World Health Organization

European Region

Nature-based solutions and health

University of Exeter

European Centre for Environment & Human Health

WHO Collaborating Centre
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Abstract

This report highlights the potential of nature-based solutions (NbS) to simultaneously address human health and environmental sustainability. NbS involve ecosystem conservation and restoration actions that provide co-benefits to both nature and human well-being. These solutions range from local interventions like green spaces for better urban conditions to large-scale interventions tackling issues such as flooding, pollution, ecosystem degradation and biodiversity loss. Diverse health benefits can be generated by NbS, including improved air, soil and water quality; prevention of disease risks; mental well-being; physical activity; and social cohesion. NbS can also be utilized by the health sector to embed nature impacts in medical treatment and to support transition into sustainable health systems. However, well-planned design and management are essential to avoid unintended health risks.

This report explores NbS impacts, challenges and practical applications, focusing on their relevance in the WHO European Region.

Keywords

NATURE, ENVIRONMENTAL HEALTH, ONE HEALTH, PUBLIC HEALTH, CITY PLANNING

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Contents

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This report was prepared by Benedict W. Wheeler, Rebecca Lovell, Cornelia Guell, Emma Bland, Lora E. Fleming and Gesche Huebner (WHO Collaborating Centre on Natural Environments and Health, European Centre for Environment and Human Health, University of Exeter, Penryn, United Kingdom).

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Abbreviations

EU	European Union
NbS	nature-based solutions
NO_2	nitrogen dioxide
PM	particulate matter

Executive summary

There is a growing recognition of the potential of holistic approaches which jointly address both human health and a healthy natural environment. This report summarizes the importance and relevance of such an approach known as nature-based solutions (NbS). NbS are actions for the conservation and protection of ecosystems and often have co-benefits wider than environmental objectives. When designed and targeted properly, they can also include significant human health and well-being benefits.

NbS are a diverse range of actions that can be implemented across various scales, from local interventions to large-scale land use and land management strategies that address challenges such as flooding or extreme heat. NbS are increasingly being grounded in national policies that support their implementation, including through the provision of funding, and are gaining traction, support and awareness through social programmes connecting people with nature.

NbS contribute to health across a range of domains. Freshwater system NbS (e.g. re-naturalization of rivers and restoration of flood plains) deliver a range of health and well-being benefits, from improved water quality to the regulation of water flows and provision of recreational spaces. NbS that address air pollution through urban forests and street trees or green transport routes can provide health benefits both directly from the reduction of exposure to pollution and/or heat, and from the wider benefits to mental health and well-being associated with physical activity and access to nature. NbS for coasts and oceans not only address potential health risks by attenuating water pollution or mitigating and adapting to climate change but can provide blue space recreation and restore fish stocks for healthy local diets, in turn supporting livelihoods and local economy. Similarly, agroecological NbS can promote biodiversity in agricultural landscapes, including urban farming, and increase the long-term sustainability of food production systems.

Regardless of the type of NbS, these actions often have implications for the health and well-being of human populations, whether or not this was a primary goal. Therefore, the delivery of benefits for human health and well-being need intentional and well-planned design and management from the NbS conception, implementation and maintenance. During this process, it is necessary to be aware of and work to minimize potential trade-offs which could arise from the NbS to avoid potential undesired health risks. For example, health risks could result from the creation of natural environments conducive to the propagation of disease vectors such as standing water in wetlands.

This report provides an overview of how NbS can impact human health and well-being in the context of the WHO European Region. It has relevance for those working both within and beyond the health and environment sectors. The report considers the opportunities for health co-benefits of natural environment-focused interventions for society in general as well as for the health sector, but also acknowledges the need to prevent and manage unintended risks to human health or increased social inequality. To illustrate the practical application examples of NbS, this report also presents brief local, national and international case studies across different environment and health domains. The report concludes by summarizing the importance of NbS for human health in the context of the triple crises of climate change, environmental pollution and biodiversity loss.

1. Rationale

1.1 Why consider the health impacts of nature-based solutions?

> "Acknowledging that human health and a healthy environment are interconnected and interdependent, the concept of Nature-based Solutions (NbS) can act as a way to bridge the gaps between conservation and public health for holistic approaches." (World Health Organization & International Union for Conservation of Nature, 2023)

Human health and well-being and the natural environment are intrinsically linked through a wide range of physical, biological, social and psychological pathways (WHO Regional Office for Europe, 2021). The concept of nature-based solutions (NbS) comprises an array of interventions and approaches designed to deliver benefits to natural ecosystems that also present multiple benefits tackling social, economic and environmental challenges, including providing benefits for human health and well-being. Chapter 2 provides a more detailed definition and explanation of NbS and their connections with health.

The 2023 Budapest Declaration of the Seventh Ministerial Conference on Environment and Health emphasizes the interlinked "triple crisis" of climate change, environmental pollution and land degradation, and biodiversity loss that "...is causing unprecedented and rapidly unfolding impacts on our lives, threatening eco-systems, human and animal health and well-being across generations..." (WHO Regional Office for Europe, 2023a). NbS provide opportunities to tackle the triple crisis at multiple scales, from the local urban pocket-park to large-scale interventions underpinned by national and international biodiversity-related strategies and policy actions (see chapter 3).

In 2022, the United Nations General Assembly passed a resolution declaring access to a clean, healthy and sustainable environment to be a universal human right (United Nations, 2022); NbS can help to deliver that environment for the health of both humans and the planet. Through the Budapest Declaration, Ministries of Health and Environment across the 53 Member States of the WHO European Region have committed to implementing NbS (WHO Regional Office for Europe, 2023a).

1.2 Why should health and environment ministries and professionals be interested in NbS?

While understandings of health have evolved over time and are debated, the definition originally adopted by WHO still has merit: "health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (International Health Conference, 1946). NbS can deliver benefits for health across this definition; not only in terms of the prevention of communicable and noncommunicable diseases and mortality, but in terms of promotion of good physical and mental health and well-being. This report highlights that an integrated approach and the engagement of health and environment ministries and professionals, along with those from other sectors, is needed to capitalize on the opportunities presented by NbS, and to guard against unintended consequences.

Relationships between human health and nature have been considered throughout history and across the world (Boyd et al., 2024). In recent decades, evidence has accumulated that human physical and mental health and well-being can benefit from diverse interactions with healthy natural environments, and these beneficial interactions can be facilitated through NbS (Boyd et al., 2024; WHO Regional Office for Europe, 2021). NbS often deliver direct human health and well-being effects and can support community resilience and disaster risk management (Babí Almenar et al., 2021; Liu, Jay & Chen, 2021; White et al., 2023). However, NbS can, in some cases, also have negative implications for human health and well-being, potentially introducing or increasing health risks or increasing health inequalities (Anguelovski et al., 2022; Sowińska-Świerkosz & García, 2021).

The human health benefits of NbS depend upon many factors, including the ways in which the NbS are designed and delivered; how and how much people are able to access benefits or are exposed to risks; the biodiversity, ecological state and other qualities of the environment; and the socio-cultural-economic characteristics of the populations involved (Palomo et al., 2021).

Natural environments are increasingly incorporated into health-care strategies, from the prevention of disease in public health, to direct use as a setting or tool in clinical care. Examples include population-level actions such as enhancing green infrastructure in urban areas to deal with excess heat (Gunawardena et al., 2017), through to more direct therapeutic uses such as nature-based "social prescribing" which prescribes contact with nature for people with complex health needs including mental health prevention and treatment (Garside et al., 2023).

It has become clear that the delivery of long-term benefits for both natural environments and the health and well-being of human populations through NbS is complex, and sometimes subject to trade-offs between various beneficial and adverse impacts (Liu, Jay & Chen, 2021; Seddon et al., 2020). To realize opportunities for health as well as wider environmental, social and economic outcomes, NbS planning and implementation therefore require the expertise of a range of different sectors including sustainable environmental management and the public health and medical communities, as well as affected communities themselves.

1.3 Target audience and methods for the report

The primary audience for this report is the ministries, national and regional agencies, local authorities and all policy- and decision-makers dealing with environment, health, public health and spatial planning. We note that most ministries and national committees for the environment currently recognize the benefits of NbS; however, in order to derive the full range of potential human health and well-being co-benefits of NbS, implementation must involve the collaborative engagement of all key stakeholders, communities and sectors, particularly the health sector. Other target audiences include potential investors in NbS, using both public and private funds (Biasin et al., 2024; European Commission, 2022; European Investment Bank et al., 2023; MacKinnon, Sobrevila & Hickey, 2008).

This report summarizes recent evidence and practical actions relating to the multiple health and well-being benefits of NbS, as well as international policy frameworks that support NbS implementation. It is written with a focus on the WHO European Region and the conditions in its 53 Member States but also uses data from, for example, the European Union (EU) or individual countries. The environment and nature themes

considered in this report build on those from a previous WHO report on nature, biodiversity and health (WHO Regional Office for Europe, 2021). Illustrative evidence and key policies were selected for inclusion based on rapid review and application of domain expertise by the authors and contributing topic experts, along with additional resources indicated through the peer-review process. The case studies in chapter 4 were selected to provide intervention examples across the WHO European Region at a range of spatial scales (transboundary, national, regional and local). These case studies were chosen pragmatically based on included literature and through NbS databases including Oppla, the EU repository of NbS (Oppla, 2023).

Flood retention areas on the Elbe River near Rosslau, Germany. © André Künzelmann/UFZ.

2. NbS definitions and scope

The concept of NbS was first mentioned by the World Bank in 2008 (MacKinnon et al., 2008). However, it is an umbrella concept for a set of strategies and actions that have been around for much longer. As the International Union for Conservation of Nature points out, there are many related concepts of utilizing nature to address different societal challenges that have a long history of application across different sectors. For example, strategies such as sustainable land management, integrated coastal zone management or ecosystem-based disaster risk reduction have been used to deliver environmental and societal outcomes simultaneously without necessarily meeting the Global Standard for Nature-based Solutions (International Union for Conservation of Nature, 2020a).

2.1 Defining NbS

There are many definitions of NbS, reflecting increasing interest in the approach and plurality of different uses and stakeholders. However, a universally accepted definition of NbS was agreed in 2022 at the fifth United Nations Environment Assembly:

> (...) nature-based solutions are actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits (...) (United Nations Environment Programme, 2022).

