

**A SPHERE UNPACKED GUIDE**  
Nature-based Solutions  
for Climate Resilience in  
Humanitarian Action

# Authors and acknowledgements

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## Disclaimer

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of any participating organisations concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this book do not necessarily reflect those of the donors or any other participating organisations.

## How to provide feedback on this version of the guide

Please complete this survey to provide feedback: [bit.ly/nbs-feedback-en](https://bit.ly/nbs-feedback-en).



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# Overview of Sphere's vision, mission, and alignment with this guide

Sphere's vision is that people affected by crises must be at the centre of decisions about humanitarian protection, assistance, recovery and resilience. They have the right to prompt, effective and quality humanitarian assistance that enables them to survive crises, rebuild their lives and recover their livelihoods with respect and dignity.

Sphere's mission is to establish, promote and review quality standards for humanitarian action which provide an accountable framework for preparedness, resource allocation, response, monitoring and advocacy before, during and after disasters and crises.

This Nature-based Solutions for Climate Resilience in Humanitarian Action Unpacked Guide, developed in collaboration with the Nature-based Solutions in Humanitarian Contexts Working Group, supports Sphere's vision and mission in that:

- it provides practical guidance for using the standards when implementing nature-based solutions (NbS) that addresses societal challenges in humanitarian action, including disaster risk reduction (DRR) and climate change adaptation;
- all elements of the Code of Conduct, Humanitarian Charter, Protection Principles, and Core Humanitarian Standard are applicable in implementing nature-based solutions approaches in humanitarian contexts.

## The Nature-based Solutions in Humanitarian Contexts Working Group

The Nature-based Solutions in Humanitarian Contexts Working Group convenes stakeholders from across from across IUCN's **Friends of Ecosystem-based Adaptation (FEBA)**, the **Environment and Humanitarian Action Network (EHAN)** and the **Partnership for Environment and Disaster Risk Reduction (PEDRR)** networks. Together we are advancing research, learning and advocacy to transform how humanitarian aid and development is done, to better incorporate nature-based solutions as a core component and strategy. This includes developing practical guidance, policy recommendations and advocacy messaging.

➔ Visit [www.friendsofeba.com/wgs/humanitarian/](http://www.friendsofeba.com/wgs/humanitarian/) to learn more.

## IUCN Friends of Ecosystem-based Adaptation (FEBA)

The Friends of Ecosystem-based Adaptation is a global collaborative network of more than 100 agencies and organisations working together to share experiences and knowledge, to improve the implementation of ecosystem-based adaptation (EbA) activities on the ground, and to raise awareness and understanding of NbS in adaptation planning processes and multilateral policy frameworks. The coordination of the FEBA network is made possible with the financial support of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).

➦ Visit [www.friendsofeba.com/](http://www.friendsofeba.com/) to learn more.

## Partnership for Environment and Disaster Risk Reduction (PEDRR)

The Partnership for Environment and Disaster Risk Reduction is a global alliance of 27 UN agencies, non-governmental organisations (NGOs) and specialist institutes. PEDRR is the clearing house for knowledge, training, advocacy and practice on ecosystem-based disaster risk reduction (Eco-DRR).

➦ Visit <https://pedrr.org/> to learn more.

## The Environment and Humanitarian Action Network (EHAN)

The Environment and Humanitarian Action Network (EHAN) is an informal network aiming to avoid, minimise or mitigate environmental impacts of humanitarian action and to promote environmentally responsible humanitarian programming through collaboration and cooperation. It was established in 2013 with the objective of mainstreaming environmental considerations in humanitarian action.

➦ Visit <https://ehaconnect.org/> to learn more.

# Introduction

## This section:

- explains why there is a Sphere Unpacked Guide on nature-based solutions;
- outlines how the Unpacked Guide is structured and who it is for;
- introduces the Sphere Handbook.

## Why is there a Sphere Unpacked Guide on nature-based solutions?

“Implementing nature-based solutions could reduce the number of people in need of international humanitarian assistance due to climate change and weather-related disasters... By 2030, 150 million people a year could need humanitarian assistance due to floods, droughts, and storms. By 2050, this is expected to rise to 200 million people annually.”

*IFRC and WWF, 2022<sup>1</sup>*

Growing disaster risk, driven in part by large-scale environmental degradation, threatens to exceed the humanitarian sector’s capacity to respond in the coming decades. With over 20 million people a year displaced by climate-related natural hazards, there is an urgent need to find new approaches to reducing risk and saving lives.<sup>2</sup> This need is particularly pressing as the nature of emergency response is shifting to longer-term, multigenerational refugee and internally displaced person (IDP) scenarios.

The environment in which people live and work is essential for their health, well-being and recovery from crisis (🔗 *see Sphere Handbook: What is Sphere?, p.19*), yet it is often overlooked within humanitarian crises. Environmental degradation exacerbates disaster risk and undermines humanitarian and development gains.

Nature-based solutions (NbS) are actions that hold the twin objectives of providing for **human well-being** and **protecting the environment**. They are a tangible solution that can build immediate and long-term resilience for those affected by crisis.

This Unpacked Guide focuses on NbS for resilience in humanitarian contexts, including for disaster risk reduction (DRR) and climate change adaptation.

<sup>1</sup> Working with Nature to Protect People: How NbS Reduce Climate Change and Weather-Related Disasters, IFRC and WWF, 2022, page 35, 🔗 [bit.ly/nbs-en-001](https://bit.ly/nbs-en-001)

<sup>2</sup> The Nature Navigator: A handbook for disaster risk management practitioners, IFRC 2022, page 4, 🔗 [bit.ly/nbs-en-002](https://bit.ly/nbs-en-002)



## What are nature-based solutions (NbS)?

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.**”<sup>3</sup>

**Nature-based solutions** is an “umbrella” concept which includes several types of ecosystem-based approaches, such as protection, restoration and sustainable management of natural resources and ecosystems, to address societal challenges such as disasters, human health, and food and water security. They also include natural/green and hybrid (combined natural and engineered/built or ‘grey’) infrastructure (Figure 1).

See **Appendix 1: Nature-based solutions: A range of approaches** for more information on the various NbS approaches.

## Who is this Unpacked Guide for?

If you are interested in integrating environmental considerations that benefit both people and the environment into humanitarian action, then this guide is for you.

It is for humanitarian practitioners working in diverse contexts, such as protracted crises, post-acute shock, or settlements for refugees or internally displaced persons (IDPs), whether in rural, peri-urban or urban environments. These humanitarian practitioners may be involved in the conception, design, implementation, monitoring or evaluation of projects.

In addition, it may be of relevance to national headquarters staff and those responsible for inter-agency coordination and higher-level strategy, as well as to environmental and recovery practitioners outside the humanitarian sector. The strategies outlined in this guide may also be relevant to the work of national and local government agencies, disaster management authorities and other civil protection actors,

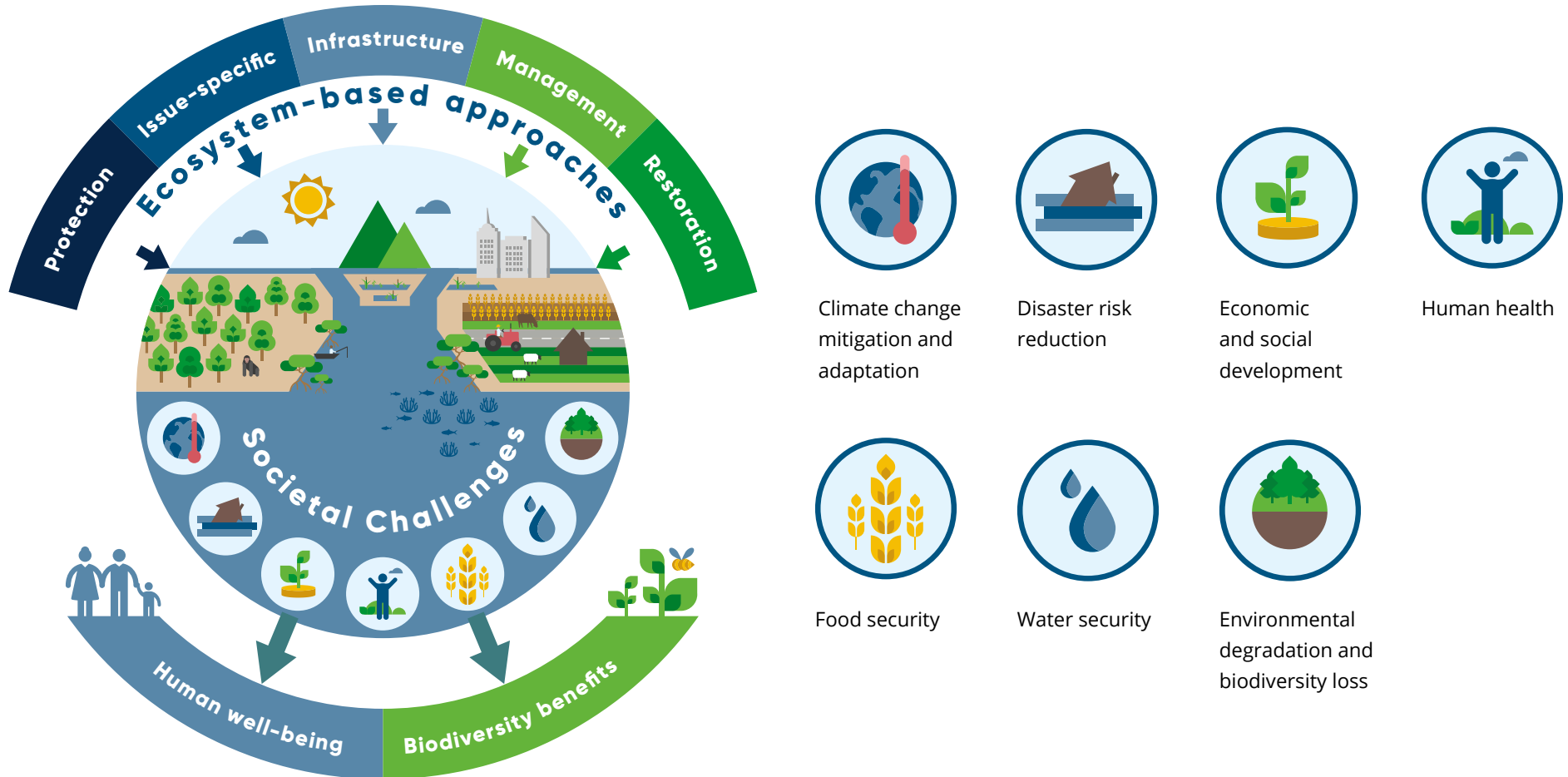
who are key stakeholders in humanitarian response. See Sphere Thematic Sheet 3: Engaging National Disaster Management Authorities ([bit.ly/sphere-ts3-en](https://bit.ly/sphere-ts3-en)).

Finally, it is important to note that, while the integration of NbS into humanitarian action can in some cases be done with little external expertise, often it does require specific technical expertise. This guide is oriented towards a broad range of humanitarian practitioners, and where required, you are encouraged to seek the guidance of technical experts familiar with the environment and ecology you are working in.

<sup>3</sup> United Nations Environment Assembly resolution 5/5: Nature-based solutions for supporting sustainable development, UNEA, 2022, [bit.ly/nbs-en-003](https://bit.ly/nbs-en-003)

# FIGURE 1: NATURE-BASED SOLUTIONS: A RANGE OF APPROACHES



Source IUCN 2020




## How to use this guide

### Navigating the guide

While we encourage you to read this Unpacked Guide from start to finish, it also contains design features that allow you to easily navigate between sections. These include:

- a **navigation bar** at the top of the page that lets you switch between sections;
- **internal links** that help you navigate to **case studies, checklists, and resource tables**;
-  external **links to recommended resources**;
-  **tip boxes** that link to key definitions and other useful information.

### Links to the Sphere standards

In addition, throughout the document you will find links to relevant Sphere standards and other information in the Sphere Handbook. These links are included to help you consider how the suggested tools and actions can help you meet the existing Sphere standards. Links can be found in-text: look for the  **icon** which indicates relevancy to specific Sphere standards, key actions, indicators, guidance notes or other information. Each reference to the Sphere Handbook includes a page number to help if you are using a print copy or PDF version of the Handbook.

### Key terms

The glossary at the end of this document explains all key terms introduced throughout the guide. Access it using the navigation bar at the top of each page.

### Abbreviations

Sphere Handbook chapters/annexes:

- CHS: Core Humanitarian Standard  
<https://www.chsalliance.org/about/>
- CoC: The Code of Conduct for the International Red Cross and Red Crescent Movement and Non-governmental Organisations (NGOs) in Disaster Relief
- FSN: Food Security and Nutrition
- PP: Protection Principle(s)
- SS: Shelter and Settlement
- WASH: Water Supply, Sanitation and Hygiene Promotion

Sphere Handbook components:

- GN: guidance note
- KA: key action

Others:

- DRR: disaster risk reduction
- EbA: ecosystem-based adaptation
- Eco-DRR: ecosystem-based disaster risk reduction
- IUCN: International Union for Conservation of Nature
- NbS: nature-based solutions
- SEADS: Standards for Supporting Crop-related Livelihoods in Emergencies

## When should this guide be used?

The environment and humanitarian aid are inherently interconnected because not only is environmental degradation a driver of disaster risk, but the environment also provides necessary resources to support people's basic needs. Therefore, nature-based solutions (NbS) can be relevant before, during and after a disaster or conflict, or during protracted crises. Signs of environmental degradation, or else the use of natural resources for activities, are key markers that NbS may be helpful in a given context.

The advice offered in this guide should be considered along with the Sphere Handbook, other Sphere guidance ([🔗 spherestandards.org/resources](https://www.spherestandards.org/resources)) and the other sets of standards which are part of the Humanitarian Standards Partnership (HSP). All HSP standards are available via the Interactive Handbook ([🔗 handbook.hspstandards.org](https://handbook.hspstandards.org)), including Livestock Emergency Guidelines and Standards (LEGS), Minimum Economic Recovery Standards (MERS) and many more.

✓ **Tip:** See **Figure 5 on p. 19** for examples of how NbS can be applied in humanitarian settings.

## About the Sphere Handbook

The **Sphere Handbook** is one of the most widely known and internationally recognised sets of common principles and universal minimum standards for the delivery of accountable and quality humanitarian responses. It defines an integrated approach to humanitarian assistance focused on supporting populations affected by disaster and crisis to survive and recover with dignity. The Handbook thus provides a holistic entry point to humanitarian response at all stages of the programme cycle. It also helps inform preparedness and early recovery.

The **Humanitarian Charter** is the cornerstone of the Sphere Handbook, expressing the shared conviction of humanitarian actors that all people affected by crisis have a right to receive protection and assistance. This right ensures the basic conditions for life with dignity.

The Humanitarian Charter provides the ethical and legal backdrop to the Protection Principles, the Core Humanitarian Standard and the Minimum Standards. It builds on the 1994 "Code of Conduct for the International Red Cross and Red Crescent Movement and Non-Governmental Organisations (NGOs) in Disaster Relief". The Code of Conduct remains an integral component of the Sphere Handbook.

The **Protection Principles** are a practical translation of the legal basis and rights outlined in the Humanitarian Charter into four principles that inform all humanitarian response. The Protection Principles help all humanitarian actors to help other people to:

- stay safe and dignified;
- access assistance;
- recover;
- claim their rights.

