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Valuing and Accounting for Nature in Ireland:

Embedding the Natural Capital Approach and Natural Capital Accounting in Irish Policy for the Benefit of People and Planet

RESEARCH PAPER

No.27 January 2024

An Chomhairle Náisiúnta Eacnamaíoch agus Shóisialta
National Economic & Social Council

An Oifig Náisiúnta um Fhorbairt Eacnamaíoch agus Shóisialta
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Introduction

This briefing paper has been commissioned from Natural Capital Ireland (NCI) by the National Economic and Social Council (NESC) as part of the project *Accounting for Nature in Ireland* to inform policymakers in advance of three roundtables on natural capital and natural capital accounting. NCI is a not-for-profit organisation leading the national conversation on natural capital (view our website here). We are a group of organisations and individuals from academia and the public, private and NGO sectors, committed to the development and application of the natural capital approach to policy and decision-making.

Our mission is to value, protect and restore Ireland's natural capital and ecosystem services, by supporting the adoption of the natural capital approach in public policy and corporate strategy, promoting informed public and private sector decision-making, and assisting in the establishment of a national natural capital accounting standard (outlined in Section 1) (See Appendix 1 for definitions and Appendix 2 for Acronyms).

We are currently in the UN Decade of Ecosystem Restoration which aims to prevent, halt and reverse ecosystem degradation globally on land and in our oceans. There has been a transformation in the way in which we understand our human relationship to nature with the central recognitions that a) we are not separate from nature at an individual, societal or economic level, b) nature has a carrying capacity beyond which it cannot replenish itself (therefore natural resources are finite), and c) that our economic systems have degraded nature to such an extent that climate change and biodiversity loss threaten the survival of our species and many others. Our economy is embedded in nature, not external to it (Figure 1).

Figure 1. Image illustrating how the economy is embedded in nature.

Source: Dasgupta Review (2021).

This new breadth of understanding has opened the door for a wholesale transformation of how we value and relate to nature. Not as an infinite resource available for use, but as a complex structure that supports our lives, livelihoods and

well-being. Thinking in this way requires us to take a systems approach given our understanding of the interconnectedness of natural systems and the man-made crises of biodiversity loss and climate change that we are facing.

Natural Capital is such an approach that has been adopted into policy in varying degrees at global, EU and national levels. It is based in the theory that the capitals - i.e. natural capital, social capital, human capital and produced capital – form the foundation of human well-being and economic success, wherein if we invest in them, they create value, and if we degrade them, we limit their ability to create value (Capitals Coalition, 2023).

Natural capital is an economic metaphor for nature, which includes all biotic and abiotic entities and processes that constitute the planet earth including plants, rocks, animals, insects, water, gases etc. and their interactions with each other. The natural capital approach involves recognising, measuring and valuing these entities and processes and is supported by an internationally recognised methodology of natural capital accounting which allows us to put the natural capital approach into action at multiple scales from national scale, to farm scale and everything in between. These accounts show changes in the health of our natural capital over time and are used to inform decisions on national policy including land-use, human health, climate change mitigation and adaptation, energy, transport, taxation, education, homelessness etc.

When integrated with the system of national accounting, natural capital accounts make visible the true economic cost of continuing to degrade nature and can illuminate new directions toward a safer, healthier and more economically viable future for all.

This paper sets out the following:

Section 1: Explaining the natural capital approach and natural capital accounting

Section 2: The policy landscape

Section 3: Issues and resolutions

Section 4: What's next?

Section 5: Key take-aways

> *"It's not too late to win the fight against the climate and **nature** crises. Given the **chance**, **nature can recover** in the most remarkable way."* (David Attenborough, 2021 in video produced for COP26 by The Wildlife Trusts, UK)

SECTION 1: Explaining the natural capital approach and natural capital accounting

For us to protect nature, it is necessary to understand as people, government departments and organisations, how we value nature. Nature has intrinsic value: non-human species and ecosystems have an innate right to survive, just as humans do. Nature has relational value to people: humans can consider themselves to be in relationship to species and ecosystems, this is characterised by an ethic of responsibility and care. Nature also has instrumental value to people: humans depend on the good health of other species and ecosystems in order to provide us with the ecosystem services, such as pollination, water purification, flood attenuation, climate regulation and much more, that create the optimal conditions for human life and the flourishing of our societies and economies.

Natural Capital deals with instrumental valuing, providing both a conceptual framework to think about nature in economic terms and an accounting framework, namely the UN System of Environmental Economic Accounting (SEEA), to do the practical work of making visible our impacts and dependencies on nature in different sectors, to help us identify the risks and benefits of choices we have to make regarding nature.

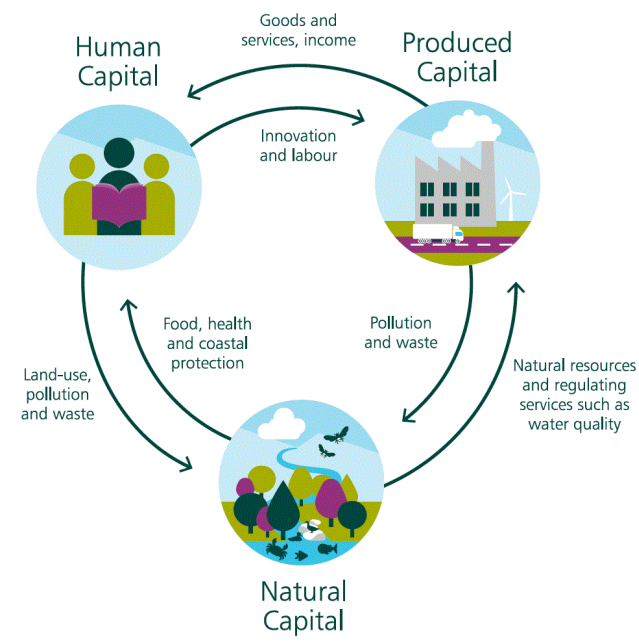
An economic metaphor, the natural capital approach frames nature's entities and processes as assets or stocks that yield a flow of benefits to people. The approach involves measuring natural capital assets which requires the collection and consideration of data across a broad range of scientific disciplines. This approach helps to reveal the often hidden social and economic costs of environmental damage and the benefits related to the conservation and wise use of natural capital assets, thereby providing critical information for a wide spectrum of national and local policies across all sectors in Ireland.

Natural capital interacts with other capitals such as produced capital and human capital (Figure 2 below) (Dasgupta, 2021). The Dasgupta Review (2021) states that macroeconomic growth and development theories do not recognise humanity's dependence on nature. The macroeconomics of growth and development was designed with the view that humans are external to nature, rather than our societies and economies being embedded in nature (Dasgupta, 2021) (Figure 3, Vardon *et al*., 2022).

When we move into this frame of thinking it becomes clear that nature should be at the core of decision-making and policy development, not only within government sectors that have an obvious link with nature, but across all departments. When we understand *how* we value nature (intrinsically, relationally and instrumentally) we can begin to make informed decisions based on those values, to restore and protect our environment, prevent climate breakdown, improve human health and well-being and make smart choices for our economy.

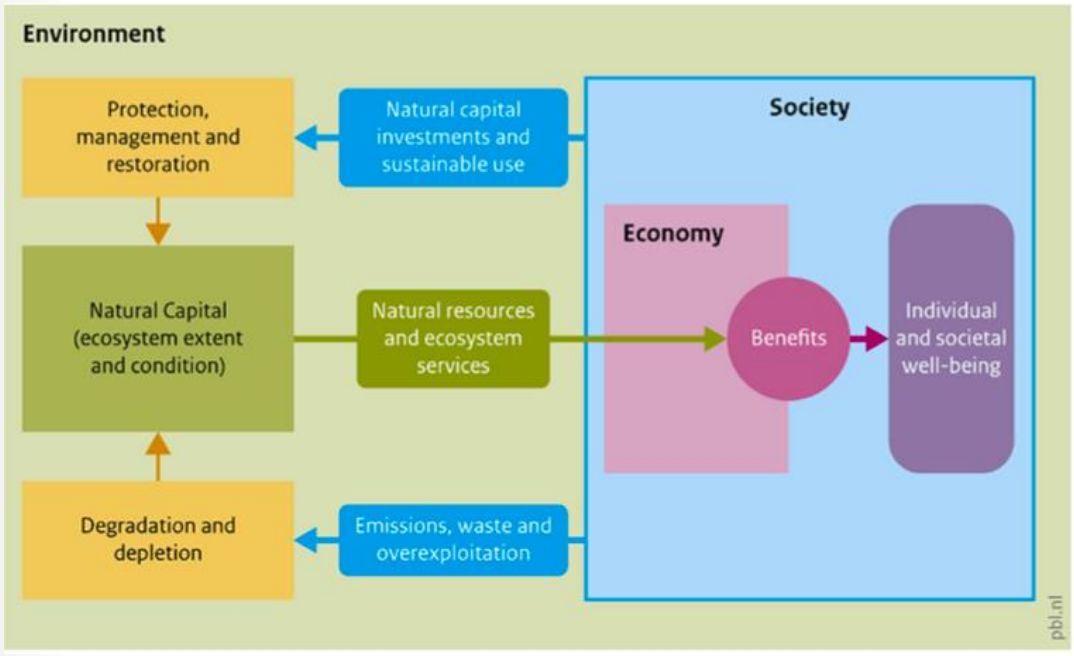
> *"The economy is a wholly owned subsidiary of the environment, not the other way around" (Attributed to Robert Kennedy Jr.)*

Figure 2. Interactions between the capitals.



