



# Promoting Human Health through the Global Biodiversity Framework: Linking Forests and Human Health in National Biodiversity Strategies and Action Plans

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## KEY MESSAGES

- The Kunming-Montreal Global Biodiversity Framework (GBF) explicitly recognizes the interlinkages between biodiversity and health, referencing One Health as an overarching consideration for all targets. The GBF, directly and indirectly, supports public health outcomes related to forest restoration and conservation in its targets.
- A provisional analysis of publicly available NBSAPs for this brief finds that most NBSAPs take a limited approach to integrating human health (if at all) and rarely consider the connections between human health and forest conservation and restoration.
- Forests are a key ecosystem for conservation and restoration, home to approximately 80% of the world's terrestrial biodiversity [1].
- Promoting the connection between forest health and human health can help conserve and restore forests by mobilizing support from both the health and conservation communities. The health community can contribute unique knowledge and resources to achieve GBF targets. Equally, the conservation community can support public health by restoring forests to maximize their human health benefits.
- Linking forests and human health also presents an opportunity for the forest conservation sector to attract funding and make it a higher policy priority. The OECD finds that global biodiversity finance is estimated at USD 78–91 billion per year (data from 2015–2017) billion [2]. In contrast, health spending is significantly higher. In 2020, global spending on health reached US\$ 9 trillion, or 10.8% of global gross domestic product (GDP) [3]. Directing some of the health funds to preventive health measures involving forest conservation could create a win-win for the health and conservation sectors.



Many states missed a key opportunity to engage the health sector and mobilise multi-sectoral support by failing to integrate human health outcomes in their National Biodiversity Strategy and Action Plans.

## CONTEXT

Research and policy experts agree that there is a close connection between our health and the health of animals, plants, and the wider environment [4]. Forests, in particular, have been shown to have significant human health benefits [5]. The concept of One Health emerged to recognize these interdependencies and promote an integrated, unifying approach that sustainably balances and optimizes the health of humans, animals, plants, and ecosystems [6]. The recent adoption of the post-2020 Kunming-Montreal GBF in December 2022 and the accompanying development and implementation of revised NBSAPs provide an opportunity for policymakers to stress the human health benefits of forest conservation and restoration.

The GBF acknowledges the interlinkages between biodiversity and health, referencing the One Health Approach. The 23 targets adopted in the GBF also, directly and indirectly, benefit human health.

Decision 15/6 by the Conference of the Parties (COP) requests that countries revise their national plans to align with the GBF targets. Many states have not prioritized human health outcomes in previous NBSAPs, missing a key opportunity to engage with the health sector and mobilize multi-sectoral for forest conservation [7]. This brief outlines the benefits of integrating human health into NBSAPs, identifies GBF targets linked to human health, and provides recommendations for integrating the forest-health nexus into NBSAPs.

## WHAT ARE THE BENEFITS OF FORESTS FOR HUMAN HEALTH?

Forests benefit human health in numerous ways. Linking forest conservation and restoration to human health offers a compelling case for achieving multiple public health outcomes.

### Improve Social Determinants of Health

Forest conservation and restoration offer cost-effective solutions and robust mechanisms to achieve development outcomes and improve the social determinants of health (SDHs). SDHs encompass poverty, food insecurity, and quality air and water and account for 30-55% of health outcomes, according to the World Health Organization [8]. Forest ecosystem services positively impact many SDHs, improving health outcomes [9]. For example, forests support biodiversity conservation by providing habitats for plant and animal species, which in turn provide services that are essential to food security, such as pollination, pest control, and disease regulation [10]. Forest conservation and enhancing human health reinforce each other and should be targeted in tandem.

**Related GBF Targets:** 1, 2, 3, 10, 11, 12

### Delivery of Essential Medicines

Forests provide essential medicines, with some studies estimating that up to 50,000 plant species are used for medicinal purposes [11]. Much of these forest medicines are critical to traditional health care systems, which are particularly abundant—and essential—in areas with restricted government health care. The World Health Organization estimates that over 80% of the global population depends on traditional medicine for their primary healthcare needs [12]. Forests play a crucial role in supporting the health of a significant portion of the world's population.

**Related GBF Targets:** 1, 2, 3, 5, 8, 10, 11

**UP TO 9.4%** estimated reduction in risk of chronic non-communicable diseases, when people have access to green spaces.

