CLUSTER 6. FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT

Areas of intervention

- Environmental Observation
- Food Systems
- Biodiversity and Natural capital
- Bio-based Innovation Systems
- Agriculture, forestry and rural areas
- Circular Systems
- Seas, Oceans and Inland waters

EU Policy Objectives

Cluster 6 will be instrumental in supporting the design, implementation and evaluation of initiatives of the **European Green Deal**, as part of the Commission 2019-2024 political guidelines, related to:

- Climate change;
- Biodiversity Strategy for 2030;
- "Farm to Fork" Strategy;
- Cherishing and protecting rural areas and investing in their future;
- Zero-pollution ambition;
- A comprehensive strategy on Africa and trade agreements with sustainable development chapter.

In addition, several EU policies and strategies related to the European Green Deal will benefit from the results of research and innovation in Cluster 6, notably:

- Common Agricultural Policy;
- Common Fisheries Policy;
- Maritime Policy;
- EU Arctic Policy;
- EU General Food Law;
- EU Bioeconomy Strategy;
- Blue Growth Strategy;
- EU environmental legislation and policies targeting biodiversity, water, soil and air.

UN SDGs

Missions relevant to the activities addressed in Cluster 6:

Targeted impacts

Improved knowledge and innovations build the foundations for **climate neutrality** by reducing GHG emission and enhancing the sink and storage functions in production systems and ecosystems, and foster **adaptation** of ecosystems, water management and production systems as well as of rural, coastal and urban areas to **climate change**.

Halt of biodiversity decline and restoration of ecosystems enabled through improved knowledge and innovative solutions towards reaching the global vision for biodiversity 2050.

Better understanding of planetary boundaries facilitates innovative solutions for **sustainable and circular management and use of natural resources** as well as **prevention and removal of pollution**, guaranteeing healthy soils and clean water and air for all as well as boosting competitiveness, value creation and attractive jobs.

Improved knowledge and innovations enhance **sustainable primary production, food and bio-based systems, which are inclusive, safe and healthy** and ensure food and nutrition security for all within planetary boundaries.

Better understanding of the **behavioural, socio-economic and demographic changes** leads to innovative approaches that **drive sustainability** and a **balanced development of vibrant rural, coastal, peri-urban and urban areas**.

Environmental observations, strengthened evidence base and tools are delivered and used for the **establishment and monitoring of governance models enabling sustainability**.

Key R&I Orientations

| ENVIRONMENTAL OBSERVATION

The **disruptive technologies emerging in the digital economy** offer many opportunities in the field of Environmental Observation to deliver information for EU strategy and policies in **bio-economy**, **food**, **agriculture**, **natural resources**, and the **environment**. The main challenge in this intervention area is to deliver more reliable and standardised information, building on the FAIR principle, to **better understand the impact of global changes** and to feed into sound decision making on the big challenges our society faces.

| BIODIVERSITY AND NATURAL CAPITAL

This orientation will support R&I and investment activities to guide the development of new methodologies, technologies and solutions, appropriate policy design, and behavioural and economic change to enable the **protection, restoration and sustainable management of ecosystems and natural capital**. Biodiversity and natural capital are essential for **mitigating and adapting to climate change**. To enhance this potential, inter-relations between biodiversity, ecosystem services and climate change mitigation and adaptation, including **carbon sequestration dynamics** from land and sea, must be better understood. EU R&I will contribute to accelerate the uptake of **ecosystem-based approaches** and **nature-based solutions** to climate mitigation and adaptation, to restore fully functional ecosystems so that they can play their role as carbon sinks contributing to the aims of the Paris Agreement, and explore complementary action in digital, regulatory framework and standards, education, market, investment, insurance, behavioural and socio-economic areas. A better understanding of biodiversity and ecosystem services, and impacts of their decline, will mobilise capacities and investments for their **conservation, restoration and sustainable management**, also through in-situ research across multiple ecosystem types, and thus facilitate the continued provision of all ecosystem services, including for **water quality**, which underpin our economy and society.