Source: Image from Dasgupta Review (2021)

Figure 3. The interactions of the environment with society and the economy.



Source: Lucas and Vardon (2021)

The natural capital approach is an important tool to reverse biodiversity loss and help us to avoid the worst effects of climate change, as it enables us to create the coherence and synergy between nature policy and other policy priorities that is desperately needed, given the vast rate at which extinction levels are rising (IPBES, 2019a). It offers a transdisciplinary language, facilitating cooperation between academics and decision-makers, across communities, governments, and business sectors (Farrell *et al*, 2021).

Restoring biodiversity, ecosystems, and ecosystem services (Figure 4) globally and nationally, is vital for the survival of all species, including ours (see Appendix 4 for details on the drivers of biodiversity loss and valuing biodiversity).

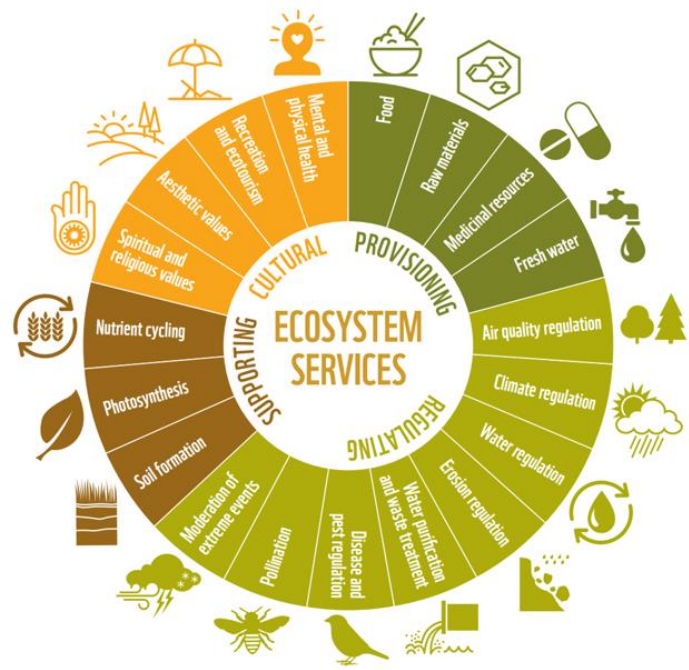
Figure 4. Image illustrating the typology of ecosystem services.

***What are Ecosystem Services*?**

An ecosystem is a biological community of interacting organisms (animals, plants, bacteria etc) and their physical environment. Woodlands, peatlands, dune systems, oceans, rivers, farmlands, hedgerows and even a garden pond are all examples of ecosystems at different scales.

Healthy, biodiverse ecosystems provide functions that are vital to our survival, well-being and prosperity. These include pollination, carbon sequestration, climate regulation, water purification, photosynthesis and many more. In the language of natural capital we refer to these functions as ecosystem services. The ecosystem services of nature result in benefits to people such as food growth, clean air and water and generation of oxygen.

Ecosystem services can be divided into three categories: *provisioning services*, *supporting and regulating services*, and *cultural services*.



Source: WWF Living Planet Index.

For a quick illustration of the natural capital approach and natural capital accounting, please take 4 minutes to watch this animated video. For a quick illustration of natural capital on farms, please take 3 minutes to watch this animated video.

How does Natural Capital Accounting work?

Natural capital accounting is an interdisciplinary approach to measuring and accounting for nature. It is not about putting a price on nature, but rather, revealing to us the myriad benefits that we gain from nature that conventional economic modelling omits. When we don't bring nature onto our balance sheets, we fail to understand that by persistently degrading it we are harming ourselves and future generations. In order to protect, restore and enhance our natural capital, we must first understand the extent and condition of existing natural assets. In other words, we must establish a baseline upon which targets for improvement can be set.

The statistical standard for natural capital accounting at national level is the System of Environmental Economic Accounting (SEEA). This includes both the overarching System of Environmental Economic Accounting - Central Framework (SEEA-CF) known as 'the SEEA' and the System of Environmental Economic Accounting - Ecosystem Accounting (SEEA-EA) *(*UN SEEA, 2023; UN SDG Indicator Metadata, (UN SDG, 2023a). See below:

The **SEEA** was adopted in 2012 and, according to the latest Global Assessment Report 2022, is in use in 92 countries worldwide, including Ireland (UN Statistical Commission, 2022). This is an international statistical standard to account for nature and its relationship with the economy. The SEEA framework is a guide to integrating economic, environmental and social data into a single, coherent framework for holistic decision-making and follows a similar accounting structure to the System of National Accounts (SNA).

The **SEEA-EA** was adopted in 2021 and is in use by 41 countries worldwide, including Ireland. SEEA-EA is an integrated statistical framework for organising biophysical data (habitats and landscapes), measuring ecosystem services in physical and monetary terms, tracking changes in the condition and extent of ecosystem assets and linking this information to economic and other human activity (UN Statistical Commission, 2022).

These SEEA frameworks require economic reporting to go beyond Gross Domestic Product (GDP) and will ensure that natural capital, including our forests, wetlands and other ecosystems, will be accounted for in economic reporting. The SEEA-EA reports across four main sets of ecosystem accounts – extent, condition, services and benefits (Figure 5) and provides a standardised framework to collate information and regularly report on progress in relation to climate actions, biodiversity conservation and restoration, protection of waterbodies, and other pro-environmental practices (as identified in cross-sectoral areas such as agriculture, energy, environment, forestry, nature, marine, planning and water supply/use policies).

There are a number of international policies that stipulate the implementation of the SEEA-EA at state level that are influencing Ireland's decision to compile national ecosystem accounts. These include the 2020 United Nations Sustainable Development Goals (Goal 15.9) and the Global Biodiversity Framework (GBF) (CBD, 2022a) introduced at COP 15 in 2022. Even more recently the proposed amendment to EU regulation (No. 691/2011), has been approved by the EU Commission and is currently with the European Parliament and Council for final approval (these will be outlined further in Section 2).

In line with these international policies, Ireland's Central Statistics Office (CSO) set up an Ecosystem Accounts Division (EAD) in 2020 tasked with developing Irish ecosystem accounts using the SEEA-EA framework. As a framework, Ecosystem Accounting is a new area for the CSO, and methodologies are still under development (CSO, 2023). The CSO's EAD has begun to compile extent and condition accounts as part of its SEEA-EA implementation. The EAD is also preparing for future reporting of ecosystem accounts to Eurostat (the statistical office of the European Union) which will entail mandatory reporting on ecosystem extent, some condition indicators, and selected ecosystem services. (CSO, 2023).

Figure 5. Image illustrating the SEEA-EA framework.

Four Accounting Streams make up Ecosystem Accounts

Extent accounts show the geographic extent of distinct ecosystems. *Condition accounts* show the level of health and functioning of the ecosystems. *Services accounts* describe the particular ecosystem services that the ecosystems provide to people and their current levels. Benefit accounts describe the ways in which these ecosystem services enhance the lives of people and help us to understand who in our societies is receiving these benefits and who is not.

Source: IDEEA group.

Natural capital accounting is a useful tool to identify trends in the condition of the environment, inform trade-offs, identify co-benefits and establish critical links between natural capital and other capitals (i.e. human, produced, etc.) (Farrell & Stout, 2020). Natural Capital Accounting is also an important tool for identifying knowledge gaps and can be used to assist in decision-making and the integration of a range of sectoral policy targets such as those relating to nature, the environment, land use, society and the economy, aligning them with the global SDGs (Farrell & Stout, 2020).

SECTION 2: The Policy Landscape

In the thirty years since the Convention on Biological Diversity (CBD) came into effect, despite various conservation successes and increased public and political engagement, the destruction of ecosystems and the loss of biodiversity has accelerated across much of the world (IPBES, 2019b). Reports such as the Millennium Ecosystem Assessment (UN, 2005), the Global Assessment from the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, 2019b) and the UK government's Dasgupta Review on the Economics of Biodiversity (Dasgupta, 2021) have highlighted that one of the major causes of ecosystem degradation and biodiversity loss is the failure of mainstream economics and policy processes to fully account for nature and its myriad contributions to human well-being. As a result, the natural capital approach continues to grow in significance at the global and EU levels within policy goals, targets and indicators with which national policy should necessarily align. This section will set out the current policy landscape, highlighting key global, European and national policies, frameworks and strategies with particular emphasis on accounting for nature using the natural capital approach.