The United Nations Environment Assembly definition further recognizes "(...) the interdependencies between biodiversity loss, pollution, climate change, desertification and land degradation and their interlinkages with human well-being, including health, and the importance of ensuring the integrity of all ecosystems (...)" (United Nations Environment Programme, 2022).

The International Union for Conservation of Nature has introduced a Global Standard for Nature-based Solutions (International Union for Conservation of Nature, 2020a). The standard is widely adopted and applies a set of eight criteria that go beyond nature aspects and should be met by NbS (see also Fig. 1):

1. NbS effectively address societal challenges;
2. design of NbS is informed by scale;
3. NbS result in a net gain to biodiversity and ecosystem integrity;
4. NbS are economically viable;
5. NbS are based on inclusive, transparent and empowering governance processes;
6. NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits;
7. NbS are managed adaptively, based on evidence; and
8. NbS are sustainable and mainstreamed within an appropriate jurisdictional context.

Fig. 1. Graphic definition of NbS

Source: Reproduced with permission from the International Union for Conservation of Nature (2020a).

Other definitions have been developed in different contexts and by different actors. For example, the European Commission defines NbS more broadly:

> Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions (European Commission, 2024a).

The Commission further adds that: "Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services." Interlinkages between ecosystem services and health and well-being have been mapped by WHO for example (World Health Organization, 2021).

NbS can help to conserve, protect, restore and/or sustainably use and manage ecosystems by tackling environmental and ecological challenges that affect humans and nature alike. The types of challenges NbS are used to address include adapting to, mitigating and responding to the impacts of, for example:

- climate change
- biodiversity loss
- ecosystem degradation
- food insecurity
- rapid land use change
- water insecurity
- environmental pollution.

NbS are typically used to provide green infrastructural components replacing aspects of or enhancing more traditional "grey infrastructure" options, by adding capacity to, reducing load on, increasing resilience of, or extending the life of existing infrastructure. For example, NbS such as constructed wetlands can be used to manage water quality, where a grey infrastructure alternative might apply technological approaches such as a water processing units. Complementary NbS examples might include the integration of green roofs or facades to built infrastructure.

The interdependency of the global and local environmental and societal issues we face further strengthens the argument for approaches that are multi-functional. This multi-functionality is, as noted earlier, core to what is considered a NbS. For example, addressing climate change through NbS will, depending on the action taken, also have impacts on other challenges such as the biodiversity crisis, the water security of local populations or threats to agricultural systems. In fact, enhancing and protecting biodiversity and enhancing ecosystem integrity is central to what is considered an NbS.

As Griscom et al. (2017) argue, where implemented effectively, some NbS – such as natural climate solutions – can simultaneously offer water filtration, flood buffering, improvements to soil health and biodiversity habitat, and enhanced climate resilience. As to how effective they are, the authors demonstrated that, in relation to climate change, "natural climate solutions can provide 37% of cost-effective CO_2 mitigation needed through 2030 for a > 66% chance of holding warming to below 2 °C".

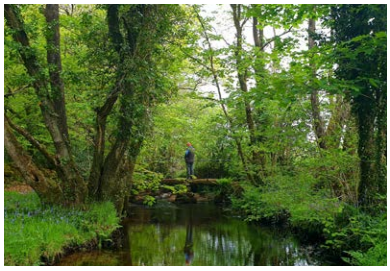
This core multi-functionality offered by NbS goes beyond the physical environment aspects of the action. It is also dependent on cross-sectoral governance and leadership as well as active engagement across sectors that will be directly and indirectly affected, including environment, planning, infrastructure and health. It is also important that NbS action can require transboundary cooperation depending on the geographical scale between cities and regions within countries and across countries. In addition, it is argued that NbS should be "people-centered, led by communities and draw from traditional and local knowledge. Nature-based solutions must be inclusive, transparent, developed with respect to land rights and respect to local people's views and the benefits should be equally distributed" (World Wide Fund For Nature, 2024). The success of NbS will, in most cases, be dependent on the ways in which affected communities are involved in and take ownership of decision-making and implementation, recognizing, for example, preferences regarding the distribution of the costs and benefits of different options (Anderson et al., 2022).

2.2 NbS and health

A healthy functioning natural environment is an essential resource for human health, whether physical or mental, well-being, quality of life, or water and food security. NbS tend to generate multiple benefits, often including human health and well-being, and have relevance to multiple levels of prevention. We identify four different levels of health promotion and prevention strategies (Kisling & Das, 2023) relevant to NbS: Primordial Prevention (protecting the fundamentals of health and well-being for entire populations); Primary Prevention (prevention of disease amongst healthy communities and individuals); Secondary Prevention (for those individuals/ communities with existing risk factors or exposures); and Tertiary Prevention (treatment of existing health conditions and prevention of exacerbation) (Fig. 2).

NbS can either indirectly or directly protect or promote human health and well-being. As noted above, many NbS focused on climate change mitigation or adaptation have a range of positive impacts on human health and well-being. Such NbS may include natural coastal defences reducing potential for life threatening extreme weather events in coastal areas, or urban greening and tree-planting programmes mitigating the urban heat island effect and reducing heat-related mortality. Other types of NbS can be used specifically and directly to support improved human health. Interventions such as conservation activities for people with complex conditions, delivered through nature-based social prescribing, offer more direct opportunities for physical activity, social contact and improvements to quality of life, alongside improving local habitats (European Commission, 2022).

Fig. 2. Examples of NbS supporting different levels of health prevention and promotion

	Prevention level	NbS example
	**Tertiary – treatment of health condition, prevention of exacerbation**	Nature-based therapeutic programmes: direct provision of care in natural setting for people with, for example, complex needs
	**Secondary – addressing issues for people exposed to or with specific risk factors**	Living coastal protection actions (e.g. oyster reefs): storm mitigation for coastal communities at risk
	**Primary – prevention of disease amongst healthy communities and individuals**	Sustainable agriculture: provision of sustainable food supply, biodiversity protection
	**Primordial – protecting the basic facets necessary for health and well-being for entire populations**	Wetland conservation, restoration or creation: carbon capture, fresh water provision, ecosystem enhancement

Photographs © Becca Lovell.

For NbS targeting health benefits, it is important to consider the health impacts during their planning and implementation and to systematically evaluate health outcomes through monitoring. This will enable the assessment of the realization of desired benefits to human health, determination of the value – including social and monetary – of realized benefits and prevention of potential emerging risks. In the planning stage, health and equity impact assessments should be used to consider who may be affected, how and to what degree, and what could be done to maximize the benefits across different population groups. Similarly, evaluation should integrate health and well-being and distributional effects alongside more traditional outcomes such as environmental and economic impacts, to fully understand the benefits to society (see section 5.4).

As mentioned above, it is important to acknowledge that the implementation of NbS can potentially result in unintended adverse health and well-being impacts for humans, and that actions to capitalize on the benefits of nature for human health could damage the environment. For example, improving natural areas and wildlife habitats in urban areas could potentially expose the local population to increased risk of vector-

borne diseases, such as Lyme disease via ticks, which may require mitigation (Köhler et al., 2023). Once implemented, how the spaces accessible to humans associated with the NbS are promoted and used can impact, and potentially undermine, biodiversity through, for example, disruption to species and habitats by human presence (Macpherson et al., 2020). Further, while NbS have the potential to tackle social inequalities in health and well-being, they also have the potential to exacerbate inequalities (Bremer et al., 2021), meaning careful planning and anticipation of unintended consequences is important.

2.3 The health sector and NbS

"Nature-based Solutions (NbS) can act as a way to bridge the gaps between conservation and public health for holistic approaches" (World Health Organization & International Union for Conservation of Nature, 2023).

The health sector itself stands to gain a wide range of benefits through NbS – be it through the protection of biodiversity to enable ongoing drug discovery; more resilient and sustainable environments that also promote and support health and well-being; or through the application of nature as a part of therapeutic approaches as shown in Fig. 2 above.

But beyond the NbS-benefits for health sector work, the health system per se (including the health insurance sector) is also an important institutional actor to support and implement NbS. In this role, the health sector can model positive change (Vora et al., 2024) by leading the way in encouraging diverse sectors, including the health-related supply chain, to place nature at the centre of all strategies. It can do this through:

- understanding, monitoring and decreasing the sector's own environmental footprint;
- supporting personnel and suppliers with resources and evidence;
- supporting nature recovery and promoting nature positivity and biodiversity on health service estates;
- re-examining equitable uses and connections to green and blue spaces; and
- ensuring that all initiatives meet the criteria of NbS and benefit biodiversity whilst also delivering social outcomes including promoting health and well-being.

These efforts will extend into many areas beyond direct health-care delivery and include considerations around energy, transport, supply chains, food and education (Leal Filho et al., 2024). The entire health sector is to be involved, including hospitals and health-care facilities, health-care systems, public health, biotechnology, pharmaceuticals, social care and indigenous health practices and communities.

Medical and public health professionals are trusted members of society who can be both experts in human health and well-being and advocates for protection and promotion of their patients and communities' well-being via appropriate NbS (Leal Filho et al., 2024). Indeed, the health sector itself has finally come to recognize that "the overall environmental crisis is now so severe as to be a global health emergency" (Abbasi et al., 2023). It is uniquely well positioned, therefore, to lead the way in advocating for NbS that benefit biodiversity and human health and to take an active part in the planning and assessment of NbS to maximize their health and well-being benefits.

3. International policy context

The conceptualization and development of NbS has been driven in part by international institutions including the World Bank, the United Nations Convention on Biological Diversity, the International Union for Conservation of Nature, the EU and the European Commission.

The European Commission has positioned itself as a leader in NbS research and innovation through, for example, funding of NbS-focused call topics within its research and innovation programmes and has supported the development of a global market for NbS and its financing (Davies et al., 2021; European Commission, 2024b). While the specific terminology of NbS is not yet common across EU policy (whether environment, planning and infrastructure or health sectors), related concepts and approaches which share its characteristics of multi-functionality and multiple benefits are commonly referenced and implemented. A recent policy screening review described a large number of EU and contextual global policies that explicitly or implicitly promote NbS, many of which have support for human health and well-being as stated goals (NetworkNature, 2023). There are numerous examples, such as the *EU Action Plan for nature, people and the economy* (European Commission: Directorate-General for Environment, 2017), providing guidance for European green infrastructure projects, and the *EU Action Plan on the Sendai Framework for Disaster Risk Reduction 2015–2030* (European Union, 2017). The EU Nature Restoration Law (2024) mandates large-scale nature restoration, including explicit support for NbS and aims to address human health and well-being challenges (European Union, 2024). A review of opportunities for health engagement in European climate policies highlights an array of actions where the interconnections between NbS, climate and health are apparent (Davies et al., 2022).

