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Enhancing the Effectiveness of Sub-National Biodiversity Policy:

Practices in France and Scotland, United Kingdom

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Sub-national governments have a key role in delivering on national and international biodiversity commitments. Drawing on policy practices from Scotland (UK), France and other signatories to the Edinburgh Declaration, this paper provides an overview and analysis of sub-national strategies, plans and mechanisms to ensure policy coherence and co-ordination. It then examines the policy instruments that subnational governments can leverage to deliver positive biodiversity outcomes. The paper highlights, among other things, the need to: develop clear and measurable biodiversity targets at sub-national level; incorporate biodiversity considerations into sub-national climate action plans and urban, rural and regional development strategies, plans and instruments; and promote nature-based solutions at a sub-national level to harness synergies between climate mitigation, climate adaptation and biodiversity.

Keywords: subnational government, policy, governance, biodiversity, nature-based solutions, ecosystem services, climate change

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Executive Summary

Sub-national governments have a key role in enhancing biodiversity and delivering on national and international biodiversity commitments. Sub-national biodiversity strategies and plans, effective institutional arrangements and well-designed policy instruments are key to delivering positive biodiversity outcomes on the ground. The role of sub-national governments is increasingly recognised under the Convention on Biological Diversity, and most recently in the 2020 Edinburgh Declaration for sub-national governments, cities and local authorities on the post-2020 Global Biodiversity Framework. However, considering that the Aichi Biodiversity Targets were not met and biodiversity continues to rapidly decline, scaled-up and concerted action is needed by all stakeholders, including sub-national governments, to ensure transformational changes under the post-2020 Global Biodiversity Framework.

Drawing on policy practices from Scotland (UK), France and other signatories to the Edinburgh Declaration, this paper provides an overview and analysis of sub-national strategies and plans, mechanisms to ensure policy coherence and co-ordination, and policy instruments to deliver positive biodiversity outcomes. A set of insights to help enhance the effectiveness of sub-national biodiversity policies are summarised below.

- Develop sub-national biodiversity strategies and plans with clear targets and associated indicators as well as monitoring and reporting frameworks. Targets should be specific, measurable, achievable, realistic and time-bound (i.e. SMART). These sub-national strategies and plans should, to the greatest extent possible, align with and contribute to the implementation of national biodiversity strategies and actions plans, while also addressing locally-specific challenges.
- Clearly define roles and responsibilities across the levels of government in both national and sub-national biodiversity strategies and plans. It is crucial to recognise that biodiversity action is a shared responsibility and to agree upon who does what to achieve a common target.
- Incorporate biodiversity considerations into sub-national climate action plans and urban, rural and regional development strategies, plans and instruments. National governments should guide and support such actions through their national strategies (e.g. national urban policies).
- Promote and support nature-based solutions as a key opportunity for sub-national governments to harness synergies between climate mitigation, climate adaptation and biodiversity. This may require, for example, adapting planning requirements and funding models.
- Tap into different opportunities for mainstreaming biodiversity in diverse geographical contexts, such as urban centres and brownfields, with tailored policy instruments.
- Use multi-stakeholder partnerships to engage all relevant actors and facilitate co-ordination in developing and implementing sub-national biodiversity action. Including both national and sub-national governments as well as local communities and other stakeholders in a partnership can effectively ensure vertical and horizontal policy coherence.
- Strengthen institutional mechanisms and align budgets to facilitate co-ordination within sub-national governments, including departments responsible for finance, economic affairs, spatial planning and climate.

- Estimate the costs of designing and implementing sub-national biodiversity strategies and action plans and develop financing strategies to mobilise the required resources, including via green budgeting.
- Use the full suite of policy instruments and harness synergies among them to ensure effective biodiversity action on the ground – these cover regulatory (command-and-control) approaches, economic incentives, information instruments and other voluntary approaches.
- Examine options to scale up the use of economic instruments at sub-national level (such as biodiversity-relevant taxes, fees and charges, biodiversity offsets and payments for ecosystem services) to provide incentives and finance for protecting, restoring and sustainably managing ecosystems.

1 Sub-national biodiversity policy in the international context

Urgency for biodiversity action

The rapid and widespread decline in global biodiversity and the ecosystem services it underpins has severe implications for economic development, human health and well-being, and societal resilience (OECD, 2021[1]). The COVID-19 global pandemic has provided a stark reminder of the urgency of reshaping our relationship with nature, as human interference with biodiversity, particularly land use change (e.g. deforestation) and wildlife exploitation, helps create the conditions for pathogens to leap from other animals to humans, creating zoonotic diseases, such as COVID-19 (OECD, 2021[2]; OECD, 2020[3]). Furthermore, biodiversity loss is inextricably linked with climate change. Biodiversity loss reduces the natural capacity of ecosystems to store and sequester carbon and undermines their resilience to the impacts of climate change. In turn, climate change is one of the primary drivers of biodiversity loss, and is pushing marine and terrestrial ecosystems dangerously close to tipping points. Both biodiversity loss (ecosystem collapse) and climate change are now considered to be among the top global risks to society (WEF, 2021[4]). The interdependencies between the two imply that they cannot be dealt with separately.

The adoption of a post-2020 Global Biodiversity Framework under the UN Convention on Biological Diversity (CBD) COP15 in Kunming, China and ongoing negotiations under the UN Framework Convention on Climate Change (UNFCCC) provide an opportunity to increase the scale of ambition of global action on biodiversity loss and climate change. The unprecedented economic crisis caused by the containment measures related to the COVID-19 pandemic could set back progress on biodiversity action by several years, though governments have an opportunity to align stimulus measures with efforts to advance biodiversity action in the spirit of building back better and greener.

Biodiversity action as a shared responsibility at all levels of government

The effective implementation of global biodiversity commitments will require policies, governance and financing across all levels of government and alignment between national and sub-national levels. National governments have a critical role in setting and implementing a national policy framework that translates international biodiversity commitments into national goals and targets. Given the multiple pressures on biodiversity as well as the multi-dimensionality and local specificities of biodiversity and ecosystem services, all actors must engage. Sub-national (regional and local) governments, in particular, have competence in many policy areas that can positively or negatively affect biodiversity such as land use planning, economic development, infrastructure investment and public service provision. In addition, they are well-equipped to address local ecological and socio-economic specificities, integrate sectoral policies and effectively engage citizens, local businesses and other stakeholders.

Several CBD decisions recognise the instrumental role sub-national governments can play in implementing international and national biodiversity commitments, including:

- COP 9 Decision IX/28.[1] Promoting Engagement of Cities and Local Authorities
- COP 10 Decision X/2.[2] Recognising the role of sub-national government in the implementation of the Strategic Plan for Biodiversity (2011-2020)
- COP 10 Decision X/22.[3] Plan of Action on Sub-national Governments, Cities and Other Local Authorities for Biodiversity
- SBI-3 Document CBD/SBI/3/19 on Engagement with Sub-national Governments, Cities and Other Local Authorities to Enhance Implementation of the Post-2020 Global Biodiversity Framework.

In addition, the *2020 Edinburgh Declaration on the post-2020 Global Biodiversity Framework* further raised the profile of sub-national biodiversity action. The declaration has been signed by 37 French local governments and local government organisations as well as more than 15 representatives from Scotland, and other signatories including from Japan, Spain, Mexico and Ecuador. It sets out the aspirations and commitments of the Scottish Government, Edinburgh Process partners, and the wider sub-national constituency of the CBD, in delivering for nature over the coming decade.[4] The signatories "acknowledge the need to build upon the existing Plan of Action [on Sub-national Governments, Cities, and Other Local Authorities for Biodiversity (2011-2020)] under CBD Decision X/22, and the advocacy agenda of sub-national governments, cities and local authorities over the past decade, and collectively commit to raising our ambition and action in the coming decade." The declaration also recognises "the need to develop effective policy, governance and financing solutions at all levels of government and to ensure vertical integration across national, sub-national, city and local levels to effect transformative change".

Objective, scope and structure of the paper

This paper aims to help decision makers better understand the opportunities and challenges for biodiversity action at the sub-national level and the key interdependencies with national strategies and policies, including between biodiversity and climate action. The paper highlights examples from Scotland and France, as well as other Edinburgh Declaration signatories, and develops good practice recommendations that can be adopted elsewhere in the world. The analysis draws on existing OECD work and other literature as well as responses to questionnaires sent out to French and Scottish sub-national government authorities.