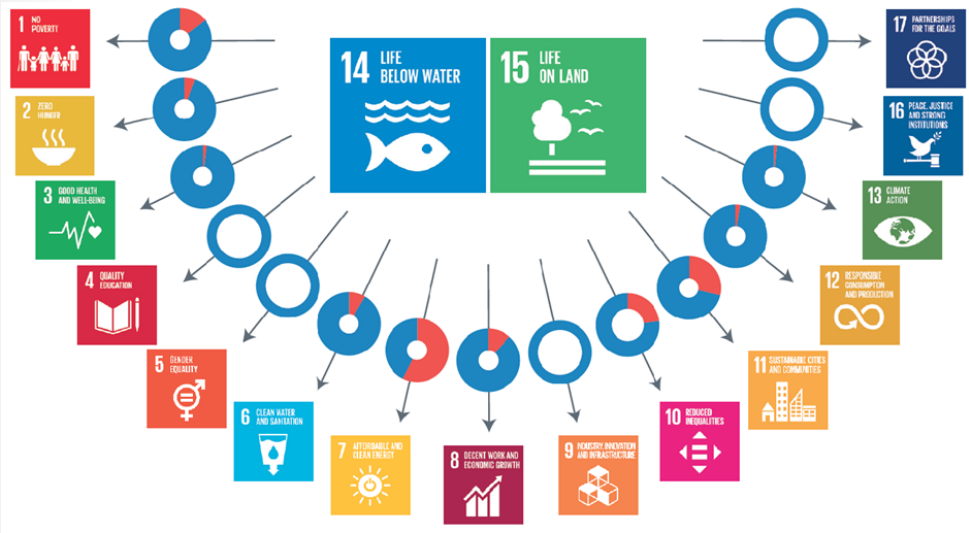
CURRENT GLOBAL GOALS

The Sustainable Development Goals

Agenda 2030 for Sustainable Development was adopted by all UN member states in 2015 and sets out the 17 Sustainable Development Goals (SDGs) which represent an urgent call for action by all countries in a global partnership to end poverty, improve health and education, reduce inequality, spur economic growth, tackle climate change and preserve our land and oceans. There are many links between the health of our planet and our own health and well-being implicit in how we live, work and engage with nature. An analysis of these linkages within the SDGs (Figure 6) demonstrates the substantial contribution of nature-focused SDGs to all other goals (Obrecht *et al.* 2021).

A growing body of research also shows that nature-focused SDGs can act as multipliers for co-benefits across all SDGs (Pham-Truffert *et al.*, 2020; Obrecht *et al.* 2021). Similarly, incorporating a natural capital approach into the other SDGs is essential to ensuring that the nature-focused SDGs – and all related environmental and biodiversity policy and action plans – are achieved. Whilst trade-offs often come into play and must be examined in an open and participatory fashion, grounding such considerations in a natural capital approach, where the essential role of natural capital in supporting human well-being is placed at the fore, can minimise conflicts and maximise success (Obrecht *et al.* 2021). The natural capital approach can reveal precisely where trade-offs may be necessary, and better informs these tough decisions.

Figure 6. The contribution of SDG14 (life below water) and SDG15 (life on land) to other SDGs. (The data is the result of a systematic compilation of the current state of knowledge about interactions among the SDGs, in terms of co-benefits (blue) and trade-offs (red).



Source: Obrecht *et al.*, 2021.

The SDGs advocate for natural capital accounting in Target 15.9 which states 'by 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts' (UN SDG, 2023a) and SDG indicator 15.9.1b: which requires 'integration of biodiversity into national accounting and reporting systems, defined as implementation of the SEEA' (UN SDG, 2023b).

The Post-2020 Global Biodiversity Framework

The 15th UN Conference of the Parties (COP15) to the CBD, held in Montreal in December 2022 resulted in UN member states adopting the landmark Kunming-Montreal Global Biodiversity Framework (GBF) which has a set of 23 targets to be reached by 2030, to achieve four overarching goals central to the overall UN vision of Living in Harmony with Nature by 2050.

The GBF provides a structured approach to better address the biodiversity crisis with a renewed focus on transformative actions which can be taken across all areas of society to halt the loss of biodiversity and ecosystems. It recognises that despite three decades of coordinated global action for conservation, the loss of biodiversity and degradation of ecosystems continues, posing significant threats to human well-being. The GBF includes a vision for biodiversity governance into the future, aiming for a global effort towards living in harmony with nature by the year 2050 and will guide actions worldwide for the decade to 2030 to preserve and protect nature and its essential services to people.

The GBF is built around a theory of change which recognises that urgent policy action is required globally, regionally, and nationally to achieve sustainable development so that the drivers of undesirable change that have exacerbated biodiversity loss will be reduced and/or reversed. The GBF's four overarching global goals pertain to:

1. Maintenance, enhancement and restoration of the integrity, connectivity, and resilience of all ecosystems;
2. The sustainable use and management of nature's contributions to people;
3. The fair and equitable sharing of benefits from the utilisation of genetic resources, digital sequencing information on genetic resources and traditional knowledge associated with genetic resources; and
4. The securing and equitable distribution of adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation.

Among the global targets for 2030 is the effective conservation and management of at least 30% of the world's lands, inland waters, coastal areas and oceans, with emphasis on areas of particular importance for biodiversity and ecosystem functioning and services.

The 23 targets set out for urgent action over the decade to 2030 need to be initiated immediately and completed by 2030 to enable achievement of the goals for 2050. These targets are divided into three categories: 1) Reducing threats to biodiversity; 2) Meeting people's needs through sustainable use and benefit-sharing; and 3) Tools and solutions for implementation and mainstreaming.

Key GBF targets relating to natural capital include:

Target 10: Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such as sustainable intensification, agroecological and other innovative approaches contributing to the resilience and long-term efficiency and productivity of these production systems and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services.

Target 11: Restore, maintain, and enhance nature's contributions to people, including ecosystem functions and services, such as regulation of air, water, and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature.

Target 14: Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular those with significant impacts on biodiversity, progressively aligning all relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.

CURRENT EUROPEAN UNION POLICIES AND STRATEGIES

The language of natural capital continues to grow at EU level, aligning with the SDGs and the GBF. The importance of natural capital accounting in line with the SEEA-EA is also clear from the proposed amendment to EU Regulation (No 691/2011) on European environmental economic accounts which proposes mandatory reporting on ecosystem accounts. It is positive that the language of natural capital is appearing across European policies, frameworks and strategies and that regulation regarding the implementation of the SEEA-EA will increase the number of countries compiling ecosystem accounts. Below are a number of other EU policies relating to natural capital.

- The European Green Deal (EC, 2019) states that "*all EU policies should contribute to preserving and restoring Europe's natural capital*". It also states that it will support businesses and other stakeholders in developing standardised natural capital accounting practices within the EU and internationally (EC, 2019).

- In June 2020, the new EU Biodiversity Strategy (EC, 2021), which sets a target to bring at least 10% of agricultural land under management for biodiversity with explicit aims to protect, conserve and enhance Europe's natural capital, and protect health and well-being from environment related risks and impacts. The development of standardised natural capital accounting practices was explicitly mentioned as part of the range of initiatives to pursue green finance and investment. The Strategy aims to '*create job opportunities, reconcile economic activities with nature and help maintain the productivity and value of our natural capital in the long run'*. The Strategy also introduces the proposed new EU Nature Restoration Law to restore ecosystems for people, the climate and the planet and aid alignment of national policy with European policy. The EU Soil Strategy 2030 is a key deliverable of the EU Biodiversity Strategy 2030.

- The EU Circular Economy Action Plan (CEAP) (EC, 2020) and updated EU Bioeconomy Strategy (EC, 2018) both make clear commitments to the protection of natural capital.

- There are a number of important EU Directives which indirectly link to the natural capital approach including the Habitats, Water Framework, Birds and Marine Strategy Framework directives.

CURRENT CROSS-SECTORAL NATIONAL POLICY AND STRATEGIES

Natural capital language and methodologies are already found in a range of flagship national policies and smaller sector specific policies. However, as compilation of natural capital accounts is not yet mandatory, the impetus is not yet there to ensure that natural capital accounting is a core part of Irish policy across departments and sectors. Natural capital accounting will play an important role in ensuring we move forward as a country that is fully accounting for nature, with capacity to implement policies that protect and conserve Irish nature and improve the health and well-being of our society. A selection of national policies that relate to natural capital are outlined below.

- The 3rd National Biodiversity Action Plan 2017-2021 which includes actions to progress the measuring and valuing elements of Ireland's biodiversity through the development of a natural capital asset register and national natural capital accounts (Action 1.1.10 and 1.1.11).

- Project Ireland 2040 National Planning Framework (NPF) places the protection, conservation and enhancement of our natural capital in the context of both sustainable water management and planning of green infrastructure (Chp 9). The NPF refers to National Policy Objective 52 which dictates that development must occur within environmental limits, adhering to both the relevant environmental legislation and the sustainable management of our natural capital.

- The National Development Plan 2021-2030 has long-term plans to develop guidance on valuing biodiversity and ecosystems which are being informed by the results from ongoing work by projects such as the Irish Natural Capital Accounting for Sustainable Environments project (INCASE) and the government's National Biodiversity Action Plan that apply natural capital accounting (Chp. 3 subsection 5). The natural capital opportunities of rehabilitating previously harvested Bord na Móna Peatlands are described as including increased biodiversity, amenity and other ecosystem services.

- National Adaptation Framework cites natural capital as one of four key thematic areas for development of sectoral adaptation plans for climate resilience in Ireland.

- Heritage Ireland 2030 mentions natural capital in the context of biodiversity and recommends using the natural capital approach to emphasise environmental risk and opportunity in economic systems, so that dependencies on our natural assets are embedded in our policies, plans and actions.

- Ireland's Climate Action Plan (2023) advocates the restoration of peatlands to enrich Ireland's natural capital through increasing ecosystem services, biodiversity, water quality and storage attenuation, carbon storage and amenity potential together with a reduction in carbon emissions (8.2.3 Peatlands Restoration Measures). The importance of rehabilitating degraded peatlands to a 'condition in which they regain their ability to deliver specific ecosystem services' and to allow mitigation gains initially and carbon sequestration in the future, are all stressed in the plan. (17.3.6 Peatland Rehabilitation). The plan highlights the importance of the

bioeconomy, focusing on utilising our biological resources sustainably, and phasing out use of non-renewable and fossil fuel products in order to use our natural capital more efficiently and sustainably (11.2.5 The Bioeconomy). Ireland's Climate Action 2021 included an action for NESC to provide advice on natural capital accounting frameworks (Action 83, Climate Action Plan (2021) Annex of Actions, pg 57).