## FIGURE 2: THE CORE HUMANITARIAN STANDARD

The **Core Humanitarian Standard** (CHS) (Figure 2) sets out nine Commitments to improve the quality and effectiveness of assistance. It facilitates greater accountability to communities and people affected by crisis; staff; donors; governments; and other stakeholders. The CHS is applicable across humanitarian response.

**Minimum Standards** help humanitarian actors determine areas of need and gaps to focus on. For each technical sector, they state what response outcomes need to be reached as a minimum. They are expressions of rights rooted in the Humanitarian Charter, the Protection Principles and the Core Humanitarian Standard – Sphere’s three foundation chapters.

**Humanitarian Standards Partnership (HSP)** Sphere and several other humanitarian standards initiatives joined together to form the Humanitarian Standards Partnership ([hspstandards.org](https://hspstandards.org)). All these standards share the same rights-based foundation consisting of the Humanitarian Charter, the Protection Principles and the Core Humanitarian Standard.



# Part 1: Nature-based solutions for humanitarian action

## This section:

- outlines the link between Sphere, the environment and humanitarian action;
- explains why considering the environment is important in humanitarian assistance;
- introduces and explains how nature-based solutions are applicable in humanitarian contexts;
- shows where in the Sphere Handbook to find more information.

## Sphere, the environment and humanitarian action

*“The environment in which people live and work is essential for their health, well-being and recovery from crisis.”*

🔗 *Sphere Handbook: What is Sphere?, p. 19*

Sphere recognises that everyone has the right to a healthy environment, and that protecting the environment is necessary under certain circumstances in humanitarian action 🔗 *Sphere Handbook: Environmental impact in humanitarian response, p. 19*. Across the Sphere Handbook’s foundation chapters there are direct and indirect references to the importance of safeguarding the environment in humanitarian action to protect people’s safety, dignity and rights. For example:

- **Code of Conduct core principle 8:** *Relief aid must strive to reduce future vulnerabilities to disaster as well as meeting basic needs.*
  - Environmental degradation can cause or exacerbate disaster risks and create vulnerabilities. There is a need to for those involved in relief aid to address environmental degradation 🔗 *CoC, p. 387*.

- **Protection Principle 1:** *Enhance people’s safety, dignity and rights and avoid exposing them to further harm.*
  - There is the need to consider environmental impacts in employing a rights-based approach to response 🔗 *GN: Humanitarian Assistance, p. 39*.
- While all the Commitments of the *Core Humanitarian Standard* (CHS) are relevant to environmental safeguarding, Commitments 1, 3, 6 and 9 are particularly important for environmental considerations:
  - **Commitment 1:** *Communities and people affected by crisis receive assistance appropriate to their needs.*
    - Key action point 1.1 requires an assessment of the context and stakeholders. Environmental risk should be considered alongside wider assessments as part of effective humanitarian response 🔗 *KA 1.1, p. 54*.
  - **Commitment 3:** *Communities and people affected by crisis are not negatively affected and are more prepared, resilient and less at-risk as a result of humanitarian action.*

- Do no harm by avoiding contributing to the unsustainable management of natural resources or the occurrence of environmental emergencies  
 🔗 **KAs 3.1, p. 59 and 3.6, p. 60.**
- **Commitment 6:** *Communities and people affected by crisis receive coordinated, complementary assistance.*
  - Humanitarian and environmental actors can work together to share information and coordinate assessments that highlight, for example, environmental sensitivities or hazards, natural resource availability or land tenure rights 🔗 **KAs 6.1, p. 70 and 6.4, p. 71.**
- **Commitment 9:** *Communities and people affected by crisis can expect that the organisations assisting them are managing resources effectively, efficiently and ethically.*
  - The unsustainable use of local or natural resources can cause or worsen disaster risks. Rapid environmental impact assessments can help determine and mitigate risk early in the response phase 🔗 **KA 9.4, p. 81** and **GN: Efficient use of resources, p. 82.**

In addition, several of the Handbook's technical chapters systematically include environmental considerations as a cross-cutting issue. (For example, all technical chapters provide appendices with assessment checklists.) These linkages are looked at in **Part 3: Applying the Sphere technical standards.**

While the Sphere Handbook does not explicitly mention nature-based solutions (NbS), its principles and standards are relevant when planning, implementing and evaluating NbS for environmental safeguarding.

🔗 See Sphere Thematic Sheet 1: Reducing environment impact in humanitarian response ([bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en)) and Thematic Sheet 2: Disaster Risk Reduction ([bit.ly/sphere-ts2-en](https://bit.ly/sphere-ts2-en)).

## Why the climate and environment matter in humanitarian action

*“Humanitarian operations affect the environment both directly and indirectly.”*

🔗 **Sphere Handbook: What is Sphere?, p. 19**

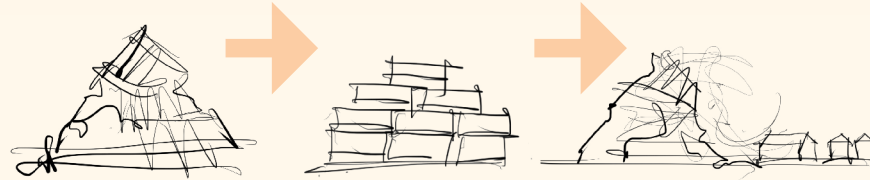
The need to protect and save lives is the foremost urgent focus of humanitarian response. In certain circumstances, to ensure the protection of lives and livelihoods, there is a need to consider the environment, especially as the climate and environmental crises are also humanitarian crises.

Environmental degradation exacerbates people's exposure and vulnerability to hazards, destroys livelihoods and increases health threats. It can trigger large-scale displacement, fuel conflict and undermine humanitarian gains, ultimately increasing the number of people in need.

This relationship between the environment and humanitarian response is twofold, in that climate and environmental crises lead to and affect humanitarian operations, while humanitarian operations can also impact the environment.

## FIGURE 3: THE IMPLICATIONS OF NOT CONSIDERING THE ENVIRONMENT

### SHELTER AND SETTLEMENTS



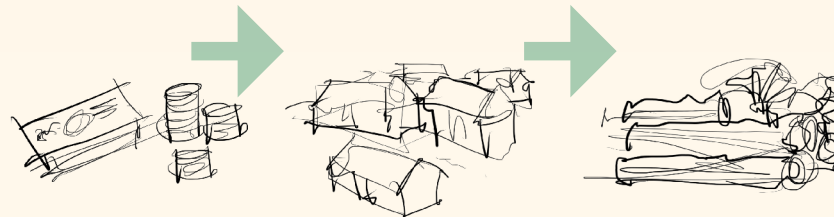
Incentivising the extraction of soil for brickmaking can degrade the environment, increasing the risk of erosion and landslides.

### WASH



Water points, constructed without considering climate and groundwater models, can dry out, exacerbating WASH and health insecurity.

### CASH



Cash transfers to support shelter reconstruction that do not consider sustainable resource management can inadvertently encourage unsustainable harvesting of wood and forest products.

- **The environment impacts humanitarian response:** A degraded environment can trigger or worsen a humanitarian crisis. For example, the loss of a mangrove forest can increase a community's exposure to storm surges, amplifying a cyclone's impacts. It can also make responding to a crisis more difficult [↗ CHS Commitment 1, GN: Vulnerability, p. 56](#).
- **Humanitarian operations can damage the environment,** exacerbating underlying vulnerability and risk. For example, deforestation on slopes surrounding a refugee camp can create an increased risk of landslides, putting lives in danger [↗ The Humanitarian Charter, p. 28; CHS Commitment 9, p. 31; CHS Commitment 3 KA 3.6, p. 60 and GN: Environmental Concerns, p. 62](#).

It is possible to reconcile life-saving objectives and environmental safeguarding. Doing so can reduce environmental risk and increase the resilience of people and the ecosystems on which they rely.

See [Figure 3](#) for examples of how risk can be generated when humanitarian actions fail to consider the environment.



There are a range of climate and environment approaches that support and improve the outcomes of humanitarian action. These vary, depending on:

- their intended **objective**;
- the time taken to see **results**;
- the **scale** at which they are applied;
- what specific **actions** are undertaken.

These activities can be categorised based on whether they focus predominantly on reducing greenhouse gas emissions or on increasing the resilience of both the environment and of communities to hazards and shocks. These areas can be both complementary and overlapping. See [Figure 4](#) for more information.

While the primary focus of this Unpacked Guide is on nature-based solutions for resilience, climate change adaptation and disaster risk reduction strategies that help reduce waste and mitigate climate change by reducing emissions are also offered.

## FIGURE 4: ENVIRONMENTAL SUSTAINABILITY AND RESILIENCE BUILDING

	ENVIRONMENTAL SUSTAINABILITY	RESILIENCE BUILDING
<b>APPROACHES</b>	<ul style="list-style-type: none"> <li>• Green response and recovery</li> <li>• Institutional greening</li> <li>• Climate change mitigation</li> </ul>	<ul style="list-style-type: none"> <li>• Nature-based solutions</li> <li>• Climate change adaptation</li> <li>• Disaster risk reduction</li> </ul>
<b>OBJECTIVE</b>	<ul style="list-style-type: none"> <li>• Operations and policies advance environmental mainstreaming and climate-conscious practices that reduce environmental impact and greenhouse gas emissions</li> </ul>	<ul style="list-style-type: none"> <li>• Practices increase the resilience of communities including social and environmental systems to climate change, disasters and conflict</li> </ul>
<b>ACTIONS (EXAMPLES)</b>	<ul style="list-style-type: none"> <li>• Use of renewable energies in operations and in the field</li> <li>• Ecological and carbon footprint assessment</li> </ul>	<ul style="list-style-type: none"> <li>• Use of drought-resistant native seed varieties</li> <li>• Restoration of mangroves to buffer against storm surges and provide habitat for fish stocks</li> </ul>

Throughout the handbook there are many suggestions of circumstances where environmental management, restoration and protection actions that support NbS approaches can be considered in humanitarian response. Part 3 of this Unpacked Guide offers some practical suggestions.

✓ **Nature-based solutions (NbS)** 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**.”

↪ *UNEA resolution 5/5* ([bit.ly/nbs-en-003](https://bit.ly/nbs-en-003))

## Nature-based solutions for resilience

Resilience building encompasses concepts and practices for increasing the resilience of social and environmental systems to climate change, disasters and other crises. Nature-based solutions are a powerful tool for achieving this. They include protecting and restoring forests, protecting mangroves and coral reefs, sustainably managing agroforestry systems, and conserving and restoring wetlands and watersheds. See **Figure 5** for examples of different types of applications.

At the heart of NbS is the fact that they **address one or more major societal issues**, including disaster risk, climate change, food and water security, socioeconomic development, and health. They are designed to enhance the range of **ecosystem services** provided by the environment that support people (**Figure 6**).

NbS differ from other environmental approaches, such as natural resource management, in that they focus on **protecting** both **human well-being** and the **environment**.

NbS are implemented in a broader context of natural resource governance, which has principles complimentary to Sphere’s, including:

- access to justice and conflict resolution;
- accountability;
- coordination and coherence;
- devolution or localisation;
- fair and effective rule of law;
- inclusive decision-making;
- recognition and respect of tenure rights, diverse cultures, knowledge and institutions;
- sustainable and equitably shared resources.

NbS can have multiple short-, mid- and long-term benefits, or “**dividends**”, that support humanitarian outcomes, while also bolstering social, economic and environmental recovery; strengthening climate resilience; and transforming humanitarian systems to be more climate-conscious.

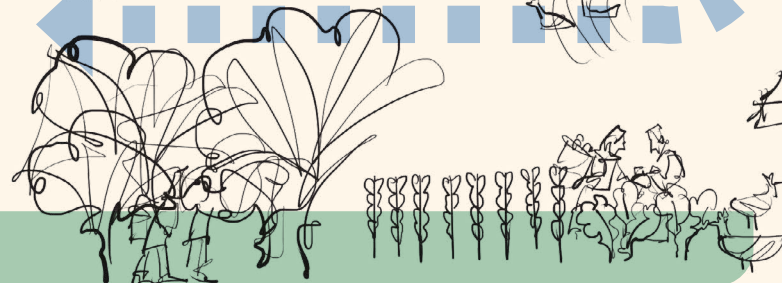
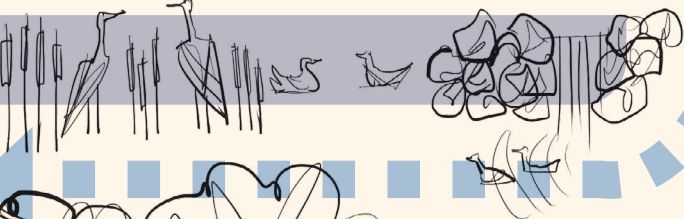
✓ **Tip: Table 1 (NbS, strategies and benefits in humanitarian clusters/sectors)**, p. 52, provides an overview of NbS strategies and the multiple benefits they can provide across sectors.

