'agroecology living labs and research infrastructures'[140], 'sustainable food systems for people, planet & climate'[141], 'one health AMR[142]' and 'pandemic preparedness'.

The partnership should allocate resources to:

- Cooperate with existing projects, initiatives, platforms, science-policy interfaces, at EU and other levels, where relevant to the partnership's goals;

- Engage with relevant EU bodies in charge of providing scientific advice for policy making in the area of animal health and welfare, such as the European Food Safety Authority and the European Medicines Agency, and other EU bodies, where relevant to the partnership's goals.

To achieve the international cooperation objectives, and given the global dimension, not least of animal health, collaboration with strategic third country partners with proven added value in the field of animal health and welfare is encouraged. In particular, the participation of legal entities from international countries and/or regions including those not automatically eligible for funding, is encouraged in the joint calls and/or in other activities of the partnership. Cooperation with international organisations may be considered.

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140 HORIZON-CL6-2023-FARM2FORK: European partnership on accelerating farming systems transition: agroecology living labs and research infrastructures

141 HORIZON-CL6-2023-FARM2FORK: European partnership on sustainable food systems for people, plant and climate

142 HORIZON-HLTH-2024-DISEASE-09-01: European Partnership: One Health Anti-Microbial Resistance

Applicants are expected to describe in detail how they would carry out this collaborative work in practice.

Efforts should be made to ensure that the data produced in the context of this topic is FAIR (Findable, Accessible, Interoperable and Re-usable).

Cross-articulation with the other data spaces, and notably with the European Open Science Cloud should be foreseen, exploiting synergies and complementarities of the different approaches.

This topic should involve the effective contribution of social sciences and humanities disciplines.

The Commission envisages to include new actions in future work programme(s) to continue providing support to the partnership for the duration of Horizon Europe.

The expected duration of the partnership is seven to ten years.

HORIZON-CL6-2023-FARM2FORK-01-3: Improving yields in organic cropping systems

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 8.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the

	Research and Training Programme of the European Atomic Energy Community (2021-2025). [143].

Expected Outcome: A successful proposal should support the objectives of the farm to fork strategy to transition to fair, healthy and environmentally-friendly food systems from primary production to consumption, notably the objective to promote and increase organic farming[144] in Europe, in line with the farm to fork and biodiversity strategies' target of at least 25% of the EU's agricultural land under organic farming by 2030 and a significant uptake of agroecological practices. Activities will support the implementation of specific actions in the action plan for the development of organic production[145]. Given the potential of organic farming to contribute to the EU's climate ambition, this topic will contribute to the objective of a climate-neutral land sector by 2035 and a climate-neutral economy by 2050.

Project results are expected to contribute to all of the following expected outcomes:

- Increased and accelerated availability, accessibility and adoption of strategies and approaches that improve yields of crops grown under organic conditions, including organic-targeted plant breeding
- Enhanced climate, environmental and economic performance of organic farming systems
- Increased networking and knowledge exchange among all relevant actors in the Member States and Associated Countries, contributing to a strengthened research and innovation ecosystem of organic production in Europe
- Provision of data, scientific support and recommendations for the development, implementation and evaluation of EU policies and initiatives relevant for organic production

Scope: Promoting the use of more sustainable farming practices is a EU policy objective enshrined in the European Green Deal and its related strategies. Boosting organic farming, one of the objectives of the farm to fork and of the EU biodiversity strategies, can greatly contribute to achieving this ambition. Moreover, the Communication 'Safeguarding food security and reinforcing the resilience of food systems'[146] highlights the role that organic farming can play in reducing EU's dependence on external inputs.

Reaching at least 25% of the EU's agricultural land under organic farming will require among other elements, a significant increase in current conversion rates. One of the obstacles that hinders conversion to organic farming is the fact that several crops grown under organic

143 This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

144 https://eur-lex.europa.eu/eli/reg/2018/848/oj

145 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0141R%2801%29

146 https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/safeguarding-food-security-reinforcing-resilience-food-systems.pdf

conditions achieve lower yields per hectare as compared with those produced under conventional farming practices. Closing the yield gap is therefore important in order to further improve the economic competitiveness and resilience of the sector, as well as to increase farmers' adoption of organic production

At the same time, closing of the yield gap should not compromise the principles and objectives of organic farming, in particular with regard to the recycling of nutrients. Moreover, it is important that approaches and strategies aiming at bridging the yield gap in organic farming are holistic and take into consideration the implications on the entire farming system.

By using a participatory approach, proposals should set up a European-wide network of testing, experimentation and demonstration sites to test, co-create and showcase practices and strategies that improve yields of crops produced under organic conditions. In this context, proposals should:

- Identify the most relevant crops in organic production for which yields can be sustainably improved in the short term, and propose crop-specific strategies with due attention to local and site-specific practices. This should consider cost-effectiveness analysis comparing with conventional farming production, in order to evaluate the economical sustainability of the strategies proposed.

- Give due attention to holistic approaches, such as those that contribute to improving organic-tailored plant varieties and appropriate use of breeds and varieties, and building soil fertility and optimal nutrient management (e.g., integrated plant-animal production systems, use of manure as fertiliser, nutrient recycling, introduction of crop rotations and intercropping, use of leguminous crops, circular approaches for maintaining and increasing soil organic matter, locally-specific optimization of water use, etc.). Nursery techniques for the production of suitable organic plant reproductive material should also be considered.

- Organise and implement advisory activities, exchange of knowledge and best practices as well as dissemination of results, including the development of practical guidelines and decision-support tools for farmers. These activities should also engage farmers involved in low-input farming, agro-ecological or circular farming, to facilitate cross-fertilisation and mutual learning.

- Identify remaining gaps (including normative gaps where relevant) and prepare a research and innovation roadmap to boost yields of crops produced under organic conditions. For these activities, proposals should ensure collaboration with relevant activities carried out under other actions in Horizon Europe, and ensure coherence with and contribution to the Strategic Research and Innovation Agenda of the future partnership ''Accelerating farming systems transition: agro-ecology living labs and research infrastructures'' and its successive updates.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of the main stakeholders (farmers, breeders, researchers, advisors, industry, etc.). Proposals should cover a representative range of pedo-climatic conditions across Europe and a wide range of crops (arable and perennial) reflecting the diversity of the European organic plant production sector. Proposals should ensure synergies and build on the results from previous and/or ongoing research projects. Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic, and ensure synergy with relevant activities carried out under other initiatives in Horizon Europe, including under the topic HORIZON-CL6-2023-GOVERNANCE: 'Developing an EU advisory network on organic agriculture', HORIZON-CL6-2024-GOVERNANCE: 'Organic farming thematic network to compile and share knowledge ready for practice', and the future partnership 'Accelerating farming systems transition: agroecology living labs and research infrastructures'. In order to better address some or all of the expected outcomes, as well as to promote learning and cross-fertilisation with activities carried out outside of Europe, international cooperation is encouraged.

HORIZON-CL6-2023-FARM2FORK-01-4: Towards research and innovation beyond farm to fork strategy targets for pesticides after 2030

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 1.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 1.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the

	Research and Training Programme of the European Atomic Energy Community (2021-2025). [147].

Expected Outcome: The successful proposal should support the implementation of the farm to fork strategy, the EU biodiversity strategy for 2030 and the EU climate policy under the European Green Deal. Activities will contribute to the transition to fair, healthy and environmentally friendly food systems from primary production to consumption, notably the target to reduce by 50% the overall use and risk of chemical pesticides and reduce the use by 50% of the more hazardous pesticides.

Project results are expected to contribute to all of the following expected outcomes:

- Improved understanding of main knowledge gaps as well as of drivers and barriers to go beyond the farm to fork targets for chemical pesticides;
- Increased networking and knowledge exchange across Europe promoting a reduction in pesticide use and risk beyond the farm to fork targets;
- Research needs for further reductions or phasing out chemical pesticides in agriculture are identified.

Scope: The use of chemical pesticides in agriculture harm non-target organisms including humans, contaminates the soil, water and the wider environment, and cause biodiversity decline in agricultural areas. The European Green Deal has set new targets and defined a roadmap to reach its objectives through multiple strategies and action plans, including the farm to fork and the EU biodiversity strategy for 2030. Ambitious targets have been set for agriculture, namely the goal of reducing by 50% the use and risks of chemical pesticides, as well as the use of more hazardous pesticides, by 2030.

Research has shown that well-designed integrated pest management programmes can control weeds and pests in an ecologically friendly manner; however, today's farming still relies significantly on chemical treatments to ensure farm yields and profits. A key challenge is to assess the impact on sustainability (environmental, social, economic) of going beyond these 2030 targets of pesticide reduction aiming for further reductions or even phasing out chemical pesticides in EU agriculture, starting with the most hazardous ones, while sustainably coping with the consequences of climate change, such as heat, drought and extreme precipitation, or pressure from invasive pests and diseases. In order to achieve this, a stronger R&I ecosystem should be put in place that would be able to contribute with sustainable solutions, assess the challenges of further reductions or phasing out chemical pesticides on food systems, including food security and affordability, and connect the different ongoing efforts and initiatives.

Proposals should:

[147] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

- Establish a network that promotes close cooperation among relevant research and innovation actors (including social sciences) and networks across the EU and Associated Countries;

- Provide a comprehensive analysis and understanding of knowledge gaps and new research paradigms to be addressed towards a sustainable (and beyond farm to fork targets) agriculture;

- Identify, map and foster pesticide use and risk reduction related activities in the EU, Associated Countries and worldwide, including programmes and demonstration facilities, all along the agri-food chain;

- Identify the challenges and opportunities for primary producers and other actors of the agri-food chain to drive the transition towards a sustainable (and beyond farm to fork targets) agriculture;

- Provide recommendations on the future research needs in agricultural sciences, as well as in technical, social, economic and policy sciences, aiming for further reductions or phasing out chemical pesticides in agriculture taking in consideration climate change, increased pressure from pests and diseases, and other challenges.

Proposals should consider arable and perennial crops. Proposals should build and capitalise on the outcomes of other relevant EU-funded research projects and initiatives under Horizon 2020 [148], Horizon Europe [149], and other programmes/initiatives (such as COST actions, PRIMA). Activities should ensure alignment and complementarity with those carried out under the future partnership 'Accelerating farming systems transition: agroecology living labs and research infrastructures' and the European Mission 'A Soil Deal for Europe". Proposals must implement the 'multi-actor approach' including a range of actors to ensure that knowledge and needs from various sector, researchers, farmers, advisory services, agri-food industries, consumers and NGOs are brought together.

HORIZON-CL6-2023-FARM2FORK-01-5: Advancing vaccine development for African swine fever

Specific conditions	
Expected EU contribution per	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately.

[148] Horizon 2020 projects: SPRINT (Grant agreement ID: 862568), IWMPRAISE (Grant agreement ID: 727321), NOVATERRA (Grant agreement ID: 101000554), WeLaser (Grant agreement ID: 101000256), Bioschamp (Grant agreement ID: 101000651), novIGRain (Grant agreement ID: 101000663)

[149] Projects under the following Horizon Europe topics: HORIZON-CL6-2022-FARM2FORK-01-02: Socio-economics of pesticide use in agriculture, HORIZON-CL6-2023-GOVERNANCE-01-21: Developing EU advisory networks to reduce the use of pesticides, HORIZON-CL6-2022-FARM2FORK-02-01-two-stage: Agroecological approaches for sustainable weed management, HORIZON-CL6-2023-FARM2FORK-01-7: Innovations in plant protection: alternatives to reduce the use of pesticides focusing on candidates for substitution.

project	Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Research and Innovation Actions

Expected Outcome: A successful proposal will support research and innovation to help policy makers and economic operators reduce the burden of African swine fever (ASF), thus contributing to a safeguarding animal health and the economic resilience of the sustainable livestock industry.

Activities under this topic will contribute to the following expected outcomes:

- Improved capacity to develop ASF pilot vaccines and their companion DIVA tests for the possible prevention and/or eradication of the disease in domestic pigs and wild boars;
- Vaccination strategies for both wild boar and domestic pigs, addressing different objectives and needs (e.g. eradication in wild boar; emergency or preventive use in domestic pigs).
- Increased international cooperation on a possible ASF vaccine.