- The National Land-Use Review Phase 1 Synthesis Report (2023) includes sections on natural capital in relation to land-use and clearly explains the important relationship between natural capital and land-use (in particular agriculture and forestry) and how it can reveal the dependence of economic and social systems on ecosystems and the services they provide (O'Rourke *et al.*, 2023).

Below are a number of policies relating to natural capital, ecosystem services, biodiversity loss and well-being:

- The National Land-Use Review Synthesis Report (2023)
- Common Agricultural Policy (CAP) (2023-2027)
- National Peatlands Strategy (2015)
- Local Biodiversity Actions Plans (BAP), i.e. (Fingal BAP (2022-2030), Dún Laoghaire-Rathdown BAP (2021-2025)
- Draft Forestry Strategy (2022-2030)
- Draft River Basin Management Plan (RBMP) (2022-2027)
- Draft Marine Strategy Framework Directive Part 3: Programme of Measures
- Expansion of Marine Protected Areas (MPAs)
- Ireland's Well-being Framework

REGULATIONS RELATING TO VALUING NATURE THAT ARE APPROACHING

The extensive inclusion of the natural capital approach and stipulations to create natural capital accounts using the SEEA and SEEA-EA frameworks at global and EU levels, shows a clear direction toward the mainstreaming of natural capital language and methodologies in policy, in response to the necessity for a systems-based approach to support sustainable development. Ireland's national and local policy needs to align with global and EU policies and regulations. Below are details of two proposed laws and one draft national biodiversity action:

- The proposed EU Nature Restoration Law, to restore ecosystems for people, the climate and the planet and aid alignment of national policy with European policy, will have legally binding targets for governments in relation to terrestrial, marine and freshwater ecosystems. The SEEA framework has been proposed to support the Nature Restoration Law (Vallecillo *et al*., 2022).
- EU Soil Health Law which proposes to set rules for sustainable soil use and restoration and aims to achieve healthy soils by 2050.
- The 4th National Biodiversity Action Plan 2023-2030 (NBAP) is expected to be published in early 2024 and it is anticipated that the natural capital approach and natural accounting will be incorporated, in line with EU-wide adoption of the SEEA and the proposed changes to the EU Regulation on the SEEA-EA. The working draft of the GBF has been considered in developing the 4th NBAP so that, as far as is possible and practicable, Ireland's efforts to address the environmental crises can support international efforts to 2030 and beyond.

PRIVATE SECTOR POLICY

Government can drive policy change and implementation in both public and private sectors. The GBF, Global Reporting Initiative (GRI), Taskforce for Nature-related Financial Disclosures (TNFD) risk management and disclosure framework and the new EU Corporate Sustainability Reporting Directive (CSRD) are being introduced to influence private companies to disclose how their operations impact and are dependent upon nature.

Target 15 of the GBF commits governments to '*take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions'* assess and disclose impacts and dependencies on nature (including their operations, supply chain, value chain and portfolios) with an overall objective of reducing their negative impacts on nature (Business for Nature, 2023).

The CSRD entered into force in January 2023 and comes under the EU Green Deal. It requires companies to assess their impacts and dependencies on nature and to increase the quality of non-financial reporting. Under CSRD, companies will have to report according to the European Sustainability Reporting Standards (ESRS), with draft Standard ESRS E4 relating to biodiversity and ecosystem services. CSRD will also have an impact on government procurement, in particular for businesses that provide goods and services to government bodies or agencies.

For businesses, utilising a natural capital approach will be important for assessing business opportunities and risks. The Capitals Coalition is a global network driving businesses to assess their impacts and dependencies on natural, social and human capital and has established the Natural Capital Protocol, a framework for the implementation of the natural capital approach at organisational level. NCI project, the Business for Biodiversity Ireland (BFBI) Platform (seed funded by DHLGH and DAFM), provides guidance to businesses in relation to CSRD and implementation of tools such as the Natural Capital Protocol.

SECTION 3: Issues and resolutions

Why do we need a natural capital approach in cross-sectoral Irish policy?

Once we understand that nature underpins and influences every aspect of human life, and that we depend on it to keep our lives and livelihoods stable and enjoyable, we begin to understand the importance of integrating nature into our decision-making across sectors. By understanding nature's specific influence on a particular sector, policymakers can advocate for the health of nature in a way that supports that sector. If all sectors are using the same approach a shared language is developed, cross-sectoral collaboration is facilitated and policies are less likely to conflict, leading to better outcomes. There are a number of ways in which integrating the approach is challenging.

1. Understanding the Approach

Understanding humans' reliance on nature

Our absolute reliance on nature is not always fully understood or recognised outside of the natural sciences, and as such does not appear as a major component of many policies. This lack of understanding of the interconnectedness of human lives, societies and economies with nature can result in decisions and policies that can negatively impact nature, and in turn negatively impact people. One such example might be a planning policy which increases congestion with negative side-effects for air quality and, as a result, human respiratory health.

Understanding the ways in which nature supports economies

It is not commonly known that nature underpins all economic activity by providing a variety of renewable and non-renewable resources as well as maintaining the health of the customer base that enables the exchange of goods and services (Dasgupta, 2021). For this reason, national economies depend on healthy biodiverse ecosystems both locally and globally.

Understanding the link between nature and human health

The relationship between nature and our health, well-being and quality of life is not always recognised. A recent report on well-being in Ireland revealed that there was significant and persistent concern in terms of current quality of life, and sustainability for future generations in relation to the environment, climate and biodiversity (DT, 2022). Nature provides

important cultural ecosystem services such as recreation, spiritual enrichment, artistic inspiration and relaxation, as well as mental-health benefits, therefore understanding human experiences and views on quality of life in relation to the environment is important, to provide valuable inputs into the budget process and to inform policy (DT, 2022).

A positive direction for understanding and capacity building.

In order to drive action around the subject of natural capital, it is important to raise awareness across departments through campaigns that build interest in the topic and drive action. When the purpose and potential of the natural capital approach is explained clearly, it enables policymakers to consider natural capital in relation to cross-departmental and cross-sectoral policies. The Dutch government started their journey to developing national natural capital accounts with a public awareness raising campaign around biodiversity and natural capital between 2011-2014 to build support for the natural capital approach, collaborating with businesses and the International Union for the Conservation of Nature (IUCN) (van Bodegraven, 2018).

In the Irish context expert workshops such as the National Data 4 Nature workshop, held in 2021, and informative public campaigns such as The Citizens' Assembly on Biodiversity Loss (CA, 2022) could be built around the natural capital approach in order to facilitate engagement and increase understanding.

Capacity building in the natural capital approach and natural capital accounting methodologies is necessary to meet the high demand for outputs in this area over the coming years. Ireland has an opportunity to integrate learnings on biodiversity and ecosystems into primary and secondary school curricula as well as producing ground-breaking interdisciplinary third-level natural capital courses to meet this need, while contributing to Ireland's recovery from the COVID-19 pandemic in line with the EU Green Recovery (Vardon et al, 2022).

Opportunities to co-design and co-develop projects to further research into natural capital should be done in collaboration with relevant stakeholders, not just within government departments and agencies. Local communities, farmers, NGOs and academia all play an important role.

2. Implementation

Once a deeper understanding of the links between our lives and nature is established the question of implementation becomes important. The provision of robust ecosystem accounts is the basis of implementation of the natural capital approach as these allow all sectors to work from the same data. At the moment Irish ecosystem accounting is still in its infancy and issues around data gathering have been identified.

Data Challenges

The impacts of biodiversity loss and ecosystem degradation, and changes to other earth system services are often not immediately felt, for instance the unprecedented global loss of freshwater species is considered an invisible tragedy (Reid *et al.,* 2019; Kelly-Quinn *et al*., 2020). Availability of data is the first step toward bringing visibility to these issues, but in Ireland lack of consistency of data collection, collation and utilisation is a barrier to understanding the true state of Ireland's nature. This impacts the ability of policymakers to make informed decisions on how to protect, conserve and restore our natural capital. Data gaps and issues around a lack of consistent data were highlighted in the Data 4 Nature workshop (NCI, 2021). This national workshop brought together policymakers, state agencies, data holders and academics to discuss ways in which the collection and publication of environmental, land and water data can be harmonised to facilitate the preparation of Ireland's natural capital accounts. Areas in particular that need to be addressed to inform policy and ensure realistic, achievable actions and outcomes for natural capital accounting were found to be:

- Alignment of data collection processes and better availability of data within all sections of government, government agencies and NGOs. Issues with availability and useability of data was highlighted by the INCASE Project.

- Increased data collection at different scales including local and national data as local data can provide more granular and locally specific detailed information.
- Local engagement to supplement missing data for each region/water catchment area is necessary, however consideration should be given to reliability/validation of data. Turning local knowledge into usable data was highlighted as one of the biggest challenges for the Bord Iascaigh Mhara project on developing natural capital accounts for Clew Bay, Co Mayo (pers. comm. Gráinne Devine, BIM, March 2023).
- There are big data gaps on ecosystem condition. Developing ecosystem and habitat maps has been recommended in the recent Land Use Review (O'Rourke *et al*., 2023) and such maps would be a very useful aid for data collection on ecosystem extent and condition for rural, urban and suburban areas.
- Often data is collected from final reports or papers on projects that are complete. It would be useful to have easy access to raw data. The UK Office of National Statistics makes raw data available in their national accounts report (ONS, 2022).