**11M** people in the Brazilian Amazon could be exposed to lethal heat stress by 2100 due, in part, to ongoing deforestation.

**UP TO 50K** plant species are used for medicinal purposes, many of which are found in forests and are critical to traditional health systems.

### Mitigate Climate Change-induced Health Impacts

Forests can further improve a country's resilience to climate change by offering nature-based solutions to reduce the risks of natural disasters. Preserved and intact forests shield individuals from various natural hazards, such as floods, landslides, and hurricanes, reducing the number of fatalities and injuries [13]. Critically, climate change induces heat waves and higher temperatures. High temperatures are associated with adverse health outcomes, including premature death and cardiorespiratory failure. Forests can reduce heat-related mortality by reducing heat through evaporation and transpiration [14]. A study on deforestation in the Brazilian Amazon found that continued deforestation in the Amazon would expose over 11 million people in Brazil to lethal heat stress by 2100 [15].

**Related GBF Targets:** 1, 2, 3, 11, 12

### Lower Risks of Non-Communicable Diseases

Many non-communicable diseases (NCDs), such as cardiovascular disease, cancer, respiratory diseases, and diabetes, share common risk factors including air pollution and physical inactivity. Forests address these risk factors by improving environmental quality and providing accessible spaces for physical activity. In Indonesia, high levels of greenspaces were associated with 0.3% to 9.4% lower NCD rates [16]. Research suggests forests also positively impact mental health by enabling physical activity and connection to nature [17]. Green spaces proved vital for supporting people's well-being during COVID-19 restrictions. As a result, the UK's National Health Service (NHS) introduced green social prescribing to improve public mental and physical health.

**Related GBF Targets:** 1, 2, 3, 11, 12

### Reduce the Spread of Infectious Diseases

Evidence suggests that deforestation increases the likelihood of infectious diseases emerging and spreading. For instance, a 2019 study found that a 1% decline in primary forest cover increases malarial incidence by 10% [18]. Research shows that deforestation increases disease transmission to humans by causing interactions between disease pathogens, carriers, and hosts due to shrinking habitats [19]. Protecting forests from deforestation can help reduce the incidence of infectious diseases.

**Related GBF Targets:** 1, 2, 3, 5, 10

## LINKS BETWEEN FORESTS AND HEALTH IN THE GBF

Many of the GBF's targets have both direct and indirect connections to human health and forests. Policymakers can use these targets as an opportunity to better integrate the relationship between forest health and human health into NBSAPs.

TARGET	LINK TO FORESTS AND HEALTH
<b>Target 1: Spatial Planning</b>	Target 1 encourages effective land management and spatial planning of conservation and restoration that balances social and economic benefits, including health, with protecting nature. Deforestation, forest fragmentation, and land use change are linked to the emergence of zoonotic diseases, among other negative human health outcomes [20]. Forests under spatial management and other effective management addressing land use change can lower disease risks and improve health outcomes.
<b>Target 2: Restoration</b>	Target 2 calls for ecosystem restoration, strengthening ecosystem services that are associated with health. Forest restoration improves the integrity of forested areas, reducing the risk of wildfires and infectious diseases by lowering wildlife spillover and strengthening forest ecosystem services associated with health.
<b>Target 3: Protected Areas</b>	Target 3 links to health since well-managed (forest) protected areas and other effective area-based conservation measures are proven to safeguard habitats, species populations, and deliver ecosystem services that benefit human health, including clean air and water.
<b>Target 5: Use of Wild Species</b>	Target 5 aims to prevent overexploitation in the use, trade, and harvesting of wild species, lowering the risks associated with the spread of disease and pathogen spillovers that negatively impact human health. This target relates to the forestry industry and is connected to the use of specific species within forests.
<b>Target 6: Invasive Species</b>	Target 6 focuses on eliminating or mitigating the impacts of invasive alien species (IAS). The IPBES found that in 2019, global annual costs of biological invasions were estimated to exceed \$423 billion, mainly due to their impact on human health [21]. For example, IAS can serve as a vectors for infectious zoonotic diseases. A disproportionate number of these documented negative impacts come from temperate and boreal forests and woodlands [22]. Forest management that involves minimizing IAS will likely improve health outcomes and save public health costs.
<b>Target 7: Pollution</b>	Target 7 calls for the reduction of pollution from all sources to improve biodiversity and ecosystem services. Pollutants have a serious impact on human health; for example, in forests, excess nutrients, like nitrogen, from fertilizer production can cause eutrophication and acidification, increasing the susceptibility to drought, diseases, and pests, causing adverse effects on human health [23].
<b>Target 10: Sustainable Production Systems</b>	Target 10 aims to achieve positive health outcomes by ensuring sustainable management of production systems, including forestry. Sustainable forest management can enhance forest ecosystem services, such as providing clean water, air, and food, and support sustainable development and poverty reduction strategies.
<b>Target 11: Nature's Contributions to People</b>	Target 11 considers nature's contributions to people, inclusive of forest ecosystem services and forest biodiversity's effect on human well-being.
<b>Target 12: Green and blue spaces</b>	Target 12 stresses urban planning for biodiversity and green spaces in developed areas to enhance human well-being. Urban forests improve health by reducing respiratory illnesses and mitigating NCDs through recreation.

