Report on the gaps, synergies and opportunities in the UK government's 25 Year Plan for the Environment

Dr Neil Brummitt and Dr Ana Claudia Araujo
Natural History Museum, London, UK

April 2023

The context and purpose of Defra's 25 Year Plan

In 2018 the UK government published 'A Green Future: Our 25 Year Plan to Improve the Environment' (hereafter, 'the Plan'), the first time that such a wide-ranging and far-reaching set of policies and proposals had been produced for the UK (UK Government, 2018a). There are also 3 accompanying Annexes (Annex 1: Supplementary evidence report, UK Government 2018b; Annex 2: Government strategies to protect and improve the environment, UK Government 2018c; Annex 3: The UK's international agreements to protect or improve the environment, UK Government 2018d). A separate document published the following year presents the outcome indicator framework to measure progress towards targets of the Plan (UK Government, 2019a). The report presented here has been commissioned by the University of Leicester via the NERC Landscape Decisions programme to explore the *gaps*, *synergies* and *opportunities* within the proposed goals and targets of the Plan.

It is the ambition of both the Prime Minister and Secretary of State in place at the time the 25 Year Environment Plan was written, and as stated in the Plan, that the government should leave the state of the UK environment in a better condition for future generations than they found it. To this end annual reports on progress towards the goals of the Plan have been released (UK Government 2019b, 2020, 2021, 2022), which are accompanied by publication of the resulting update to the outcome indicator framework of the Plan (also consolidated and available at https://oifdata.defra.gov.uk/). Enshrined in the 2021 Environment Act is the intention that this Plan will be refreshed regularly to ensure that focus is maintained on "the right priorities, using the latest evidence, to deliver better value for money" (page 14 of the Plan), and the first revision of the 25 Year Environment Plan was published earlier this year (UK Government, 2023). In total this amounts to more than 1,000 pages of documentation on environmental policies published in the last 5 years.

Environmental policy is mostly a devolved responsibility of the Scottish Government, Welsh Government and Northern Ireland Assembly; not all elements of this Plan relate to the UK as a whole, therefore, and many – such as the 2023 revision of the Plan, the Environmental Improvement Plan – relate to England only. It is also important to acknowledge that, in addition to being a signatory on international conventions such as CITES (the Convention on International Trade in Endangered Species), Ramsar and the Convention on Biological Diversity (CBD) (more than 4 pages of international legislation are listed in Annex 3 to the 25 Year Plan (UK Government, 2018d), the UK government also has legal jurisdiction over and responsibility for the environmental resources of the UK Overseas Territories (UKOT's), which are not directly part of the UK landmass or offshore waters.

The Department of the Environment, Food and Rural Affairs (Defra) necessarily has to balance conflicting demands on the landscape of the UK, including principally the need to produce and harvest commercial livestock and food crops, and environmental products such as timber and fresh water, with the need to conserve natural environments (terrestrial, freshwater and marine) and the plants and wildlife found within them. This Plan was therefore developed in the context of two other

important pieces of government legislation, the 2013 Sustainable Development Indicators (UK Government, 2013) and the 2017 Industrial Strategy and its component Clean Growth Grand Challenge (UK Government, 2017 [since withdrawn and superseded by the government's 2021 Plan for Growth]). Beyond acknowledging this at appropriate points, however, this report is concerned with a review of gaps, synergies and opportunities in the UK government's 25 Year Environment Plan and its 66 proposed indicators in the outcome indicator framework, rather than the associated Sustainable Development Indicators, Industrial Strategy and Clean Growth Grand Challenge (for more on this see below).

The scope and purpose of this report

In order to evaluate the scope, aims, goals and targets within the Plan, some context and comparison outwith the UK is needed. Together with the overwhelming majority of countries, the UK is a Party to the UN Convention on Biological Diversity (CBD). It is therefore legally obliged, in common with other Parties, to enact policies to help achieve, and measure progress towards, the goals and targets of the CBD. These goals and targets are agreed jointly between Parties to the Convention internationally, at the global level, although responsibility for implementing policies to achieve these goals and targets lies with individual Parties (almost exclusively national governments). The CBD framework thus offers a compelling context in which to determine whether there are gaps, synergies and opportunities within the UK government's 25 Year Plan in comparison with internationally-agreed aims, and to compare the policies of the UK to those of other countries.

A different approach might have been to assess goals of the 25 Year Environment Plan solely against the 17 global Sustainable Development Goals (SDGs) of the United Nations. However, these are broader in scope than the 25-Year Plan is and cover additional aspects of economic development such as poverty, hunger, health, education, inequality, energy and infrastructure. There is also already a separate UK government process for measuring progress towards goals for sustainable development, with a set of 12 headline and a further 22 supplementary Sustainable Development Indicators (SDIs) collected by the Office for National Statistics and published by Defra (UK Government, 2013). Therefore, although these 34 government SDIs also cover such aspects of the UK environment such as air and water quality, use of land and natural resources, and status of wildlife, habitats and priority species, the focus of the report presented here has been the more detailed targets contained within the 25 Year Plan and comparison with the associated targets within the CBD Global Biodiversity Framework.

Although naturally enough the CBD is focussed on biodiversity, as with the UK government Plan the targets of the CBD also address cultivated and domesticated biodiversity (i.e., crops and livestock), use of and trade in biodiversity, pollution, and amenity use and appreciation of natural environments. At the recent Conference of the Parties (COP) meeting in Montreal in December 2022 (COP 15), a new framework of targets and indicators for the CBD to be achieved by 2030 was agreed and adopted, known as the post-2020 Global Biodiversity Framework (hereafter, 'the Framework'). This was published as decision CBD/COP/15/L.25 and contains four Goals and 23 Targets for urgent action over the decade to 2030 (CBD, 2022a). It is a new set of targets for the CBD agreed after several years of on-off negotiations that has replaced the 20 Aichi Targets previously set at COP 10 in Nagoya in 2010, none of which was achieved by 2020.

The accompanying monitoring framework and its associated indicators to measure progress towards meeting these post-2020 targets was published simultaneously as decision CBD/COP/15/L.26 (CBD,

2022b) and contains 25 headline indicators, more than 50 component indicators (including dis-aggregations of headline indicators tailored to particular targets, such as trade or biodiversity services, e.g. Living Planet Index for used species, Red List Index (impact of pollution)), and many dozens of complementary indicators. Many targets of the CBD post-2020 Global Biodiversity Framework are similar to goals of the UK government 25 Year Environment Plan. At the same time, as all Parties to the Convention do, the UK government has a legal obligation to report to the CBD on progress towards meeting these internationally-agreed targets, in the UK's case both within the UK and in its overseas territories.

Our aim with this report is thus to perform a gap analysis of the UK government's 25 Year Plan in the light of this new international framework, following the earlier model by Geijzendorffer et al. (2015). We highlight areas covered by the CBD Global Biodiversity Framework but not covered by the Plan (*gaps*), compare policy areas with similar aims between the Framework and the Plan where action will address both bodies of legislation (*synergies*), and suggest existing indicators and monitoring frameworks that could either be adopted or adapted in order to measure progress towards elements of the 25 Year Plan (*opportunities*). We make a series of recommendations for actions that can be taken now, and additional areas where further research could bring significant benefits in the future to enhance the environments and natural resources of the UK and its overseas territories.

Definitions: Goals, Targets, Indicators, Metrics

Some definitions and clarifications are useful at this point. There are ten *Goals* in the 25 Year Plan and the Plan lists 44 *Targets*, with 66 *Indicators* given in the outcome indicator framework. Topics covered by *Targets* in the government's 25 Year Plan align more-or-less with those of the *Targets* of the CBD, which for the CBD mostly each have one or more *Indicators* assigned to measure progress towards meeting them. Indicators of CBD Targets are generally specific indices or calculations, with a published methodology, for example the Living Planet Index, IUCN Red List Index, Ocean Health Index, etc. and a particular value of that index is produced at regular intervals in order to measure progress towards meeting that Target of the CBD Global Biodiversity Framework. Most CBD Targets have more than one headline indicator while a few so far have none, and each indicator may be used to measure more than one CBD Target.

