PEOPLE

Ecosystem Restoration

# D2B: POLICY AND STAKEHOLDER ANALYSIS

**January 2023**


*Prepared for:*

**ESA/ESRIN**

Frascati, Italy

**Hatfield Consultants LLP**

#200 - 850 Harbourside Drive
North Vancouver, British Columbia, Canada V7P 0A3
Tel: 1.604.926.3261 • Fax: 1.604.926.5389
www.hatfieldgroup.com

PEOPLE
Ecosystem Restoration

# PIONEER EARTH OBSERVATION APPLICATIONS FOR THE ENVIRONMENT – ECOSYSTEM RESTORATION (PEOPLE-ER)

# D2B: POLICY AND STAKEHOLDER ANALYSIS

*Prepared for:*

**ESA/ESRIN**
LARGO GALILEO GALILEI 1
00044 FRASCATI (ROMA)
ITALY

*Prepared by:*

**HATFIELD CONSULTANTS LLP**
#200 - 850 HARBOURSIDE DRIVE
NORTH VANCOUVER, BC
CANADA V7P 0A3
TEL: 1.604.926.3261 • WWW.HATFIELDGROUP.COM

**JANUARY 2023**

ESA11339
VERSION 1

# TABLE OF CONTENTS



# LIST OF TABLES



# LIST OF FIGURES

# LIST OF ACRONYMS

| | |
|---|---|
| **ADB** | Asian Development Bank |
| **AusAid** | Australian Agency for International Development |
| **CEOS** | NASA/Committee on Earth Observation Satellite |
| **CIFOR** | Center for International Forest Research |
| **COP** | Conference of the Parties |
| **EC** | European Commission |
| **EO** | Earth Observation |
| **ER** | Ecosystem Restoration |
| **EU** | European Union |
| **FAO** | Food and Agriculture Organization of the United Nations |
| **FANC** | Finnish Association for Nature Conservation |
| **FLRM** | Forest and Landscape Restoration Mechanism |
| **GEO** | Group on Earth Observations |
| **GFOI** | Global Forest Observations Initiative |
| **GPFLR** | Global Partnership on Forest and Landscape Restoration |
| **ICMM** | International Council on Mining and Minerals |
| **IUCN** | International Union for Conservation of Nature |
| **LUKE** | Natural Resources Institute (Finland) |
| **NASA** | National Aeronautics and Space Administration (USA) |
| **PEOPLE** | Pioneer Earth Observation apPlications for the Environment |
| **ROMSILVA** | National Forest Administration (Romania) |
| **SDG** | Sustainable Development Goals |
| **SERNbc** | Society for Ecosystem Restoration in northern British Columbia |
| **UKAid** | United Kingdom Agency for International Development |
| **UNDP** | United Nations Development Programme |
| **UNEP** | United Nations Environment Programme |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **UN-REDD** | United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation |
| **US** | United States |
| **USAID** | United States Agency for International Development |
| **USGS** | US Geological Survey |
| **WRI** | World Resources Institute |
| **WWF** | World Wildlife Fund |

# DISTRIBUTION LIST

The following individuals/firms have received this document:

| Name | Firm | Email | SharePoint | Project Website |
|---|---|---|---|---|
| Frank Martin Seifert | ESA | ✓ | - | - |
| Early Adopters representative | IUCN Vietnam, African Parks, Luke, INCDS, SERNbc | ✓ | ✓ | - |
| | Public | | - | ✓ |

# AMENDMENT RECORD

This report has been issued and amended as follows:

| Issue | Description | Date | Approved by | |
|---|---|---|---|---|
| 1 | First version of D2B: Policy and Stakeholder Analysis | 20230131 |  |  |
| | | | Andy Dean<br>Project Manager | Marcos Kavlin<br>Assistant Project Manager |

# 1.0 INTRODUCTION

Ecosystem Restoration (ER) is important to reverse biodiversity loss and is a critical element of nature-based solutions (NBS) for climate change mitigation and adaptation, food security, and disaster risk reduction. ER is needed on a large scale to achieve the United Nations (UN) sustainable development agenda and as part of the UN Decade on Ecosystem Restoration (2021−2030). At the Convention on Biological Diversity (CBD) COP 15 in Montreal in December 2022, nations adopted a target to "Ensure that by 2030 at least 30 percent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity." [1]

Effective planning, monitoring, and assessment of ER is required to evaluate ecosystem functions and to determine whether ER is having the desired impact. ER investments must be data-driven, requiring historical information on ecosystem disturbance and degradation, to enable planning of interventions, which are then monitored for their impact. There is a huge opportunity for satellite Earth Observation (EO) applications for ER, to meet the needs for regular, repeat measures of ER processes over long time periods covering large, often remote, areas.

To support ER investments, innovative methods are required to deliver high-quality EO-based products and indicators targeting high-priority biodiversity variables.

The Pioneer Earth Observation apPlications for the Environment (PEOPLE) ER project financed by the European Space Agency (ESA) is a trailblazer project to develop innovative high-quality EO-based application products, indicators, and methods, targeting ER research and development (R&D) priorities.

PEOPLE-ER is led by Hatfield Consultants – a science-driven service-oriented company that builds solutions to complex environmental challenges, with a depth of experience in ER projects in Canada and around the world. Hatfield is a trusted partner for the development of cutting-edge and practical EO technologies. The PEOPLE-ER consortium includes:

- VTT – the remote sensing team at VTT Technical Research Centre of Finland produces EO data processing chains for domestic and international users. The team is internationally known, particularly for its forest monitoring applications and the Forestry TEP cloud processing platform. VTT is ranked among the leading European Research and Technology Organisations (RTO).
- University of British Columbia, Faculty of Forestry – Dr. Nicholas Coops leads the Integrated Remote Sensing Studio (IRSS) and is a leading international research scientist in the application of EO technologies for forest ecosystem assessment and monitoring, including ER and the prioritization of methods and products for remote sensing essential biodiversity variables (RS-EBVs).