Section 2 focuses on sub-national biodiversity strategies and actions plans (SBSAPs), including biodiversity targets and monitoring frameworks. Section 3 examines the mechanisms in place to ensure policy coherence and co-ordination between and across levels of government (i.e. horizontal and vertical policy coherence), including finance and budget mechanisms. Section 4 examines the types of policy instruments that are in place to deliver on biodiversity conservation and its sustainable use at a sub-national level. The final section provides a summary and concludes with possible areas for further analytical work.

[1] https://www.cbd.int/decision/cop/?id=11671

[2] https://www.cbd.int/decision/cop/?id=12268

[3] https://www.cbd.int/decision/cop/?id=12288

[4] https://www.gov.scot/publications/edinburgh-declaration-on-post-2020-biodiversity-framework/ First published on 31 August 2020, with the latest update on 24 May 2021 (at time of writing this report).

2 Sub-national biodiversity strategies and action plans

An overview: key features of sub-national biodiversity strategies and action plans

Sub-national biodiversity strategies and action plans (SBSAPs) are important for setting common objectives and providing clear direction to the multiple stakeholders whose actions impact on local biodiversity. More and more regions and cities around the world are developing sub-national biodiversity strategies and action plans (Box 1). In Scotland, for example, local biodiversity action plans (LBAPs) have been developed in large municipalities such as Edinburgh, Glasgow and Aberdeen and cover almost all Scottish mainland and islands. In France, more than half of the Regions[5] had developed Regional Strategies for Biodiversity by 2015 (IUCN, 2015[5]), and since 2016 Regional Strategies for Biodiversity are compulsory. In addition, many cities such as Paris, Montpellier and Niort have local biodiversity plans. In Japan, all 47 prefectures had developed SBSAPs by October 2021 and at least 121 municipalities had developed SBSAPs (CBD, n.d.[6]). Mexico has at least 11 SBSAPs in place and 13 out of 25 regions in Peru have established SBSAPs. In Ireland, the City of Dublin released a draft Biodiversity Action Plan for 2021-25 in May 2021, following a series of city-level biodiversity action plans.

Two important features of SBSAPs are specific and measurable biodiversity targets and robust monitoring and reporting guidelines. These features are discussed below with examples.

[5] As of 2015, 11 out of 22 regions before the merger in 2015 had Regional Strategies for Biodiversity, including Auvergne, Brittany and Lower Normandy for example.

Box 1. Examples of sub-national biodiversity strategies and plans in France and Scotland (UK)

- **Paris:** The Biodiversity Plan 2018-2024 of Paris was developed over two years through consultation with residents, local mayors, the Paris Council, associations and other actors. It includes 3 pillars and 30 actions. The actions include creating 20 new biodiverse public spaces by 2020, and publishing an atlas of Paris' biodiversity.
- **Occitanie region:** Occitanie's Regional Strategy for Biodiversity provides a road map for collective and concerted action to preserve, restore, and enhance the natural environment through public policies and local projects. It is framed around five challenges and associated targets, such as net zero land take and net zero biodiversity loss by 2040, and the integration of biodiversity considerations into all public policies by 2030. To achieve these targets the strategy identifies 29 actions to which all actors can contribute.
- **Edinburgh:** The Edinburgh Biodiversity Action Plan 2019-2021 is the fifth edition of a city wide action plan since the first LBAP was launched in 2000. It promotes partnership working and community involvement, with represented groups including Council departments, government agencies, national and local environmental charities, volunteer conservation bodies and community groups. The plan has four overarching aims, including to influence other plans, policies, projects and strategies (i.e. to mainstream biodiversity). Actions to achieve these aims are organised across five themes: green networks, blue networks, geodiversity, built environment and species.
- **Glasgow:** In 1996, Glasgow City Council established a Biodiversity Action Plan Steering Group consisting of officers from various Council Services, outside agencies and interested groups, in order to prepare a LBAP for the City. The LBAP was initially launched in September 2001, and additional habitat and species plans have since been approved. The LBAP was developed to support the aims and objectives of the Route Map to 2020 and thereafter further Scottish Biodiversity Strategies as these are introduced. New LBAP actions and projects are developed every 3 to 5 years as required.

Sources: Paris (2018[7]), Plan de Biodiversité de Paris 2018-2024, https://cdn.paris.fr/paris/2021/02/17/fbb551749cd3dabdf2b730d5f4097629.pdf; Occitanie (2020[8]), Stratégie régionale pour la biodiversité, www.laregion.fr/SrB-Occitanie; City of Edinburgh Council (2019[9]), Edinburgh Biodiversity Action 2019-2021, https://www.edinburgh.gov.uk/downloads/file/26216/edinburgh-biodiversity-action-plan-2019-2021; Glasgow City Council (n.d.[10]), Glasgow Local Biodiversity Action Plan, CHttpHandler.ashx (glasgow.gov.uk)

Setting clear and specific sub-national biodiversity targets

Both national and sub-national biodiversity strategies and action plans should include clear – and ideally quantitative – targets that are specific, measurable, achievable, realistic and time-bound (SMART) (OECD, 2018[11]; OECD, 2019[12]). Lack of specific and measurable targets creates challenges in monitoring and assessing whether progress has been achieved over time and, if not, helping to determine why not so as to adapt responses.

Practices in Scotland and France confirm the challenges but also illustrate some examples of quantitative targets in SBSAPs. The aims and actions listed in Edinburgh's Biodiversity Action Plan 2019-2021, for example, are predominantly qualitative, with a few exceptions. Exceptions include a target to naturalise 15% of amenity grassland on Council land as part of the Edinburgh Living Landscapes programme and to establish three new wildflower meadows in areas of Holyrood Park outside the Site of Special Scientific Interest, both by 2021. Glasgow's Local Biodiversity Action Plan (LBAP) also does not include specific

measurable targets, but does make reference to *Scotland's Biodiversity: A Route Map to 2020* and explains how actions in Glasgow's LBAP are intended to contribute to the national strategy. Ecosystem Statements have been prepared for each of the five identified ecosystem types in Glasgow: grassland, woodland, wetland, urban and farmland. An example of a general objective (which applies to all ecosystems) is to ensure no net loss of the habitat within the City; with the corresponding target to retain all existing habitat. A second general objective is to promote sympathetic management of habitat, with the corresponding target of establishing favourable management at identified key sites.

The Paris Action Plan does include some quantitative and time-bound targets, such as the creation of 20 biodiversity spaces by 2020; that 35% of the land surface is converted to permeable vegetated surface by 2024 and 50% by 2030; and that a biodiversity assessment is carried out for 50% of the Parisian territory by 2024. In contrast, the 2011-2020 Biodiversity Action Plan of Auvergne and the Niort 2019-2024 Biodiversity Action Plan do not have specific, measurable biodiversity targets. In Mulhouse, the city's Strategy for Nature includes quantitative targets such as 20% increase in protected natural areas, planting 3 000 trees and creating a forest of 8 000 m² within the framework of a specific project (Mulhouse Diagonales – see Box 3).

National governments have a key role to play, since the more specific and measurable the targets are at national level, the clearer is the guidance for sub-national governments, when they develop their own biodiversity strategies and action plans. SMART targets can therefore also serve as a tool for policy coherence.

In the case of the Scottish Biodiversity Strategy: *2020 Challenge for Scotland's Biodiversity* (Government of Scotland, 2013[13]), published in 2013, the only quantitative targets are those on protected areas (i.e. "conserve at least 18% of land and inland water, and 10% of coastal and marine ecosystems, within protected areas by 2020"). All other measures are qualitative, using terminology such as 'promote an ecosystem approach' or 'restore and extend natural habitats'. Large scale collaborative projects to support the delivery of the Scottish Biodiversity Strategy: 2020 Challenge for Scotland's Biodiversity are set out in the *Scotland's Biodiversity: A Route Map to 2020* (Scottish Government, 2015[14]). Quantitative targets here include to restore 15% of degraded ecosystems, to create 3 000 to 5 000 ha of new native woodland per year and to develop a community-based riparian invasive non-native species project over approximately 29 500 km^2 of Northern Scotland.