## FIGURE 5: EXAMPLES OF NATURE-BASED SOLUTIONS APPLICATIONS IN HUMANITARIAN SETTINGS

**Protection and restoration of mangrove, coral reef and coastal wetlands** to reduce coastal flooding



**Protection and restoration of wetlands and watersheds** for reduced flooding and increased water security

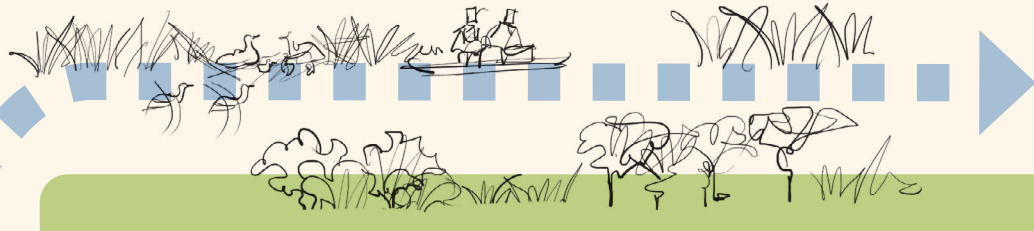


**Agroforestry systems** for increased food security and environmental health

**Forest restoration and bio-engineering** to reduce landslides, erosion, rockfall and avalanches



**Providing space for rivers to flow naturally** to enable flood protection and water security



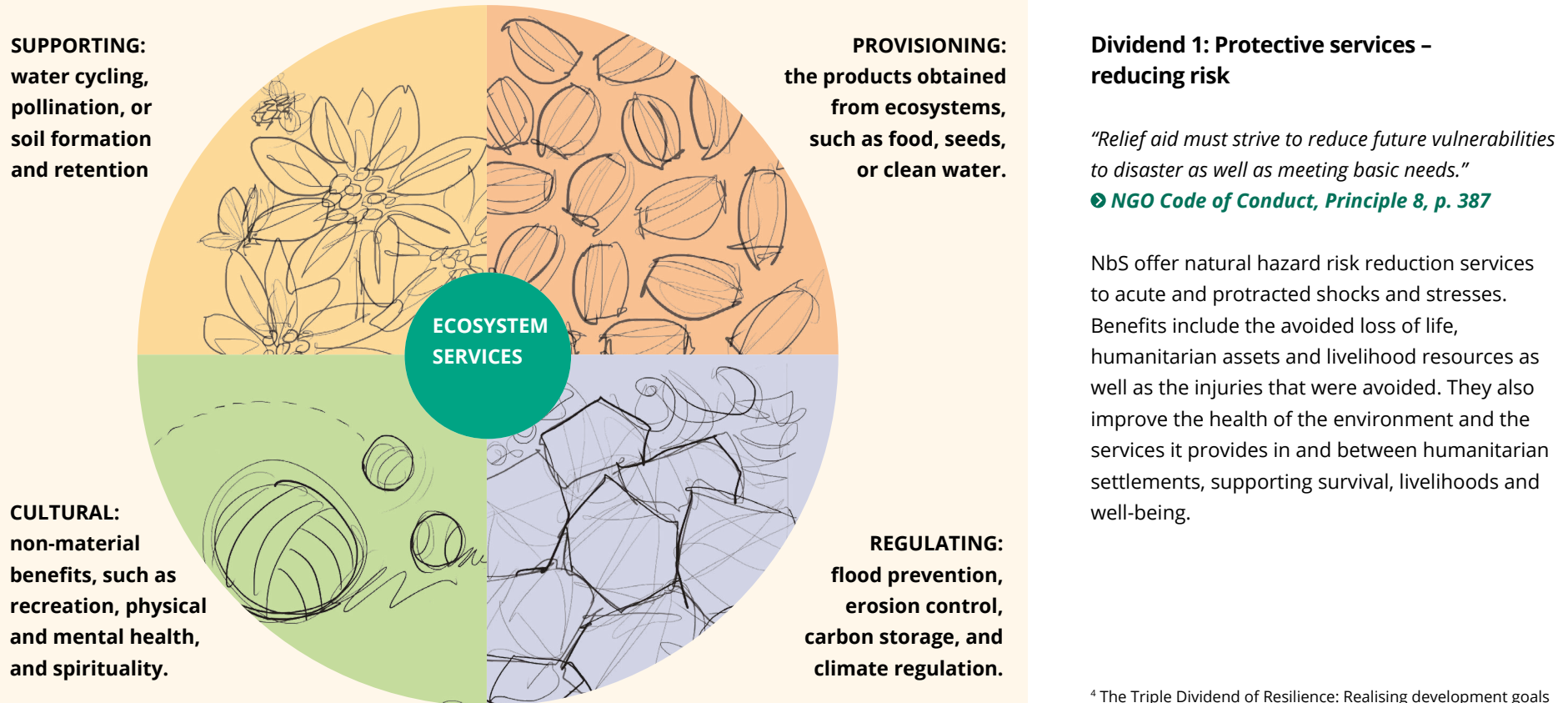
**Green belts** as shelters from sand and providing shade



**Urban green and blue spaces** to help climate regulation, health, social development and green jobs

## FIGURE 6: ECOSYSTEM SERVICES

Nature-based solutions are founded on the fact that ecosystems provide people with essential services for their survival and well-being. These ecosystem services can be put in four main categories:



Source: *Millennium Ecosystem Assessment (2005)*

These resilience “dividends” relate to the Triple Dividend of Resilience framework<sup>4</sup> and, in the context of NbS, can be summarised as follows:

### Dividend 1: Protective services – reducing risk

*“Relief aid must strive to reduce future vulnerabilities to disaster as well as meeting basic needs.”*

🔗 *NGO Code of Conduct, Principle 8, p. 387*

NbS offer natural hazard risk reduction services to acute and protracted shocks and stresses. Benefits include the avoided loss of life, humanitarian assets and livelihood resources as well as the injuries that were avoided. They also improve the health of the environment and the services it provides in and between humanitarian settlements, supporting survival, livelihoods and well-being.

<sup>4</sup> The Triple Dividend of Resilience: Realising development goals through the multiple benefits of disaster risk management, Tanner et al., 2015, [bit.ly/nbs-en-004](https://bit.ly/nbs-en-004) and The Nature Navigator: A handbook for disaster risk management practitioners, IFRC, 2022, figure 1.6, page 11, [bit.ly/nbs-en-002](https://bit.ly/nbs-en-002)

NbS can contribute to the humanitarian imperative of preventing and alleviating suffering caused by climate and environmental crises by:

- **preventing** or **mitigating** the incidence and severity of hazards:
  - *Reforestation degraded slopes through terraced agroforestry can reduce the risk of landslides.*
- **reducing** people's **exposure** to hazards:
  - *Land restoration approaches that counter desertification can reduce exposure to sandstorms, drought, and related food and water insecurity.*
- **reducing** people's **vulnerability**, and bolstering resilience capacities:
  - *Distributing climate-smart vegetable garden supplies along with trainings to support shelter gardens in refugee camps can bolster food security, sequester carbon and improve soil fertility.*

➔ **CHS Commitment 3, p. 49, including KA 3.1, p. 59.**

✓ **Tip:** The Sphere Handbook's foundation chapters – The Humanitarian Charter (HC), Protection Principles (PPs) and Core Humanitarian Standard (CHS) – provide a solid ground for translating disaster risk reduction into practice. *Sphere Thematic Sheet 2: Disaster Risk Reduction, 2020, p. 2* ([bit.ly/sphere-ts2-en](https://bit.ly/sphere-ts2-en))

**Figure 7** shows how healthy ecosystems can reduce hazard impact and increase societal resilience across a wide variety of landscapes.

### **Dividend 2: Economic – unlocking sustainable poverty escapes**

*“Each year, implementing nature-based solutions could provide developing countries with valuable protection against the economic cost of climate change, reaching US\$104 billion in 2030.”<sup>5</sup>*

Dividend 2 fosters increased positive coping and adaptive capacities benefits, such as livelihood and income generation and self-reliance. These benefits help people to escape poverty and reduce longer-term aid dependency.

- **Economic and social benefits:** NbS can provide food and water security. Approaches such as agroforestry can restore and strengthen food systems and foster biodiversity, helping to improve agricultural yields and lessening food insecurity. Access to agricultural resources can provide additional income sources that offer poverty escapes during lean seasons or drought.
- **Health benefits:** There is a close link between people's health and the environment. In addition to the benefits brought about by improved food security and nutrition, NbS can reduce air, water and soil pollution while creating natural spaces that support physical and mental well-being.

<sup>5</sup> Working with Nature to Protect People: How NbS Reduce Climate Change and Weather-Related Disasters, IFRC and WWF, 2022, page 35, [bit.ly/nbs-en-001](https://bit.ly/nbs-en-001)

# FIGURE 7: NATURE-BASED SOLUTIONS FOR DISASTER RISK REDUCTION

Source: IFRC, 2021

**How can we use nature to help communities build resilience to extreme weather events and climate change?**

## Farmland



**Hazard:** Drought leads to crop failure and livestock loss  
**Solution:** Implement agroforestry to reduce evaporation and make better use of soil moisture



**Hazard:** Flooding leads to loss of assets, crop yield reduction and transport disruption  
**Solution:** Protect and restore forests to slow water runoff

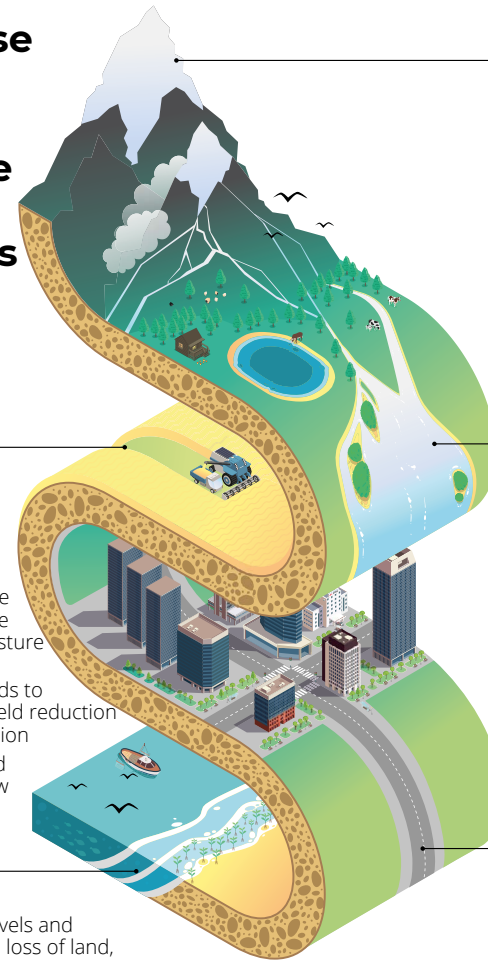
## Coasts



**Hazard:** Rising sea levels and coastal erosion cause loss of land, livelihoods and assets  
**Solution:** Restore coastal wetlands



**Hazard:** Storm surges lead to loss of life and assets  
**Solution:** Protect and restore mangroves, marshes and reefs to buffer coasts and absorb floodwaters



## Mountains, forests and watersheds

**Hazard:** Intense rainfall causes landslides, soil loss and siltation  
**Solution:** Protect and restore forests to stabilise soils and slow water runoff



**Hazard:** Wildfires lead to loss of life and assets  
**Solution:** Protect and manage forests to prevent wildfires



## Rivers and Wetlands

**Hazard:** Flooding leads to loss of assets, contaminated waters and crop yield reduction  
**Solution:** Restore wetlands to absorb and filter flood waters



**Hazard:** Drought reduces the flow of rivers  
**Solution:** Protect and restore forests and watersheds to regulate the flow of rivers



## Cities

**Hazard:** Intense rainfall causes urban flooding  
**Solution:** Restore passageways for water, expand green spaces and introduce porous surfaces to reduce flood risk



**Hazard:** Urban heat islands can cause heat stress  
**Solution:** Expand green spaces in and around cities



Source: Adapted from Global Commission on Adaptation, Adapt Now report, 2019

- **Cost-effective:** NbS are increasingly recognised as an effective, practical and cost-efficient way of building resilience.<sup>6</sup> Scaling up such solutions could provide protection against the economic cost of loss and damage caused by environmental degradation and climate change.

✓ See **Appendix 1** for an overview of the different NbS approaches, including blue/green and hybrid infrastructure.

### Dividend 3: Socioecological – catalysing sustainability outcomes

NbS promote or reinforce multiple humanitarian outcomes across sectors, and increase protection through enhanced community governance of natural resources, improved social cohesion and reduced conflict.

- **Climate and environmental benefits:** From filtering water to preventing soil erosion, NbS offer many climate and environmental benefits. Making these benefits a reality is important as humanitarians tackle growing risks brought about by environmental degradation and climate change, such as increases in the spread of zoonotic diseases between animals and people [↪ CHS 9, GN: Environmental impact and use of natural resources, p. 82](#).
- **Transformative opportunities:** NbS provide a framework to reprioritise the environment into humanitarian action, as a means to alleviate suffering in humanitarian contexts and prevent future harm. They offer a transformative opportunity to shift assistance from short-term, small-scale responses towards long-term, landscape-scale responses that integrate environmental measures to increase the climate resilience of affected people [↪ NGO CoC, Principle 8, p. 387](#).

These “triple dividends” that nature-based solutions provide can help to enhance the effectiveness, impact, sustainability and accountability of humanitarian action [↪ What is Sphere?, p. 4](#).

### When to consider using nature-based solutions

Nature-based solutions can be implemented to different degrees and scales at various stages of the disaster management cycle, including:

- **Prevention, mitigation, and preparedness**
  - *Time frame:* Ongoing
  - *Context:* Post-acute shock; new and protracted crises
  - *Example:* Promote crop diversification with drought-tolerant native species to strengthen livelihood resilience to future droughts.
- **Emergency phase**
  - *Time frame:* Hours to days
  - *Context:* Post-acute shock
  - *Example:* Prevent harm to people and the ecosystem services that protect and sustain them by including environmental impacts in rapid integrated assessments.

<sup>6</sup> Policy Brief: How cost-effective are Nature-based Solutions to climate change adaptation?, Nature Based Solutions Initiative, 2018, [↪ bit.ly/nbs-en-005](https://bit.ly/nbs-en-005)

- **Early recovery**
  - *Time frame:* Weeks to months
  - *Context:* Post-acute shock; new and protracted crises
  - *Example:* Innovating via small-scale “learning pilots”, testing strategies and actions.
- **Sustainable reconstruction**
  - *Time frame:* Months to years
  - *Context:* Post-acute shock; ongoing protracted crises
  - *Example:* Integrate and scale strategies conducted in the small-scale learning pilots into ongoing and new programme activities, joint response plans, operational strategies.

✓ **Table 2 (NbS by sector across the disaster management cycle stage)**, p. 69, outlines NbS strategies by sector – food security and nutrition (FSN); health; shelter and settlement; and water supply, sanitation and hygiene promotion (WASH) – across the different stages of the disaster management cycle.

## Challenges

Implementing NbS in humanitarian contexts is not without its challenges:

- **Time frame:** Access to resources must be secured, and basic human security protected. Once these objectives are met, it might take weeks to years to see the short-, mid- and long-term benefits to humanitarian outcomes of nature-based solutions.
- **Scale:** “Scale” can refer to the dynamic cultural, social and economic systems within which nature-based solutions are applied. NbS often require a broader landscape-scale (such as a “ridge-to-reef”) approach, spanning political and agency response boundaries. Engaging in landscape-level design requires transboundary, inter-agency coordination and conflict-sensitive governance.
- **Funding:** Operations are often planned and funded for the short term, despite the longevity of crises. NbS approaches don’t always align with traditional donor priorities and time frames, and access to funding for testing and scaling approaches can be difficult. Building the cost-benefit and evidence base can help shift donor buy-in and funding mechanisms.
- **Expertise:** Building NbS expertise requires training interventions, tools, technology and changes in behaviour. Often this involves partnering with Indigenous and local community members; environmental experts; affected peoples; and academic, civil society, and other actors.
- **Safeguards:** In crises the environment is often degraded, which can impact NbS options. Benefits may not be equally shared if solutions are not designed using socially inclusive and gender-sensitive processes. Environmental safeguarding and trade-offs need to be integrated into assessments to ensure inequalities are not created.



## Guidance

- Recent research by the University of Massachusetts Amherst ([🔗 Eco-DRR: Equity and Efficiency Analysis, bit.ly/nbs-en-006](#)) demonstrates how nature-based solutions can be economically efficient and promote equity.
- For additional guidance on equitably balancing trade-offs between environmental protection and other benefits (including livelihoods and the rights, usage of and access to land and resources), [🔗](#) see the IUCN Global Standard for Nature-based Solutions ([bit.ly/nbs-en-007](#)).

**Table 1 (NbS strategies and benefits in humanitarian clusters/sectors)** and **Table 2 (NbS by sector across the disaster management cycle stage)** provide practical suggestions for exploring NbS with different scales, time frames, and scopes, and within and across sectors, stakeholders and agencies.

## Additional resources

In addition to the resources provided above in Part 1, the following guidance can be useful in considering nature-based solutions for humanitarian action. See **Table 3: Recommended guidance** for more details.