The Early Adopters are:

- **National Institute for Research and Development in Forestry (INCDS)** (Romania) – formally a member of the consortium, INCDS is the main organisation of research and development in forestry from Romania. INCDS is in charge for the forest resources assessment and monitoring

[1] HYPERLINK "https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022"https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022

in Romania through National Forest Inventory. INCDS has also secured the support of two Romanian NGOs as documented in letters of support: Forestry Society Association and Fundatia Grupul Verde Oradea.

- **IUCN** (Vietnam) – established in 1948, IUCN is an international authority working on a wide range of themes related to nature conservation, forests, ecosystem management, protected areas, global policy and governance and rights.
- **African Parks Network** – APN is a leading non-profit conservation organisation that takes on the complete responsibility for the rehabilitation and long-term management of national parks across Africa in partnership with governments and local communities.
- **Society for Ecosystem Restoration in northern British Columbia (SERNbc) (Canada)** – a key enabler for ER in forested ecosystems affected by cumulative disturbances from forest operations, energy exploration, wildfires, and forest pests/diseases.
- **Natural Resources Institute (Luke) (Finland)** – as one of the biggest clusters of bioeconomy expertise in Europe, Luke develops knowledge-based solution models and services for renewable natural resources management and supports decision-making in society.

## 1.1 SCOPE

This is document is part of Deliverable 2 (D2) and addresses:

- Major relevant ongoing projects/initiatives related to ecosystem restoration and a broad characterisation of the major relevant stakeholder groups, analysing their mandate and characteristics; and
- Analysis of the underlying policy frameworks, policy needs in terms of monitoring, assessment, and reporting needs in addition to the needs of the involved Early Adopters.

# 2.0 ECOSYSTEM RESTORATION PROJECTS & INITIATIVES AND STAKEHOLDERS

ER projects are typically local in scope and driven by local communities or regional stakeholders with a desire to address and reverse ecosystem degradation. These local projects may be stimulated by regional, national, or international initiatives. This section reviews key international initiatives and example projects that help to provide a framework to position PEOPLE-ER.

## 2.1 STAKEHOLDERS

For the PEOPLE-ER project, a stakeholder is any entity with an interest or stake in the development or availability of EO tools for Ecosystem Restoration assessment and monitoring and the results of the demonstrations. We structure stakeholders into international organizations, government at all levels, non-government organizations, and private sector.

International stakeholders include **UN Agencies** implementing the **UN 2030 Agenda for Sustainable Development** and **UN conventions** on Biological Diversity, Wetlands, and Desertification. Key UN agencies related to ER include **UNEP**, **FAO**, and **UNDP**. Of relevance to PEOPLE-ER, FAO leads the development of Sepal (see Deliverable 2A, Section 3.3.4).

International financing institutions form an important stakeholder group with significant influence given their role in financing and mandate in poverty reduction. The **World Bank** sustainable forest landscapes programs include land rehabilitation and forest restoration and recognize the positive impact for livelihoods, food security, and long-term climate resilience through enhanced productivity of local natural resources assets. The **Asian Development Bank** (**ADB**) has ambitious programs to invest in ER and nature-based solutions to climate change and disaster risk mitigation.

Global non-profit organizations include the **World Resources Institute**, which implements several EO data-driven programs with partners, such as Global Forest Watch. Other global NGOs that are important ER stakeholders include **IUCN**, **WWF**, **Conservation International**, **Birdlife International**, and **Wetlands International**. We identified NGOs as priority "early adopters" for PEOPLE-ER and will directly work with **African Parks**, **IUCN Vietnam**, and **SERNbc**.

International multi-stakeholder groups include the **Group on Earth Observations** (GEO).

National agencies with international activities include **National Aeronautics and Space Administration (NASA)**, **United States Agency for International Development (USAID)**, **AusAID** and **UKAid**.

At the national level, stakeholders include government forestry or environmental protection agencies, as well as institutions that are responsible for exploitation of EO data. PEOPLE-ER directly includes government agencies and institutions in **Finland** and **Romania**. Other national stakeholders will be exposed to the PEOPLE-ER project, e.g., Ministry of Forests of British Columbia, Canada.

## 2.2 PROJECTS & INITIATIVES

The importance of ER as a solution to climate change, poverty reduction, and biodiversity loss is demonstrated in the number and variety of major initiatives and projects. Many initiatives do not explicitly include satellite EO based components, representing an opportunity for PEOPLE-ER to provide valuable methods and tools. A summary of major ER projects and initiatives at international, national, and NGO group level is provided below.

### 2.2.1 UN Level Initiatives

**UN Decade on Ecosystem Restoration 2021-2030** is a high-level initiative calling for the protection and revival of ecosystems all around the world, for the benefit of people and nature. Best practices and monitoring task forces related to the UN Decade are led by **FAO**.

Global initiatives include the **Bonn Challenge** to restore 150 million hectares of deforested and degraded land by 2020 and 350 million hectares by 2030. The **UN New York Declaration on Forests** aims for 350 million ha under restoration activities by 2030.