Scope: ASF is a devastating viral disease that has showed its potential for very serious and rapid spread, not only in Europe, but throughout the world. It has a serious socio-economic impact on farming sector and is of major importance in the international trade of animals and animal products. While strict control measures including in particular biosecurity, culling of infected pigs, appropriate management of wild-boar populations, have contributed to reduced spread of the disease, concerns are raised on the possibility to eradicate the disease without vaccination in the long-term.

Global research efforts are starting to show some promising results, but further work on the development of effective and safe ASF vaccines is needed, as an additional tool to re-inforce control and eradication strategies currently in place.

All the following elements should be incorporated:

- Address the necessary steps for developing pilot vaccines against ASF for domestic pigs and wild boars;
- Address the necessary steps to develop companion DIVA tests, where feasible.
- Decipher pathogen genetics/genomics and immune response of the host, to develop innovative approaches to African swine fever vaccine development, at least including those virus types circulating in Europe. Study different types of vaccines and modern techniques to develop novel ASF vaccines;

In order to achieve the expected outcomes, international cooperation is encouraged in particular with North America.

The selected project should take into consideration the EU animal health regulatory framework.

Proposals should ensure adequate involvement of stakeholders from the European Medicines Agency, veterinary authorities, farmers and hunters. Involvement of the pharmaceutical industry is highly recommended.

While it is expected that proposals will present innovative approaches to ASF vaccine development, the projects could consider the relevant activities and outputs of past or ongoing EU funded research, such as VACDIVA[150] and DEFEND[151], and of other international projects on ASF vaccine and build on them where appropriate. They should contribute to the relevant objectives of the Star-Idaz International Consortium[152].

HORIZON-CL6-2023-FARM2FORK-01-6: Towards sustainable livestock systems: European platform for evidence building and transitioning policy

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the

150 https://vacdiva.eu/
151 https://defend2020.eu/
152 https://www.star-idaz.net/

	Research and Training Programme of the European Atomic Energy Community (2021-2025). [153].

Expected Outcome: Increasing sustainability, viability and resilience of climate friendly agricultural production are key objectives of the farm to fork strategy. The adoption and enhancement of more biodiversity-friendly farming systems is among the objectives of the EU biodiversity strategy for 2030. In line with these objectives, the successful proposal will support policy makers with science-based evidence on the impacts and externalities of livestock farming as part of the food system and wider ecosystem.

Activities under this topic will contribute to all of the following expected outcomes:

- Assembled collation of comparable and sound data on positive and negative impacts and externalities from the terrestrial livestock sector in accordance with internationally agreed methodology
- Quantitative, qualitative and monetized evidence of the social, economic and environmental impacts and externalities of different livestock production systems (extensive, intensive, organic, different animal species), and their relation to particular food systems (e.g., short supply, circular, market oriented…) as well as trade-offs/synergies assessed at farming and landscape scale
- Recommendations/policy advice on more effective tools in mitigating negative externalities and increasing positive externalities in different terrestrial livestock production systems
- Ensured more intensive and broader communication and dissemination of evidence-based knowledge in the EU and beyond, and make it accessible to all stakeholders groups, citizens and civil society at large.

Scope: The current debate on positive or negative impact and values of animal production is based on abundant contradictory data and on the difficulties in quantifying natural processes linked to agricultural production and land use. Negative and positive impacts and externalities, including potential trade-offs, should be deeply investigated in different types of farming systems, practices and environments. The project will build on a wide range of scientific information, reports, expert opinions and other available material such as databases.

The following elements should be incorporated:

- Provide a comprehensive study on the positive and negative impacts and externalities of terrestrial livestock farming systems in different social, economic and environmental contexts across Europe at farm, landscape and regional levels

[153] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

- Mapping of research and innovation projects as well as complementary initiatives, vision papers and reports on impact and externalities of different terrestrial livestock farming systems (extensive, intensive, organic, different animal species) within different food systems

- Develop methods and indicators to measure the scale, range and degree of identified externalities in different livestock systems

- Generate data on the aggregated effects of environmental, social and economic externalities available to allow the assessment of net global impact. Elaborate potential scenarios at national, regional levels through the use of existing or improved modelling

- Improve the understanding of the co-benefit of livestock systems for biodiversity and ecosystem services, land use/change, circularity, GHG emissions/savings, energy consumption, air/water/soil quality, human diet/health, animal health and welfare, food and nutritional security

- Provide new and improved evidence to support decision makers, public authorities, other organizations and stakeholders in the assessment of the socio-economic and environmental impacts and externalities of terrestrial livestock production systems around Europe, building on the specific elements above

- Communicate sciencebased evidence of the impacts of terrestrial livestock systems on climate, environment, biodiversity and ecosystem services as well as potential for improvement towards sustainable livestock systems. The socio-economic dimension should be considered.

In order to better address some or all of the expected outcomes, international cooperation is encouraged. The project will seek to engage a dialogue with and feed into any relevant structure or organization at European level and beyond such as Standing Committee on Agricultural Research (SCAR) [154] , FAO, Livestock Environmental Assessment and Performance Partnership (LEAP, FAO) [155] , Global Agenda for Sustainable Livestock (GASL)[156], etc.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of the main stakeholders involved in terrestrial livestock production systems and their sustainability (e.g., farmers, advisory services, policy makers, producers, land managers, ecology and nature conservation experts, social scientists and other relevant actors).

This topic should involve the effective contribution of Social Sciences and Humanities (SSH) disciplines.

154 https://scar-europe.org/
155 https://www.fao.org/partnerships/leap/en/
156 http://www.livestockdialogue.org/en/

HORIZON-CL6-2023-FARM2FORK-01-7: Innovations in plant protection: alternatives to reduce the use of pesticides focusing on candidates for substitution

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 6.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 12.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.

Expected Outcome: A successful proposal should support the farm to fork strategy to transition to fair, healthy and environmentally-friendly food systems from primary production to consumption, notably the target to reduce by 50% the overall use and risk of chemical pesticides and reduce the use by 50% of the more hazardous pesticides by 2030.

Project results are expected to contribute to all of the following expected outcomes:

- Increased availability of widely accessible and cost-efficient alternatives for prevention and (bio)control of plant pest with improved environmental performance (e.g., reduced effects on non-target organisms, natural resources, humans and the environment);
- Reduced reliance on hazardous plant protection products and favour low risk plant protection solutions, to sustain crop productivity and food security while contributing to sustainable agriculture and/or forestry;
- Minimized pesticides impact on human and animal health, terrestrial and aquatic ecosystems, drinking water, soils and the food chain.

Scope: The use of chemical pesticides in agriculture contributes to soil, water and air pollution, biodiversity loss and can harm non-target plants, insects, birds, mammals and amphibians. The Commission is taking action to reduce the overall use and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 50% by 2030. Significant

efforts are required to develop alternatives to critical active substances used in plant protection. Active substances with certain properties defined in Regulation (EC) No 1107/2009 are considered as candidates for substitution[157]. For Plant Protection Products (PPPs) containing these active substances, Member States are required, when assessing an application for authorisation, to evaluate if these PPPs can be replaced (substituted) by other adequate solutions (chemical or non-chemical). Proposals should target one or more pesticides candidates for substitution in the EU and those pesticides which have been reported to be losing their efficiency due to the emergence of resistant pests.

Proposals should:

- Develop and test alternative approaches, tools, strategies, agents, and/or substances (either conventional, natural-based, or biological) for prevention (promoting prophylaxis measures) and/or (bio) control of plant pest [158] with improved environmental performance (e.g., reduced effects on non-target organisms, natural resources and the environment) and acceptable efficacy, enlarging the toolbox of integrated pest management (IPM);

- Improve current agronomic, ecological, cultural, and traditional practices to increase the resilience of agricultural production against biotic stresses;

- Assess the social, economic and environmental issues associated with the proposed innovative solution, including trade-offs, the impact on labour, safety culture, and risk management on farms;

- Demonstrate the safety of alternatives in accordance with established scientific risk assessment methodology and relevant EU regulatory frameworks related to their manufacturing and placing on the market.

- Set up demonstration sites in Europe to promote participatory demonstration activities, and the exchange of knowledge and best practices among farmers.

- Support capacity building, training and education enabling farmers/growers to the proposed solution reducing the use and risk of pesticides.

Proposals must implement the ‘multi-actor approach’ including a range of actors to ensure that knowledge and needs from various sectors such as researchers, farmers, advisors, and industry including SMEs are brought together.

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157 These are plant protection products containing active substances that meet the cut-off criteria as set out in points 3.6.2. to 3.6.5 and 3.8.2 of Annex II to Regulation (EC) No 1107/2009 or are identified as candidates for substitution in accordance with the criteria in point 4 of that Annex.

158 A pest is defined here as any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (EU legislation, Regulation 2016/2031)

Where relevant, proposals should seek complementarities and synergies, while avoiding duplication and overlap, with relevant actions funded under Horizon 2020[159]. Proposals should specify how they plan to collaborate with other proposals selected under this and other relevant topics[160], for example by undertaking joint activities, workshops or common communication and dissemination activities. Proposals should allocate the necessary resources to cover these activities.

The possible participation of the JRC in the project will consist of supporting the assessment of the social, economic and environmental issues associated with the proposed innovative solution, including trade-offs, the impact on labour, safety culture, and risk management on farms.

In this topic, the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Enabling sustainable fisheries and aquaculture

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-FARM2FORK-01-8: Using automatic species recognition and artificial intelligence to fight illegal fish discards and revolutionise fisheries control

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Innovation Actions
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.

Expected Outcome: In line with the European Green Deal objectives, both the farm to fork strategy and the common fisheries policy aim to ensure that fishing and aquaculture are ecologically, economically and socially sustainable and provide a source of healthy food for EU citizens. The successful proposals should unequivocally contribute to phase out the practice of discarding unwanted fish and improving catch-reporting data by using automatic species recognition and artificial intelligence to analyse data sources, such as video footage,

[159] Projects from topic SFS-04-2020 - Integrated health approaches and alternatives to pesticide use: NOVATERRA (Grant agreement ID: 101000554), WeLaser (Grant agreement ID: 101000256), Bioschamp (Grant agreement ID: 101000651), novIGRain (Grant agreement ID: 101000663)

[160] For example, HORIZON-CL6-2023-GOVERNANCE-01-21: Developing EU advisory networks to reduce the use of pesticides

rapid DNA-based assays and sensor data in real-time through, for example, internet of things or similar monitoring systems.

To ensure that fisheries are ecologically, economically and socially sustainable and provide a source of healthy food, the EU needs to close the possible loopholes in the legislations that could potentially allow for illegal and unsustainable fishing practices. To be successful, the EU needs to have in place a technologically advanced and effective fisheries monitoring and control system and the digitisation of fisheries is a key element (notably through the use of techniques such as artificial intelligence, sensors and robotics). This objective will also contribute to the headline ambition "A Europe fit for the digital age".

The selected project is expected to contribute to all of the following outcomes:

- Effective methods, tools and systems for species automatic recognition, analysis of Remote Electronic Monitoring video footage, rapid DNA-based assays and sensor data in real-time, and enhanced integration of results into the reporting systems used by fishers to report catches to competent authorities;
- Enhanced capability to monitor and control illegal discarding practices at sea and increased ability by EU Member States to fully implement the Landing Obligation;
- Implementation of ad-hoc sensors for the detection of discards and take advantage of the data from the Copernicus network, namely from its Maritime Surveillance Service;
- Optimal fishing operations and fishing processing and enhanced EU ability to collect, exchange and analyse data;
- Improved monitoring capabilities, including processing activities on board fishing vessels, and ultimately support to a sustainable management of marine biological resources.

