

THE ENVIRONMENT STRATEGY FOR SCOTLAND

DRIVING THE TRANSITION TO A NATURE POSITIVE ECONOMY:
A SYNTHESIS OF POLICY LEVERS FOR GOVERNMENTS

Report by the James Hutton Institute



Disclaimers

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1. Acronyms

BAU	Business as Usual
BRN	Borderlands Restoration Network
CAP	Common Agricultural Policy
CAT	Common Asset Trust
CBD	Convention on Biological Diversity
CDP	Carbon Disclosure Project
CIW	Canadian Index of Wellbeing
CO ₂	Carbon Dioxide
COP	Convention of the Parties
COVID	Coronavirus
CSB	Council for Sustainable Business
CST	Centre for Complex Systems in Transition
DAO	Decentralized Autonomous Organization
DWM	Department of Watershed Management (City of Atlanta)
EOI	Economic Operating Infrastructures
ESG	Environmental, Social and Governance
EU	European Union
EVRI	Environmental Valuation Reference Inventory (Canada)
FAO	Food and Agriculture Organisation (of the United Nations)
FRB	Forest Resilience Bond
FSC	Forest Stewardship Council
GANE	Global Assessment for a New Economics
GBF	Global Biodiversity Framework
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEP	Gross Ecosystem Product
GHG	Greenhouse Gas
GPI	Genuine Progress Indicator
GPP	Green Public Procurement
GRI	Global Reporting Initiative
GWP	Global Water Partnership
ICAP	International Carbon Action Partnership
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IFCSB	International Finance Corporation Forests Bond
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
LGBTQ+	Lesbian, gay, bi, trans, queer/questioning and more

LSE	London School of Economics
MSC	Marine Stewardship Council
NbS	Nature-based Solutions
NCAPP	NatureScot Natural Capital Pilot Programme
NEF	New Economics Foundation
NGO	Non-governmental Organisation
NFCP	Natural Forest Conservation Program
OECD	Organisation for Economic Co-operation and Development
PAM	Partnership Assurance Model
PES	Payment for Ecosystem Services
PSE	Private Sector Engagement
RBC	Responsible Business Conduct
RIB	Rhino Impact Bond
RLUP	Regional Land Use Partnership
RSPB	The Royal Society for the Protection of Birds
S&P	Standard and Poor
SAI	Sustainable Agriculture Initiative
SBTN	Science Based Targets Network
SEEA	Systems of Environmental Economic Accounting
SEI	Stockholm Environment Institute
SLCP	Sloping Land Conversion Program
STAR	Species Threat Abatement and Recovery Metric
TEEB	Economics of Ecosystems and Biodiversity
TEV	Total Economic Value
TLFFSB	Tropical Landscapes Finance Facility Sustainability Bond
TNFD	Nature-related Financial Disclosures
TPI	Transition Pathway Initiative
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
WBCSD	World Business Council for Sustainable Development
WWF	Worldwide Fund for Nature

2. Executive Summary

An intended outcome of the Scottish Environment Strategy is: ‘Our thriving, sustainable economy conserves and grows our natural assets’. Achieving this outcome will mean transforming the Scottish economy so that it thrives within the planet’s sustainable limits, and is nature positive, net zero and circular. This report contributes to the evidence base needed to inform the development of a ‘pathway’ for achieving that outcome, and in particular on the transition to a nature positive economy.

Nature positive economies are an emerging concept, with no current consensus on how they are defined. However, there is an acceptance that they are economies built around principles of wellbeing for nature and societies rather than monetary and material values, with actions that are regenerative and collaborative, in which economic growth is only valued where it contributes to social progress and environmental protection. Some of their components are recognisable as part of a system that tackles climate change and biodiversity loss and delivers outcomes consistent with wider societal goals.

An important aspect of achieving such a transformation is to progress towards renovating infrastructures and implementing innovations that integrate social, institutional, and physical processes and relationships that support the connections within and between systems. One framework for articulating the transformations required is Economic Operating Infrastructures (EOI) for a wellbeing economy.

An EOI reframes economics around the following principles:

- **stewardship of the whole** (valuing and honouring whole systems, including planetary ones)
- **co-creating collective value** (optimizing wellbeing and the dignity of all beings)
- **governance through cosmopolitan-localism** (cosmo-localist governance, with a principle of subsidiarity in which decisions are made at the lowest level appropriate while acknowledging the global context)
- **generativity, reciprocity, and circularity** (recognising that the Earth’s resources can only be used within their capacity for renewal)
- **relationality and connectedness** (the notion that humans are social beings existing in an interconnected web of interdependencies)
- **equitable markets and trade** (markets that honour full costing and pricing, fair trade, and community self-sufficiency).

The categories of EOI that follow the principles for a wellbeing economy consist of economic innovations associated with overarching efforts to shift the **narrative** away from conventional economics towards one of wellbeing, alongside innovations in approaches to **economic governance, financing mechanisms, exchange mechanisms, business structures, and products and services**. This report considers the policy levers of most relevance to delivering on the elements of the EOI (Table Executive Summary 1 [ES 1]).

Table ES 1. Categories of policy levers used in the analysis of nature positive economies

Economic Operating Infrastructure	Regulatory measures	Economic measures
Narrative dissemination and education	Multilateral agreements	Taxes
Economic governance: national/private/multi-stakeholders initiatives	Mandatory due diligence	Subsidies
Financing mechanisms: financing transformation (greening finance and financing green)	Sustainable public procurement	Biodiversity offsetting
Exchange mechanisms: embedding nature value in policy/ metrics for national accounts/ metrics for business/ new currencies (blockchain)		
Product and services: payment for ecosystem service schemes/ ecological footprint reduction and ecolabelling		

To understand the relevance of policy levers to achieve nature positive economies, a review was undertaken of grey and academic literature, and a set of case studies were identified, which illustrate actions or initiatives of policy levers in an international context. The recommendations proposed have been articulated according to the policy levers in a classification presented in Table ES 2.

Table ES 2. Summary of recommendations for actions towards a nature positive economy transition, based on the literature and classified by policy levers.

Policy levers	Alignment with Harris (2023)	Actions based upon the literature review	Adherence to options for change (Figure 21.1, Dasgupta, 2021)
Creating a new narrative for a nature positive economy (<i>EOI-narrative</i>)	Information-based	Pursuing a pattern of sustainability requires a transformative change in thinking before acting	Transform institutions and systems

Debating new economics principles at all educational levels <i>(EOI-narrative)</i>	Information-based	Including ecological economics principles in scholastic curricula	Transform institutions and systems
Proposing a renovated economic governance supporting positive nature actions at multiple institutional scales <i>(EOI-economic governance)</i>	Regulatory/ Economic lever	Building effective institutions operating from global to local scales	Transform institutions and systems
Addressing economic governance for nature positive actions through value chain creation <i>(EOI-economic governance)</i>	Economic lever	Implementing landscape management approaches to conserve and restore natural assets	Balance the impact equation and increase nature's supply
Committing to new nature positive policies and regulatory measures <i>(regulatory)</i>	Regulatory levers	Making a pledge to nature positive actions through enforcing stronger regulations	Transform institutions and systems
Reforming fiscal tools and economic incentives <i>(economic)</i>	Economic lever	Operating a revision of economic policy mechanisms that disincentivise nature conservation	Transform institutions and systems

Addressing nature valuation in policies, accounting, and wellbeing metrics beyond GDP (<i>EOI-exchange mechanisms</i>)	Economic lever	Incorporating the value of nature into policy and proposing new economic metrics to capture benefits to nature and people	Change measures of economic success
Enforcing policies and regulation for greening finance (<i>EOI-financing mechanisms-economic</i>)	Economic lever	Directing business to measure and disclose impacts, dependencies, and risks to nature by enforcing international standards and metrics	Transform institutions and systems
Reforming financial mechanisms (<i>EOI-financing mechanisms-economic</i>)	Economic lever	Implementing mechanisms to finance green activities	Transform institutions and systems

Based upon a rapid review of evidence, a synthesis of actions and recommendations to achieve transitions to nature positive economies identified the following:

- **Pursuing a pattern of sustainability requires a transformative change in thinking before acting.** Coordinated actions to achieve nature positive economies need support and an agreed common vision for sustainable development which captures the imagination of a broad community of stakeholders. Such a vision has become important in sustainability science for developing transition pathways.
- **Reformulating education programmes to include ecological economics across schools and universities.** Successful narratives can shift power and bring about transformative change because of their potential to change mindsets.
- **Building effective institutions operating from local to global levels.** Develop strategies in which public, private and civil society institutions work together to make flexible and polycentric arrangements. These should reflect local knowledge within decision-making. Benefit would accrue from use of the

concept of *glocalization*, where problems are sorted locally, according to the specific needs of the place and communities, but are of global domain.

- **Incorporating value of nature in policy and proposing new economic metrics to capture benefits to nature and people.** Valuing nature must guide decision-making following principles of scientific and economic integrity throughout the valuation process.
- **Pursuing landscape management approaches to protect and restore natural assets.** Coordination and balance is required between protecting terrestrial and marine protected areas and supporting other human needs, with effective stakeholder engagement and participation in planning and decision-making.
- **Pledging nature positive actions supported by enforcement of policies and regulations.** Political direction and signals of intent towards achieving nature positive targets require suitable measures and regulations, and enforcement. Greater impacts will be achieved for requirements which are mandatory, such as due diligence for investors and trade in global commodities.
- **Reforming economic policy mechanisms.** Some fiscal policies currently make destroying nature cheaper than its protection. Subsidies for harmful practices should be reformed. More use should be made of economic tools such as environmental taxes, charges, tradable permits, Payment for Ecosystem Services (PES) programmes, and ecological fiscal transfers to strengthen the adoption of 'polluter pays' principles, and to remove or reduce economic costs falling on sustainable practices.
- **Directing businesses to measure and disclose impacts, dependencies and risks on nature by enforcing international standards and metrics.** Steps are needed to ensure that businesses assess and manage their impacts and dependencies on nature and associated risks, and that this is built into corporate governance. The adoption or tailoring of international standards could help de-risk the shift in financial flows away from nature-negative towards nature positive outcomes.
- **Implementing mechanisms to finance green activities.** International and national governments and agencies should lead efforts to ensure the security and robustness of innovative finance mechanisms as a means of raising capital from private markets and facilitate the flow of investments into companies and projects that can have a positive impact on biodiversity.

Table ES 3 provides a summary of the **policy levers** mentioned above together with **recommendations** to achieve a nature positive economy.

Table ES 3: Recommended actions for policy levers.

EOI lever - Creating a new narrative for a nature positive economy

- work on transformative change in narrating the principles for nature positive economies.
- agree on a common vision for sustainable development and transition pathways.
- empower citizens to achieve changes envisaged by the new narratives.
- listen to and reward people who operationalise nature positive transitions.
- reinforce access to green space to reduce some types of deprivation.
- redesign urban architecture to enable human-nature connectedness.
- promote active citizen engagement, such as citizen assemblies to address nature, climate, and the economy.

EOI lever - Debating new economics principles at all educational levels

- disseminate stories and narratives about the roles of nature positive economies.
- consider a transformation of the discipline of economics.
- ground economics in sustainable, equitable and inclusive values.
- promote nature positive values in research, information campaigns, education and university curricula.
- use open-access platforms to understand the economics of innovation, inequality, and environmental sustainability.

EOI lever - Proposing renovated economic governance supporting positive nature actions at multiple institutional scales

- work with public, private and voluntary institutions to generate flexible top-down and bottom-up arrangements.
- instigate institutional reforms to enable transitions to nature positive economies.
- address multi-stakeholder platforms to counter biodiversity loss in ecosystems that span across countries.
- operationalise sustainable supply chain models by implementing Responsible Business Conduct (RBC) standards in supply chains.
- incentivize future sustainable produce through ecolabelling.

EOI lever - Addressing economic governance for nature positive actions through value chain creation

- make a compelling economic case for global efforts to expand coverage of protected areas.
 - direct financial resources to integrate the protection of land and sea, and involve indigenous people and communities to support international goals of COP15.
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- adopt strategies that tackle multiple societal challenges.
 - use integrated planning and management approaches that facilitate dialogue between communities, institutions and production sectors.
 - combine nature conservation and nature regeneration through sustainable habitat management.
 - involve actors throughout value chains at early stages of planning to understand the actions on the ground needed (e.g. nature-based solutions).
 - establish formal compliance of forest and land use carbon offsetting.
 - promote financing of nature-based solutions by carbon pricing programmes such as cap-and-trade system and carbon taxes.
 - develop an approved suite of nature-based solution approaches, which can be included in carbon offset programmes.

Regulatory lever – Committing to new nature positive policies and regulatory measures

- promote international multilateralism.
- pledge to reverse biodiversity loss by 2030, adhering to the Leaders' Pledge for Nature.
- implement the post-2020 Global Biodiversity Framework.
- adopt the Kunming-Montreal Global Biodiversity Framework (GBF).
- champion nature positive trade policies.
- regulate for mandatory due diligence for investors.
- enforce OECD guidelines on responsible business conduct and due diligence guidance.
- ensure public procurement vendors disclose biodiversity impacts along their value chain.

Economic lever – Reforming fiscal tools and economic incentives

- reform subsidies of harmful activities.
 - restructure environmental taxes, charges, tradable permits, Payment for Ecosystem Services programme, ecological fiscal transfer.
 - adopt 'polluter pays' principles.
 - prevent economic costs impacting upon sustainable practices.
 - incentivise sustainable decision-making by removing financial barriers (e.g. dedicated credit lines) for sustainable practices.
 - implement a carbon tax and direct funds towards investments in natural capital (e.g. afforestation/reforestation, peatland restoration).
 - ringfence taxes on discharge of pollutants, use of pesticides and extraction of resources towards investments in nature positives actions.
 - incentivise fiscal exemptions for conservation easements.
 - compensate ecological fiscal transfers from the Global North to the Global South that face reductions in GDP through incentivising nature positive policies.
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EOI Lever - Addressing nature valuation nature in policies, accounting, and wellbeing metrics beyond GDP

- decision-making guided by valuing nature, in which the valuation process follows principles of scientific and economic integrity.
- reinforce the assessment of diverse values in the valuation of nature.
- realise the importance of value for local communities taking into account place-based decisions.
- promote and implement natural capital approaches.
- test accounting rules for resources and ecosystems, as per those elaborated by the United Nations System of Environmental Economic Accounting.
- encourage businesses to use the Natural Capital Protocol to measure dependencies and their impacts on nature, and consequences throughout the supply chain.
- require businesses and investors to disclose their strategies' reports of risks to biodiversity.
- promote natural capital accounting to advance policies for embedding negative externalities in the price of natural resources.
- use natural capital approaches/accounts for planning, implementing and monitoring the effects of public policies.
- formulate new metrics as alternatives to GDP to measure wellbeing and inclusive wealth.
- promote the use of metrics that target biodiversity, such as the IUCN Species Threat Abatement and Recovery Metric (STAR).

EOI Lever - Enforcing policies and regulations for greening finance

- ensure that public, private and voluntary sectors disclose the impacts of their investment choices.
- coordinate international actions between the environmental sector, national finance ministries, central banks and financial regulators.
- implement the EU Taxonomy and the Sustainable Finance Disclosure Regulation.
- ensure that businesses assess and manage their impacts and dependencies on nature, and associated risks to nature.
- promote the use by businesses and financial institutions of ESG standards such as those of the Global Reporting Initiative (GRI).
- endorse initiatives such as the UN Global Compact (based on 10 principles concerning human rights, labour, the environment, and anti-corruption), the Transition Pathway Initiative (TPI), and CDP (formerly the Carbon Disclosure Project).
- require mandatory compliance with the Taskforce on Nature-related Financial Disclosures (TNFD) framework.
- regulate stock markets to facilitate innovative mechanisms for issuing stocks and bonds that define impacts rather than only objectives of financial outcomes.

EOI lever - Reforming financial mechanisms

- promote the use of a broad range of market and financial mechanisms that would advance nature positive economies.
- encourage PES-like schemes which operate at regional and landscape scales and have appropriate sets of standards and metrics.
- issue nature and climate sovereign bonds.
- use environmental impact bonds in which the beneficiary party works with private investors on a pay for success basis.
- make use of blended finance to de-risk markets.
- facilitate the aggregation of projects which are too small to attract financial investment.
- require standardised data and transparency as part of overcoming barriers to the deployment of private finance to sustainability.

The policy levers listed in Table ES 3 are supported by **case studies** listed in Table ES 4 below.

Table ES 4. Summary of case studies in support of policy levers.

Regulatory measures: international agreements and mandatory due diligence	Economic measures: tools to realign producers and consumers strategies	Economic Operating Infrastructures (EOI)	
<i>International/ multilateral agreements:</i> Due diligence obligations: French laws on climate and nature finance disclosures - case study 1	<i>Taxes:</i> Conservation easement - case study 3	<i>Financial mechanisms:</i> Green bond - case study 6 Environmental impact bonds - case studies 7 & 8	<i>Economic governance:</i> Pre-competitive agreement, multilateral platform - case studies 12 & 13
<i>Mandatory public procurements:</i> Green Public Procurement policy in agriculture - case study 2	<i>Subsidies:</i> Removing harmful subsidies - case study 4	<i>Exchange mechanisms (currencies):</i> Cryptocurrencies and biodiversity tokens - case study 9	<i>Economic governance:</i> Infrastructure to conserve and restore nature (nature-based solutions) - case study 14

<p><i>Biodiversity offset:</i></p> <p>The role of compensation mechanism for residual impacts - case study 5</p>	<p><i>Exchange mechanisms (metrics):</i></p> <p>Valuing nature and natural capital accounting - case study 10</p> <p>New metrics, beyond GDP - case study 11</p>	<p><i>Narrative research:</i></p> <p>Boosting a new narrative and cultural shift to nature positive, and restructuring the economics discipline - case studies 15 & 16</p>
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Key messages which can be derived from the case studies in Table ES 4 are:

- To achieve the goal of reversing the loss of biodiversity it is essential to set **mandatory requirements** for **businesses, investors** and the entire **financial sector**, in order to improve transparency in disclosing the impacts on biodiversity and risk for nature, business and society (see *case study 1*).
- **Mandatory Green Public Procurement** (GPP) would empower the public sector to support nature restoration. Evidence from Sweden shows that organic farming has expanded since 2006 by implementing a national GPP policy (*case study 2*).
- Economic tools can be used to realign production to more sustainable practices by pricing resources more correctly through environmental taxes or by removing harmful subsidies. **Fiscal tools** which can help transition to nature positive economies are those designed to incentivise positive behaviours such as tax credits for project developers or landowners. Fiscal exemptions for conservation easements can promote conservation practices (*case study 3*).
- **Subsidies** continue for practices which are harmful to biodiversity, notably those linked to production in the forestry, agriculture and fisheries sectors (*case study 4*).
- **Biodiversity offsetting** can be used as a compensation mechanism for projects that, after applying the appropriate prevention and mitigation measures, still have residual impacts on biodiversity. However, this mechanism can be inappropriate due to the long-time scale for habitat recovery and a high probability of restoration failure (*case study 5*).
- **Innovative finance** can lever economic resources from public and private organizations to provide low cost, low risk and long-term debt capital attracting risk-averse investors (*case study 6*), which is linked to outcomes (*case study 7*), but with risks arising from uncertainty associated with cashflow forecasts and use of simplified impact metrics (*case study 8*).
- Several Economic Operating Infrastructures (EOI) have been proposed and implemented, examples of which are:
 - EOI, as **exchange mechanisms**, proposing innovative crypto-currencies and tokens based on blockchain to align money with value for societal

benefit. Tokens can be bought and used as evidence of investments in nature for use in ESG reporting and disclosure (*case study 9*).

- **Natural capital valuation** can be an important policy lever for assessing the physical and monetary benefits of ecosystem services. Systematising such valuations in accounts can provide direction to reversing the loss of nature, support the planning and monitoring of policy, inform recommendations for decision making, and be used in response to both climate and biodiversity crises (*case study 10*). Natural capital valuation can also be used as a basis for metrics at a national level that can accompany the standard GDP to assess pathways to sustainability (*case study 11*).
- EOI can address new **economic governance** mechanisms characterised by a set of measures or arrangements of different scope and scale (from local to global) to facilitate the partnering of public, private and civil society stakeholders. International cooperation between private organizations with impacts on social and environmental public sector are emerging which respect to environmental values and their enhancement (*case studies 12 and 13*).
- EOI can be harnessed to protect, manage, and restore nature, and generate wider benefits for human wellbeing and biodiversity, through use of **nature-based solutions**. Nature-based solutions can be used to promote restorative measures that help green and blue infrastructure for the delivery of a range of ecosystem services, and should be a component of end-to-end value chain assessments (*case study 14*).
- The infrastructures and approaches identified are more likely to achieve transformations towards a nature positive economy if they are part of a new **narrative** about the relationship between humans and nature, including revised content in academic curricula in economics (*case studies 15 and 16*).

3. Introduction

An intended outcome of the Scottish Environment Strategy is: ‘Our thriving, sustainable economy conserves and grows our natural assets’. Achieving this outcome will mean transforming the Scottish economy so that it thrives within the planet’s sustainable limits, and is nature positive, net zero and circular.