France's 2011-2020 National Biodiversity Strategy (Government of France, 2011[15]) does not include quantitative targets. However, the French National Biodiversity Plan (Government of France, 2015[16]), does include a few quantitative targets, such as a goal to lead all cities and conurbations to attain an average of between one tree per four to ten inhabitants; and to increase the share of utilised agricultural land labelled as organic farming to reach 15% by the year 2022.

While qualitative language on national targets can be useful to guide sub-national governments to develop their own targets and policies, it makes it difficult to obtain a clear understanding of the scale of efforts needed, and to set corresponding quantitative targets at the sub-national level. Specific and measurable targets at the national level in the post-2020 timeframe would facilitate regions and cities to mobilise efforts accordingly.

Robust monitoring and reporting guidelines in sub-national biodiversity strategies

Robust monitoring and reporting guidelines are a core element of SBSAPs. In Scotland, the Edinburgh Biodiversity Action Plan specifies that there will be annual progress reports. Similarly, the Glasgow LBAP states: "Monitoring of the LBAP will be carried out annually and an Annual Monitoring Report produced." In earlier monitoring reports however, such as that of 2013/2014, the targets for wetlands, for example, are to ensure that there are no net losses of such habitats and that attempts should be made to increase their extent and quality through creation, restoration and positive management. However, the list of outcomes does not provide clarity on whether these targets were met (examples of outcomes include "Ponds created at Cathkin Braes LNR"). It is not clear what the baseline is for the target of no net loss of wetlands. The language on increasing the extent and quality could also be strengthened, given that it says "attempts should be made" and no quantitative references are included with respect to the baseline extent and quality of wetlands, and by how much the extent and quality should be increased.

The City Biodiversity Index (CBI) or the Singapore Index on Cities' Biodiversity (SI), developed in 2014, is a self-assessment tool for cities to evaluate and monitor the progress of their biodiversity conservation efforts against their own individual baselines. It comprises the "Profile of the City", which provides the city's background information, and 23 indicators that measure native biodiversity, ecosystem services provided by biodiversity, and governance and management of biodiversity (Chan et al., 2014[17]). Cities including Paris, Edinburgh and Singapore have used the CBI to evaluate and monitor their progress over time.

Another example of a monitoring and evaluation plan is from the Basque Country, Spain. The *Basque Biodiversity Strategy to 2030 and the 2020 Action Plan* includes clear indicators with specific and time-bound objectives against which progress can be monitored (Box 2).

Box 2. Monitoring and evaluation plans: An example from the Basque Country, Spain

The 2030 Basque Strategy clearly develops outcome orientated objectives in its monitoring and evaluation plan, as set out below. This report sets out the Action Plan for 2020, and states that a further Action Plan will be developed for 2025, and again for 2030.

Table 1. Balanced Scorecard for the Biodiversity Strategy of the Basque Country 2030

Result indicators	Objective 2020	Objective 2030
Conservation status of the Habitats of Community Interest with an unfavourable status	≤ 75% 77% by the year 2012	≤ 65%
Number of hectares (ha) under agri-environment measures	60 000 ha 55 600 ha by the year 2012	95 000 has
Number of ha under sustainable forestry management	100 000 ha 77 992 ha by the year 2015	150 000 has
Number of ha under forestry-environment measures	100 ha	1 500 has
Basque citizen's knowledge of the Natura 2000 Network	20%	30%
Action Plan Management Indicators	**Objective**	
Level of implementation of the Action Plan 2020	100% (intermediate objective ≥ 50%)	
Production of the Action Plan monitoring Reports	Biennial (starting in 2018)	
Production of evaluation Reports	2020, 2025, 2030	

Source: Biodiversity Strategy of the Basque Autonomous Community 2030 – and First Action Plan 2020 (2016), https://www.regions4.org/wp-content/uploads/2019/06/BiodiversityStrategy2030-1.pdf.

Establishing clear monitoring and reporting guidelines at the international level (i.e. under the Convention on Biological Diversity and in the post-2020 Global Biodiversity Framework) and nationally, with associated indicators for biodiversity targets, can help guide sub-national governments on their own monitoring and reporting. The greater the commonalities in monitoring and reporting – including the indicators used, the greater the comparability across sub-national governments.

In Scotland, the Nature Conservation (Scotland) Act requires three-yearly reporting on the Scottish Biodiversity Strategy to be submitted to the Scottish Parliament. As outlined in the Wildlife and Natural Environment (Scotland) Act 2011, every public body in Scotland is required to produce a publicly available report, on their compliance with the Biodiversity Duty.

3 Ensuring policy coherence and co-ordination

Effective implementation of biodiversity strategies and action plans (BSAPs) at all levels of government requires policy coherence and co-ordination, both horizontally and vertically. Horizontal coherence means policies are aligned across a national government (i.e. across ministries and agencies), across sub-national governments (i.e. departments and divisions) and among sub-national governments in the same functional area. Vertical coherence refers to policy coherence across different levels of government (i.e. national, regional and local). This section analyses how countries, regions and cities are working to ensure horizontal and vertical policy coherence and co-ordination for biodiversity. The following elements are analysed by drawing examples: clarifying roles and responsibilities across levels of government; mainstreaming biodiversity across policy areas; strengthening institutions and partnerships; greening budget mechanisms; and engaging stakeholders.

Clarifying roles and responsibilities across levels of government

Many NBSAPs specifically mention the role of sub-national governments, or state that biodiversity is a shared responsibility across levels of government. In some cases, they require sub-national governments to develop their strategies and align them with national governments.

Scotland's biodiversity strategies[6] and the recently established Scottish Biodiversity Programme give a clear priority to mainstreaming biodiversity across government, public bodies and business (NatureScot, 2019[18]). More specifically, the Scottish Planning Bill requires that sub-national planning authorities prepare regional spatial strategies, e.g. open space strategies (a statutory requirement), which create synergies among climate, biodiversity and planning goals (Scottish Government, 2020[19]). As previously discussed, under the Nature Conservation (Scotland) Act 2004, public bodies in Scotland have a duty to further the conservation of biodiversity. All public bodies in Scotland must submit a three yearly "Biodiversity Duty" report to the Scottish Parliament on how they are contributing to the Scottish Biodiversity Strategy.

In France, the National Biodiversity Strategy 2011-2020 clearly states that the aim is implementation not just at the national government level, but also by local authorities and various stakeholders in civil society. It recognises that local projects promoting biodiversity can have positive and fast effects (Government of France, 2011[15]).

[6] The original strategy – Scotland's Biodiversity: It's in Your Hands – was published in 2004. In 2013, it was supplemented by the 2020 Challenge for Scotland's Biodiversity. The two documents together now constitute the Scottish Biodiversity Strategy. In 2015, the two-part strategy was then further complemented with publication of *Scotland's biodiversity: a route map to 2020.* https://www.scotlink.org/wp-content/uploads/2021/02/Scotlands-biodiversity-conservation-Background-report.pdf

Mainstreaming biodiversity across policy areas

Mainstreaming biodiversity across different policy areas (e.g. climate, health) and sectors (e.g. agriculture, transport and energy) at the sub-national level, including cities and regions, can help address the main pressures on biodiversity and harness nature's contribution to other policy objectives. Integrating biodiversity into climate policy and urban, rural and regional development is examined below.

Integrating biodiversity and climate action

Biodiversity loss and climate change are interdependent. Climate change is a key driver of biodiversity loss, whilst biodiversity loss reduces the capacity of ecosystems to sequester and store carbon and undermines their resilience to the impacts of climate change. Furthermore, some climate change responses can place further pressure on biodiversity if not carefully planned and implemented (e.g. renewable energy infrastructure and bioenergy expansion). One way to harness synergies and address trade-offs is to adopt a well-being lens, which means ensuring that decisions aim to deliver simultaneously on multiple well-being objectives, such as biodiversity and climate (OECD, 2019[20]).

In practice, this requires biodiversity considerations to be integrated into climate and related strategies and action plans (e.g. for flood management and energy), and reciprocally for climate considerations to be integrated into biodiversity strategies and action plans. A key opportunity for local governments to harness synergies between climate and biodiversity is by promoting and supporting nature-based solutions (NbS)[7]. NbS refer to sustainably managing or restoring nature with the goal of maintaining or enhancing ecosystem services to address social, environmental and economic challenges such as climate change (OECD, 2020[21]). For example, in Scotland, a specific action included in Glasgow's Climate Emergency Action Plan is to create new Local Nature Reserves to help mitigate the urban heat island effect, while supporting biodiversity. The Local Biodiversity Action Plan is a central pillar of the Climate Emergency Action Plan. Another example is the Argyll and Bute Biodiversity Action Plan (Scotland), which evaluates actions against a set of four outcomes, one of which is conservation management for future proofing biodiversity that includes environmental activities to manage climate change (Argyll and Bute Council, 2020[22]).