**UN-REDD** is the flagship UN knowledge and advisory partnership on forests and climate to reduce forest emissions and enhance forest carbon stocks. It is the largest international provider of REDD+ assistance, supporting its 65 partner countries to protect their forests and achieve their climate and sustainable development goals.

The **Global Partnership on Forest and Landscape Restoration (GPFLR)** [2] is a global network of governments, organizations, academic/research institutes, communities, and individuals under a common goal: to restore the world's lost and degraded forests and their surrounding landscapes. Under the GPFLR, FAO and WRI published *The Road to Restoration – A Guide to Identifying Priorities and Indicators for Monitoring Forest and Landscape Restoration* (FAO and WRI 2019), which provides high level guidance on a monitoring system for restoration projects. Satellite EO is referenced as one potential tool.

A related initiative is the **Forest and Landscape Restoration Mechanism (FLRM)**[3] established by FAO in 2014 with the aim to scale-up monitoring and reporting on FLR activities to contribute to the Bonn Challenge and Aichi Biodiversity targets**.**

Under GEO, the **Global Forest Observations Initiative** (GFOI) was established in 2011 as a forum to coordinate forest monitoring activities using EO. GFOI constitutes an informal partnership of countries and institutions who collaboratively and consistently assist developing countries to operationalize or improve their national forest monitoring systems. This work with developing countries addresses the reduction of deforestation and degradation and increased forest restoration.

### 2.2.2 International Financing Institution Initiatives

The World Bank and ESA have partnered through several initiatives to build awareness and understanding of the value of satellite EO data and tools. The World Bank has several important ecosystem and landscape restoration initiatives:

- **PROGREEN**[4] is a global partnership for sustainable and resilient landscapes launched in 2019, which supports countries' efforts to improve livelihoods and strengthen investment in management and conservation of forests and all terrestrial ecosystems, biodiversity conservation, landscape restoration, and climate change mitigation and adaptation.
- **Sustainable Landscapes Programs** – the programs in the Amazon and Indonesia and several sustainable land management projects integrate ER at landscape level, including Ethiopia. These projects can include the use of satellite EO data, in part stimulated by the collaboration with ESA.

**ADB** have partnered with ESA in a similar manner to the World Bank. ADB has several national regional ER related projects:

- Regional Flyway Initiative (RFI) includes interventions in wetland habitat restoration, rehabilitation, disaster risk reduction, reforestation, regeneration, and plantation[5]. The RFI is part of ADB's Roadmap for Nature-Positive Investments, which will expand ADB financing for biodiversity and provide developing member countries with targeted support for programs that address ecological priorities in Asia and the Pacific. The roadmap builds on ADB's Strategy 2030 which includes a focus on tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability.

[2] https://www.forestlandscaperestoration.org/

[3] https://www.fao.org/in-action/forest-landscape-restoration-mechanism/en/

[4] https://www.worldbank.org/en/programs/progreen

[5] https://www.adb.org/news/adb-launches-regional-flyway-initiative-preserve-priority-wetlands

National projects promoting and incentivising ER fall under several of ADB's sector and thematic groups, including Climate Change and Disaster Risk Management, environment, Rural Development and Food Security, and Water.

### 2.2.3 EU Initiatives

The European Union aims to be a global leader in sustainable use of natural resources and mitigation of climate change effects. The European Green Deal is an ambitious programme aiming to make EU climate neutral in 2050. It contains a set of policy initiatives by the European Commission (EC) related to circular economy, sustainability, and climate change. Protection of biodiversity and ecosystems is among the key priorities of the Green Deal. Several strategies and initiatives under the umbrella of the Green Deal have links to ER. These include:

- *Biodiversity Strategy for 2030*, aiming to put Europe's biodiversity on the path to recovery by 2030 for the benefit of people, climate and the planet.
- *EU Nature Restoration Plan*, for EU countries to put in place effective restoration measures to restore degraded ecosystems.
- *EU Forest Strategy for 2030*, setting a vision and concrete actions to improve the quantity and quality of EU forests and strengthen their protection, restoration and resilience.
- Proposal for a Regulation of the European Parliament and of the Council establishing a Union certification framework for carbon removals Nov 30.2022.

Each of these strategies and initiatives will be described in more detail in the "Ecosystem Restoration Policy Frameworks"-section. To support the implementation of these strategies, the EU has funded dozens of research and innovation projects over the past year. Good examples of the scale of the ongoing efforts are four massive ongoing projects (total of 85 million euros), aiming to deliver large-scale restoration interventions. These projects spread out across European ecosystems and territories and pave the way for further upscaling and replication activities in the years to come. The four projects include:

- ***SUPERB***[6] aiming to create lasting transformative change towards large-scale forest and forest landscape restoration. The project will inform decisions for the restoration of biodiversity, ecosystem services and carbon sequestration to maximise synergies between ecosystem services. SUPERB will conduct 12 large-scale demonstrations to showcase best practices in forest restoration.
- ***MERLIN***[7] aiming to demonstrate best practices for freshwater restoration. Bringing together 44 partners from across Europe, including universities, research institutes and nature conservation organisations, as well as stakeholders for businesses, governments and municipalities, the project will draw on successful freshwater restoration projects across Europe transforming them into beacons of innovation.