Nature positive economies are an emerging concept, with no current consensus on how they are defined. However, there is an acceptance that they are economies built around principles of wellbeing for nature and societies, rather than monetary and material values, with actions that are regenerative and collaborative, in which economic growth is only valued where it contributes to social progress and environmental protection. Elements required for a nature positive economy are being developed, in different contexts around the world, by academia, governments and NGOs.

A rapid evidence review has been carried out to identify frameworks and the components which would be appropriate for transitioning towards a nature positive

economy in Scotland. It supports wider research being undertaken by the New Economics Foundation (NEF) to help inform the development of a pathway towards the goal of a just transition to a net zero, nature positive, circular economy.

The findings from this review have been structured using the concept of Economic Operating Infrastructures (EOI; Waddell *et al.*, 2023) to classify policy levers (Rivington *et al.*, 2023) that can be used by public, private and voluntary sectors for accelerating the uptake of nature positive approaches, supported by international examples of initiatives and approaches. The EOI is linked to requirements for a wellbeing economy (Hough-Stewart *et al.*, 2019; Wellbeing Economy Alliance, 2020), and of the need for new economics for a thriving society (Boehnert, 2018; Fazey *et al.*, 2020).

This report brings together and summarises the key findings from the review across a range of international studies which explore the policy levers governments can use to help drive the transition to a nature positive economy.

4. Aims

This report will support the development of the Environment Strategy for Scotland. In particular, it will help to provide the evidence base needed to inform the development of a 'pathway' for one of the Environment Strategy outcomes: 'Our thriving, sustainable economy conserves and grows our natural assets'¹.

Achieving this outcome will mean transforming Scotland's economy so that it thrives within the planet's sustainable limits. In particular, it will mean supporting the just transition to an economy which is:

- **Nature positive** – promoting nature's recovery by rebuilding natural capital and driving a shift to sustainable production and consumption - ensuring that our economic activities are designed to replenish and regenerate the natural systems on which our economy and wellbeing depend.
- **Net zero** - rapidly decarbonising across sectors and investing in nature-based solutions to reach net zero by 2045, while also reducing the carbon footprint of our consumption of imported goods and services.
- **Circular** - shifting from a linear 'take, make, waste' economy to a circular economy which is regenerative and minimises waste – in turn, supporting decarbonisation and reducing pressure on nature.

This report focuses on the transition to a nature positive economy and aims to summarise key evidence in the scientific and practice domains which underpin recommendations in international reviews of relevance, notably that of Dasgupta (2021) in their reporting on the economics of biodiversity. The EOI framework is then used to organise the evidence in relation to levers which can be used by

¹ Note that before publishing the full Environment Strategy, the wording of this outcome may be updated to reflect the scope of issues set out in this section, including the goal of a just transition to a net zero, nature positive, circular economy.

government, and other relevant actors, to achieve the aim of a nature positive economy.

The report contributes to a wider project led by the New Economics Foundation (NEF), which aims to gather and analyse existing sources of evidence to draw conclusions on Scotland's current performance in progressing towards a just transition to a net zero, nature positive, circular economy; and to recommend the policy levers that could be used most effectively by the Scottish Government to drive progress towards this goal. The findings from this evidence review have been made available to NEF, in draft and final forms, as background information for the development of recommendations on how the Scottish Government can strengthen its approach to achieving the outcome 'Our thriving, sustainable economy conserves and grows our natural assets' (also referred as the 'Economy' outcome).

5. The Environment Strategy for Scotland

The Environment Strategy creates an overarching strategic framework for Scotland's policies on the environment and climate change. One of its key aims is to support a whole-of-government approach to tackling the climate and nature emergencies. The strategy was placed on a statutory basis by the [UK Withdrawal from the European Union \(Continuity\) \(Scotland\) Act 2021 \('the Continuity Act'\)](#), with Section 47 requiring Scottish Ministers to prepare and publish an environmental policy strategy.

The Scottish Government is taking a phased approach to developing the Environment Strategy. Its [vision and outcomes](#) were published in 2020, followed by an [initial monitoring framework](#) and [website](#) for tracking progress towards these outcomes, published in 2021. Progress reports to update the Scottish Parliament were published in March [2022](#) and [2023](#). The current and final phase is to develop 'outcome pathways', identifying actions and priorities across government for driving progress towards the strategy's outcomes.

One Earth. One home. One shared future.

By 2045: By restoring nature and ending Scotland's contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come.

The strategy's outcomes are designed to provide focus for the efforts of the Scottish Government and its partners when working to deliver the vision, summarised above.

Three of the outcomes describe the Scottish Government's ambitions for the environment, focusing on nature, climate change and sustainable resource-use:

- Scotland's **nature** is protected and restored with flourishing biodiversity and clean and healthy air, water, seas and soils.
- We play our full role in tackling the global **climate** emergency and limiting temperature rise to 1.5°C.
- We use and re-use **resources** wisely and have ended the throw-away culture.

There are established policies and strategies in these areas - the Environment Strategy sets an overall framework for these and explores synergies between them. The remaining three outcomes describe wider ambitions for Scotland's economy, society and global citizenship – drawing out connections with wider government policies:

- Our thriving, sustainable **economy** conserves and grows our natural assets.
- Our healthy environment supports a fairer, healthier, more inclusive **society**.
- We are responsible global citizens with a sustainable **international footprint**.

The Environment Strategy recognises that playing Scotland part in tackling the climate and nature emergencies will rely on transformative changes across Scotland's economy and society, based on a just transition. In turn, this can help to achieve wider goals for the health and wellbeing of Scotland's people and the resilience of our economy.

6. Nature positive economies

The loss of nature is recognised as a risk to the functioning of economies and societies. Recent global assessments have called for a systematic transformation of economies through implementing initiatives that fulfil the objectives proposed in the *post 2020 Global Biodiversity Framework* to commit the global community to halt and reverse biodiversity loss ("Global Risks Report 2022," 2022; World Economic Forum, 2020; Boehnert, 2018; Dasgupta, 2021; Mace *et al.*, 2018; Power *et al.*, 2022; SEI, 2022; Economics for nature 2022; UNEP, 2021). The arguments for such transformations recognise the limited achievement of the global Aichi targets of biodiversity despite international agreement aiming to halt biodiversity loss (CBD, 2020). The emphasis has moved to one of evolving nature positive economies (zu Ermgassen *et al.*, 2022), a concept which has stimulated significant levels of interest from the private sector with associated guidance and proposals for best practice, such as Taskforce for Nature-related Financial Disclosures (TNFD) and the Conservation Hierarchy (Milner-Gulland *et al.*, 2021).

Nature positive economies represent a new concept the specifics of which may change over time as it is operationalised. In its current guise, it can be considered to be "a wider system that recognises different nature goals (e.g. climate and biodiversity), and delivers outcomes consistent with wider social goals and targets" (Locke *et al.*, 2021; zu Ermgassen *et al.*, 2022).

A consensus on what nature positive means is not established, although it is clear that it represents a shift from no net loss to net positive impact (zu Ermgassen *et al.*, 2022). Some of the definitions proposed in the literature refer only to one of the

elements necessary to describe the concept, or the target to achieve and the process to be followed.

UNEP considers a nature positive economy as one “that is regenerative, collaborative and where growth is only valued where it contributes to social progress and environmental protection” (UNEP, 2021). Natural England and the UK Joint Nature Conservation Committee consider this approach as a way to reverse “the current decline in biodiversity so that species and ecosystems begin to recover” (JNCC, 2021). The UK Council for Sustainable Business (CSB) considers a nature positive economy to be “a proactive and restorative approach focused on conservation, regeneration, and growth” (CSB, 2022). From the perspective of the target, it can be considered a strategy to achieve net positive by 2030, and a full recovery by 2050 (Locke *et al.*, 2021).

Other authors argue the importance of achieving nature positive rather than defining it, such as Business for Nature which considers this concept to be a process to “*assess, commit, act, advocate*” (Business for Nature, 2021). A process-based description is also provided by the World Business Council for Sustainable Development, that defines the steps necessary to achieve nature positive as “*assess and prioritise, commit, measure and value, act, transform, disclose and report*” (WBCSD, 2021).

7. The importance of nature to society and the economy

The section above on ‘Nature positive economies’ presented an emerging concept of embedding the idea of societal transformations beyond the goal of restoring biodiversity. In this section the need for such a transformation is reviewed in light of the importance that nature has on societies and economies.

An effect of the COVID-19 pandemic was to slow down all of the world’s economies (IPBES, 2020). Initially, this had some positive effects on the level of consumption of resources and a reduction in levels of pollution. The Scottish Government notes the desirability and opportunity to plan for a green recovery from COVID-19, such as locking in reductions in GHG emissions (Scottish Government, 2020). However, recovery policies may create a disproportionately high impact if they are not coordinated with the aim of transitioning towards nature positive economies, with a risk of exacerbating impacts on social and natural boundaries (IPBES, 2019; Pascual *et al.*, 2022).

Approximately three billion people live in circumstances that are highly vulnerable to climate change (Pörtner *et al.*, 2022). Current unsustainable development is increasing the exposure of ecosystems and people to climate hazards. Since 1970, trends in agricultural production, fishing, bioenergy production and the harvesting of materials have all increased, but contributions of nature to wellbeing, mostly regulating and non-material services, have declined (IPBES, 2019).

The use of natural resources has more than tripled since 1970. However, benefits accrued and environmental impacts created have been uneven across countries and regions (UN, 2019). If benefits are mainly accrued to final consumers in rich

economies, environmental damages are suffered by those who supply goods and environmental services, and depend more on nature. In many circumstances it is the poorest and most vulnerable communities to suffer the highest death tolls caused by climate-related disasters, air pollution and stresses on natural resources (e.g. soil and water quality). Estimates show that more than one billion jobs in sectors such as farming, fisheries, forestry and tourism depend on healthy ecosystems (SEI, 2022). Thus impacts on nature can contribute to unemployment and exacerbate inequalities between and within countries, with the share of global wealth mainly in private hands and governments becoming poorer (Chancel *et al.*, 2022).

The 2021 drought in California, USA, led to restrictions in the use of water which caused reductions in cultivation, a shortage of crops, and increases in retail prices, in turn creating inflationary pressures in the US economy (Power *et al.*, 2022). The scarcity of stocks of natural resources such as water and the loss of regulating ecosystem services can have an adverse impact on businesses. For example, pollination supports 75% of global food crop types, including fruits and vegetables, and some of the most important cash crops such as coffee, cocoa, and almonds with estimates of market values ranging between US\$ 235 billion and US\$ 577 billion (FAO, 2022). Negative impacts on natural capital can create indirect effects on markets with consequences for prices of commodities, reductions of revenues for businesses, and a loss of purchasing power of household income. Multiple challenges to supply chains and increasing costs for business are expected (e.g. Foot, 2022).

Economic impacts can translate into risks for the public and financial sectors, potentially compromising financial stability. Adverse impacts on nature may lead to direct and indirect fiscal implications for government finances through lower tax revenue, damage to infrastructure, additional expenditure on welfare, increased costs of ecosystem restoration, slower economic growth, and increased sovereign credit risk (Power *et al.*, 2022).

Progress has been made in valuing and measuring stocks and flows of natural capital using physical and monetary metrics to thinking about their roles and uses (Alpizar *et al.*, 2020; Costanza *et al.*, 2014a; Dasgupta, Partha, 2021; Turner *et al.*, 2010). Evidence shows the implications of the degradation of nature on the loss of income for economic sectors such as forestry, agriculture and tourism, and benefits to communities (e.g. Nature4Climate, 2020).

Researchers have included natural capital into integrated assessment models to account for the benefits nature provides and explore macroeconomic implications on losses to GDP, and how this is shared amongst countries under scenarios of business as usual compared to those of nature positivity (WWF, 2020). Businesses have developed quantitative metrics to assess biodiversity impacts at site, project, product, supply chain and corporate levels, by means such as targeting the analysis of dependencies and impacts on the environment (Capitals Coalition, 2021a; Joseph, 2018). There is also increasing recognition that the knowledge and economic models of indigenous peoples and local communities can offer holistic

understanding that connects the wellbeing of people and nature (Carr, 2020; Pio and Waddock, 2021; Maseyk *et al.* 2019).

Political and institutional actions that direct transformative change (Nature4Climate, 2020; Power *et al.*, 2022; World Economic Forum, 2020; WWF, 2020) can set the conditions in which nature positive economies can emerge in the following ways:

- building a clear political vision that incorporates diverse voices and perspectives, including those of Indigenous Peoples (Carr, 2020; Pio and Waddock, 2021; Maseyk *et al.* 2019; Ruth, 2020);
- making nature more visible in decision making by mainstreaming full-cost accounting of natural capital into economic decision-making (Barbier *et al.*, 2020; Bateman and Mace, 2020; Costanza *et al.*, 2014a, 2021; Turner *et al.*, 2019, 2010);
- integrating nature into business decisions by measuring and valuing their dependencies on natural capital (Capitals Coalition, 2021b, 2021a; Freeman, 2017; Waddock, 2020b);
- financing nature protection by developing and incorporating biodiversity metrics into public and private finance (Cooper and Trémolet, 2019; Loorbach *et al.*, n.d.; OECD, 2019);
- working with nature by investing in restoring ecological infrastructures and nature-based solutions;
- co-creating a shared vision for a nature positive future through inclusive, participatory processes and multi-stakeholder dialogue (Green Economy Coalition, 2022.; Waddell and al, 2021; Waddock, 2021, 2020c).

8. Infrastructure for new economies

To progress towards a nature positive economy requires a realignment of an existing economy with a range of values that look beyond the principle of economic growth fuelled by the throughput of natural resources (Barnes and Boait, 2020; Boarini and D'Ercole, 2013; Costanza *et al.*, 2014c; OECD, 2018). Such a vision for a new economics is founded in the principles of wellbeing for nature and society (Costanza *et al.*, 2016; Hough-Stewart *et al.*, 2019; Wellbeing Economy Alliance, 2020). In order to flourish, the wellbeing approach needs a reconfiguration of society beyond the economic paradigm of growth as narrated by the capitalistic approach. It needs to broaden the scope of concerns to an integrated perspective that focuses on the wellbeing of people and nature, such that economies are based predominantly on equitable socio-ecological values rather than those of monetary and material wealth (Kenter and O'Connor, 2022; Lovins *et al.*, 2018). Wellbeing economies are based upon values which take account of the stewardship of the whole, decentralization, relationality, and regenerativity (Waddock, 2020c), rather than neoliberalism's market primacy, growth orientation, and profit maximization values (Faber, 2020; Institut Montaigne, 2020; Jackson, 2021).

The achievement of this transformation requires renovation of old infrastructures and implementation of new innovations organised under the concept of Economic Operating Infrastructure (EOI) for a wellbeing economy (Waddell *et al.*, 2023). In this context, 'renovation' means transforming the economic landscape by integrating social, institutional, and physical infrastructures, processes and relationships that support connections between parts of systems and between systems.

The term EOI refers to elements of transformation systems, or integrated activities and efforts that are attempting to build new economies. Such elements include ideas, technologies, and innovative structural relationships and new institutional arrangements that foster equitable and thriving life (see Methods section). In the context of systemic transformations, EOI involves deep changes in the purpose of a system, performance metrics, and power structures and relations between stakeholders. This in turn influences operating practices (Waddell *et al.*, 2021; Waddock, 2021).

These wellbeing EOIs support new approaches to economics that can be referred to as regenerative (Morseletto, 2020), circular (D'Amato *et al.*, 2017; D'Amato and Korhonen, 2021; Ellen Macarthur Foundation, 2022, 2022), doughnut (Raworth, 2017a), and feminist (Bahn *et al.*, 2020; Eisler, 2017; Nussbaum, 2003; Piaget *et al.*, 2020).

Transitioning to nature positive actions requires the adoption of strategies that embed plurality of values as promoted by new economics approaches. Such transitions require recognition of the importance of the contribution of all members of society, with voice given to the least heard (zu Ermgassen *et al.*, 2022).

The GANE (Global Assessment for a New Economics) initiative (www.neweconomics.net) undertook a non-systematic scoping review of "new economics" approaches from which it derived 10 core principles. A proposed set of wellbeing economics values upon which nature positive economies can be built is provided in Table 1 (slightly amended in a paper under review, Kenter *et al.*, forthcoming). These principles reframe economics around 'what gives life to systems':

- **stewardship of the whole** (valuing and honouring whole systems, including planetary ones);
- **co-creating collective value** (optimizing wellbeing and dignity of all beings);
- **governance through cosmopolitan-localism** (cosmo-localist governance, or ensuring decisions are made at the lowest possible level while acknowledging the global context);
- **generativity, reciprocity, and circularity** (the concept that the Earth's resources should only be used within its capacity for renewal);
- **relationality and connectedness** (the notion that humans are social beings existing in an interconnected web of interdependencies);

- **equitable markets and trade** (markets that honour full costing and pricing, fair trade, and community self-sufficiency)

Table 1. Values and principles promoted by new economics approaches investigated by GANE.

Values	Principles (a subset)
<i>Stewardship of the whole</i>	<ul style="list-style-type: none"> • Recognise that economies are embedded within societies and ecosystems, and the purpose of economics should be to maintain and improve human and planetary wellbeing • Acknowledge that economies have fundamental biophysical and biochemical limits to growth • Recognize that human-derived capital depends on nature
<i>Co-creating collective value</i>	<ul style="list-style-type: none"> • Consider equity and justice as central questions of economic inquiry • Embed a positive understanding of freedom based on wellbeing, dignity, and sufficiency in all economic thinking, decisions, and actions • Embrace pluralistic social and relational approaches that support social enfranchisement and the common good
<i>Governance through cosmo-localism</i>	<ul style="list-style-type: none"> • Recognise that economies are embedded within societies and ecosystems, and the purpose of economics should be to maintain and improve human and planetary wellbeing • Take post-capitalist, decolonised economic perspectives • Embed participation, deliberation, and cooperation as core to economic thinking and policy
<i>Regenerativity, reciprocity, circularity</i>	<ul style="list-style-type: none"> • Recognise that economies are embedded within societies and ecosystems, and the purpose of economics should be to maintain and improve human and planetary wellbeing • Recognize that human-derived capital depends on nature • Design economies to be regenerative and circular • Acknowledge that economies have fundamental biophysical and biochemical limits to growth
<i>Relationship-connectedness</i>	<ul style="list-style-type: none"> • Embrace pluralistic, social, and relational approaches that support social enfranchisement, social needs and the common good • Embed participation, deliberation, and cooperation as core to economic thinking and policy • Embrace complexity and the need for inter-disciplinarity in addressing economic problems

Transitions to a nature positive economy align with the concept of being positive to the values proposed in Table 1. Initiatives proposed by the JNCC, WWF and UNDP, suggest that to pursue this road it is necessary to:

- put **people** at the heart of economy, facilitating connectedness;
- advocate **systemic** economic reform;
- involve **multi-stakeholder** institutions as an essential element of reshaping governance and decision making for a nature positive economy;
- operate within **planetary boundaries** and working with **nature** to address societal challenges (European Union, 2022);
- provide benefits for both human wellbeing and biodiversity through implementing **nature based solutions** (Natural England *et al.*, 2021; Nature4Climate, 2020; Economics for nature, 2022; WWF, 2020, 2022).

9. Methods

This section describes how the literature consulted has been classified to enable the proposal of policy levers that could be used by the Scottish Government to facilitate the transition toward a nature positive economy. For consistency with the recent report on “Reducing Scotland’s International Environmental Impact: Learning from International Best Practices” (Rivington *et al.*, 2023) the macro classification of policy levers to reduce consumption (JNCC; Harris, 2023) has been used, as summarised in Figure 1.

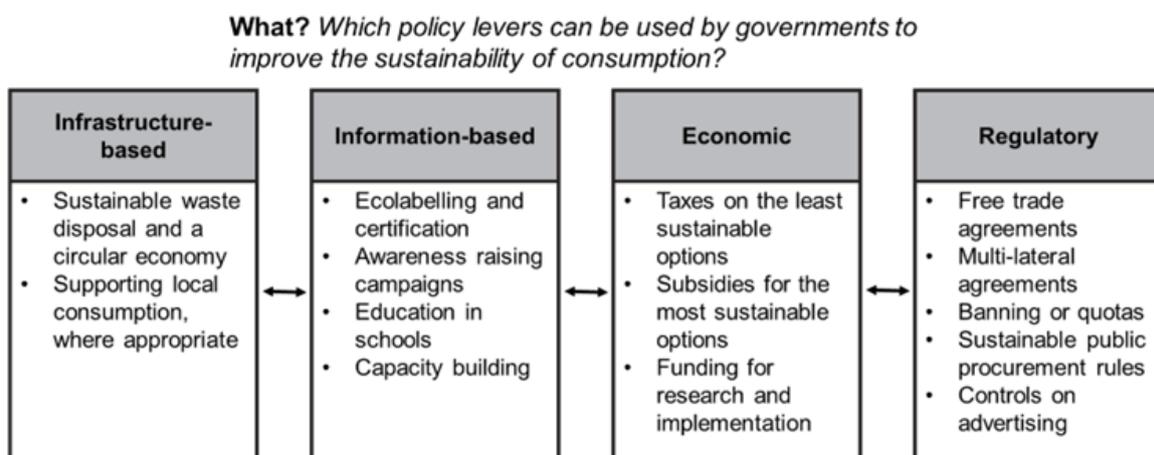


Figure 1. Framework for policy levers proposed by Harris (2023)

The classification of Harris (2023) provides specific policy levers applicable to the sustainability of consumption, which can be grouped under four broad headings: infrastructure-based; information-based; economic; and regulatory.