In France, the LIFE ARTISAN project led by the French Office of Biodiversity (OFB) aims to implement the national climate adaptation plan through NbS. It places an emphasis on implementing NbS at a local level (ten pilot territories) and identifying opportunities to upscale NbS (OFB, 2020[23]). The Department of Seine-Saint-Denis flood risk management strategy, which traditionally relied on grey infrastructure to control flooding of inland areas, has shifted their strategy to better leverage the role of ecosystems in flood control (IUCN, 2016[24]; Institut Paris Region, 2019[25]). Various initiatives have been implemented to restore nature – e.g. maintaining areas of soil and increasing plant cover to improve water infiltration (IUCN, 2016[24]; Institut Paris Region, 2019[25]). Similarly, the Paris Rain Plan (*Paris Pluie*) encourages nature-based solutions, including green roofs, to increase water absorption and rainwater use. Such measures help avoid the overflow of saturated drainage systems from heavy rains, whilst benefiting biodiversity (IUCN, 2016[24]). Similar examples of applying nature-based solutions for water management can be found in Scotland. For instance, the masterplan of the Metropolitan Glasgow Strategic Drainage Partnership has an objective of "habitat improvement" and a guiding principle of "urban biodiversity enhancement", recognising that nature-based solutions are an important complement to traditional grey infrastructure approaches (MSDG, 2021[26]).

Sub-national governments can also use NbS to increase carbon storage or reduce greenhouse gas emissions, for example by preventing soil degradation, protecting peatlands and expanding forest cover (The Nature Conservancy, 2020[27]). Such actions can help to simultaneously protect and restore

[7] In the context of climate change, nature-based solutions are also known as ecosystem-based approaches to adaptation and mitigation.

biodiversity if designed effectively (e.g. using a variety of native species in af/reforestation projects) (OECD, 2020[28]; OECD, 2021[1]). In France, forests play a fundamental role in biodiversity conservation and climate regulation, covering about one third of the country's territory. The regional government of the Rhône-Alps Region established the "FRENE" (ash) project to promote the free evolution of at least 10% of the Rhône-Alps Region forests. Biodiversity issues are also taken into consideration through the establishment of a "biodiversity" clause in reforestation operations (IUCN, 2016[24]).

Raising awareness of the benefits of NbS amongst local authorities, and providing guidance, is an important first step for scaling up NbS. In Scotland, for example, elected local authority council members of the Convention on Scottish Local Authorities (COSLA) published and endorsed a briefing note on NbS for all local authorities in Scotland (SSN, NatureScot, COSLA, 2021[29]). Connecting Nature, a consortium of 30 partners, including Greenspace Scotland and Glasgow City Council, has produced a series of guidebooks on scaling up NbS in urban settings (European Union, 2020[30]). Recent OECD work examining NbS in the context of water-related risks identifies a number of further bottle necks for scaling up NbS and best practices for overcoming these. These practices include, for example, revising regulations (e.g. performance codes and standards) that were originally developed for grey infrastructure and tailoring finance mechanisms to support NbS (OECD, 2021[31]; OECD, 2020[32]).

One way for sub-national governments to assess whether both climate and biodiversity benefits are achieved is to adopt indicators to track, for example, the biodiversity impacts of climate strategies in different sectors – such as transport, buildings and energy (OECD, 2019[20]). The Green Space Factor, for example, has been used in Berlin, Seattle and other cities to measure the "change in the areas (hectares) of urban parks and open spaces per 1 000 population over the previous five years". For greater specificity, Green Space Factors can be weighted and designed to monitor and analyse the contribution of cities to biodiversity. For example, Malmö (Sweden) developed a point system for its Green Space Factor to focus on climate change adaptation and biodiversity. Some of the elements include tree diversity, the inclusion of bird boxes, bat boxes, biotope of insects, amongst others (OECD, 2019[20]).

Mainstreaming biodiversity into urban, rural and regional development

The need to mainstream biodiversity into economic growth and development is being increasingly recognised and is now also firmly embedded in the Sustainable Development Goals. At the national level, most National Biodiversity Strategies and Action Plans (NBSAPs) recognise the linkages between biodiversity and development and include targets for mainstreaming National Development Plans (NDPs), National Sustainable Development Plans, and Green Growth Strategies (OECD, 2018[33]). This should also be promoted at the sub-national level, by mainstreaming biodiversity into sub-national (urban, rural and regional) development strategies.

The need for mainstreaming biodiversity action in sub-national development strategies is particularly acute in cities given that almost half (48%) of the global human population lives in cities – this share has more than doubled over the last 40 years, and is projected to reach 55% by 2050 (OECD/European Commission, 2020[34]).[8] Urban sprawl has a range of economic, social and environmental repercussions including encroachment on nature and displacement of agricultural land. Land-use change has had the largest relative negative impact on terrestrial and freshwater ecosystems, which is due primarily to agricultural expansion and intensification but also to urban expansion and associated infrastructure (IPBES, 2019[35]). On the other hand, well-planned and well-managed urbanisation presents an opportunity to simultaneously enhance biodiversity and ecosystem services and the various well-being benefits they provide: clean air, reduced water-related risks, carbon sequestration, physical and mental health, recreation and more.

[8] The figures are based on a new harmonised global definition of cities developed jointly by the OECD and European Commission. Cities are defined as high density places of at least 50,000 inhabitants.

Some cities mainstream biodiversity action in urban development policies. For instance, the Municipal Plan 2015-2030 of Oslo, Norway, states that urban open space will be preserved (primarily for recreation and public health, but also for biodiversity, mobility and climate change adaptation) and further developed as the city grows. According to the plan, the city mapped recreational opportunities and pollination potential as an indicator for biodiversity (Oppla, n.d.[36]). In Scotland, the Midlothian Council, for example, adopted the Midlothian Local Development Plan in 2017, which incorporates policies to safeguard and promote the natural environment. This is consistent with a regional-scale development plan, the 2013 South East Scotland Strategic Development Plan, which also mainstreams biodiversity. Glasgow, Scotland, informs their open space strategy with the biodiversity action plan. Many of the open spaces protected by the City Development Plan, including natural/semi-natural greenspace and green corridors, are also designated for their nature conservation value as, for example, Local Nature Reserves (LNRs) or Sites of Importance for Nature Conservation (SINCs) (Glasgow City Council, 2020[37]).

National governments can guide and support biodiversity action in cities by mainstreaming biodiversity into national urban policies (NUPs). According to a recent study, 72 out of 113 countries (64%) give extensive or moderate attention to environmental sustainability in their NUPs (OECD/UN-HABITAT/UNOPS, 2021[38]). More specifically, countries such as Canada, Colombia, Israel, Korea, the Netherlands, Norway, Slovak Republic, Spain and Sweden promote green and blue infrastructure, biodiversity and nature-based solutions within their NUPs. In order to accelerate such national action, it is important to enhance knowledge on biodiversity policy in ministries and agencies in charge of urban policy. The study also found that lack of expertise at the intersection of climate change and urban policy is the most common obstacles to integrating climate objectives in national urban policy (OECD/UN-HABITAT/UNOPS, 2021[38]), providing useful insights to mainstreaming biodiversity into urban development.

Diverse urban and rural development contexts present different opportunities for mainstreaming biodiversity. For example, urban fringes are strategic places with conflicting interests in land use (e.g. urban development, industry, agriculture). In the United Kingdom, retaining and enhancing biodiversity is recognised as an additional benefit of the Green Belts, designated to prevent urban sprawl around large built-up areas (UK Department for Levelling Up, Housing and Communities, 2012[39]). In Colombia, Medellin's Green Belt (Cinturón Verde) initiative aims at not only controlling urban sprawl at urban fringes, but also adapting to climate change by acting as a natural buffer against climate-related disasters (UNFCCC, n.d.[40]).