| AGRICULTURE, FORESTRY AND RURAL AREAS

Sustainable, climate-friendly and resilient farming and forestry systems provide economic, environmental and social benefits. In addition to contributing to **food and nutrition security**, feeding into dynamic value chains, providing millions of jobs and securing well-being of people, EU's farmers and foresters are important stewards of the natural environment, and thus have significant potential to **shape and maintain rural landscapes**, **promote healthy ecosystems**, **mitigate the effects of climate change** and **halt the loss of biodiversity**. Vibrant rural areas are essential for farmers, foresters and other rural dwellers to keep managing EU's land and resources for the rest of society and to achieve the EU's objectives for territorial cohesion. EU R&I activities under this intervention area will advance knowledge, build capacities and develop solutions to **use land in more sustainable ways** and to **move to climate-friendly, resilient and socially inclusive agriculture and forestry systems**. This transition will be supported by applying

principles of agro- and forest ecology and making better use of ecosystem services. R&I will contribute to providing consumers with **healthy and nutritious food** and to developing **new value chains** (including urban farming) in rural and urban areas. It will further contribute to a more balanced development of rural areas, based on implementation of effective, evidence-based policies.

| SEAS, OCEANS AND INLAND WATERS

Seas, oceans and inland waters have a central role in climate processes and in the provision of food, biodiversity, critical ecosystem services, renewable energy and other resources. Oceans, seas and inland waters can deliver **food with lower carbon and freshwater footprints** than land-based production, while boosting profitability in the sector. **Sustainable fisheries and mariculture** are set to play an increasing role on food and nutrition security and be part of the forthcoming sustainable food from "farm to fork" strategy. The **health of the ocean and freshwater ecosystems**, its conservation and protection are a prerequisite to benefit from their services. By 2100, without significant changes, more than half of the world's marine species may stand on the brink of extinction. Activities will underpin EU's leading position to **advance restoration of biodiversity and ecosystems** and its commitment in **halting the decline of marine and freshwater species**.

| FOOD SYSTEMS

The global food system is facing a range of challenges including **malnutrition** (undernutrition, over-nutrition and micronutrient deficiencies), **climate change**, **resource scarcity**, **biodiversity loss**, including in soils, **growing and ageing population**, **urbanization**, **food waste** and **food poverty**. Food systems are also an important part of the bio-economy in terms of turnover and employment, and because of their common ecosystems. This creates synergies, but limits must be respected. A **food systems' transformation** is required which shifts towards **more sustainable and healthy diets** and aims to ensure **food and nutrition security for all**, thus contributing to the "farm to fork" strategy for sustainable food. The Food 2030 initiative is a useful model to follow with its four priority areas of nutrition and health, climate and sustainability, circularity and resource efficiency and innovative communities. Its goal is to use systemic approach to transition and future-proof our food systems.

| BIO-BASED INNOVATION SYSTEMS

Bio-based innovation has a major role to play in the sustainable and just transition to a **"green" economy** that is climate neutral and circular and operates within planetary boundaries. Building on the use of **biological renewable resources**, as a substitute for fossil- and mineral-based ones, it fosters **climate neutrality** in very significant parts of European industrial and economic sectors. It contributes to achieving the **resource-efficiency goals of the circular economy**. At the same time, it capitalises on the enormous advances of biosciences and biotechnology to deliver **greener and innovative products, processes and services**.

| CIRCULAR SYSTEMS

The EC report on the implementation of the Circular Economy Action Plan, the EU Strategy for Plastics in Circular Economy, the updated EU Bioeconomy Strategy, the reflection paper towards a Sustainable Europe by 2030 and the Clean planet for all strategic vision acknowledged the need for further progress in scaling up circular economy, reducing pressure on the environment and consolidating the competitive advantage it brings to EU businesses. There is need to:

- Continue supporting R&I and investments to develop and demonstrate **innovative systemic solutions** in various sectors and reap their full benefits to circularity and **cut greenhouse emissions and other forms of pollution**;
- Address the challenges related to the **circular use of natural resources**, including recycling, energy and material efficiency;
- Support **new circular business models**, and consumption and production patterns;
- Enhance circularity and **sustainable water use** and circular nutrient and manure management;
- Develop indicators and governance systems to monitor and measure the progress and **accelerate the transition to the circular economy**, and tools that could allow consumers/citizens to make better informed choices;
- Integrate **circular approaches in all phases of a product life cycle**, from design to re-use, recycling and disposal.

European Partnerships

Two institutionalised partnerships: BioBased Industries and PRIMA. Cluster 6 will collaborate with relevant EIT KICs: EIT Climate-KIC and EIT Food. Furthermore, the following 8 areas for future partnerships have been identified:

Towards more sustainable farming: agro-ecology living labs and research infrastructures; European Partnership on Animals and Health; Environmental Observations for a sustainable EU agriculture (Agriculture of data); Rescuing biodiversity to safeguard life on Earth; A climate neutral, sustainable and productive Blue Economy; Safe and Sustainable Food Systems for People, Planet & Climate; European Partnership for a Circular bio-based Europe: sustainable innovation for new local value from waste and biomass; Water4All: Water security for the planet.