This classification has been refined to align with mechanisms for enabling transitions to a nature positive economy. The information and infrastructure-based policy levers have been aligned with the approach of Economic Operating Infrastructures (EOI) suggested by Waddell *et al.* (2023). This reflects their potential to embed wellbeing principles to support a wellbeing economy (Kenter *et al.*, forthcoming; Waddock, 2020c, 2020a) (Figures 2 and 3).

-
- **Narrative research**
 - Narrative dissemination and education
 - Cultural change campaigns
 - **Economic Governance**
 - Private governance initiatives
 - National constitutional reform
 - Multi-stakeholder initiatives of intergovernmental organizations
 - **Financing mechanisms**
 - Integrating wellbeing economies principles into historic infrastructure
 - New aggregation mechanisms
 - Ecosystems for financing transformation
 - **Exchange mechanisms**
 - Markets
 - Production chain agreements
 - New technology platforms
 - Product-consumer direct exchanges
 - Metrics
 - National accounts
 - Change initiatives metrics
 - ESG ratings of businesses
 - Currencies
 - Local currencies
 - Cryptocurrencies
 - **Production structures**
 - For-benefit organizations
 - Partnerships, alliances, and networks
 - Benefit corporations
 - **Products and services**
 - Co-production
 - Payment for ecosystem services
 - Reducing the ecological footprint of production
-

Figure 2. Categories of innovation in the current wellbeing EOI; sources (Waddell *et al.*, 2023).

Figure 2 presents the EOI list and subcategories reported by Waddell *et al.* (2023) as relevant to support and sustain ecosystems and lives, improve human well-being, prioritize basic needs, and reduce inequality. The analysis of these infrastructures is

based upon non-systematic web- and document-based research published between 2011 and 2021, comprising scientific journals explored in the Scopus catalogue and Google Scholar, and grey literature (reports and web sites). The categories derived consist of economic innovations associated with overarching efforts to shift narratives away from conventional economics towards wellbeing, innovations in approaches to economic governance, financing mechanisms, exchange mechanisms, business structures, and products and services.

A framework for the EOI shows the support and influence, and feedback, of one category on another (Figure 3). Details of the meaning, typologies and subcategories for each of the six EOI are provided in Waddell *et al.* (2023).

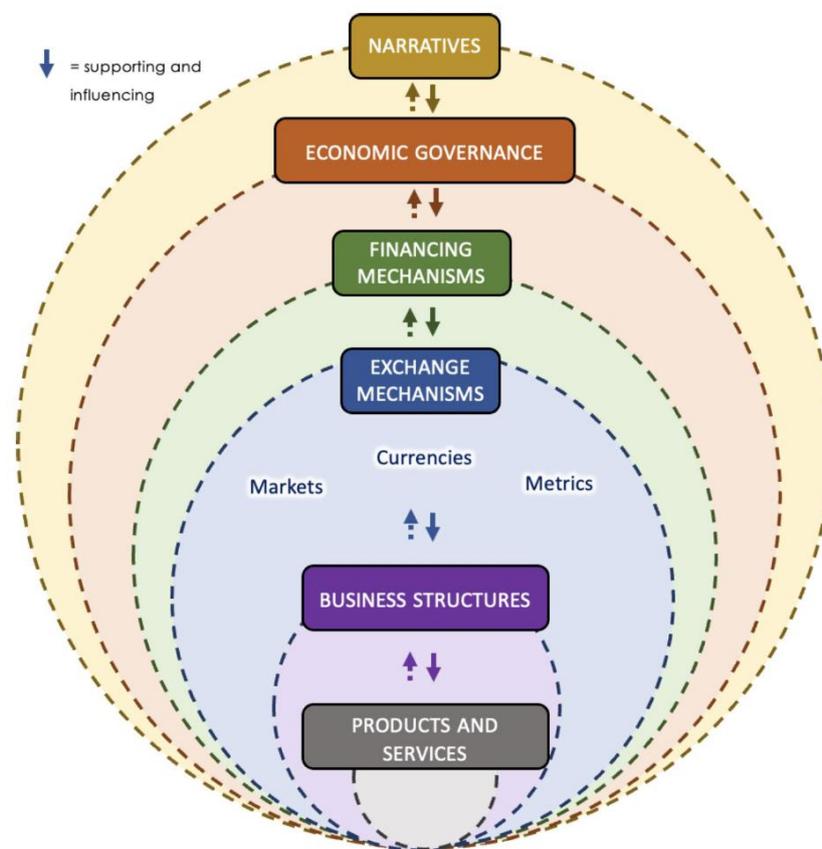


Figure 3. Wellbeing Economies Infrastructures; sources (Waddell *et al.*, 2023).

Combining the frameworks of Harris (2023) and Waddell *et al.* (2023) reveals an overlap between the infrastructure-based and information-based policy levers and some of the EOI. In particular, it highlights narrative research and economic governance infrastructures which encompass a broad range of public, private and blended public-private mechanisms operating at local, national and international scale.

Table 2 summarises categories of policy levers which suits the two schemes, and reflects the ideas and principles of nature positive economies. It presents common

recommendations on how to carry out the transition to such an economy, as presented in Part 1 of the results.

Table 2. Categories of policy levers considered for the analysis of nature positive arrangements.

Economic Operating Infrastructure	Regulatory measures	Economic measures
Narrative: dissemination and education	Multilateral agreements	Taxes
Economic governance: national/private/multi-stakeholders initiatives	Mandatory due diligence	Subsidies
Financing mechanisms: financing transformation (greening finance and financing green)	Sustainable public procurement	Biodiversity offsetting
Exchange mechanisms: embedding nature value in policy/ metrics for national accounts/ metrics for business/ new currencies (blockchain)		
Product and services: payment for ecosystem service schemes/ ecological footprint reduction and ecolabelling		

From reviewing the Economic Operating Infrastructure in Table 2 one can conclude that recommendations for a stronger case towards a nature positive economy do not fulfil the full range of EOI proposed in Figure 2.

At the time of writing (May 2023) it was not possible to source an example directly relating to the concept of a nature positive economy for all the EOI subcategories described by Waddell *et al.* (2023). The missing EOI mainly refer to exchange mechanisms, such as a *new technology platform*, and financing mechanisms, such as *integrating wellbeing economic principles into historic infrastructures*. These two categories make a promising case for new markets. However, although the principles for responsible investment and sustainable stock exchange initiatives align with the principles of a wellbeing economy, no evidence was found of them tackling the natural and environmental domains necessary for transitions towards nature positive economies.

The EOI classification is an open framework capable of encompassing additional categories. The current wellbeing EOI classification is the result of research carried out in 2021 and 2022 of more than 100 case studies in collaboration between the

GANE project and the initiatives Catalyst 2030 (<https://catalyst2030.net/>) and Bounce Beyond (<https://www.bouncebeyond.global/>).

Building on this framework, the [Results section](#) is split into two parts.

The first part ('[Recommendations for Enabling Transitions to a Nature Positive Economy](#)') provides an overview of relevant policy approaches and levers, and recommendations for government actions to transition towards a nature positive economy, derived from the review of selected academic and grey literature. These are expressed in terms of policy actions, but are not comprehensive without research on specific topic areas, by means of a systematic review.

The second part ('[Presentation of Case Studies](#)') draws on the broad range of evidence published in the scientific and grey literature of types of regulatory, economic, and infrastructural policy levers which can be actioned by governments, regulators and the private sector.

10. Results

10.1 Recommendations for enabling a transition to a nature positive economy

The following is a synthesis of potential actions which could be adopted to enable a transition to a nature positive economy in Scotland, supported by international case studies. These actions cover the role of policies, regulations, economic and financial levers which could be taken by the public and private sectors.

The opportunities for action for transitions to a nature positive economy are classified by regulatory, economic and EOI measures with respect to nine policy levers (Table 3). The classification is aligned with that of Harris (2023).

This section introduces each policy lever, citing actions identified in the scientific and grey literature that are relevant to facilitating change towards a nature positive economy.

Table 3. Summary of recommendations of actions for a transition to a nature positive economy, classified by policy levers.

Policy levers	Alignment with Harris (2023)	Actions based upon the literature review	Adherence to options for change (Figure 21.1, Dasgupta, 2021)
Creating a new narrative for a nature positive economy (<i>EOI-narrative</i>)	Information-based	Pursuing a pattern of sustainability requires a transformative change in thinking before acting	Transform institutions and systems

Debating new economics principles at all educational levels <i>(EOI-narrative)</i>	Information-based	Including ecological economics principles in scholastic curricula	Transform institutions and systems
Proposing a renovated economic governance supporting positive nature actions at multiple institutional scales <i>(EOI-economic governance)</i>	Regulatory/ Economic lever	Building effective institutions operating from global to local scales	Transform institutions and systems
Addressing economic governance for nature positive actions through value chain creation <i>(EOI-economic governance)</i>	Economic lever	Implementing landscape management approaches to conserve and restore natural assets	Balance the impact equation and increase nature's supply
Committing to new nature positive policies and regulatory measures <i>(regulatory)</i>	Regulatory levers	Making a pledge to nature positive actions through enforcing stronger regulations	Transform institutions and systems
Reforming fiscal tools and economic incentives <i>(economic)</i>	Economic lever	Operating a revision of economic policy mechanisms that disincentivise nature conservation	Transform institutions and systems

Addressing nature valuation in policies, accounting, and wellbeing metrics beyond GDP (<i>EOI-exchange mechanisms</i>)	Economic lever	Incorporating the value of nature into policy and proposing new economic metrics to capture benefits to nature and people	Change measures of economic success
Enforcing policies and regulation for greening finance (<i>EOI-financing mechanisms-economic</i>)	Economic lever	Directing business to measure and disclose impacts, dependencies, and risks to nature by enforcing international standards and metrics	Transform institutions and systems
Reforming financial mechanisms (<i>EOI-financing mechanisms-economic</i>)	Economic lever	Implementing mechanisms to finance green activities	Transform institutions and systems

The causes of nature loss are diverse such that only coordinated actions of intergovernmental organizations, governments across levels of governance, businesses, communities and citizens can be effective in achieving positive outcomes (Dasgupta, 2021). Such coordinated action needs support for an agreed common vision for sustainable development, capturing the imagination of a broad community of stakeholders for developing transition pathways (IPBES, 2019; Kenter *et al.*, forthcoming; UNEP, 2021; Waddell *et al.*, 2023).

10.1.1 Creating a new narrative for a nature positive economy (EOI narrative)

➤ **Action:** Pursuing a pattern of sustainability requires a transformative change in thinking before acting.

For example, the Stockholm +50 international meeting (SEI, 2022), timed for halfway through the decade of action for Agenda 2030, reinforced the vision of a world "...in which democracy, good governance and the rule of law, as well as an enabling environment at the national and international levels, are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and

hunger...” (2015 UN Resolution ‘Transforming our world’). However, this vision is not embedded into the cultures of nations or formalised in coordinated institutional settings which could affect the lives of citizens and society. The Economics for Nature (2022) note the need for examples of nature positive economies to encourage changes in policy and investment strategies.

To achieve the types of changes envisaged by a new narrative, a strategy is required for engagement and empowerment of citizens. Actors in business, civil society and citizens, especially those who steward the natural environment, including indigenous communities, are valuable sources of practice knowledge for shaping biodiversity policies (Pio and Waddock, 2021; SEI, 2022). Thematic, practice and local and site knowledge can be essential to ensure actions enhance rather than destroy nature (Dasgupta, 2021).

Not all actors will be willing or have the capacity to engage, or have insight into what is meant by nature positive. A strategy and mechanisms are required to raise awareness and capacities of actors in designing and implementing all the elements required for a nature positive economy. Active citizen engagement, such as citizens’ assemblies addressing nature, climate and economy, are one means of involving stakeholders in the process of developing policies (Economics for Nature, 2022). Such approaches are evident in Scotland, such as the Citizens’ Panels of rural, island and urban communities to understand views and acceptability regarding draft policies and measures for delivery of Scotland’s National Transport Strategy (Transport Scotland, 2019) and Scotland’s Climate Assembly, which is a citizens’ assembly focused on climate change, the origins of which are in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019).

A component of such a strategy could also include mechanisms that demonstrate the relevance of nature to people’s quality and ways of life, such as benefits and access to green space, the significance of which was increasingly apparent under restrictions during COVID-19 (Venter *et al.*, 2020).

10.1.2 Debating new economics principles at all educational levels (EOI narrative)

➤ **Action:** Reformulating educational programmes to include ecological economics in scholastic curricula

Successful narratives can shift the power and bring about transformative change through their potential to change mindsets. Current thinking in relation to the protection and enhancement of biodiversity, and the political-economic status quo, is for a need for significant change if humanity is to stay within planetary boundaries (Crépin and Folke, 2015; Raworth, 2017b; Sjøfjell, 2020). Initiatives aimed at disseminating narratives about the role that nature positive economies should play comprise a wide range of perspectives and concepts. However, new economics thinking has not emerged in meaningful ways in most economies. The transformation required is one in which neoclassical/neoliberal and closely related economic approaches are retired to make way for ‘new’ life-giving, equity-oriented, and ecologically flourishing economics and economies (Hoveskog *et al.*, 2018; Kosoy *et al.*, 2012).

For economies to genuinely transform, there is a need for them to have a greater grounding in sustainable, equitable and inclusive values. Research, information campaigns, new approaches to the education curricula in schools and universities, which present ecological economics as a relevant discipline, are all needed to facilitate the widespread acceptance of ideas promoting a positive nature economy (Dasgupta, 2021; SEI, 2022; Waddell *et al.*, 2023; Waddock, 2020c). A deeper relationship between economics and nature would require the inclusion of greater ecological knowledge, practical skills, and learning about local environmental issues through engagement with communities (SEI, 2022).

The promotion of new curricula for economics, and relevant resources, would inform a shift in narratives towards new economics values (Fazey *et al.*, 2021, 2020; Gills and Morgan, 2020; Green *et al.*, 2020; Ruth, 2020). An example of the types of new resources becoming available is the “Core” project (<https://www.core-econ.org/>). This operates through an open-access platform to provide information on the economics of innovation, inequality, and environmental sustainability. It also provides a resource for teachers for preparing online courses on topics such as climate change, racial discrimination, inequality, and global health crises.

10.1.3 Proposing a renovated economic governance supporting positive nature actions at multiple institutional scales (EOI economic governance)

➤ **Action:** Building effective institutions operating from local to global scales.

Such educational materials would benefit from greater recognition and representation of indigenous local knowledge and rights for nature (Pio and Waddock, 2021; Ruth, 2020; SEI, 2022). In Scotland, examples of such materials are the [Soils of the Crofts](#) (Macaulay Land Use Research Institute and Crofting Connections, 2011), which explains the significance of soils in traditional crofting practices; and the [Machair Educational Resource](#) (Macaulay Land Use Research Institute, 2011) which illustrates the unique values of the machair as a habitat of conservation importance, and a landscape with great cultural significance.

Sharma *et al.* (2023), in a study of forest governance in Scotland, observe a need for more flexible arrangements and structures between governments and private institutions, proposing an approach based upon “glocalization”. That is where problems are tackled locally according to the specific needs of the place and communities, but are of a global domain (Kossoff, 2019; Sharma *et al.*, 2023).

The localised component of multidimensional decision-making facilitates social enfranchisement, needs, common good, and embedding participation, deliberation, and collaboration. It can take the form of relationships with place as defined by culture, history and ecosystems, supporting local economies and communities rather than transferring the benefits to multi-national businesses (Norberg-Hodge, 2012). The effectiveness of new models of governance requires the broad engagement of central government, subnational agencies, and communities on the ground to be incorporated into upstream sector strategies, planning, and investments (Power *et al.*, 2022).

In Scotland, a new level of governance is the Regional Land Use Partnerships (RLUPs), [five pilots](#) of which have been created by the Scottish Government as part of its strategy for tackling climate change. These are emerging governance “partnerships facilitating natural capital led collaboration on regional land use changes to help Scotland’s just transition to net-zero, involving local and national government, communities, land owners, land managers, and wider stakeholders.”

In some national and regional contexts, constitutional or administrative reforms may be necessary to promote transitions to nature positive economies. For example, in 2016, Costa Rica created 28 multi-stakeholder networks (Territorial Councils; *Consejos Territoriales de Desarrollo Rural*), reflected in the national Constitution and relevant legislation. The membership of the Steering Committees of the Councils comprises 60% civil society and private sector, and 40% public institutions. Their remit includes responsibilities for ‘social, economic, environmental, and cultural rural development’ of their territories, and approving development plans (Waddell *et al.*, 2023).

The UNDP and OECD propose institutional changes at higher levels of government that will promote initiatives that embed nature positive approaches (Boarini and D’Ercole, 2013; OECD, 2019, 2017). Such changes include how to integrate natural capital into environmental performance reviews at national levels. Also at a multi-national level, the EU Commission has set out an overarching strategy, the European Green Deal (see Figure 4), an aim of which is for activities in Europe to give back more than they take away (European Commission, 2019a).

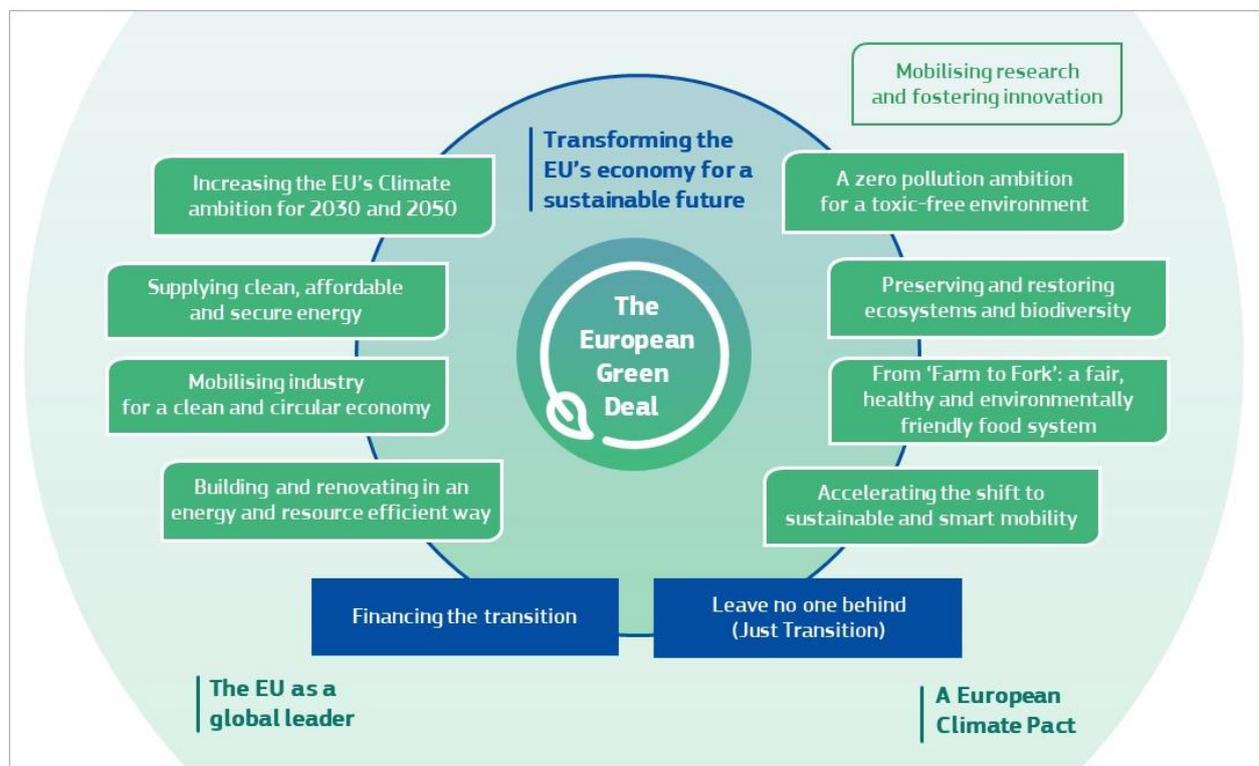


Figure 4. The various elements of the European Green Deal. Source: eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52019DC0640

Multi-stakeholder platforms are necessary to counter adverse environmental impacts relating to systems that cross international boundaries. For example, the *Twin Deltas Initiative* reflects the importance of international cooperation when tackling the disruptions created to river ecosystems (e.g. by dams and hydro-electric schemes), and risks to local biodiversity and food supply. Two such very large deltas are the Mekong in Vietnam and the Ganges- Brahmaputra in India and Bangladesh. The initiative involves governments and businesses operating in the hydropower sector to rethink issues such as “hydroelectric power and clean water supplies, comprehensive environment risk assessment approaches for downstream regions, and reducing the removal of sand for construction” (World Economic Forum, 2020).