A positive direction for data

The Data 4 Nature Report recommendations:

1. Develop a centralised dashboard for Irish nature data (such as the Irish Marine Atlas and the Dutch Natural Capital Atlas)
2. Establish data gathering protocols for Irish nature data
3. Develop protocols to ensure harmonisation of formats
4. Establish methods to publicise and promote Irish nature data
5. Ensure equality of access

A data gap analysis similar to the CBD Ecological Gap Analysis, can reveal gaps in data and define the extent of available data. Such information would enable decision-makers and policymakers to determine how best to manage and fill any gaps.

Mapping Challenges

The newly published National Landcover Map (NLC) is an important tool for developing natural capital accounts. Development of this map was a collaborative project driven by the cross-governmental National Landcover and Habitat Mapping (NLCHM) working group.

Consideration needs to be given to how the NLC can be used for land-use mapping and ecosystem mapping which were highlighted as gaps in the Land Use Review (O'Rourke *et al*., 2023). The new NLC does not identify land-uses, ecosystems, or habitats, although it is a good basis for delivering such maps (O'Rourke *et al.,* 2023).

The NLC is based on 2018 data, so it is important that it is continually updated to reflect current land cover. This could be done in a similar way to the online Marine Atlas (developed by the Marine Institute - the Marine Atlas provides access to Ireland's marine data and related information).

A positive direction for mapping

Land use and ecosystem maps will support Ireland's national reporting obligations for compiling ecosystem accounts under the SEEA-EA. In the Netherlands, High Resolution Ecosystem Unit (LCEU) maps delineating ecosystems units have been developed that can provide guidance for developing such maps in Ireland.

From a user perspective, a map linked dashboard could be the most practical and accessible interface, as with the online Marine Atlas. Building natural capital data into such an interface would allow the user to define an area and identify what data is available. This data can then support decision making for specific issues and assess progress over time (pers. comm. Gráinne Devine, March 2023).

In the wider context, an online dashboard could be linked with water quality factors, storm data, water temperature, pollution events, etc. This in turn can help identify areas which are suitable for future restoration efforts. The Dutch government developed an open-access online platform - Natural Capital Atlas - for the exchange of spatial data and other information on ecosystem services and natural capital - this would be useful in an Irish context as suggested in Ireland's Data 4 Nature Report (NCI, 2021).

Below are details of three recommendations from the Land Use Review (O'Rourke *et al.,* 2023) relating to mapping:

Recommendation 8: To develop a land use map which could aid development of land use strategies.

Recommendation 15: To develop a national map of ecosystem extent and condition that can support land-use decision-making.

Recommendation 18: Relates to investment in land, soil and ecosystem mapping in Ireland and the need for data on land and ecosystem health to help inform decision-making.

Sectoral Knowledge Challenges

Understanding the broad context of our dependence on nature is the starting point. In order for policymakers to understand how their sector relates to nature, an assessment of the relationships should be made. This would require an interdisciplinary approach so that all relevant relationships are captured. A mapping exercise to then identify connections between sectors can ensure a robust understanding of interlinkages. A process can now be established to best utilise the data specific to each sector. Linking use of natural capital to policy is outlined in Figure 7 below (reproduced from Vardon *et al.*, 2022 and Lucas & Vardon (2021):

Figure 7. Linking use of NCA to policy and questions of decision-makers. Reproduced from Vardon *et al.* (2022).

Policy uses	Decision makers' questions	What information helps (data, accounts and analytical tools)	Types of answers that NCA can provide
Problem identification	How are we doing? What has changed, and how does that link to changes in the economy and other factors? Given assumptions about domestic and international development, how will we fare in the future?	Accounting data and derived indicators, simple projections, input–output analysis, environmental-economic models, scenario modelling, spatial analysis, footprint analysis	Interpretations from the data on past and present state Scenarios for future development of economy and environment
Policy design	If we want to change the current state or projected future state, what can we do? Who benefits from changes in policy? Who bears the costs of producing these benefits?	Accounting data and derived indicators, input–output analysis, computable general equilibrium modelling, environmental economic models, scenario modelling, cost–benefit analysis, integrated assessment	Economic and environmental effects of restrictions on scenarios to achieve policy targets Ex ante assessment of the policies' effects on the economy and environment
Policy implementation	How can we target the policy response to get the most improvement for the least cost? Which activities should be done first? What price should be put on natural resources?	Accounting data, derived indicators, environmental-economic modelling, spatial analysis, industry analysis, cost–benefit analysis, business case	Detailed assessment of all the pros and cons of the policy interventions
Policy monitoring	Are the policies making progress towards goals and targets?	Accounting data and derived indicators	Ex-post assessment of policy progress and evaluation of the need to adjust policy instruments
Policy review	How can we make the existing policy more effective to achieve the goals and targets? Are there any unintended consequences of the policy response? Do we need different policy responses?	Accounting data and derived indicators, econometric modelling	Ex-post policy evaluation of effectiveness and efficiency of policy instruments

Source: original source Lucas & Vardon (2021)

Funding

Integrating the natural capital approach requires a continuing research component to track and develop condition indicators based on current information and applications. The short-term character of both the political and business cycles has led to short-term planning for nature where biodiversity and ecosystems can take generations to regenerate, necessitating a longer-term approach. Commitment to adequate funding and support is necessary for projects to address natural capital knowledge gaps and establish where losses are occurring to enable further research on scaling the application of the SEEA and SEEA-EA in different contexts.

A positive direction for funding

Funding for meaningful long-term, in-community engagement and best-practice 'reciprocal restoration' (ecological, cultural and spiritual restoration) is necessary to engender support for the natural capital approach at a local level, particularly in the Irish context as much of our land is privately owned (estimated 78% - O'Rourke *et al.*, 2023).

Funding for projects to build capacity in key areas of research in relation to natural capital and food, human health and well-being, culture, marine, forestry, agriculture, wetlands.

The National Development Plan (Project 2040) notes the role of the Public Spending Code in relation to valuing biodiversity and ecosystem services which is in line with SDG 15.a to *mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.* The government has committed to reviewing the Public Spending Code on an ongoing basis and specifically mentions the INCASE Project, the National Biodiversity Action Plan and natural capital accounting. If the natural capital approach is to be progressed in Ireland, public spending will need to be channelled to projects that support the protection, restoration and conservation of nature, as well as data streamlining and accessibility; however, the responsibility also rests with the business community to invest in restoring our shared natural capital.

Conflicting policies

EU directives are not always fully aligned. It is important that there is alignment across policies as in some cases this is lacking which can cause confusion and frustration. For example, Ireland's CAP Strategic Plan (2023-2027), Objective 4.N1, which aims to reduce GHG emissions from agriculture, does not fully align with the nitrates derogation for dairy farmers which has increased the use of nitrates on the land. It also does it fully align with the Water Framework Directive.

A positive direction for policy harmonisation

Global agreements such as the SDGs, the GBF, the proposed amendment to EU Regulation on European Environmental Economic Accounts, and the proposed Nature Restoration Law, give Ireland a clear path to integrating the natural capital approach in cross-sectoral policy. This will aid in building cross-sectoral policy alignment.

The recently published Land Use Review is a key document for highlighting shortfalls in current land use policy in order to target areas that need reform.

Enforcement of policy

It is not enough to develop and implement policies to restore, protect and conserve our natural capital without adequate funding and enforcement. The recent Citizens' Assembly on Biodiversity Loss report found that the State has comprehensively failed to adequately fund, implement and enforce existing national legislation, national policies, EU biodiversity-related laws and directives related to biodiversity with a recommendation that this situation must change (CA, 2023).

A positive direction for enforcement

The proposed Nature Restoration Law and the recommendations from the Citizens' Assembly on Biodiversity Loss provide a clear direction for policy enforcement. Enforcement of legislation is important for delivering on policy objectives, but also for ensuring that all sectors are fully aware of their obligations.

SECTION 5: What's next?

Building on existing applications

Natural capital research projects have revealed knowledge and data gaps and identified priority areas which can be addressed in the short, medium, and long-term to enable increased accuracy and efficiency of natural capital accounting in Ireland. The outputs of the following projects are a rich source of knowledge as we continue to refine our use of the SEEA and SEEA-EA in Ireland.

Mixed landcover natural capital accounts: The INCASE Project, which concluded in April 2023, developed natural capital accounts at river catchment scale at four locations across Ireland to support the implementation of the EU Water Framework Directive. This involved accounting for ecosystem services across a range of land cover areas including, agricultural, peatlands, freshwater systems, forests, industrial and urban sites. The INCASE final report is an ideal jumping off point for developing natural capital accounts at various scale in Ireland.

Marine natural capital Accounts: Bord Iascaigh Mhara (BIM) undertook a natural capital accounting initiative at Clew Bay, Co Mayo, which concluded in 2022, to explore how the natural capital approach can support the Irish seafood industry in the sustainable management of ocean resources, and to support seafood industry operators to create value (IDEEA, 2022). The project provided an opportunity for BIM to explore the utility of natural capital accounting and its application to other Irish marine and coastal areas (IDEEA, 2021). Natural capital accounting using the SEEA-EA framework was considered particularly useful for supporting effective place-based policies (IDEEA, 2019). The learnings from this project can be taken forward for delivering natural accounts for Ireland's marine environment.