Within the government's 25 Year Environment Plan, however, Targets are not necessarily SMART (Specific, Measurable, Achievable, Realistic, Time-bound), although some are – for example, a target aiming to reduce industrial atmospheric pollution may not specify a reduction of how much of which pollutant by what date. Unlike the CBD, Targets of the UK government 25 Year Plan do not necessarily have single or specific quantifiable indices designed to measure progress towards meeting them, although the separate set of UK government Indicators has associated *Metrics* and where a suitable metric and its component data has been produced, these are provided (see https://oifdata.defra.gov.uk/). Indicators in the government's 25 Year Plan thus correspond more closely to what would be termed Targets in the CBD Global Biodiversity Framework, and specific values of what are termed Indicators in the CBD Framework would be termed Metrics in the government's 25 Year Plan.

The 66 individual UK government Indicators and Metrics contained in the outcome indicator framework thus roughly, but not precisely, correspond to the 44 Targets of the 25 Year Plan (UK Government, 2019a). In a few cases indicators are measured that do not address specific targets. This makes comparisons between the 25 Year Plan and other, non-UK environmental policy

instruments and aligning the independent use of similar metrics and indicators in different contexts difficult. It even makes difficult relating the different indicators adopted by the outcome indicator framework of the 25 Year Plan to particular targets of the Plan itself, as many indicators address more than one target while some do not address any single target. However, it should be noted here that a similar situation exists with regard to the UN Sustainable Development Goals, with the UK government choosing to collate and publish its own series of Sustainable Development Indicators for the UK that relate to those of the UN SDGs, but do not necessarily address each of them directly.

The 66 indicators are grouped into 16 'headlines' under ten Themes aligned with the ten Goals and related to the 44 Targets of the Plan. However, there is not a one-to-one relationship between the ten Themes of the outcome indicator framework and the ten Goals under which the 44 Targets of the 25 Year Plan are grouped. Each Goal of the Plan is represented by at least one Theme, but one Goal of the Plan ('Thriving plants and wildlife') is addressed by two Themes, 'Seas and Estuaries' and 'Wildlife' (and four indicator 'headlines') and two other Goals of the Plan ('Clean Air' and 'Mitigating Climate Change', and 'Enhancing biosecurity' and 'Managing exposure to chemicals') are addressed by a single Theme ('Air' and 'Biosecurity, chemicals and noise', respectively) but more than one indicator 'headline' (see also Table 1 below). An additional Theme of the outcome indicator framework, 'International', does not relate to any particular Goal of the 25 Year Plan, but it does address this important component of the UKs legal obligations under the many bodies of existing international legislation to which the UK is already a signatory (as listed in Annex 3 of the Plan, UK Government 2018d).

The 44 Targets of the 25-year Plan

There are 44 Targets listed in the Plan grouped under 10 Goals, the first six Goals focused primarily on delivering goods and benefits, and a further four on managing pressures on the environment. These Goals and Targets are:

1. Clean air

- Meeting legally binding targets to reduce emissions of five damaging air pollutants. This should halve the effects of air pollution on health by 2030.
- Ending the sale of new conventional petrol and diesel cars and vans by 2040.
- Maintaining the continuous improvement in industrial emissions by building on existing good practice and the successful regulatory framework.

2. Clean and plentiful water

- Reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies.
- Reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans.
- Supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025.
- Minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters. We will make sure that potential bathers are warned of any short-term pollution risks.

3. Thriving plants and wildlife

- Reversing the loss of marine biodiversity and, where practicable, restoring it.
- Increasing the proportion of protected and well-managed seas, and better managing existing protected sites.
- Making sure populations of key species are sustainable with appropriate age structures.
- Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems.
- Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term.
- Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits.
- Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories.
- Increasing woodland in England in line with our aspiration of 12% cover by 2060: this would involve planting 180,000 hectares by end of 2042.

4. Reducing the risks of harm from environmental hazards

- Making sure everyone is able to access the information they need to assess any risks to their lives and livelihoods, health and prosperity posed by flooding and coastal erosion.
- Bringing the public, private and third sectors together to work with communities and individuals to reduce the risk of harm.
- Making sure that decisions on land use, including development, reflect the level of current and future flood risk.
- Ensuring interruptions to water supplies are minimised during prolonged dry weather and drought.
- Boosting the long-term resilience of our homes, businesses and infrastructure.

5. Using resources from nature more sustainably and efficiently

- Maximising the value and benefits we get from our resources, doubling resource productivity by 2050.
- Improving our approach to soil management: by 2030 we want all of England's soils to be managed sustainably, and we will use natural capital thinking to develop appropriate soil metrics and management approaches.
- Increasing timber supplies.
- Ensuring that all fish stocks are recovered to and maintained at levels that can produce their maximum sustainable yield.
- Ensuring that food is produced sustainably and profitably.

6. Enhancing beauty, heritage and engagement with the natural environment

- Safeguarding and enhancing the beauty of our natural scenery and improving its environmental value while being sensitive to considerations of its heritage.
- Making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas, and encouraging more people to spend time in them to benefit their health and wellbeing.
- Focusing on increasing action to improve the environment from all sectors of society.

7. Mitigating and adapting to climate change

- Continuing to cut greenhouse gas emissions including from land use, land use change, the agriculture and waste sectors and the use of fluorinated gases. The UK Climate Change Act 2008 commits us to reducing total greenhouse gas emissions by at least 80 per cent by 2050 when compared to 1990 levels.
- Making sure that all policies, programmes and investment decisions take into account the possible extent of climate change this century.
- Implementing a sustainable and effective second National Adaptation Programme.

8. Minimising waste

- Working towards our ambition of zero avoidable waste by 2050.
- Working to a target of eliminating avoidable plastic waste by end of 2042.
- Meeting all existing waste targets – including those on landfill, reuse and recycling – and developing ambitious new future targets and milestones.
- Seeking to eliminate waste crime and illegal waste sites over the lifetime of this Plan, prioritising those of highest risk. Delivering a substantial reduction in litter and littering behaviour.
- Significantly reducing and where possible preventing all kinds of marine plastic pollution – in particular material that came originally from land.

9. Managing exposure to chemicals

- Seeking in particular to eliminate the use of Polychlorinated Biphenyls (PCBs) by 2025, in line with our commitments under the Stockholm Convention.
- Reducing land-based emissions of mercury to air and water by 50% by 2030.
- Substantially increasing the amount of Persistent Organic Pollutants (POPs) material being destroyed or irreversibly transformed by 2030, to make sure there are negligible emissions to the environment.
- Fulfilling our commitments under the Stockholm Convention as outlined in the UK's most recent National Implementation Plan.

10. Enhancing biosecurity

- Managing and reducing the impact of existing plant and animal diseases; lowering the risk of new ones and tackling invasive non-native species.
- Reaching the detailed goals to be set out in the Tree Health Resilience Plan of 2018.
- Ensuring strong biosecurity protection at our borders, drawing on the opportunities leaving the EU provides.
- Working with industry to reduce the impact of endemic disease.

The need for indicators measuring progress towards these goals is set out on page 131 of the Plan. Some indicators already exist, some are in development and some are yet to be developed. Links between indicators, goals and targets are set out in 'Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan' (UK Government 2019a) available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/925779/25-yep-indicators-2019.pdf and the data behind these indicators themselves are provided in an interactive dashboard at: https://oifdata.defra.gov.uk/. In some cases existing indicators have already been developed by other organisations and in other contexts which could be adopted to measure similar goals in the 25 Year Plan. A table detailing these indicators, both those which exist and those which could be adopted, against the relevant goals of the Plan is given in the accompanying Excel spreadsheet, and the relationships between Goals of the 25 Year Environment

Plan and the Themes and Indicator Headlines with their associated indicators from the outcome indicator framework is summarised in Table 1 below.