Private sector innovations for delivering nature positive actions operate through multi-stakeholder governance which operationalise sustainable supply chain models (World Economic Forum, 2020), in particular by implementing Responsible Business Conduct (RBC) standards in commodity supply chains to support sustainable production and consumption patterns (OECD, 2021). Options for implementation include contractual arrangements between supply chain actors to incentivize the sustainability of produce through ecolabelling practices.

Such certification schemes operate through multilateral platforms, examples of which are the management of:

- forests (Forest Stewardship Council; FSC, 2023);
- fish (Marine Stewardship Council; MSC, 2023);
- water (Global Water Partnership; GWP, 2023).

10.1.4 Addressing economic governance for nature positive actions through value chain creation (EOI economic governance)

➤ **Action:** Implementing landscape management approaches to conserve and restore natural assets.

IPBES (IPBES, 2020, 2019; Pascual *et al.*, 2022) provides evidence of the necessity of reversing the loss of nature. They report that under a Business as Usual (BAU) scenario, biodiversity will continue to decline and thus so will many of the economically important ‘regulating’ services provided by nature (e.g. coastal protection, crop pollination, soil protection, nitrogen retention, pest control and carbon storage) (WWF, 2020). It makes the economic case for a global effort to expand the coverage of protected areas (PAs) (IPBES, 2019).

The Kunming-Montreal Global Biodiversity Framework (GBF) was developed at COP 15, with 23 targets to be achieved by 2030 to safeguard and sustainably use biodiversity. A message from COP15 was the need to “address the key drivers of biodiversity loss and lifting the nature agenda.” (CBD, 2021).

To support the goal of protecting 30% of all land, inland waters and oceans, beyond reforms of economic and fiscal incentives (see the economic policy lever) there is a need for effective local governance and benefit-sharing by which local communities can be assisted in participating in the local economy of the protected

area (Wu *et al.*, 2020). There is also a need to provide safeguards for loss of income or other benefits which are provided by such areas (Pechacek, *et al.*, 2013).

Any practice to support the expansion and protection of natural areas should be carried out considering that biodiversity loss and climate change should be tackled with synergistic strategies because any efforts in nature protection can be neutralized by disruptions imposed by climate change (IPCC, 2022, 2021; Pörtner, Hans-Otto *et al.*, 2021). Planning new protected areas requires cooperation between conservation bodies and the carrying out of human activities; this is vital for both terrestrial and marine protected areas, as evidenced by public discussion over the prospective implementation of Highly Protected Marine Areas in Scotland. The challenges of achieving the appropriate balance points to the need for integrated approaches that facilitate dialogue between communities, institutions and the production sectors (fisheries, aquaculture, energy, tourism).

An example which builds upon ecosystem and natural capital valuation is coastal zone management and the formulation of integrated coastal zone planning and management in Belize, aiming to implement win-win solutions that minimise adverse trade-offs between uses (Arkema *et al.*, 2015; Ruckelshaus *et al.*, 2022). A similar approach has been used to restore coastal ecosystems such as mangroves, planned in synergy with fisheries and tourism. In Vietnam, this is a practice which has increased the income of coastal communities between 200% and 800% from aquaculture products (World Economic Forum, 2020).

However, nature conservation alone will not deliver a nature positive economy without other complementary strategies and actions. These activities are necessary to satisfy the high public demand for ecosystem services generated outside protected areas (Dasgupta, 2021). Programmes for restoring the environment in countries such as India (the Mahatma Gandhi National Rural Employment Guarantee Scheme), Ethiopia (the Productive Safety Nets Programme) and Mexico (the Temporary Employment Programme) have provided social protection and income while contributing to community resilience and improved biodiversity irrespective of protected areas (Norton *et al.*, 2020).

Agricultural incentives which aim to limit adverse impacts on nature and facilitate restoration are commonly used in Europe and OECD countries, such as limiting the use of fertilisers (Deutz *et al.*, 2020; OECD, 2021), and encouraging agro-ecological and regenerative agricultural practices (Morseletto, 2020; Robertson *et al.*, 2022). However, consideration is also required on how to incorporate impacts on nature into business strategies, such as how they can deliver emission reductions through nature-based solutions (NbS) (WWF, 2020). NbS are one example of working with nature to address societal challenges which have the potential to provide benefits such as enhancing biodiversity, mitigating and adapting to climate change (Collier *et al.*, 2023; Deutz *et al.*, 2020; Di Pirro *et al.*, 2023; Economics for Nature, 2022), and delivering social and economic benefits (European Commission, Directorate-General for Research and Innovation, 2022).

A range of options are available for funding the implementation of NbS, such as carbon pricing programmes with cap-and-trade systems and carbon taxes. New Zealand has used such tools in the regulation of the forestry sector, but no country

has applied them to emissions resulting from land-use changes from agriculture (ICAP, 2023). Several countries have established formal compliance forest and land-use carbon offsetting programmes (e.g. Australia, Canada and China) which provide experiences from which other countries can learn (Deutz *et al.*, 2020).

NbS are being used to support a wide range of natural infrastructure such as facilitating soil retention, restoring soil health and sequestering soil carbon; improving water quality and flow, and flood management in catchments; regenerative farming practices, and enhancing biodiversity through agroecology farming practices and systems (Nesshover *et al.*, 2017; IUCN, 2022; World Economic Forum, 2020; Maes and Jacobs, 2015).

New frameworks are being explored to promote practices in the agricultural sector in the UK and Europe, such as through the creation of farmer clusters (Wardhana *et al.*, 2020). Such clusters are voluntary mechanisms with the aim of delivering biodiversity related goals under the supervision of a cluster facilitator (see [H2020 FRAMEwork](#) project), and economic incentives through carbon credits to farmers to encourage practices that increase the amount of carbon sequestered in soil (Agriprove, 2023).

10.1.5 Committing to new nature positive policies and regulatory measures (regulatory)

➤ **Action:** Making a pledge to nature positive actions through enforcing stronger regulations.

Environmental policies cannot be isolated from national development and economic decisions, and must be led by Governments. Addressing the drivers of the loss of nature requires an approach that cuts across the whole of an economy (World Bank, 2021). International multilateralism is important in developing shared positions and common goals regarding global challenges (Kalfagianni and Young, 2022). This is reflected in the evolution of the UNFCCC and CBD, emerging from the Rio Summit on Sustainability in 1992, and agreements and mandates which have emerged (e.g. Paris Agreement, Aichi Biodiversity Targets). The existence of such shared goals provides a focus for legislation and strategies. However, they have a mixed history of success.

The [Montreal Protocol on Substances that Deplete the Ozone Layer](#) agreed the banning of the use of Chlorofluorocarbons from all new refrigerators and freezers from January 2000. Fridge manufacturers in the European Union were also obliged to accept back old fridges and dispose of their components safely. The periodic revising of the Protocol lead to the phasing out of Hydrochlorofluorocarbons (HCFCs) by 2030. However, Green *et al.* (2019), in a review of progress towards the Aichi targets, concluded that although “all of the targets scored highly for being comprehensive, most scored relatively poorly on being measurable and realistic”. It may be that the regulation and prohibition of substances has a greater impact than the setting of targets without accompanying constraints on certain types of activity or products.

The [Leaders' Pledge for Nature](#), endorsed by 64 countries in September 2020, aims to “send a united signal to step up global ambition for biodiversity and to commit to matching our collective ambition for nature, climate and people with the scale of the crisis at hand.” The pledge contributes to efforts to bend the curve of biodiversity loss (DEFRA, 2021b; Kering, 2020; Leadley *et al.*, 2022; Mace *et al.*, 2018; McElwee *et al.*, 2020) through national strategies and plans. However, there is no commitment to direct funding. The expectation is that funding to achieve the aims of the pledge would be channelled through existing financial packages, and “aligning our domestic climate policies with the Paris Agreement, with enhanced Nationally Determined Contributions and long-term strategies consistent with the temperature goals of the Paris Agreement.”

The [UN Biodiversity Conference \(COP 15\)](#) resulted in the adoption of the Kunming-Montreal Global Biodiversity Framework (GBF) to halt and reverse nature loss. This framework has a common goal of protecting 30% of the planet and 30% of degraded ecosystems by 2030, and phasing out or reforming subsidies that harm biodiversity. It proposes funding at least US\$500 billion per year, with at least US\$200 billion per year from public and private sources, and increasing international financial flows from developed to developing economies to at least US\$30 billion per year (UN, 2022). These measures can be reinforced by legislation at the relevant level of governance, such as the EU nature restoration law proposal (European Commission, 2023a), which is a key element of the EU Biodiversity Strategy for 2030 (European Commission, 2020a). In relation to deforestation, international commitments include the New York Declaration on Forests (aiming to halving deforestation by 2020 and ending it by 2030) and the Amsterdam Declaration (aiming for deforestation-free supply chains by 2020). In these cases, the targets are accompanied by financial packages to support enabling activities or incentives.

Several commitments were announced at the COP26 in Glasgow (November 2021), notable amongst which were: i) the [Declaration on Forests and Land Use](#), which refers to “promoting an inclusive rural transformation”, and building resilience, enhancing rural livelihoods, and ii) the [Global Methane Pledge](#) to reduce global anthropogenic methane emissions across all sectors by at least 30 percent below 2020 levels by 2030.

The complex nature of global commodity supply chains means that goods are difficult to identify and track. To combat fraud, technologies such as blockchain, artificial intelligence, and big data analytics can be used, although their cost may be more problematic in low-income countries (OECD, 2021). Mechanisms that can help achieve nature positive targets may be more effective if they are mandatory, such as due diligence by investors to ensure that they finance sustainable projects.

In 2019, France set up disclosure requirements for corporate and finance bodies, with an explicit focus on biodiversity. It distinguished between risks from the impacts caused by the investment strategy and the main risks from biodiversity dependencies. Recently, the UK Government made provisions for due diligence obligations for forest-risk commodities within the Environment Act 2021, although it includes only deforestation and land conversion that is illegal according to the local laws of the producer country.

By comparison, the EU proposals for corporate responsibility for due diligence recognises that EU companies may encounter difficulties identifying and mitigating risks in value chains in relation to human rights or environmental impacts. The regulations adopt the OECD Guidelines for Multinational Enterprises and related due diligence guidance². The belief is that identifying adverse impacts in value chains will be easier if companies exercise due diligence and thus more data is available on human rights and environmental adverse impacts (European Commission, 2022a, 2022b). Therefore, for example, in relation to forest products the new regulations would mean that products may only be placed on, or exported from, the European market if they are 'deforestation-free' (i.e. not produced as a result of deforestation) (Rivington *et al.*, 2023).

Environmental due diligence is discussed under the policy lever of regulatory international agreements and mandatory due diligence (from page 53).

Options by which governments can promote nature positive trade policies include removing or amending final prices of agricultural goods, tackling illegal wildlife trade through the prosecution of environmental crimes, and improving the traceability and sustainability of the supply chain (OECD, 2021, 2019). The implementation of such measures would also require domestic due diligence legislation, covering trade in global commodities such as palm oil, soya, beef, timber and cocoa, and enforcing responsible business conduct standards (RSPB, 2022; UK Government, 2019).

Governments can play influential roles in encouraging and enhancing sustainability in supply chains. For example, they can ensure that public procurement vendors disclose biodiversity impacts throughout their value chain, and mandatory standards for procurement regarding standards and sustainable sourcing requirements. Guidelines and examples of such procurement are provided by the EU in its Green Public Procurement guidelines, criteria for food and catering services (European Commission, 2018) and taking account of social considerations in public procurement (European Commission, 2021).

10.1.6 Reforming fiscal tools and economic incentives (economic)

➤ **Action:** Operating a revision of economic policy mechanisms that disincentivise nature conservation.

The consequences of some fiscal policies are that it is more expensive to protect nature than financing activities that contribute to its degradation (International Energy Agency, 2020; RSPB, 2022). In 2019, globally, over £300 billion of subsidies went to fossil fuel consumption (International Energy Agency, 2020). In comparison, 15% of the US\$700 billion in agriculture subsidies were directly linked to the delivery of public goods (FOLU, 2019) and US\$20 billion to the fishing fleet (World Economic

² The OECD Guidelines for Multinational Enterprises and related due diligence guidance provide a framework to help enterprises manage a wide range of Responsible Business Conduct (RBC) risks throughout their supply chains and recommendations to businesses on how to manage environmental risks and improve environmental performance, including throughout their supply chains.

Forum, 2020). The cost of these subsidies and environmental externalities generates a disbenefit of US\$4 trillion to US\$6 trillion annually, which is approximately 5% to 7% of global GDP (Dasgupta, 2021; Deutz *et al.*, 2020; OECD, 2021).

Achieving the goal of protecting at least 30% of lands, rivers, lakes, and wetlands by 2030 will require a mix of different types of regulatory and voluntary approaches. Dasgupta (2021) and other authors (e.g. Deutz *et al.*, 2020) argue that it is necessary to rethink policy levers to transform the economic system to incentivise sustainable decision-making through new fiscal incentives (e.g. repurposing subsidies); removing financial barriers (e.g. providing dedicated credit lines) for sustainable practices, such as agriculture operating in the vicinity of protected areas or as part of a mixed landscape (Power *et al.*, 2022; WWF, 2020); and to involve indigenous people and local communities (SEI, 2022). Dasgupta (2021) estimates that the cost of such actions could be of the order of US\$140 billion annually, equivalent to 0.16% of global GDP.

Financing such actions could make use of economic tools such as environmental taxes, charges, tradable permits, PES programmes, and ecological fiscal transfers to strengthen the adoption of polluter pay principles, and to remove or reduce economic costs falling on sustainable practices (Power *et al.*, 2022).

Environmental taxes are widely used, such as the [Aggregates Levy](#) in Scotland, on the extraction of minerals and resources, and penalising the discharge of pollutants and the use of pesticides (OECD, 2021). Their use aims to increase the cost of final products generated by certain economic activities, and to partially internalise environmental damages into market prices. However, if such taxes are not properly designed, they could cause leakage such as shifting to other activities that damage nature (Dasgupta, 2021). To date, no OECD country has collected more than 1% of its GDP in environmental taxes, apart from those which relate to energy or motor vehicles, which account for 5.1% of total tax revenue (OECD, 2021).

Experiences of carbon taxes are emerging in several countries, although most are operating in tropical countries, directed at reducing biodiversity loss. For example, Costa Rica and Colombia levy taxes on emitted carbon and invest revenues in afforestation and reforestation. (Barbier *et al.*, 2020). A few European countries like Sweden can boast a long history in implementing carbon taxes. Informed by the principles of letting the polluter pay, reducing carbon leakage, and generating double dividends, the tax targeted mainly fossil fuels and has generated a positive impact on reducing CO₂ emissions, causing a fuel switch to biomass, and contributing to reduced income taxes (Rivington *et al.*, 2023).

Other taxes which can contribute to a nature positive strategy are those that incentivise fiscal exemptions for conservation easements (Nova Scotia Environment, 2008; Scottish Land Commission, 2020); and, payments associated with downsides to protected areas. Pechacek *et al.* (2013) studied peer reviewed literature of countries in transition and developing regions and evidence of examples from Asia, Africa, and South America. They conclude that "compensation schemes promote tolerance and awareness, and responsibility of the broader society while minimizing confrontations."

Research findings suggest that integrated ecosystem economic models can be used to assess climate change scenarios and impacts on ecosystem services. Those findings show that changing from BAU to nature positive scenarios can generate economic benefits (income) although not for all countries (WWF, 2020). Further ecological-economic coupled modelling (Johnson *et al.*, 2021) showed that a small number of economies in transitions experienced a decline in real income, thus requiring compensation, which could be achieved, for example, through ecological fiscal transfers from the Global North to the Global South (Avriel-Avni and Dick, 2019; Droste, 2020; Power *et al.*, 2022).

10.1.7 Addressing nature valuation in policies, accounting, and wellbeing metrics beyond GDP (EOI exchange mechanisms)

➤ **Action:** Incorporating the value of nature into policy and proposing new economic metrics to capture benefits to nature and people.

Approaches to valuing nature must adhere to scientific and economic integrity of the valuation process (Economics for Nature, 2022). Such valuations should consider broad perspectives to enable the incorporation of factors such as environmental health, human wellbeing, mental health and spiritual values (IPBES, 2019, 2009; Pascual *et al.*, 2022). Values for these factors can be analysed with a view to their importance to local communities. Their implementation can take into account place-based decisions (Reed *et al.*, 2017, 2022) where the emergence of shared and transient properties (Kenter *et al.*, 2015, 2011; Kenter and O'Connor, 2022) can inform a more contingent interest of nature. An example of their use is in assessing instrumental benefits such as the provisioning, regulating and cultural ecosystem services explained in the Millennium Ecosystem Assessment and The Economics of Ecosystem and Biodiversity (Millennium Ecosystem Assessment (Programme), 2005; TEEB, 2010).

The valuation of ecosystem services requires data on market values (where available), or from stated or revealed preference approaches or cost-based methods (Costanza *et al.*, 2014b; Turner *et al.*, 2019, 2010). Supporting traditional cost benefit analysis (Dittrich *et al.*, 2019; Hockley, 2014) with Triple Balance Sheet (Turner *et al.*, 2019) and risk opportunity analyses, provides more holistic views of potential trade-offs and risks that may be missed by natural capital accounting (Mercure *et al.*, 2021). The inclusion of local information that builds upon place-based approaches with a view to capturing knowledge and non-monetary values (benefits) of local communities and indigenous people, can provide insights to the value of ecosystem services (Power *et al.*, 2022).

The United Nations Systems of Environmental Economic Accounting (SEEA) provides an international framework for integrating economic and environmental data (Annex 3vi.a) (see Figure 5). It sets out standards to enable comparisons to be made internationally, and has a working group dedicated to issues of the use of spatial units (Bogaart *et al.*, 2019). It recognises the full value of natural resources such as soil, vegetation, animals, water, and biodiversity for the public sector and its contribution to GDP (Deutz *et al.*, 2020; Power *et al.*, 2022; Economics for Nature, 2022).

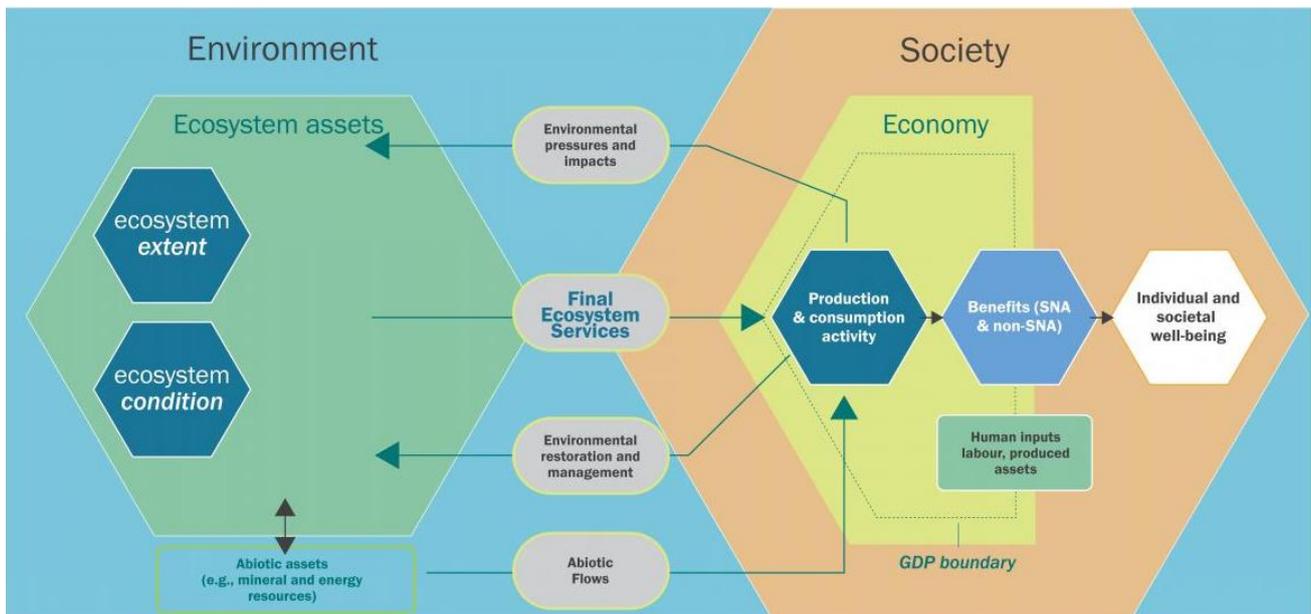


Figure 5. SEEA EA conceptual structure. Source: <https://seea.un.org/introduction-to-ecosystem-accounting>.