Brownfield sites, once widely regarded as being of no ecological value and fit only for redevelopment, can harbour rich and sophisticated ecosystems that often provide space for rare or threatened species (Hunter, 2014[41]). Governments increasingly distinguish brownfield sites on the basis of their conservation value. The UK government, for example, added some brownfields to its list of priority sites in its 2006 Natural Environment and Rural Communities Act (Hunter, 2014[41]). Cities also have abandoned or unused sites (e.g. old railway lines) which can be transformed for recreation and biodiversity. The High Line in New York City, United States, is an example of the city redeveloping its older infrastructure into public space with nature. Nearly half of the High Line's plants are native species, selected for being drought-tolerant, low-maintenance and a source of food and shelter for wildlife (The High Line, n.d.[42]). In Mulhouse, France, abandoned allotment gardens, once polluted by asbestos, are being renatured for the benefit of the local biodiversity and the citizen's access to nature (Box 3).

Box 3. Mulhouse Diagonales project: reconnecting water and nature with the city

The Mulhouse Diagonales project intends to restore the place of nature and water by redesigning 10 km of the banks and allow access to the shores. The EUR 32 million project aims to result in a better quality of life for the citizens and a better protection of the natural resources for the benefit of the local biodiversity.

As part of the project, the Promenade of the river Doller (Promenade de la Doller) is a re-natured 10 ha area that was designed to replace former abandoned allotment gardens. While the initial plan was to extend the Bourtzwiller sports area, a biodiversity diagnosis for the project and consultations with experts as well as local stakeholders led to resulted in an ambitious renaturation proposal. The project started in 2019 with demolition of the old allotment gardens including a removal of asbestos plates. A total of 24 000 trees were planted altogether and wetlands were restored, benefitting the local biodiversity with spawning grounds for pike, flood meadows, toad pools, habitat for dragonflies and other insects, hedges and groves, dry grassland, etc. The site has been accessible to the public since summer 2020, with educational panels providing information on the site's natural resources.

Source: (City of Mulhouse, n.d.[43])

A number of cities and other local governments are adapting their approach to managing green spaces to enhance their biodiversity value. In Scotland, for example, the Aberdeenshire Capital aims to improve the variety of wildlife and reduce carbon output in council-owned greenspaces. This involves diversifying green spaces, e.g. by reducing the area of well-kept grassy areas and increasing the number of natural spaces, trees planted, woodland areas and wildflower meadows. In Singapore, the Singapore Green Plan, announced in February 2021, aims at restoring nature back into the city for liveability, sustainability and well-being by adding 10 000 ha of green spaces and planting 1 million more trees by 2030.

Aligning sub-national budget with biodiversity objectives

Financing sub-national biodiversity action is crucial for effective implementation. A key starting point is to obtain an understanding of the state of sub-national public finance dedicated to biodiversity, and how much of sub-national government finance may be detrimental to biodiversity. For example, the city of Mulhouse created the programme “Nature in the City and Biodiversity” in 2021 to identify investment expenditures related to biodiversity.

Green budgeting is intended to evaluate (positive and negative) environmental impacts of budgetary and fiscal policies and to assess their coherence towards the delivery of national and international commitments. While a few examples of green budgeting that include biodiversity are beginning to emerge at the national level (OECD, 2020[3]), few examples of sub-national green budgeting efforts exist. One exception is the Department of Mayenne, France, which applied green budgeting in December 2020, making it the first Department in France to do so. Mayenne applied the green budgeting methodology developed by the national government, which includes biodiversity (Government of France, 2020[44]). The department found that 5.5% of its budget is environmentally harmful, mostly related to road investments (Actu-Environnement, 2020[45]).

Green budgeting by sub-national governments that includes biodiversity is a first step; ideally it would be helpful to obtain an understanding of any other sub-national sources of finance for biodiversity protection, including from the private sector, as well as finance flows from other non-government sources that are detrimental to biodiversity. This would serve to establish a baseline against which future trends could be

evaluated against. Section 4 (Instruments for effective implementation of sub-national biodiversity policy) discusses how economic instruments can be used to generate revenue for government, which could then be channelled back into biodiversity conservation and sustainable use objectives.

Aligning sub-national investment with biodiversity objectives is all the more important in the current context of the recovery from the COVID-19 pandemic. Various funds, programmes and instruments have emerged to support businesses and communities in their recovery efforts, which provides a unique opportunity to incentivise and channel financial resources towards the protection and enhancement of biodiversity (OECD, 2020[3]). An example of sub-national funds is the Cairngorms Green Recovery Fund in Scotland. In 2020, the Cairngorms National Park Authority (CNPA) and the Cairngorms Trust announced the creation of a fund to support communities and local businesses recover in the aftermath of the COVID-19 pandemic. The fund's first criteria for funding is that projects have positive impacts on climate and biodiversity. Building on the successful operation, additional funding of GBP 300 000 was announced in 2021, requiring positive benefits for ecology and climate change (Cairngorms National Park Authority, 2021[46]). Although such local funds may be limited in scale compared with national funds, they can address specific local challenges, provide targeted support to individual businesses, and facilitate local partnerships.

Strengthening institutions and partnerships

Institutional mechanisms are crucial to make sure that national strategies, plans and programmes can play a role in aligning national and sub-national biodiversity policies. At the sub-national level, a dedicated department/agency can also align policies within a city government. In the case of France, regional biodiversity agencies (ARB) are being created to stimulate collaborative partnerships with the national office of biodiversity (OFB). Since 2019, eight ARBs have been created and seven others are in the process of being established as of February 2021 (French national office of biodiversity, n.d.[47]). ARBs serve as a consultation body when the national government formulates and implements their national biodiversity strategies and policies. For instance, in order to implement the Biodiversity Law, the French government is launching a consultation process with ARBs to formulate its new National Biodiversity Strategy and Action Plan. In the case of Scotland, dedicated 'biodiversity officers' co-ordinate across departments within sub-national governments. For example, in Perth and Kinross Council, the Biodiversity Officer advises on how to protect and enhance wildlife across a range of Council services including building, property, housing, education, community greenspace and development management. The officer also screens planning applications for any potential impacts on biodiversity.

In addition, a multi-stakeholder partnership can engage different local actors, facilitate local biodiversity action and co-ordinate policies at the metropolitan/functional urban area scale. For example, in Scotland, the Glasgow and Clyde Valley Green Network Partnership (GCVGNP) brings together eight local authorities in the Greater Glasgow and Clyde Valley region as well as several national and sub-national agencies covering from various policy areas such as Scottish Forestry, Scottish Environment Protection Agency, Scottish Enterprise, Scottish Natural Heritage, National Health Service Scotland and the Glasgow Centre for Population Health. Established in 2006, the aim of the partnership is to provide well-connected, high quality, multi-use greenspaces throughout the region, from cycle paths to allotments, wildlife habitats to rain gardens. In 2019 the GCVGNP launched its blueprint "Our Blueprint - GCV Green Network", which facilitates the movement of wildlife throughout the landscape and the off-road movement of people between communities through greenspace. To support local authority partners in delivering the Blueprint, the GCPGNP is currently producing for each council a detailed assessment of the access and habitat networks (Glasgow and Clyde Valley Green Network Partnership, n.d.[48]). The fact that the partnership engages national agencies means that there is not only horizontal co-ordination among sub-national governments but also vertical policy integration (i.e. from national through to regional and local). It can also help identify and mobilise funds and share expert knowledge on biodiversity among the partners.

At the national level, some countries have a dedicated agency for biodiversity policies. In France, the national biodiversity agency (OFB) plays a role in driving the biodiversity agenda at the national level by setting a national vision, aligning policies across ministries as well as with other levels of government and by designing and implementing national programmes and projects. In Scotland, the national agency NatureScot is responsible for advising Scottish ministries and local authorities on issues such as development planning and management, nature reserves and biodiversity action plans. NatureScot is also involved in a number of joint initiatives such as the Central Scotland Green Network and the Joint Nature Conservation Committee. A national Local Biodiversity Action Plan Officer Network facilitates the exchange of best practice, local, national and international developments on nature conservation, and helps ensure local biodiversity action planning is in line with national biodiversity priorities.