On the global stage, the focus on NbS has predominantly come from an environmental perspective. At the 2022 Fifth United Nations Environment Assembly, a now universally accepted definition was developed (see chapter 2), and the respective Resolution (UNEP/EA.5/Res.5) recognizes the interdependencies among biodiversity loss, pollution, climate change, desertification and land degradation; human health and well-being; and the integrity of ecosystems (United Nations, 2022). The Resolution names specific policies for which it is of critical importance to strengthen actions in support of nature, and highlights the linkages between NbS and other strategies to deal with environmental and societal challenges, in particularly the United Nations Sustainable Development Goals, but also the Kunming-Montreal Global Biodiversity Framework (including targets 8, 11 and 12) (Convention on Biological Diversity, 2022) and the Paris Climate Agreement (United Nations Framework Convention on Climate Change, 2025). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and the Intergovernmental Panel on Climate Change have also promoted NbS to address climate and biodiversity crises (Pörtner et al., 2021). In 2022, at the United Nations Climate Change Conference of the Parties 27 in Sharm el-Sheikh, Egypt, the Enhancing Nature-based Solutions for an Accelerated Climate Transformation initiative was agreed. This aims to coordinate international efforts to use NbS to tackle climate change, biodiversity loss and ecosystem degradation. Emphasizing collaborative approaches, it aims to “bring coherence to and strengthen collaboration between existing NbS efforts and partnerships” (International Union for Conservation of Nature, 2022).

At the 71st World Health Assembly in 2018, WHO presented a short report on biodiversity and health and stated that there is sufficient evidence to support "no regrets" measures linking nature, biodiversity and health. The report specifically referred to:

> (...) investing in nature-based solutions, such as the integration of biodiverse green spaces in urban development; improving availability of and accessibility to diverse diets; tightening control and rationalizing use of antimicrobial agents, pesticides and other biocides; maximizing the health benefits of exposure to biodiverse environments; and better monitoring of environmental change in line with the "One Health" approach (World Health Assembly 71, 2018).

Within the WHO European Region, the Budapest Declaration on Environment and Health – adopted by Member States in July 2023 – calls for urgent, wide-ranging action on health challenges related to the triple crisis: climate change, environmental pollution and biodiversity loss and land degradation. To strengthen country capacities to fulfil commitments made under the Declaration, a roadmap defines the commitment of Member States to work against biodiversity loss and land degradation, making nature and health a part of the public health agenda (WHO Regional Office for Europe, 2023a).

While the majority of the international policy instruments and action on NbS has come from an environmental or infrastructural perspective, the human health implications, whether direct or indirect, have been recognized in the majority of commitments. For instance, the Enhancing Nature-based Solutions for an Accelerated Climate Transformation initiative includes health as a cross-cutting concern, with a commitment to clarify "how NbS can prevent and address health risks (both communicable and non-communicable)" (International Union for Conservation of Nature, 2022).

4. Evidence and case study examples

In this section, we explore NbS designed for a range of primary purposes that have implications for health and well-being across a range of nature-health domains. The selected topics build upon those considered in the WHO report *Nature, biodiversity and health: an overview of interconnections* (WHO Regional Office for Europe, 2021) and are shown in Fig. 3. The inherent multi-functionality of NbS is clear here, with interactions between domains and most examples indicating the delivery of multiple beneficial health, social and environmental impacts.

Each subsection includes a case study example to illustrate how NbS and related approaches can look like in different settings, for different purposes and at different scales.

Fig. 3. Nature, environment and health domains

Source: Based on WHO Regional Office for Europe (2021).

4.1 Freshwater systems

Topic introduction

Freshwater systems play numerous fundamental roles in supporting good human health and well-being. These include direct use of water for drinking, sanitation and hygiene, and indirect use such as through secure food production through agriculture and horticulture (World Health Organization, 2021).

While it is estimated that 92% of the population of the WHO European Region have access to safely managed drinking water, around 16 million people do not, and communities in the Region can experience outbreaks of water-borne diseases, including dysentery and hepatitis A (WHO Regional Office for Europe, 2024). Good-quality freshwater resources in urban areas can also provide opportunities for recreation, excess heat mitigation and psychological well-being.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

A recent review argues that "people need freshwater biodiversity", with biodiversity underpinning a range of ecosystem services, many of which have impacts on human health and well-being (Lynch et al., 2023). For example, the ready availability of safe drinking water in adequate amounts is fundamental to human health, and well-functioning freshwater (and terrestrial) ecosystems can support its supply and security. NbS that aim to support and improve freshwater biodiversity are likely to directly or indirectly promote human health and well-being through delivery of these ecosystem services. NbS can also protect public health from water-related hazards, for example, ecosystem-based flood management schemes can protect people from the immediate and longer-term health impacts of flooding, while delivering multiple co-benefits that may not be gained through traditional "grey" flood protection infrastructure (European Commission, 2020; Hajat et al., 2005).

As with all environmental interventions, there is a risk that poorly-planned freshwater NbS could serve to exacerbate health inequalities, for example, by disproportionately benefiting more advantaged segments of society (Kaufmann et al., 2021). Further, health risks may be an unintended consequence of freshwater NbS interventions, for example by increasing the suitability or extent of habitat for disease vectors, especially mosquitoes (Medlock & Vaux, 2015). Careful planning, management and risk mitigation of these interventions with both environmental and human health experts is therefore required.

Examples of NbS and delivery of co-benefits

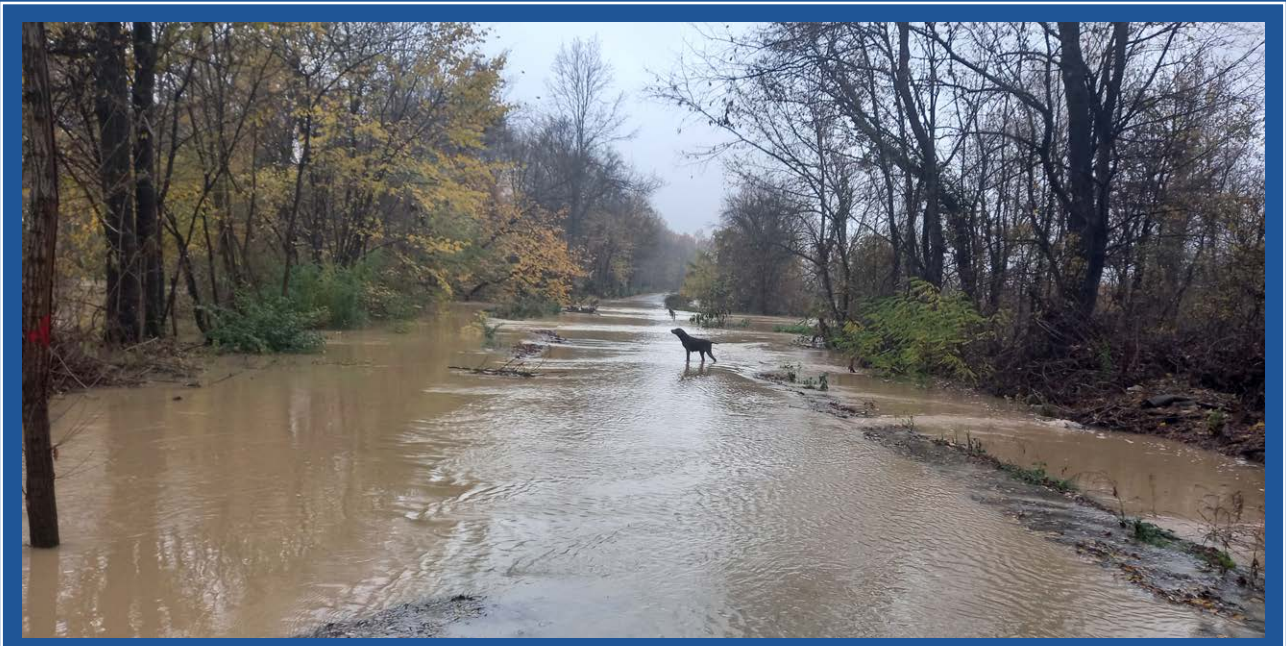
A wide range of NbS have been developed and delivered within freshwater systems (see Box 1). Some may involve landscape-scale interventions such as the re-naturalization of river channels and restoration of flood plains (Mubeen et al., 2021). Others are micro-scale, such as development or improvement of ponds. One recent global study of pond-focused NbS highlighted that, while habitat creation for biodiversity was usually the priority goal, many aimed to deliver multiple benefits including opportunities for human physical and psychological health benefits (Bartrons et al., 2024).

NbS such as wetland conservation or restoration can serve to improve freshwater ecosystem functioning and consequently also improve and protect freshwater quality, helping to secure potable water supplies for drinking, sanitation and hygiene. Additionally, these interventions can deliver climate mitigation benefits by reducing the intensity of water purification required within the water supply system, with associated reduction in energy and resource use.

Box 1. Case study 1

A range of NbS have been implemented within the Tamnava river basin in Serbia, with the primary goal of addressing flood risks. Interventions have included afforestation and reforestation, developing retention ponds and floodplain restoration. Economic analyses have been undertaken to evaluate the total benefit of these NbS, such as mitigation of flood risk. In this case, beyond the clear public health benefits of reducing flood risk, the health benefits associated with air pollution mitigation through increased forest coverage were also assessed as a key co-benefit. Additional outcomes considered included protection and support for wildlife and biodiversity, which also has the potential to deliver improved freshwater quality for human use.

These analyses indicate that considering flood risk damage alone results in costs that are greater than the value of benefits. However, once the multiple benefits, including benefits to human health, are considered, the benefits can outweigh the costs by around three to six times (Ruangpan et al., 2024).