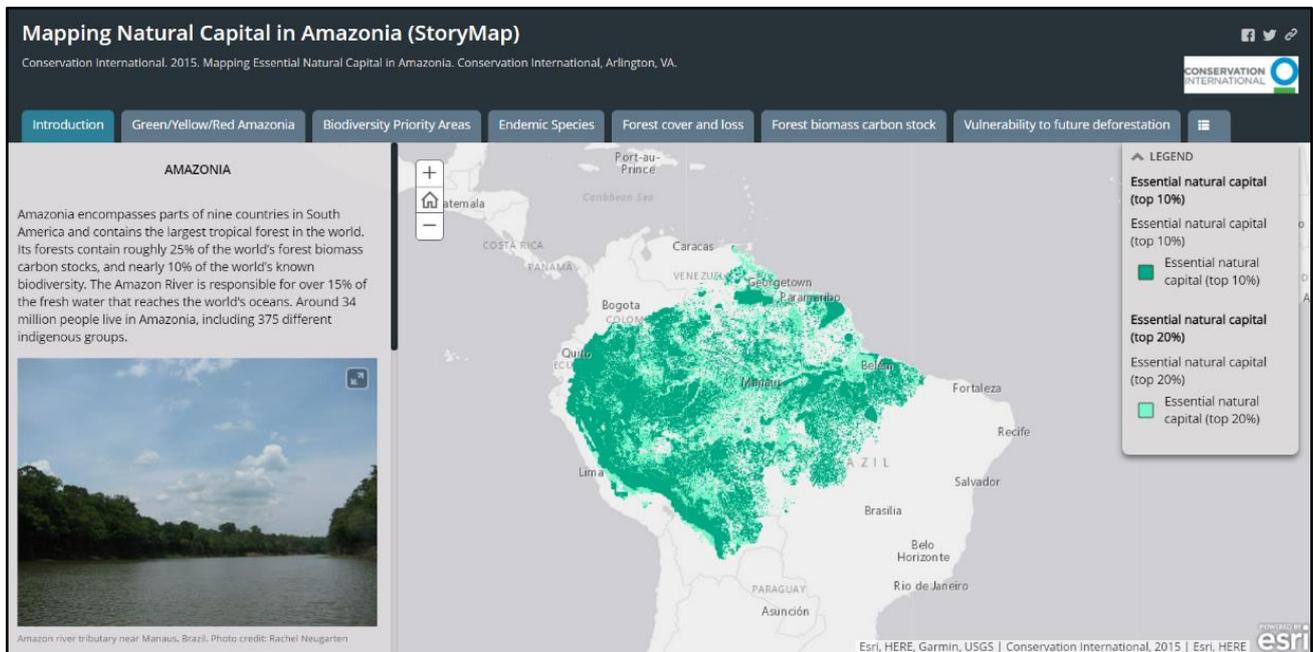
An example of the implementation of that standard is the mapping of aspects of natural capital for Amazonia (Conservation International, 2015). The aim was to present evidence of the distribution of natural capital across Amazonia in ways that can be used by 'governments, development banks, conservation organizations, and other actors seeking to meet conservation and sustainable development goals'. A storymap (Mapping Natural Capital in Amazonia, arcgis.com) has been compiled with a series of interactive maps and accompanying text and imagery reporting a three-class zonation of Amazonia (Figure 6). It presents topics such as biodiversity priority areas, forest biomass and carbon stocks, endemic species, and climate mitigation vulnerability to future deforestation.

Considerable interest has emerged in the application of the SEEA framework at the level of individual enterprises in an attempt to understand business dependencies and their impacts on nature and consequences for entire supply chains (Capital Coalition, 2016; Capitals Coalition, 2021a; Joseph, 2018). Governments can pick up these private initiatives to improve the sustainability of supply chains by strengthening multilateral actions (RSPB, 2022; World Economic Forum, 2020; WWF, 2022, 2020), and requiring mandatory disclosure of biodiversity risks (Agence France Trésor, 2020; France Invest, 2022; OECD, 2019; TNFD, 2023; UNDP, 2022).

Dasgupta (2021) observes that that humanity underestimates the value of nature, leading to an overconsumption of natural assets. The promotion of natural capital accounting provides a valuable tool to advance policies for internalising negative externalities in the price of natural resources and contributing to more appropriate funding (Barbier, 2022). Sufficient evidence is now available on the assessment of natural capital at national and regional levels to enable governments to evaluate how natural capital accounting can be used for designing, implementing and monitoring policies aimed at progressing to nature positive economies (Ruijs *et al.*, 2019) in decision making (Vardon *et al.*, 2017), and guiding policies addressing

climate change (Ruijs and Graveland, 2018) and biodiversity (Ruijs and Vardon, 2018a). Dasgupta (2021) proposes that governments take advantage of the development of accounting methods to embed the value of nature in 'inclusive wealth indicators', measuring the sum of the accounting values of the manufactured, human and natural capital (Dasgupta, 2021).

Figure 6. [Storymap of mapping natural capital of Amazonia](#), showing forest biomass carbon stocks.



(source: Conservation International).

Taking account of all of these capitals can inform the development of a new measure of economic progress that accounts for the benefits from investing in natural assets and the economic benefit of non-traded activities (e.g. voluntary caring), as proposed in the Genuine Progress Indicator (GPI) (Costanza *et al.*, 2009; Department of Natural Resources, 2020; Durand, 2015; Mizobuchi, 2014). This can operate alongside other new forms of metrics, such as the IUCN Species Threat Abatement and Recovery Metric (STAR), which measures the contribution of investments to reducing species extinction risk (IUCN, 2021a; Mair *et al.*, 2021).

10.1.8 Enforcing policies and regulation for greening finance (EOI financing mechanism/ economic)

➤ **Action:** Directing business to measure and disclose impacts, dependencies, and risks to nature by enforcing international standards and metrics.

Deutz *et al.* (2020) report a lack of policies and measures (e.g. regulations) that discourage financial firms from making investments that cause material environmental harm. The most significant constraints are in how investment funds are marketed and the benchmarks they use to assess performance (e.g. [Dow Jones Sustainability Index](#)), and in turn the basis of those indices (e.g. [S&P Global Corporate Sustainability Assessment](#) which assesses businesses against 20 financially relevant sustainability criteria across economic, environmental and social

dimensions). The other principal approach is that of exclusion, in which there is no investment in businesses operating in a proscribed set of activities (e.g. tobacco, arms, fossil fuels). In all such cases, there is a need for investment companies to be transparent in what they are investing.

Investment funds (e.g. life and pension funds) provide significant sources of finance which could be directed towards investment in actions which accelerate transitions to a nature positive economy. This requires actions that align with nature related goals, as proposed by the EU Taxonomy (European Commission, 2020b) and associated regulations (e.g. Sustainable Finance Disclosure Regulation; European Commission, 2020b; Power *et al.*, 2022; SustainLife, 2021). This package of regulations and guidance aims to establish criteria for environmentally sustainable economic activities, including the protection and restoration of biodiversity and ecosystems (European Commission, 2019b; OECD, 2021).

The [EU Taxonomy](#) is a tool to “help investors identify environmentally sustainable economic activities, promote a transition to a zero-carbon future and guide funding towards solutions to tackle the climate crisis and prevent further environmental degradation” (European Commission, 2020b). It provides a list of environmentally sustainable activities by defining technical screening criteria for each of the six environmental objectives of: climate change mitigation, climate change adaptation, the sustainable use and protection of water and marine resources, the transition to a circular economy, pollution prevention and control, and the protection and restoration of biodiversity and ecosystems. Accompanying the activities identified is a ‘Taxonomy Navigator’ comprising:

- a Taxonomy Compass, providing a visual representation of sectors, activities and criteria included in the EU Taxonomy,
- a Taxonomy calculator tool to help users understand and support reporting obligations set out in the [Disclosures Delegated Act](#);
- a FAQ repository of reporting obligations and the technical screening criteria defined in the Taxonomy delegated acts;
- a Taxonomy user guide, explaining the EU Taxonomy and how it fits within the wider sustainable finance regulatory frameworks.

The [EU Taxonomy](#) (European Commission, 2020b) provides a model from which the UK and Scottish Governments could learn and consider equivalents.

Governments can take other types of steps to ensure that businesses assess and manage their impacts and dependencies on nature, and any associated risks to nature. The means of achieving this include the implementation of legal and regulatory frameworks that hold businesses to account for the impacts of their activities on nature.

A call for action by businesses is reflected in the Conference of the Parties (COP 15) post-2020 global biodiversity framework. Target 15 seeks business of all sizes to “assess and report on their dependencies and impacts on biodiversity, from local to global, and progressively reduce negative risks...” (CBD, 2021). To achieve this aim, key tools are required to inform risk management, including the standardization of metrics for reporting business dependencies and impacts on nature. These will

enable businesses to take responsibility for their impacts, adherence to principles of responsible environmental conduct, and reducing their exposure to and impacts on biodiversity (Deutz *et al.*, 2020). The following is a sample of examples of initiatives on standards:

- The **Global Reporting Initiative (GRI) 304: Biodiversity 2016** standards have been reviewed and updated by a technical committee which included IPBES, CDP, the Align project, Partnership for Biodiversity Accounting Financials, and the Accountability Framework. The content is reported as having been shaped by input from the Science Based Target Network (SBTN), TNFD, and WBA Nature Benchmark, and was open to public consultation in early 2023 (GRI, 2023). Standards such as those provided by the GRI could form the basis of mandatory requirements for businesses and financial institutions. Other such initiatives are the UN Global Compact (based on 10 principles concerning human rights, labour, the environment, and anti-corruption), and the Transition Pathway Initiative (TPI), and CDP (formerly the Carbon Disclosure Project), both of which collect standardized information on climate change and the use of natural resources (LSE, 2018).
- The **Taskforce on Nature-related Financial Disclosures (TNFD)** is a business partnership led by major finance organisations from 18 countries with funds under management of c.US\$20.6 trillion in assets and have a footprint in over 180 countries. It has developed guidance for organisations on how they can evaluate and manage nature-related risks in governance, strategy, risk management, metrics and targets (TNFD, 2023). The aim is to shift flows of global financial away from nature-negative outcomes (Business for Nature, 2021; WWF, 2022).
- The TNFD beta framework, released on 31st March 2023, includes 10 core metrics for organisations to use to align their operations with the Global Biodiversity Framework. This enables impacts to be demonstrated with respect to drivers of change in nature: Land/Sea Use Change; Climate Change; Direct Exploitation; Pollution; and Invasive/Alien Species. Its use could facilitate the disclosure of nature-related risks in governance, strategy, risk management, metrics and targets (SBTN, 2020; UNDP, 2022). This provides one framework which governments and investors could require businesses to use as part of commitments to reduce significant and material impacts and dependencies on nature, and incorporate environmental management and performance into corporate governance. Such commitments would need to be subject to regular, robust monitoring, the results of which would be made publicly available (RSPB, 2022).
- The **Natural Capital Protocol** is “a decision-making framework that enables organisations to identify, measure and value their direct and indirect impacts and dependencies on natural capital.” (Capital Coalition, 2016). It has been developed to “help businesses to understand their relationships with natural resources, and how these resources form the foundation of thriving societies and prosperous economic activities.” (Capital Coalition, 2016).
- Findings of the application of the Natural Capital Protocol are emerging from studies in Scotland, across different types of environments and land

management systems. Blackstock *et al.* (2020) analysed five pilot studies on uses of natural capital based approaches to support sustainable land management in Scotland. They observe that the process of implementing a natural capital approach encouraged collaboration and knowledge-sharing between stakeholders, and in discussions about business decisions, but there is limited evidence that it has directly affected land management choices. They also note that the pilot studies originated from altruistic motivations and stronger economic benefits will need to be demonstrated to encourage wider adoption. They conclude that, in Scotland the new Natural Capital Pioneer Fund in the 'Route Map to £1 billion' provides a funding opportunity for more land-based organisations to trial natural capital approaches whilst minimising financial risks.

- Ovando (2021) applied the natural capital protocol on an upland farm in north-east Scotland (Glensaugh, Aberdeenshire). Findings show the potential of the Protocol as a tool for businesses to understand the impacts of land management practices and dependence on natural capital, and “to identify risks and opportunities that could be integrated into business models to respond to global environmental challenges.” The NatureScot Natural Capital Pilot Programme (NCAPP) is exploring how to work with natural capital at different levels. It appears to use some spatial data in the pilot project 'Facilitating Local Natural Capital Investment' (Hume *et al.*, 2021).

Additional changes to the financial sector could see governments being more active in regulating markets to facilitate innovative mechanisms issuing stocks and bonds that are defined in change impacts rather than defining objectives in financial outcomes (Waddell *et al.*, 2023). For example, Social Stock Exchanges are innovative financing mechanisms which can provide sources of investment to a range of social initiatives that are not available through traditional stock markets (Telefonica, 2013; Mair, 2018). They provide platforms through which capital can be raised by social enterprises, volunteer groups and welfare organisations (Deepak, 2020). Galina *et al.* (2013) reviewed 155 projects in Brazil, Portugal and South Africa which raised capital in social stock exchanges. They observe the high level of creativity of social entrepreneurs funded through social stock exchanges, particularly in the fields of social cohesion and regional development.

10.1.9 Reforming financial mechanisms (EOI financing mechanism/economic)

➤ **Action:** Implementing mechanisms to finance green activities.

National governments are in a position to support and promote a broad range of market and financial mechanisms for public and private actors that fund the conservation, restoration and sustainable use of nature (Power *et al.*, 2022).

Payment for Ecosystem Services (PES) is used to support conservation and restoration at local and national levels. Although it is usually considered an atypical market which aggregates buyers and sellers of ecosystem services, in terms of EOI finance it can be viewed as a market-based service instrument or product (IPBES, no date; Waddell *et al.*, 2023).

Costa Rica was one of the first countries to create a PES programme for halting deforestation. Through its National Fund for Forest Finance (FONAFIFO), private landowners were paid for conservation and restoration activities by finances raised from fossil fuel taxation (Costanza *et al.*, 2021). Income generated is also distributed across citizens in a jurisdiction according to the principle that the natural asset is a Common Asset Trust (CAT) (Costanza *et al.*, 2021).

PES are also being applied at the level of watersheds, aiming to encourage the delivery of good water quality (Appleton, n.d.), and in the protection of coastal and marine areas (Gaglio *et al.*, 2023; Hejnowicz *et al.*, 2014; Lau, 2013). Bladon *et al.* (2016) report on the use of PES in different fisheries contexts: Namibian hake, Mozambican shallow-water shrimp, Western and Central Pacific skipjack tuna and Bangladesh hilsa. They concluded that the design of PES depends on institutional context and that requires creative approaches to handling conditionality (i.e. on actions) and additionality (e.g. of ecosystem benefits), and would require systematic private sector engagement to increase investments in fisheries improvement by buyers of ecosystem services.

Innovative PES-like schemes are also emerging, with some of these deviating from “classic” private market mechanisms (Pan *et al.*, 2017). For example in China, two government programmes (the Natural Forest Conservation Program, NFCP; and the Sloping Land Conversion Program, SLCP) offer opportunities to protect sensitive landscapes and enhance the wellbeing of rural populations by direct public payments to farmers as restorative measures (Li *et al.*, 2011; Liu *et al.*, 2008, 2021). The extensive geographic area covered, magnitude of payments and their ambitious goals make these programmes potentially very significant in enhancing ecosystems and encouraging a shift away from damaging land management practices. The NFCP aims to conserve natural forests through bans on logging and to support afforestation through incentives to forest enterprises, while the SLCP aims to convert cropland on steep slopes to forest and grassland by providing farmers with grain and cash subsidies.

Findings from these programmes are still emerging. Huang *et al.* (2019) report NFCP to have led to the improper management of forest resources, a shortage of capital investment and limited transfers of staff between sectors, but conclude that structural changes in forestry and agriculture may benefit forestry workers and other stakeholders over the long term. After 7 years of SLCP implementation, Li *et al.* (2011) report that there is lower income inequality among households participating to the programme than among those who did not, and that there has not been the policy intention of a transfer of labour towards non-farming activities.

In the UK and Europe voluntary PES schemes are operating at regional or landscape scales. The funding and operation of such schemes often operate outwith conventional land management payment schemes (e.g. EU Common Agricultural Policy). Sets of standards and metrics are emerging, with businesses developing innovative systems of financing (Wunder, 2015, 2005; Wunder and Wertz-Kanounnikoff, 2009). The models of such businesses vary. Some operate through demand and supply aggregators to define a common proposition to

broker a deal (e.g. [Landscape Enterprise Networks](#)), operating with a blended public-private finance approach (Reed *et al.*, 2017).

A broad range of financial mechanisms can be used to support a just and green transition and characteristics of nature positive economies. These include nature and climate sovereign bonds (i.e. green bonds), sustainability-linked loans, environmental impact bonds, insurance products, private equity and impact investing (Dasgupta, 2021; Deutz *et al.*, 2020; OECD, 2020, 2021; RSPB, 2022).

Green bonds have been used to support actions that target the mitigation and adaptation to climate change and some, more limited, impacts on biodiversity. Reed *et al.* (2022) identify approaches to blend public and private funding for providing ecosystem services, noting a need for robust standards to govern new markets, provide investor confidence, and to ensure outcomes are delivered, and a role for regulation to integrate benefits (e.g. Net Biodiversity Gain) within national planning systems.

Environmental impact bonds provide mechanisms in which the beneficiary party (often public sector) operates with private investors on a basis of pay for success. This mechanism has been used by the District of Columbia Water and Sewer Authority (DC Water) and the City of Atlanta Department of Watershed Management (DWM), to finance projects that manage storm water runoff (Deutz *et al.*, 2020). A similar mechanism is being explored in the Australian state of Queensland (Power *et al.*, 2022) to protect mangroves. Other mechanisms aim to de-risk carbon markets using a price threshold. This is a price guarantee by which public finance intervenes only when the market price falls below the threshold (NatureScot, 2021a, 2021b).

The Seychelles have launched a type of green bond named 'Blue Bond' to raise finance on capital markets to fund sustainable use of marine resources, sustainable fisheries, and coastal ecosystems. The Blue Bond is guaranteed by the World Bank and the Global Environment Facility (World Bank, 2019).

The intervention of public investment has aimed to achieve three goals: i) improve the profitability of private finance in conservation and restoration projects which would otherwise have a low return and be unattractive to investors; ii) facilitate the aggregation of projects which would otherwise be too small to attract financial investment; and iii) provide standardised data and transparency to overcome barriers to investment by private finance (Cooper and Trémolet, 2019).

The principal recommendations which emerge for each policy lever are summarised in Table 4.

Table 4. Recommended actions for policy levers.

EOI lever - Creating a new narrative for a nature positive economy

- work on transformative change in narrating the principles for nature positive economies.
- agree on a common vision for sustainable development and transition pathways.
- empower citizens to achieve changes envisaged by the new narratives.
- listen to and reward people who operationalise nature positive transitions.
- reinforce access to green space to reduce some types of deprivation.
- redesign urban architecture to enable human-nature connectedness.
- promote active citizen engagement, such as citizen assemblies to address nature, climate, and the economy.

EOI lever - Debating new economics principles at all educational levels

- disseminate stories and narratives about the roles of nature positive economies.
- consider a transformation of the discipline of economics.
- ground economics in sustainable, equitable and inclusive values.
- promote nature positive values in research, information campaigns, education and university curricula.
- use open-access platforms to understand the economics of innovation, inequality, and environmental sustainability.

EOI lever - Proposing renovated economic governance supporting positive nature actions at multiple institutional scales

- work with public, private and voluntary institutions to generate flexible top-down and bottom-up arrangements.
- instigate institutional reforms to enable transitions to nature positive economies.
- address multi-stakeholder platforms to counter biodiversity loss in ecosystems that span across countries.
- operationalise sustainable supply chain models by implementing Responsible Business Conduct (RBC) standards in supply chains.
- incentivize future sustainable produce through ecolabelling.

EOI lever - Addressing economic governance for nature positive actions through value chain creation

- make a compelling economic case for global efforts to expand coverage of protected areas.
- direct financial resources to integrate the protection of land and sea, and involve indigenous people and communities to support international goals of COP15.
- adopt strategies that tackle multiple societal challenges.

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- use integrated planning and management approaches that facilitate dialogue between communities, institutions and production sectors.
 - combine nature conservation and nature regeneration through sustainable habitat management.
 - involve actors throughout value chains at early stages of planning to understand the actions on the ground needed (e.g. nature-based solutions).
 - establish formal compliance of forest and land use carbon offsetting.
 - promote financing of nature-based solutions by carbon pricing programmes such as cap-and-trade system and carbon taxes.
 - develop an approved suite of nature-based solution approaches, which can be included in carbon offset programmes.

Regulatory lever – Committing to new nature positive policies and regulatory measures

- promote international multilateralism.
- pledge to reverse biodiversity loss by 2030, adhering to the Leaders' Pledge for Nature.
- implement the post-2020 Global Biodiversity Framework.
- adopt the Kunming-Montreal Global Biodiversity Framework (GBF).
- champion nature positive trade policies.
- regulate for mandatory due diligence for investors.
- enforce OECD guidelines on responsible business conduct and due diligence guidance.
- ensure public procurement vendors disclose biodiversity impacts along their value chain.