### Climate, the environment and humanitarian action

- Climate and Environment Charter for Humanitarian Organisations ([🔗 climate-charter.org](#))
- NbS In Humanitarian Contexts Working Group ([🔗 friendsofeba.com/wgs/humanitarian](#))
- Environment and Humanitarian Action Connect (EHA Connect) ([🔗 ehaconnect.org](#))
- Environment and Humanitarian Action: Increasing Effectiveness, Sustainability and Accountability, ProAct Network, Groupe URD, 2014 ([🔗 bit.ly/nbs-en-008](#))

### Nature-based solutions

- Disasters and Ecosystems, Resilience in a Changing Climate - Source Book, UNEP, 2019 ([🔗 bit.ly/nbs-en-009](#))
- Ecosystem-based Adaptation (EbA) Tools Navigator, FEBA, IIED, IUCN, UNEP-WCMC, GIZ ([🔗 toolsnavigator.friendsofeba.com](#))
- NbS in Humanitarian Contexts: Key Messages, IUCN, FEBA, PEDRR, 2021 ([🔗 bit.ly/nbs-en-010](#))
- Words into Action: NbS for disaster risk reduction, UNDRR, 2021 ([🔗 bit.ly/nbs-en-011](#))

## FIGURE 8: SUMMARY OF CHALLENGES TO IMPLEMENTING NATURE-BASED SOLUTIONS

ACCESS, SECURITY, AND RESPONSE TIMEFRAMES



SCALE REQUIRED – ‘WATERSHED’ OR ‘RIDGE-TO-REEF’ LEVELS



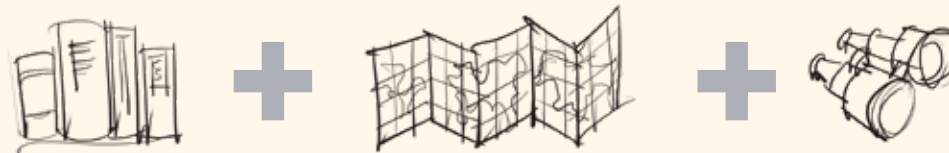
INTEGRATING ENVIRONMENTAL AND SOCIAL SAFEGUARDING



EVIDENCE OF EFFECTIVENESS AND SCALABILITY



EXPERTISE



FUNDING AND DONOR FLEXIBILITY



## Part 2: Towards an integrated approach

### This section:

- introduces an integrated approach to NbS in humanitarian contexts;
- outlines shared characteristics between humanitarian responses and NbS;
- notes where to find relevant information in the Sphere Handbook and key resources.

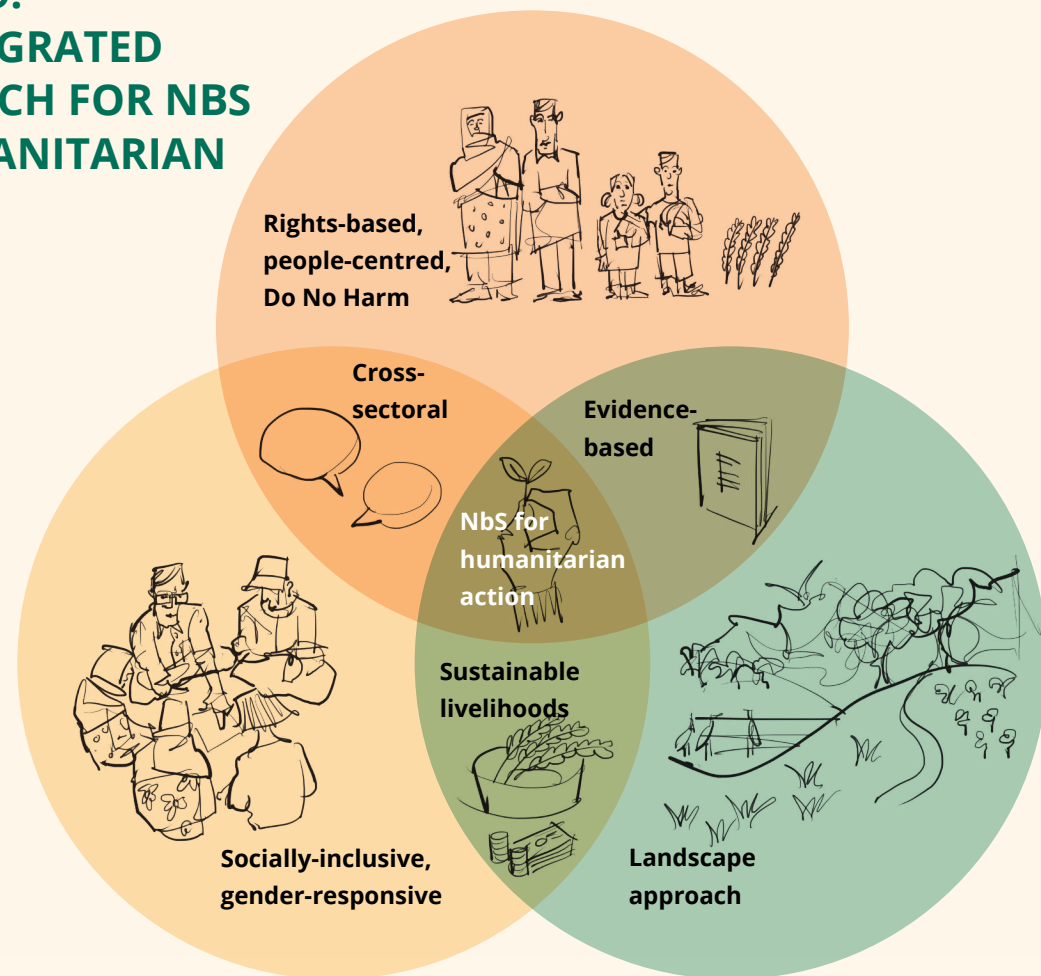
### An integrated approach for nature-based solutions in humanitarian contexts

Humanitarian aid and nature-based solutions (NbS) share complementary approaches, including being:

- cross-sectoral;
- gender-informed;
- participatory;
- people-centred;
- rights-based;
- socially inclusive.

**Figure 9** shows approaches that NbS and humanitarian action share.

**FIGURE 9:  
AN INTEGRATED  
APPROACH FOR NBS  
IN HUMANITARIAN  
ACTION**



## A rights-based, people-centred, “do no harm” approach

*“The Sphere Handbook reflects Sphere’s commitment to a principled and rights-based humanitarian response.”* ♦ **What is Sphere?, p. 5**

The Sphere Standards are expressions of universally applicable human rights and are based on fundamental respect for people’s right to be fully involved in decisions regarding their recovery. Participation in NbS approaches should be based on mutual respect and equality, regardless of gender, age or social status, and should uphold the right of Indigenous peoples to “free, prior and informed consent” (FPIC).

This includes undertaking NbS in ways that:

- uphold the rights of Indigenous peoples and local communities, including the right to access, own and benefit from natural resources ♦ **Protection Principle 4, p. 43;**

- support displaced communities to access land tenure and sustainable livelihoods through conflict-sensitive processes with host communities ♦ **Shelter standard 6: Security of tenure, p. 266;**
- acknowledge, involve and respond to the concerns of stakeholders and at-risk populations;
- are participatory and community-led and -sustained ♦ **CHS Commitment 4, p. 62 and Commitment 8, p. 31.**

The Handbook also emphasises the “do no harm” principle: aid must not inflict further harm upon its recipients, nor should it contribute to or cause further environmental degradation ♦ **PP 1, p. 38 notably** ♦ **GN: Humanitarian assistance, p. 39,** and ♦ **CHS Commitment 3, GN: Negative effects and “do no harm”, p. 61.** Nature-based solutions can:

- contribute to the environmental responsibility of humanitarian action at multiple stages;
- reinforce the humanitarian objectives of addressing human suffering and protecting lives.

➔ See Sphere Thematic Sheet 1: Reducing environment impact in humanitarian response ([bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en))

✓ **Tip:** Environmental impact assessments are tools that can support the efficacy of humanitarian programmes. See **Assessment** for examples of tools that can be used to support the **do no harm** principle.

## A landscape approach

Ecosystems, such as watersheds, can exist across political and agency response boundaries and thus require a landscape approach (**Figure 10: What is a landscape approach?**). While it is often challenging, taking a landscape approach in designing operations can be essential in accounting for the interconnected aspect of social, ecological and economic systems

➔ *Shelter standard 7, GN: Urban and rural contexts, p. 273*. Where possible, NbS in humanitarian action should:<sup>7</sup>

- identify the right landscape **scale** to maximise effectiveness. An ecosystem assessment can help to identify the appropriate scale to work at (e.g. ecosystem, watershed, etc.);
- account for how the ecosystem **interacts** with adjacent ecosystems;

## FIGURE 10: WHAT IS A LANDSCAPE APPROACH?

A landscape approach is a cross-sectoral and holistic approach. Its main characteristics include the following:

---

It places communities at the centre.

---

It considers all actors.

---

It examines the entire landscape in which risks originate and manifest themselves.

---

It includes an analysis of the hydrology.

---

It integrates ecosystem management and restoration.

---

It manages trade-offs.

---

It is flexible to future changes.

---

It demands a long-term perspective.

---

Source: Adapted from *A landscape approach for disaster risk reduction in 7 steps*, CARE and Wetlands International, 2021, [bit.ly/nbs-en-012](https://bit.ly/nbs-en-012))

<sup>7</sup> Adapted from *The Nature Navigator: A handbook for disaster risk management practitioners*, IFRC 2022, [bit.ly/nbs-en-002](https://bit.ly/nbs-en-002)

## FIGURE 11: NBS IN HUMANITARIAN CONTEXTS AT A LANDSCAPE SCALE

### HUMANITARIAN CHALLENGES

Deforestation, increased heat islands/lack of tree canopy and vegetative cooling, habitat loss  
Erosion, landslides, rockfalls, flooding, mudflow, avalanche

Reduced water supply and quality up and downstream  
Insufficient WASH, contamination of ground and surface water, environmental pollution, health hazards, increased vector-borne and water-borne diseases

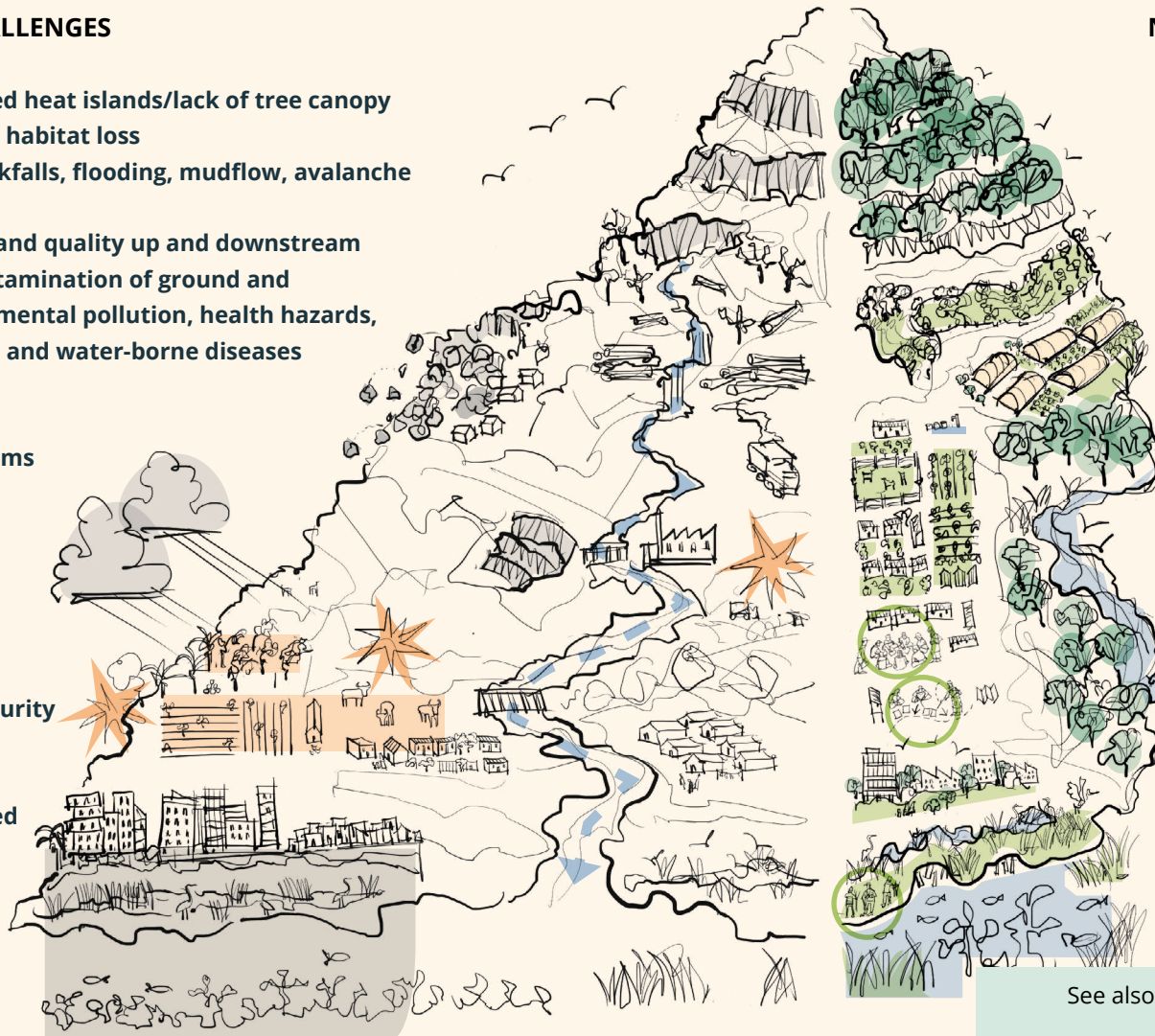
Increased severity and unpredictability of storms

Overgrazing, poor soil health, increased pest infestations, crop and livestock losses

Lack of land tenure security  
Tensions, conflict

Unsafe housing, reduced food security, lack of sustainable livelihood opportunities

Coastal flooding



### NATURE-BASED SOLUTIONS

Terraced reforestation and slope stabilization;  
Water catchment banks, swales, groundwater recharge

Weather-resistant shelters designed for extreme rainfall and wind events

Household and community gardens and animal pens separated from shelters and environmentally sensitive areas, water points

Community-based committees lead landscape and site mapping, design and planning to incorporate NbS into settlements, reduce tensions and hazards, and restore environmental functions

See also [Figure 5](#), [Figure 6](#) and [Table 1](#).

- consider **interdependencies** between the environment and broader social, ecological and economic systems [🔗 Shelter standard 2, KA 2, p. 249](#) and associated **GN: Drainage of rainfall and floodwater, p. 252**.

For more information on the different landscape assessment tools available, see p. 36.

**Figure 11** shows examples of NbS applied at a landscape scale in humanitarian response.

## A socially inclusive and gender-responsive approach

NbS provide an opportunity to respond to the concerns of different stakeholders. Shared characteristics of equitable humanitarian and nature-based approaches include:

- being inclusive of and strengthening Indigenous peoples and local communities (including those affected by crises) in decision-making processes and activities around response, disaster risk reduction and recovery [🔗 CHS 4, KA 4.3, p. 63, CHS 4 KA 4.6, p. 64, CHS 4 GN: Participatory Engagement, p. 65, and CHS 4 GN: Organisational commitment, p. 66](#);
- prioritising marginalised groups as leaders in designing and delivering locally grounded, culturally sustainable approaches;
- mobilising young people as agents of change;
- engaging those involved in natural resource management practices, and empowering them to reduce risks and vulnerabilities to future shocks and stresses;
- understanding that different genders relate to natural resources and their management in different ways [🔗 CHS 1, KA 1.1, p. 54](#) – for example, proposing activities that inadvertently increase women’s care burden may be better avoided;
- supporting women as powerful actors for change and as equitable stakeholders in decision-making mechanisms and processes.