[6] https://cordis.europa.eu/project/id/101036849

[7] https://cordis.europa.eu/project/id/101036337

- ***WaterLANDS***[8] aiming to tackle large-scale restoration of wetland sites across Europe that have been decimated by human activity. Going beyond simple restoration, WaterLANDS will synthesise existing knowledge of ecology, community, governance and finance, and best-practice models for scalable, resilient restoration. WaterLANDS will also engage with local communities and stakeholders to ensure that wetland restoration results in tangible community gains, alongside environmental rehabilitation.
- ***REST-COAST***[9] aiming to assess ecosystem services from coastal marshes, seabed meadows and coastal dunes, to reduce erosion and flooding risks while enhancing biodiversity and blue carbon. It will develop large-scale river-coast connectivity and increase the nearshore accommodation space for the resilient delivery of coastal ecosystem services. The project will conduct nine pilots in the main EU regional seas.

These highlighted projects are supported by numerous smaller projects and projects focusing on related topics (e.g., ecosystem mapping and monitoring). Large European funded projects also support and have connection with national level activities.

### 2.2.4 National Level

**Finland**

Metsähallitus that manages more than nine million ha of government forests or 35% of the total forestry land of Finland, has been particularly active in launching restoration projects, mainly in the northern peatlands. Metsähallitus has managed and restored protected areas over an area of approx. 6,000 hectares every year. In multiple use forests such habitats as mires have been restored over approx. 660 hectares per year. Smaller sites, for example streams, are also restored every year[10]. Metsähallitus is an indirect partner of the PEOPLE-ER project because the Natural Resources Institute Finland (Luke) that closely cooperates with this project supports Metsähallitus in developing methods for the monitoring of restoration activities. Metsähallitus field data are used in PEOPLE-ER.
https://www.metsa.fi/en/nature-and-heritage/habitats/

Lumimuutos (Snowchange) is a not-for-profit cooperative that was founded in its initial form in 2000. It has a relatively extensive peatland, lake, and river restoration program. The cooperative also practises fishing and fish processing. Their projects focus on the eastern and northern Finland[11].

Hiilipörssi Oy is a startup company since 2020 that collects investments from the private and institutional sectors for the restoration of ditched peatlands[12]. It sells carbon compensation through restoration at €40/metric tons of $CO_2$. Hiilipörssi is a spin-off from the Finnish Association for Nature Conservation (FANC) which is the largest non-governmental organization for environmental protection and nature conservation in Finland. It has been a frontrunner in Finland's environmental affairs since 1938. The FANC continues restoration projects with the help of donations e.g., from private foundations[13].

[8] https://cordis.europa.eu/project/id/101036484

[9] https://cordis.europa.eu/project/id/101037097

[10] https://www.metsa.fi/en/nature-and-heritage/habitats/

[11] http://www.lumi.fi/

[12] https://hiiliporssi.fi/

[13] https://www.sll.fi/en/

**Romania**

Romania has formulated a "National Strategy on Preventing and Combating Desertification and Land Degradation 2019-2030". The Strategy aims to provide procedures for combating desertification in southern and south-eastern Romania and land degradation. The areas contain plain and hilly areas and include measures for afforestation and biodiversity protection. Both afforestation and biodiversity protection need surveillance activities to monitor the implementation, progress and impact of the activities.

Romania has also established the concept of a "Forestry Month (15 March – 15 April)". During this timeframe annually, the National Forest Administration (ROMSILVA) apply its yearly programme for afforestation-reforestation. Part of these activities are related to the Strategy for combatting desertification and land degradation discussed above.

**Canada**

Canada has several ER initiatives at national and provincial level that are relevant to the PEOPLE-ER demonstration.

- Two Billion Tree program[14] – in 2021 Canada made a commitment to partner with governments and organizations to plant two billion trees over 10 years to provide climate change, air and water quality, and biodiversity benefits.
- Recovery Strategy for the Woodland Caribou, Boreal population (Rangifer tarandus caribou) in Canada[15] defines requirements for undisturbed habitat within the boundary of each boreal caribou range.

**United States of America**

**SERVIR** is a joint initiative of NASA and USAID, which has supported some projects in ER but does not have a dedicated theme.

### 2.2.5 NGO Initiatives

IUCN joins the FAO and UNEP along with the Global Landscapes Forum to form the consortium for the implementation of the UN Decade on Ecosystem Restoration. IUCN's Nature-based Solutions Group is also contributing through flagship programmes like **The Restoration Initiative**, **SUSTAIN**, and **Catalysing Private Sector Commitment to the Bonn Challenge**. IUCN also leads the Global Mangrove Alliance[16] and initiative to accelerate a comprehensive, coordinated, global approach to mangrove conservation and restoration. IUCN Vietnam is an early adopter as part of the PEOPLE-ER project.

African Parks model includes biodiversity as a key pillar with action on restoring, monitoring, and evaluation of critical landscapes. African Parks is an early adopter as part of the PEOPLE-ER project.

[14] https://www.canada.ca/en/campaign/2-billion-trees.html

[15] https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/woodland-caribou-boreal-2020.html

[16] https://www.mangrovealliance.org/

## 2.3 STAKEHOLDER ANALYSIS

Using a method developed by the World Bank[17] the analysis categorizes stakeholders using four major attributes:

- the stakeholders' position on the issue;
- the level of influence (power) they hold;
- the level of interest they have in the specific issue; and
- the group/coalition to which they belong or can reasonably be associated with