Flood retention areas at the Tamnava riverbanks, Serbia. © Nikola Rosić

4.2 Air quality

Topic introduction

Air pollutants, including particulate matter (PM) (both fine particles $PM_{2.5}$ and coarse particles PM_{10}) and gaseous pollutants, e.g. nitrogen dioxide (NO_2), sulphur dioxide and ozone, pose significant challenges for human health. Currently, 97% of the population in the WHO European Region are exposed to air pollution levels exceeding the WHO air quality guideline values, leading to over 500 000 premature deaths annually attributed to ambient air pollution, and significant morbidity associated with chronic conditions such as chronic obstructive pulmonary disease, lung cancer, cardiovascular disease and asthma (WHO Regional Office for Europe, 2023b). Cleaner air can provide short-term and long-term health benefits across the life course, as well as supporting subjective well-being.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

Vegetation can reduce air pollution exposure through various mechanisms, such as deposition onto leaf surfaces, and aiding dispersion. On the macro level, a scenario simulation study in the city of Eindhoven, Netherlands (Kingdom of the), estimated that implementing NbS (e.g. green park, green roofs) can lead to a 12% reduction in NO_2 concentration in the city area (Ascenso et al., 2021). On the micro-level, vegetation planting in street canyons can potentially reduce street-level PM_{10} by 60% and NO_2 by 40% (Pugh et al., 2012). Urban greening can therefore contribute to urban air quality management.

However, not all studies report positive effects. Green roofs may lead to a small overall increase of PM_{10} (0.6–1.5%) and NO_2 (0.8–3.5%), due to a decrease of vertical mixing of the air near the earth's surface (Rafael et al., 2020). Trees and other plants may be natural sources of chemicals such as volatile organic compounds and pollen, which can be harmful to human health (Salmond et al., 2016). Tree canopies in street canyons can also trap air pollutants, potentially leading to higher concentrations (Grylls & Van Reeuwijk, 2022). As a result, when implementing plant-based NbS to improve air quality and health, consideration needs to be given to the balance of beneficial and adverse impacts on air pollution, and preference may be given to plants with specific traits, such as lower production of volatile organic compounds and pollen. Further, it is important to understand the extent to which different types of NbS can improve air quality, so as not to lose sight of the importance of other interventions, such as emissions controls, for air quality improvement (O'Sullivan et al., 2020).

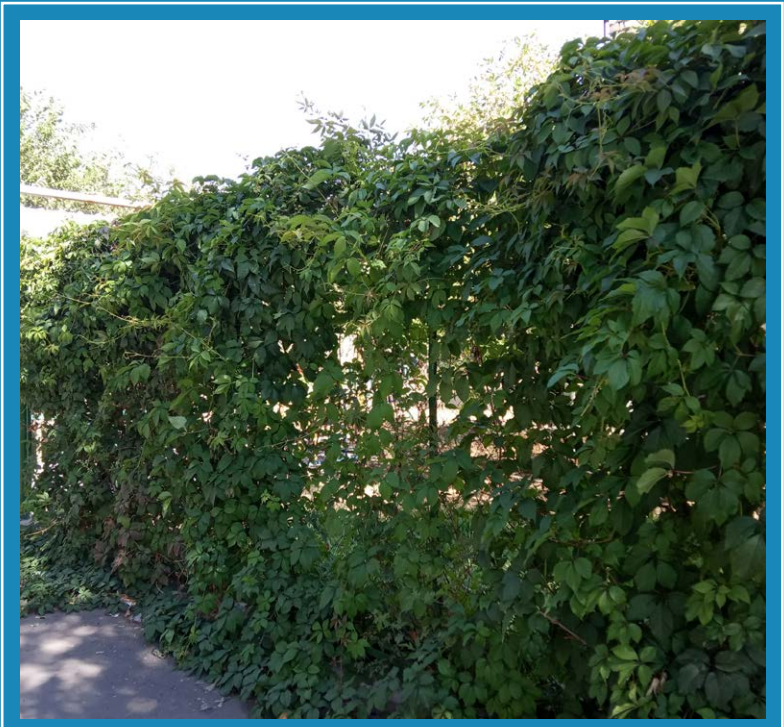
Examples of NbS and delivery of co-benefits

NbS that have an impact on air quality and associated health impacts have been exercised in city planning, increasingly at community scale. Common practices include natural green and blue landscapes/spaces such as urban trees, forests, parks and other vegetation. They also include specifically designed built environment interventions like green walls and green roofs (see Box 2). Daylighting of buried waterways may also mitigate air pollution through increasing surface water (Zhu & Zhou, 2019).

If exercised with care, for example regarding plant/tree choice, growing medium, structural support, maintenance irrigation and water management, NbS that tackle urban air quality may offer multiple benefits such as the creation of new green jobs, improved acoustic comfort, opportunities for community-based urban agriculture, improved hydrologic connectivity in urban areas, increased biodiversity, carbon sequestration and storage in biomass, reduced energy consumption for heating and cooling of buildings, mitigation of urban heat island effects, increased social cohesion and sense of place (Xing, Jones & Donnison, 2017).

Box 2. Case study 2

Yerevan, the capital city of Armenia, typically experiences high levels of air pollution. In association with the Horizon 2020 Connecting Nature Project (Connecting Nature, 2025), and aligned with the Yerevan Green City Action Plan, the Municipality implemented a “green wall for kindergartens” NbS , funded by the Eurasia Charity Public Organization. This involved planting and maintenance of plant species such as Virginia creeper, Amur grape and monkshood vine along the boundary fence surrounding the kindergarten. The project was situated within a wider 10-year programme of tree planting in the city, with a key aim to mitigate and prevent air pollution. A primary aim of the green wall was to address traffic-related air pollution at micro-scale for a kindergarten affected by air pollution from the neighbouring streets, with additional co-benefits relating to education and wider well-being. Geochemical studies indicated that the green wall was successful in reducing risks to children attending the kindergarten associated with exposure to potentially toxic metallic particulates, which are associated with an array of health outcomes including adverse neurological impacts and cardiovascular disease (Tepanosyan et al., 2023).



Air pollution protection through a green wall at a kindergarten in Yerevan, Armenia. © Center for Ecological-Noosphere Studies NAS RA.

4.3 Coasts, seas and oceans

Topic introduction

Coastal regions are home to 40% of the global population, and oceans cover approximately 71% of the surface of the earth and contain 97% of global water resources (Sunagawa et al., 2020). These environments are integral to human health and well-being and provide a wide variety of ecosystem services. Marine environments provide climate regulation, carbon sequestration, food and fibre resources, and support recreational opportunities and traditional harvesting/cultivation practices, all of which can contribute directly and indirectly to public health (Fleming et al., 2019).

Despite these benefits, marine environments face a series of threats due to overfishing, pollution and climate change. For example, numerous communities within the WHO European Region are threatened by extreme coastal flooding (Vousdoukas et al., 2017), while others experience issues related to depleted fish stocks and declining marine biodiversity.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

NbS have the potential to deliver significant health protection and promotion in marine environments by enhancing ecosystem resilience and mitigating environmental hazards. For example, restoring coastal wetlands, estuaries and coral reefs can protect coastal communities from storm surges and erosion, reducing the impacts of extreme weather events (Asari et al., 2021) such as flooding and corresponding infrastructure damage. Importantly, terrestrial NbS can substantively impact marine systems, such as those that improve and protect freshwater quality (see section 4.1) and consequently reduce downstream pollution of coastal and marine ecosystems. More broadly, NbS and associated/enabling activities can serve to support the resilience of marine ecosystems, promoting natural "robustness" to human interference. For example, the implementation of marine protected areas and marine spatial planning can provide a context for coastal ecosystem restoration, in turn producing resilience to damage from more common extreme weather events associated with climate change (O'Leary et al., 2023).

Designation of Marine Protected Areas is a conservation and protection action that can safeguard marine biodiversity, providing benefit to local economies and increasing food security. Furthermore, nature-based interventions to restore and protect coastal areas and to improve marine water quality can promote a variety of water-based recreational activities (Börger et al., 2021), which have been shown to benefit physical and mental health.

However, implementing NbS in coastal and marine environments must be carefully managed to avoid risks. For example, water-based recreation may be more accessible for communities with higher swimming abilities or access to transport or appropriate equipment. Governance initiatives and social interventions may be needed alongside coastal restoration/protection actions to support equitable coastal access, and to mitigate any increased risks such as from drowning (Gray et al., 2023). Increasing coastal wetlands could also potentially present greater risk of some vector-borne diseases, such as through increasing breeding habitat for salinity-tolerant mosquitoes, but this can potentially be mitigated, for example through management of flooding regimes (Medlock & Vaux, 2015).

Examples of NbS and delivery of co-benefits

A variety of NbS have been successfully implemented in coastal and marine environments, delivering multiple co-benefits (see Box 3). For instance, the restoration of oyster reefs not only enhances biodiversity but also may reduce wave intensity during extreme events and improve water quality by filtering pollutants and providing habitat for fish and other marine life, supporting good nutrition and livelihoods for local populations (Richardson et al., 2022). Similarly, the replanting of seagrass meadows contributes to carbon sequestration, supports fisheries and offers recreational opportunities that promote physical and psychological health (Macreadie et al., 2021).

These examples illustrate how NbS can simultaneously address environmental challenges and enhance human well-being, contributing to both biodiversity conservation and public health.

Box 3. Case study 3

The Baltic Sea Action Plan is a multinational initiative with local community engagement designed to restore and protect the ecological health of the Baltic Sea (HELCOM, 2023). It proposes several NbS, including the restoration of coastal wetlands and the protection of marine habitats.

Taking a specific example that will support delivery of the Baltic Sea Action Plan, the Interreg project Supported by Nature (Interreg Baltic Sea Region, 2025) includes river and wetland restoration efforts, along with learning sites, that aim to deliver multiple benefits, including reduced nutrient flow into the sea. The consequent reduction in eutrophication (excessive nutrient enrichment) of the Baltic waters will benefit the sensitive, complex marine food web, with knock-on potential for human health gain through nutritional and socioeconomic benefits associated with improvement of wild fish stocks and protection of aquaculture.

A drained wetland in the Słowiński Biosphere Reserve, Poland, set to be restored into a multifunctional wetland. © Leszek Schiefelbein

4.4 Soil, agriculture, nutrition and food security

Topic introduction

Global food systems play a crucial role in human and environmental health. Agriculture is a leading contributor to climate change, contributing more than a third of greenhouse gas emissions. Agriculture also accounts for approximately 70% of global freshwater use, whilst climate change increases risk of drought and water scarcity. Intensive farming practices in particular contribute to biodiversity loss, water pollution and soil degradation, and reduced resilience to climate-related natural disasters (Crippa et al., 2021). Furthermore, unsustainable food production practices are associated with reduced access to, and availability of, nutrient-dense foods, exacerbating diet-related health inequalities. More frequent and severe droughts, flooding and other weather events associated with climate change are impacting upon food security. As a core aspect of sustainable food systems, healthy soils deliver multiple benefits, for example through regulation of water flows (mitigating flooding), carbon storage and provision of nutrients for crop growth. Soils therefore need to be protected from sealing by impermeable surfaces, contamination and degradation, and soil health considered as an essential component of healthy food systems.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

A substantial transformation of current food production is urgently required to protect ecosystems, reduce greenhouse gas emissions and reduce diet-related ill health (International Panel of Experts on Sustainable Food Systems, 2023). This requires sustainability-driven changes throughout the system from food production to consumption. These changes are essential in order to reduce environmental burdens related to food, and to meet the United Nations's Sustainable Development Goal 2 (to end hunger and all forms of malnutrition by 2030) and climate mitigation targets (Willett et al., 2019).