25 Year Plan Goal	Outcome Indicator Framework Theme	Indicator Headline and Indicators
Clean Air	A Air	1. Air quality (A1, A3, A6)
Mitigating Climate Change		2. Greenhouse gas emissions (A2)
Clean and plentiful water	B Water	3. Water and the water environment (B3, B4, B5)
Thriving plants and wildlife	C Seas and Estuaries	4. Diversity of our seas (C3, C4, C5)
		5. Health of our seas (C7, C8)
	D Wildlife	6. Wildlife and wild places (D2, D5)
		7. Nature on land and water (D1, D4, D7)
Efficient use of natural resources	E Natural Resources	8. Production and harvesting of natural resources (E1, E3, E4, E7, E9)
Reduced risk from environmental hazards	F Resilience	9. Resilience to natural hazards (F1, F2, F3)
Enhanced beauty and engagement	G Natural beauty and engagement	10. Landscapes and waterscapes (G1, G2, G3)
		11. People enjoying and caring about the natural environment (G4, G5, G6, G7)
Enhancing biosecurity	H Biosecurity, chemicals and noise	12. Exotic diseases and invasive non-native species (H1, H2)
Managing exposure to chemicals		13. Exposure of people and wildlife to harmful chemicals (H3, H4)
Minimising waste	J Resource use and waste	14. Resource efficiency and waste (J2, J4, J5, J6)
Global impacts*	K International	15. Impacts on the natural environment overseas (K1)
		16. Improving the environment overseas (K2, K3, K4)

Table 1 Alignment of Goals of the 25 Year Environment Plan with Themes, Targets and Indicator headlines of the accompanying outcome indicator framework for measuring progress towards delivering the Plan, adapted from Figure 1 of the outcome indicator framework (UK Government, 2019a, page 8); note that there are slight discrepancies between the assignment of indicators to headlines in Figure 1 on page 8 and Figure 3 on page 11 of the same report (UK Government, 2019a), so here we follow headline indicator assignments given in Figure 3. One Goal of the Plan, 'Thriving plants and wildlife', relates to two Themes (and four headlines) of the outcome indicator framework, while in two cases two Goals of the Plan relate to a single Theme of the outcome indicator framework ('Clean air' and 'Mitigating climate change', and 'Enhancing biosecurity' and 'Managing exposure to chemicals'). Two other Goals of the Plan relate to more than one headline of the outcome indicator framework, 'Enhanced beauty and engagement' and 'Global impacts'; *'Global impacts' is not strictly a Goal of the 25 Year Plan, but it is nonetheless a legal obligation of the UK government in its overseas territories and is listed in the outcome indicator framework as if it is a Goal. 44 of the 66 individual metrics of outcome indicator framework are listed under their respective indicator headline; the other 22 metrics mostly refer to more than one Goal and indicator headline, or do not address specific targets.

Reports on and revisions of the 25 Year Environment Plan

Annual reports showing progress on meeting the targets of the 25 Year Environment Plan have been published each year from 2019 onwards (UK Government 2019b, 2020, 2021, 2022), with an update of the outcome indicator framework provided usually later that same year. Not every one of the 66 indicators is updated: in 2022, for example, trends for 50 indicators are given, of which 10 have no new data since 2021 and five more are new 'interim' indicators either supplementing or replacing one of the original 66 indicators. In 2023 the first revision of the 25 Year Environment Plan was published (UK Government, 2023), and the current Prime Minister has re-stated the government commitment to leaving the environment in a better state than they found it. The 10 Goals from the 2018 publication of the 25 Year Environment have been retained but, reflecting decisions agreed at the CBD COP 15 meeting in Montreal in December 2022, the Environment Improvement Plan has re-ordered the importance and in some cases, slightly re-worded the title of some Goals.

A comparison of Goals in the original 2018 25 Year Environment Plan and the corresponding Goal in the 2023 Environmental Improvement Plan is given in Table 2 below. Now the goal of 'Thriving plants and wildlife' is established as an Apex Goal to which Goals 2-9 all contribute, with all goals contributing to the outcome of Goal 10, 'Enhancing beauty, heritage, and engagement with the natural environment'. This change of emphasis is captured in the statement of the current Secretary of State in her Foreword to halt the decline of nature by 2030. The over-arching ambition of the CBD 2030 Global Biodiversity Framework, to which the UK government is also a signatory, of prioritising 30% of the world's land surface for conservation ("30-by-30") is captured by the government commitment to protect 30% of the UK's land and sea for nature by 2030 through the Nature Recovery Network and designated Highly Protected Marine Areas.

25 Year Environment Plan (2018)	Environmental Improvement Plan (2023)
1. Clean Air	Goal 2. Clean Air
2. Mitigating Climate Change	Goal 7. Mitigating and adapting to climate change
3. Clean and plentiful water	Goal 3. Clean and plentiful water
4. Thriving plants and wildlife	Goal 1. Thriving plants and wildlife
5. Efficient use of natural resources	Goal 6. Using resources from nature sustainably
6. Reduced risk from environmental hazards	Goal 8. Reduced risk of harm from environmental hazards
7. Enhanced beauty and engagement	Goal 10. Enhancing beauty, heritage, and engagement with the natural environment
8. Enhancing biosecurity	Goal 9. Enhancing biosecurity
9. Managing exposure to chemicals	Goal 4. Managing exposure to chemicals and pesticides
10. Minimising waste	Goal 5. Maximise our resources, minimise our waste
11. Global impacts*	

Table 2 Comparison of wording and order of Goals in the 25 Year Environment Plan of 2018 (UK Government, 2018a) with the Environmental Improvement Plan of 2023 (UK Government, 2023), the first revision of the 25 Year Plan. *'Global impacts' is not a Goal of the 25 Year Plan, but it is nonetheless a legal obligation of the UK government in its overseas territories and is listed in the first version of the outcome indicator framework (UK Government, 2019a) as if it is a Goal.

Reception to and commentary on the Plan

The 25 Year Environment Plan has prompted a number of formal responses from the UK scientific and conservation community. In general, the responses applaud the scale and ambition of the Plan, while expressing concern over a lack of progress in delivering the Goals and Targets of the Plan, and also in having an appropriate monitoring framework in place that will be able to measure any progress, or lack of it, in achieving the aims of the Plan. Major responses are summarised below.

In 2020 the Natural Capital Committee (NCC) chaired by Professor Dieter Helm of the University of Oxford published its formal response to the Plan in a 486 report. The Natural Capital Committee had been set up following the 2011 publication of the government white paper The Natural Choice, and had been responsible for first recommending the development of the 25 Year Environment Plan. Dieter Helm commented at the time of its publication that the Plan is "substantive" and added that "nothing on this scale has been brought forward for at least a decade". However, in its October 2020 response to the second progress report from the Government (UK Government, 2020), Helm subsequently stated that there was "very little evidence of improvements in the state of our natural capital" and that "the evidence … further highlights the lack of progress, and some worrying declines". The NCC had previously proposed an "integrated, systems-based approach … it is crucial to use the right framework and metrics or risk multiple policy failures including the success of the 25 Year Environment Plan, all future Environmental Improvement Plans, the delivery of Environmental Land Management schemes and environmental net gain" and advocated this natural capital approach to be used as a template for future progress reports.