Scope: Proposals should develop innovative and cost-effective solutions for automatic species recognition and quantification and assessment of health status of species (e.g., presence of parasites), and automatically analyse Remote Electronic Monitoring video footage, rapid DNA-based assays and sensor data in real-time. They should also develop mechanisms to ensure that the data collected by the cameras and sensors to be automatically analysed cannot be tampered with and that the system can automatically identify cases of system malfunction or missing information. Additionally, proposals should test the suggested solutions in real conditions, including the development of at least three pilot cases in three different European seas. They should also analyse vulnerabilities, dependencies and critical infrastructure in expanding the use of the solutions to Europe and worldwide (e.g., Regional Fisheries Management Organisations and Sustainable Fisheries Partnership Agreements).

Moreover, proposals should investigate possibilities for the integration of the results of the artificial intelligence analyses for the purposes of automated catch recording and reporting recommend effective designs of remote monitoring systems to cover processing activities on board of fishing vessels, and explore the possibilities of the system to contribute to the

identification of parasites in processed fish (e.g. via DNA-based assays). They should also recommend standardised remote electronic monitoring formats for the exchange of the information between different control authorities or to be used for scientific purposes, including standards based on FLUX that could be potentially proposed for recognition by UN/CEFACT.

Also importantly, proposals should analyse how fisheries data, containing private information, can be shared in an anonymized and safe way complying with EU data protection rules (General Data Protection Regulation).

Finally, they should explore and recommend strategies to overcome possible resistance, by all stakeholders/parties, to the implementation of the innovative solutions and propose different ways for effective implementation.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Transforming food systems for health, sustainability and inclusion

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-FARM2FORK-01-9: European partnership on sustainable food systems for people, planet and climate

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 45.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 45.00 million.
Type of Action	Programme Co-fund Action
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: The funding rate is 30% of the eligible costs. Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. As financial support provided by the participants to third parties is one of the

	primary activities of the action in order to be able to achieve its objectives, the EUR 60 000 EUR threshold provided for in Article 204(a) of the Financial Regulation No 2018/1046 does not apply. The maximum amount to be granted to each third party is EUR 10 000 000 for the whole duration of Horizon Europe.
Total indicative budget	The total indicative budget for the duration of the partnership is EUR 175 million.

Expected Outcome: Food systems are among the central leverage points for the transition; they are inextricably linked with the well-being of people and planet. This is reflected in the farm to fork and EU biodiversity strategies, which are at the heart of the European Green Deal. They identify ambitious targets and objectives for redesigning parts of the food system, outline actions, and pledge to monitor the progress towards them. The UN Global Food Systems Summit 2021 has addressed these issues globally. A successful proposal will contribute to the European Green Deal priorities, especially to the farm to fork strategy, and will deliver co-benefits on each of the Food 2030 priorities: nutrition for sustainable healthy diets, climate and environment, circularity and resource efficiency, innovation and empowering communities. The Partnership will also contribute to the common agricultural policy / common fisheries policy, circular economy action plan / blue economy, sustainable aquaculture, single market for green products, Europe's digital decade, 2030 climate target plan, Waste Framework Directive, bioeconomy strategy and action plan, and the EU zero pollution action plan.

The Partnership will coordinate, align, and leverage European and national R&I efforts to future-proof food systems for co-benefits through an integrated and transdisciplinary systems approach. The Partnership will provide the scientific evidence, as well as the collaborative experience among practitioners and citizens, to support the transformation of local, national, European and global food systems.

The partnership is intended to contribute to all the following expected outcomes:

- Accelerated transformation of local, national, European and global food systems, making them safe, sustainable, within planetary boundaries, healthy, fair and trusted – for everyone;
- Sustained multi-stakeholder EU partnership for R&I on food systems transformation with global-to-local linkages and a core strategy on food systems;
- Enabled EU-wide committed food innovation policy and a strong foundation for a European Research Area for food systems;
- Enhanced changes in the way we eat: safe, healthy and sustainable food are standard for all in the diverse food environment, via dietary shifts; changes in the way we process and

supply[161] food: supply-side and process innovation towards carbon neutrality, product diversity and circularity, changes in the way we connect with food systems: Citizen engagement and consumer trust in reoriented food systems; and changes in the way we govern food systems: Leverage points for local, national, EU and global transition pathways – incentives, boundary settings and co-creation.

Scope: The future health of Europe's people and the planet lies on our plate. The way in which food is produced on land, in fresh water and in oceans, as well as in aquaculture systems, fished, processed, packaged, distributed, valued, prepared, consumed, wasted and recycled should change to ensure that environmental, social and economic sustainability of food become core assets of EU's food systems, along with food safety and food security. Research and Innovation (R&I) is a critical resource for the EU in the transformation towards Sustainable Food Systems[162] for People, Planet & Climate (SFS). The prime condition for success is that a wide diversity of actors join forces in a Partnership – with a mission for change and willingness to contribute to joint actions.

There is consensus about the need for transformation of the current types of production, processing, distribution, and consumption in linear food chains towards circular food systems functioning within planetary boundaries. The sustainable food systems will provide food that is safe, sustainable healthy, fair and trusted for/by everyone. This transition needs an overarching food systems approach to address several challenges in an integrative manner and empowering all relevant stakeholders, diverse voices and geographical regions. This partnership does not address primary production as growing food, agricultural production and other specific aspects related to it, will be covered in the Horizon Europe Partnerships on Agroecology and Animal Health and Welfare.

This Partnership will provide a food systems R&I platform connecting local, national and European platforms, R&I programs and combining in-cash and in-kind resources in support of the transition to sustainable European food systems by 2030.

The European Partnership under Horizon Europe Sustainable Food Systems for People, Planet & Climate should be implemented through a joint programme of activities. These should target high impact, relevance for stakeholders and capacity building, ranging from research, innovation to coordination and networking activities, including training, dialogue, communication and dissemination activities in all research and innovation projects of the Partnership. Emphasis should be given to demonstration, upscaling and experimentation calls that strengthen collective intelligence and effect meaningful transformations through informing all of the stakeholders on the best science, data and insights from across the food systems:

The Partnership should aim to achieve the following objectives:

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161 Food supply does not refer to agricultural production, but to food processing, extraction and combination of ingredients, and food preparation (such as by the catering and restaurant industry).

162 IPES-Food (2017). Unravelling the Food–Health Nexus: Addressing practices, political economy, and power relations to build healthier food systems. The Global Alliance for the Future of Food and IPES-Food. Available at: http://www.ipes-food.org/reports/

- Develop work programmes as implementation steps of the high-level Strategic Research and Innovation Agenda (SRIA) defining key activities;
- Pool R&I resources by joint calls for R&I projects based on commonly developed Strategic Research and Innovation Agenda (SRIA) and a Roadmap;
- Establish a Food systems knowledge Hub of hubs with a central Hub (or Platform) for understanding when food systems are evolving sustainably (in what contexts, with which actors, etc.), and a network of transformative research and innovation labs (FS-labs or 'hubs') for systemic innovations at different scales;
- Provide place-based solutions in the FS Labs, exploring them as living labs to test sustainable food systems pathways, like policy and city labs, experimental restaurant environments, etc.;
- Provide the frame for developing system approaches with sustainable outcomes in the Hub of hubs;
- Enable knowledge sharing, and scaling - adapting knowledge systems, innovation platforms and science-policy interfaces for ensuring impact; while making use of data and technology where it adds value. The science based collective intelligence will effect meaningful transformation. Proposals are encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC). The JRC may provide expertise on how to strengthen the relationship between scientists and European policy makers and to promote research and collaboration on food systems science.

When it comes to food systems, it is important to recognize that all food producers, including aquaculture and fisheries, as well as retailers and processors have a key role as intermediaries between production and consumption. Alignment of private and public goals is a condition for success of public strategies. In particular, innovative food businesses implementing the European Green Deal, farm to fork and bioeconomy objectives could play a lighthouse role. Stakeholders from the quadruple helix[163] (i.e. policymakers, businesses/industry, researchers, and civil society), from different sectors of the food system, should be brought together on this overarching platform, with the aim of strengthening science-policy-society interfaces and increase transformative potential.

Partners are expected to provide financial and/or in-kind contributions for the governance structure, the joint calls and other dedicated implementation actions and efforts for national coordination. The partnership is expected to mobilise EU, national and regional capacities to leverage investments, including from the private sector and foundations, increase up-scalability and market accessibility for the developed solutions and thus increase the return to investments.

[163] https://op.europa.eu/en/publication-detail/-/publication/6e54c161-36a9-11e6-a825-01aa75ed71a1

Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties.

The Partnership is part of a "partnership landscape" that needs to avoid overlaps and build synergies for win-win collaboration and solutions, in particular with the Partnerships Accelerating farming systems transition: agroecology living labs and research infrastructures, Agriculture of Data and Animal Health and Welfare. Proposals should pool the necessary financial resources from the participating national (or regional) research programmes with a view to implementing joint calls for transnational proposals resulting in grants to third parties.

The Partnership should allocate resources to cooperate with existing projects, initiatives, platforms, science-policy interfaces, institutional processes at EU level, and at other levels where relevant to the partnership's goals. Proposals should pool the necessary financial resources from participating national (or regional) research programmes with a view to implementing coordinated calls for transnational proposals that provide grants to third parties.

This topic should involve contributions from the social sciences and humanities disciplines.

The expected duration of the partnership is seven to ten years.

The Commission envisages to include new actions in its future work programmes to provide continued support to the partnership for the duration of Horizon Europe.

HORIZON-CL6-2023-FARM2FORK-01-10: Eradicate micronutrient deficiencies in the EU

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 9.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 9.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In line with the European Green Deal priorities, the farm to fork strategy for a fair, healthy and environment-friendly food systems, and the EU's climate ambition for 2030 and 2050, the successful proposal will support R&I to eradicate micronutrient deficiencies in the EU and Associated Countries. It will contribute to the transformation of food systems to deliver co-benefits for climate (mitigation and adaptation), biodiversity, environmental sustainability and circularity, dietary shift, sustainable healthy nutrition and safe food, food poverty reduction and empowerment of communities, and thriving businesses.

The main objective of this topic is to contribute to the eradication of micronutrient deficiencies and reduction of nutrition inequalities across EU and Associated Countries at different levels (e.g. countries, regions, urban/rural/coastal areas) and for different communities of vulnerable groups such as infants, elderly, pregnant women, people with food intolerances/allergies, people with metabolic disorders on the one hand, and migrants and low income groups on the other hand.

Project results are expected to contribute to all of the following outcomes:

- Improved knowledge of the true prevalence of human micronutrient deficiencies across EU and Associated Countries and development of proposals for optimal interventions to eradicate micronutrient deficiencies in different target groups;
- Improved knowledge and understanding of micronutrient functionality and metabolism during food digestion at different critical periods of life;
- Reduction of nutrition inequalities by providing solutions at a general population level across EU and Associated Countries;
- Eradication of micronutrient deficiencies by providing solutions particularly for the vulnerable population groups in shifting towards healthier diet;
- Better understanding of the health costs resulting from micronutrient deficiency.

Scope: Globally, more than 820 million people have insufficient food intake and many more consume low quality diets that cause 2 billion of people with micronutrient deficiencies and 2 billion of people overweight or obese. Micronutrient deficiencies have a direct impact on individuals and on societies, resulting in poorer health, lower educational attainment and decreased capacity to work and earning potential. The elderly, pregnant woman, children, people with chronic disease and poorer population groups or people socially isolated are particularly at risk. Even if modern food distribution has largely eliminated seasonal gaps in fruits and vegetables, only a limited number of edible crops (2 %) are currently used for the human diet. Therefore, it is still possible that individual diets are not varied enough to ensure adequate dietary quality and prevent micronutrient deficiencies. Climate change and increased atmospheric CO2 can directly alter (micro) nutrient content of crops and livestock products. Processing also alters the nutrient composition of foods (e.g. by removal of the part of the grain that contain beneficial nutrients such as fibre, protein and micronutrients) and, potentially, nutrient bioavailability (e.g. change of structure with treatment with high

pressure/temperature). In Europe, studies suggest substantial variability in micronutrient intakes such as vitamins D and E, iron, iodine, magnesium, potassium, selenium and zinc according to sex and among different population groups and countries.