Stakeholder engagement and participatory planning

Stakeholder engagement and participatory planning is critical for effective implementation of sub-national biodiversity policies. Sub-national governments are well-positioned to engage diverse actors at all stages of policy design and implementation. Seeking input, guidance and leadership on projects and plans through participatory decision-making with community members can help design and implement more effective biodiversity policies, while also supporting community ownership and buy-in. As previously described, the case of Mulhouse, France, is a good example of how consultations with experts as well as local stakeholders could transform a sport facility extension into a full renaturation project (Box 3). Engagement and participation can also empower specific groups (women, youth, etc.) (OECD, 2018[49]).

In Scotland, partnerships are commonly used to engage stakeholders. In addition to the examples previously described, the Tayside Biodiversity Partnership actively engages more than 100 members in Perth and Kinross Council, with the aim of conserving and enhancing the region's biodiversity. It publishes a regular online E-News, organises events and publishes a comprehensive annual Bulletin. The partnership is increasingly working with businesses, village communities and farmers/landowners through its Biodiversity Villages/Towns initiative. Fife's Biodiversity Partnership steers development and delivery of the Fife LBAP. The partnership includes representation from the public, voluntary and private sectors, academic institutions, specialist and community groups, as well as two elected members appointed by Fife Council as spokespersons for biodiversity. The Fife Council has acted as Secretariat to the Fife Biodiversity Partnership since 1997, and co-ordinates the work of the Plan. As a land manager, Fife Council also leads joint initiatives with partners, such as the Corn Bunting Recovery Project. The council joined farmers, estates and golf courses and created three wild bird cover crop areas with school children from three primary schools in parks in the East Neuk of Fife to provide cover and winter food for this threatened farmland bird (Fife Council, 2021[50]).

Another example from Scotland is the Dee Catchment Partnership, established in 2006 with a focused aim to restore habitat and water quality in the River Dee catchment. With the view to bring together the interests of everyone involved with the River Dee, the partners include governments (e.g. Aberdeen City Council), research institutions (e.g. James Hutton Institute) and interest groups (e.g. National Farmers Union), as well as land managers and individual householders. The partnership develops catchment management plans, carries out projects such as the Easter Beltie restoration, research and monitoring, and outreach and education for the local communities (Dee Catchment Partnership, n.d.[51]).

Co-design is an approach to raising awareness, ensure co-ordination and generate innovative solutions by engaging stakeholders and individual citizens on the same footing as professional actors (researchers, planners, politicians, decision makers, experts, institutional stakeholders). For example, in Paris, France, the biodiversity plan was co-created with various local actors (citizens, elected officials, associations, companies) through 17 participatory and collaborative workshops carried out in district town halls from 2015 to 2017 and supplemented by professional workshops and the City of Paris, which issued more than

600 proposals and action items. Internet surveys and collaboration platforms made it possible to test ideas from these workshops. The city of Athens, Greece, conducted a co-creation workshop in September 2018 to address the urban heat island problem in the city as well as to integrate natural systems into the urban fabric as part of the New Resilience strategy. The workshop included experts, academics from different universities, stakeholders from C40, CLEAN solutions and other Environmental NPOs (C40 Cities, 2018[52]). Further knowledge sharing and mutual learning across cities and regions may be useful in order to apply the method effectively to design and implement sub-national biodiversity policies.

4 Instruments for effective implementation of sub-national biodiversity policy

Sub-national governments can leverage a range of regulatory, economic and information policy instruments to achieve their biodiversity objectives. The appropriate mix of policy instruments may vary from one sub-national government to another, depending on a range of factors including the ecological, political, legal and administrative context. For example, the authority vested in sub-national governments to pass laws or administer fiscal policy varies across countries, and across types of sub-national governments (e.g. city, department, region). Sub-national governments also have an important role in supporting the effective implementation of national-level policies.

Spatial planning and other regulatory instruments

Regulatory instruments such as spatial planning, protected areas, standards and restrictions on use, form a core part of sub-national governments' biodiversity policy responses. In most countries, sub-national governments are responsible for land-use planning, zoning and urban design. Key land-use planning considerations to support biodiversity include: balancing social, economic and environmental demands; protecting areas important for biodiversity and ecosystem services (e.g. ecologically sensitive and/or biologically rich); maintaining and strengthening ecological connectivity; promoting large contiguous areas of nature; identifying areas and integrating plans for nature restoration; and promoting biodiversity-rich green spaces. Applying strategic environmental assessment or broader sustainability appraisals that explicitly account for biodiversity can facilitate efforts to mainstream biodiversity into land-use planning, urban design and local development strategies.

In Scotland, the Fourth National Planning Framework, currently being developed, presents the expansion of green infrastructure, biodiversity and natural spaces as a key consideration, stating that "our approach to planning supports Scotland's role in responding to the twin global crises of biodiversity loss and climate change, including by strengthening policies designed to protect and restore Scotland's biodiversity and natural assets and to improve their long term resilience to the impacts of our changing climate" (Government of Scotland, 2020[53]). The strong commitment will guide and regulate sub-national land use and development as a binding mechanism once it is adopted. For example, the Perth and Kinross Council takes account of the Tayside Local Biodiversity Action Plan (LBAP) in their binding development control. More specifically, development proposals that have a detrimental impact will not be supported unless clear evidence can be provided that the ecological impacts can be satisfactorily avoided and mitigated.

In France, municipalities and inter-communalities have a primary responsibility for the conservation and sustainable use of biodiversity through their autonomous role in land-use planning and regulations, including territorial consistency schemes (SCoT), local town planning plans (PLU) and inter-municipal plans (PLUi) (IUCN France, 2018[54]). For example, the City of Paris uses the Urban Planning and Sustainable Development Plan (*Projet d'aménagement et de développement durable*, PADD) to promote

green corridors. As the PADD is part of its PLU, it has a binding power to regulate land use to protect green space including privately owned land (OECD, 2012[55]). The classified wooded area (*l'espace boisé classé,* EBC) for local urbanism plans (PLU) prohibits any change of use or any mode of land use likely to compromise the conservation, protection or creation of classified wooded areas, which encompasses woods, forests, parks, isolated trees, hedges and plantations.

At the regional scale, French law[9] gives departments the authority to preserve, reclaim and enhance spaces that exhibit remarkable ecological and / or landscape functions and / or are threatened through the sensitive natural space (*espaces naturales sensibles,* ENS) policy. The policy is based on two important and complementary components: the preservation of natural spaces, landscapes and their functions and public access for discovery and awareness. The management of the ENS is either by the Department or a delegated public or private actor (IUCN France, 2018[54]). Departments in France have acquired and/or manage approximately 4 000 ENS sites, covering nearly 200 000 ha.

France's rural leases with environmental clauses (*le bail rural à clauses environnementales*) are intended to enable ongoing agriculture and other economic activities while aligning them with ecological objectives. The environmental requirements and monitoring methods are determined by the local authority leasing the land together with the lessee, and are based on the Rural Code. Environmental requirements may cover, for example, the methods of managing meadows or crops, the use of inputs and irrigation, the creation or maintenance of hedges, bosquets or ponds, organic farming and agroforestry. As an incentive, lessees may receive an environmental rural lease at a lower cost than a standard rural lease. The reduction in the amount of the rent depends on the commitments in terms of agricultural practices adopted by the farmer (Duval et al., 2019[56]). The European Metropole of Lille, for example, has developed rural environmental leases with farmers, which require measures that help to address issues of carbon storage and air quality, biodiversity, protection of water tables, surface water and flood management, and pesticide use (Duval et al., 2019[56]).

A number of countries also have legal instruments that enable long-term land use restrictions to be attached to land or property titles in order to protect the natural environment and biodiversity. A long standing example is the conservation easement in the United States, which is a voluntary legal agreement between a landowner and a land trust or government agency, which has been effectively used to protect biodiversity values. In France, the 2016 French law on biodiversity established a new land tenure instrument called real environmental obligations (*obligations réelle environnementales*, ORE) to support biodiversity.[10] Local governments (*communes*) are playing an active role in its implementation (Box 4).

[9] Law n ° 85-729 of July 18, 1985, amended by the law of February 2, 1995

[10] Article 72 of Law No. 2016-1087 of August 8, 2016 on the reconquest of biodiversity of nature and landscapes.