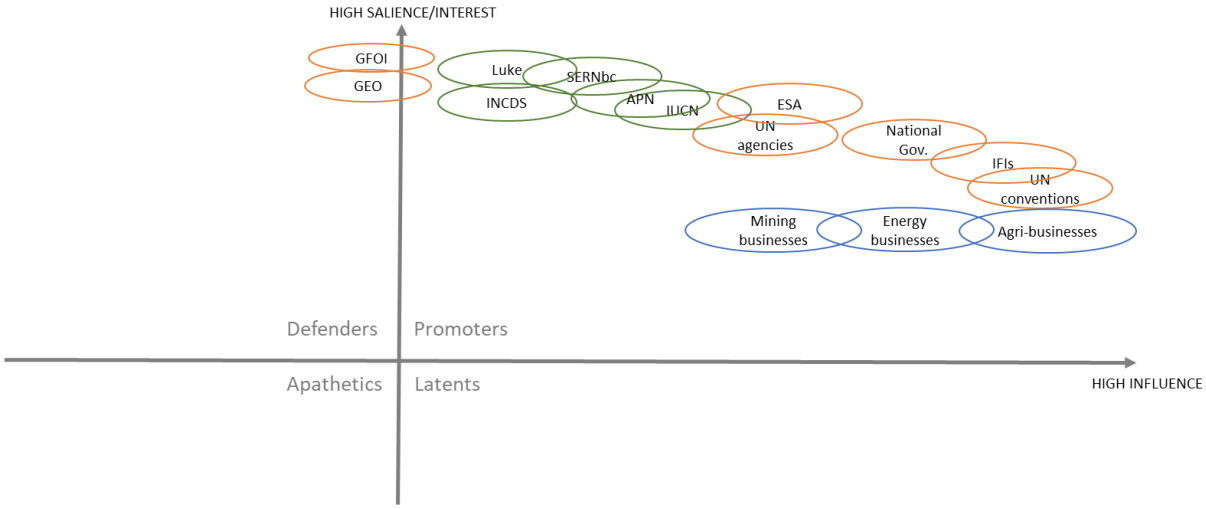
The stakeholder data is organized according to relative power/influence and salience of each stakeholder to understand their potential support or opposition for the proposed issue:

- **Promoters:** Stakeholders who attach a high priority to the issue and whose actions can have an impact on implementation
- **Defenders:** Stakeholders who attach a high priority to the issue but whose actions cannot have an impact on the implementation
- **Latents:** Stakeholders whose actions can affect the implementation but who attach a low priority to this issue
- **Apathetics:** Stakeholders whose actions cannot affect the implementation activity and who attach a low priority to this policy

An illustration of stakeholder analysis for "EO for ER" policy and action is presented in Figure 1. We identify the PEOPLE-ER early adopters, who have demonstrated interest in the application of EO technology, but whose individual influence is limited. However, they are strong advocates for ER around the world with IUCN arguably the most influential as a global conservation membership union. UN conventions and the SDGs have potential for high influence on actions, but do not specifically refer to the use of EO technologies for ER. Given the relevance of the demonstration in PEOPLE-ER, UN agencies are a priority for engagement for PEOPLE-ER knowledge sharing. Given their role in financing of natural resources, energy, and poverty reduction, IFIs are highly influential, and given their partnership ESA, most recently under the Global Development Assistance initiative, we identify IFIs as influential and with increasingly high interest in EO. The private sector is an influential stakeholder, with agri-business companies having potentially large influence due to their importance in food production systems around the world and commitments sustainable supply chains and a landscape approach to sustainability. Energy and mining companies similarly have policies and commitments for ecosystem and biodiversity management, with specific interest in ER as a method for nature-based solutions for climate change. Knowledge development organizations such as GEO/GFOI have high interest in EO for ER, but adoption requires other organizations. International and national space agencies such as ESA, NASA, and the Canadian Space Agency also exert influence, not least through providing the critical open EO data for ER applications, but also financing demonstrations and tool development such PEOPLE-ER.

[17] http://www1.worldbank.org/publicsector/anticorrupt/PoliticalEconomy/stakeholderanalysis.htm

**Figure 1 Stakeholder analysis satellite EO application for ecosystem restoration.**




# 3.0 ECOSYSTEM RESTORATION POLICY FRAMEWORKS

From a policy perspective, ER exists within a complex, dynamic interplay between environment, socioeconomics, technology, and politics. The importance of ecosystem protection and restoration in policymaking is increasingly recognizes in the context of key drivers such as climate change resilience and mitigation, biodiversity and ecosystem services, disaster risk reduction, food security, livelihoods, and health. In the following sections we highlight several of the priority policy frameworks for the PEOPLE-ER project at international to national level, including the private sector.

## 3.1 UN

**Sustainable Development Goals**

In the United Nations General Assembly 2015, a set of 17 Sustainable Development Goals (SDG's) were approved. The goals aim to be the "shared blueprint for peace and prosperity for people and the planet, now and into the future"[18]. Each of the goals typically has 8–12 targets, and each target has between one and four indicators used to measure progress toward reaching the targets. The targets are meant to be achieved between 2020 and 2030. A key goal in the context of ER is the goal "15, Life on Land". The overall mission statement for this goal is to "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

Two targets of the goal directly address ER. Target 15.1 stands: "By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements". This target raises particularly the importance of forest. The area of forest is one of the two indicators to measure the success of the target. Note that this target was aimed to be reached already by 2020. It was assessed that the proportion of forests in protected areas and under long-term

[18] https://sdgs.un.org/goals

management plans, as well as certified forest area, would have increased or remained stable at the global level[19]. This would indicate general success of the target and form a good foundation for the other targets of Goal 15.

Target 15.3 stands: "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world." The indicator for the success of this target is the proportion of land that is degraded over the total land area. Essentially, the success of this entire target depends on the extent and success of ER activities.