Micronutrient deficiencies are preventable and the choice of interventions should be based on the root cause, the scope and severity of the micronutrient deficiencies. Proposals for interventions/solutions need to be coherent with national/Associated Countries and EU food and health laws and policies. Where relevant, activities should build on and expand the results of past and ongoing research projects and collaborate with relevant initiatives.

Standardized methods should be used for collecting missing data and/or for updating them using existing data/studies/cohorts to generate better quality data on population micronutrient statuses to plan and target proposals for policy makers to develop intervention programs and propose them mechanisms to monitor their progress.

Proposals are expected to address all of the following R&I activities:

- Develop specific micronutrient biomarkers to facilitate screening of high-risk populations/individuals and to identify the optimal intervention.

- Map and monitor the specific vulnerable groups suffering from micronutrient deficiencies at national/regional/rural/urban/coastal levels for different gender, age, socio-economic and cultural groups in EU and Associated Countries to determine the root cause and the true prevalence of the micronutrient deficiencies, identify their specific needs for optimal health/development.

- Explore the determinants and barriers of micronutrient deficiencies in different geographical zones. Utilize big data and artificial intelligence to elucidate the complex links between micronutrients, diets, health and development of diseases.

- Further study the functionality, bioavailability, risk/benefits of the micronutrients during critical periods of life. Understand the specific mechanism of food digestion (e.g. the effect of the matrix, role of the gut microbiome, interaction with other ingredients/nutrients) to enable to advise for optimal combinations of foods to maximise bioavailability, or to incorporate, where appropriate, micronutrients in food products in order to be taken efficiently.

- For the vulnerable groups, develop innovative solutions/strategies/programme, through an integrated food-based approach instead of food supplementation and fortification (e.g. fresh and diversified food naturally rich in (micro)nutrients of concern which are under-consumed including old/neglected fruit and vegetable crops) for different geographical zones and for different communities and evaluate their effective impact on micronutrients deficiencies.

- Develop innovative and effective tools to improve education, communication and training on healthy nutrition and diets in order to avoid micronutrient deficiencies which are adapted to various socio-economic groups of the populations in respect of cultures,

ages, gender, needs at different level (e.g. public authorities, health care providers, education systems). These tools should be available to policy makers, responsible national authorities to support their efforts for health promotion, disease prevention and care.

- Provide recommendations, guidelines and cases studies underpinned by scientific evidence that are coherent with relevant national and EU food law and policy and that could be used by policy makers to design coherent, safe and sustainable micronutrient deficiency programmes. Provide evidence in the form of a cost/benefit analysis of the proposed measures and the costs of not acting.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of academia, research-technology organizations, food businesses and other relevant actors of the value chain and take into account sex and gender analysis. Relevant advice of European Food Safety Authority (EFSA) has to be taken into account.

HORIZON-CL6-2023-FARM2FORK-01-11: New detection methods on products derived from new genomic techniques for traceability, transparency and innovation in the food system

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B.

Expected Outcome: The successful proposal will be in line with the European Green Deal priorities and the farm to fork strategy for a fair healthy and environmentally friendly food system, as well as with the EU's climate ambition for 2030 and 2050. The farm to fork strategy aims to accelerate the transition to sustainable farming and food systems. It recognises the role that new innovative techniques may play in increasing sustainability, provided they are safe for consumers and the environment while bringing benefits for society as a whole. In addition, one of the strategy´s main priorities is to ensure traceability and

authenticity, and to enhance transparency. In this context, the successful proposals should contribute to ensuring traceability and authenticity, enhancing transparency and promoting innovation in the area of new genomic techniques.

Although existing detection methods may be able to detect even small alterations in the genome, this is sometimes not sufficient to confirm the presence of a genetically modified organism/product (GMO) regulated under Directive 2001/18/CE or Regulation 1829/2003, as the same alteration(s) could have been obtained by conventional breeding, which is not subject to the GMO legislation.

The existing approaches for the detection of GMOs cannot be applied in all cases. Various products obtained with new genomic techniques, as defined by European Commission, Joint Research Centre 2021[164], do not contain targets (e.g., promoters/terminators for screening purposes or event-specific sequences) on which GMO detection is largely based.

The challenge to identify certain genetically modified products is not always related to the available methodologies, but rather to the difficulty to differentiate against non-regulated products.

Some of the above mentioned challenges have been identified by recent literature[165] and the European Network of GMO Laboratories (ENGL) report of 26 March 2019 (JRC116289) which, referring to gene editing derived plant products, concluded that validation of an event-specific detection method and its implementation for market control will be feasible only for products carrying a known DNA alteration that has been shown to be unique (i.e. the alteration should be specific for the gene edited organism/product). The same consideration might apply for cisgenesis applications combined with gene editing. Under the current circumstances, market control will fail to detect unknown genome-edited plant products. The report notes that several issues regarding the detection, identification and quantification of genome-edited products will require further consideration, as its findings are currently based on theoretical assessments.

Project results are expected to contribute to all of the following expected outcomes:

- Reliable detection methods to address the challenges described;
- Development and validation of detection tools for enforcement authorities as well as for developers and agri-food operators;
- Empower enforcement authorities, developers and agri-food operators for the authenticity and traceability of products obtained through new genomic techniques;

164 New genomic techniques : state-of-the-art review 2021, https://data.europa.eu/doi/10.2760/710056

165 Genome-Edited Plants: Opportunities and Challenges for an Anticipatory Detection and Identification Framework. 2021. Alexandra Ribarits, Michael Eckerstorfer, Samson Simon and Walter Stepanek. Foods 2021, 10(2), 430; https://doi.org/10.3390/foods10020430; Detection of genome edits in plants—from editing to seed. 2021. Raymond D. Shillito, Sherry Whitt, Margit Ross, Farhad Ghavami, David De Vleesschauwer, Katelijn D'Halluin, Annelies Van Hoecke, Frank Meulewaeter. In Vitro Cellular & Developmental Biology - Plant 57:595–608. https://doi.org/10.1007/s11627-021-10214-z

- Enable informed consumer choices by enhancing transparency and traceability across the food chain;

- Enable innovation in the food system linked to new genomic techniques.

Scope: Proposals are expected to contribute to the development and validation of detection methods of products obtained through new genomic techniques, including all of the following activities:

- Examine innovative ways and/or specific markers that would allow for distinction between products resulting from new genomic techniques subject to the GMO legislation and products that are not subject to the GMO legislation. This should not only entail the detection of specific mutations, but also of other markers in the genome that are specific for the genotype containing the mutation/s. The methods should be able to distinguish between identical mutations obtained through different techniques;

- Development and validation of reliable detection methods including when possible quantification. Such methods could focus on products with known mutations (i.e. DNA sequence known) or on products with unknown mutations;

- The proposed detection methods should focus on a wide applicability of all or a subgroup of products, allowing for a screening approach. These methods should be assessed on pure products as well as on mixtures typical of food or feed products in the market. Proposals should always include plant-based products and may include also animal and/or microorganisms-based products.

- The proposal could also focus on the detection of unintended mutations or insertions (foreign DNA, CRISPR-Cas sequences, etc);

- The proposals could also include digital/virtual/AI modelling aspects along with the detection methods alternatives;

- The development and validation of standardized methodologies and the contribution to future standardisation processes is encouraged.

Proposals are encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC) Knowledge Centre for Food Fraud and Quality, which provides expertise in food science, authenticity and quality of food supplied in the EU. Proposals could also foresee the involvement of the European Network of GMO Laboratories (ENGL).

Activities are expected to achieve TRL 4-5 by the end of the project. Proposals should define clearly the TRL starting point for each involved technology and the plan to reach more advanced TRL.

Applicants should seek synergies and capitalise on the results of past and ongoing research projects (including projects under the same topic) in the areas of food and feed chain traceability and new genomic techniques. Therefore proposals should include a dedicated

task, appropriate resources and a plan on how they will collaborate with other projects funded under e.g. the topic HORIZON-CL6-2021-ZEROPOLLUTION-01-08. In order to achieve the expected outcomes, international cooperation is encouraged.

HORIZON-CL6-2023-FARM2FORK-01-12: Thematic network ensuring food safety by translating research and innovation into practice

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 2.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [166].

Expected Outcome: In line with the farm to fork strategy the successful proposals will support food safety in the food system. Despite the continued generation of new knowledge and innovative solutions through funded European projects on how to ensure food safety in the food supply chain, they are often insufficiently exploited/known and widely applied by end-users for different reasons (official control authorities, food business operators, food safety risks assessors, etc.). Innovative ideas from practice are also insufficiently captured, exchanged and spread. Food safety knowledge and innovation ecosystems are insufficiently connected.

[166] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

Project results are expected to contribute to all of the following expected outcomes:

- Widespread use of existing new knowledge and innovative solutions by end-users (practitioners) on the ground ensuring food safety;
- Improved flow of knowledge and innovative solutions with end-users through more dynamic interactions and new collaboration methodologies to ensure food safety along the food supply chain;
- Better incorporation of end-users needs into the activities of research and innovation ecosystems, which would generate a better targeted and shared research agenda for innovation-driven food safety research, including the multi-actor approach. Greater user acceptance and adoption of the collected solutions generated;
- Improved skills and long-term availability of training and education material and on-line communities for end-users on how to ensure food safety

Scope: Proposals are expected to contribute to the creation of a thematic network in the area of food safety, including all of the following activities:

- Development of a community of practice to foster knowledge exchange between end-users and research and innovation ecosystems who will work together. Traditional and local food products should be taken into consideration in this community of practice;
- Proposals must implement the 'multi-actor approach' and ensure adequate involvement of academia and research-technology organizations, etc. with end-users (official control authorities, food businesses, industrial clusters, etc.) and other relevant actors of the food chain;
- Compilation of a comprehensive description of the state of food and feed safety practices, procedures, systems and technologies (including not only technologies for food safety hazards detection but also preventative approaches as well as food equipment/systems hygienic design best practices, and existing big data and/or artificial intelligence tools applied to food safety). Proposals should focus on the cost/benefit aspects of the practices and innovations collected and build on existing and new available knowledge, data and models enabling the practical implementation of solutions;
- Creation of tailor-made communication materials summarizing, sharing and presenting, in a language easily understandable for end-users, existing best practices and innovations that are close to implementation into practice, but not sufficiently known by end-users;
- Identification and mapping of possible relations and synergies with other networks, projects, initiatives and policy and funding instruments at regional, national and European level, that could help disseminate and exploit knowledge and results showing the added value of these inter-connections as well as to put in place mechanisms ensuring the future sustainability of the community of practice. Dissemination via public

events, publication of case studies, dissemination papers and reports, and the creation of an on-line collaborative space that remain active in the long-term including the availability of materials for training and education;

- Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under the topics HORIZON-CL6-2021-FARM2FORK-01-07, HORIZON-CL6-2021-FARM2FORK-01-16 and HORIZON-CL6-2021-FARM2FORK-01-17.

- Proposals should run for minimum 3 years.

HORIZON-CL6-2023-FARM2FORK-01-13: Cultured meat and cultured seafood – state of play and future prospects in the EU

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposal should also coordinate potential overlapping or complementary work with the European Food Safety Authority (EFSA).

Expected Outcome: In line with the European Green Deal priorities, the farm to fork strategy for a fair, healthy and environment-friendly food system, the biodiversity strategy for 2030 and the EU's climate ambition for 2030 and 2050, the successful proposal will support R&I to promote the production, provision and safe consumption of alternative sources of protein, and dietary shifts towards sustainable healthy nutrition, contributing to the transformation of food systems to deliver co-benefits for climate (mitigation and adaptation), biodiversity, environmental sustainability and circularity, sustainable healthy nutrition and safe food, food poverty reduction, empowerment of communities, and thriving businesses.

Cell-based agriculture, and especially cultured meat (also called in vitro meat, lab-grown meat, artificial meat, cellular meat or cell-based meat) and cultured seafood, could be considered as a promising and innovative solution to help achieving the objectives of the farm to fork strategy for fair, safe, healthy and environmentally-friendly food systems. However, the potential environmental impact and impact on sustainability aspects need to be thoroughly assessed and safety established.