One of the early recommendations of the NCC was the creation of a statutory watchdog monitoring progress towards the aims of the 25 Year Plan, and subsequently the Office for Environmental Protection (OEP) was established in the Environment Act of 2021 to undertake this function. The OEP notes that "The government has made some progress in achieving its environmental ambitions and aspirations through the 25 YEP and the provisions of the Environment Act 2021. However, it needs to go further than ever before in scale, ambition, speed, and commitment if there is a hope to not only halt, but reverse trends of environmental decline. Much remains to be done to embed the EIPs [Environmental Improvement Plan(s)] across government and to change focus from plans and strategies to actions and tangible environmental outcomes." They also emphasize "the need for better monitoring, assessing and reporting, so that government is better able to see fully the impacts of new and existing policy interventions, and understand how environmental laws are being implemented in practice" and that "current governance arrangements for delivering the 25 YEP are inadequate. We agree that a bold vision and ambitious environmental goals and targets will place additional demands that current governance arrangements will not bear."

The Royal Society of Biology described the Plan as having "a wide ambition covering a large remit of environmental issues, which is welcome. However, there is a lack of concrete targets and milestones to allow the effective monitoring of progress towards its aims. Consistent, timely review and evaluation of the value of natural resources and biodiversity are needed for the successful implementation of the Plan's natural capital led approach. Close co-operation with devolved nations, our European neighbours and the rest of the world will be needed for the Plan to achieve its intended impact" and also identified a number of deficiencies: emissions from shipping and aviation, along with the use of shale gas and other fossil fuels; assessing and remediating land contaminated by industry and landfill sites; domestic food production following exit from the EU, with an ambition to incentivise healthier and more sustainable food systems; training and education to deliver the

skills and expertise necessary to implement key actions, e.g. taxonomists to perform identification necessary for monitoring biodiversity, and diagnostic skills and capacity to achieve the aim of 'enhancing biosecurity'; mitigating rather than simply eliminating the risks derived from both relative toxicity and exposure, relating to the use of specific compounds; other medicines and chemical products, such as antimicrobials and biocides, entering the environment through human activity; historic applications of fertilizers to agricultural land that can cause nitrates in the groundwater system to rise for many years following interventions.

The Chartered Institute for Ecology and Environmental Management (CIEEM) stated that "The Plan rightly sets out the importance of the natural environment to people and the economy, and the huge challenges facing the natural environment. These challenges also unfortunately highlight some of the shortcomings of the Plan, which is an ambitious vision but uses weak, non-committal language and lacks detail on immediate action" and that "The Plan sets out a "blueprint" but no legally-binding targets, and where there are targets they are too far into the future. The Plan does not set out how delivery of the government's ambitions will be funded and resourced, and how all departments across government will play their part in delivering it." Similarly, the Association of Local Government Ecologists (ALGE) commented that "Currently ALGE feel there is a gap between the ambitions of the 25 Year Plan and the local delivery mechanism, skills and capacity available to achieve the Plan's outcomes."

The National Farmers Union (NFU)'s Environment Forum chair, Richard Bramley, acknowledged that "Agriculture is picked out by the OEP as a driver placing pressure on water quality, habitat loss, soil degradation and ammonia emissions and in need of government prioritisation and immediate action" and additionally recognised that "Central to the plan to achieving the government's aims will be to engage, support and enthuse farmers as they deliver these improvements. And this needs to be alongside recognising the absolutely vital role of producing our nutrition, alongside energy, bio-materials and fibres and many other aspects of human health and well-being" while "Getting what we currently have to work better to deliver results is the way forward – not more initiatives." The BusinessGreen newsletter recognised that the quality of the natural environment is "Fundamental to the economy"

The World Wide Fund for Nature (WWF) described the Plan as "a strong start, and it's good to see the government putting the environment firmly on the agenda" and as "an important first step, but the commitments will only become a reality if they are backed by the force of law, money and a new environmental watchdog with the power to make sure the government lives up to its promises." In a guest blog for the RSPB, Jess Chappell commented that "At the end of the first year of the 25 Year Environment Plan, Government have been able to mark their own homework and put out the results without critique or debate. We need a process which clearly states whether Government are on track to achieve their ambition to restore nature and improve the environment … Defra published their set of indicators to show how the environment is changing over time. There are many positive things to say about these indicators, which are in the main progressive and forward thinking, and recognise that measuring progress is key to driving delivery of the 25 Year Plan." The Wildlife Trusts believed that "the lack of legal underpinning is a fundamental flaw" and that "cross-party support and legislation if this plan is going to be implemented over the next 25 years: we must guard against a change of mood in a few weeks, months or years if these promises are to become a reality."

The Wildlife and Countryside Link commented that "we applaud the Government for devising the 25 Year Plan. Now the challenge for Government is to put this Plan into practice, through a combination of strong laws and governance, sufficient funding, effective local action and global leadership … In the first year since the Plan was published we have seen strong and encouraging announcements

emerge from Defra in a range of areas, such as resources and waste, net biodiversity gain and nature recovery networks. However, questions still linger over whether the funds, legal underpinning, binding targets and enforcement, needed to make these plans a reality, will be forthcoming, and whether delivery will happen quickly enough." The legal NGO Client Earth stated that the Plan is "full of empty promises" and called for strong nature laws once the UK had left the EU, while the campaign group Greener UK commented that "If they want to leave a green legacy, ministers really need to introduce ambitious, legally binding targets with the environment bill, and a truly world-leading independent watchdog to hold future governments to account." Defra stated that the Government will legislate when needed in relation to individual policy areas, as it has subsequently done in the 2021 Environment Act.

In the press release for its 2022 independent report on the government's progress in meeting the targets of the Plan, Taking Stock (OEP, 2022), the chair of the Office for Environmental Protection, Dame Glenys Stacey, is quoted as saying that "The 25 Year Environment Plan was an ambitious attempt to confront the challenges facing the environment, yet we continue to see worrying and persistent trends of environmental decline. Our rivers are in a poor state, bird and other species numbers are in serious decline, poor air quality threatens the health of many and our seas and sea floor are not managed sustainably. Turning this round will certainly not be easy. But the Environment Act and the new tools it provides creates a real opportunity for government to make the difference needed. We press government to use the Act to full effect, to deliver the environmental improvements needed for proper stewardship of the environment. Now is the time for a clear and ambitious vision for the environment which is shared and prioritised across all of government. Government must aim high, act with greater expediency, and plan well for a sustainable environment, and give this crisis the priority it needs."

Coverage of and gaps in the Plan

The four Goals of the CBD Global Biodiversity Framework are more narrowly focussed than are the ten goals of the UK government 25 Year Environment Plan. Goal A concerns maintenance of the integrity of biodiversity at ecosystem, species and genetic diversity levels (broadly, Targets 1-8); Goal B concerns the sustainable use of biodiversity (~Targets 9-12); Goal C concerns the monetary and non-monetary benefits arising from the use of biodiversity (~Target 13); and Goal D concerns the actions and resources needed to implement the Framework (Targets 14-23) [targets are not actually formally assigned to specific goals in the CBD Framework]. The 44 Targets of the UK's 25 Year Environment Plan are arguably broader in scope than are the 23 Targets of the CBD Framework and place a greater emphasis on the impact of environmental policies on human prosperity and well-being, with Goals focussed on air quality, provision of clean water, reducing impacts from environmental hazards and exposure to harmful chemicals and on increasing biosecurity.

Conversely, the 23 Targets of the CBD Framework, especially Targets 1-3, place greater emphasis on the integrity of biodiversity, particularly at ecosystem scale. Specifically, Target 1 of the CBD Framework aims to ensure "participatory integrated biodiversity inclusive spatial planning" of "areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030" but does not relate directly to a specific target of the 25 Year Environment Plan, while Target 2 of the Framework aims that "by 2030 at least 30 per cent of areas of degraded … ecosystems are under effective restoration". The aim to conserve 30% of terrestrial, freshwater and marine areas by 2030 is also reflected in the 2023 revision of the UK 25 Year Environment Plan, but is not represented by any specific target, whereas Target 3 of the CBD Framework is to "ensure and enable

that by 2030 at least 30 per cent of terrestrial, inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed".