**🔗 What is Sphere?: Understanding vulnerabilities and capacities, p. 10, including children; p. 12, gender; p. 13 and LGBTQI people; p. 15.**

**🔗 Guidance:** See p. 138 of Disasters and Ecosystems, Resilience in a Changing Climate - Source Book, UNEP, 2019 ([bit.ly/nbs-en-009](http://bit.ly/nbs-en-009)), for more on gender, disaster risk response and community-based tools in nature-based approaches.

## A cross-sectoral approach

Ecosystems deliver services to a diversity of sectors. Programmes should be designed and implemented collaboratively and with consideration for the environment. This includes:

- prioritising localisation;
- supporting civil society organisations to integrate decision-making into humanitarian operations;
- engaging local communities, all levels of government and civil society in multi-stakeholder collaborative partnerships;
- developing shared inter-agency, cross-sector assessments and joint response plans and policies [↻ CHS 6, p. 70 notably CHS 6 GN: Coordination, p. 72.](#)

✓ **Tip:** See p. 20 to learn more about ecosystem services.

## Sustainable livelihoods

Lives and livelihoods depend on the goods and services provided by healthy ecosystems. See [Figure 6 \(p. 20\)](#) for an overview of the services the environment can provide. Humanitarian actors can protect livelihoods by safeguarding natural resources that affected communities rely on by:

- integrating environmental risk reduction, ecosystem valuation, and safeguards to ensure aid is promoting sustainability and healthy environments that support livelihoods [↻ What is Sphere? Appendix: Delivering assistance through markets, p. 20](#) and [Food Security standard 5, KA 4, p. 194](#);
- working together with environmental professionals to coordinate and find common solutions that improve livelihoods for disaster-affected communities [↻ CHS 6, p. 70](#) and [CHS 9, GN: Environmental impact and use of natural resources, p. 83.](#)

See [Part 3: Food security and nutrition](#) for practical guidance on how NbS can help protect and restore livelihoods.

[↻ CHS Commitment 3, KA 3.6, p. 60](#)

[↻ Food Security and Nutrition Section 7: Livelihoods, p. 211, notably FSN standard 7.1, KA 5, p. 211](#) and [FSN 7.1 GN: Production strategies, p. 212](#)

[↻ Guidance:](#) The Standards for Supporting Crop-related Livelihoods in Emergencies (SEADS) ([bit.ly/seads-2022](https://bit.ly/seads-2022)) is a set of international principles and minimum standards that support actors responding to a humanitarian crisis to design, implement and evaluate crop-related crisis responses.



## Evidenced-based

“Ensure that ecosystem-based adaptation and disaster risk reduction interventions are evidence-based, integrate Indigenous and traditional knowledge, where available, and are supported by the best available science, research, data, practical experience, and diverse knowledge systems.”

*Words Into Action, 2021, p. 39*

A strong evidence base is an enabler of effective NbS and humanitarian programmes.

- Working with globally agreed standards across the humanitarian programme cycle allows for timely and evidence-based decisions within response.

🔗 **What is Sphere? The standards apply throughout the programme cycle, p. 9**

🔗 Sphere in Context and for Assessment, Monitoring and Evaluation ([bit.ly/sphere-camel-en](https://bit.ly/sphere-camel-en))

- Integrating response with NbS approaches can support learning and improving the evidence-base across sectors, contributing to increased programme effectiveness and organisational change 🔗 [CHS 2, KA 2.4, p. 57](#) and [CHS 7, p. 73](#).

**Part 3, Applying the Sphere technical standards (p. 35), and Part 4, Tools for integrating nature-based solutions (p. 52),** offer tools and strategies that can help build the evidence base.

### 🔗 Guidance:

- Ecosystem-based disaster risk reduction: Implementing NbS for resilience, UNDRR, 2020 ([bit.ly/nbs-en-014](https://bit.ly/nbs-en-014))
- Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions, GIZ, UNEP-WCMC and FEBA, 2020 ([bit.ly/nbs-en-015](https://bit.ly/nbs-en-015))
- Words into Action: NbS for disaster risk reduction, UNDRR, 2021 ([bit.ly/nbs-en-011](https://bit.ly/nbs-en-011))

### 🔗 Guidance:

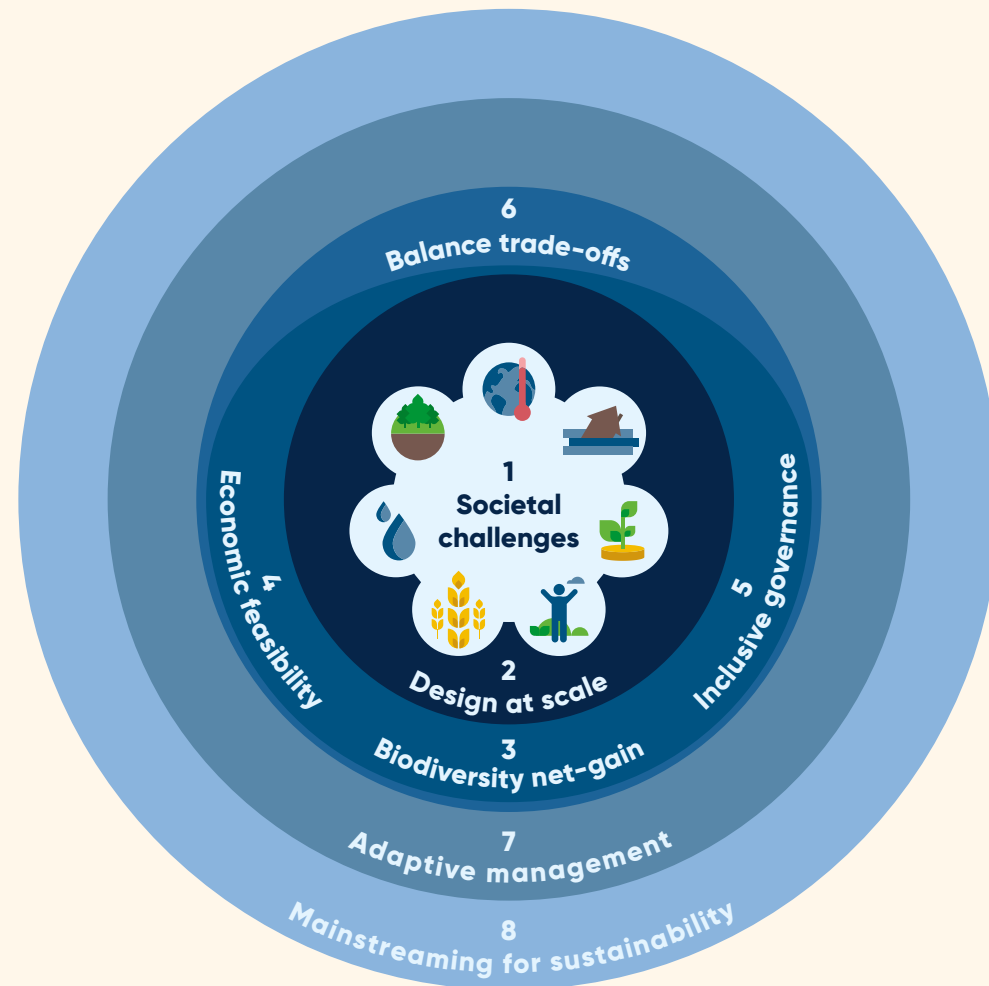
- IUCN Global Standard for Nature-based Solutions: A user-friendly framework for the verification, design and scaling up of NbS ([bit.ly/nbs-en-007](https://bit.ly/nbs-en-007))
- See The Nature Navigator: A handbook for disaster risk management practitioners, IFRC, 2022 ([bit.ly/nbs-en-002](https://bit.ly/nbs-en-002)) for more on how to use the Global Standard in humanitarian action
- Sphere Thematic Sheet 3: Engaging National Disaster Management Authorities ([bit.ly/sphere-ts3-en](https://bit.ly/sphere-ts3-en))

## FIGURE 12: THE IUCN GLOBAL STANDARD FOR NATURE-BASED SOLUTIONS

Source: IUCN 2020

The *IUCN Global Standard for Nature-based Solutions* outlines eight criteria that provide a common understanding and consensus on what constitute good nature-based solutions:

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



## Part 3: Applying the Sphere technical standards

### This section:

- identifies cross-cutting areas in humanitarian action where nature-based solutions can be applied;
- provides practical guidance for applying nature-based solutions across Sphere's technical chapters.

### Introduction

*"The Sphere Handbook provides an integrated, balanced approach to ensuring that humanitarian actors strive to preserve and restore the environment as an integral part of overall humanitarian response and recovery activities."*

🔗 [Sphere Thematic Sheet 1 \(bit.ly/sphere-ts1-en\)](https://bit.ly/sphere-ts1-en)  
p. 2

Throughout the handbook there are direct and indirect references to the importance of safeguarding the environment in humanitarian action so as to protect people's safety, dignity and rights. **Part 3** provides practical guidance for applying nature-based solutions (NbS). Opportunities highlighted may contribute directly or indirectly to one or more of the dividends outlined above in **Part 1: Nature-based solutions for resilience, p. 14**.

### Cross-cutting topics

#### Assessment

*"Organisations should commit to environmentally sound policies and practices (including a plan of action and rapid environmental impact assessment) and make use of existing guidelines to help address environmental issues in an emergency."*

🔗 [CHS 9, GN: Natural resources and environmental impact, p. 83](#)

When considering NbS in environmental screening, try to:

- integrate questions that draw on local knowledge about changing environmental patterns over time, such as weather, erosion or vegetative patterns;
- consider longer-term, landscape-scale assessment tools, such as weather and climate models;

- ensure there is adequate environmental expertise present for programme assessment, as well as for design, execution, monitoring and evaluation;
- evaluate how humanitarian aid can itself cause or contribute to negative environmental impacts (adapted from [ehaconnect.org](https://ehaconnect.org));
- adapt existing vulnerability and environmental impact assessments (EIAs) to integrate ecosystem considerations (for example, modify a WASH EIA to ask which water sources might be used, are more fragile, and/or are going to lead to further vulnerability in the medium- to long-term if used);
- ensure local actors and affected populations are at the centre of both the assessment processes and the monitoring, evaluation and learning (MEAL) ones.

Assessment is one component of the broader MEAL process. See Sphere in Context and for Assessment, Monitoring and Evaluation ([bit.ly/sphere-camel-en](https://bit.ly/sphere-camel-en)) for further guidance on why it is important to use the Sphere Standards throughout the humanitarian programme cycle and how to do so.

## 🔗 Assessment resources

While each of the technical sectors covered in Sphere has its own environmental assessment processes, there are resources that can support the purposeful integration of environmental approaches (including those specifically focused on NbS) in a more holistic way:

- Climate Vulnerability and Capacity Analysis (CVCA), CARE, 2019 ([careclimatechange.org/cvca](https://careclimatechange.org/cvca))
- Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL), IISD, n.d. ([iisd.org/cristaltool](https://iisd.org/cristaltool))
- Enhanced Vulnerability and Capacity Assessment, IFRC, n.d. ([ifrcvca.org](https://ifrcvca.org))
- Flash Environmental Assessment Tool (FEAT), UNEP/OCHA, 2017 ([resources.eecentre.org/resources/feat](https://resources.eecentre.org/resources/feat))
- FRAME Toolkit: Framework for Assessing, Monitoring and Evaluating the Environment in Refugee-related operations, UNHCR and CARE, 2009 ([bit.ly/nbs-en-016](https://bit.ly/nbs-en-016))
- Green Response: Environmental Quick Guide, IFRC, 2022 ([bit.ly/nbs-en-017](https://bit.ly/nbs-en-017)), p. 12
- Green Recovery and Reconstruction: Training Toolkit for Humanitarian Aid (GRRT), WWF, 2010 ([envirodm.org/green-recovery/](https://envirodm.org/green-recovery/))
- Guidebook for Monitoring and Evaluating EbA Interventions, FEBA, GIZ, UNEP, 2020 ([bit.ly/nbs-en-015](https://bit.ly/nbs-en-015))
- Making Ecosystem-based Adaptation Effective: A Framework for Defining Qualification Criteria and Quality Standards, FEBA, 2017 ([bit.ly/nbs-en-018](https://bit.ly/nbs-en-018))
- Integrated Strategic Environmental Assessments in Post-Crisis Countries (ISEA), UNEP and OCHA Joint Environment Unit, 2018 ([bit.ly/nbs-en-019](https://bit.ly/nbs-en-019))
- Integrated Valuation of Ecosystem Services and Trade-offs (InVEST), Natural Capital Project, Stanford University, n.d. ([bit.ly/nbs-en-020](https://bit.ly/nbs-en-020))
- Nexus Environmental Assessment Tool (NEAT+), UNEP and OCHA Joint Environment Unit, n.d. ([neatplus.org](https://neatplus.org)): A screening tool covering the overall environmental sensitivity of projects, including shelter, WASH and food security interventions.
- Opportunity Mapping, UNEP and UNEP GRID-Geneva, n.d. ([bit.ly/nbs-en-021](https://bit.ly/nbs-en-021))
- Rapid Environmental Assessment Tool (REA), CARE, 2018 ([bit.ly/nbs-en-022](https://bit.ly/nbs-en-022))

See **Part 4: Tools for integrating nature-based solutions**, for resource descriptions, as well as links to additional assessment and participatory engagement resources.

## Protection

In terms of the Sphere Standards, nature-based solutions are relevant to all four of Sphere's Protection Principles.

Humanitarian actors can integrate NbS to help enhance the safety, dignity and rights of people and avoid exposing them to harm (🔗 **Protection Principle 1, p. 36**) by:

- integrating questions into assessments that consider key protection risks related to the environment such as:
  - Will deforestation caused by increased need for shelter or the overuse of water resources result in women and girls having to travel further, resulting in higher exposure? (Adapted from ehaconnect.org) 🔗 **FSN 1.1, GN: Coping strategies, p. 168**
  - Are toilets placed too close to sources of flooding between shelters? 🔗 **WASH 3.1, GN: Distance from water sources, p. 174**
  - Will livelihood activities put a strain on natural resources, increasing tension and conflict?

- Are there any protection guidelines relating to the environment that inform your sector's activities that should be emphasised? (Adapted from [ehaconnect.org](https://ehaconnect.org))
- using humanitarian corridors, climate-resilient infrastructure, and WASH and FSN services for affected people (see Green humanitarian corridors, shown right);
- working with environmental experts and local communities to understand how natural infrastructure, such as coral reefs or forests, can reduce exposure to natural hazards;
- providing environmentally sustainable income-generating activities that reduce the need for social protection services;
- building processes that improve community governance over natural resources into programme planning, with the aim of improving social cohesion, reducing risk and increasing self-reliance.

### Green humanitarian corridors: Protecting nature and people

The environment has historically offered marginalised and persecuted people safe refuge; for example, refugees of war might find safe shelter and transit under the cover of trees.

Natural corridors for conservation offer critical habitat and migration pathways between landscapes for wildlife. Similarly, humanitarian green corridors exist to permit safe demilitarised humanitarian access and refuge; they can also serve as sociopolitical buffers between conflicting factions.

These practices can be merged, bringing conservationists and natural resource managers together with humanitarian access negotiators, government representatives and affected peoples to intentionally protect, restore or install green corridors that provide safe harbour for crisis-affected populations and wildlife.