Box 4. Real environmental obligations (ORE) in France

Through the real environmental obligations (*obligations réelle environnementales*, ORE), a land owner can enter into a voluntary contract with any legal person whether governed by public or by private law, including sub-national governments. The property owner retains possession of the property, but voluntarily restricts its use by setting obligations with the co-contractor with the purpose of maintaining, conserving, managing or restoring elements of biodiversity or ecological functions. The ORE is also a mechanism through which developers can implement their biodiversity offset obligations. As an incentive, the national biodiversity law permits communes to provide exemptions from land registration fees and land tax for areas under an ORE. A 2021 Finance bill provides further incentives, allowing real estate security contribution exemptions. Further fiscal incentives could help increase the uptake of ORE. Below are some examples of ORE:

- In 2018, the Conservatory of Natural Spaces of Savoy and the Municipality of Yenne signed the first ORE, with the technical support of the Federation of Conservatories of Natural Spaces. The Savoyard ORE spans a 30 years and aims to maintain, conserve and manage the biodiversity and ecological function of the Lagneux marsh.
- In 2020, CDC Biodiversité signed an ORE with the Municipality of Messimy to implement biodiversity offset measures intended to compensate for the negative impacts resulting from the expansion a Boiron industrial site. Through the ORE, CDC Biodiversité undertakes to strengthen and maintain biodiversity on the site to fulfil Boiron's legal requirements, while the Municipality of Messimy undertakes to respect CDC's ecological objectives on this plot for a period of at least 15 years renewable.
- In 2019, the first private landowner signed an ORE. The landowner is a farming family in the Pays d'Auge Ornais, Normandy. The co-contractor is the Conservatory of Natural Spaces in West Normandy. The landowner placed its 20 hectare property for 50 years under a biodiversity conservation programme, which includes: preservation of hedges and ponds, no use of pesticides, and no mowing and grazing of a limestone hill that is home to the Orchis frog, a rare orchid.

Source: (MTES and CEREMA, 2018[57]), Obligation Réelle Environnementale Fiche de Synthèse, Guide-methodologique-obligation-reelle-environnementale.pdf; (FRB, 2021[58]), Comment développer les Obligations réelles environnementales (ORE) en France?, https://www.fondationbiodiversite.fr/wp-content/uploads/2021/03/FRB-ORE-2021.pdf; (Gosseman Avocats, 2020[59]),Obligation réelle environnementale (ORE) : un contrat pour protéger la biodiversité, http://www.arnaudgossement.com/archive/2020/02/15/obligation-reelle-environnementale-le-cadre-juridique-du-con-6212941.html; Cerema (2021), Outils de l'aménagement: Accompagner les collectivités dans l'aménagement de leur territoire RETOUR D'EXPERIENCES - Quelques exemples de contrats d'obligations réelles environnementales (ORE) signés

Fiscal and other economic instruments

Economic instruments, including fiscal measures, can be used by sub-national governments to incentivise more environmentally sustainable production and consumption. These instruments range from taxes, which are based on the polluter pays principle, through to payments for ecosystem services, which are based on a beneficiary pays approach. In addition to steering behaviour, many economic instruments can mobilise private finance for biodiversity or raise government revenues, which could be used to finance biodiversity measures, address any potentially regressive distributional impacts of policy measures or reduce fiscal burden. Synergies may exist between economic instruments and regulatory or information instruments. For example, in France, the land tenure instrument "real environmental obligations" discussed

above could facilitate the implementation of biodiversity offset obligations or payments for ecosystem services.

Taxes, fees and charges

In France, revenue from the national development tax[11] is a source of funding for biodiversity (Government of France, 2019[60]). While the tax is established by national law, it comprises both a communal (or intercommunal) part and a departmental part. The tax rate is determined by sub-national governments (municipal and departmental councils), within nationally-determined limits. The proceeds from the departmental part of the tax are intended to finance, among other things, the protection of environmentally sensitive areas (ENS – see above). From January 1, 2022, renaturation can also be financed under the protection of ENS. In addition to generating revenue for ENS protection, changes to the tax base of the development tax planned for 2022 intend to help incentivise efforts to reduce land take[12].

France's aquatic environment management and flood prevention tax provides another example of how sub-national governments can leverage taxes to fund biodiversity (Government of France, 2021[61]). Under French law, municipalities that exercise the competence for the management of aquatic environments and flood prevention can institute and collect a tax in order to finance the management of aquatic areas and the prevention of floods. The income from the tax is at most equal to the estimated annual amount of operating and investment costs for managing aquatic environments and the prevention of floods.

Similar to France's development tax, the Scottish Planning Bill from 2019 proposed new Infrastructure Levy Regulations, with an aim to entitle local authorities to seek payments, in connection with the grant of planning permissions, to be used "to fund, or contribute towards funding, infrastructure projects". The definition of 'infrastructure' includes 'green and blue' infrastructure, defined as 'features of the natural and built environment (including water) that provide a range of ecosystem and social benefits'. Should these regulations come into force, they could provide sub-national governments with a means by which to fund environmental projects.

Subsidies (including tax exemptions) and grants

Sub-national governments can directly fund or subsidise activities undertaken by private actors that benefit biodiversity. The Region of Ile de France, for example, launched a call in 2000 for projects that help conserve and restore biodiversity, with a particular focus on the following four themes: ecological connectivity, wild pollinators, nocturnal fauna, and health and biodiversity. The region covers up to 70% of the amount of investment expenses (capped at EUR 200 000) and 50% of operating expenses (capped at EUR 20 000) (Région Ile de France, 2021[62]). The region of Haut de France aims to promote knowledge and awareness of biodiversity through its *Génération+ Biodiv* (GBIO), which provides up to up to 90% of funding for activities conducted by educational institutions that help contribute to two objectives: i) supporting biodiversity onsite and in surrounding areas and improving knowledge of the natural heritage for schools and scientific community; and ii) developing eco-citizenship among high school members of the educational community (Région Haut de France, 2021[63]).

Sub-national governments and their constituents may also depend in part on national subsidy and grant schemes to achieve their biodiversity objectives. In Scotland, for example, Loch Lomond and The Trossachs National Park supported communities through the National Park grant scheme to enhance local biodiversity through small scale native woodland planting, hedgerow restoration and community-led

[11] The construction, reconstruction and extensions of buildings as well as all developments that require planning permission are subject to a development tax, which is calculated based on the surface area and value

[12] The compulsory and optional exemptions for the municipalities in the base of the development tax will include outdoor permeable parking spaces and underground parking, which is currently included in the development tax base

management of invasive species. A number of national funds have been established to support local biodiversity action including the Biodiversity Challenge Fund, the Peatland Action Fund, the Green Infrastructure Investment Fund and the Agri-Environment Fund. As previously discussed, some sub-national funds to address specific local challenges also exist (e.g. Cairngorms Green Recovery Fund in Scotland).

Payments for ecosystem services (PES)

Payments for ecosystem services (PES)[13] can be an effective tool for sub-national governments to incentivise the conservation, restoration or sustainable management of ecosystems. They have been defined as (1) *voluntary transactions;* (2) *between ecosystem service users;* (3) *and ecosystem service providers;* (4) *that are conditional on agreed rules of natural resource management;* (5) *for generating offsite services* (Wunder, 2015[64]). An ecosystem service may be purchased by the beneficiary of that service (e.g. a water company), or by a third-party (e.g. a sub-national government) acting on behalf of beneficiaries (e.g. the local community).

For example, Eau de Paris (Paris Water) (a public company that collects, transports, treats and distributes an average of 483 000 m^3 of drinking water per day to 3 million users) established a PES scheme to address the impacts of agriculture on water catchment areas (FNAB, 2021[65]). The scheme supports farmers to adopt more sustainable agricultural systems, for instance, limiting the use of inputs such as fertiliser and promoting the development of organic farming and grassland areas. A consultation with farmers, partners and technical experts (e.g. Seine Normandy Water Agency) was held during 2018 to co-construct the specifications and associated remuneration. The PES scheme comprises four measures – water and crops, water and livestock, water and bio, water and sensitive areas – each of which is associated with a set of commitments to adjust agricultural practices, a payment amount and a duration. Between 100 and 200 farms could benefit from one of the four measures which are in place in the four water catchments that supply Paris.

In Scotland, markets for payments for ecosystem services are facilitated by the UK Woodland Carbon Code (UK Woodland Carbon Code, n.d.[66])and the UK Peatland Code (UK Peatland Code, n.d.[67]). These codes provide a standard against which voluntary land carbon projects can be assessed, in order to provide quality assurance to potential buyers of carbon credits. The associated UK Land Carbon Registry promotes transparency by making publically available data about the status of Woodland Carbon Code and Peatland Code projects, and the ownership and use of carbon units.