Under the 2023 revision, the Environmental Improvement Plan, eight of the ten Goals of the 25 Year Environment Plan all contribute, in addition to their beneficial impacts on people, to the Apex Goal of 'Thriving plants and wildlife', for England. However, perhaps in tacit acknowledgement of the intensively used landscapes in the UK and lack of extensive areas of high biodiversity importance and ecological integrity, few goals or targets of the original 2018 UK Plan relate to ecosystem connectivity, integrity or ecosystem services. Existing National Parks, Areas of Outstanding Natural Beauty (AONBs), National Nature Reserves and Sites of Special Scientific Interest (SSSIs) of the UK will address Target 3 of the CBD Framework but such protested areas already cover 27.8% of the land area and 38.2% of the sea (UKBI - C1. Protected areas | JNCC - Adviser to Government on Nature Conservation, Table C1i), so under these area and site designations the 30-by-30 target of the CBD is likely to be easily met. However, large areas such as National Parks are not exclusively for biodiversity conservation or ensuring provision of ecosystem services, but primarily for the preservation of extensively cultivated but aesthetic and cultural historical landscapes that are also primarily privately owned. National Park authorities are thus just one of several landowners and governing bodies, with many views to be taken into account in the decision-making process.

In a subsequent change of emphasis, however, the 2023 Environmental Improvement Plan does outline a series of SMARTer policy targets that will help deliver the Apex Goal of 'Thriving plants and wildlife' that aims to "halt the decline of species by 2030" through "a growing and resilient network of land, water and sea that is richer in plants and wildlife" (UK Government 2023, page 30). Given renewed emphasis in recognition of Target 3 of the CBD Global Biodiversity Framework, the 25 Year Plan already proposed new protected areas with 500,000 hectares of wildlife-rich buffer habitats restored or created, as well as restoration plans for existing National Parks and AONBs, improving the Green Belt and building a Nature Recovery Network through consultation with local partners. A map of what the contributions to this 30-by-30 target are will be published by the end of 2023. There is a further commitment to restore the condition of 75% of 4,128 SSSIs by 2042 and a new Landscape Recovery scheme, initiatives that most closely match CBD Target 2, along with policies designed to restore woodlands, peatlands, coastal and marine habitats including seagrass meadows.

The Environmental Improvement Plan of 2023 contains so many individual narratives, new initiatives and smaller targets that it becomes hard to use it to evaluate progress towards the targets established in the previous 25 Year Environment Plan of 2018. Therefore the focus of this report remains the 44 Targets and their 66 Indicators set out in the original 25 Year Plan (UK Government, 2018a) and its outcome indicator framework (UK Government, 2019a). For example, the two targets of "Making sure populations of key species are sustainable with appropriate age structures" and "Taking action to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human-induced extinction or loss of known threatened species in England and the Overseas Territories" directly relate to Target 4 of the CBD 2030 Global Biodiversity Framework to "to halt human induced extinction of known threatened species and for the recovery and conservation of species", although with regard to the second of these UK targets it should be acknowledged that it is within the UK Overseas Territories (UKOTs) rather than the UK mainland itself that globally threatened species are much more likely to be found.

A total of 15 of the 66 indicators of the outcome indicator framework of the 25 Year Environment Plan directly link to measuring progress to delivering the Apex Goal 1 of 'Thriving plants and wildlife', under two Themes, C Seas and Estuaries (Indicators C2-C9) and D Wildlife (Indicators D1-D7) (see

Table 1). Improvements in many of the other indicators will also help to improve the status of native plants, wildlife and natural habitats of the UK, and as captured in the Environmental Improvement Plan of 2023 (page 10), Goals 2-9 all also help to achieve the Apex Goal of 'Thriving plants and wildlife'. The Goals of 'Clean Air', 'Clean and Plentiful Water' and 'Managing Exposure to Chemicals', now re-numbered as Goals 2, 3, and 4, respectively (see Table 2) and grouped under the rubric of 'Improving Environmental Quality' would all fall loosely under the same target of the CBD Global Biodiversity Framework, Target 7 ("Reduce pollution risks and the negative impact of pollution from all sources, by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services … ") as there is no other more appropriate target – reflecting the greater focus of the 25 Year Environment Plan on targets that more directly affect people than biodiversity in general. Of these Goals only Indicators A6, A7, B6, B7, H3 and H4 directly relate to impacts on biodiversity.

The Goals now numbered as numbers 5 and 6 (see Table 2), 'Minimising Waste' and 'Efficient use of natural resources', are now grouped under 'Improving our use of resources' (UK Government, 2023). Indicators E1, E6, E7 and E9 from the 'Natural Resources' Theme and Indicators J1, J2 and J5 from the 'Resource Use and Waste' Theme relate more-or-less directly to impacts on biodiversity; however, other indicators from these Themes also relate more directly to agricultural and sylvicultural production, and to household waste recycling, respectively. In comparison with the Goals and Targets of the CBD 2030 Global Biodiversity Framework the 'Natural Resources' indicators most closely correspond to the targets of Goal B, "Biodiversity is sustainably used and managed … ", and more specifically Target 9, "Ensure that the management and use of wild species are sustainable … ", relating to timber and seafood harvesting. CBD Target 10 is focused on sustainable agriculture and the application of biodiversity-friendly practices. With regard to the 'Resource Use and Waste' Theme, the most similar target of the CBD Framework is again the generic target on reducing pollution risks, Target 7, in this case specifically relating to plastics in the marine environment: "and also preventing, reducing, and working towards eliminating plastic pollution."

Goals 7 and 8, now 'Mitigating and adapting to climate change' and 'Reduced risk of harm from environmental hazards', respectively, and grouped under the heading 'Improving our mitigation of climate change' (UK Government, 2023), are represented by only one (Indicator A2) and three (Indicators F1, F2, F3) indicators, respectively. Indicator J1, 'Carbon footprint and consumer buying choices', is also being used to measure progress in 'Mitigating and adapting to climate change'. Probably due to the independent UN Convention on Climate Change and the Inter-governmental Panel on Climate Change (IPCC) assessment process, climate change does not feature heavily in the Targets of the CBD Global Biodiversity Framework (CBD, 2022a); however, Target 8 is the one target where climate change is mentioned, and it is the sole focus of this target: "Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions … ".

The 'Reduced risk of harm from environmental hazards' Theme is focused primarily on impacts of floods, erosion, wildfires and drought *on* humans, rather than the impact *of* humans on the environment, so again there is little direct correlation with CBD targets, but of the 23 Targets of the Global Biodiversity Framework Target 11 is the most similar: "Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as regulation of air, water, and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through nature-based solutions and/or ecosystem-based approaches for the benefit of all people and nature". Finally, the goal of 'Enhancing biosecurity' is measured by two indicators, H1 and H2, of which H1, "Abatement of the number of invasive non-native species entering and establishing against a baseline" corresponds closely to CBD Target 6,

"Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services" while pests and diseases of biodiversity are listed in CBD Target 11.

All these nine Goals of the 25 Year Environment Plan together contribute to Goal 10, 'Enhancing beauty, heritage and engagement with the natural environment' (see Table 2). The targets and indicators of Goal 10 correspond with Goal B of the CBD Global Biodiversity Framework, that "Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050", and the three UK Targets under this goal relate closely to CBD Targets 9, 12 and 11, respectively, and are measured by seven indicators, G1-G7. Despite the greater emphasis on ecosystem-level measures and processes within the CBD Global Biodiversity Framework and the greater emphasis on impacts on people within the UK 25 Year Environment Plan, the ten Goals and 44 Targets of the plan nonetheless address, directly or indirectly (i.e., in ways that can form part of the UK obligation to report on progress to addressing the CBD Global Biodiversity Framework) at least 15 of the 23 CBD Targets: Targets 1-12 and, mostly through the international commitments and obligations of the UK (see below), also Targets 19, 20 and 21.