Economic lever – Reforming fiscal tools and economic incentives

- reform subsidies of harmful activities.
 - restructure environmental taxes, charges, tradable permits, Payment for Ecosystem Services programme, ecological fiscal transfer.
 - adopt 'polluter pays' principles.
 - prevent economic costs impacting upon sustainable practices.
 - incentivise sustainable decision-making by removing financial barriers (e.g. dedicated credit lines) for sustainable practices.
 - implement a carbon tax and direct funds towards investments in natural capital (e.g. afforestation/reforestation, peatland restoration).
 - ringfence taxes on discharge of pollutants, use of pesticides and extraction of resources towards investments in nature positives actions.
 - incentivise fiscal exemptions for conservation easements.
 - compensate ecological fiscal transfers from the Global North to the Global South that face reductions in GDP through incentivising nature positive policies.
-

EOI Lever - Addressing nature valuation nature in policies, accounting, and wellbeing metrics beyond GDP

- decision-making guided by valuing nature, in which the valuation process follows principles of scientific and economic integrity.
- reinforce the assessment of diverse values in the valuation of nature.
- realise the importance of value for local communities taking into account placed-based decisions.
- promote and implement natural capital approaches.
- test accounting rules for resources and ecosystems, as per those elaborated by the United Nations System of Environmental Economic Accounting.
- encourage businesses to use the Natural Capital Protocol to measure dependencies and their impacts on nature, and consequences throughout the supply chain.
- require businesses and investors to disclose their strategies' reports of risks to biodiversity.
- promote natural capital accounting to advance policies for embedding negative externalities in the price of natural resources.
- use natural capital approaches/accounts for planning, implementing and monitoring the effects of public policies.
- formulate new metrics as alternatives to GDP to measure wellbeing and inclusive wealth.
- promote the use of metrics that target biodiversity, such as the IUCN Species Threat Abatement and Recovery Metric (STAR).

EOI Lever - Enforcing policies and regulations for greening finance

- ensure that public, private and voluntary sectors disclose the impacts of their investment choices.
- coordinate international actions between the environmental sector, national finance ministries, central banks and financial regulators.
- implement the EU Taxonomy and the Sustainable Finance Disclosure Regulation
- ensure that businesses assess and manage their impacts and dependencies on nature, and associated risks to nature.
- promote the use by businesses and financial institutions of ESG standards such as those of the Global Reporting Initiative (GRI).
- endorse initiatives such as the UN Global Compact (based on 10 principles concerning human rights, labour, the environment, and anti-corruption), the Transition Pathway Initiative (TPI), and CDP (formerly the Carbon Disclosure Project).
- require mandatory compliance with the Taskforce on Nature-related Financial Disclosures (TNFD) framework.

- regulate stock markets to facilitate innovative mechanisms for issuing stocks and bonds that define impacts rather than only objectives of financial outcomes.

EOI lever - Reforming financial mechanisms

- promote the use of a broad range of market and financial mechanisms that would advance nature positive economies.
- encourage PES-like schemes which operate at regional and landscape scales and have appropriate sets of standards and metrics.
- issue nature and climate sovereign bonds.
- use environmental impact bonds in which the beneficiary party works with private investors on a pay for success basis.
- make use of blended finance to de-risk markets.
- facilitate the aggregation of projects which are too small to attract financial investment.
- require standardised data and transparency as part of overcoming barriers to the deployment of private finance to sustainability.

10.2 Presentation of case studies

This section introduces each policy lever supported by one or more case studies listed in Table 5.

Table 5. Summary of the case studies used to explore policy levers to transition to nature positive economies

Regulatory measures: international agreements and mandatory due diligence	Economic measures: tools to realign producers and consumers strategies	Economic Operating Infrastructures (EOI)	
<i>International/ multilateral agreements:</i> Due diligence obligations: French laws on climate and nature finance disclosures - case study 1	<i>Taxes:</i> Conservation easement - case study 3	<i>Financial mechanisms:</i> Green bond - case study 6 Environmental impact bonds - case studies 7 & 8	<i>Economic governance:</i> Pre-competitive agreement, multilateral platform - case studies 12 & 13

<p><i>Mandatory public procurements:</i></p> <p>Green Public Procurement policy in agriculture - case study 2</p>	<p><i>Subsidies:</i></p> <p>Removing harmful subsidies - case study 4</p>	<p><i>Exchange mechanisms (currencies):</i></p> <p>Cryptocurrencies and biodiversity tokens - case study 9</p>	<p><i>Economic governance:</i></p> <p>Infrastructure to conserve and restore nature (nature-based solutions) - case study 14</p>
	<p><i>Biodiversity offset:</i></p> <p>The role of compensation mechanism for residual impacts - case study 5</p>	<p><i>Exchange mechanisms (metrics):</i></p> <p>Valuing nature and natural capital accounting - case study 10</p> <p>New metrics, beyond GDP - case study 11</p>	<p><i>Narrative research:</i></p> <p>Boosting a new narrative and cultural shift to nature positive, and restructuring the economics discipline - case studies 15 & 16</p>

10.2.1 Regulatory measures: international agreements and mandatory due diligence

International multilateral agreements have been the first response to halting the decline in nature since the 1970s, setting standards or targets to which parties can commit. Examples are:

- the UN Ramsar Convention on Wetlands, which has been in effect since 1975. Its mission is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world” (RAMSAR, 1974);
- the UNESCO World Heritage Convention, adopted in 1972, which combines the goals of conserving both cultural sites and nature (UNESCO, 1972);
- the Convention on International Trade in Endangered Species, which is an international agreement adopted in 1973 (CITES, 1973);
- the Bonn Convention on Migratory Species (CMS, 1979).

Principles and rights for biodiversity conservation in the EU were granted by the Bern Convention on the Conservation of European Wildlife and Natural Habitats (Council of Europe, 1979). This is a binding legal instrument in effect since 1982 that aims to “ensure conservation of wild flora and fauna species and their habitats” (Council of Europe, 2023). Signatories to the Convention include countries in North Africa and Europe, and the UK. The EU implements the Bern Convention primarily through the

1992 Habitats Directive and the 1979 Wild Birds Directive (Fleurke and Trouwborst, 2014). In 2021, the Council of Europe published a Vision for the Bern Convention for the period to 2030: “By 2030, declines in biodiversity are halted, leading to recovery of wildlife and habitats, improving the lives of people and contributing to the health of the planet.” (Council of Europe, 2021).

An international agreement of overarching significance is the [Convention on Biological Diversity](#), which was signed by 150 government leaders in 1992, following the Brundtland Report ([World Commission on Environment and Development: Our Common Future \(1988\)](#)), and the Rio Sustainability Summit in 1992. The Convention lays out three goals: i) *the conservation of biodiversity*; ii) *the sustainable use of its components*; and iii) *the equitable sharing of benefits arising from its use* (United Nations, 1992).

Although these agreements provide standards and targets for the signatory parties, and legitimacy in the implementation of policy instruments, their success in the targets being met is uneven (Phang *et al.*, 2020), with criticisms about its effectiveness as a policy (Ana María Ulloa *et al.*, 2018). However, the impact depends on how instruments are implemented by individual countries (Gaget *et al.*, 2020).

All of these mandatory initiatives were framed around the logic of halting and reversing biodiversity loss. Only recently this concept has been replaced by the idea of nature positive. At the UN Conference on Climate Change in November 2021 (COP26), the leaders of 145 countries endorsed the [Glasgow Leaders' Declaration on Forests and Land Use](#), committing to work collectively to “halt and reverse forest loss and land degradation by 2030”. Building on that, as part of COP27, a number of countries launched a [Forests and Climate Leaders' Partnership](#), to which the UK committed £1.5 billion in the finance for forests over 2021-2030. More recently, in 2022, at the Conference of the Parties (COP 15) (the CBD's governing body), world leaders adopted the [Kunming-Montreal Global Biodiversity Framework](#), which includes the targets of restoring 30% of degraded ecosystems by 2030, and reducing tenfold the risk and rate of species' extinction by 2050. Countries adopting the Framework committed to setting national targets for its implementation (CBD, 2022, 2021).

Governments can also contribute to achieving the goals above by setting mandatory requirements for businesses, investors, and the broader financial sector to ensure transparency regarding their impacts on biodiversity and how they assess risks to nature, business, and society. In February 2022, the European Commission proposed a Directive on mandatory value chain due diligence, in which companies would be required to identify, prevent, or mitigate adverse impacts of their activities on biodiversity. Once the Directive is adopted, Member States will have two years to transpose it into national law, although some Member States have already adopted national rules on due diligence (European Commission, 2022a).

In the UK, the Environment Act 2021 includes due diligence provisions for larger businesses using forestry commodities (DEFRA, 2022). However, these provisions include only commodities produced on land which has been illegally occupied or

used, according to the laws of the countries of production, and have been criticised for focussing on forests rather than all ecosystems. This leaves large areas of deforestation unprotected even if in compliance with local laws, leading to limited impacts on the deforestation and loss of biodiversity associated with UK supply chains. Such due diligence may also prove difficult to implement because of the complexity and limited transparency of the legal structures of producing countries (Jennings *et al.*, 2021).

Environmental due diligence is gaining traction in leading economies around the world. France established its Duty of Vigilance law (*Loi de Vigilance*) in 2017. This requires companies (including parent and subsidiary businesses, and supply chains) to do due diligence in human rights and environmental issues. Other examples of requirements of legal standing are the German Due Diligence Act (2021) and the Japanese guide for environmental due diligence (2020) (OECD, 2021).

Case study 1

France makes disclosures relating to nature and climate affected by financial services mandatory (Agence France Trésor, 2020; Bulletins Officiels, 2019; France Invest, 2022).

Article 29 of the French Law on Energy and Climate requests financial institutions to provide information on the position of their assets with respect to criteria set out in the EU Taxonomy (European Commission, 2020b). This adopts the concept of double materiality, meaning targeting both dependency and impacts on climate and biodiversity.

The implementation decree (2021) of the Law on Energy and Climate introduces new obligations relating to biodiversity such as: i) information on Environmental, Social and Governance (ESG) criteria in the investment decision-making process, and voluntary integration of biodiversity related issues; ii) obligation to publish a strategy with long-term biodiversity objectives, including compliance with the objectives of the Convention on Biological Diversity (CBD) and a contribution to the objectives defined by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), and use of biodiversity footprint to measure compliance with the objectives set by CBD; iii) publication of information on how ESG criteria are taken into account in risk management including physical transition and liabilities related to climate change and biodiversity.

Additional regulatory measures towards a nature positive economy can be attractive to green public procurement while still implemented on a voluntary basis. Public procurement includes the goods and services purchased by the public sector, including schools, hospitals, and the offices of government and its agencies. Due to the large volume of goods and services obtained through procurement by the public and private sectors the inclusion of green criteria can provide security of markets and influence producers to invest in more sustainable technologies, and contributing to sustainability goals (Lundberg *et al.*, 2016).

EU Directives which came into force in 2014 enable public authorities to consider environmental objectives in public procurement. The European Commission defines

Green Public Procurement (GPP) as “a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life-cycle when compared to goods, services and works with the same primary function that would otherwise be procured.” (European Commission, 2023b). In the EU, GPP is a voluntary instrument providing guidance to Member States on its implementation. The aim is to promote the use of sustainable products and services by public authorities, contributing to achieving environmental policy goals, including those relating to biodiversity loss ([EU criteria – GPP – Environment – European Commission](#)).

The inclusion of mandatory elements, rather than relying on a voluntary basis, would be likely to increase the uptake of GPP (Pouikli, 2021). This would be in line with the European Parliament position, in reference to the EU’s Public Procurement Framework, that voluntary uptake is insufficient, and that the EU should increase the number of mandatory green procurement requirements, and EU Directives on procurement. These provide legal frameworks for socially responsible public procurement through social and environmental clauses (European Commission, 2021). The European Parliament recommends the Member States to professionalise public procurement authorities and mainstream GPP (Ferrer, 2020; Schwarz *et al.*, 2022). Mandatory GPP legislation could also incentivise market developments towards environmentally-friendly solutions (Mélou, 2020). It also could help to deliver on SDG Target 12.7 of promoting public procurement practices that are sustainable, in accordance with national policies and priorities.

An empirical case study, showing how nature restoration (triggered by the increase of organic farming) can be positively influenced by GPP, is summarised in the Case study 2.

Case study 2

Green Public procurement and organic farming (Lindstrom *et al.*, 2020).

In 2006, the Swedish Government implemented a Green Public Procurement (GPP) policy to organic farming. The policy aimed to increase the level of purchases of organic food by the public sector. The aim was to incentivise Swedish farmers to convert to organic practices and contribute to a national environmental goal of 20% organic farmland by the year 2010. In 2017, a more ambitious version of the policy stated that the share of the public sector’s food consumption of organic produce should reach 60%, and the proportion of organic farmland 30% by 2030.

Lindstrom *et al.* (2020) empirically tested the relationship between public sector organic food purchases and the extent of organic agricultural land, while controlling for direct agricultural policy in the form of subsidies for organic production. They found that the 2006 organic food policy was associated with a significant, positive, impact on the extent of land under organic status. Direct subsidies for organic production had more of an effect than providing means of supporting organic food purchases.

Although the Swedish public sector accounts for only 4% of the Swedish food market, it was a sufficiently large buyer to exercise market influence compared to

the size of any single county which would be likely to have insufficient purchasing power to influence producers. Through the purchasing power of public authorities, it is expected to shape consumption and production trends and so increase demand and influence the market structure in favour of more environmentally friendly products. A change in regulation also removed a barrier to uptake of procurement rules prohibiting favour being shown to local suppliers.

Further examples of the role of public procurement in shifting support towards organic food are provided in the European Commission (2021) guide on procurement, noting the Fair trade food for Munich's schools, Germany, and reserved tender for food processing in Vendée, France. These examples suggest barriers such as market saturation of organic products can be overcome, and the important role of the public sector in creating the conditions favourable to agroecological transitions by encouraging long-term stability of market demand (Schwartz *et al.*, 2022).

10.2.2 Economic measures: tools to realign producers and consumers strategies

Tax raising powers provide regulators with a commonly used means of changing the behaviour of producers and consumers. In this report, emphasis is placed on the mechanism of the optimal tax (Pigouvian tax) which internalises external costs.

The goal of this policy lever is to correct market failures in relation to public goods (i.e. any environmental good that is not traded) that are not characterised by *rivalry* (e.g. a good is not available because consumed by others) and *excludability* (capacity to exclude from resource access or markets, as opposed to a situation of open access, e.g. marine resources in the high seas). Regulators can intervene to correct the prices of market goods to which externalities (e.g. pollution) are associated by imposing a tax (Cannan, 1921). The goal of such an action is to provide signals to consumers and producers to behave in a more sustainable way.

The introduction of this tax is based on the polluter pay principle (Pigouvian Tax; Cannan, 1921) and aligns with goals of the Biological Conservation framework and the Kunming-Montreal Global Biodiversity Framework (GBF). The tax is paid on the amount of externality produced, being a function of the external cost generated by the harmful activity (Perman *et al.*, 2003). The result of imposing a tax is a reduction in production and/or consumption, and mobilisation of finance for the regulatory authority. The generated finance can be reinvested in nature protection, restoration, funding of more efficient productive processes, activities that benefit biodiversity, and reform of fiscal tools that are harmful to biodiversity in economic sectors such as agriculture, fisheries, and forests (Deutz *et al.*, 2020).

Compared to imposing regulatory standards, taxes can provide incentives to achieve objectives more cost-effectively (Hanley *et al.*, 1997; Perman, 2003). For instance, taxes on pesticides (France) and timber harvests (i.e. logging, adopted in Canada), are among the ones adopted by OECD countries to disincentive harmful behaviours that may negatively impact biodiversity (OECD, 2021). Globally, taxes on such harmful behaviours generated US\$7.7 billion in revenue per year (2016-2018 average). Political decisions are then made to determine how the revenue

generated is to be used. The OECD (2020) notes that taxes on harmful behaviours could be earmarked for the benefits of nature and biodiversity. For example, carbon taxes imposed on the energy sector can be reinvested in biodiversity conservation through afforestation, as per the PES scheme in Costa Rica (Barbier *et al.*, 2020; Costanza *et al.*, 2021; Pagiola, 2008).

Other instruments similar to the Pigouvian tax can be used to generate revenues to more directly support biodiversity protection. These taxes are usually called fees or charges, and are payments for the use of a resource, usually paid in proportion to how the resources are used. Examples of such fee/charges are: i) funds arising from applications for water consumption (sub-national water abstraction in Germany); ii) biodiversity-relevant noncompliance fines (a coastal protection fee in the US) (OECD, 2021). Other examples are protected area entry or usage fees for hunting, fishing, and recreational activities conservation stamps, and hydropower usage payment based on water utilisation (Deutz *et al.*, 2020). According to the OECD, biodiversity-relevant fees and charges generated US \$1.2 billion in revenue per year during the period 2015 to 2017 (OECD, 2020).

Another way to use taxes for nature positive economies is to disincentivise harmful behaviours that negatively impact on biodiversity (Deutz *et al.*, 2020). Examples of such measures are:

- fees to mitigate the consequences of a project or infrastructure on land/water/species;
- commercial or residential development impact fees (e.g. Sections 69 and 75 developer contributions under Scottish planning);
- penalties for environmental damage or violation of regulations on the protection of water, air, and wildlife.

Regulators can also use tax policies to incentivise positive behaviours such as tax credits for project developers or landowners promoting conservation practices, and fiscal exemptions for conservation easements (case study 3).

Case study 3

Property tax mechanisms for conservation easements (Schuster *et al.*, 2018)

This case study describes a fiscal scheme used in Canada as exemptions for conservation easements. This mechanism involves voluntary agreements between an easement holder, typically a land trust or government agency, and a private landowner. Under this mechanism easement holders acquire and retain certain property rights to restrict land use and in return private landowners may receive payments and/or a reduction in property or income taxes. For example, the Ontario Conservation Land Tax Incentive Program provides for a 100% reduction in the property tax on areas of land maintained to protect “provincially important natural heritage features.”

Although this tax seems to suggest a win-win outcome for both the public and private actors involved, costs can be incurred by participants and government. For example, landowners incur opportunity costs by forgoing land uses that are incompatible with their contracted obligations, and transaction costs and costs of

conservation management. From a government perspective, tax programmes and easements can reduce revenue.

Schuster *et al.* (2018) provided support to decision makers on the protection of coastal habitats of Douglas Fir of the Georgia Basin in south-western British Columbia (BC). They identified high-priority parcels for potential biodiversity conservation ("high conservation priority"). Two scenarios were developed: i) increase the protection of the ecosystem from 9% to 17% to meet CBD targets; and ii) increase protection from 9% to 30% to meet a target set by scientific assessment.

Results indicate that raising property tax rates by 0.13% on parcels of low biodiversity value may offset the elimination of property taxes on high-biodiversity parcels. The aim of such taxes was to incentivise conservation on private land to achieve scenario 1 (based on 100% uptake). Targets to conserve 30% of landscapes (scenario 2) required higher increases in tax rates (that appeared feasible based on 40% uptake). The results imply that, given sufficient uptake by landowners of parcels with high-biodiversity value, tax shifting offers an efficient mechanism for governments to meet conservation targets in partnership with private landowners, without reducing tax revenue or requiring land purchases.

Other economic tools commonly employed by governments are subsidies. Conventionally, a subsidy is a form of government support to an economic sector (or institution, business or individual) with the aim of promoting an activity (Barbier, 2022). Globally, the total amount of subsidies given to sectors that are potentially harmful to biodiversity - such as fossil fuels, agriculture, water, and fisheries - are conservatively estimated to be in the range of US\$5 to 7 trillion annually (Dasgupta, 2021).

The most recent global estimate of subsidies that are known to be harmful to biodiversity is from the OECD (2020). This is valued as high as US\$500 billion per year, 500 times higher than biodiversity relevant 'positive' subsidies that amount to US\$0.89 billion per year (OECD, 2019). Additional public expenditures for conservation and sustainable use of biodiversity are estimated to be approximately US\$67.8 billion per year globally, but overall they remain much lower than biodiversity harmful support to traditional economic sectors (OECD, 2020). Most subsidies of harmful activities are delivered to: i) support production levels or prices; ii) support income; or iii) provide indirect forms of support.

Subsidies for harmful practices are not easy to remove because they can provide socio-economic benefits to some groups of citizens (or the population as a whole) and, or, because of political pressure from interest groups. However, some countries are decoupling food production and input use. This is advocated by the EU Biodiversity Strategy for 2030 (European Commission, 2020a) which calls on Member States to phase out subsidies harmful to biodiversity, ban subsidies that exacerbate illegal, unreported, and unregulated fishing, and direct support to environmentally friendly and efficient techniques.

The decoupling of farm support from production and input use has been practiced in the EU since 1992, leading to a 20% decline in the use of fertilisers (Deutz *et al.*,

2020). The current [EU Common Agricultural Policy \(CAP\)](#) (2023 to 2027) sets ambitions that require CAP plans to be aligned with environmental and climate legislation, and higher than in the previous CAP period (referred to as 'no backsliding'), and the targets in the EU Green Deal. The National CAP Strategies of Member States require them to design measures that deliver on the aims of the EU Green Deal, which includes its Biodiversity Strategy for 2030 (European Commission, 2020a) and Farm to Fork Strategy, and the Long-Term Vision for Rural Areas.