Along with the other targets in goal 15, these two goals not only highlight the importance of ER, but particularly the importance of being able to monitor the development of ecosystems and their restoration activities. Objective, transparent and timely monitoring approaches are needed to ensure the success of SDG Goal 15, Life on Land.

In a wider perspective, ER affects, way or the other, nearly all of the SDG's. Some of the other key goals affected by ER activities include e.g. SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production) and SDG 14 (Life Below Water).

**Decade on Ecosystem Restoration**

The United Nations also proclaim environment related decades, aiming to promote environmental aspects. The "Decade on Ecosystem Restoration"[20] runs from 2021 to 2030. Activities related to the Decade on Ecosystem Restoration aim to facilitate global cooperation for the restoration of degraded and destroyed ecosystems. In the big picture, ER activities are seen to support efforts to combat climate change and safeguard biodiversity, food security and water supply.

The Decade on Ecosystem Restoration is led by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization (FAO). In addition, several key international bodies participate in the activities, including, e.g., the Center for International Forestry Research (CIFOR) and the International Union for Conservation of Nature (IUCN).

In addition to combatting degradation and desertification in general, restoration and protective activities in some habitats have been raised. These habitats include peatlands, mangroves, and coral reefs. Also, sustainable management of forests, halting deforestation, restoring degraded forests, and increase in afforestation and reforestation have been wide promoted in the context of the Decade on Ecosystem Restoration.

**Conventions**

In addition to the broad initiatives discussed above, the United Nations has several conventions, or written agreements between the countries and the UN, that relate to ER activities. At least the following conventions have direct connections to ER activities:

- *Convention on Biological Diversity*[21], which has three main components: (1) the conservation of biological diversity; (2) the sustainable use of its components; and (3) the fair and equitable sharing of benefits arising from genetic resources. The convention has been effective since

[19] https://documents-dds-ny.un.org/doc/UNDOC/GEN/N20/108/02/PDF/N2010802.pdf?OpenElement

[20] https://www.decadeonrestoration.org/

[21] https://www.cbd.int/

1993 and is currently drafting the post-2020 Global Biodiversity Framework. Key features of this framework include, e.g., the goal to designate 30% of land and 30% of sea as protected areas.

- *Convention to Combat Desertification*[22] which aims to promote activities reducing desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements. The convention has been effective since 1993.
- *Ramsar Convention on Wetlands of International Importance*[23], which aims to promote conservation and sustainable use of Ramsar sites (wetlands). The name of the convention is derived from the Iranian city where the convention was signed. The convention has been effective since 1975. There are nearly 2500 Ramsar sites around the world, including a wide range of wetlands from lakes and river estuaries to peatlands and mangroves.
- *Framework Convention on Climate Change*[24], with the objective to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. The convention has been effective since 1994 and has grown to be one of the most well-known and influential conventions of the UN. Due to its major importance, it is presented in greater detail in the next section.

Each of these conventions have a Conference of the Parties (COP), consisting of the governments that have ratified the treaty, as the highest governing body. The COP's meet regularly to review the progress, identify new priorities and set work plans for members. The COP also assigns technical committees identifies priorities for research making recommendations on the topic of the convention.

At the Convention on Biological Diversity COP 15 in Montreal in December 2022, nations adopted four goals and 23 Targets for 2030. Target 2 is to "Ensure that by 2030 at least 30 percent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity[25]."

## 3.2 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE – UNFCCC

Due to the ongoing climate change, the "Framework Convention on Climate Change" has become the most well-known and influential of all of the Conventions of the United Nations. It aims to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. It is directly connected to SDG 13, Climate Action, which has a mission to "take urgent action to combat climate change and its impacts by regulating emissions and promoting developments in renewable energy". The UNFCCC is the main intergovernmental forum for negotiating the global response to climate change.

[22] https://www.unccd.int/

[23] https://www.ramsar.org/

[24] https://unfccc.int/

[25] https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022

During the history of UNFCCC, several key treaties have been agreed. The latest major treaty reached in the UNFCCC negotiations is the **Paris Agreement**, which is the current guideline for global climate action. The treaty, agreed upon on the 2015 UN Climate Change Conference in Paris, aims to limit global warming to less than 2 °C, and try to limit the increase to 1.5 °C, compared to the pre-industrial level. In addition to limit on temperature rise, the Paris agreement has another major goal of "increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production"[26]. Particularly this goal relates strongly to ER, through greater resilience of healthy habitats towards environmental pressure. Naturally, in many cases ER also directly affects atmospheric greenhouse gas concentrations through carbon accumulation and reduction of methane emissions.

The latest **Conference of Parties (COP27)** of the UNFCCC was held in Egypt in November 2022. Although generally the decisions of the meeting were found by many parties somewhat inadequate, some progress was made. From ER point of view, at least the decisions on the "Loss and Damage"[27] as well as the "Least developed countries"[28] can be considered important. Both decisions make progress towards funding arrangements to support, countries in general, and the least developed countries in particular, in activities related to climate change mitigation and environmental disaster recovery. ER plays an important role in both aspects.

## 3.3 EU

**Biodiversity Strategy and Nature Restoration plan**

The new EU Biodiversity Strategy for 2030 (European Commission 2020) is a comprehensive long-term plan to protect nature and reverse the degradation of ecosystems. ER plays an important role in the strategy, particularly for carbon rich habitats and climate friendly agriculture. Forests and wetland ecosystems are among the most carbon rich ecosystems, making their restoration efforts an integral part of the biodiversity strategy. In the context of the Biodiversity Strategy for 2030, an EU Nature Restoration Plan will be set up to include a legally binding instrument for ER. The pivotal role of nature restoration in European climate actions is illustrated by the fact that a significant proportion of the 25% of the EU budget dedicated to climate action is planned for investment in biodiversity and nature-based solutions.