Missing are policies directly addressing CBD Targets 13-18: CBD Target 13 concerns the fair and equitable sharing of benefits arising from the use of biodiversity; CBD Target 14 concerns the integration of biodiversity issues and environmental values into planning and development regulations; CBD Target 15 concerns the impact of businesses on biodiversity; CBD Target 16 concerns sustainable consumption choices by people; CBD Target 17 concerns strengthened safety measures for biotechnology products (arguably also addressed by Goal 9 of the 25 Year Environment Plan); and CBD Target 18 concerns reform of subsidies harmful to biodiversity. It can be argued that CBD Targets 13-18 are implicitly covered by the 25 Year Environment Plan and related government policies, through: the Levelling Up White Paper, Agricultural Transition Plan, Sustainability and Climate Change Strategy, Resources and Waste Strategy, Clean Air Strategy, UK Marine Strategy and GB Plant Biosecurity Strategy, and associated changes to planning rules and farming practices. The government would no doubt argue that there is little it should do to legislate on the behaviour of companies and individuals, and that it is not the place of government to do so.

The international dimension to the Plan

The UK is signatory to more than 50 international agreements relating to aspects of environmental policy covered in the 25 Year Environment Plan (UK Government, 2019d). Although it is not a specific goal of the outcome indicator framework of the Plan, the international dimension to the 25 Year Environment Plan has two components: one is reducing the impact of the UK on environments outwith the UK Overseas Territories and Crown Dependencies (UKOTs) (Indicator Headline 15 of the outcome indicator framework: 'Impacts on the natural environment overseas and Indicator K1); the other is improving the environment within the UK Overseas Territories and Crown Dependencies (Indicator Headline 16, 'Improving the environment overseas' and Indicators K3 and K4). The former concerns the impact on environments overseas resulting from domestic consumption linked to the sustainability of imported products (Target 16 of the CBD Framework), and also tackling the illegal wildlife trade both within and outwith the UK (CBD Target 5). The latter component addresses the status of endemic or globally threatened species (UK Indicator K3, CBD Target 4) and the extent and condition of protected terrestrial and marine areas (UK Indicator K4, CBD Targets 1-3) in the UKOTs.

A Biodiversity Strategy specifically targeting UKOTs and that could address Targets 1-6 of the CBD 2030 Global Biodiversity Framework is being developed together with the Joint Nature Conservation Committee (JNCC). An additional and significant international contribution of the UK is in the provision of political support, finance, scientific advice and expertise, capacity building and training to individuals and organisations working overseas (Indicator K2, 'Developing countries better able to protect and improve the environment with UK support'). Financially, the UK contributes billions of pounds of International Climate Finance to nature-based climate solutions, and in addition the Biodiverse Landscapes Fund and the 10 Point Plan for Financing Biodiversity, amongst other initiatives, all of which contribute to Target 19 of the CBD 2030 Global Biodiversity Framework. The Illegal Wildlife Challenge Fund addresses the illegal wildlife trade through legislative reform, training and media campaigns and relates to Target 5 of the CBD Framework. The Darwin Award scheme shares scientific knowledge, expertise and resources with local counterparts to help them achieve outcomes relating to Targets 9-13 of the CBD Framework and itself relates to CBD Targets 20 and 21, while the Darwin Plus scheme is specifically aimed at the biodiversity of the UKOTs.

Synergies within the Plan and with other policy instruments

There are both synergies between different elements within the 25 Year Environment Plan, and also synergies between the 25 Year Environment Plan and other policy instruments, both those produced by the UK government and by other bodies but to which the government is a signatory. Since the 2018 publication of the 25 Year Environment Plan the UK government has set specific policy programmes affecting implementation of the Plan. The 2023 Environment Improvement Plan (UK Government 2023, page 17) should therefore be considered alongside:

- Resources and Waste Strategy
- Clean Air Strategy
- Government Food Strategy
- England Trees Action Plan
- England Peat Action Plan
- Joint Fisheries Statement
- UK Marine Strategy
- GB Plant Biosecurity Strategy
- The Agricultural Transition Plan
- Sustainability and Climate Change: a strategy for the education and children's services systems
- Levelling Up White Paper
- Transport Decarbonisation Plan

As the indicators adopted for the CBD Global Biodiversity Framework also do (CBD, 2022b), several of the 66 Indicators adopted for the 25 Year Environment Plan (UK Government, 2018a) and its 2023 revision, the Environmental Improvement Plan (UK Government, 2023) measure progress towards more than one target of the Plan. For example, Table 1 of the outcome indicator framework lists 33 indicators likely to be impacted by residential, infrastructural, commercial or industrial development, while Table 2 lists 26 indicators that can be used to measure the need for or successful adaptation to climate change (UK Government, 2019a); 11 of these are shared across both of these issues (Indicators B5, C3, C4, D1, D5, F1, F2, F3, G3, G7 and H4). Of the 66 indicators, 21 are used to measure progress towards more than one target, while seven (including four under Global Impacts, that is not strictly a Goal of the Plan) are not used to measure progress against any specific target.

The set of biodiversity metrics for the UK that is collated and published by JNCC (UK Biodiversity Indicators 2022 | JNCC - Adviser to Government on Nature Conservation) are currently mapped to the 2010 Aichi Targets of the CBD, but not yet the targets of the 2030 CBD post-2020 Global Biodiversity Framework, although work is ongoing to do this; these biodiversity metrics are used as some of the indicators in the government's 25 Year Environment Plan.

70% of land in the UK is used for farming – therefore, long-term changes to farming are likely to have the most wide-reaching impacts on the state of the UK environment across many different goals of the 25 Year Environment Plan; on the other hand, most farmland is privately owned, often of small size, distributed across many thousands of individual landowners and often passed down between family generations, making establishing any long-term changes to UK farming culture hard to achieve. Agriculture touches on every Goal of the 25 Year Environment Plan, and since leaving the EU's Common Agricultural Policy the government has pledged to evolve its Countryside Stewardship Plus scheme to pay for a wider range of actions to increase local biodiversity, has embarked on its Agricultural Transition Plan and Sustainable Farming Incentive to support landowners and farmers to adopt nature-friendly farming, and has committed to publishing a Land Use Framework in 2023. Many of the larger targets of the 25 Year Plan, especially those to meet the 30-by-30 commitments of the CBD Global Biodiversity Framework, will necessarily rely on the involvement and contribution of local farmers and other landowners, especially through the Farming in Protected Landscapes programme and the Landscapes Review, which sets targets for the expected contribution to national environment and climate commitments that are to be embedded in management plans.

The new Environmental Land Management Schemes (ELMS) – the Sustainable Farming Incentive, Local Nature Recovery and Landscape Recovery schemes – are expected to support farmers and land managers to improve species abundance through restoring and creating habitat, more targeted action for the rarest species, and tackling pressures (including species that present a threat to threatened native species or habitats). There are currently over 1.6 million hectares under Countryside Stewardship, and 1.4 million hectares under Environmental Stewardship. These comprise 422,000 hectares of grassland under active management and have created 2,500 miles of new hedges, towards a target of returning hedgerow lengths in England to 10% above their 1984 peak. Alongside food and other production, farmers are expected to contribute at least 80%, if not 100%, of the target to restore or create more than 500,000 hectares of wildlife-rich habitat outside of protected areas by 2042, including peat restoration and biodiverse woodland creation: the agroforestry standard will be rolled-out within the Sustainable Farming Incentive in 2024 and financial support within these schemes is expected to achieve approximately 90% of the Environment Act target to increase tree cover to 16.5% of England's land area by 2050. Through the Nature for Climate Fund, 65-80% of landowners and farmers are expected to adopt nature friendly farming on at least 10-15% of their land by 2030 and contribute at least 50% of the target of bringing protected sites into favourable condition by 2042.