## HOW ARE NBSAPs CURRENTLY INTEGRATING HUMAN HEALTH AND THE HEALTH SECTOR?

For the purpose of this brief, IUCN has conducted a provisional content analysis of a sample of twenty NBSAPs from countries with the highest % of forested areas as a proportion of total land area. The analysis examined if the country acknowledged human health in its NBSAP by scanning for references to human health or associated terms in the plans. The analysis then considered the context in which human health was referred to, determining if it was linked to specific targets and actions and if health was specifically linked to forests. The findings are limited to NBSAPs published in English and Spanish and are publicly available on the CBD website.

- Of the 20 sampled NBSAPs, 17 acknowledged the links between human health and forests. This acknowledgment mainly reflected Aichi Target 14 to enhance ecosystem services associated with health.
- 10 NBSAPs included specific targets and action items (typically under three) associated with human health outcomes.
- 4 NBSAPs included links between forest conservation and human health. For example, the Republic of Korea's plan includes a target to expand public ecosystem services and forest healing.

Country	% of Forest Area (FAO, 2020)	NBSAP implementation period	Acknowledges human health	Links human health to specific targets and actions	Links forests to human health
Suriname	97.4	2012-2016			
Guyana	93.6	2012-2020	X		
Micronesia	92	2018-2023	X	X	
Solomon Islands	90.1	2016-2020	X	X	X
Palau	90	2015-2025			
Equatorial Guinea	87.3	2015- n.d.			
Papua New Guinea	79.2	2019-2024	X		
Liberia	79.1	2017-2025	X	X	
Finland	73.7	2012-2020	X	X	
Seychelles	73.3	2015-2020	X	X	X
St. Vincent & the Genadines	73.2	2015- 2020	X		
Brunei	72.1	2015- n.d.	X		
Laos	71.9	2016-2025	X	X	
Bhutan	71.4	2014 - n.d.	X		
Guinea-Bissau	70.4	2015-2020	X	X	
Sweden	68.7	2011-2020	X	X	
South Korea	64.4	2019-2023	X	X	X
Dominica	63.8	2014-2020	X		
Sweden	62.4	2020-2025	X	X	
Montenegro	61.5	2016-2020	X		X

### FOREST-HEALTH NEXUS NBSAP CASE STUDY: SAINT LUCIA

Saint Lucia updated their NBSAP in 2018 for the implementation period of 2018-2025. The Caribbean Island nation has a significant forest cover (34.5% of the total land area). The updated NBSAP emphasizes the importance of conserving and restoring the biodiversity of its forests. Saint Lucia's NBSAP considers health extensively, with a specific focus on nature's role in improving mental health and reducing non-communicable disease risks.

The NBSAP details integrating ecosystem management into health policy, forests for traditional medicine, the cultural value of nature, invasive species' health impacts, and gender-linked health outcomes. While health tends to be linked to biodiversity more generally, Saint Lucia's NBSAP does acknowledge the health benefits of ecosystem services provided by forests. It also highlights how misconceptions of mangrove systems as disease carriers have led to the deforestation of mangroves in the country. Considering the country's high forest cover, integrating health and forests in the NBSAP could lay the groundwork for a greater exploration of the connections between Saint Lucia's forests and positive human health outcomes.