As such, the objective of this topic is to develop knowledge on the sustainability aspects relevant to this subject (i.e. environmental, economic, and social). It does not aim to help developing the market of cultured meat and cultured seafood in the EU.

Project results are expected to contribute to all of the following expected outcomes:

- Full understanding and up-to-date knowledge provided to food system actors on environmental, economic and social aspects of cultured meat and cultured seafood, including on ethics.

- Additional knowledge provided on potential challenges of and opportunities offered by cultured meat and cultured seafood to reduce greenhouse gas (GHG) emissions, air, water and soil pollution, resource depletion and impact on ecosystems, generation of wastes, and on human health.

Contribution to the farm to fork objectives and Food 2030 priorities: nutrition for sustainable healthy diets, climate, biodiversity and environment, circularity and resource efficiency, innovation and empowering communities (e.g., meeting the needs, values and expectations of society in a responsible and ethical way).

Scope: In 2020, cultured meat and cultured seafood knew a boost in interest outside Europe, with the first authorisation for marketing cultivated meat products in Singapore and a large increase in investment. In Europe, this sector is starting to attract investments as well (the EU invested through REACT-EU in lab-grown meat[167]). At present, cell-based food products are not marketed in the EU. Such products require a pre-market authorisation before they can be placed on the EU market and, depending on the techniques used, this authorisation may need to be via either the GMO legislation or the novel food regulation. Once an application for the authorisation of these products is submitted to the Commission, the European Food Safety Authority (EFSA) will carry out the safety evaluation of these products, including whether they are nutritionally disadvantageous.

Few studies have been developed to understand the impact of the cultured meat cycle (production, consumption, waste) on the environment, and its link to social and cultural aspects. Rough estimates based on a life cycle assessment suggest lower GHG emissions, land requirements and water use compared to conventional meat. Conclusions on energy use depend on the methodology used and assumptions made. Cultured meat and cultured seafood also face social and cultural challenges.

Proposals are expected to address the following:

- Study the social aspects related to cultured meat and cultured seafood (potential benefits and risks): including the consumers' perception on cultured meat and cultured seafood, animal welfare, religious and ethical aspects, health aspects (for example impacts on obesity or NCDs, nutrition aspects) beyond safety risks eventually assessed by EFSA, etc.

[167] https://www.independent.co.uk/news/science/beef-culture-grown-eu-lab-sustainable-b1942580.html.

- Study the economic aspects (potential benefits and risks): including how to reduce the high infrastructure costs and high-cost raw materials, as well as scaling up in a cost-effective way (including through reaching out to start-ups in this field to understand the difficulties and potential); and the "cost of inaction" (economic impact of not having such investments in the EU and Associated Countries).

- Study the environmental aspects (potential benefits and risks) considering the entire life cycle by using the Environmental Footprint methods, including elements on carbon footprint, pollution, impacts on biodiversity, resource use, and considerations on how the released land from livestock production could be utilised within the bioeconomy system, etc. and develop a comparison of the overall environmental impact of cultured meat/seafood vs. conventional meat/seafood. Particular attention should be given to the assessment of the energy intensiveness of cultured meat and cultured seafood production. Livestock co-products, such as leather, pet food, cosmetics, fertilisers, other chemicals, etc., should also be considered, as well as food waste and packaging issues.

- Study technical problems relating to the production of cultured meat and cultured seafood and identify possible solutions that could improve the economic viability, circularity and overall sustainability.

- Identify new sources of ingredients for the cultured meat and cultured seafood to increase the sustainability aspects of the products (including the nutritional value).

- Identify, explore and study scenarios of market penetration and consumer acceptance of cultured meat and cultured seafood and conduct LCA analysis to assess the environmental and sustainability impact/benefits each scenario would result in (considering issues such as the availability of energy for different levels of uptake of this technology).

- Explore the current and possible future impacts for the farmers (including aqua-farmers) and industry, including economic viability, challenges and opportunities for the farming sectors, etc.

- Proposals should involve a multi-disciplinary consortium of independent researchers that should organize conferences and meetings gathering a wide range of food system actors. International cooperation is strongly encouraged. Where relevant, activities should build and expand on the results of past and ongoing research projects (e.g., Meat4all, CCMeat). The proposals should also consider projects selected under HORIZON-CL6-2021-FARM2FORK-01-12 and HORIZON-CL6-2022-FARM2FORK-01-07. The project should have a clear plan as to how it will collaborate with any other relevant project funded under other relevant topics. They should participate in joint activities, workshops, focus groups or social labs, and common communication and dissemination activities, and show potential for upscaling. Applicants should plan the necessary budget to cover these activities.

This topic should involve the effective contribution of SSH disciplines.

HORIZON-CL6-2023-FARM2FORK-01-14: Providing marketing solutions to prevent and reduce the food waste related to marketing standards

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [168].

Expected Outcome: In line with the European Green Deal priorities, the farm to fork strategy for a fair, healthy and environmentally friendly food system, and the EU's climate ambition for 2030 and 2050, and the Commission communication "Safeguarding food security and reinforcing the resilience of food systems", the successful proposals will support R&I to prevent and reduce food losses and waste [169]. They should therefore contribute to the transformation of food systems to deliver co-benefits for climate (mitigation and adaptation),

[168] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

[169] Definition of food waste included in the Waste Framework Directive: *Food waste means all food as defined in Article 2 of Regulation (EC) No 178/2022 of the European Parliament and of the Council that has become waste*. Food waste does not include losses at stages of the food supply chain where certain products have not yet become food as defined in Article 2 of Regulation (EC) No 178/2002, such as edible plants which have not been harvested. Such products would be considered food losses. In addition, food waste does not include by-products from the production of food that fulfil the criteria set out in Article 5(1) of Directive 2008/98/EC, since such by-products are not waste.

biodiversity, environmental sustainability and circularity, sustainable food consumption, food poverty reduction and empowerment of communities, and thriving businesses.

Projects results are expected to contribute to all the following outcomes:

- Better understanding of the impact of food marketing standards on the generation of food waste along the supply chain[170], including the food waste generated between stages of the supply chain, and for various commodities.
- Improved market access to foods that do not meet marketing standards but are still safe to eat.
- Better understanding of the purpose and nature of private marketing standards and the underlying reasons for establishing such standards.

Contribution to the Food 2030 priorities: nutrition for sustainable healthy diets, climate, biodiversity and environment, circularity and resource efficiency, innovation and empowering communities.

Scope: Food marketing standards are standards individuals and businesses comply with to be able to put food on the market or to sell to a particular buyer. These standards include or may include requirements about technical definitions, classification, presentation, marking and labelling, packaging, production method, conservation, storage, transport related administrative documents, certifications and time limits, restriction of use and disposal, …

As these standards focus on quality, they are different from food safety standards (foods that do not comply with marketing standards can still be safe to eat).

The marketing standards applied to food marketed in the EU exist at different levels and in different forms:

- International standards[171].
- EU marketing standards, contained in the Common Market Organisation (CMO) Regulation, the CMO secondary legislation and the "Breakfast Directives".
- National marketing standards set up by governments of Member States
- Private marketing standards.

Proposals should address all the following points:

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170 The Commission Delegated Decision (EU) 2019/1597 establishing a common EU methodology to measure food waste outlines the following stages of the food supply chain: primary production; processing and manufacturing; retail and other distribution of food; restaurants and food services and households. https://eur-lex.europa.eu/eli/dec_del/2019/1597/oj

171 E.g. the United Nations Economic commission for Europe (UNECE) standards, the Codex Alimentarius standards, or international guidelines such as the Organization for Economic Cooperation and Development (OECD) schemes. These standards serve or may serve as a basis for standards adopted at EU or national level or for private standards.

- Provide estimates of the amounts of food waste resulting from the application of the above-mentioned marketing standards along the food supply chain. In particular, estimates of the amounts of food waste due to interactions between the stages and actors of the value chain should be provided. These estimates should be differentiated according to the responsible marketing standard(s).

- Assess trade-offs between food waste prevention/reduction objectives and other objectives pursued by marketing standards (e.g. keeping food of unsatisfactory quality off the market, providing clarity and transparency on the market, facilitating the functioning of the internal market; responding to consumers' and society's expectations).

- Assess the underlying reasons for setting up private marketing standards, including aspects related to consumers expectations.

- Identify solutions that would enable to improve the business potential for suboptimal foods not meeting market standards yet still safe to eat. This should include the identification of alternative marketing channels or models (including processing and other destinations), whilst ensuring the highest possible value for their valorisation and considering trade-offs between the different valorisation options. The most promising interventions and good practices already in place for similar foods or food categories should be considered.

- Provide recommendations/solutions to food businesses, owners of marketing standards and regulators on how to prevent/reduce food waste due to marketing standards.

- Some recommendations may help design marketing standards or support future policy development, in order to prevent and reduce food waste.

- Implement the multi-actor approach (see eligibility conditions) by conducting inter- and trans-disciplinary research and involving a wide range of food system actors.

The proposal activities should be performed at least for fruits and vegetables. Applicants may choose to cover additional commodities from the following food types: cereals, fish, meat, dairy and eggs.

The proposal activities should be performed across several Member States, in different parts of the EU.

Proposals should build on past or ongoing research projects and ensure synergy with relevant initiatives, including the Commission's EU Platform on Food Losses and Food Waste[172] and the evaluations already carried out by the European Commission in view of the revision of EU marketing standards and date marking rules. Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and any other relevant topic, e.g. by participating in joint activities,

[172] https://ec.europa.eu/food/safety/food-waste/eu-actions-against-food-waste/eu-platform-food-losses-and-food-waste_en

workshops, etc. Selected proposals under this topic will thus need to work together and adapt their initial work plan. Communication and dissemination activities should also be grouped and coordinated in a complementary manner.

Social innovation is recommended when the solution is at the socio-technical interface and requires social change, new social practices, social ownership or market uptake.

This topic requires the effective contribution of SSH.

HORIZON-CL6-2023-FARM2FORK-01-15: Fostering resilient European food systems in a changing world

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 8.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 8.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.

Expected Outcome: In line with the recent communication on "Safeguarding food security and reinforcing the resilience of food systems"[173] and the farm to fork strategy, the successful proposal will support the implementation of the communication "Contingency plan for ensuring food supply and food security in times of crisis",[174] thereby enhancing the resilience of European Union food systems in a changing world, as well as taking into account developments on the farm to fork strategy's proposal for a legislative framework for sustainable food systems.

Project results are expected to contribute to all of the following expected outcomes:

- Better understanding of the short- and long-term drivers of change that may affect food systems at different levels (global, national, regional, urban/rural areas level) and put food security at risk.

173 https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/safeguarding-food-security-reinforcing-resilience-food-systems.pdf.

174 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12770-EU-food-supply-and-food-security-contingency-plan_en.

- Better understanding of the vulnerabilities, dependencies and critical infrastructures of the food systems in the EU and worldwide, where this may have implications for the EU and Associated Countries.

- Improved preparedness to deal with risks that may threaten the nutritionally appropriate EU and Associated Countries' food supply and food security by making use of available data and platforms (including on weather, climate, biodiversity, socio-economic and markets data).

- Enhanced resilience of nutritionally appropriate food supply and improved food security in the EU and Associated Countries, in a changing world.

- Contribution to the farm to fork objectives and Food 2030 priorities: nutrition for sustainable healthy diets, climate, biodiversity and environment, circularity and resource efficiency, innovation and empowering communities (e.g., meeting the needs, values and expectations of society in a responsible and ethical way).

Scope: Food is necessary to sustain life. Ensuring food supply is an objective set out in Article 39 of the Treaty on the Functioning of the European Union. The food systems in the European Union have been reliable and supplied more food than demanded. They proved to be resilient to large-scale disruption caused by the COVID-19 pandemic. However, the surge in global commodity prices, further accelerated by Russia's invasion of Ukraine, highlights again the need for EU agriculture, fisheries, aquaculture and food supply chains to become more resilient and sustainable. In an increasingly complex and uncertain world, which is already experiencing unprecedented environmental and climate changes, and in which the state of global geopolitical tensions is high, sustaining the ability of food systems to provide enough food for all that is as nutritious and meets dietary needs is likely to be a substantial challenge for Europe in the future.