**Forest Strategy**

Due to the high importance of carbon rich ecosystems, the new EU Forest Strategy for 2030 (European Commission 2021) is a key component of the European Green Deal and is aligned with the Biodiversity Strategy. The Forest Strategy aims to make forests more adaptable to changing climate conditions and promote their environmental, societal, and economic sustainability. It puts growing emphasis on biodiversity and the multifunctional role of forests. Considering ongoing climate change and biodiversity loss, EU calls for adaptive forest restoration and ecosystem-based management approaches that strengthen the resilience of EU forests. Restoration efforts are considered vital to achieve EU policy targets.

[26] https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

[27] https://unfccc.int/sites/default/files/resource/cma4_auv_8f.pdf

[28] https://unfccc.int/sites/default/files/resource/cop27_auv_11_LDCs.pdf

The increasing multifunctional role of forests and the introduction of afforestation and restoration activities pose new challenges and require new approaches for forest monitoring activities. The reporting requirements of actors operating in forests and the monitoring requirements of regulatory agencies are increasing and becoming more complex. EU aims to establish an EU-wide integrated framework for forest monitoring. Remote sensing will have a central role in this framework together with geospatial data integrated with ground-based monitoring. The focus should be on timely reporting on priority EU policy-relevant topics, including biodiversity, health, damage, and invasive alien species, which all relate also to monitoring of ER activities.

Note that the EU Forest Strategy does not set binding obligations for the member countries. Finland, for instance, has considered important to define its national policy in forestry.

**Taxonomy regulation**

The EC is also committed to the protection and restoration of forests outside Europe (European Commission 2019). In this context, EU works with its global partners on forest protection, restoration, and sustainable forest management. To meet these objectives, EU is implementing legislation to ensure that products, whether sourced in the EU or from other countries, sold on the EU market do not contribute to global deforestation. As an example, the recently approved EU Taxonomy Regulation on sustainable investment activities includes ‘‘rehabilitation and restoration of forests, including reforestation and natural forest regeneration after an extreme event”. The regulation applies to activities globally, requiring investors to verify the sustainability of activities outside Europe.

**Proposal for a Regulation of the European Parliament and of the Council establishing a Union certification framework for carbon removals,** Nov 30.2022[29].

The proposed legislation would contribute fulfilling the European Climate Law[30] that aims at European carbon neutrality by 2050. The draft plan originates from the Circular Economy Action Plan that includes a task to develop an effective certification framework for carbon removals. By 2028, all land managers should have access to verified emission and removal data. It is proposed that a single and transparent system for the monitoring of carbon removals will be developed because comparison of the present certification systems is difficult.

## 3.4 NATIONAL POLICIES

**Romania**

National policies related to ER in Romania include at least the “**Romania’s Forest Act**”, where a chapter is focused specifically on Ecological Restoration of Degraded Lands. There is also a “**National Strategy on Preventing and Combating Desertification and Land Degradation 2019-2030**”, which has already been discussed in section 4.2.4. Furthermore, there is a **‘‘Law on protective forest belts**”. The forest belts aim to protect agricultural lands mainly, and roads and villages in plain areas, and will contribute to reduce the deflation on sandy soils.

To regulate restoration activities, there are “**Technical norms for afforestation of degraded lands**”. The technical norms provide specific instructions for each type of soil and land degradation regarding

[29] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0672

[30] https://climate.ec.europa.eu/eu-action/european-green-deal/european-climate-law_en

species, planting method etc. Monitoring of the abidance of these technical norms is one aspect where remote sensing methodology could be useful.

**Finland**

The Finnish Forest Strategy[31] has been accepted in 2019. It defines the implementation guidelines of the Government Report on Forest Policy which has been commented by the Parliament. The strategy outlines the general framework for Finnish forestry whose corner stones are active forest management and ecological and economic sustainability.

Restoration of forest ecosystems is focused on peatlands that have been ditched for wood production. Approximately one half or nearly 5 million ha of Finnish peatlands have been drained. The active restoration means blocking up the ditches and removal of trees to reduce evapotranspiration. Particularly barren peatlands where economic wood production is questionable have been subject to restoration activities. To a lesser extent restoration projects have been conducted on the most fertile mineral soil lands and sun exposed eskers with specific vegetation. On the fertile soils, restoration means removal of spruce and support of expansion of broadleaved trees.

Presently there is no legal obligation to conduct restoration projects. However, several legislations enable receiving of financial support for ER. The support is being managed by the Forest Centre, a government agency for the private forest owners[32]. These legislations include the law on environmental protection and the temporary financing act for sustainable forestry. This law is being renewed.

Public and private organizations, supporting the private forest owners have published guidelines for the restoration and instructions for applying funding for restoration projects. Tapio Oy, an advisor organization for Finnish foresters, is participating the MERLIN program. It also publishes guidelines for forest restoration[33].

In **Canada**, the federal and provincial governments implement several regulations and policies in which planning, implementation, and assessment can be supported by EO-based ER tools and information. Examples include:

- Federal laws such as the Species at Risk Act with recovery strategies that require critical habitat identification and potentially restoration, or the Fisheries Act related to aquatic habitat.
- Provincial laws affecting forest resources and practices and energy sector regulation.

## 3.5 PRIVATE SECTOR

Many companies are making commitments to improve their environmental performance including “net zero” commitments to reduce greenhouse gas emissions. Many recognize that investments in ER and nature-based solutions are an important component of their business practices.