Forestry natural capital Accounts: The Habitats Assessment under Article 17 of the EU Habitats Directive reported that forestry impacted 35% of habitats assessed (NPWS, 2019). Unsustainable forestry practices were identified in the EU Red List of Birds as a driver of bird population decline across Europe (EC, 2022). In response the ForES Project will use natural capital accounting methodology to co-develop tools for sustainable forestry management decision-making. This will enable foresters to recognise the multiple benefits that forest ecosystems provide to people and supply the information needed to fulfil multiple objectives at different sites. This is the first project to combine natural capital accounting with Bayesian Belief Network modelling of ecosystem service supply to support a structured decision-making approach in the Irish context.

Local authorities & community projects: Irish local and regional authorities have been proactively adopting ecosystem approaches for green infrastructure and strategic planning (e.g. Fingal County Council, Dún Laoghaire-Rathdown County Council, Eastern and Midland Regional Assembly) for some time. Consideration should therefore be given when integrating natural capital accounting into this work, which will require collaboration and resourcing.

Implementing natural capital frameworks and tools

The CSO Ecosystem Accounts Division (EAD), set up in 2020, has begun to compile extent and condition accounts as part of its SEEA-EA implementation and will require further resourcing to develop this work.

The SEEA-EA is also being trialled at farm scale (The Farm Zero-C Project) with research reports and findings available from the project website.

There is potential for greater use of other frameworks in conjunction with natural capital accounting such as Community Wealth Building (CWB) and Regenerative Development which involve mapping resources (natural, social, economic and cultural) and enabling capabilities in a particular landscape or water catchment.

Land use

The recently published Land Use Evidence Review (Phase 1) provides evidence to inform policy development and outlines the environmental, social and economic impacts of land use (O'Rourke *et al.*, 2023). This includes content on the natural capital approach in agriculture and forestry, two sectors responsible for the stewardship of c. 78% of the Irish landscape (c. 67% and c. 11% respectively) (O'Rourke *et al*., 2023) with the potential to positively impact on ecosystems, species and habitats, greatly increasing Ireland's natural capital.

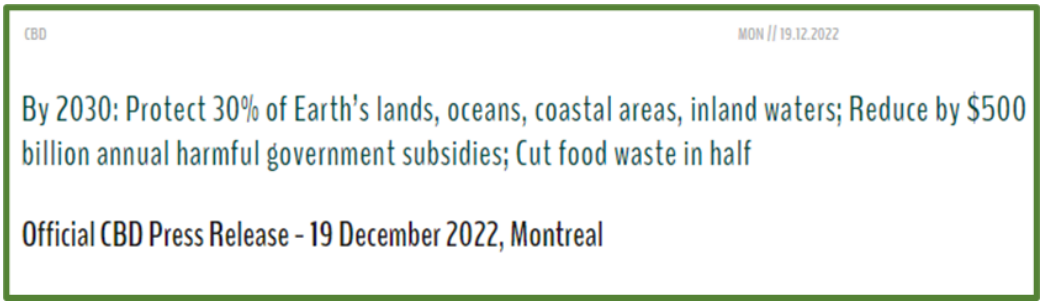
The EU Habitats Directive Article 17 Report states that over 70% of habitats were impacted by pressures relating to agricultural practices and that forestry impacted 35% of habitats assessed (NPWS, 2019). These are sectors where implementation of the SEEA and SEEA-EA can yield important data to demonstrate how to reconcile policy approaches to best improve the health of agricultural ecosystems that are provisioning food, supporting biodiversity, facilitating livelihoods and maintaining Irish culture.

Agri-environmental Schemes and Subsidies

Long-term economic success cannot be sustained if climate, water quality and biodiversity are undermined (O'Rourke *et al.*, 2023). Natural capital approaches are effective tools that drive investment to deliver mutual benefits across an array of multilateral environmental agreements (Farrell *et al*., 2021). Approximately half of the EU territorial area comprises agricultural habitats with approximately 50% of all species and several habitats of conservation concern dependent on agricultural management (O'Rourke & Finn, 2020). Conservation on farmland is therefore key to reversing biodiversity and ecosystem loss in Europe.

Agri-Environmental Schemes (AES), have been implemented in the EU for the last 30 years under the Common Agricultural Policy (CAP), however, they have not always been effective in protecting nature. Instead they have often been seen as a farm income source rather than a means of delivering on environmental and ecological goals, with ecological performance and cost effectiveness of such schemes considered mixed during this time (O'Rourke & Finn, 2020). However, it should be noted that there are a number of Rural Development Programme (RDP) funded agri-environment European Innovation Partnerships (EIP) that have had a positive impact, such as the Hen Harrier IEP Project and the Pear Mussel IEP Project.

Figure 8. Image of the press release issued after the landmark GBF agreement, December 2022 (note: the reduction in value of harmful government subsidies).



There is a need for government subsidies at a sufficient scale that support the protection and creation of natural capital and provide long-term economic return - current biodiversity and forestry supports are in some cases providing incentives that do not align with the outcome objectives. Subsidies that are fit-for-purpose should be co-developed with external stakeholders such as expert practitioners, academics, NGO's, and any other relevant persons/organisations.

When setting the level of subsidies, consideration should be given to the financial impact of future EU fines of failing to meet our environmental targets. The value of high biodiversity land has not always been reflected in available subsidies, however, going forward, EU member states should ensure better alignment with biodiversity strategies and CAP strategies (O'Rourke & Finn, 2020).

Modern agricultural practices are not often compatible with provision of ecosystem services (Dasgupta, 2021), therefore developing schemes that pay landowners to manage their land for biodiversity and ecosystem services is beneficial to both the landowner and nature. *Payment for Ecosystem Services* (PES) is based on the principle that beneficiaries of ecosystem services should pay to preserve and restore them (Dasgupta, 2021), i.e.. whoever preserves or maintains an ecosystem service should be paid for doing so (Sustainable Finance Hub). *Results-based Payment Schemes* link payments to the environmental quality of a farm, with better nature condition resulting in a higher payment level.

Success of any AES should be assessed and monitored over time to ensure it delivers on its actions and objectives. Schemes should be co-created with farmers and landowners in order to fully benefit from their experience and expertise and successfully address challenges. Below are some current examples of agri-environmental schemes.

Results-based Payment Schemes (RBPS)

The Farming for Nature publication (O'Rourke & Finn, 2020) includes Irish case studies that have implemented results-based approaches and payments for conservation of farmland habitats and species including projects and programmes such as the Burren Programme, AranLIFE, KerryLIFE, the NPWS Farm Plan Scheme and the Result-Based Agri-environmental Payment Schemes project (RBAPS).

Agri-Climate Rural Environment Scheme (ACRES) (RBPS)

The ACRES scheme is a new agri-environment climate scheme under Ireland's CAP Strategic Plan which is due to open in the third quarter of 2022. Its purpose is to support farmers that join the scheme to address biodiversity decline due to agricultural practices along with other objectives relating to climate change, food and health. The scheme uses results-based scorecards with incentives to increase scores and improve the farmed landscape (DAFM, 2022). It is proposed that payments for the ACRES scheme will be co-funded by the National Exchequer and the European Agricultural Fund for Rural Development (EAFRD] of the EU under Ireland's CAP Strategic Plan (2023-2027) (DAFM, 2022). This scheme has a funding allocation of €1.5 billion and aims to address biodiversity decline and provide income support to 50,000 farming families in Ireland to adopt more sustainable farming practices on their holdings.

Waters of LIFE

Waters of LIFE aims to reverse the deterioration of Ireland's most pristine waters (one of the objectives of the draft River Basin Management Plan 2022-2027). Although the primary focus of this project is on protecting and restoring high status objective rivers, it will also employ RBPS in recognition of the need to consider the whole farm ecosystem for sustainable management.

All-island approach

Nature does not recognise borders, therefore, implementation of the natural capital approach could be taken from an all-island perspective. The All-Island Climate and Biodiversity Research Network (AICBRN) recognises the importance of natural capital in an all-island context and the need for collaboration. The (AICBRN) is a multidisciplinary network that brings together researchers from across the island of Ireland who are undertaking research in climate and biodiversity topics (AICBRN, ND).

Ireland's natural capital is fundamental to Ireland as a tourist destination. An all-island perspective aligns tourism over a sense of space and place (north and south) and our landscapes are what 'sells' Ireland as a tourism destination. Despite this, the language of natural capital is not widespread in the terminology of the tourism trade (pers. com. Geraldine Cusack, Fáilte Ireland).

Natural capital accounting in other countries

A number of countries are developing national natural capital accounts with the recent addition of the United States and Australia, who announced at COP15 in Montreal in 2022 a joint project on natural capital accounting using the SEEA framework to value nature in national accounts. Learnings from natural capital projects in other countries are very useful, providing an opportunity to learn about the challenges and successes of producing natural capital accounts and to network with those undertaking such projects.

When integrated with the system of national accounting, natural capital accounts make visible the true economic cost of continuing to degrade nature and can inform new roadmaps toward a safer, healthier and more economically viable future for all. The Office for National Statistics (ONS) UK produced natural capital accounts, see Figure 9 below showing details from 2019 and 2020 natural capital accounts. See Appendix 3 for details of natural capital accounting being implemented in other countries.