Agroecology is an approach to agricultural production that simultaneously applies social and ecological best practices and concepts to the development and management of sustainable systems of agricultural production. Alongside improving food system sustainability, it also supports the multiple ecosystem services delivered by healthy soil. It is considered a science, a practice and social movement, encompassing a transdisciplinary approach which applies ecological principles to food production, based on practices of conservation of natural resources and biodiversity and operationalized through elements of resource efficiency, resilience and social equity (Wezel et al., 2020). Agroecological practices such as crop diversification, intercropping and soil management have been shown to positively impact food security and nutrition, including dietary diversity and nutritional status, in low- and middle-income countries (Bezner Kerr et al., 2021).

Examples of NbS and delivery of co-benefits

The implementation of agroecology can be considered a system-level NbS, providing multiple ecosystem services that benefit human health (see Box 4). Minimizing soil disturbance can promote good soil health, reducing soil loss through erosion and improving the water-holding capacity, soil organic carbon content and nutrient density of the soil (Thorn et al., 2016). Action to promote biodiversity – for example implementing

hedgerows and riparian zones, and supporting crop diversity – provides underpinnings for well-functioning, resilient agricultural ecosystems. These ecosystems are then in a fit state to sustainably deliver multiple services, including the sustainable delivery of food and fibre, in the face of a changing climate.

Another key aspect of the agroecology system is the promotion of social cohesion, for example via community-based agriculture. The approach promotes traditional, indigenous food systems by aiming to incorporate traditional knowledge and skills to empower local communities and support livelihoods (International Panel of Experts on Sustainable Food Systems, 2022). As a result, this holistic, participatory approach can provide health impacts including those associated with social contact and community cohesion. Associated interventions, such as social prescription of horticultural therapy (see section 4.8) may enhance social and health benefits (Hardman et al., 2024).

It is recognized that food production system NbS alone are unlikely to achieve policy targets and negate environmental pressures such as agricultural carbon emissions, so require implementation alongside other system changes, such as population scale dietary modification (Röös et al., 2022).

Box 4. Case study 4

An example of a nature-based approach to sustainable agriculture enabling food system NbS in Europe is the EU-funded Agroecology Partnership. This can be considered as an action that impacts the "upstream drivers" of public health, i.e. the development of higher-level and macro-scale policy and strategy that creates the conditions for population health protection and improvement (Amaro, 2014). Launched in 2024, this scheme connects 26 countries with the aim of accelerating farming system transitions through agroecology (Agroecology Partnership, 2025). It aims to address issues of climate change, biodiversity loss, food security and environmental degradation by redesigning agroecosystems and implementing living labs and research infrastructures to assess the impact of transitions to agroecology. The connection across European countries aims to accelerate transfer of locally adopted agroecological innovations and provide evidence for NbS focused on sustainable agriculture and wider food system transformation. This example illustrates how NbS can respond directly to higher-level policies, and in turn drive nature-positive interventions, which in turn have implications for human health.

Organic vineyard with interrow cover, Hungary. © Csaba Pelsöczy.

4.5 Infectious diseases

Topic introduction

Numerous infectious diseases arise through human exposure to micro-organisms in natural environments, especially zoonoses – diseases transmitted to humans from animals. Key transmission routes (WHO Regional Office for Europe, 2021) include:

- disease transmitted directly from animal hosts to humans, which may then be transmitted between humans, such as Ebola, H5N1 influenza and coronavirus disease;
- vector-borne diseases, where pathogens are transmitted to humans from animals via vectors such as ticks or mosquitoes (e.g. malaria and Lyme disease); and
- diseases caused by parasites (such as giardiasis and cryptosporidiosis) transmitted to humans directly from environmental sources.

An important framework relevant to infectious diseases and natural environments is One Health, which can be defined as:

> (...) an integrated, unifying approach that aims to sustainably balance and optimize the health of humans, animals, plants and ecosystems. It recognizes the health of humans, domestic and wild animals, plants and the wider environment (including ecosystems) are closely linked and interdependent (Food and Agriculture Organization et al., 2022).

One of the key actions promoted in the One Health Joint Plan of Action, 2022–2026 (Food and Agriculture Organization et al., 2022) is for "upstream interventions" including ecosystem management and biodiversity protection to prevent the emergence, spillover and spread of zoonotic pathogens.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

The importance of dynamic human-nature interactions, urbanization, pollution, biodiversity loss and climate change as critical aspects of infectious diseases have been brought to the fore by recent epidemics and pandemics, most notably by the coronavirus disease pandemic. There is a complex interplay of humans, animals and their environments in driving infectious disease transmission. It is argued that ecosystem degradation results in increased pathogen transmission and human disease risk, for example through the urbanization of natural habitats leading to increased interactions between humans and wildlife (Dubey et al., 2023). NbS that address this ecosystem degradation can therefore be an important approach to sustainable prevention and control of known pathogens and the emergence of novel diseases (Gibb et al., 2025).

Problematic human exposure to pathogens in nature can arise through a variety of mechanisms, but disruption to ecosystems and wildlife habitats, encroachment of human populations into new territories, and biodiversity loss all play a part. Similarly, habitat loss can lead to pathogens and vectors finding new niches to occupy in areas settled by humans. Damaged ecosystems might permit certain species to become dominant and if those species act as pathogen reservoirs, the risk of transmission to humans can increase (WHO Regional Office for Europe, 2021). Well-designed NbS that, for example, restore habitats and ecosystem functions therefore can help to reduce human exposure to pathogens.

However, NbS may have the potential to increase risks of infectious disease transmission. For example, urban greening

programmes that improve biodiversity could also unintentionally increase opportunities for transmission of tick-borne infections such as Lyme disease (Fournet, Simard & Fontenille, 2024). Interventions therefore need to consider the potential for increasing transmission, and mitigate risks, for example through species selection, design of public access routes, environmental management and surveillance of vector species. Research is ongoing into the management of infectious disease risks associated with NbS, particularly in the context of climate change (IDAlert Consortium, 2025).

Examples of NbS and delivery of co-benefits

A wide range of NbS have been considered as opportunities to prevent infectious diseases. Protection of wildlife habitats to reduce human contact with pathogen sources, restoration of ecosystem integrity (see Box 5) and protecting/increasing biodiversity, can reduce the likelihood of a single pathogenic species becoming dominant (United Nations Environmental Programme World Conservation Monitoring Centre, 2020). For example, restoration of predator species populations such as raptors can balance wildlife populations, including in urban environments, consequently reducing pathogen reservoirs and human exposure to those pathogens (Hopkins et al., 2022).

Agricultural NbS for sustainable food production (see section 4.4) could deliver prevention of infectious diseases as a co-benefit by reducing large-scale intensive animal production, and therefore the risk of pathogen transmission to humans (Frison & Clément, 2020). Another example is that urban ecosystem regeneration could serve to reduce vector-borne disease risk by increasing populations of predators and competitors for vector species (Fournet, Simard & Fontenille, 2024).

Box 5. Case study 5

The incidence of West Nile virus (transmitted by mosquitoes) has been increasing in the WHO European Region, and the virus has been shown to be in circulation in the wetlands of the Camargue region of southern France. NbS have been implemented in this region to restore ecosystems that have been significantly impacted by human activity, such as saltworks and rice cultivation. These NbS aim to restore natural water flows and levels, for example through interventions to restore waterways and reconnect water bodies (Segura et al., 2018). By reducing standing, stagnant water and restoring balanced food webs and natural predators of mosquitoes, these interventions have potential to reduce the risk of transmission of West Nile virus to humans (Pradier et al., 2014). However, thorough monitoring and evaluation is needed to prevent potential adverse impacts of the interventions.

Common Shelducks in restored salt meadows of the Camargue former-saltworks, France. © Marc Thibault.

4.6 Microbes in the environment and human body

Topic introduction

Microbes exist in all natural environments and play an important role in all natural processes, including nutrient and oxygen cycling. They are thus key players in a range of ecosystem services. Microbes also exist in the human body and, although often beneficial, they can also cause disease, as described in section 4.5.

Microbes causing problematic infection are treated with antimicrobials, and the mis- and overuse of these has led to an increase in antimicrobial resistance worldwide. The global burden of disease associated with bacterial antimicrobial resistance has been estimated globally at approximately 5 million deaths annually (Murray et al., 2022).

How NbS can deliver health protection and promotion – and how to avoid NbS risks

NbS can provider cleaner, healthier water systems by reducing the number and quantity of pollutants (including antibiotics and other antimicrobials) using natural processes such as filtration, microbial degradation and photodegradation. NbS offer a range of approaches to remove, treat and reduce the spread of harmful microbes through the treatment of wastewater including human sewage – a common source of microbes into the natural environment. NbS can augment or replace conventional wastewater treatment approaches, for example through "constructed wetlands" providing treatment through natural processes. As described in section 4.5, they can also help to manage pathogen reservoirs and constrain transmission of pathogenic microbes to humans in natural systems.

NbS can also play a crucial role in supporting healthier populations more generally, for example through nature-based social prescribing (see section 4.8), reducing the use of prescription medications (Turunen et al., 2023). Since non-antibiotic medications in the environment can still drive antimicrobial resistance through co-selection processes (Murray et al., 2024), NbS that reduce prescribing in general could contribute to the reduction of risks associated with antimicrobial resistant pathogens.

However, as described in section 4.5, NbS can potentially both increase and decrease the risks of vector-borne disease. NbS relating to wastewater treatment could present additional microbial risks, for example if natural wastewater treatment interventions are unable to sufficiently reduce problematic microbial contamination, or if they themselves become contaminated or degraded to the extent that they can no longer function properly (Mumtaj et al., 2024).