Overall, 40% of the CAP budget has to be climate-relevant and strongly support the general commitment to dedicate 10% of the EU budget to biodiversity objectives by the end of the EU's multiannual financial framework (MFF) period, with subsidies focusing on conditionality to environmentally friendly agriculture (Féret *et al.*, 2023). Support mechanisms of the EU CAP include enhanced conditionality whereby beneficiaries have their payments linked to a stronger set of mandatory requirements so that on every farm at least 3% of arable land is dedicated to biodiversity and non-productive elements, possible support through eco-schemes on 7% of farm area, and at least 25% of the budget for direct payments allocated to eco-schemes. This is described as providing stronger incentives for climate- and environment-friendly farming practices and approaches such as organic farming, agro-ecology, carbon farming. Under the Rural Development Programmes, at least 35% of funds are allocated to measures to support climate, biodiversity, environment and animal welfare.

Similar steps have been taken by Switzerland in reforming agricultural subsidies by removing direct payments to livestock farmers and increasing payments to farmers meeting biodiversity goals (OECD, 2017). The approach to the CAP (2023-2027) represents a structural change in the design of support mechanisms, within a broad framework, the impacts of which will not be known until the relevant evaluations of the new CAP.

Examples of subsidy reform are also evident in the fisheries sector. Between 1984 and 1986, partly driven by a fiscal crisis, New Zealand phased out all agricultural and fisheries subsidies including price support, concessionary lending, development loans and tax concessions. The government helped with the transition through pay-outs for those leaving their respective sectors, shifting to rights-based management in fisheries, social welfare programs, and loan restructuring (CBD, n.d.; TEEB, 2009).

Case study 4

Removing subsidies for harmful practices in European Union fisheries (Villasante *et al.*, 2022)

Villasante *et al.* (2022) show how fisheries subsidies have historically contributed to fleet overcapacity, and currently are being used to maintain its profitability. Findings of the study show that removing harmful subsidies and reducing overfishing will help with the recovery of resource biomass, subsequently leading to increased levels of sustainable catches, income, and the well-being of fishers. It can also be expected to reduce inequities in income and consumption when fish stocks are not effectively managed.

The subject of the research was the EU fishing fleet, which is one of the world's largest. Total Factor Productivity (TFP) is used to measure the productivity of all inputs or factors of production, in terms of their combined effect on output. In this study, the TFP approach was used to define the proportion of output not explained by the inputs used in production.

Results show that the productivity of small-scale fishing fleets is almost 100% greater in the North Atlantic and 16% higher in the Mediterranean and Black Seas compared to large-scale vessels. This finding explains that subsidies for harmful fisheries activities, disproportionately allocated to large vessels, have introduced distortions in the efficient allocation of inputs (capital, labour, and energy). As a result, there is no correlation evident between vessel size and productivity, so referring to the size of a vessel cannot be considered synonymous of productive or unproductive respectively in EU fleets.

While taxes and biodiversity supporting payments are an effective way to redirect economic policies towards a nature positive direction, more controversy is generated by the concept of biodiversity offsetting. This term refers to a compensation mechanism for residual impacts on biodiversity arising from project development after appropriate prevention and mitigation measures have been taken. For example, the US wetland compensatory mitigation scheme allows for the creation or restoration of habitats such as wetlands to compensate for impacts at other locations resulting from infrastructure development (OECD, 2021). The IUCN estimated that over 100 countries have policies that support or specify the need for biodiversity offsets. However, to be fully effective, this mechanism should be used to reduce residual impacts after taking into account strategies that avoid and then minimise impacts (IUCN, 2021b).

Case study 5

Biodiversity offset: a support for positive nature? (Curran *et al.*, 2014)

Biodiversity offsetting is “measurable conservation outcomes designed to compensate for adverse and unavoidable impacts of projects, in addition to prevention and mitigation measures already implemented” (IUCN, 2021c). IUCN notes that the aim of biodiversity offsetting is to achieve No Net Loss (NNL) and preferably a Net Gain (NG) of biodiversity, but this strategy is only appropriate for projects which have rigorously applied the widely used ‘mitigation hierarchy framework’. They also consider it a measure of last resort; and in certain cases, a measure not appropriate that should not be used.

Curran *et al.* (2014) analysed data from 108 comparative studies on the biodiversity value of passively recovering and actively restored habitats. These sites covered 1,228 sites of secondary growth and 716 sites of old-growth habitat as reference sites.

They investigated the presence of three criteria to prevent a net loss: i) restored ecosystems develop over time to harbour old-growth assemblages of species; ii) active restoration significantly accelerates the process of ecosystem restoration;

and iii) offsetting policy is designed and applied to accommodate the time lags and uncertainties associated with compensatory habitat restoration.

Species checklists were extracted, and standardized response ratios for species richness were calculated. Results showed that it took approximately a century for species richness to converge to the old growth reference status, and hundreds of years and longer for the composition of assemblages to reach that of the reference sites. The rates for all the indices used were significantly accelerated through active restoration.

Empirical estimates of success rates and time lags indicate that offset ratios would be very large, exceeding what it is commonly applied in practice. Those success rates are adversely impacted upon by uncertainty (e.g. climate, interventions, disruption such as fire and flood), and risks of restoration failure. The long-term delays (over periods of decades to centuries) and a high probability of restoration failure (up to 82%) is not accounted for by current offset policy.

Pope *et al.* (2021), report the magnitude of multiplier ratios required to determine how big an area should be to achieve habitat protection. A minimum is 1:1, with 5:1 for 'vulnerable' ecosystems, 20:1 for 'endangered' ecosystems and 30:1 for 'critically endangered' ecosystems (in exception circumstances). The higher levels of ratios are likely to lead to significant institutional challenges, especially in regions with high levels of corruption and social and political uncertainty.

Curran *et al.* (2014) concluded that based upon the evidence of their study, restoration offset policy led to a net loss of biodiversity, and was inappropriate.

10.2.3 Economic Operating Infrastructure: green financial investments

Financial products used by public, private and voluntary organisations for funding green investments, can be amended to better align with the generation of positive impacts on the environment and biodiversity.

Some investments products which are marketed as low risk are **green bonds**, green loans, and sustainability linked loans. Products which are identified as higher risk investment mechanisms are represented by **private or public equity funds**, with specific investment strategies in areas such as sustainable forestry and carbon finance, and not always targeting nature and biodiversity protection. Other more innovative products are emerging such as **environmental impact bonds**.

Green loans have the legal form of a lending product by which a private borrower obtains credit from a bank in return for specific commitments. Sustainability linked loans are associated to sustainability commitments agreed by the borrowers and lenders.

Green bonds are security assets issued by public or private organizations to provide low-cost, low risk and long term of debt capital attracting risk-averse investors (Deutz *et al.*, 2020). They are similar to ordinary bonds except that investment proceeds are restricted to finance green projects and assets.

The green bond market is still limited. A small percentage (4%) of the US\$258 billion global green bond market in 2019 has been issued to finance projects to support

the integration of nature in economic sectors, such as sustainable agriculture or ecosystem conservation (OECD, 2021). Only 2% of the proceeds of such bonds facilitated sustainable land use. Green bonds issued by public organizations (i.e. Sovereign Green Bonds) represented 13% of the total green bond market (Deutz *et al.*, 2020). They were used to finance projects in the land use, renewable energy, and transport sectors. Examples of such bonds are: i) the water management bond issued by Washington DC to support construction of infrastructure to transport storm water to a wastewater treatment plant (Climate Bonds Initiative, 2014); and ii) the sustainable land use bond issued by the state of Louisiana for funding coastal erosion prevention projects (Climate Bonds Initiative, 2018).

To date, green bonds have primarily funded projects which address climate-change mitigation and adaptation. However, they can also be used to address the depletion of natural resources, loss of biodiversity, and water and air pollution (Dasgupta, 2021). An example is the Sovereign Green Bond issued by France, which raised approximately €1 billion in 2019 to provide capital for investments in actions for climate mitigation, climate adaptation, biodiversity, reductions in pollution, research, and incentive schemes for organic agriculture. (Agence France Trésor, 2020).

Case study 6

Blue bond – The Seychelles sovereign bond (Deutz *et al.*, 2020; Jackson, 2019; World bank, 2019)

In 2019 the Republic of the Seychelles was the first country to use a sovereign green bond to support sustainable marine and fisheries projects (a 'blue bond'). This green bond (renamed blue bond) raised US\$15 million from international investors Calvert Impact Capital, Nuveen, and the US Headquartered Prudential Financial Inc. The aims were to mobilize resources for empowering local communities and businesses, expanding marine protected areas, improving governance of priority fisheries, and developing the Seychelles' blue economy.

The 10-year bond will repay capital with an interest rate of 6.5% in three equal instalments in 2026, 2027 and 2028. The Seychelles blue bond is partially guaranteed by a US\$5 million guarantee from the World Bank and further supported by a US\$5 million concessional loan from the Global Environment Facility (GEF) which will partially cover interest payments for the bond. This blended finance approach will reduce the interest rate payments for the Seychelles from 6.5% to 2.8%, thus saving the state US\$8 million in interest payments.

Environmental Impact Bonds are a mechanism by which the payee interacts with investors to procure a service or intervention on payment of success (Deutz *et al.*, 2020). The payee is not required to repay the investors unless predetermined metrics (which indicate the service or intervention has been successful), verified by a third party, are achieved (Thompson, 2023). If the predetermined metrics are met, investors receive their full principal and returns. Returns on some impact bonds are graduated to reflect different success levels of the intervention or of the service provided (Deutz *et al.*, 2020; Thompson, 2023).

Case study 7

The Rhino investment impact bond (Jeffries *et al.*, 2019; Thompson, 2023)

In 2006 the rhino impact investment project was launched to address rhino conservation using an outcomes-based financing model for species conservation targeting a financial return.

Black rhinos are a critically endangered species, with a global population of c. 5,250, which is at risk due to illegal hunting for their horns. The aim of the project is to increase five black rhino populations in South Africa by 65% over 5 years. The actions include anti-poaching efforts to reduce unnatural deaths and habitat improvement to increase births.

Rhino Impact Bonds (RIB) were issued in 2021 to raise US\$45 million to support the actions of the project, including additional anti-poaching efforts to reduce unnatural deaths. Principals and coupons (1.8%) are paid to investors at the maturity date (2026), based progress against the 65% target.

Implementation of the strategies to raise the growth of the rhino population is paid for by “investors”. The “outcome-payers” are contractually committed to pay back investors their original investment plus or minus a pre-defined yield relative to the degree of outcome success.

Assessments of success will use bespoke metrics by which to measure outcomes (i.e. rhino growth rate), which are directly related to the impact (e.g. an increase in rhino's population). Preparatory work was required to identify baseline performance across all five sites (3.0% to 3.2%), with an aim of reaching 5.5% by the end of 2026.

Issues which arise include agreement on the baselines (e.g. quantity and quality of baseline and monitoring data) to enable the degree of confidence, and the spatial extent of observations (e.g. baselines linked to coarser data on rhino populations in 'Africa as a whole' rather than South Africa specifically; Jeffries *et al.*, 2019). There is a requirement to understand and assess counterfactuals, such as strengthened anti-poaching efforts at five study sites leading to poachers moving elsewhere.

An observation in the process of these bonds is the focus on simple and easy-to-measure outputs rather than impact. Outcome-payers such as the Global Environment Facility (GEF) include institutions which already fund conservation. They are exploring the potential of this new financing model which transfers the financial risk of non-performance to the private capital markets (i.e. investors) and aims to deliver outcomes (in this case a higher population of rhinos) rather than just outputs (for example, more rangers).

Case study 8

Biodiversity impact bonds and risk (Thompson, 2023)

Conventional bonds are suited to conservation impacts that can be commodified to generate revenue (e.g. selling more sustainably produced timber or rubber).

Impact bonds are suited to conservation impacts that are difficult to commodify and that, historically, have been funded by donors (e.g. increasing rhino populations).

Philanthropic donations can be very effective but are often insufficient, so finance from the private sector is increasingly sought. It is likely that investors will only finance conservation projects that are credible for delivering a financial return alongside positive environmental impacts, termed 'for-profit conservation'. Financial returns can be generated by attaining price premiums for sustainably produced commodities such as timber, cocoa, or oil palm, or by selling ecosystem services (e.g. carbon credits from reduced deforestation projects).

The paper reviews five projects into which impact investments are channelled. These are three conventional bonds of: i) Green Bond for Working Forests (GBWF); ii) Tropical Landscapes Finance Facility Sustainability Bond (TLFFSB); iii) International Finance Corporation Forests Bond (IFCSB). The two impact bonds studied are the Forest Resilience Bond (FRB) and Rhino Impact Bond (RIB). A theory of change is used to visually map linkages between i) inputs, ii) activities, iii) outputs, iv) outcomes, and v) impacts.

Results have shown that a positive interest has been generated for investors from these five bonds reflecting the risk mitigation measures in place. However, the study has revealed some drawbacks at project level. These are due to poor forecasting of cashflow and the use of simplified metrics adopted mainly for measuring the delivery of activities (number or type of output) rather than a real environmental impact.

The recommendations propose the use of risk mitigation strategies such as describing baselines and counterfactuals to establish additionality, and guarantors to protect investors if revenues are insufficient.

10.2.4 Economic Operating Infrastructure: exchange mechanisms (new currencies and tokens for nature and biodiversity markets)

Exchanging mechanisms of goods and services can serve nature positive economies through the adoption of new currencies and tokens. Local currencies have emerged to emphasise values of locality (examples are Toreke, Belgium; Totnes Pound, Devon UK; Regiogeld, Germany; Berkshares, US; Waddell *et al.*, 2023) with the aim of keeping money circulating within a community and building credit for small, green businesses. More innovative ideas are linked to the advent of blockchain technology to support a wellbeing economy, providing communities with tokens representing prepaid cards, crowdfunding, and complementary currencies.

Some projects use a digital wallet called a "*CommonsHood*" for supporting communities in the co-creation of local economy models (Balbo *et al.*, 2020). This initiative provides small retailers with tokens representing loyalty tools and institutions with purpose-driven tokens to reward volunteers for recycling, and to allow the dematerialization of tickets.

Alternative currencies have been promoted with an aim of integrating markets in new forms of municipalism and socio-economic collaboration, such as cooperative networks. For example, FairCoop in Catalonia is a network of cooperatives developing tools around [Faircoin](#), a cryptocurrency based on social and ecological principles. This builds an alternative financial infrastructure which shows how non-capitalist and degrowth oriented technological innovation can generate economies in more progressive and community-led ways (Balaguer Rasillo, 2021).

Case study 9 provides an example of cryptocurrency and token that can work also for delivering nature positive in innovative market structures.

Case study 9

Cryptocurrencies and tokens to regenerate the environment, community and the economy (CreditNature, 2023; Jepson, 2022; SEEDS, 2023; Waddell *et al.*, 2023)

Nature impact tokens can be used to raise funding for investment, which buyers can use to show their investment in nature for Environmental, Social and Governance (ESG) reporting and disclosure. One such form of token uses blockchain technology to generate cryptocurrency which direct funds towards investment in people and regeneration actions on the ground. An example of such a crypto-currency is Seeds, operated by "SEEDS" (<https://joinseeds.earth/>), which in turn is organised by the Hypha DAO network (Hypha, 2023) and members of Seeds.

The model used has the potential to stimulate economic localisation, give credit to small and green businesses, reduce ecological footprints, and build the informal economy. It has a strong alignment with the 'next economy values'. The crypto currency is used to fund regenerative actions such as the planting of trees (<https://seedslibrary.com/money-that-grows-trees/>), and support for a farm-based, multicultural learning centre designed to reconnect people with self, community, food and nature (Finca Sagrada, sacred land farm). No fees are levied on the use of the cryptocurrency and the tools by those in receipt of funds.

A second example of a blockchain application is the CreditNature approach. This is a mechanism to tokenise biodiversity units operating in markets for nature impact securities. Such tokenising includes biodiversity recovery (Jepson, 2022) for which a digital certificate, or form of credit, is produced, by verified conservative or restorative projects, that gives holders the right to report and display their investment in a nature recovery project, the impacts of which are forecasted using the NARIA metric framework (CreditNature, 2023). Nature impact tokens are available to be marketed as a unit expressing benefits arising from project recovery that contributes to integrity, connectivity and resilience of the ecosystem, thereby reducing the risk of commoditisation.

10.2.5 Economic Operating Infrastructure: nature valuation in policies, accounting and the formulation of wellbeing metrics

The valuation of nature is considered essential to correct market prices and redirect human behaviour through the generation of new environmental markets, one means of which is via Payment for Ecosystem Services (PES) schemes (Dasgupta,

2021). PES are becoming a familiar tool for conserving and restoring ecosystems and the services they provide. OECD (2021) identified 107 PES schemes, 21 in operation, spanning 36 countries, with a total finance allocated of US\$18.2 billion per year.

PES is based on the principle that beneficiaries of ecosystem services should pay to conserve and restore them (Wunder, 2015). However, they are more complex arrangements in that payments can be considered to be “administered prices” (Dasgupta, 2021) with compensation made by beneficiaries that can be public or private actors.

An international example of PES is the scheme for restoring forests in Costa Rica by redistributing economic resources through a carbon tax (Barbier *et al.*, 2020; Costanza *et al.*, 2021), and aiming to deliver both social and ecological outcomes. The monitoring of PES in Costa Rica showed the participation of farmers motivated by recognition of the environmental benefits, compared to less than half of participants joining the scheme for only economic benefits (Chan *et al.*, 2017).

A second example of a PES-like scheme is in China in which the state pays for the cost of restoration for benefits generated by farmers in a programme to revegetate degraded, hilly areas (Ouyang *et al.*, 2016). Other examples do not necessarily feature compensation made by governments, but rather they use mechanisms to distribute money through private transactions (Dasgupta, 2021).

Innovative regional markets are under development in Europe and the UK, with mechanisms providing new insights into how ecosystem markets are being used in a risk-based funding model, and aggregating both supply and demand to overcome issues of free-riding, ecosystem service trade-offs and land manager engagement (Reed *et al.*, 2022).

Valuations made for the generation of natural capital accounts can also be a useful tool for correcting GDP for the importance provided by nature to traditional economic sectors. Such accounts can provide information to support spatial planning and the implementation and monitoring of public policies (e.g. forestry, soils, water, energy), and as evidence to inform recommendations for decision makers (Vardon *et al.*, 2017) addressing climate (Ruijs and Graveland, 2018) and biodiversity concerns (Ruijs and Vardon, 2018a). Adopted by more than 100 countries, the United Nations System of Environmental Economic Accounting (SEEA) (NCAVES, 2021) is the agreed-upon international standard to monitor progress of the Post-2020 Global Biodiversity Framework (Capitals Coalition, 2021a).

Case study 10

The use of Natural Capital accounts for biodiversity protection and mainstream policies (Capitals Coalition, 2021a)

Natural capital assessments and systematisation in accounts can be used to provide directions to reverse nature loss.

In Indonesia, natural capital accounts were prepared under the aegis of the WAVES programmes to assess the extent of peatlands and make a stronger case

for their protection. The information developed informed discussion with stakeholders on tackling the expansion of oil palm plantations (World Bank, 2019b).

Sweden has used the United Nations System of Environmental Economic Accounting principles to prepare land accounts and identify landowners responsible for biodiversity management on agricultural land. It has published ecosystem services accounts to assist and direct agriculture towards more sustainable and regenerative practices (Ruijs and Vardon, 2018a; Steinbach, 2017; Vardon *et al.*, 2017).

A range of metrics and indicators have been developed and are in operational use around the world which measure the contribution of nature and wider characteristics of society and quality of life to inform policies that support goals of wellbeing economies.

Examples are:

- **Gross Ecosystem Product (GEP)** (Ouyang *et al.*, 2020) is an index to measure the value of the contributions of nature to economic activity, summarising the value of ecosystem services in a single monetary metric. It uses the total value of final ecosystem goods and services supplied to human well-being in a region, on an annual basis, and which incorporates physical and monetary elements (Dasgupta, 2021). It was tested for the Chinese province of Qinghai, which is the source of the Mekong, Yangtze, and Yellow Rivers. Findings showed that water-related ecosystem services are the source of c. 66% of the value of GEP for Qinghai, most of which accrue downstream. The GEP has been officially adopted by the United Nations Statistical Commission as part of the UN-SEEA system of ecosystem accounting.
- **Bhutan's Gross National Happiness Index (GNH)** (Ophi, n.d.; Thinley and Hartz-Karp, 2019; Tobgay *et al.*, 2011) is a multi-dimensional poverty index. It aggregates Bhutan's performance across nine domains and 33 development indicators into a single number. It incorporates factors that include psychological health, living standards, environmental and cultural resilience, and the OECD's Better Life Index (Durand, 2015; Mizobuchi, 2014) which measures progress in 11 domains considered essentials for achieving quality of life. The Gross National Happiness index is used to building social and environmental safeguards into Bhutan's public policies. Businesses are awarded Gross National Happiness certificates for having operations aligned with the nine domains of Gross National Happiness (Thomas and Rinzin, 2023).
- Natural capital accounting can be used to contribute to the formulation of 'inclusive wealth indicators', with the sum of the accounting values of produced, human and natural capital as a new measure of economic progress that accounts more appropriately for benefits from investing in natural assets than GDP (Dasgupta, 2021). This approach is beginning to be used to support new indicators for economic development, which are applicable at national and local levels.