Understanding what drives our food system, both externally and internally, on a short-term basis and in the long-term, and how we can measure or monitor the drivers of change and their impacts on the food supply and food security is vital if we want to give policymakers and businesses better tools for making food systems more sustainable and more resilient to diverse shocks and stresses (such as pandemics, geopolitical disruptions, conflicts and economic sanctions, extreme climatic conditions, environmental changes, natural disasters or energy price increase). The project should not only point to some serious vulnerabilities, (inter)dependencies and critical infrastructure of the food systems, but also offer indications for policymakers and businesses about where to direct efforts and investments to improve resilience.

Proposed activities should cover all of the following aspects:

- Analyse vulnerabilities, (inter)dependencies and critical infrastructure of the EU and Associated Countries' food systems in the global context.

- Establish an observatory for the main socio-economic, political, health, technological and environmental drivers of change, including short-term shocks and long-term stresses, to which the food systems were/are/might be exposed and develop an early warning system. For long-term developments, use of foresight is encouraged.

- Advance and/or develop innovative methods/models/tools, including exploratory modelling and capacity for managing deep uncertainties, to identify/evaluate/manage potential risks and improve risk scenario building for EU and Associated Countries' food security.

- Map and prioritize the risks that the different drivers of change pose to the food systems.

- Scan and benchmark what is already being done by government, civil society, and the private sector to reduce the risks and improve the capacity to deal with the various drivers of change.

- Develop innovative solutions and evidence-based recommendations for strategies and best practices on what policymakers, businesses, civil society, scientists, teachers, and other environmental and food system operators (can) do through policy, research, education, community action, or other means to enhance substantially the resilience of the food systems, and thereby ensure food security.

- Explore and mobilize the potential of new technologies, (integrated) information and communications technology (ICT) solutions and big data in improving preparedness for food security crises and the flow of information during crises.

- Establish a regular dialogue with the European Commission and the European Food Security Crisis preparedness and response Mechanism (EFSCM) with the goal to provide relevant contributions supporting the implementation of the communication "Contingency plan for ensuring food supply and food security in times of crisis".

Proposals are encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC) and its Data-Modelling platform of resource economics.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of public authorities and civil society organisations, consumers, the private sector and other relevant actors of the value chain.

This topic should build on the knowledge provided by the assessment reports established by IPCC (Intergovernmental Panel on Climate Change), IPBES (Intergovernmental science Policy Platform on Biodiversity and Ecosystem Services) and IRP (International Resource Panel).

Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other relevant projects and existing research infrastructures, and ensure synergy with relevant activities carried out under other initiatives in Horizon Europe.

Collaboration and complementarity with the European Partnership on "Sustainable Food Systems for People, Plant and Climate" is encouraged. This topic should involve the effective contribution of SSH disciplines. In order to achieve the expected outcomes, international cooperation is encouraged.

HORIZON-CL6-2023-FARM2FORK-01-16: Microbiomes fighting food waste through applicable solutions in food processing, packaging and shelf life

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: International organisations with headquarters in a Member State or associated country are exceptionally eligible for funding. The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Technology Readiness Level	Activities are expected to achieve TRL 6-7 by the end of the project – see General Annex B.

Expected Outcome: The successful proposal should be in line with the European Green Deal priorities, the farm to fork strategy and Food 2030 priorities[175] for a fair healthy and environmentally friendly food system, as well as with the EU's climate ambition for 2030 and 2050. It will support innovation to foster advances related to microorganisms for safer, healthier and more environmentally friendly food, thus reducing food waste. This is in addition to contributing to the transformation of food systems to deliver co-benefits for climate (mitigation and adaptation), biodiversity, environmental sustainability and circularity, dietary shift, sustainable healthy nutrition and safe food, food poverty reduction and empowerment of communities, and thriving businesses.

Projects results are expected to contribute to all of the following expected outcomes:

[175] https://ec.europa.eu/info/publications/food-2030-pathways-action-research-and-innovation-policy-driver-sustainable-healthy-and-inclusive-food-systems-all_en

- Applicable innovative and/or business solutions in food processing and packaging and targeting spoilage and/or pathogenic microorganisms in perishable foods to extend shelf life and address food loss and waste.

- Significant measurable improvements in development of microbial preservatives for the food industry as an alternative to chemical ones. Develop an evidence based robust and responsive policy framework for microbiome control in the food system.

- Clearly explain how the proposal will deliver co-benefits to each of the Food 2030 priorities: nutrition for sustainable healthy diets, climate, biodiversity and environment, circularity and resource efficiency, innovation and empowering communities.

Scope: Proposals should aim for a holistic approach to realize the full potential that microbiome innovation has in terms of addressing food, health, environmental challenges and related economic problems and opportunities, to extend food shelf life and provide sustainable solutions in food processing and packaging.

Proposals are expected to address all the following:

- Develop microbial indicators of unexpected contaminants or environmental changes in food (e.g., during processing and packaging) and exploring possible microbial-based pathways to prevent food spoilage and reduce food loss and waste.

- Develop applicable microbiome business solutions for food packaging aiming to reduce/control/limit spoilage microorganisms in perishable foods to extend shelf life

- Develop, test and evaluate approaches that combine (meta)genomic or alternative microbiome indicator data in an inter- and transdisciplinary approach, to dynamically predict shelf life.

- Develop models and tools for controlling and predicting shelf life and risk of foodborne infection for improved decision making

- Demonstrate the safety of the developed approach, in accordance with relevant EU regulatory frameworks, related to its placing on the market.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of academia, research-technology organizations, small-medium enterprises (including start-ups), food businesses and other relevant actors of the value chain.

In order to achieve expected outcomes international cooperation is strongly encouraged, in particular in the framework of the International Bioeconomy Forum.

Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under this topic and other relevant topics. They should participate in joint activities, workshops, focus groups or social labs, as well as organise common communication and dissemination activities and show potential for upscaling. Applicants should plan the necessary budget to cover these activities.

In this topic the integration of the gender dimension (sex and gender analysis) in research and innovation content is not a mandatory requirement.

Targeted international cooperation

Proposals are invited against the following topic(s):

HORIZON-CL6-2023-FARM2FORK-01-17: EU-African Union cooperation – linking the activities of the Food and Nutrition Security and Sustainable Agriculture (FNSSA) partnership and those of the Pan-African Network for Economic Analysis of Policies (PANAP)

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If eligible for funding, legal entities established in all African Union Member States* may exceptionally participate in this Coordination and support action as a beneficiary or affiliated entity. * "African Union member states" includes countries whose membership has been temporarily suspended. Due to the scope of this topic, legal entities established in all African Union member states* are exceptionally eligible for Union funding.* "African Union member states" includes countries whose membership has been temporarily suspended. International organisations with headquarters in a Member State or associated country are exceptionally eligible for funding. The following additional eligibility criteria apply: due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, consortia must include at least five independent legal entities established in Africa. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant	The rules are described in General Annex G. The following exceptions apply:

Agreements	Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [176].

Expected Outcome: In line with the European Green Deal priorities and in particular the farm to fork strategy, and in support of the African Free Trade Area, the successful proposal will contribute to the African Union (AU)-EU High Level Policy Dialogue (HLPD) on Science, Technology and Innovation, and its priority on Green Transition (and the respective R&I partnerships on Food and Nutrition Security and Sustainable Agriculture and Climate Change and Sustainable Energy), as well as to the implementation of the short-term actions outlined in the working document of the AU-EU Innovation Agenda, aiming to translate R&I efforts into tangible business, development and employment opportunities in Africa and Europe.

Projects results are expected to contribute to all of the following expected outcomes:

- Improved alignment of activities of the FNSSA Research and Innovation Partnership and of the Pan-African Network for Economic Analysis of Policies (PANAP) in the scope of EU-AU cooperation, supporting the implementation of the FNSSA 10-year roadmap and the global transition towards sustainable food systems, providing end users with co-benefits in terms of evidence-based policy analysis supporting food and nutrition security and sustainable agriculture.

- Provide opportunities for exchange in sustainable agricultural and food system policy development and related studies between EU and AU in the context of the EU-AU FNSSA Research and Innovation Partnership and in the framework of PANAP.

- Support African agricultural and food systems policy making process through enhanced cooperation in the area of economic, social and environmental impact (including biodiversity) analysis of policy options for food systems, nutrition performance, agri-food trade, and development of rural areas.

- Fill in the gap between researchers and decision-makers, by fostering dialogues to better understand the duties and responsibilities of stakeholders.

Scope: Proposals should address the following:

- Reinforcing capacity building on policy definition and impact analysis by aligning European and African training and capacity building programmes, including exchange

[176] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

opportunities and networking with EU-AU and intra-Africa partners, and developing partnerships between universities.

- Designing actions that will support current and future activities under the PANAP network, building on the FNSSA roadmap and ensuring synergies and complementarities with the FNSSA partnership.
- Providing methods and strategies to promote recognition of the value of integration of scientific support within policy development in Africa and in Europe.
- Using digital technologies and information systems as a means to accelerate the translation of research results into policies.

The consortium selected for funding is encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC). The possible participation of the JRC in the project could consist in the JRC joining the project steering committee, to ensure a strong contribution of the project to the goals and activities of the PANAP network.

HORIZON-CL6-2023-FARM2FORK-01-18: Support for the implementation of a sustainable platform for the EU-African Union cooperation under the Food and Nutrition Security and Sustainable Agriculture (FNSSA) partnership

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 4.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: If eligible for funding, legal entities established in all African Union Member States* may exceptionally participate in this Coordination and support action as a beneficiary or affiliated entity. * "African Union member states" includes countries whose membership has been temporarily suspended. Due to the scope of this topic, legal entities established in all African Union member states* are exceptionally eligible for Union funding.* "African Union member states" includes countries whose membership has been temporarily suspended. International organisations with headquarters in a Member State or associated country are exceptionally eligible for funding.

	The following additional eligibility criteria apply: due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, consortia must include at least five independent legal entities established in Africa. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [177].

Expected Outcome: In line with the European Green Deal priorities and in particular the farm to fork strategy, and in support of the African Free Trade Area, the successful proposal will contribute to the African Union (AU)-EU High Level Policy Dialogue (HLPD) on Science, Technology and Innovation, and its priority on Green Transition (and the respective R&I partnerships on Food and Nutrition Security and Sustainable Agriculture and Climate Change and Sustainable Energy), as well as to the implementation of the short-term actions outlined in the working document of the AU-EU Innovation Agenda, aiming to translate R&I efforts into tangible business, development and employment opportunities in Africa and Europe.

Projects results are expected to contribute to all of the following expected outcomes:

- Support to the implementation, functioning, consolidation and possible enlargement of a sustainable, and therefore long-term, platform for the EU-Africa Research & Innovation FNSSA partnership in the form of an International Research Consortium (IRC).
- Creation of a knowledge platform for sharing information on relevant research activities and results concerning the FNSSA roadmap.
- Maintenance and better coordination of EU-Africa research and innovation activities and investments in food nutrition security and sustainable agriculture in line with the FNSSA roadmap, thereby maximizing complementarities and avoiding duplication of efforts by supporting FNSSA Working Group.

Scope: Food and Nutrition Security and the Sustainability of Agriculture (FNSSA) are top priorities in the 'Green Transition' of the EU and Africa. It is recognised that there will be

[177] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

more opportunities to achieve these common goals if the EU and Africa join forces. Therefore, the EU and the AU have adopted an enhanced Research & Innovation cooperation as their core strategy and approved a 10-year FNSSA Roadmap. To boost this FNSSA partnership, the Horizon 2020 project LEAP4FNSSA, has been tasked to establish a bi-continental platform to advance FNSSA, in the form of an International Research Consortium. It is expected that the International Research Consortium will be launched before the end of 2022 under the coordination of the project LEAP4FNSSA.