Examples of NbS and delivery of co-benefits

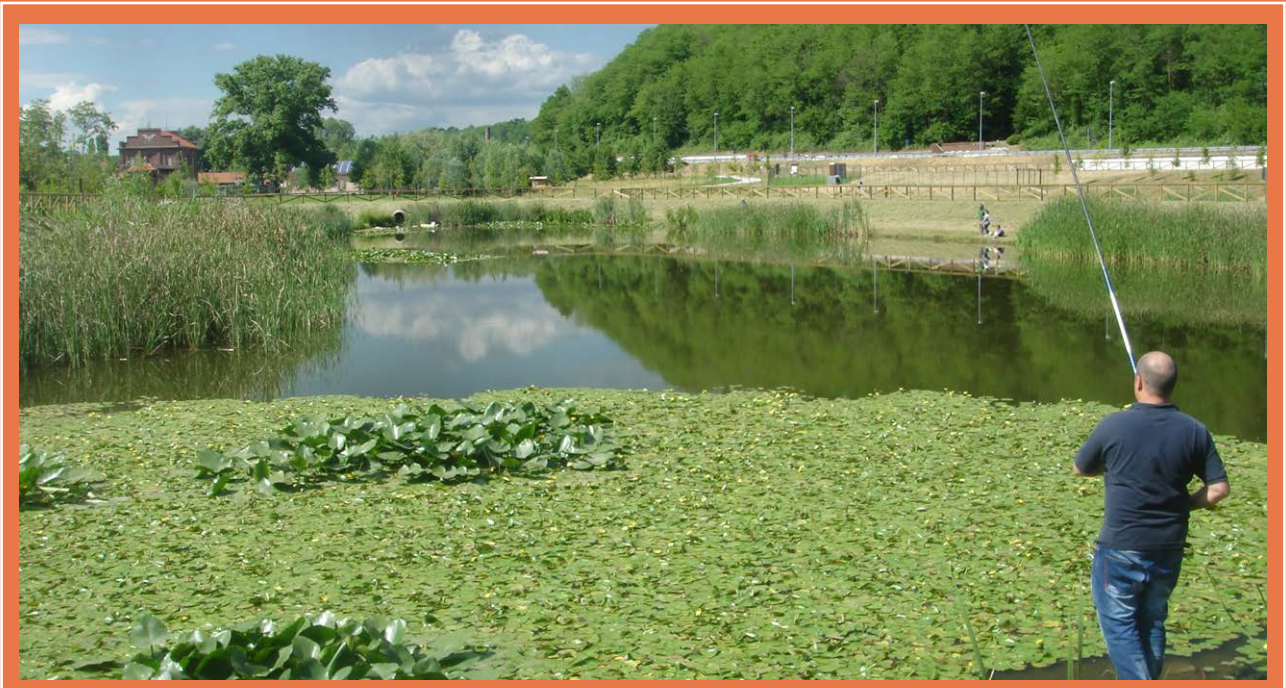
Constructed wetlands are artificial wetlands often implemented to treat sewage, stormwater or wastewater, and have been successfully used for many years (Vymazal, 2023) to both improve the quality of water (including the removal of bacterial contamination and other pollutants such as metals, nutrients and sediments) and manage water flow (see Box 6). Other forms of constructed wetland can be used as part of river restorations, for example creating uncultivated buffer strips along rivers to reduce agricultural runoff (including microbe-rich animal waste) reaching waterways. In addition to the immediate benefits to water quality and reduced microbial exposure

for users and consumers of this water, co-benefits include the slowed water flows reducing downstream flooding, reduced soil erosion and the creation of diverse habitats that support increased biodiversity and associated opportunities of engagement with nature. Harnessing NbS to combat the environmental challenges associated with microbial pollution in these ways can bring significant, multiple benefits.

Box 6. Case study 6

Gorla Maggiore, a small municipality in Northern Italy, utilized an NbS to treat a mix of sewage and rainwater being discharged into the Olana River through a combined sewer overflow. A treatment wetlands approach was used to create the Gorla Maggiore water park, which covers an area of nine hectares. It includes i) a pollutant removal area with a grid, a sedimentation tank and four vertical subsurface flow constructed wetlands; ii) a surface flow constructed wetland with multiple roles, such as pollution retention, buffer for flood events, maintenance of biodiversity and recreation; and iii) a recreational park with restored woodland, green open space, information panels, walking and cycling paths and other services.

A study comparing this approach to a standard solution involving storage tanks and a wastewater treatment plant, and the previous approach of individual septic tanks, found the NbS for wastewater treatment performed as well or better than a traditional construction alternative for water purification, while having additional flood protection, recreational and wildlife benefits that deliver health and well-being benefits to local residents (Liquete et al., 2016).



Natural water treatment at Gorla Maggiore water park, Italy. © Nicola Martinuzzi.

4.7 Access to nature

Topic introduction

"Access to nature" refers to the ease with which individuals can visit or otherwise engage with natural environments, which are known to have positive impacts on health and well-being. Access can refer to the distance to nature from a given location or the amount of such environments within an area (Ekkel & de Vries, 2017), and also to subjective qualities by which someone can use and benefit from nature, such as perceptions of its safety or inclusivity. NbS can serve to improve accessibility both in terms of quantity (availability) and qualities of natural spaces and infrastructure.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

It is widely recognized that improving access to nature can benefit physical and mental health and well-being through three broad mechanisms, which have been framed by Markevych et al. (2017) as:

1. "reducing harm" for example by reducing air pollution concentrations or heat island effects;
2. "building capacities" such as by promotion of physical activity or supporting social connection; and
3. "restoring capacities" such as promoting relief from stress or restoration of depleted capacity to focus attention.

Various characteristics of natural environments may enhance or broaden the health benefits of engagement with nature, including biodiversity (Sandifer et al., 2015). NbS can therefore deliver public health benefits through supporting and promoting availability and accessibility, and by changing the qualities of public green space and other natural infrastructure.

Despite these health benefits, improving access to nature must avoid exacerbating existing and future health inequalities. Access to nature is typically inequitably distributed in cities, with greater access typically in areas with more highly educated and wealthier populations (Wüstemann et al., 2017). Provision of good quality natural infrastructure also requires appropriate ongoing maintenance and attention to security, safety and other concerns (Alvarado et al., 2023). These relationships are complex; ensuring equitable distribution can reduce health inequality, yet improvements to the accessibility of nature may engender gentrification, thereby worsening future inequalities (Triguero-Mas et al., 2021). Inclusive and participatory design practices with local communities that clearly address their needs and ensure that all local stakeholders have meaningful autonomy in decision-making processes can help to mitigate these risks (Calderón-Argelich et al., 2023).

Examples of NbS and delivery of co-benefits

NbS that can deliver increasing access to nature may take the form of interconnecting green corridors (i.e. linking parks) which make it easier for people to engage with nature more regularly, alongside the ecological benefits of reducing fragmentation (Grădinaru & Hersperger, 2019). A health impact assessment for around 169 million residents of around 1000 European cities (Barboza et al., 2021) suggested that enabling all residents to access a greenspace of 0.5 hectare in size within 300 metres of their home would be associated with the potential prevention of approximately 32 000 to 64 000

deaths annually. This mortality prevention is proposed to occur through a variety of mechanisms such as physical activity promotion, temperature regulation and stress reduction as described above (Markevych et al., 2017). A useful empirical guide for municipalities with respect to the socially equitable and just re-naturing of urban spaces is the recently proposed "3-30-300" rule, which specifies that individuals should see three trees from their residence, have 30% tree canopy in their neighbourhoods, and live within 300 metres of a high-quality green space (Browning et al., 2024).

In studies on the greening of derelict/unused land parcels ("vacant lots"), 73% of intervention studies have demonstrated positive impacts on health outcomes (Sivak et al., 2021). A strategy which does not involve the creation of greenspace itself might involve increasing public transport accessibility to natural areas; such policies have also been associated with public health improvements (Khomenko et al., 2020).

NbS can also result in bringing more nature into everyday settings, where people may experience it incidentally (rather than intentionally), as a means to ensure equitable access to nature (see Box 7). These might include school greening programmes, urban tree planting or green walls. NbS may also help to deliver health care (see section 4.8), climate resilience and other environmental improvements by encouraging greater appreciation of nature, leading to more sustainable habits (DeVille et al., 2021).

Box 7. Case study 7

The Connswater Community Greenway in Belfast, Northern Ireland, United Kingdom is a £40 million project creating a 9 km linear park with 16 km of interconnected pathways. The greenway runs through several areas of high deprivation, with seven electoral wards among the 25% most deprived in Northern Ireland.

Physical activity at Connswater Community Greenway, United Kingdom. © Jacqueline O'Hagan.

Research has highlighted the importance of awareness campaigns in supporting people to make use of the renovated greenway (Wang et al., 2024). The greenway development was associated with improved mental well-being among users, and improvements were attributed to greater feelings of safety and social trust (Wang et al., 2023). Additionally, a 40-year projection estimated that every £1 invested in the greenway would generate between £1.34 and £1.59 in social value, including health and well-being gains and flood alleviation (Tate et al., 2023). Ongoing research is now exploring how the project might contribute to climate resilience and improved biodiversity.

4.8 Health care

Topic introduction

Biodiversity has been crucial in the development of modern medicines (Cordell, 2000). Plants are the source of more than 80% of products used to treat some of the most prevalent human diseases, such as cancer and cardiovascular disease, while many more treatments are inspired by nature (Fabricant & Farnsworth, 2001). Recent developments in health care have also explored how direct access to nature can support patient health through "nature-based social prescribing". More broadly, social prescribing refers patients to activities in the community beyond health services, and many of these activities are nature-based. The concept is gaining traction in a number of European countries, including Poland, Slovenia, Spain and the United Kingdom (Kurpas et al., 2023; Scarpetti et al., 2024), although models and the degree of embedding in mainstream health systems vary.

Nature-based activities (such as conservation activities, community gardening, nature walks or swimming in natural waters) can be delivered through social prescription, along with practical advice and support. As discussed in section 4.6, engagement with nature can lead to reduced consumption of pharmaceuticals, relieving pressure on natural systems and reducing pharmaceutical budgets for health service providers.