## Cash-based interventions

While cash programming is a key part of humanitarian action, it should be delivered in an environmentally responsible way.<sup>8</sup> Taking an NbS approach can assist in doing so by:

- incentivising greener, climate-smart livelihood opportunities through cash programmes designed to help people restart their livelihoods;
- ensuring cash- and voucher-based assistance does not exacerbate environmental degradation; this can be achieved by integrating environmental considerations into market assessments to ensure sustainability.
  - When making cash transfers to support shelter reconstruction, consider ensuring some kind sustainable resource management plan to avoid inadvertently encouraging unsustainable wood and forest product harvesting.
  - Consider how local markets may not be able to provide sustainably produced products of high quality and durability, resulting in increased waste and greenhouse gas emissions.

See other strategies for integrating NbS approaches into cash-based interventions in [FSN 6.2; p. 201](#), [FSN 7.1; p. 211](#) and [FSN 7.2; p. 215](#).

## Cross-sector cluster coordination, joint response operations

To advance the integration of NbS into coordination and operational planning:

- Build longer-term landscape approaches that mainstream the environment for climate resilience into the required operational strategies and joint response plans.
  - ➦ See Sphere Thematic Sheet 3: Engaging National Disaster Management Authorities ([bit.ly/sphere-ts3-en](#)).
- Develop institutional and community-based strategies for social behaviour change that support nature-positive approaches in and across sectors and the cluster system.
- Support local and national governments to understand the stakes and linkages between human suffering and environmental issues.

- Increase financing to build the evidence base for NbS in humanitarian contexts.
- ➦ Advocate to include humanitarian contexts for funding consideration under the Green Climate Fund (<https://www.greenclimate.fund/>) and the Loss and Damage Mechanism of the United Nations Convention on Climate Change ([bit.ly/nbs-en-027](#)).

## Water Supply, Sanitation and Hygiene Promotion (WASH)

*“Integrated water and sanitation management should meet human needs and protect the environment.”*

➦ **WASH: A combination of approaches is needed, p. 94**

*“The right to safe and clean drinking water and sanitation [is] a human right that is essential for the full enjoyment of life and all human rights”*

UN General Assembly Resolution 64/292, 2010  
(➦ [bit.ly/nbs-en-024](#))

In crises, inadequate water quantity and quality is often the underlying cause of health, food security,

<sup>8</sup> From The State of the World's Cash 2020, CALP Network, 2020 (➦ [bit.ly/nbs-en-023](#)) and quoted in Green Response: Environmental Quick Guide, IFRC, 2022 (➦ [bit.ly/nbs-en-017](#))

livelihood and conflict-related problems. Harmful environmental management practices can directly impact access to safe water supply. Environmental degradation can change how water infiltrates the ground, impacting water resources and exacerbating drought or flooding.

Nature-based solutions can help return highly degraded environments back to productive, healthy systems that provide access to clean water and help increase the absorptive capacity of the ground, reducing flood risk. Watershed management is a good example.

In many contexts, there may not be sufficient water available to meet basic needs. Where possible, look for opportunities to link short-term strategies for providing sufficient water quality and quantity to longer-term approaches for protecting, restoring and creating more sustainable water resources.

In terms of the Sphere Standards, nature-based solutions are especially relevant to water quantity and quality, excreta management, vector control and solid waste management.

### Hygiene promotion standard 1.1: Hygiene promotion

People are aware of key public health risks related to water, sanitation and hygiene, and can adopt individual, household and community measures to reduce them.

- When designing hygiene campaigns, consider how an improved environment can help benefit physical and mental health.
- Integrate the environment as a source of health hazards and benefits into assessment tools, and use this information to inform strategies that reduce vector-borne and waterborne communicable diseases [▶ Health Appendix 1: Health assessment checklist, p. 350](#).
- Develop a broader social and behaviour change strategy that addresses stakeholder beliefs, including those involved in WASH, health, and natural resource management.

### Water supply standard 2.1: Access and water quantity

People have equitable and affordable access to a sufficient quantity of safe water to meet their drinking and domestic needs.

- Apply a landscape-scale (e.g., watershed catchment) lens when mapping risks and resources and planning action; this should include engaging with or considering upstream and downstream communities.
- Apply a multi-year (5- to 10-year) lens when planning new infrastructure, such as boreholes, that takes climate change into consideration so as to improve longer-term sustainability.

- Consider multiple information sources across the disaster management cycle stages:
    - weather (10-day, monthly, and seasonal) forecasts;
    - climate models (e.g., 1- to 10-year plus precipitation, heat, desertification or groundwater models);
    - early warning systems (for floods, droughts, conflict, tsunamis, heatwaves, pests, etc.);
    - population growth models that balance meeting current supply needs with future ones – consider water point locations, quantity, depths, design of boreholes, etc.;
    - the overall level of environmental health and the ecosystem services it can or could provide.
  - Construct sustainable drainage systems such as bioswales (vegetated channels) and retention basins.
  - Engage in community-supported green/blue “hybrid” infrastructure measures for degraded watersheds, including:
    - removing waste from blocked waterways;
    - restoring or protecting forests and wetlands to increase groundwater recharge and storage;
    - restoring vegetation cover on riverbanks or slopes to minimise erosion;
    - using agroforestry and climate-smart sustainable agriculture to promote soil and water conservation, environmental protection and improved food production.
  - Ensure WASH infrastructure and services are rehabilitated or installed using climate-resilient measures, and whenever possible, are out of hazard zones.
  - Adopt “multipurpose” water supply solutions and blue/green infrastructure. For example:
    - Bioswales can be used to retain flood waters in a camp and also as spaces for cultivating aquatic food crops such as rice.
  - Combine water retention structures made from natural resources (such as sand dams) with other water point sources (such as wells for cattle) to boost water and food security.
  - Combine half-moon water harvesting with climate-smart agriculture like drought-resistant seeds.
  - Use water opportunity maps, which often have a longer-term horizon, to understand water-related risks and inform strategies for safeguarding the environment.
  - Apply low-tech water harvesting techniques in areas prone to drought to help recharge the water table during the wet season. For example:
    - Expanding a wadi’s underground storage capacity during the wet season can help boreholes continue to yield water during the dry season.
- 📌 **CHS 1, KA 1.3, p. 55** and **CHS Appendix: Guiding questions for monitoring key actions and organisational responsibilities, p. A2 (not in printed book)**
- 📌 **WASH Appendix 1: WASH initial needs assessment checklist, p. 139**
- ✓ **Tip:** See definitions for “agroforestry”, “permagarden”, “rain garden”, “bioswale”, “half-moon water harvesting”, “hybrid infrastructure”, “wadi” and “water opportunity mapping” in **Glossary** (p. 82).



### Water supply standard 2.2: Water quality

Water is palatable and of sufficient quality for drinking and cooking, and for personal and domestic hygiene, without causing a risk to health.

Design settlements in coordination with environmental health experts to ensure risks (such as flooding in areas where boreholes or water catchments may be planned) are avoided or mitigated.

- Ensure natural drainage systems are not disrupted when planning roads or infrastructure.
- Improve water quality (and quantity) during times of flood and drought through:
  - planting native species of reed beds that act as “green filters”, helping to reduce the contaminants in polluted waterways;
  - agroforestry, permagardens or rain gardens;
  - natural regeneration of trees and shrubs;
  - rainwater catchment techniques;
  - reforestation;
  - revegetation and terracing of sloped areas.

✦ *CHS 3, GN: Environmental concerns, p. 62*

✦ *Shelter: These Minimum Standards should not be applied in isolation, p. 242*

### Excreta management standard 3.1: Environment free from human excreta

All excreta are safely contained on-site to avoid contamination of the natural, living, learning, working and communal environments.

- Conduct integrated landscape assessments that consider topography, soil permeability, and ground and surface water (including seasonal variations) to avoid contaminating water resources.
- Apply integrated flood management practices like wetland restoration and green or hybrid infrastructure offering flood protection (green embankments, for example) to reduce environmental contamination risks (and associated public health impacts) from wastewater seepage as a result of floods and other hazards.

### Excreta management standard 3.3: Management and maintenance of excreta collection, transport, disposal and treatment

Excreta management facilities, infrastructure and systems are safely managed and maintained to ensure service provision and minimum impact on the surrounding environment.

- Build climate-resilient toilets and other waste management structures to avoid contamination during floods. For example, outside flood zones or at depths safe from varying water table levels. ✦ *SS 2, GN: Drainage of rainfall and floodwater, p. 252*
- Leverage faecal sludge management as a resource for biogas, combustible bricks, and soil conditioner or fertiliser for household gardens. ✦ *WASH 3.3, GN: Excreta as a resource, p. 120*

- Develop integrated water resource management (IWRM) strategies in tandem with WASH and based on landscape assessments (see **WASH standard 2.1**, above) to reduce:
  - effluent in waterways;
  - vector-borne and waterborne disease incidents;
  - exposure to contaminated water.

➤ **WASH Appendix 1: WASH initial needs assessment checklist, p. 139**

✓ **Tip:** See **Glossary** (p. 82) for a definition of “integrated water resource management” (IWRM).

### Vector control standard 4.1: Vector control at settlement level

People live in an environment where vector breeding and feeding sites are targeted to reduce the risks of vector-related problems.

- Build on the NbS proposed in WASH standards 1–3 (above), including integrated landscape assessments and flood management strategies, and reduce or eliminate vector-borne diseases through:
  - natural and hybrid drainage;
  - biological controls (native fish, for example) to eliminate insects;
  - situating toilets and water points in areas of adequate drainage.

➤ **SS 2, Key actions 1 and 4, p. 249** and **SS 2 GN: Drainage of rainfall and floodwater, p. 252**

➤ **SS 3, GN: Vector control, p. 257**

### Solid waste management standard 5.1: Environment free from solid waste

Solid waste is safely contained to avoid pollution of the natural, living, learning, working and communal environments.

- Promote NbS that help avoid environmental degradation through the reuse or composting of solid waste, including those solutions that support livelihoods.

➤ **WASH 5.1, GN: Reuse, re-purpose and recycle, p. 128**

➤ **FSN 7.2, GN: Environmental management, p. 218**

- Integrate composting as part of the household and communal garden systems.
- Repurpose solid waste to support activities that have multiple benefits. For example, reuse tyres as part of a hybrid solution to stabilise hillsides at risk of landslides and create terraced gardens.

## Food Security and Nutrition

*“Over time, responses should protect and restore livelihoods, stabilise or create employment opportunities and contribute to restoring longer-term food security. They should not have a negative impact on natural resources and the environment.”*

➤ **FSN section 5. Food security (introduction), p. 193**

Environmental degradation and the increasingly variable and extreme weather caused by climate change affect the ability of ecosystems to provide basic food resources. This can exacerbate conflict and increase insecurity. For example, collecting firewood and producing charcoal make it possible to cook food and generate income. However, these activities can also result in the deforestation of surrounding hillsides, leading to hazards such as landslides and flash floods.

Response should protect and support food security, livelihoods and energy access in the short to mid-term, while promoting the environmental health needed to foster long-term food security

➤ **FSN 1.1, GN: Environmental degradation, p. 167.**

In taking a longer-term approach that incorporates climate and environmental considerations, food security and nutrition (FSN) programmes ensure the fulfilment of the humanitarian imperative of preventing and alleviating suffering arising from conflicts and disasters.

At a minimum, responses should avoid contributing to further degradation. By working with nature, protective functions to shocks and stresses are supported. This can lead to reduced risks of natural hazards as well as improved soil quality and water filtration – ecosystem services that food production depends on.

In terms of the Sphere Standards, nature-based solutions are relevant to food security and livelihoods.

### Food security and nutrition assessments standard 1.1: Food security assessment

Where people are at risk of food insecurity, assessments are conducted to determine the degree and extent of food insecurity, identify those most affected and define the most appropriate response.

Environmental degradation and food security are inextricably linked (➤ **FSN 1.1, KA 1, p. 166** and **FSN 1.1, GN: Environmental degradation, p. 167**), so food security strategies must be climate-resilient and environmentally sustainable. Food security assessments should include:

- identifying opportunities to fortify foods with indigenous forest products;
- ecosystem health data, such as soil quality, hydrology and native plants and animals, ideally from a landscape level;
- population growth models that inform estimates on the carrying capacity of the local environment;

- information on the root causes of environmental degradation;
- data that outlines how shifting climate and weather patterns will impact the environment, and what the follow-on impacts will be for dependent livelihoods.

➤ See *FSN Appendix 1: Food security and livelihoods assessment checklist, p. 219* for entry points for climate and environmental resilience action.

➤ See *Sphere Thematic Sheet 1 (bit.ly/sphere-ts1-en)* for more on the relationships between food security, nutrition and livelihoods.

### Food security standard 5: General food security

People receive food assistance that ensures their survival, upholds their dignity, prevents the erosion of their assets and builds resilience.

And

### 6: Food assistance

Food assistance may also be used to prevent people adopting negative coping mechanisms such as the sale of productive assets, over-exploitation or destruction of natural resources or the accumulation of debt.

Sphere calls for the protection, preservation and restoration of the natural environment from further degradation when delivering food assistance, all elements which form the foundation of nature-based solutions ➤ *Food security standard 5, KA 4, p. 194*. To integrate nature-based approaches in food security and assistance:

- Include ecosystem services in assessments to promote an understanding of the drivers of environmental degradation (fuelwood collection, for example) and to identify sustainable alternatives ➤ *CHS 9, KA 9.4, p. 81*.
- Promote and distribute fuel-efficient stoves to replace the use of charcoal or other forest products ➤ *FSN 5, GN: Environmental impact, p. 195* and *FSN 6.2, GN: Food storage and preparation, p. 204*.
- Promote sustainable pasture management practices and protection measures that keep soils healthy, provide suitable forage and reduce food production costs.
- Ensure that livelihood and food assistance strategies such as cash-based assistance do not exacerbate degradation; where possible offer incentives for environmental protection, sustainable management and/or restoration ➤ *FSN 6.2, GN: Food packaging, p. 203*.

- When pre-positioning food stocks, incorporate strategies that mitigate weather and climate-related shocks such as providing climate-resilient seeds [↻ FSN 1.1, GN: Market analysis and cost of diet, p. 168.](#)
- Promote solutions that increase security across multiple scales. Rooftop gardens, community plots and terraced agroforestry can bolster ecosystem services, social cohesion and nutrition.
- Promote climate-smart agriculture practices that protect the environment by changing food customs that may cause degradation and that support long-term safety net systems [↻ FSN 5, GNs: Exit and transition strategies, and Environmental impact, p. 195.](#)

✓ Climate-smart agriculture is an integrated approach to managing landscapes – cropland, livestock, forests and fisheries – that addresses the interlinked challenges of food security and climate change.

### Livelihoods standard 7.1: Primary production

Primary production mechanisms receive protection and support.

Livelihoods standard 7.1 requires climate-resilient intervention strategies that promote double dividends for livelihoods and food security and nutrition in the face of climate change:

- Leverage cash for work schemes to train people to restore or sustainably manage natural assets that support food security [↻ FSN 7.1, KA 5, p. 212.](#)
- Enable farmers to use cash or vouchers to select climate-resilient, environmentally friendly inputs, including seeds, fish stocks and livestock species [↻ FSN 7.1, KA 1, p. 212.](#)
- Promote governance approaches that ensure risk and conflict are not exacerbated [↻ FSN 7.1, KA 3, p. 212.](#)
- Maximise available space through climate-smart agriculture practices, such as terraced landscapes.