## WHY INTEGRATE THE FOREST-HEALTH NEXUS INTO THE NBSAPs?

### **Improve collaboration with the health sector**

Most countries have yet to draw on the expertise and potential for partnership with the health sector in their NBSAPs. By connecting forest management to human health, health professionals can begin to view forest conservation and restoration as a public health issue and a form of preventative healthcare. Potential partners can range from physicians, nurses, community health workers, epidemiologists, health researchers, and more. Each of these professions has a unique skill set that can support communicating, implementing, monitoring, and evaluating the actions in NBSAPs. Physicians, for example, are trained to have strong communication skills and are positioned as trusted public servants [24]. They could promote public health messages that also stress changing citizens' relationship with nature and promote forest conservation and restoration.

### **Leveraging more investment in forest conservation**

According to the OECD, the world currently spends about USD 78-91 billion annually to support global biodiversity, while harmful financial flows that damage biodiversity are estimated to be over 500 billion [25]. In comparison, global spending on healthcare reached US\$ 9 trillion in 2020, accounting for 10.8% of the global GDP [26]. The conservation and restoration of forests can be a cost-effective preventive healthcare solution. Governments should consider investing healthcare spending towards protecting, managing, and restoring forests.

For instance, a study conducted in Cambodia found that an increase in protected forest area coverage resulted in a decrease in incidences of diarrhoea and acute respiratory infections [27]. Similarly, another study found that protecting Amazon Indigenous territories and conserving forested areas could prevent over 15 million respiratory and cardiovascular cases annually, saving the Brazilian government approximately \$2 billion USD in health costs [28]. Integrating the forest-health nexus into the NBSAPs could also encourage private sector actors, such as health insurers, to further invest in public health measures that consider forest conservation and restoration.

### **Encourage socially inclusive health objectives**

Studies show that women and Indigenous Peoples disproportionately rely on forests for nutrition and livelihoods in specific contexts [29]. The GBF highlights the importance of biodiversity plans being responsive to gender and the needs of children, youth, and persons with disabilities, ensuring rights-based approaches to conservation (e.g., Targets 22 and 23). Recognizing the significance of forests to many Indigenous Peoples' health and well-being could improve Indigenous health outcomes, as well as the health of other forest-dependent communities.



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## RECOMMENDATIONS FOR INTEGRATING THE FOREST-HEALTH NEXUS INTO NBSAPS

NBSAPs reflect the country's priorities and its policy, regulatory, and economic landscape. Integrating the links between forests and health requires assessing existing forest management and public health objectives. The following recommendations provide some high-level guidance when developing the NBSAPs. <sup>12</sup>

### **Integrate public health indicators related to forests**

It is vital that NBSAPs incorporate measurements for health risks and impacts. To monitor the GBF, CBD Decision 15/5 has provided a framework of indicators, including those that identify the potential health risks associated with biodiversity loss. Indicators include mortality rates attributed to unsafe water and sanitation or the number of deaths, missing persons, and directly affected people attributed to disasters per 100,000 population. Some indicators align with the Sustainable Development Goals (SDG). Indicator 3.9.1, for example, measures the mortality rate attributed to ambient air pollution. Other indicators could measure the impacts of conservation efforts on public health, such as the potential healthcare savings from forest conservation measures. For instance, Australia's NBSAP includes progress measures that focus on human health, such as measuring the promotion of human health benefits of nature-based activities.

### **Address the underlying causes of forest loss and links to specific health outcomes**

NBSAPs should recognize the primary causes of forest loss within their countries and make direct links between forest loss and negative health outcomes (e.g., researching the links in deforestation rates to increased prevalence of zoonotic diseases). This is particularly pertinent for countries where forests are a primary ecosystem and critical to the local economy.

### **Recognize how forests can achieve public health outcomes**

The conservation and restoration of forests are linked to a range of public health outcomes. Inversely, degraded forests pose severe risks to human health, including disease transmission and reduced air quality by forest fires. The degradation of forests primarily stems from the unsustainable exploitation of forest resources and weak forest management. There needs to be increasing awareness and recognition of the links between forests and health across the conservation and health sectors, which should be made explicit within NBSAPs through links with specific targets.

### **Pursue proactive intersectoral collaboration**

Developing NBSAPs should be a multi-stakeholder process, both in its development and its implementation. The CBD requires mainstreaming the biodiversity strategy across government, the private sector, and civil society. Creating working groups and dialogue between various stakeholders, including ministries of environmental and health, in the NBSAP process will likely secure multi-sector support.

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