How NbS can deliver health protection and promotion – and how to avoid NbS risks

Nature-based social prescribing may be appropriate for a wide range of people and can be seen as therapeutic as well as preventative. These activities may particularly benefit health through the "building capacities" and "restoring capacities" mechanisms (Markevych et al., 2017) mentioned in section 4.6. For example, trials show that interventions promoting exercise in nature have more positive mental health benefit than those in the gym (Thompson Coon et al., 2011). The evidence base is diverse, but findings suggest the benefits are non-trivial; one meta-analysis indicated mean systolic blood pressure reduction of around 5 mm Hg and an increase of around 900 daily step counts for those receiving a nature prescription compared to controls (Nguyen et al., 2023). The benefits may be derived through increased physical activity, reduced stress, mutual peer support, acquiring new skills, a sense of purpose or developing a relationship with nature (Fullam et al., 2021).

As with any nature-based activity, there are some risks, such as injury or exposure to vector-borne diseases, but social prescribers can help to reduce risks with careful design of activities, ensuring that staff and volunteers have appropriate training (e.g. first aid and mental health awareness), appropriate policies and safeguarding, and ensuring information sharing between all parties involved (Garside et al., 2023). In addition, activities should ensure no harm to nature.

Examples of NbS and delivery of co-benefits

A variety of nature-based activities can be offered through green social prescribing and have been shown to have multiple benefits for individuals, society and the environment (see Box 8). A community garden for refugees in Denmark, for example, offers people the chance to grow and cook familiar foods together, reduces isolation and can promote cohesion with the wider community (Storm et al., 2023). Elsewhere, veterans have

found respite from post-traumatic stress disorder through surfing (Caddick et al., 2015). Conservation activities enable people to develop a sense of place and greater knowledge and understanding of their local environment, as well as potentially benefiting the health of the natural environment (Lovell et al., 2015). Importantly, nature-based social prescribing can be a valuable mechanism for enhancing the delivery of the multiple benefits of NbS. For example, ecosystem restoration programmes can offer opportunities for local social prescribers (e.g. for patients to take part in conservation volunteering), giving local stakeholders a sense of involvement and ownership in the NbS and building social capital in the community around the NbS location.

Box 8. Case study 8

The Preventing and Tackling Mental Ill Health through Green Social Prescribing Project was a two-year £5.77 million, cross-governmental initiative in England, United Kingdom that focused on improving the use of nature-based settings and activities, such as gardening, to promote well-being and improve mental health. More than 8300 people were involved in a range of local nature-based activities, and evaluation showed positive improvements in their mental health and well-being. Costs compared well with usual care alternatives such as cognitive behavioural therapy, while the social return on investment ratio was 1:2.4 indicating health benefits and economic feasibility of green social prescribing (Haywood et al., 2024).

Wildflower planting on a conservation volunteering day, a common activity in nature-based social prescribing. © Joanne Garrett.

4.9 Liveable cities and communities

Topic introduction

Today, more than half the world's population lives in cities (United Nations Department of Economic and Social Affairs, 2014). By 2050, this figure is expected to rise to almost 70% globally and over 80% in Europe (European Commission, 2015). This increase in urbanization coupled with increasing densification is leading to increased temperatures in built-up areas, increased pollution from surface runoff, and greater numbers of people living in areas at risk from flooding (Ascenso et al., 2021).

Natural areas within cities can increase resilience to the impacts of climate change and environmental threats by improving stormwater management to minimize flooding; providing cooling services by planting vegetation to moderate microclimates and generate shading; improving air quality through the capture of and protection from atmospheric pollutants by vegetation; and increasing biodiversity and access to nature within our communities. However, to achieve socially just and equitable NbS it is important to adopt approaches that engage with local communities through inclusive and transparent processes, and that address existing issues of inequality and prioritize nature interventions that will provide benefits especially for those most at-risk.

How NbS can deliver health protection and promotion, and how to avoid NbS risks

NbS can improve the "liveability" of cities by strengthening urban resilience and increasing the adaptive capacity of residents, providing more holistic, efficient, sustainable and cost-effective solutions compared to artificial, engineered approaches (Cortinovis et al., 2022; Pathak et al., 2022).

NbS can foster sustainable, socially just and equitable approaches to address the challenges facing cities (Pathak et al., 2022), helping to make urban areas more resilient, healthier places for those living and working in them. To ensure these benefits are equally accessible to all residents, engagement with communities to inform planning, design, access and usage is essential to ensure that nature is available to all and can be embedded in daily life.

Examples of NbS and delivery of co-benefits

As described in section 4.6, NbS can deliver health benefit through "reducing harms" (Markevych et al., 2017), for example, mitigating the urban heat island effect by moderating the local microclimate through effects such as shading and evaporation (see Box 9). Blue and green infrastructure can also contribute to the cooling and insulating of surrounding buildings and improve air quality while also reducing solar radiation. For example, vegetated parks can substantially reduce air temperatures, with the cooling effect extending beyond the park itself (Aram et al., 2019). Street trees can also reduce local temperatures and provide shading, reducing exposure to heat stress and heat-related health effects for residents (Salmond et al., 2016).

Parks and other green spaces can reduce surface runoff in urban areas by increasing the infiltration of stormwater, thereby reducing surface water flooding, and when located near rivers and lakes can form part of flood management plans. NbS upstream of cities (e.g. re-naturalization of rivers, or beaver

reintroduction) can help to reduce peak water flows after severe rainfall events, lowering the risk or extent of downstream flooding. Reducing flood risk lessens health impacts, for example on mental health, skin and gastro-intestinal conditions and waterborne diseases (Bracher, 2022).

NbS can provide an important passive control system, filtering pollutants including PM from the air (see section 4.2). By improving the liveable environment within cities, NbS that deliver harm reduction can also support the building and restoring capacity mechanisms (see section 4.7), for example, increasing opportunities for physical activity and social interactions, so providing health and well-being benefits through multiple interacting means.

Box 9. Case study 9

The city of Poznan in Poland made a strategic decision to be a green, mobile city, incorporating NbS objectives into spatial planning and other strategic plans (Oppla, 2025). The aim was to improve air pollution, address climate change and keep residents in the city. The city adopted a “green wedge” system, planting roadside trees, and creating new city parks where possible and adding planted containers where it was not. New seasonal beaches were created on the Warta River for local resident use and gardening tools and plants were provided to residents and community gardens established. Cycle routes across the city have been improved and extended. The City reports improved air quality and increased cooling capacity, and overall improvements in the quality of public spaces. They also report greater engagement by residents with these spaces and increased awareness and support for investments in green infrastructure.

Urban nature scenery in Poznan, Poland. © Galit Palzur.

5. Cross-cutting issues: equity, participation and evaluation

The International Union for Conservation of Nature Global Standard for NbS outlines key challenges and principles for NbS (International Union for Conservation of Nature, 2020b). In this chapter we briefly consider some of the key cross-cutting aspects of NbS with relevance to health in the context of Global Standard criteria relating to health equity, justice, inclusion and evaluation. Sections 5.1–5.3 consider the linked aspects of inequalities, vulnerabilities and engagement/involvement. Section 5.4 discusses the importance of the evaluation of health impacts of NbS.

5.1 Inequalities

Chapter 4 identified socially equitable distribution of benefits and trade-offs as one of the main challenges to ensure that NbS costs and benefits are shared equitably across population groups. Equity and the specific consideration and involvement of vulnerable and marginalized groups is therefore a cross-cutting requirement for all NbS.

Structural inequalities related to race, ethnicity, socioeconomic status, age, disability and gender can skew the distribution of NbS benefits. NbS risk exacerbating such inequalities unless they recognize and seek to address key drivers (Kotsila et al., 2023) as follows:

- **Inequitable distribution of environmental "goods" (e.g. parks or retention areas) and burdens (e.g. pollution):** the unequal distribution of NbS-related benefits can further disadvantage those already experiencing social deprivation or material and livelihood inequality, and risk creating "green enclaves" for already privileged residents.
- **The commodification of NbS:** upgrading environmental quality through NbS can drive up property prices, leading to already-marginalized residents being displaced through "green" or "ecological" gentrification.
- **Weak governance and power imbalances:** Criterion 5 of the Global Standard requires that NbS are "based on inclusive, transparent and empowering governance processes" (International Union for Conservation of Nature, 2020b). Unfit governance structures can weaken civil society and fail to address the legacy of historical processes of exclusion, or the role of uneven power relations in shaping social inequalities.
- **Limited community participation:** this arises from a lack of meaningful citizen participation in decision-making regarding the design, location, implementation and management of NbS. Such participation should recognize, respect and act on the diverse knowledge and priorities of marginalized communities.

NbS have a great potential to improve environment, health and well-being but this is only valid when all citizens, and especially disadvantaged population groups, can benefit from the NbS and their respective impacts. Unequal distribution of benefits – most likely to the disadvantage of more vulnerable population groups – will strongly counteract the positive impacts of the NbS and contribute to enhanced social and health inequality.

5.2 Vulnerabilities

Human vulnerability within the NbS context is diverse and influenced by multiple factors, including age, health and socioeconomic status. Those living in poverty, for example, are more vulnerable to the health impacts of climate change as they are more likely to live in ill health and less likely to have the means to adapt and recover. Vulnerability is also linked to different levels of access to nature. For example, a lack of green space in urban areas creates fewer opportunities to stay cool during heat waves, and lower-income communities often have fewer safe, accessible green spaces (Buckland & Pojani, 2023). More socially vulnerable communities can also be more likely to reside in areas of high flood risk (Sayers et al., 2018).

When designed and delivered well, NbS can help address multiple factors contributing to vulnerability and poor health. To maximize these benefits and avoid maladaptation, NbS should address the following:

- **Identify the full range of stakeholders directly and indirectly affected by a given challenge and/or potential NbS action, and prioritize actions to engage the most vulnerable groups:** understanding who is most at risk and why, enables targeted NbS interventions – for example, urban greening in areas of deprivation.
- **Engage all stakeholders, including vulnerable and marginalized communities, in co-design and co-management processes:** inclusive, transparent and empowering NbS governance processes help to ensure that decision-making reflects local knowledge and needs – for example, working with a community to better understand how food from an NbS project can be made as acceptable, accessible and affordable as possible (also see section 5.3).
- **Consider the wider determinants of vulnerability and ill health**: ensue the NbS contributes to environmental, personal and economic thriving, for example, in areas with local economic challenges, it may be possible to incorporate training and job opportunities for unemployed local people to deliver and manage the NbS.
- **Systematically embed health and well-being considerations within NbS (co-)design processes**: this helps maximize the health benefits and minimize trade-offs, for example, considering which plants might aggravate a health condition or ensuring the design of individual NbS and systems of NbS within an urban area maximize opportunities for active travel.