[31] https://mmm.fi/en/nfs

[32] https://www.metsakeskus.fi/en.

[33] https://tapio.fi/tag/ennallistaminen/

Policies include those of individual companies as well as industry or sector membership bodies such as the ICMM[34] that supports members with approaches to biodiversity management and environmental reclamation, rehabilitation, and restoration in the mining sector.

## 3.6 POLICY TRACEABILITY MATRIX

### Table 1 Policy traceability matrix to highlight policies and relevance to PEOPLE-ER.

| Policy | Indicators | Relevance to PEOPLE-ER solutions |
|---|---|---|
| **UN** | | |
| **UN Decade on Ecosystem Restoration 2021-2030** | - | Tools and demonstrations for **best practices** and **monitoring** of ER |
| **Bonn Challenge** | Restore 150 million hectares of deforested and degraded land by 2020 and 350 million hectares by 2030. | Tools and demonstrations for **best practices** and **monitoring** of ER |
| **UN New York Declaration on Forests** | 350 million ha under restoration activities by 2030 | Tools and demonstrations for **best practices** and **monitoring** of ER |
| **UN REDD and Paris Agreement** | - | |
| **SDG 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss** | | |
| 15.1<br>By 2020, ensure the conservation, **restoration** and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements | 15.1.1<br>Forest area as a proportion of total land area | Methods and tools suitable for measurement of freshwater and terrestrial ER |
| 15.2<br>By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, **restore degraded forests and substantially increase afforestation and reforestation globally** | 15.2.1<br>Progress towards sustainable forest management | Methods and tools suitable for measurement of afforestation, reforestation, and improvement in forest condition (e.g., tree cover density) |
| 15.3<br>By 2030, combat desertification, **restore degraded land and soil**, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world | 15.3.1<br>Proportion of land that is degraded over total land area | Methods and tools suitable for assessment of ER in dry forest landscapes |

[34] https://www.icmm.com/

## Table 1 (Cont'd.)

| Policy | Indicators | Relevance to PEOPLE-ER solutions |
|---|---|---|
| **SDG 14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development** | | |
| 14.2<br>By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans | 14.2.1<br>Number of countries using ecosystem-based approaches to managing marine areas<br>(Mangrove restoration indirectly linked) | Methods and tools suitable for assessment of mangrove ER |
| **SDG 6 – Ensure availability and sustainable management of water and sanitation for all** | | |
| 6.6<br>By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes | 6.6.1<br>Change in the extent of water-related ecosystems over time. | Methods and tools suitable for wetland and wetness trend & change detection |
| **UN Conventions** | | |
| Ramsar:<br>Strategic Plan for 2016-2024<br>Goal 3: Wisely Using All Wetlands | Restoration is in progress in degraded wetlands, with priority to wetlands that are relevant for biodiversity conservation, disaster risk reduction, livelihoods and/or climate change mitigation and adaptation | Methods and tools suitable for wetland and wetness trend & change detection |
| UNCCD | Land Degradation Neutrality (LDN) Targets | Methods and tools suitable for vegetation productivity recovery in dry landscapes. |
| CBD<br>COP15 (2022) – Four Goals and 23 targets | Target 2: 30 percent of areas of degraded terrestrial, inland water, and coastal marine ecosystems, under effective restoration. | Methods and tools for the assessment of the restoration of large scale and diverse ecosystems |
| **EU Policies** | | |
| EU Forest Strategy | Greenhouse gas emission reduction targets<br>Forest restoration and reinforced sustainable forest management for climate adaptation and forest resilience<br>Planting 3 billion additional trees by 2030 | Methods and tools suitable for measurement of afforestation, reforestation, and improvement in forest condition (e.g., tree cover density) |
| EU Biodiversity & Biodiversity Strategy and Nature Restoration plan | Restore 20% of EU's land and sea area by 2030 and all ecosystems in need of restoration by 2050 | Methods and tools for the assessment of the restoration of large scale and diverse ecosystems |

**Table 1 (Cont'd.)**

| Policy | Indicators | Relevance to PEOPLE-ER solutions |
|---|---|---|
| EU Taxonomy for sustainable activities<br>Objective 6: The protection and restoration of biodiversity and ecosystems | - | Methods and tools for the assessment of the restoration of large scale and diverse ecosystems |
| **Private Sector (examples)** | | |
| Shell | Target to become a net-zero emissions energy business by 2050 Net Zero<br>Overall positive impact on biodiversity… investing in conservation and taking steps to safeguard and, where possible, enhance local environments. | Methods and tools suitable for nature-based solutions assessment |
| Nestle | Global Reforestation Program "we aim to grow 200 million trees by 2030 in and around farms where we source our ingredients."<br>Use satellite data to map our forest footprint and future risk areas<br>Invest in forest conservation and restoration projects in and around our supply chains | Methods and tools suitable for monitoring tree cover density and forest restoration. |

# 4.0 REFERENCES


European Commission. 2019. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Stepping up EU Action to Protect and Restore the World's Forests COM/2019/352 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1565272554103&uri=CELEX:52019DC0352.

European Commission. 2020. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions EU Biodiversity Strategy for 2030 Bringing nature back into Our lives COM/2020/380 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380.

European Commission. 2021. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee And The Committee of the Regions New EU Forest Strategy for 2030 COM/2021/572 final. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021DC0572.

FAO, WRI. 2019. The Road to Restoration – A Guide to Identifying Priorities and Indicators for Monitoring Forest and Landscape Restoration.