- Promote adaptation to climate change (such as selecting adapted seed varieties) that can improve food security and increase livelihood opportunities [↻ FSN 7.1, GNs, p. 212.](#)
- Partner with local knowledge keepers to create seed banks for times of emergency.
- Stimulate demand for local, sustainably produced food products [↻ What is Sphere?: Appendix: Delivering assistance through markets, p. 20.](#)
- Promote climate-smart agribusinesses that include vocational training and small-scale learning plots where solutions can be experienced first-hand and scaled out over time (see [Table 2: Nature-based solutions by sector across the disaster management cycle stage](#)).

↻ See Standards for Supporting Crop-related Livelihoods in Emergencies (SEADS) ([bit.ly/seads-2022](https://bit.ly/seads-2022)) and Livestock Emergency Guidelines and Standards (LEGS) ([bit.ly/legs-2014-en](https://bit.ly/legs-2014-en)) for additional guidance.

### Livelihoods standard 7.2: Income and employment

Women and men receive equal access to appropriate income-earning opportunities where income generation and employment are feasible livelihood strategies.

Nature-based solutions can support inclusivity and equity in income-earning opportunities by:

- delivering gender-sensitive food and cash-for-work programmes and trainings focused on environmental restoration or management, such as composting biodegradable waste for use as fertiliser. See **Table 2: Nature-based solutions by sector across the disaster management cycle stage.**
- supporting household dialogue strategies to improve gender equity in decision-making around finances **🔗 FSN 7.2, GN: Environmental management, p. 218.**

- integrating bio-rights or payment for ecosystem services into programme design.

✓ Bio-rights provide microcredits for sustainable development enabling local communities to refrain from unsustainable practices and to be actively involved in environmental conservation and restoration.

🔗 See Bio-rights in Theory and Practice, Wetlands International, van Eijk et al., 2009 (<https://bit.ly/nbs-en-025>)

✓ Payments for ecosystem services are incentives offered to farmers or landowners in exchange for managing their land to provide some sort of ecological service.

## Shelter and Settlement

Shelters and settlements carry one of the highest risks of negative environmental impacts,<sup>9</sup> and when constructed without considering the natural environment, can place vulnerable populations at greater exposure to hazards and conflict. There is opportunity for transformative change by integrating environmental considerations across shelter and settlement responses, from assessing environmental impact to embracing nature-based solutions across the standards.

In terms of the Sphere Standards, environmental sustainability is mainstreamed across the Shelter and Settlement chapter introduction and the first six standards, and the seventh standard is dedicated to the topic. As such, nature-based solutions are relevant to all shelter and settlement standards.

<sup>9</sup> Thematic Sheet 1: Reducing environment impact in humanitarian response (🔗 [bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en))

### Shelter and settlement standard 1: Planning

Shelter and settlement interventions are well planned and coordinated to contribute to the safety and well-being of affected people and promote recovery.

- Take a landscape approach to site selection. See p. 29 for more on information on how to do this.
- Integrate environmental considerations into assessment and design. See p. 35 for more on the different types of environmental assessments, such as ecosystem services assessments [↻ SS 1, GN: Assessment, p. 247](#).
- Ensure analyses are collaborative and transparent.
- To identify the most effective and appropriate assistance options, consider and present nature-based solutions from the point of view of cost-efficiency, quality and environmental benefits [↻ SS 1, KA 3, p. 249](#).

### Shelter and settlement standard 2: Location and settlement planning

Location and settlement planning should promote safe, acceptable and accessible living spaces that offer access to basic services, livelihoods and opportunities to connect to a broader network,

And

### Shelter and settlement standard 3: Living space

People have access to living spaces that are safe and adequate, enabling essential household and livelihoods activities to be undertaken with dignity.

- When the correct plant species are used, trees and other vegetation planted on slopes surrounding settlements can stabilise the soil and reduce the risk of landslides.
- Use green and hybrid infrastructure like bioswales to address rainfall or floodwater drainage in settlements [↻ SS 2, KA 5, p. 250](#) and [SS2, GN: Drainage of rainfall and floodwater, p. 252](#).

- Plan land use to provide sufficient multipurpose space for all functions. For example, areas designated to absorb seasonal flooding can also serve as communal gathering spaces [↻ SS 2, KA 4, p. 249](#).
- Use nature-based solutions to provide thermal comfort and as pollution filters. For example, planting trees next to houses can provide solar shading, and green roofs can provide thermal insulation, while absorbing some pollutants.
- Design terraces that are natural or hybrid infrastructure to mitigate landslide risk. Look for opportunities to incorporate food crops as slope-stabilising vegetation [↻ SS 2, KA 1, p. 249](#).
- Utilise space surrounding dwellings for subsistence activities such as planting fruit trees or vegetable gardens, and harvesting rainwater [↻ SS 2, GN: Surface area of planned or self-settled settlements, p. 251](#).
- Aim to do no harm by, where possible, planning and constructing that avoids hazardous areas such as floodplains [↻ SS 2, KA 5, p. 250](#).

- Promote the sustainable extraction of building materials. For example, the excessive extraction of sand from rivers can increase the risk of flooding. Consider other materials, such as trees blown down by hurricanes, or renewable resources that regenerate quickly **SS 3, KA 3, p. 254.**
- Design structures to be climate-resilient, maximising energy efficiencies for heating or cooling **SS 3, GN: In hot, dry climates, p. 256.**
- Consider seasonal elements (sun position, temperatures, winds, rains, etc.) when designing living spaces to reduce weather-related illness, injury and discomfort **SS 3, GNs: In warm, humid/hot, dry/cold climates, p. 256-7.**
- Identify local techniques shaped by the environment including traditional methods and innovations tested in the landscape **SS 2, KA 2, p. 249.**

↪ See also the Minimum Standards for Camp Management ([bit.ly/mscm-2021-en](https://bit.ly/mscm-2021-en)).

#### Shelter and settlement standard 4: Household items

Household item assistance supports restoring and maintaining health, dignity and safety and the undertaking of daily domestic activities in and around the home.

- Increase access to energy-efficient, culturally appropriate cooking stoves to reduce unsustainable fuelwood harvesting practices **SS 4, GN: Affordable fuel and household energy supply, p. 260.**

#### Shelter and settlement standard 5: Technical assistance

People have access to appropriate technical assistance in a timely manner.

- Involve affected people and local government and professionals in the design and implementation of building practices that support nature-based solutions **SS 5 KA 1, p. 262.**

- Promote the use of nature-based solutions for safer settlements and housing to reduce future risks **SS 5, KA 3, p. 262** and **SS 5 GN: Sourcing of materials, p. 264.**
- Learn from, improve, and innovate local nature-based techniques where possible; facilitate effective knowledge transfer to promote appropriate nature-based solutions **SS 5, KA 3, p. 262.**
- Ensure NbS expertise is grounded in local and traditional knowledge and building practices.
- As the application of NbS may require technical expertise:
  - Support shelter actors to have basic climate and environmental awareness and training to ensure programmes and policies do no harm to people or to the environment.
  - Collaborate with environmental experts to build environmental sensitivities into site design and to increase the technical capacity amongst the affected population **SS 5, KA 4, p. 263** and **SS 5, GN: Procurement and construction, p. 265.**



- Encourage locally available, sustainable, and familiar nature-based solutions, and hire local labour to maintain and upgrade them  
 ➔ **SS 5, KA 5, p. 263.**

### Shelter and settlement standard 6. Security of tenure

The affected population has security of tenure in its shelter and settlement options.

Tenure security provides a certainty of security from eviction. This encourages long-term consideration for the local environment, thus improving the likelihood of sustainable behaviour by future inhabitants. Transient populations or those at risk of eviction are less likely to protect the local environment.<sup>10</sup>

- Consider agricultural and forested areas when working on tenure issues.
- Consult and involve local authorities and organisations about service issues (such as natural resource availability) that play a role in tenure issues.

<sup>10</sup> Introduction: Environmental Checklist for Shelter Response in Vanuatu, Annex 11 Shelter Cluster, IFRC, 2020 (↪ [bit.ly/nbs-en-026](https://bit.ly/nbs-en-026))

<sup>11</sup> The Nature Navigator: A handbook for disaster risk management practitioners, IFRC 2022, page 74, (↪ [bit.ly/nbs-en-002](https://bit.ly/nbs-en-002))

- Even where land tenure is not possible in the near future, as more crises become protracted and settlements intergenerational, try to design and manage settlements with the environment in mind.

### Shelter and settlement standard 7: Environmental sustainability

Shelter and settlement assistance minimises any negative programme impact on the natural environment.

Standard 7 is fully in line with NbS and as such does not require additional guidance. Moreover, many of the strategies for integrating NbS that are also relevant to this standard have been detailed elsewhere in this guide.

## Health

People's health and well-being are directly connected to the health of the environment around them. When the environment is degraded, so too is the health of the people who rely on it. The relationship can be relatively direct and clear, as with the impacts of air pollution on health, or it can be more indirect and complex, such as the relationship between the environment and mental health.

During crises, humanitarian operations can strengthen ecosystem services through nature-based solutions. These, by definition, include actions that target human health. For example, nature-based approaches can include supporting stakeholders to work across sectors to protect or restore forests, which provide clean air and water and regulate the spread of vector-borne diseases.<sup>11</sup>

The health chapter contains two focus areas: health systems and essential healthcare. In terms of the Sphere Standards, nature-based solutions are particularly relevant to essential healthcare, including communicable diseases, prevention, and mental health care.

## Essential healthcare

Within the Sphere Standards, there are many secondary benefits NbS can bring to essential healthcare, including:

- reduced incidence of injury and death as a result of risk reduction;
- healthier people as a result of improved food security and nutrition through increased food production;
- reduced incidents of vector-borne and waterborne diseases when WASH and shelter and settlements are designed through an integrated flood management approach;
- reduced exposure to emergency zoonotic diseases such as Ebola or Covid-19 through the protection or restoration of environmental buffers between people and nature;
- reduced risk of landslides, floods and other hazards, enabling on-the-ground service delivery.

### Essential healthcare: 2.1 Communicable diseases Standard 2.1.1: Prevention

People have access to healthcare and information to prevent communicable diseases.

Ecosystem fragmentation can increase the spread of certain infectious diseases and increase conflict between people and wildlife. Interventions to address communicable diseases should include prevention [📌 Health 2.1.1, KAs 1 and 4, p. 312](#).

Strategies that build a nature-based approach into health programming include:

- adding environmental considerations to health assessments for communicable diseases. For example, polluted or blocked drainage channels that create standing water can cause vector breeding [📌 Health Appendix 1: Health assessment checklist, p. 349](#);

- integrating an awareness of the health benefits of intact natural spaces into community-level health promotion programmes focused on vector control [📌 Health 2.1.1, GN: Risk assessments, p. 313](#);
- providing programmes which address specific fears, rumours or common beliefs that could undermine the health of people and wildlife, and which promote co-existence strategies [📌 Health 2.1.1, KA 2, p. 312](#);
- collaborating with WASH practitioners to ensure environmental projects such as wetland restoration or construction are well-managed to minimise mosquito breeding [📌 WASH 3.2, p. 112](#);
- collaborating with shelter and settlement practitioners to integrate mixed-use planning with settlements, such as agroforests, to increase nutrition and reduce hazard risk;

- promoting a One Health approach by working with other stakeholders, including local health officials and practitioners as well as environmental specialists, to support programmes that protect or enhance natural spaces.

✓ **One Health** is a collaborative, multi-sectoral approach that recognises that the health of people is closely connected to the health of animals and our shared environment.

### Mental health standard 2.5: Mental health care

People of all ages have access to healthcare that addresses mental health conditions and associated impaired functioning.

And

### Non-communicable diseases standard 2.6: Care of non-communicable diseases

People have access to preventive programmes, diagnostics and essential therapies for acute complications and long-term management of non-communicable diseases.

Green spaces (for example, forests or communal gardens) and blue ones (for example, waterways) can support mental health by lowering stress and promoting faster recovery from psychological events. They also play an important role in providing clean air and water, essential to physical health. In addition, trees can play an essential role in providing shade in heat-stressed regions.

- Collaborate on land restoration projects that offer health benefits. For example, green shelterbelts can provide protection from sandstorms and act as windbreaks, reducing exposure to dust and the risk of respiratory diseases.
- Work with shelter and settlement practitioners to design spaces that incorporate nature and support mental and physical health. These can include integrated green spaces such as parks or communal gardens that double as safe spaces to promote community dialogue and conflict resolution. [Health 2.5, GN: Community self-help and support, p. 341](#) and [Health 2.6, GN: Health promotion and education, p. 245](#).

✓ **Shelterbelts** are natural or strategically planted trees in multi-row settings that help reduce the leeward wind speed over extended areas, up to 40 times the height of the trees.

## Part 4: Tools for integrating nature-based solutions

### TABLE 1: NATURE-BASED SOLUTIONS STRATEGIES AND BENEFITS IN HUMANITARIAN CLUSTERS/SECTORS

Table 1 provides an overview of NbS strategies and the multiple benefits they can provide across the five technical sectors covered in the Sphere Handbook.

NBS STRATEGIES/ ACTIONS	CROSS-SECTOR BENEFITS Risk reduction, resilience capacity strengthening, humanitarian outcomes	BENEFITS BY SECTOR: <b>WASH; SHELTER AND SETTLEMENT; FOOD SECURITY AND NUTRITION (FSN); HEALTH</b>
<b>REEF CONSERVATION, REHABILITATION OR RESTORATION</b>		
<b>Coral reef or shellfish conservation, rehabilitation or restoration</b>	Protection of people and assets from coastal hazards: <ul style="list-style-type: none"> <li>• sea level rise</li> <li>• storm surge</li> <li>• high wave or tide events</li> <li>• shoreline erosion.</li> </ul>	<b>WASH:</b> Reduced exposure of infrastructure and assets to coastal hazards <ul style="list-style-type: none"> <li>• Improved continuity of services.</li> </ul> <b>SHELTER:</b> Reduced exposure of shelters and settlements to coastal hazards. <b>FOOD SECURITY AND NUTRITION (FSN):</b> Livelihoods: Income from fish/shellfish; Tourism; Livelihoods diversification • FSN: Increased fish/shellfish stocks. <b>HEALTH:</b> Reduced incidence of injury and death from coastal hazards <ul style="list-style-type: none"> <li>• Benefits related to improved FSN.</li> </ul>

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## COASTAL WETLAND RESTORATION

**Seagrass meadows, intertidal flats, tidal saltmarshes, mangrove forests, tidal freshwater wetlands<sup>12</sup>**

People near degraded areas face increased risk from waves, storm surges, floods and erosion. Strategies:

**Natural:** Improve area by reducing disturbances and restoring or enhancing hydrology and water quality.

**Artificial:** Replanting/transplanting native vegetation – usually more cost- and labour-intensive, so only applied if a) natural restoration has failed or b) ecosystem assessments indicate natural restoration is unlikely to succeed.

Reduced disaster risk.

Protective: Narrow mangrove belts can reduce wind/waves;<sup>13</sup> wider belts can attenuate storms<sup>14</sup>.

Sedimentation, erosion control.

Carbon sequestration: Mangroves alone are estimated to sequester 31.2 - 34.4 million tonnes of carbon per year.

Biodiversity gains.