Failure to recognize vulnerable groups and ensure that they can benefit from NbS will result in failure to achieve the maximum societal benefits that a NbS intervention can provide.

5.3 Engagement and involvement

To build healthy, resilient and sustainable societies, NbS must prioritize the active engagement and empowerment of local communities and other affected stakeholders in order to acknowledge, involve and respond to the concerns and rights of all those affected. This helps prevent deepening existing inequalities – or creating new ones – whilst reducing the sustainability risks of a given NbS intervention and increasing its social license to operate.

Sections 5.1 and 5.2 above make various points on the engagement of stakeholders and public participation. Involving local communities, nongovernmental

organizations and other stakeholders and rights holders is essential to create sustainable and equitable NbS (Mercado et al., 2024; Seddon et al., 2020). This enables NbS actions to be designed and developed with sensitivity to local circumstances and makes them more likely to successfully realize the full range of potential environmental, economic and social benefits.

However, a review of 58 case studies found that citizen participation in NbS is often tokenistic, and that deeper, more meaningful engagement is necessary to yield improved outcomes including "social learning, enhanced sense of belonging, environmental stewardship, and inclusiveness and equity" (Kiss et al., 2022). Traditional models of "consultation" should therefore move towards more meaningful "co-creation" with all stakeholders, including communities whose health may be impacted positively or negatively by an NbS. Ongoing co-creation processes will also deliver the adaptive management required in the Global Standards. A large number of projects and programmes have developed guidance on inclusivity in NbS; some of these are summarized and discussed in *Network Nature Knowledge Brief 3: Leaving no one behind: Towards inclusive nature-based solutions* (Gionfra et al., 2023).

5.4 Evaluation of health impacts

Guidance on the implementation of United Nations Environment Assembly resolution 5/5 on NbS for supporting sustainable development (United Nations, 2024) states:

> Methods of assessing NbS in the short and long term must be improved and the value of ecosystem services needs to be assessed in a more holistic way if we are to have a realistic reflection of cost and benefits. For example, how do you quantify mental health benefits that may arise from urban green infrastructure?

Criterion 7 of the Global Standards requires that NbS are "managed adaptively, based on evidence" including a specific indicator on monitoring and evaluation, and Criterion 4 also requires that NbS are "economically viable" (International Union for Conservation of Nature, 2020b). Given that NbS can give rise to substantial benefits for human health and well-being, it is important that health impacts are recognized, anticipated and evaluated. Not doing so risks missing achieving or recognizing potentially significant outcomes of NbS in regards to addressing crucial societal challenges. It also risks making incorrect conclusions about economic viability through undervaluing benefits. Similarly, given that some NbS may have unintended consequences of introducing or increasing risks to health, these should also be evaluated and managed, and where possible anticipated to allow for mitigation to be designed-in.

Health impacts should be included in the overall design, monitoring and evaluation strategy for an NbS throughout the cycle from planning to implementation to maintenance (and decommissioning if necessary). Health can therefore be considered in various forms of impact assessment (e.g. health, equity, environmental, integrated impact assessments) during the NbS planning/design phase (WHO Regional Office for Europe, 2025). Collaboration with the health sector and a leading role of health experts will be essential for effectively capturing potential health benefits to be monitored and anticipating any health risks that may arise. The quantification of NbS-related health impacts is therefore a great opportunity for the health sector to become involved in NbS.

Before/during/after the NbS implementation phase, some health impacts may be evaluable on a quantitative before–after basis, including quantification of the change in specific health outcomes (or associated mechanistic

or risk factors) in a local community or a specific population group. For example, improvements in mental health outcomes amongst those receiving a nature-based social prescription can be measured (Haywood et al., 2024). Other outcomes might be subject to longer term processes meaning traditional before–after methods are not feasible or appropriate; in such circumstances quantitative modelling of likely health impacts may be more suitable (Barboza et al., 2021). However, some health and well-being outcomes may not be suitable for this type of quantitative evaluation, and methods for evaluation of health impacts should therefore reflect the diversity of outcomes and how they may arise in different contexts or variation in how they are experienced by different groups. This means an implementation of a range of methods, including qualitative approaches, may be appropriate (Wheeler et al., 2024; WHO Regional Office for Europe, 2023c).

Health impacts are incorporated in a range of frameworks and guidance on NbS evaluation. For example, an EU handbook for practitioners includes several examples and case studies (European Commission, 2021) and an EKLIPSE publication includes public health and well-being impact evaluation within a wider framework (EKLIPSE Expert Working Group, 2017). A recent World Bank report provides guidelines for the assessment of costs and benefits of NbS for climate resilience, with various health implications, such as heat mitigation (van Zanten et al., 2023). However, the understanding of the most appropriate approaches to the evaluation of health impacts relating to nature exposure and experience is rapidly evolving, and careful selection of methods appropriate to the NbS, context and likely specific health outcomes are needed.

6. Conclusion

6.1 Why NbS for health?

The triple crisis of climate change, environmental pollution and biodiversity loss presents critical challenges for human health and the environmental systems that we are a part of. The evidence and case studies discussed in this report show that NbS comprise a range of approaches that can contribute to tackling these major issues and simultaneously deliver multiple benefits for the environment and society, including improved social equity as well as human health and well-being.

There are limits to the extent to which NbS can deliver mitigation of environmental health risks, and where appropriate other substantive social and economic change may be required. For example, as mentioned in section 4.2, NbS can contribute to air pollution mitigation, but to tackle the significant human health impacts of air pollution in most urban areas, additional measures are required (such as emission reduction interventions). However, the NbS framing has gained considerable political and social traction on national and international scales, and can support the delivery of the recently declared universal human right to access a clean, sustainable and healthy environment (United Nations, 2022). NbS also provide opportunities at multiple scales to contribute to achieving multiple Sustainable Development Goals (United Nations, 2025) and related targets and actions for addressing climate change (United Nations Environmental Programme & International Union for Conservation of Nature, 2021) and biodiversity loss (Convention on Biological Diversity, 2022).

Health sector decision-makers can also benefit from implementing NbS within their respective contexts, and combine efforts towards more sustainable health systems with opportunities for promoting individual well-being and reducing pollution and related health risks. Furthermore, health-enhancing nature features can be gainfully embedded in medical and therapeutic treatment through green social prescribing and maximizing access to nature close to health care settings.

Why evaluate health outcomes of NbS?

Even where human health is not the primary driver of an NbS, improvements to human well-being are intrinsic to NbS actions and should be reported and measured (International Union for Conservation of Nature, 2020b). This is most relevant to prevent that well-intended interventions may cause unexpected and unintended impacts on people, affecting their well-being negatively. Where human health is identified as a core challenge, NbS co-creation can focus on designing interventions that specifically maximize human health-related co-benefits and evaluation efforts can help to monitor health impacts and react quickly when necessary. This health-specific evaluation of NbS impacts offers great collaboration opportunities for the health sector.

Monitoring the health and social equity impacts of NbS in both the short and long term, taking mixed methods approaches, will contribute to ensuring the multiple benefits are recognized and valued, and can be traded off against the costs of implementation to some extent. However, as discussed in section 5.4, it is important to acknowledge the extent to which the “true value” of health impacts can be evaluated and traded off against monetary costs, and that establishing causality may often not be feasible. Evaluation therefore needs to be multi-faceted and transdisciplinary, and non-monetary values

should be recognized and communicated clearly alongside monetary values. Further, evaluation should consider and mitigate any unintended consequences for human health of what might otherwise be considered a benign intervention.

6.2 Who should be involved?

As the examples in this report show, realizing the potential of NbS requires the involvement of a broad range of stakeholders. An integrated, transdisciplinary approach is needed, including – at a minimum – environmental and health professionals, along with representatives of other sectors relevant to the specific NbS design and implementation, such as transport, urban planning, education or housing. A specific application area is the utilization of nature elements in health care, which would be of interest to clinicians and managers of health-care facilities, and would enable the strategic implementation of selected NbS within the health system.

As identified in the Global Standards, in order to be successful, NbS need to be economically viable. Ideally, assessment of viability of a given NbS intervention requires holistic consideration of the full range of direct and indirect benefits and costs, including the valuation of ecosystem services and analysis of who pays and who benefits. However, this can be very complex and challenging, especially where monetary valuation of health benefits is not feasible (e.g. assessment of long-term population-scale impacts on chronic noncommunicable disease outcomes) or may be unable to sufficiently capture "true" value (e.g. spiritual and cultural values of flora, fauna or natural landscapes). Consequently, including relevant professionals and organizations involved in NbS finance, climate adaptation finance, health economics, environmental investment and related fields will be of great value for those health aspects that can be evaluated using economic methods. However, health impact evaluation is likely to require broader approaches that are able to consider the plurality of relevant mechanisms and outcomes in different contexts and their non-monetary values (WHO Regional Office for Europe, 2023c).

Additionally, involving local communities before, during and after implementation of NbS is critical to their long-term success and to address social inequalities. The meaningful engagement of local stakeholders and rights holders throughout the process of NbS co-creation, implementation and adaptive management is necessary for the realization of the full range of potential social benefits from NbS actions. Inclusive engagement is also likely to deliver increased public support for the NbS, long-term community empowerment and sense of ownership, and engagement with protection/maintenance.

6.3 NbS and Health: an opportunity

NbS can provide specific gains for human health and well-being as a key opportunity amongst multiple environmental, societal and economic benefits. Careful planning can maximize potential human health and well-being benefits while minimizing or preventing potential risks. The public health sector is uniquely positioned to contribute to – or even coordinate – the health-specific planning and assessment of NbS to maximize their health and well-being outcomes.

This report presents clear evidence and arguments for the health sector to promote and engage with NbS in order to capitalize upon the health benefits. It simultaneously calls upon environment and nature conservation sectors traditionally responsible for initiating NbS to design and implement actions that take advantage of opportunities to benefit health and well-being. Engagement and collaboration between environment, health and other sectors as well as local communities in co-design, implementation and impact assessment is essential to optimize potential human health and well-being outcomes of NbS.

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United Kingdom
Uzbekistan

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WHO European Centre for Environment and Health
Platz der Vereinten Nationen 1
D-53113 Bonn, Germany
Tel.: +49 228 815 0400
E-mail: euroeceh@who.int
Website: www.who.int/europe