Across other Goals of the 25 Year Environment Plan, agriculture is expected to contribute to: reducing ammonia and agricultural greenhouse gas emissions, through the Slurry Infrastructure Grant scheme (Goal 2, 'Clean Air'); reducing agricultural water use through the Farming Investment Fund, and soil and nutrient run-off leading to eutrophication of waterways through the Catchment Sensitive Farming programme (Goal 3, 'Clean and Plentiful Water'); implementing Integrated Pest Management in agricultural settings (Goal 4, 'Managing Exposure to Chemicals and Pesticides'); reducing food waste, as set out in the Resources and Waste Strategy (Goal 5, 'Maximise our Resources, Minimise our Waste'); halting and reversing forest loss and land degradation globally by 2030 by improving soil health, restoring peatland and establishing and restoring woodland and

forests under the Sustainable Farming Incentive (Goal 6, 'Using Resources from Nature Sustainably'); decarbonising agricultural emissions through adopting nature-based solutions and sustainable land management approaches through the Farming Innovation Programme and Farming Investment Fund, the Sustainable Farming Incentive and Countryside Stewardship Plus schemes (Goal 7, 'Mitigating and Adapting to Climate Change'); reducing risks and impacts from floods, droughts, and wildfires through new farming schemes (Goal 8, 'Reduced Risk of Harm from Environmental Hazards'); leading on antimicrobial resistance to further reduce use of antibiotics in livestock, and control or eradicate priority diseases in cattle, sheep and pigs through the Animal Health & Welfare Pathway (Goal 9, 'Enhancing Biosecurity'); and supporting farmers to improve protected landscapes through the Farming in Protected Landscapes programme to deliver projects across 4 themes (Climate, Nature, People and Place) for National Parks and AONBs in England (Goal 10, 'Enhancing Beauty, Heritage and Engagement with the Natural Environment').

It is the stated intention of the Environmental Improvement Plan to align the UK Biodiversity Indicators, as far as possible, with the indicators for monitoring the CBD 2030 Global Biodiversity Framework (UK Government 2023, page 70). Within the Apex Goal of 'Thriving plants and wildlife' are a series of policy initiatives to help "halt the decline of species by 2030", such as: a multi-million pound Species Survival Fund, along with Species Conservation Strategies and a Species Recovery Programme targeting 215 species across 93 projects in partnership with stakeholder organisations; a National Pollinator Strategy that established a UK Pollinator Monitoring Scheme and research partnership; ; implementing a Biodiversity Net Gain condition for planning permission, requiring a 10% gain in biodiversity either on- or off-site, and developing a similar Marine Net Gain for new infrastructure developments at sea; and raising at least £500m at year, rising to more than £1 billion a year by 2030, to support nature recovery from the private sector through its (forthcoming) Green Finance Strategy. These policies will help progress towards Targets 4, 11, 14 and 19, respectively, of the CBD 2030 Global Biodiversity Framework.

Opportunities for further policy development

There is no *a priori* reason why the aims of the CBD Global Biodiversity Framework ought to be reflected in the UK 25 Year Environment Plan – the two policy frameworks could each work independently of the other. It is also fair to acknowledge that not all targets of the CBD Global Biodiversity Framework are SMART. However, as previously mentioned, as a signatory of the UN Convention on Biological Diversity the UK government has a legal obligation to report on progress in meeting the targets of the CBD. There is therefore considerable scope for investigating the applicability of indicators adopted for monitoring landscape-scale targets of the CBD Framework, especially those to help meet the 30-by-30 commitment, within a UK context. It is important, however, to recognise not only that most land in the UK is privately owned and either intensively farmed (70%) or extensively developed industrially or residentially, but that the same government department has responsibility both for farming and fishing the landscape and seascape and for the natural condition of its biodiversity and ecosystems. There are inevitable conflicts and trade-offs to be taken into account for future development of environmental policies, therefore.

A map of what contributes to this 30-by-30 target will be published by the end of 2023 (UK Government, 2023, page 40). However, it is likely to include areas already designated as 'protected', which includes Areas of Special Scientific Interest (Northern Ireland), Sites of Special Scientific Interest (England, Scotland and Wales), National Nature Reserves, Marine Conservation Zones, Nature Conservation Marine Protected Areas, Ramsar Sites, Special Areas of Conservation (including

candidate Special Areas of Conservation and Sites of Community Importance), Special Protection Areas, Areas of Outstanding Natural Beauty, National Scenic Areas, National Parks, and a map of these areas is already available for the UK (UKBI - C1. Protected areas | JNCC - Adviser to Government on Nature Conservation, Figure C1iii) that shows that the cumulative total is already close to (27.8% of land) or exceeds (38.2% of onshore and offshore UK waters) the threshold of the 30-by-30 target.

Of the 23 Targets of the CBD Global Biodiversity Framework, two of them (Targets 2 and 3) explicitly mention achieving 30% by 2030 (for restoration and for conservation, respectively). These each have a single headline indicator in the CBD Framework: Indicator 2.2, the Area under restoration and Indicator 3.1, the Coverage of protected areas and OECMs (other effective area-based conservation measures) and so should be easy for the government to achieve for the UK (although more challenging for the UK Overseas Territories and Crown Dependencies). There are, respectively, two and eight component indicators for these two targets, and 16 complementary indicators for them both, of which only two (the IUCN Red List of Ecosystems and the Status of Key Biodiversity Areas) are shared across the two targets. Two indicators (the IUCN Red List of Ecosystems and the Species Protection Index) are listed as both component and complementary indicators for Target 3, meaning that there are 38 individual indicators, either component or complementary, measuring progress towards the 2030 Target (CBD, 2022b). Of all these indicators, the Environmental Improvement Plan (UK Government, 2023) only mentions one, the IUCN Red List Index (the aim of the Plan is to improve the Red List Index for England by 2042, relative to 2022 levels).

The IUCN Red List of Ecosystems provides a measure of the health of ecosystems analogous to the likelihood of extinction measured by the IUCN Red List of Species. The IUCN Red List Index measures species' overall likelihood of extinction and will improve as a consequence of habitat restoration across 30% of UK land and sea area, which is why this indicator is listed only as a complementary indicator of CBD Target 3. However, it is naturally the headline indicator to measure progress towards CBD Target 4, "… to halt human induced extinction of known threatened species …", and will be used within the government's 25 Year Environment Plan in this context. Similarly, there are another five component and seven complementary indicators for CBD Target 4, so other indicators of the 50 or so used to measure the principal targets of the CBD Framework (CBD Targets 2, 3 and 4) addressing the Apex Goal 1 of the 25 Year Environment Plan, 'Thriving plants and wildlife' could usefully be adopted by the UK government to measure other aspects of progress towards this goal.

For example, the Living Planet Index can help measure the target of "Making sure populations of key [marine] species are sustainable with appropriate age structures" as well as progress in "Taking action to recover threatened, iconic or economically important species of animals, plants and fungi" on land, even if those species do not recover sufficiently for their IUCN Red List category to change. The Red List Index and Living Planet Index can both help measure progress with the target of "Reversing the loss of marine biodiversity and, where practicable, restoring it", as can the Biodiversity Habitat Index. The IUCN Red List of Ecosystems, Biodiversity Habitat Index, Ecosystem Restoration Index and Protected area and OECM management effectiveness (MEPCA) indicator can all be used to measure the targets of "Ensuring seafloor habitats are productive and sufficiently extensive to support healthy, sustainable ecosystems" and "Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits". And so on.