Proposals should address the following:

- Building on the work done by the Horizon 2020 project LEAP4FNSSA, the selected proposal should provide the necessary support to the implementation and the activities of the International Research Consortium.
- Building up and consolidation of a formal research cooperation between the EU and the AU on the issue of food nutrition security and sustainable agriculture, supporting the implementation of the FNSSA 10-year roadmap.
- Providing support in updating the FNSSA roadmap with new R&I priorities based on identified knowledge gaps as well as in identifying and developing joint flagship initiatives.
- Providing support to the establishment of the governance of the International Research Consortium and the set-up of working groups as necessary for the working of the International Research Consortium.
- Contributing a sound method for the analysis of the results of ongoing R&I activities, and the analysis of research gaps.
- Facilitating public access and knowledge sharing through a single online knowledge platform, with access to information and data from the existing database developed under the Horizon 2020 LEAP4FNSSA project.
- Organising the interaction with relevant projects and initiatives.

Activities will build on other initiatives which implement the FNSSA roadmap such as the ERA-Nets LEAP-AGRI and Food Systems and Climate (FOSC). Synergies with the European Commission’s Knowledge Centre for Global Food and Nutrition Security will be explored.

The consortium selected for funding is encouraged to cooperate with actors such as the European Commission’s Joint Research Centre (JRC). The possible participation of the JRC in the project could consist in the JRC joining the project steering committee.

HORIZON-CL6-2023-FARM2FORK-01-19: Support to the markets and trade of agroecological food products under the Food and Nutrition Security and Sustainable Agriculture (FNSSA) partnership

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 7.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 7.00 million.
Type of Action	Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: Due to the scope of this topic, legal entities established in in all African Union member states* are exceptionally eligible for Union funding. * "African Union member states" includes countries whose membership has been temporarily suspended. International organisations with headquarters in a Member State or associated country are exceptionally eligible for funding. The following additional eligibility criteria apply: due to the specific challenge of this topic, in addition to the minimum number of participants set out in the General Annexes, consortia must include at least three independent legal entities established in Africa. The places of establishment of at least two of these legal entities must be in the same geographical region of Africa (as defined by the African Union: https://au.int/en/member_states/countryprofiles2). The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Expected Outcome: In line with the European Green Deal priorities and the farm to fork strategy for a fair, healthy and environment-friendly food system, and in support of the African Free Trade Area and of the climate objectives of the African Union and the EU, the successful proposal will contribute to the AU-EU High Level Policy Dialogue (HLPD) on Science, Technology and Innovation, and its priority on Green Transition (and the respective R&I partnerships on Food and Nutrition Security and Sustainable Agriculture and Climate Change and Sustainable Energy), as well as to the implementation of the short-term actions

outlined in the working document of the AU-EU Innovation Agenda, aiming to translate R&I efforts into tangible business, development and employment opportunities in Africa and Europe.

Projects results are expected to contribute to all of the following expected outcomes:

- Improved assessment systems for agroecological food systems with co-benefits for producers, climate, biodiversity and citizens,
- Assessment of certification schemes, testing innovative solutions (e.g. digital solutions) with agro-food systems/certification actors, such as fair agricultural trade, ministries in charge and border regime management.
- Contribution to the joint EU-AU Innovation Agenda.

Scope: Agroecology [178] is a holistic approach that relies on and maximises the use of ecological processes to support agricultural production. By working more with nature and ecosystem services, it has the potential to increase farms' circularity, diversification and autonomy, while preserving/enhancing biodiversity, and drive a full transformation of farming systems and agricultural value chains, from input substitution and beyond. Agroecological farming systems therefore have great potential to enhance the sustainability performance of agriculture and agricultural value chains that contribute to the objectives of the EU farm to fork strategy and the FNSSA partnership.

Proposals should address the following:

- Conducting a scoping exercise on existing agroecological initiatives in Africa, including an analysis of what has worked or failed, and why.
- Increased competitiveness of the agroecological production for safe and nutritious food in Africa with improved quality and transparency in local, regional and international markets.
- Supporting training, and capacity building for actors in agro-ecological businesses and fair trades.
- Organising demonstration and networking events with relevant actors of the food chain, ranging from producers to final users, including administrations relevant for promoting agro-ecological food products.
- Implementation of the new technologies, including internet of things and artificial intelligence, to bring transparency to the agro-ecology food value chain.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of the farming sector and all other relevant food chain actors.

178 http://www.fao.org/3/i9037en/i9037en.pdf

This topic should involve the effective contribution of social sciences and humanities (SSH) disciplines.

Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under topics HORIZON-CL6-2021-FARM2FORK-01-03: Digitalisation as an enabler of agroecological farming systems and HORIZON-CL6-2021-CLIMATE-01-05: Agroecological approaches for climate change mitigation, resilient agricultural production and enhanced biodiversity.

The consortium selected for funding is encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC). The possible participation of the JRC in the project could consist in the JRC joining the project steering committee and supporting the consortium to disseminate results of the activities developed by the project.

HORIZON-CL6-2023-FARM2FORK-01-20: EU-Africa Union – food safety

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: at least three partners from Africa and at least two from the same region as defined by the African Union (https://au.int/en/member_states/countryprofiles2). Due to the scope of this topic, legal entities established in in all African Union member states* are exceptionally eligible for Union funding. * "African Union member states" includes countries whose membership has been temporarily suspended. International organisations with headquarters in a Member State or associated country are exceptionally eligible for funding. The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part. The Joint Research Centre (JRC) may participate as member of the consortium selected for funding.

Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Beneficiaries may provide financial support to third parties. The support to third parties can only be provided in the form of grants. The maximum amount to be granted to each third party is EUR 60 000.

Expected Outcome: In line with the European Green Deal priorities and the farm to fork strategy for a fair, healthy and environment-friendly food system, and in support of the food safety systems of the African Union and the EU, the successful proposal will contribute to the first priority of the AU-EU High Level Policy Dialogue (HLPD) on Science, Technology and Innovation on Food and Nutrition Security and Sustainable Agriculture.

Regional integration, including through greater trade in goods and services, is one of the key aspirations of the African Union's (AU) Agenda 2063. The launch of the African Continental Free Trade Area (AfCFTA) has the potential to significantly accelerate growth and sustainable development, doubling intra-African trade and food trade in particular. While strong local food systems are a backbone of food security, trade contributes to resilient food systems by balancing between markets. The promotion of trade needs to take a start from the local, national and regional level to integrate food safety practices into all aspects of food production, distribution, marketing and consumption. Food safety is a pre-condition for food trade. It aligns with the recent AU decision to establish the Africa Food Safety Agency to ensure the coordination of food safety at the continental level[179]

Projects results are expected to contribute to all of the following expected outcomes:

- Improved African food safety systems,
- Building blocks for improved food safety in Africa, improving climate, environment and food systems, reducing losses by mycotoxins, enhancing local transformation, local markets and regional trade, while reducing impacts on environment, biodiversity, health and society.

Scope: Proposals are expected to address the following:

- Contribute to a better understanding of food safety in the informal sector by generating data and evidence on trade actors in the informal sector. Improve the understanding of informal trade operations and ways to improve food safety for better access to nutritious food for urban and rural populations.
- Assess and recommend ways to maintain the informal sector`s participation towards possible integration into the formal food system. Explore ways for its access to

[179] https://www.fao.org/food-coalition/take-action/detail/en/c/1321182/

infrastructure such as labs to be able to respond and manage the food safety risks along the chain."

- Address regulatory aspects, including the risk of over regulation. Develop solutions towards a quality culture from the SME level going forward, including opportunities of better organization of SME in view of lower cost for certification and conformity assessment.
- Pilot training systems to help the informal sector towards compliance with food safety and quality schemes.
- Improve tools to improve risk assessment of health risks, including long term risks of mycotoxins. Risk assessment and other evidence should inform the regulatory systems.
- Contribute towards the development of a food safety strategy for Africa, including monitoring and an early warning system.
- Contribute to a better understanding how fermentation can reduce mycotoxin levels in food products.
- Identify solutions and business cases to improve microbiome based approaches such as traditional and new food fermenting, drying and coating processes for reducing food waste and promoting longer shelve lives. Develop approaches for scale-up.
- Adapting to climate change: reducing increased risks to food safety
- Implement the multi-actor approach by involving a wide range of food system actors and conducting trans- and inter-disciplinary research including an effective contribution of SSH disciplines.

Innovation: Proposals should foresee a space for mentoring and accelerating innovative business concepts, including social innovation and upscaling in view of African or European food business entrepreneurs and start-ups with special consideration of women and the diaspora using cascading funding opportunities. Proposals may involve financial support to third parties e.g. to academic researchers, start-ups, SMEs and other multidisciplinary actors, to, for instance, develop, test or validate developed assessment approaches or collect or prepare data sets or provide other contributions to achieve the project objectives... Consortia need to define the selection process of organisations, for which financial support will be granted. Maximum 20% of the EU funding can be allocated to this purpose.

Call - Fair, healthy and environmentally-friendly food systems from primary production to consumption

HORIZON-CL6-2024-FARM2FORK-01

Conditions for the Call

Indicative budget(s)[180]

Topics	Type of Action	Budgets (EUR million)	Expected EU contribution per project (EUR million)[181]	Indicative number of projects expected to be funded
		2024		
Opening: 17 Oct 2023 Deadline(s): 22 Feb 2024				
HORIZON-CL6-2024-FARM2FORK-01-1	RIA	5.00	Around 5.00	1
HORIZON-CL6-2024-FARM2FORK-01-10	RIA	18.00	Around 6.00	3
HORIZON-CL6-2024-FARM2FORK-01-11	RIA	9.00	Around 4.50	2
HORIZON-CL6-2024-FARM2FORK-01-2	RIA	10.00	Around 5.00	2
HORIZON-CL6-2024-FARM2FORK-01-3	CSA	2.00	Around 2.00	1
HORIZON-CL6-2024-FARM2FORK-01-4	RIA	8.00	Around 4.00	2
HORIZON-CL6-2024-FARM2FORK-01-5	IA	6.00	Around 3.00	2
HORIZON-CL6-2024-FARM2FORK-01-6	RIA	10.00	Around 5.00	2
HORIZON-CL6-2024-FARM2FORK-01-7	RIA	9.00	Around 4.50	2
HORIZON-CL6-2024-FARM2FORK-01-8	RIA	9.00	Around 4.50	2
HORIZON-CL6-2024-FARM2FORK-01-9	IA	9.00	Around 4.50	2
Overall indicative budget		95.00		

General conditions relating to this call	
Admissibility conditions	The conditions are described in General

180 The Director-General responsible for the call may decide to open the call up to one month prior to or after the envisaged date(s) of opening.
The Director-General responsible may delay the deadline(s) by up to two months.
All deadlines are at 17.00.00 Brussels local time.
The budget amounts are subject to the availability of the appropriations provided for in the general budget of the Union for years 2023 and 2024.

181 Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.

	Annex A.
Eligibility conditions	The conditions are described in General Annex B.
Financial and operational capacity and exclusion	The criteria are described in General Annex C.
Award criteria	The criteria are described in General Annex D.
Documents	The documents are described in General Annex E.
Procedure	The procedure is described in General Annex F.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G.

Enabling sustainable farming systems

Proposals are invited against the following topic(s):

HORIZON-CL6-2024-FARM2FORK-01-1: Agro-pastoral/outdoor livestock systems and wildlife management

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 5.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the

	Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy Community (2021-2025). [182].

Expected Outcome: In line with the objectives of the farm to fork strategy for a transition to fair, healthy and environmentally friendly livestock production systems, and of the EU biodiversity strategy for 2030, including the conservation status of certain habitats and species, the successful proposal will help policy makers and other actors to monitor and improve the management of farming and terrestrial wildlife relationships, thus contributing to sustainable agriculture and ecosystem services.