Figure 9. Example of the outputs from national natural capital accounts from the Office for National Statistics (ONS) UK showing outputs from 2019 and 2022

UK Natural Capital Accounts: Make the value of nature clear.

Office for National Statistics

UK natural capital accounts: 2019

Estimates of the financial and societal value of natural resources to people in the UK.

- The cooling shade of trees and water saved the UK £248 million by maintaining productivity and lowering air conditioning costs on hot days in 2017.
- Around 27,500 life years were saved through vegetation removing air pollution in 2017
- In 2016, living within 500 metres of green and blue space was estimated to be worth £78 billion to UK homes

UK natural capital accounts: 2020

Estimates of the financial and societal value of natural resources to people in the UK.

- Asset value of £921 billion
- Living near publicly accessible green and blue spaces added £3,146 to the average property price
- Over 5 billion nature-related visits within the UK were made in 2018, amounting to 10 billion hours
- Urban green and blue spaces help mitigate the costs of hot days

SECTION 5: Key take-aways

Areas for further focus to advance the natural capital approach and natural capital accounting in Ireland:

- Build capacity to deliver on Ireland's obligations to compile national ecosystem accounts using the SEEA-EA framework, including upskilling, training, and building natural capital into the education system.
- Budget for nature - allocating sufficient funds across sectors to support Ireland's journey to developing national natural capital accounts cannot be overstated. Natural capital accounting can help policymakers to build cases for budget allocation and stewardship with clear benefits.
- Development of land-use, ecosystem and habitat maps as recommended in the recent report on the land-use review. This would have potential to enable identification of natural assets, provide condition assessments and outline ecosystem services provided. Such maps will provide a significant boost to Ireland's ability to produce natural capital accounts at different scales. Investment in technology to develop online software to enable easy access to nature data is an important step.
- The mainstreaming of natural capital and associated terminology will help to avoid misconceptions and misunderstandings. The National Land-Use Review Synthesis Report (2023) includes sections on natural capital in relation to land-use and clearly explains the important relationship between natural capital and land-use. This level of detail is missing from many strategies. Signposting the natural capital approach within national policies, frameworks and strategies would bring more coherence across policies.
- Establishment and resourcing of a Natural Capital Advisory group (an Irish equivalent to the concept of the UK's Natural Capital Committee ([1]NCC) (see their final report here (NCC, 2020)) to support the integration of the natural capital approach across government.

[1] The Natural Capital Committee (NCC) was an independent advisory committee from 2012-2020. Many of the functions of the NCC have now been transferred to the Office of Environmental Protection.

Appendices

APPENDIX 1: GLOSSARY

Abiotic: Non-living as in the non-living parts of ecosystems (e.g. temperature, light, water) (Esmerelda Project)

Asset: Anything that has current or future economic value. Natural assets are assets in the natural environment and consist of biological assets (produced or wild), land and water areas with their ecosystems, subsoil assets and air (OECD 2022)

Benefit accounts: Describe the ways in which ecosystem services enhance the lives of people and help us to understand who in our societies is receiving the benefits and who is not

Biodiversity: The variety of all life, including genetic, species and habitat/ecosystem diversity. In most cases, the more biodiverse ecosystems have more resilience to environmental change

Biotic: Relating to or resulting from living organisms; the living parts of ecosystems

Condition accounts: Show the level of health and functioning of the ecosystems

Cultural services: The tangible and intangible services related to the perceived or experienced qualities of ecosystems whose existence and functioning contributes to a range of cultural benefits i.e., spiritual enrichment, artistic inspiration, relaxation, recreation etc.

Earth system services: The services provided to humans from earth systems including the atmosphere, biosphere, hydrosphere, cryosphere and geosphere

Ecosystem: All the organisms living within a specified community and the non-living factors with which they interact e.g. river, hedgerow, ocean, dune system

Ecosystem condition: The quality of an ecosystem measured in terms of its abiotic and biotic characteristics

Ecosystem extent: The size of an ecosystem asset, commonly in terms of spatial area (UN, 2021 / SEEA, simplified)

Ecosystem services: The outputs from ecosystems which have a benefit and value to human wellbeing. Defined to categories including: Provisioning Services such as food and water; Regulating Services such as climate and pollination; Supporting Services such as soil nutrient cycling; and Cultural Services such as educational, aesthetic and cultural heritage including recreation and tourism. (MA, 2005)

Extent accounts: Show the geographic extent of distinct ecosystems

Flows (of an ecosystem service): The amount of an ecosystem service that is actually mobilized in a specific area and time

Green Infrastructure (GI): A strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services (ES). It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings.

Gross Domestic Product (GDP): The standard measure of the value added created through the production of goods and services in a country during a certain period (OECD 2022)

Human capital: This refers to the productive wealth embodied in labour, skills and knowledge. (Dasgupta, 2021)

Landcover: The observed physical and biological cover of the Earth's surface, includes natural vegetation and abiotic (non-living) surfaces. (SEEA Central Framework)

Land use: Reflects both (a) the activities undertaken and (b) the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions. (SEEA Central Framework)

Macroeconomics: Macroeconomics is the study of large-scale economic issues, such as inflation, GDP (GDP), and unemployment. (Investopedia)

Natural capital: Describes the earth's natural environment, including living (plants, animals and microorganisms, and their interactions and functions) and non-living elements (including land, water, and air), considered as assets or stocks that yield a flow of services and benefits to people. Also known as *Natural Assets. (adapted from Natural Capital Protocol via Atkinson and Pearce 1995; Jansson et al. 1994).*

Natural capital accounting: A way of organising information about natural capital so that the state of and trends in natural assets can be documented and assessed by decision makers. NCA is often used interchangeably with the terms Environmental and Green Accounting though they have different origins and meanings.

Natural capital approach: A natural capital approach integrates the concept of natural capital and the methodology of natural capital accounting into decision-making and is underpinned by the understanding that human life is dependent on the health of nature. Thinking in 'capital' terms enables comparison of many changes and decisions at the same time. *(adapted from Natural Capital Coalition)*

Nature: The natural, physical, or material world or universe. It is often used to describe wildlife and geology, and is analogous with the more strictly defined concept of ecosystems

Produced capital: Capital goods embodied in human-made goods or structures, such as roads, buildings, machines, and equipment (Dasgupta, 2021)

Provisioning services: Are those ecosystem services representing the contributions to benefits that are extracted or harvested from ecosystems

Regulating services: Are those ecosystem services resulting from the ability of ecosystems to regulate biological processes and to influence climate, hydrological and biochemical cycles, and thereby maintain environmental conditions beneficial to individuals and society

SEEA: System of Environmental-Economic Accounting developed by the United Nations. This approach to natural capital accounting contains the internationally agreed standard concepts, definitions, classifications, accounting rules and tables for producing internationally comparable statistics and accounts (SEEA)

Services accounts: Describe the particular ecosystem services that the ecosystems provide to people and their current levels

Social capital: Mutual trust and associated norms of reciprocity that enable people to engage with one another (Dasgupta, 2021)

Stocks: A supply or quantity of something accumulated or available for future use

Systems approach: Describes a way of dealing with complex problems by analysing the entire system in as large a context as possible, in order to establish a solution which will be successful across the entire system.

APPENDIX 2: ACRONYMS

Acronym:	Meaning
ACRES:	Agri-Climate Rural Environment Scheme
AES:	Agri-environmental scheme
AICBRN:	All-Island Climate and Biodiversity Research Network
BFBI:	Business for Biodiversity Ireland
BIM:	Bord Iascaigh Mhara
CAP:	Common Agricultural Policy
CBD:	Convention on Biological Diversity
CEAP:	EU Circular Economy Action Plan
CSO:	Central Statistics Office
CSRD:	Corporate Sustainability Reporting Directive
CWB:	Community Wealth Building
DAFM:	Department of Agriculture, Food and the Marine
DEFRA:	UK Department of Environment Food & Rural Affairs
DHLGH:	Department of Housing Local Government and Heritage
EAD:	Environmental Accounts Division
EAFRD:	European Agricultural Fund for Rural Development
EC:	European Commission
ESRS:	European Sustainability Reporting Standards
ESRS-E4:	Draft European Sustainability Reporting Standards E4 Biodiversity and ecosystems
EU:	European Union
GBF:	Global Biodiversity Framework
GDP:	Gross Domestic Product
GHG:	Green House Gas
GI:	Green Infrastructure
GRI:	Global Reporting Initiative
IDEEA:	Institute for Development of Environmental-Economic Accounting
INCASE:	Irish Natural Capital Accounting for Sustainable Environments project
IPBES:	Intergovernmental Platform on Biodiversity and Ecosystem Services

IUCN:	International Union for the Conservation of Nature
NBAP:	4th National Biodiversity Action Plan (2023-2030)
NCI:	Natural Capital Ireland
NGO:	Non-Governmental Organisation
NLC:	National Landcover Map 2018
NPF:	Project Ireland 2040 National Planning Framework
NPWS:	National Parks and Wildlife Service
ONS:	UK Office of Statistics
PES:	Payment for Ecosystem Services
RBPS:	Results-based Payment Schemes
SDG:	Sustainable Development Goals
SEEA:	System of Environmental Economic Accounting
SEEA-CF:	System of Environmental Economic Accounting -Central Framework
SEEA-EA:	System of Environmental Economic Accounting-Ecosystem Accounting
SELINA:	Science for Evidence-based and Sustainable Decisions About Natural Capital
SNA:	System of National Accounts
TNFD:	Taskforce for Nature-related Financial Disclosures

APPENDIX 3 Details of natural capital approaches and accounting being implemented in other countries.