Biodiversity offsets

Biodiversity offsets are measurable conservation outcomes that result from actions designed to compensate for significant, residual biodiversity loss that arises through development projects (OECD, 2016[68]). They are intended to be implemented only after all reasonable steps have been taken to avoid and minimise biodiversity loss at the development site, i.e. they are the last step in the so-called mitigation hierarchy. Offsetting is based on the premise that adverse impacts from development can be offset if sufficient habitat can be protected, enhanced or established elsewhere. Sub-national governments may be involved in the implementation of biodiversity offsets in three key ways: 1) offsetting the impacts of their own projects either voluntarily or in response to national or sub-national regulations; 2) establishing requirements for biodiversity offsets, if they have the authority to do so; 3) facilitating the creation and identification of potential biodiversity offsets and biobanks, particularly on public land.

The Scottish Borders, one of 32 council areas in Scotland, provides an example of a sub-national government that has created its own biodiversity offset scheme. While the national and local planning

[13] Often referred to in France as Payments for Environmental Services.

framework is supportive of renewable energy development, it also seeks to protect biodiversity. To help balance these economic and environmental objectives, the Scottish Borders Council, together with other stakeholders, developed a biodiversity offset scheme. Developers secure an offset project with the Council by a legal agreement through the statutory planning process and a programme of work is agreed for delivery by a third party (a local environmental NGO). One species that has benefited from the scheme is the black grouse, which was declining due to habitat fragmentation among other things. Two projects (Central Southern Uplands and Lammermuirs) funded by biodiversity offsets have together put more than 30 000 hectares under management for black grouse. The offset scheme is helping meet the objectives of the Scottish Biodiversity Strategy, the Scottish Borders LBAP, the Scottish Borders Woodland Strategy and the Council's biodiversity duty under the Nature Conservation (Scotland) Act 2004 (RSPB, 2013[69]; NatureScot, n.d.[70]).

In France, the obligation to respect the mitigation hierarchy – avoid, reduce and compensate negative impacts – was embedded in France's 1976 environment code and further strengthened by the 2016 Biodiversity Law. Planned or foreseen damage to biodiversity from a project, or implementation of a plan, scheme, programme or other planning document must be compensated for, respecting the principle of ecological equivalence. Offset measures should aim to achieve zero net loss or even net gain of biodiversity. A developer can implement the compensatory measures directly, contract them to a third party or purchase compensation credits (biobanking). Sub-national governments may be required to provide a biodiversity offset when they develop projects or plans requiring an environmental impact assessment. In some instance, they may also play a role in identifying and providing suitable land to deliver biodiversity offsets (Lucas, 2017[71]; Besnault, 2018[72]). The City of Paris, for example, is working with CDC Biodiversité to identify opportunities to pool biodiversity offset projects in order to promote ecological connectivity and large contiguous areas of habitat, for example along the banks of the Seine or railway lines (Ville de Paris, 2019[73]).

Information and other instruments

In addition to regulatory and economic instruments, local governments can draw on information-based and other policy instruments to achieve biodiversity objectives, such as ecolabels, voluntary agreements between business and government, industry standards and guidance.

Ecolabelling schemes can support the development of markets for biodiversity-friendly products by certifying that companies adhere to a set of criteria and communicating this information to consumers. In France, a number of regional governments (Bretagne, Normandie, and Pays de la Loire) have supported the development and roll-out of Le Label Haie, which is an ecolabel to protect bocage hedges. Bocage holds important value for biodiversity, landscape heritage and carbon storage, but is declining in France by approximately 11 500 km per year. The ecolabel promotes the adoption of good practices to sustainably manage bocage hedges, and encourages wood from bocage to be locally and sustainably sourced (Label Haie, 2021[74]).

Biodiversity inventories are another information instrument that local governments can adopt. Inventorying biodiversity can help to increase the awareness of citizens, local governments and businesses of the local biodiversity, and to facilitate the integration of biodiversity considerations into planning and management. In France, more than 1 400 municipalities and intercommunalities are developing municipal biodiversity atlases, which provide an inventory of the ecosystems and species present in their territory. Efforts to inventory biodiversity at the local level are supported by the French Office for Biodiversity, which has provided funding for over 150 projects to date (OFB, 2021[75]).

Sub-national governments can also develop and support the dissemination of guidance on biodiversity conservation and sustainable use for government employees, the private sector and citizens. For example, the Midlothian Council in Scotland adopted Nature Conservation Planning Guidance in 2020 to help

developers and others to identify the biodiversity considerations that should inform development proposals (Midlothian Council, 2021[76]). Similar guidance has been developed by other local governments to support the implementation of their local development plan, including Aberdeenshire (Aberdeenshire Council, 2021[77]), Glasgow (Glasgow City Council, 2016[78]) and Argyll and Bute (Argyll and Bute Council, 2016[79]) Councils. In addition, several local governments provide advice to citizens on how they can increase biodiversity within their gardens (e.g. Argyll and Bute), and engage in broader awareness raising and education activities, such as organising biodiversity events, providing guided walks (Fife Coast and Countryside Trust (Fife Council, 2021[80])), publishing educational resources online (Loch Lomond and The Trossachs National Park (Loch Lomond and The Trossachs National Park, 2018[81])) and developing a biodiversity teaching guide to help integrate biodiversity into the school curriculum (e.g. East Lothian Council (East Lothian Council, n.d.[82])).

National governments can also support sub-national governments' biodiversity action by sharing policy practices and facilitating data and knowledge sharing among them. In Scotland, "Biodiversity Duty" reports, submitted to the Scottish Parliament, are available on the NatureScot website. This not only ensures transparency but also facilitates mutual learning. The Japanese government established the Biodiversity Centre in 1998, in order to conduct basic survey and monitoring of the natural environment and biodiversity. The results are widely disseminated through its webpage and used for research and policy making at both national and sub-national levels.

5 Summary and suggestions for further work

This paper examined selected issues to identify how to better enhance the effectiveness of sub-national biodiversity policy. It covered important features in the design of sub-national biodiversity strategies and action plans, namely specific targets and robust monitoring and reporting guidelines; mechanisms to enhance policy coherence and co-ordination, including mainstreaming biodiversity (with a focus on climate change and territorial development); and instruments to implement effective policies for concrete biodiversity outcomes. It also presented many policy practices, predominantly from France and Scotland, which illustrated how various recommendations put forward in the paper have been put into practice, as well as remaining challenges and gaps to bridge.

Although the examples studied are limited, a key finding of the paper is the depth and diversity of knowledge and experience accumulated at the sub-national level for protecting and enhancing biodiversity, from which other cities and regions can learn. In particular, the paper identified many new programmes and initiatives led by the signatories of the Edinburgh Declaration on post-2020 Global Biodiversity Framework, which verifies the momentum created by the Declaration. It is important to take advantage of this momentum to advance sub-national biodiversity action and eventually to advance national and international commitments. National governments as well as the international communities can further support and facilitate the process.

In order to further support sub-national biodiversity policies, the following areas of work could be considered:

- Knowledge sharing and dissemination of sub-national biodiversity action. Much more effort can be made to share and learn from existing practices of sub-national governments. As discussed in the paper, national governments can play a role (e.g. collecting and sharing biodiversity duty reports). At the international level, the CBD has developed a website on SBSAPs (CBD, n.d.[6]), which could serve as a useful platform to communicate up-to-date SBSAPs (e.g. by collecting more SBSAPs across the globe, including SBSAP focal point contact details).
- Further in-depth analysis of sub-national biodiversity policy, with a focus on (1) examining a greater number of features in SBSAPs; (2) assessing the extent to which existing SBSAPs align with CBD guidance documents on how to develop these; (3) understanding the variation of challenges faced by different sub-national governments and how they are addressed. These analyses can benefit from a refined methodology such as more detailed questionnaires, with a broader sample of countries, or through specific case studies at the sub-national level.
- Country specific policy reviews. In the longer term, once Parties to the CBD have established their post-2020 NBSAPs, it would be informative to undertake a review to determine to what extent SBSAPs are guided by NBSAPs, and the extent to which the post-2020 SBSAPs include SMART targets, with associated indicators.

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