Project results are expected to contribute to all of the following outcomes:

- Innovative and sustainable practices and tools at landscape level to prevent and control negative consequences of interactions between livestock and wild animals to protect wildlife and pastoral/outdoor production systems
- Recommendations/policy advice on optimal management at EU level of wildlife and agro-pastoral systems
- Decision-making process on wildlife management and land planning participated by relevant stakeholders
- Improved coordination across Europe in terms of wildlife management, surveillance and data collection systems

Scope: Agro-pastoral/outdoor livestock farming systems, which include a large number traditional activities in Europe such as grazing systems, mountain livestock farming, transhumance, silvo-pastoral and agroforestry systems, offer beneficial effects not only to animal production, e.g., in case of scarce fodder resources, or to animal welfare, but also to habitat maintenance, carbon sequestration, biodiversity conservation and soil protection.

The increased demand for natural resources by human population with the consequent fragmentation of wildlife habitat, together with the increased population of wild animals and the change in land use have often resulted in human-wildlife conflicts. The interactions between livestock farmers and wildlife are more frequent and cause damages to both sides with conflicts in the management of farming systems and natural resources.

Wildlife population, which is worth protecting, occupies wide geographic area and extend across administrative borders, and public administrations face difficulties with regards to the reduction of the impact of wildlife on livestock farming. The implementation of a common

[182] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

and integrated approach at EU level is required to optimize the management of the co-existence of terrestrial wildlife (large carnivores, ungulates) and agro-pastoral/outdoor livestock systems at landscape level.

The following elements should be incorporated:

- Review of current wildlife management approaches in agro-pastoral/outdoor production systems in the different EU Member States and Associated Countries and assessment of the effectiveness of different prevention measures
- Map the most common types of damages caused and the positive externalities created by wild animals with respect to livestock and crops in Europe. Create an inventory of good practices and infrastructures at farms and regional levels, within a wider wildlife management approach.
- Improve or develop tools/technologies for (real time) data collection and analysis to assess, monitor and control (wild) animal behaviour and damages
- Cost/benefit analysis of current and new farming strategies that preserve, protect and valorise wildlife and pastoralism in different regions and ecosystems. Socio-economic, environmental, cultural and political aspects should be considered.
- Assess stakeholders' (farmers, hunters, conservationists, general public, policy makers…) perspectives and needs (participatory approach) and improve or develop effective instruments to reduce conflicts between livestock farming and wildlife. Identify the most effective measures to mitigate damages and the most common (monetary, non-monetary) compensation mechanisms across Europe.

The proposal should take into account projects funded under the LIFE programme, and interact and engage a dialogue with relevant EU organizations such as EU Platform on Coexistence between People and Large Carnivores[183].

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of the main stakeholders involved in managing wildlife/livestock interaction (e.g., farmers, hunters, game farmers and producers, agricultural advisory services, land managers, ecology and nature conservation experts, animal behaviour scientists, social scientists and other relevant actors).

This topic should involve the effective contribution of social sciences and humanities (SSH) disciplines.

Transforming food systems for health, sustainability and inclusion

Proposals are invited against the following topic(s):

[183] https://ec.europa.eu/environment/nature/conservation/species/carnivores/coexistence_platform.htm

HORIZON-CL6-2024-FARM2FORK-01-2: New healthy and sustainable food products and processes

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 5.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 10.00 million.
Type of Action	Research and Innovation Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding. The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Technology Readiness Level	Activities are expected to achieve TRL 4-5 by the end of the project – see General Annex B.

Expected Outcome: In line with the European Green Deal priorities, the farm to fork strategy for a fair, healthy and environment-friendly food system, and the EU's climate ambition for 2030 and 2050, the successful proposal will support R&I to develop new food products and processes in conventional or organic production systems. These new products should be healthier and overall more sustainable and based on natural ingredients, tasty appealing to the consumer, affordable and minimally processed.

They should also optimize nutritional, structural and functional food properties of raw materials to enhance health and well-being benefits for EU and Associated Countries citizens and have a low impact on the environment/climate. This will contribute to the transformation of food systems to deliver co-benefits for climate, biodiversity, environmental sustainability and circularity, the shift to healthy and sustainable diets, safe food, food poverty reduction and empowerment of communities, and thriving businesses.

Project results are expected to contribute to all of the following outcomes:

- New knowledge that the food industry can use in the design of new healthy and sustainable food products and processes to improve health and well-being of EU and Associated Countries citizens and with low impact on the environment/climate.
- Alignment in goals of consumers and food solution providers with more healthy, tasty, minimally processed, affordable and sustainable food.

- New market and job opportunities for sustainable food SMEs and industries.

Scope: Several studies in adults found a strong scientific concordance between consumption of ultra-processed foods and a higher risk of developing cancer, irritable bowel syndrome, obesity, type 2 diabetes and hypertension. Evidence is accumulating from mechanistic studies of the plausible causal pathways by which the physical structure and chemical compositions of these foods might cause harm. Additives or cocktail of additives could play a role in the incidence of NCDs and further R&I are needed. It is now widely accepted that a diet rich in plant-based food, such as fruits, vegetables, wholegrain cereals, legumes and nuts, may reduce the incidence of chronic diseases and is also beneficial against obesity and metabolic diseases. Further research is necessary to determine how the structural characteristics of plant-based foods deliver health benefits in modulating digestibility and in improving bioavailability of nutrients and how the physical structure may be modified by processing.

An increasing number of people pay attention to environmental, health, social and ethical issues and they seek value in food more than ever before. Therefore, a food systems' transformation is needed with a shift towards more healthy, safe, affordable, accessible and sustainable food for all, coupled with a respective change in the food production, distribution and consumption involving all the actors of the food chain.

A move to a plant-based diet with less red and processed meat, less salt, sugars, saturated and trans fats and additives, with more whole-grain cereals, fruit and vegetables, legumes and nuts, as well as processing efficiency and reduced losses and wastage along the food supply chains is needed. Where relevant, activities should build on and expand the results of past and ongoing research projects and collaborate with relevant initiatives.

Proposals are expected to address the following R&I activities:

- Develop and optimise new efficient methods/processes to reduce costs (e.g. energy, water, food raw materials) and impact on the environment to produce minimally processed functional food ingredients and food products and assess their nutritional, sensorial, structural and functional properties to enhance health and well-being, including the values provided by the plant/produce microbiome for nutritional qualities and its effects on the human gut microbiome.

- Develop new healthy, sustainable, diversified, minimally processed, reformulated, tasty and affordable food products and assess their nutritional, structural, sensorial and functional properties to enhance health and well-being and to improve nutrition status.

- Demonstrate the safety of the developed food products in accordance with relevant EU regulatory frameworks related to their placing on the market, and generate relevant data for pre-market authorisation,

- Investigate, assess and develop improved predictive realistic models for quantifying effects on human health (risks/benefits) of processing and food ingredients (and/or mixture of them).

- Study and optimise the role of the food matrix structure to make specific ingredients available or not (in case of caloric control) to our digestive system to reach the desired health effects/to combat non-communicable (NCDs).

- Ensure societal acceptance and the consumer buy in of new food products and processes in involving consumer at all stage of the product development process.

Proposals must implement the 'multi-actor approach' and ensure adequate involvement of academia, research-technology organizations, food businesses and other relevant actors of the value chain and take into account sex and gender analysis.

Proposals could consider cooperation with of the European Commission's Joint Research Centre (JRC) research infrastructures (Nanobiotechnology laboratory) and its expertise at the interface between the research activities and regulatory aspects. In that respect, the JRC will consider collaborating with any successful proposal and this collaboration, when relevant, should be established after the proposal's approval.

HORIZON-CL6-2024-FARM2FORK-01-3: Thematic network tackling food fraud by translating research and innovation into practice

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 2.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 2.00 million.
Type of Action	Coordination and Support Actions
Eligibility conditions	The conditions are described in General Annex B. The following exceptions apply: The Joint Research Centre (JRC) may participate as member of the consortium selected for funding. The following additional eligibility criteria apply: the proposals must apply the multi-actor approach. See definition of the multi-actor approach in the introduction to this work programme part.
Legal and financial set-up of the Grant Agreements	The rules are described in General Annex G. The following exceptions apply: Eligible costs will take the form of a lump sum as defined in the Decision of 7 July 2021 authorising the use of lump sum contributions under the Horizon Europe Programme – the Framework Programme for Research and Innovation (2021-2027) – and in actions under the Research and Training Programme of the European Atomic Energy

	Community (2021-2025). [184].

Expected Outcome: In line with the farm to fork strategy the successful proposals will support increased authenticity, traceability and transparency in food systems. One of the strategy´s main priorities is to tackle food fraud along the food supply chain. The successful proposals should therefore facilitate progress to preventing food fraud by translating research and innovation knowledge into practical applications.

Project results are expected to contribute to all of the following expected outcomes:

- Widespread use of existing new knowledge and innovative solutions by end-users/practitioners (official control authorities, food businesses, etc.) on the ground ensuring that food fraud is tackled;
- Improved flow of knowledge and innovative solutions with end-users through more dynamic interactions and new collaboration methodologies to prevent food fraud in the food supply chain;
- Better incorporation of the needs of end-users into the activities of research and innovation communities, which would generate a better targeted and shared food fraud research agenda for innovation-driven research.
- Improved skills and long-term availability of training and education material and on-line communities for end-users on how to tackle food fraud.

Scope: Proposals are expected to contribute to the creation of a thematic network in the area of food fraud, including all of the following activities:

- Development of a community of practice to foster knowledge exchange between end-users and research and innovation ecosystems who will work together mapping existing food fraud practices. Traditional and local food products should be taken into consideration in this community of practice;
- Proposals must implement the 'multi-actor approach' and ensure adequate involvement of academia and research-technology organizations with end-users (official control authorities, food businesses, industrial clusters, etc.) and other relevant actors of the food chain;
- Compilation of a comprehensive description of the state of new knowledge, practices, procedures, systems and technologies tackling food fraud (including not only technologies for detection but also preventative approaches). Proposals should build on existing and new available knowledge and trends, data and models (including big data tools and/or artificial intelligence applied to food fraud). Proposals should focus on the

[184] This decision is available on the Funding and Tenders Portal, in the reference documents section for Horizon Europe, under 'Simplified costs decisions' or through this link: https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/guidance/ls-decision_he_en.pdf

cost/benefit aspects of the practices and innovations collected and build on existing and new available knowledge, data and models enabling the practical implementation of solutions;

- Creation of tailor-made communication materials summarizing, sharing and presenting, in a language easily understandable for end-users, existing best practices and innovations that are close to implementation into practice, but not sufficiently known by end-users;

- Identification and mapping of possible relations and synergies with other networks, projects, initiatives and policy and funding instruments at regional, national and European level, that could help disseminate and exploit knowledge and results, showing the added value of these inter-connections. Dissemination via public events, publication of case studies, dissemination papers and reports, and the creation of an on-line collaborative space that remain active in the long-term including the availability of materials for training and education;

- Proposals should include a dedicated task, appropriate resources and a plan on how they will collaborate with other projects funded under the topics HORIZON-CL6-2021-FARM2FORK-01-07, HORIZON-CL6-2021-FARM2FORK-01-17, HORIZON-CL6-2022-FARM2FORK-01-11 and HORIZON-CL6-2022-FARM2FORK-01-04.

- Proposals are encouraged to cooperate with actors such as the European Commission's Joint Research Centre (JRC) Knowledge Centre for Food Fraud and Quality, which provides expertise in food science, authenticity and quality of food supplied in the EU. Proposals could also foresee the involvement of the European Network of GMO Laboratories (ENGL).

- Cross-articulation with the other data spaces, and notably with the European Open Science Cloud (EOSC) should be foreseen, exploiting synergies and complementarities of the different approaches. Efforts should be made to ensure that the data produced in the context of this topic is FAIR (Findable, Accessible, Interoperable and Re-usable)

- Proposals should run for minimum 3 years.

HORIZON-CL6-2024-FARM2FORK-01-4: Climate change and food safety: effects of climate change on food safety across food systems

Specific conditions	
Expected EU contribution per project	The Commission estimates that an EU contribution of around EUR 4.00 million would allow these outcomes to be addressed appropriately. Nonetheless, this does not preclude submission and selection of a proposal requesting different amounts.
Indicative budget	The total indicative budget for the topic is EUR 8.00 million.
Type of Action	Research and Innovation Actions