 *The United Kingdom:*

There are useful learnings from the United Kingdom on developing national natural capital accounts, having released UK Natural Capital Accounts for 2022 with estimates of the financial and societal value of natural resources to people in the UK (Office for National Statistics (ONS), 2022). These accounts were developed in line with the guidelines set out by the SEEA framework. ONS (2022) provides a detailed report on the UK natural capital accounts which includes accounts for provisioning, regulating and cultural services, and also provides access to the data via hyperlinks. A background paper was published to explain the concepts and methodology underlying the UK natural capital accounts developed by the ONS and Department of Environment Food and Rural Affairs (DEFRA) National (ONS, 2017).

The UK make public their NC accounts data including a breakdown of the financial and societal value of natural capital to UK residents (Chp 7).

 *The Netherlands:*

The Dutch government have developed policies that promote nature-inclusive land use and nature-based solutions that benefit people and nature (van Bodegraven, 2018). They have invested in developing tools and guidance to integrate natural capital accounting in policy related issues and produce national natural capital accounts. Testing and production of high resolution, national scale ecosystems accounts started in 2012, a collaboration between the Netherlands Statistical Office and Wageningen University (Lars *et al*., 2020). They worked on a national level to include high resolution maps and accounting tables for ecosystem type, condition, service, assets, carbon and biodiversity (Hein *et al*., 2020). A full carbon account for the Netherlands that was published in 2018 based using the SEEA and provided a comprehensive overview of relevant carbon stocks and flows (carbon accounts are one of the thematic accounts for ecosystem accounting) (Lof *et al.*, 2018). In 2019, natural capital accounts for the Dutch North Sea area were developed showing the extent and condition of ecosystems of the North Sea (Schenau *et al*. 2019).

 *Columbia*:

Columbia has become one of the first of 11 partner countries in the National Ecosystem Assessment Initiative at the UNEP-WCMC to launch its national ecosystem assessment. Data from the ecosystem assessment are used to ensure that biodiversity is accounted for in decision-making. The National Ecosystem Assessment was a collaboration that included Indigenous peoples and local communities.

 *United States*:

In 2022 President Biden signed an executive order to develop guidance to account for nature and its benefits in federal decision-making, an initiative to create the first government-wide natural capital accounts, with the purposes of measuring the economic value that natural resources provide to society and illustrating how a robust economy depends on a healthy natural environment.

 *Australia:*

Although not yet a feature at national level, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) of Australia and IDEEA Group work with government, industry and communities to assess and account for natural capital across a range of projects at different scales. Research has been undertaken on the use of natural capital accounting and ecosystem accounting to investigate provisioning services of Australian native forests which demonstrated the contributions of ecosystems beyond traditional national accounts. Ecosystem services and their contributions to industry were shown to be quantifiable, and could reveal the trade-offs required when use of services by different industries conflict (Keith *et al*., 2017)

CAPITALS COALITION

Good practice projects highlighted by the EU Commission of Capitals Coalition projects include:

- EU LIFE project Transparent - Developing a standardised methodology for natural capital accounting in business:
- Align project - Aligning Accounting Approaches for Nature to support businesses, financial institutions and other stakeholders in developing standardised natural capital accounting practices.

United Nations Statistics Division and the United Nations Environment Programme, in collaboration with the Convention on Biological Diversity:

Natural Capital Accounting and Valuation of Ecosystem Services (NCAVES) project aims to advance both the knowledge agenda and the development of policy-applications of environmental-economic accounting, and in particular for ecosystem accounting. The project initiated pilot testing of the SEEA EA in five participating partner countries - Brazil, China, India, Mexico and South Africa,

 *Science for Evidence-based and Sustainable Decisions About Natural Capital (SELINA)*

Funded by the EU. SELINA is a multinational transdisciplinary network of professionals ranging from ecologists, economists, and social scientists to decision-makers of all levels. Their mission is "*To reshape decision making processes within the public and private sectors by improving the uptake of biodiversity, ecosystem condition and ecosystem services information*".

APPENDIX 4: Drivers of biodiversity loss and valuing nature

The drivers of biodiversity loss and ecosystem change

When we hear about biodiversity loss, it can be difficult to visualise what exactly is being 'lost'. It can also be difficult to understand how biodiversity loss impacts us specifically as individuals, and globally as a human society. We can think of this from two perspectives: 1) Other species have intrinsic value and therefore the same rights to exist as humans and 2) it benefits humans to live in a biodiverse world because that diversity provides resilience to threats such as disease and destructive weather events. A natural capital approach is an important tool to halt biodiversity loss and to protect, conserve and restore biodiversity, ecosystems and the services they provide.

The Drivers of Biodiversity and Ecosystem Loss

The main factors driving biodiversity and ecosystem loss are human activities. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) states that *'Nature and its vital contributions to people, which together embody biodiversity and ecosystem functions and services, are deteriorating worldwide'* and that *'Direct and indirect drivers of change have accelerated during the past 50 years*' (IPBES, 2019). The five main drivers of biodiversity loss are:

1. Land use change – particularly caused by agriculture
2. Exploitation of our ecosystems
3. Pollution
4. Invasive/alien species
5. Climate change

These can be viewed as direct and indirect drivers including:

Indirect drivers of biodiversity loss	Direct drivers of biodiversity loss
Global population growth	Habitat destruction, on land and in freshwater and aquatic systems
Global politics and trade	Soil degradation as a result of land use change, development, agricultural intensification and habitat destruction
Land use change and soil degradation	Pollution of land and water (including agrochemicals)
Urbanisation	Introduction of non-native species that become invasive
Agricultural intensification	Fossil fuel use
Climate Change	Increased global temperatures, increased frequency and severity of extreme weather events

Valuing Biodiversity

Biodiversity is short for biological diversity and refers to the diversity of life at different scales such as genetic, species, ecosystem, biome etc. Diversity at all of these levels builds resilience in nature and supports the processes that make human life possible on earth. As we degrade nature through land-use change, pollution, introduction of invasive species, over-exploitation, and climate change, extinction levels rise and the level of biodiversity falls. This has dire consequences for human health and contributes to a warming climate (Dasgupta, 2021).

In Europe, most protected habitats and species have either poor or bad conservation status (EEA, 2023). This is reflected in Ireland too, with the results from the most recent EU Habitats Directive Article 17 Report stating that 85% of protected habitats have an unfavourable (*Inadequate* or *Bad*) conservation status – of this figure, 46% are Inadequate and 39% are Bad, with only 15% having a favourable conservation status (NPWS, 2019; EPA, 2020). The report shows ongoing declining trends in 46% of protected habitats (NPWS, 2019). The Article 17 report also highlighted that declining trends were particularly notable in marine, peatland, grassland and woodland habitats (NPWS, 2019). These are worrying trends for these Natura 2000 habitats because as they decline the services that they provide to us also decline. Currently only 17% of the world's terrestrial areas and 10% of the world's marine areas are under protection (CBD, 2022b). Globally, freshwater ecosystems show among the highest rate of decline in condition (IPBES, 2019; Kelly-Quinn *et al.*, 2020).

In December 2022 the United Nations Biodiversity Conference (COP15) highlighted the stark reality of the ongoing biodiversity crisis at a global level and the threat it poses to nature and human well-being (CBD, 2022a). In recognition of this a landmark agreement was made by the parties to: Protect 30% of Earth's lands, oceans, coastal areas, inland waters; Reduce by $500 billion annual harmful government subsidies; and Cut food waste in half by 2030. The conference also launched the Global Biodiversity Framework (GBF) to support states to reach these targets.

The 2023 Report of the Citizens' Assembly on Biodiversity Loss (CABL), highlights the urgent need to drive change in order to halt biodiversity loss with a whole-of-government, whole-of-society approach. Advocating strongly for nature, the CABL recommends a referendum of the people to amend the Constitution with a view to protecting biodiversity (CA, 2023).

The recent World Economic Forum's Global Risks Report (WEF, 2023) considers biodiversity loss and ecosystem collapse as one of the fastest deteriorating global risks over the next decade and is ranked in the top four risks over the next 10 years. All six environmental risks are ranked in the top 10 risks over the next 10 years (*Failure to mitigate climate change; Failure of climate change adaptation; Natural disasters and extreme weather events, Biodiversity loss and ecosystem collapse; Natural resource crises; Large-scale environmental damage incidents*). Each of these risks are interrelated and compound each other. These risks are a direct threat to our natural capital, and also stem largely from our failure to conserve and restore it.

The Irish government declared a climate emergency and a biodiversity emergency in 2019, however the biodiversity emergency has not been treated with the urgency reflective of the current crisis, nor with the same degree of urgency as that of the climate crisis. Both crises are interlinked - it can be useful to think of them as two sides of the same coin. If we fail at protecting nature, we will fail at preventing climate breakdown and conversely, actions to help protect, conserve and restore biodiversity can mitigate the negative impacts of climate change. This is infinitely important, not only for the health of our planet, wildlife, and economies, but for human health and well-being. As stated in the recently published Report of the Citizens' Assembly on Biodiversity Loss '*To protect ourselves, we must protect nature*' (CA, 2023).

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