There is much data on the status of UK biodiversity already being routinely gathered and for which indicators are regularly published (e.g. UK Biodiversity Indicators 2022 | JNCC - Adviser to Government on Nature Conservation). However, as is often the case, much of this is focused at

habitat scale, or on rare species, or is for specific organismal groups (e.g. birds and butterflies). In particular, plants (the basis of all terrestrial ecosystems) are an obvious oversight, although again much data does already exist here (https://www.brc.ac.uk/; https://bsbi.org/plant-atlas-2020) and is regularly updated (Stroh et al., 2023): in the latest survey, over half of native UK plants have declined in distribution since the 1950s, and there are now more introduced plant species in the UK than native species. Such data can be the basis of producing indicators of change that emulate (or in some cases can replicate) indicators already developed, proposed and adopted by the CBD. These can be complemented by additional data, such as phylogenetic relationships and plant traits: work at the NHM has developed machine learning algorithms to extract trait information automatically from taxonomic descriptions. Digital twins working at fine spatial scales, such as those developed through the NERC Landscape Decisions Programme, incorporate these trait data with species' climate envelopes to provide detailed simulations of responses to future environmental change at a landscape scale, to guide current policy making. These can thus be used to measure performance of multiple CBD-compatible indicators and give trend information both in the past and into the future, and critically provide counter-factual scenarios with which to test the impact of competing policy decisions. This is the approach being applied in the Landscape Decisions project 'The interplay of land-use, climate and plant biodiversity on the UK stage'. Through developing this for the UK, where there is abundant high-quality data, the sensitivity of these techniques to data quality can also be tested, and a similar approach then developed for areas without such high-quality data, such as the UK Overseas Territories and Crown Dependencies, and indeed the rest of the world, as we are doing.

A detailed breakdown of UK Goals and Targets, their alignment with CBD Goals and Targets, and the correspondence of Indicators measuring both sets of targets, is provided in the accompanying Excel file. There is not sufficient space in this report to go through each of these Target by Target or Indicator by Indicator. As also discussed already in this report, there is not necessarily a direct correspondence between the Goals and Targets of the two policy frameworks or the indicators employed in each. Nonetheless, the best alignment has been sought in each case. Although the onus is on the UK, as an individual Party to the UN Convention on Biological Diversity, to inform the Convention of its progress within the UK and its Overseas Territories and Crown Dependencies in meeting globally-agreed targets, the obvious advantages of adopting similar indicators as those already used by the CBD are that this information can be contributed directly by the UK to the CBD as part of its nationally-determined contributions, and this provides a comparable measure of progress by the UK against that of other countries. Given that the historical status of UK biodiversity means that a number of CBD targets will be easily met, this is likely to show the actions of the UK government in a favourable light.

Recommendations of this report

- The broad focus of the Goals of the UK government 25 Year Environment Plan should be maintained, including areas not directly covered by the CBD Global Biodiversity Framework, as this will help maintain public support for policies.
- Targets should be aligned where possible, and common Indicators between the UK's 25 Year Environment Plan and the CBD Global Biodiversity Framework adopted where suitable [this is a stated intention of the Environmental Improvement Plan (UK Government 2023, page 70)].
- Targets aimed at landscape-scale interventions will address the greatest number of Goals of the Plan and have the greatest benefit to biodiversity.

- In particular, improvements to farming – as exemplified by the new Environmental Land Management Schemes – and fishing policies have the potential for the greatest enhancement to the state of the UK environment and the plants and wildlife within it.
- Such policies will need community buy-in from the largest sectors of society and the active contributions of a large constituency of stakeholders, not just government and its agencies.
- Existing data should be used to generate CBD-compatible indicators of trends in biodiversity wherever possible, and complemented by detailed field surveys and simulations of responses to future environmental change using the latest techniques.
- Complementary indicators from the CBD should be adopted to measure, in concert, multiple aspects of the same changes to biodiversity within the environment, to show multi-faceted responses to complex biological processes in the round.
- Reporting outcomes from these policy interventions can address commitments both within the 25 Year Environment Plan and the 2030 Global Biodiversity Framework of the CBD, and allow progress to be measured relative to that of other countries.

References

CBD, 2022a. Agenda item 9A, Kunming-Montreal Global biodiversity framework. Decision CBD/COP/15/L.25. Available at: https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf

CBD, 2022b. Agenda item 9B, Monitoring framework for the Kunming-Montreal global biodiversity framework. Decision CBD/COP/15/L.26. Available at: https://www.cbd.int/doc/c/179e/aecb/592f67904bf07dca7d0971da/cop-15-l-26-en.pdf

Geijzendorffer, I.R., E. Regan, H.M. Pereira, L. Brotons, N.A. Brummitt, Y. Gavish, P. Haase, C.S. Martin, J.-B. Mihoub, C. Secades, D.S. Schmeller, S. Stoll, F.T. Wetzel & M. Walters, 2015. Bridging the gap between biodiversity data and policy reporting needs: an Essential Biodiversity Variables perspective. *Journal of Applied Ecology* 53(5): 1341–1350.

Office for Environmental Protection, 2022. Taking stock: protecting, restoring and improving the environment in England. Presented to Parliament pursuant to Section 29(2) of the Environment Act 2021. Available at: https://www.theoep.org.uk/taking-stock

Stroh, P.A., Walker, K.J., Humphrey, T.A., Pescott, O.L. and Burkmar, R.J. (eds). 2023. Plant Atlas 2020. Mapping changes in the distribution of the British and Irish flora. 2 volumes. Botanical Society of Britain and Ireland, Durham & Princeton University Press, Princeton.

UK Government, 2013. Sustainable Development Indicators. 100 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/223992/0_SDIs_final__2_.pdf

UK Government, 2017. Industrial Strategy: building a Britain fit for the future. 256 pages. Department for Business, Energy and Industrial Strategy. Available at: https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

UK Government, 2018a. A Green Future: Our 25 Year Plan to Improve the Environment. 151 pages. Department for Environment, Food and Rural Affairs. Available at: https://www.gov.uk/government/publications/25-year-environment-plan

UK Government, 2018b. A Green Future: Our 25 Year Plan to Improve the Environment. Annex 1: Supplementary evidence report. 145 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673492/25-year-environment-plan-annex1.pdf

UK Government, 2018c. A Green Future: Our 25 Year Plan to Improve the Environment. Annex 2: Government strategies to protect and improve the environment. 3 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/673160/25-year-environment-plan-annex2.pdf

UK Government, 2018d. A Green Future: Our 25 Year Plan to Improve the Environment. Annex 3: The UK's international agreements to protect or improve the environment. 5 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/678681/25-env-plan-annex3.pdf

UK Government, 2019a. Measuring environmental change: outcome indicator framework for the 25 Year Environment Plan. 131 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/925779/25-yep-indicators-2019.pdf and also see https://oifdata.defra.gov.uk/

UK Government, 2019b. 25 Year Environment Plan Progress Report, January 2018 to March 2019. 75 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/803266/25yep-progress-report-2019-corrected.pdf

UK Government, 2020. 25 Year Environment Plan Progress Report, April 2019 to March 2020. 63 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/891783/25yep-progress-report-2020.pdf

UK Government, 2021. 25 Year Environment Plan Annual Progress Report April 2020 to March 2021. 111 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1032472/25yep-progress-report-2021.pdf

UK Government, 2022. 25 Year Environment Plan Annual Progress Report April 2021 to March 2022. 63 pages. Department for Environment, Food and Rural Affairs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1092495/25yep-annual-progress-report-2022.pdf

UK Government, 2023. Environmental Improvement Plan 2023. First revision of the 25 Year Environment Plan. 262 pages. Department for Environment, Food and Rural Affairs. Available at: https://www.gov.uk/government/publications/environmental-improvement-plan