- The **Genuine Progress Indicator (GPI)** (Department of Natural Resources, 2020) is a “multi-dimensional composite indicator that estimates the quantity and distribution of net benefits of the embedded economic system on the larger social and environmental systems” (Fox and Erickson, 2020). It is designed to reveal the trade-offs between costs and benefits of economic growth, taking account of several aspects of economic life of citizens which is not represented in GDP, and differentiates between economic transactions that add to wellbeing and those that diminish it (Power *et al.*, 2022).
- The **Canadian Index of Wellbeing (CIW)** (Michalos *et al.*, 2009; Muhajarine *et al.*, 2012; University of Waterloo, 2020) builds upon the premises of the GPI and can be used to formulate and monitor policies enhancing local and national wellbeing (see Case study 11).
- The New Zealand Treasury provided a detailed assessment of the natural capital for the country in a discussion paper on ‘The Start of a Conversation on the Value of New Zealand’s Natural Capital’ (Joey and Sonette, 2018). The analysis used multiple sources of data from national mapping programmes on land cover, biodiversity, water status, etc. The approach for preparing an overall assessment of natural capital uses the Total Economic Value (TEV) framework. Their valuation of biodiversity draws upon the categorisation of the Canadian Environmental Valuation Reference Inventory (EVRI) database.

Case study 11

Beyond GDP, the Canadian Index of Wellbeing (Muhajarine *et al.*, 2012; University of Waterloo, 2020)

The Canadian Index of Wellbeing (CIW), developed at the University of Waterloo, provides a comprehensive analysis of the quality of life of Canadians. Primarily, it draws on data from Statistics Canada, which provides 64 indicators representing eight interconnected domains of key importance to quality of life. These domains are: Community Vitality, Democratic Engagement, Education, Environment, Healthy Populations, Leisure and Culture, Living Standards, and Time Use.

The CIW framework was developed after broad consultations with citizens from across the country, and national and international experts. The index is used as a tool for working with communities in conducting community wellbeing and building community resilience.

The development of the CIW contributed to generating a cultural shift at federal and provincial levels in recognising the limitations of GDP for measuring wellbeing. It has influenced Canadian federal initiatives such as the Quality Life Framework and Strategy which is a quality of life approach to decision-making in response to COVID-19 (Department of Finance Canada, 2019).

The third national index report was published in 2016 (University of Waterloo, 2016) findings of which showed robust economic growth since first publication of the index in 1994, with GDP up 38.0% by 2014, but lower increases in the wellbeing of Canadians with the overall CIW index in 2014 of up 9.9%. Examples of changes for

individual domains show Education up 32.8%, Healthy Populations up 16.2%, Community Vitality up 14.8%, Democratic Engagement up 13.0%, Living Standards up 11.9%, Time Use up 3.0%, Environment down 2.9%, and Leisure and Culture down 9.3%.

The report concludes that public policy needs to increase attention on quality of lives as a whole, and that the inter-related nature of the CIW domains points to the need for a high level of cooperation to achieve the best outcomes for all citizens. The fourth CIW report is due to be published in 2023.

The CIW is complemented by reports for individual provinces of Ontario, Nova Scotia, Saskatchewan and some regions at lower levels of governance.

10.2.6 Economic Operating Infrastructure: reformulation of economic governance

This EOI refers to a broad set of processes that support economic activities which take collective actions to provide appropriate physical and organizational infrastructures. The role of economic governance is to influence macroeconomic policies that promote equitable growth, support livelihoods and social and economic rights claims, and enhance natural resource governance that is responsive, sustainable, transparent, and accountable (Waddell *et al.*, 2023).

Dasgupta (2021) argues the need for governments to work with private institutions to make flexible and polycentric arrangements of governance, facilitating participation of communities and businesses, and to spread knowledge at all organizational levels. This is also likely to require changes in governance within, and between, the public and private sectors, and civil society, which are already complex.

Moore and Hartley (2008) report characteristics of innovations in governance in the public sector of: i) going beyond organizational boundaries to create network-based decision-making, financing, and production systems; ii) tapping new pools of resources; iii) exploiting government's capacity to shape private rights and responsibilities and redistribute the right to define and judge value; iv) evaluating the degree to which governance structures promote justice and the development of a society, and their efficiency and effectiveness in achieving collectively established goals. Such innovations would be consistent with characteristics of nature positive economies.

In the private and third sectors there is a very broad range of governance structures that reflect ownership rights and responsibilities. These include publicly and privately owned businesses, partnerships, cooperatives, trusts and social enterprises. Transformations in governance may come about due to mergers and acquisitions, new forms of contractual relationships within businesses or between them and suppliers, and relationships with non-profit organizations.

Programmes of land reform, notably in Scotland, are leading to changes in governance, notably of the roles of communities and civil society. Polman *et al.* (2019), in the H2020 SIMRA project, identified triggers and reconfigurations of governance by civic society, or socially motivated responses to failures of markets and State, that lead to social innovations. They reflect the changes in governance

that are associated with the emergence of social innovations, which is “The reconfiguring of social practices, in response to societal challenges, which seeks to enhance outcomes on societal well-being and necessarily includes the engagement of civil society actors”. The [H2020 SIMRA project](#) concluded that the emergence of new social networks and governance mechanisms are crucial in addressing environmental and economic challenges in marginal rural areas, and that the ends can be diverse. Such societal well-being is closely aligned to aims of a nature positive and wellbeing economies. For evaluations of examples of social innovation see Ravazzoli *et al.* (2020).

Examples are emerging of international cooperation between the private sector partners with impacts on social and environmental sectors. The coordination of investments and efforts between companies through a common platform helps member companies achieve economies of scale and amplify the impact of individual projects. An example of the development of formal partnerships is Partnerships and Private Sector Engagement (PSE), which are initiated by pre-competitive agreements involving two or more companies within the same industrial sector (e.g. pharmaceutical sector; Stevens *et al.*, 2013). The aim of these partnerships is to combine efforts to address a shared problem, focusing on common social or environmental impacts, but in ways which do not affect direct business competition. Under these agreements, the private sector partners may be joined by community actors such as NGOs, donors or foundations in a target region or value chain. Together, they forge new solutions to overcome shared challenges with an aim of unlocking opportunities of benefit to all parties.

An example of an organisation which brokers such partnerships is the Resonance initiative (<https://www.resonanceglobal.com>). It states it has aided the formation of over 350 partnerships, identifying how, where, and with whom to partner to tackle business and global development challenges. One of its partnerships is in the aquaculture sector involving the Thai Union North America, Monterey Bay Aquarium, and research, industry and civil society partners. This partnership uses a [Partnership Assurance Model \(PAM\)](#) for the co-design, implementation, and verification of the sustainability of activities and satisfactory employment standards and conditions in aquaculture. To achieve this required forging connections between buyers, governments, NGOs, fish farmers and suppliers who are all focused on a specific production region (PAM, 2020). Through PAM, partners invest in the supply ecosystem and then work together to measure and certify the cumulative impact of their sustainability efforts, stressing the need to tackle complexities.

Another example of facilitating the development of partnerships to address specific challenges is the [Sustainable Agriculture Initiative \(SAI\) Platform](#). Launched by Danone, Nestle, and Unilever, this initiative operates globally, engaging local partners with a broad range of stakeholders to map existing activities. It is a non-profit network of over 170 members worldwide across agriculture and food supply chains, and assurance schemes and standards organisations. It operates in an environment of pre-competitive collaboration and its aim is to guarantee supplies whilst promoting a land management strategy that respects environmental values.

The types of stakeholders involved are local government, small private companies, foundations, multi-national companies, and international development banks.

Case study 12

The Sustainable Agricultural Initiative (SAI) Platform (Kruschwitz, 2013; Poetz *et al.*, 2012; SAI, 2023)

The SAI Platform (Sustainable Agricultural Initiative) was launched by Danone, Nestle, and Unilever to accelerate pre-competitive collaboration across the food and beverage industry. The latter is a partnership agreement in which two or more firms (partners) agree to engage in a common action, with a pecuniary scope that indirectly accelerates widespread adoption of sustainable agricultural practices, globally. By coordinating the investments and efforts of its member companies, the SAI Platform helps companies achieve economies of scale and amplify the impact of individual projects, to advance sustainable agricultural supply chains.

In Pakistan, the SAI strategically combines and coordinates individual company efforts and connects member companies to the existing landscape of relevant donors, foundations, international development banks, and local government initiatives and partners. Their actions enable companies build on existing efforts and bring in additional expertise, resources, and local networks from cross-sector partners to solve shared supply chain challenges.

It is common for companies in Pakistan to concentrate sourcing in the most fertile regions of the country, so farmers often alternate crops between seasons. This means that different companies may be buying from the same set of farmers but at different times of the year. To promote soil quality and health, Pakistani farmers must deploy sustainable, regenerative agricultural practices year-round and across their major crops.

The extensive range of stakeholders participating in the platform helps determine more equitable trade throughout the supply chain. Through its activities, SAI promotes several values of new economics thinking, in particular relating to relationships and connectedness co-creation of collective values, an economy that is regenerative and circular, and equitable markets and trade.

Case study 13

Global Water Partnership (GWP, 2023)

Integrated water resources management is based on the equitable and efficient management and sustainable use of water and recognizes that water is an integral part of the ecosystem, a natural resource, and a social and economic good, the quantity and quality of which determine the nature of its utilization. This stresses the importance of an integrated and collaborative approach, in which there is clear articulation of the link between water resources management and the “3Es” of sustainable development: economic efficiency in water use, social equity, and environmental and ecological sustainability.

The Global Water Partnership (GWP) is a global action network with over 3,000 partner organizations in 179 countries. The network has 69 accredited Country Water Partnerships and 13 Regional Water Partnerships. The network is open to all organizations involved in water resource management: developed and developing country government institutions, agencies of the United Nations, bi- and multilateral development banks, professional associations, research institutions, non-governmental organizations, and the private sector.

The GWP does not operate independently. Its networking approach provides a mechanism for coordinated action and adds value to the work of other key development partners. GWP Partners, locally, regionally, and globally, work to make water a top policy priority. It supports several values for a wellbeing economy with a particular emphasis on co-creating values; facilitating relationships and connectedness; and addressing regeneration, reciprocity, and circularity.

In contrast to dialogues around specific water bodies, regional dialogues can facilitate more open discussions on key aspects and issues related to transboundary waters. By focusing on solutions, these dialogues can assist in identifying entry points for cooperation. Regional dialogues constitute a series of events (conferences, workshops, study visits, seminars) focusing on policy and technical instruments to address transboundary water management, assisting in highlighting benefits of cooperation, and leading to improved capacity for practitioners and stakeholders. Stakeholders are given a voice in water planning and management, with particular attention to securing the involvement of women and the less well off in society.

Decision-makers and institutions must acquire the attitudes and skills needed for a behavioural change to manage water effectively. Building their capacities can range from supporting dialogues on participatory approaches, workshops (e.g. on financing, flood management, and international water law), and working with stakeholders such as parliamentarians, women's organizations, and urban planners. Building such capacity requires certain types of knowledge, for which GWP provides technical background papers and policy briefs, on issues ranging from effective water governance to water efficiency.

10.2.7 Economic Operating Infrastructure: landscape management, conservation and restoration of natural assets

Nature-based Solutions (NbS) are one mechanism that can link governance and interventions that progress towards nature positive actions. NbS is an umbrella concept encompassing multiple dimensions (spatial planning, soft-engineering, ecosystem services, green and blue infrastructures) that can leverage actions to protect, manage and restore nature to generate wider benefits for human wellbeing and biodiversity (European Commission, Directorate-General for Research and Innovation, 2022).

NbS as a concept can support a nature-based economy (Dasgupta, 2021) by:

- pricing and valuing nature to boost resource efficiency (Costanza *et al.*, 2014b; Turner *et al.*, 2019);

- promoting interaction and diversity of actors in production and consumption through articulated decision making process (IUCN, 2020);
- The latter involves value chain analysis, where suppliers engage with end users early in product planning to establish needs, instead of an economic model with linear flows between producers and their suppliers, retail trade and consumers.

Case study 14

NbS value chain in the sustainable agricultural sector (European Commission, Directorate-General for Research and Innovation, 2022; European Commission, 2019c)

LIFE IP ARTISAN (2019-2027) is a Life Natura 2000 project that aims to reinforce French national adaptation to the impacts of climate change. It is a capacity building project aimed at mainstreaming good practices and creating a favourable framework for the emergence of local climate adaptation projects focussing on ecosystems by creating a network of at least 200 relevant stakeholders working towards a common objective, i.e. an increased use of NbS.

A case study within this project is that of the Fermes de Figeac cooperative, located in the Ségola Limargue areas in central France. It is an agricultural and territorial cooperation project, whose aims are to preserve local ecosystems, maintain a thriving agricultural sector, and develop quality food in the territory. Its ambition is to promote responsible development based on local resources, creating value, and cooperation between local actors in networking and the transfer of knowledge.

Its approach to cooperation is with all the resources of the territory including businesses, local authorities, civil society, to co-construct projects and attract talent. It manages common goods, develops synergies between actors, and generates added value. It assesses itself against the ISO 26000 standard developed to help organizations effectively assess and address social responsibilities.

The activities of the cooperative include the production of dairy products, and measures to mitigate climate change, reduce GHGs, prevent the degradation of biodiversity and landscapes, and the creation of local value chains.

10.2.8 Economic Operating Infrastructure: boosting a new narrative and cultural shift to nature positive, and restructuring the economics discipline

The transition to nature positive economies requires a new description of systems, ideas, and events referring of the concept (Fazey *et al.*, 2020; Riedy, 2020), prior to its formalisation in codes, governance and sustainable public and private practices.

When new paradigms are created and become dominant, they shape attitudes and beliefs about how the world works. In the context of infrastructure, memes and narratives provide the logic and values framework that support the design of innovations (Waddell *et al.*, 2023). Currently, the dominant narrative is that of neoliberal economics accompanied by scientific reductionism that separates

humans from nature. Several initiatives are working on changing narratives around the role of economics and shaping a new relationship between humans and nature. Examples of such narratives are “Better Nature” (<https://betternature.earth/>), and “Good Anthropocene” (<https://goodanthropocenes.net/>), the latter being led by McGill University, Canada, the Stockholm Resilience Centre, Stockholm University, Sweden, and the Centre for Complex Systems in Transition (CST), Stellenbosch University, South Africa. The Good Anthropocene looks at social initiatives, new technologies, economic tools, social-ecological projects, and organisations. It proposes new ways of operating, referring to “seeds”, which arise from research disciplines, communities of practice, and individuals that have flourishing-oriented worldviews, values, and problems. Seeds are identified in prototype forms, representing a diversity of worldviews and values but are not currently dominant or prominent in the world (Bennett *et al.*, 2016). A visioning and participatory scenario process follows which draws on these seeds as a basis of generating desirable narratives of potential futures (Pereira, 2021).

Case study 15

Borderlands Restoration Network (BRN, 2023)

Borderlands Restoration Network is an ecological-economic initiative that implements traditional ways of restoring land (as used by Indigenous communities), reducing erosion, and managing water. It uses approaches that create jobs and facilitate the integration of communities along the borders between Mexico and Arizona.

Borderlands works on a narrative approach, based on the concept of regenerative economics closely involving communities and respecting the physical/ecological limits of the environment. The aim is to build better and resilient ecosystems, through a cosmo-localism approach which recognises the biophysical and socio-economic dimensions.

Borderlands Restoration Network operates to create a regenerative economic landscape, through values such as reciprocity and circularity, the implementation of the principles embedded in Doughnut Economics (Doughnut Economics Action Lab, 2020; Raworth, 2017a). Its holistic approach towards stewardship recognises that economies are embedded within societies, and that ecosystems need to be maintained, aiming to improve human and planetary wellbeing.

Although the process of managing land is not innovative, engineering approaches have been replaced in favour of traditional systems of retaining water that are more labour intensive and less ecologically harmful. Borderlands operates by facilitating connections with and within communities through one-to-one communications and direct participation in land use initiatives, facilitating the creation of jobs. The goal is to retain people on their land and to rejuvenate relationships between land and people of all backgrounds and ages within their territory.

Case study 16

Rethinking economics (<https://www.rethinkeconomics.org/contact-2/>)

Rethinking Economics is an international network of students, academics and professionals building better economics in society and the classroom. It organises campaigns, events, and engagement projects, with the aim of encouraging economics education that is pluralist, realistic, diverse and decolonized.

Rethinking Economics argues that economics in universities is too narrow, uncritical with a lack of diversity of thought linked to a lack of diversity amongst prominent thinkers and practitioners. The initiative lobbies for reading lists to include more diverse scholars and for teaching materials to include more contributions from women, people of colour, populations from the global south, LGBTQ+ members, disabled people and from lower socioeconomic backgrounds.

In reforming the economics curriculum, the movement promotes collective values, by embracing pluralistic social and relational approaches that support social enfranchisement and the common good. It explains the benefits of an economy that is based on regenerative, reciprocity, and circularity through embracing pluralistic social and relational approaches that support social enfranchisement and the common good.

11. Conclusions

Conserving biodiversity by policies that promise to reverse its loss is becoming a common requirement. The failure of reaching the Aichi biodiversity target by 2020 should not be ignored. This increases the pressure on delivering the [Leaders' Pledge for Nature](#), endorsed by 64 countries in September 2020, signatories to which included the UK Prime Minister. The Pledge included commitments to protecting at least 30% of terrestrial areas and seas, and restoring lands outside protected areas by 2030.

Achieving this goal needs recognition that any effort in halting and then reversing the loss of biodiversity requires coordination with policies tackling climate change and actions from public, private, third sectors, and individuals. Within their remits and roles, each of these types of actors has responsibilities and capabilities to embrace the principles of a nature positive economy. This **vision** of the economy emphasizes **wellbeing for nature and societies rather than the total throughput of materials**. It is anchored to a series of **principles** that reframe economics around stewardship of the whole; generating co-created collective values; promotion of governance through cosmopolitan localism (i.e. ensuring decisions are made at the most local level possible while acknowledging the global context); promoting generativity, reciprocity, and circularity, and relationality and connectedness. The literature on nature positive economies emphasises these values. A challenge is to find and integrate the policy levers that promote these values.

The policy levers proposed by Harris (2023) to progress towards sustainable consumption (**infrastructure-based, information-based, economic, and regulatory**) have been integrated into the framework of Economic Operating Infrastructures

(EOI). These comprise economic innovations associated with efforts to shift **narratives** away from conventional economics toward one of a thriving life, with innovations in **economic governance, financing and exchange mechanisms, and products and services**.

The review of literature and case studies identified:

- three main **regulatory** measures of multilateral agreements; mandatory due diligence; and sustainable public procurement for reversing biodiversity loss;
- three principal **economic** measures of taxes, subsidies, and pricing of resources for stimulating ecosystem services markets;
- the roles of building **EOI** based upon dissemination and education of narratives that inform multilateral economic governance for addressing local aspects of conservation. These promote nature-based solutions at local and landscape scale, and international multilateral platforms managing forest, agriculture, fisheries, water through multilateral public-private-voluntary partnerships.

This high-level summary of findings also reflects the substitution of information-based and infrastructure-based levers (Harris, 2023) with some of the EOI (Waddell *et al.*, 2023).

Evidence from the **case studies** shows that to progress towards a nature positive economy it will be necessary to form new relationships between parties to address public and private sectors and civil society. However, greater accountability will be required in all sectors, to ensure credible and accurate assessments of impacts and dependencies on natural capital throughout value chains.

The review of the pilot from the TNFD suggests mandatory due diligence obligations, offers a strategy with the greatest scope for reducing environmental footprints within supply chains, and aligns with the objectives of the Scottish Government Environment Strategy. To prepare for new nature positive policies, EOI such as **valuing nature and introducing new exchange mechanisms** (PES schemes and ecosystem services markets) are fundamental to embed the importance of natural capital in decision making.

A broad range of indicators can be expected to be required and used to monitor how the economy in its entirety, and per sector, is performing against natural, human, and social domains, as well as financially. To align these policies towards a nature positive pathway will require the **right fiscal and economic incentives** to enforce polluter pay principles through taxes and remove subsidies of harmful activities. The promotion of restorative measures by the public, private and civil society sectors will require suitable financial policy levers to stimulate and regulate investment through **green finance**.

The materials reviewed suggest that by embedding the goal of nature positivity by 2030, and building an economy around Economic Operating Infrastructures that promote principles of wellbeing, conditions can be established for an economy which replenishes natural capital, secures against the risks associated with biodiversity loss, and contexts for societal prosperity.

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