**WASH:** Reduced exposure of infrastructure and assets to coastal hazards • Improved continuity of services.

**SHELTER:** Reduced exposure of shelters and settlements to coastal hazards.

**FOOD SECURITY AND NUTRITION (FSN):** Increased fish and shellfish stocks; access to alternative food • Livelihoods: Income generation from increased fish and shellfish stocks; tourism; Livelihoods diversification • Other economic benefits: Greater availability of fish; Reduced negative coping for securing food.

**HEALTH:** Reduced incidence of injury and death through coastal hazard risk reduction • Benefits related to improved FSN.

<sup>12</sup> Perillo et al., 2019:5, coastal wetlands: an integrated ecosystem approach.

<sup>13</sup> McIvor et al., 2012:3, storm surge reduction by mangrove

<sup>14</sup> Spalding et al., 2014:51, the role of ecosystems in coastal protection: adapting to climate change and coastal hazards

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## HORIZONTAL LEVELS

**Hybrid hardened flood embankments (levees) set back from coastlines or riverbanks, with conserved or restored natural habitat maintained between the flood defence and the water.**

Sometimes also known as “managed realignment”.

Protection of people and assets from coastal hazards such as:

- sea level rise;
- storm surges;
- high wave or tide events;
- shoreline erosion.

Lower maintenance costs.

Protection of the natural coast, biodiversity and habitat.

**WASH:** Reduced exposure of infrastructure and assets to coastal and shoreline hazards • Reduced risk of contamination from toilets, effluent seepage and other wastewater systems.

**SHELTER:** Reduced exposure of shelters and settlements to coastal/ riparian hazards.

**FOOD SECURITY AND NUTRITION (FSN):** Livelihoods: Income generation from improved fish and shellfish stocks; tourism • Livelihood diversification  
• FSN: Increased fish and shellfish stocks; access to alternative food.

**HEALTH:** Reduced incidence of injury and death through flood or coastal hazard risk reduction; direct and indirect benefits related to improved FSN and WASH.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## SUSTAINABLE LAND USE AND LAND MANAGEMENT

**Conservation** (if possible), **revegetation** and reforestation (using native species and drought-tolerant species), **soil conservation**, **avoiding or reducing degradation of watersheds/forests**.

Ideally should be done within a broader integrated water resource management plan and in support of restoration of ecological services and biodiversity.

Also includes rewilding, renaturalisation and other restoration of ecosystems and their services.

Conservation or combined conservation/humanitarian operations can be more cost-effective – prevention of environmental degradation is most effective and less costly than retroactively reforesting highly degraded lands.

**WASH:** More drought and flood-resilient watersheds, with improved groundwater and surface water security (quality and quantity) due to greater water infiltration and base flow.

**SHELTER:** Short-term solutions (such as sustainable forest management) provide sustainable wood resources for shelter. • Longer-term solutions at scale (e.g., forest protection and restoration) can provide protective benefits for shelter, such as protection from floods.

**FOOD SECURITY AND NUTRITION (FSN):** Improved soil quality and water retention • Supports more climate-smart agriculture and potentially pastoralism on higher-elevation terraces and low-gradient fields, maximising productivity of land. • Increased FSN. • Increased income generation opportunities, sustainable poverty escapes.

**HEALTH:** Benefits related to improved FSN • Improved mental, physical and psychosocial health • Social and cultural benefits of having healthy forests and waterways • Reduced exposure to and interaction with wild animals, increasing safety and security.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## FOREST LANDSCAPE RESTORATION AND SUSTAINABLE MANAGEMENT

**Forest restoration and sustainable forest management,** including including a landscape approach that fosters primary and secondary forest growth, agroforestry, and food forests. Also includes protective forests.

In drylands, forest restoration can be done through farmer-managed natural regeneration, or assisted natural regeneration (ANR) – a traditional technique to stimulate the growth of bare tree stumps, which are pruned and protected to enable regrowth.

Supports ecosystem services such as hazard risk reduction and sustainable provision of environmental goods needed for shelter, energy, food and water, among others.

In conjunction with sustainable energy access programmes (e.g. clean cooking stoves, community kitchens, etc.), forest restoration can reduce social and environmental protection risks for girls (and all others at risk) by reducing the need to travel far to collect fuelwood.

**WASH:** More drought- and flood-resilient watersheds, with improved groundwater and surface water security (quality and quantity) due to greater water infiltration and base flow.

**SHELTER:** Reduced vulnerability of shelters and settlements to flood, landslide, rockfall and mudflow events • Sustainable access to materials needed for construction of shelters.

**FOOD SECURITY AND NUTRITION (FSN):** Improved soil quality and water retention • Forest restoration may support maximising productivity of land. • Increased FSN • Increased income generation opportunities, sustainable poverty escapes.

**HEALTH:** Same as above. • Reduced exposure to emergency zoonotic diseases (e.g. Ebola, Covid-19, SARS) as a result of enhanced natural barriers/buffers between people and nature.



## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## SLOPE STABILISATION

**Slope stabilisation through Nbs includes the use of deep-rooted plants and trees along with other tools**, such as creating terraces, contour lines, and installing fascine drains, gabion walls and check dams.

Can be done in conjunction with **forest management and protection, integrated water resources management** and **climate-smart agriculture**.

Reduced risk of landslides, mudslides and erosion.

Improves water infiltration and reduces water-runoff.

**WASH:** Reduced risk to WASH infrastructure from landslides.

**SHELTER:** Reduced risk of settlement destruction by land or mud slides.

**FOOD SECURITY AND NUTRITION (FSN):** Terraces provide more physically stable platforms for both shelters and productive food systems supporting improved access to food and diverse nutrition.

**HEALTH:** Reduced incidence of injury and death through hazard risk reduction.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## RESTORATION OF RIVERS AND STREAMS

**Protecting, restoring or planting** of native and flood-tolerant/ hydrophilic **riparian vegetation along rivers, streams and ditches** to reduce erosion and flooding, and improve water quality.

Where rivers have been constrained and channelised, it is also possible to improve and slow down river flow by widening the river and re-introducing natural meanders.

**Naturally reinforcing embankments** to rivers/streams/ditches in settlements with bio-dykes (combining vegetation of slopes with flood walls/gates).

This should ideally be done within a broader integrated water resource management plan.

Reduced risk of (flash) flooding  
• Improved water quality from riparian plants absorbing effluent/toxins and excess nitrogen.

Reduced risk of waterway erosion through reduced flow.

Increased water infiltration, increased biodiversity, and soil stabilisation

Reduced erosion and sedimentation downstream.

**WASH:** When done in tandem with WASH, riparian areas will have reduced effluent/ human waste in waterways • Improved groundwater and surface water quality and quantity • Reduced exposure to contaminated water.

**SHELTER:** Reduced risk to shelters and settlements of impacts from flooding.  
• Avoided land loss due to riparian erosion.

**FOOD SECURITY AND NUTRITION (FSN):** Potential for improved security of home gardens, community gardens and productive riparian vegetation (for fuelwood or fibre harvesting, or fruit/nut trees) resulting in improved FSN and livelihood/ income-generating activities.

**HEALTH:** Direct and indirect benefits from WASH benefits. • Reduced vector-borne disease incidence. • Reduced waterborne disease incidence.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## MAINTENANCE OF HEALTHY WATER FLOW AND FLOODPLAINS

**Maintaining flow and environmental function of natural drainage** can be done through:

- local governance processes, via “stream teams” (earning cash for work) doing clean-ups of trash and natural debris, and maintaining or replanting riparian species;
- restoring or maintaining natural drainage paths (e.g. streams, rivers, ditches) or creating hybrid drainage systems (bioswales or fascine drains)
- living weirs or terraced dams within waterways (hybrid).
- Creating (multipurpose) floodplains.

All these strategies should ideally be done within a broader integrated water resource management plan.

Reduced risk of flash floods during extreme weather events along with reduced risk of injury, illness, death; reduced hazards from waste and debris.

Reduced risk of drought and water insecurity, of food insecurity and other secondary impacts.

**WASH:** Building WASH infrastructure away from the flood zone ensures the dynamics of perennial and annual waterways and drainage paths can occur without damaging WASH assets or disrupting the associated services. • Reducing the risk of septic or toilet pit leakages into waterways and the groundwater system, with the same benefits as above as well as improved water security during times of drought.

**SHELTER:** Building shelters away from the flood zone ensures the dynamics of perennial and annual waterways and drainage paths can continue without damage to shelters or people. • Improved drainage systems means less flooding in settlements.

**FOOD SECURITY AND NUTRITION (FSN):** Less polluted water to wash food; • Improved water access for home gardens;

**HEALTH:** Direct and indirect benefits from related WASH/environmental health and FSN benefits.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## SHELTERBELTS, GREENBELTS, WINDBREAKS, LIVING FENCES

**Protecting, restoring or planting** greenbelts of shrubs and trees at safe distances (because of tree fall potential) between and within shelters, blocks, settlements and agropastoral or riparian areas.

Protection from high wind events is beneficial for agroforestry due to reduced erosion, reduced wind damage and the resultant increased crop yield and protected livestock.

**WASH:** Reduced risk of wind damage to WASH infrastructure and associated services.

**SHELTER:** Design of shelters and settlements to be climate-resilient to high wind events, to take into consideration wind dynamics; reduced risk of shelter damage, and of displacement of people from high wind events including cyclones and storms. Increased shade that can be used for certain crops. Tree cover can also buffer heat.

**FOOD SECURITY AND NUTRITION (FSN):** Increased crop yield and livestock protection on leeward side of belts; increased FSN and livelihood/income generation with the incorporation of fruit and nut trees within the shelterbelts.

**HEALTH:** Reduced incidence of injury and death through hazard risk reduction

- Benefits related to improved FSN
- Improved mental, physical and psychosocial health.
- Reduced respiratory diseases from reduced dust
- Reduced heat through cooling effect of vegetation.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## GREEN CORRIDORS

**Hybrid green/humanitarian corridors**

Protection, implementation and restoration of green/natural corridors (for ecosystem resilience and biodiversity) that also serve as humanitarian corridors (for ceasefires permitting human mobility and social protection through demilitarised zones).

Improved permanence and physical protection via green humanitarian corridors for refugees, IDPs, migrants and other displaced persons.

Improved or protected biodiversity, habitat and ecosystem functions between humanitarian settlements, offering similar protective, restorative and maintenance services as those of shelterbelts (see above).

**WASH:** Increased and/or quicker access to WASH.

**SHELTER:** Increased and/or quicker access to shelter.

**FOOD SECURITY AND NUTRITION (FSN):** Increased and/or quicker access to FSN.

**HEALTH:** Reduced risk of injury or death during movement through green humanitarian corridors • Increased and/or quicker access to health services  
• Improved access to mental health services.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## INTEGRATED WILDFIRE MANAGEMENT

**Use of controlled burns** to reduce risks to people, assets and the environment from wildfires; maximisation of environmental (and associated social and economic) benefits of prescribed burns through the integration of fire ecology, culture and indigenous knowledge and practices, which will in itself reduce wildfire risks.

Controlled burning, also known as prescribed burning, involves setting planned fires to maintain the health of a forest. These burns are scheduled for a time when the fire will not pose a threat to the public or to fire managers.

Reduced risk of wildfires and their associated impacts (injury; loss of property, life, livelihoods).

Increased biodiversity and social and cultural benefits.

Reduction in invasive species and restoration of native, more climate-resilient species.

**WASH:** Reduced risk of wildfire damage to WASH infrastructure and associated services.

**SHELTER:** Design of shelters and settlements to be fire-resistant despite high wind events during periods of wildfire risk, when coupled with trained local fire/emergency response teams and fire suppression methods and tools; reduced risk of shelter damage and of displacement of people from wildfire events.

**FOOD SECURITY AND NUTRITION (FSN):** Maintained or increased crop yield and livestock protection with reduced wildfire risk and incidence.

**HEALTH:** Reduced incidence of injury and death through hazard risk reduction; benefits related to improved FSN; improved mental, physical and psychosocial health.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## CLIMATE-SMART AGRICULTURE

Done in tandem with most relevant NbS strategies listed throughout this guide **climate-smart agriculture (CSA)** supports integrated land management, improves resilience and productivity of food systems.

Strategies include soil conservation and water efficiency measures (see below), the use of crops adapted to the changing climate, **permaculture**, diversity of species and intercropping through practices such as **agroforestry**.

Improved climate-smart agricultural and livestock production dependent upon healthy soil.

Reduced vulnerability of crops and livestock to pests and diseases, increased biodiversity.

Increased income generation and diversified sources of livelihoods.

**WASH:** Improved climate-smart water security over time. • CSA strategies like terraced/bench landscape designs will offer slope stabilisation and enhanced water and soil nutrient retention.

**SHELTER:** Shelters/settlements can be designed in conjunction with the mixed-use/greening strategies such as incorporation of permagardens and edible slope-stabilising vegetation interspersed amongst the shelters.

**FOOD SECURITY AND NUTRITION (FSN):** Adoption of food species/seeds adapted to changing climate improves FSN • Longer-term solutions (e.g., agrobiodiversity or agroforestry) can provide fresh water, soil fertility, and income-generation opportunities.

**HEALTH:** Benefits related to improved FSN • Multiple mental, physical, and psychosocial health benefits of having productive green spaces integrated within and around households, blocks and camps/settlements.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## SOIL CONSERVATION AND IMPROVED WATER EFFICIENCY IN AGRICULTURE

**Soil conservation measures and water efficiency** in agriculture can be done in many ways:

- **Terrace farming:** These terraces create level fields and thus allow water to sink into the soil rather than run off the slope.
- **Low or zero tillage** are practices that can be applied in most contexts to reduce erosion.
- **Mulching, composting** and using **organic fertilisers & biochar** are some ways to replenish nutrients to the soil where needed.
- **Half-moons or lunar landscaping** supports combating desertification.
- **Natural or built ground catchment, reservoir or hafir** for enhanced access to water for livestock, agriculture or household consumption.

Improved soil health and structure, reduced erosion and sedimentation.

Reduced risk/enhanced environmental and social protection for girls in particular, and all people at risk, who are travelling long distances to access water points.

**WASH:** Reduced risk of natural hazard damage and long-term climate impacts (e.g. drought, desertification, groundwater table depletion) to WASH infrastructure and associated services.

**SHELTER:** Terraces provide more physically stable platforms for shelters.

**FOOD SECURITY AND NUTRITION (FSN):** More productive food systems supporting improved access to food and diverse nutrition.

**HEALTH:** Benefits related to improved FSN.



## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## MIXED-USE SETTLEMENT/CAMP/URBAN GREENING

**Conservation, restoration or creation of public green spaces** within camps and other settlements can be done in varying scales from household or block level to across settlements, depending on the availability of land and governance capacity.

Such strategies include the following:

- **Camp or urban forests or community gardens.**
- **Green spaces** like parks, playgrounds, community gardens.
- **Green corridors** (see previous section)
- **Wetlands integration:** These may be natural or constructed, and fulfil numerous functions for biodiversity, flood management and the reduction of air pollution.

Urban greening creates buffers from extremes (heatwaves, extreme rainfall, storms) while providing numerous continuous benefits (air and water filtration, biodiversity, recreation and associated mental and physical health, social protection, carbon sequestration).

**WASH:** Reduced incidence of waterborne, vector-borne and communicable diseases • Improved water security of groundwater and surface water resources • Urban forests and other green spaces detoxify contaminated soils and groundwater.

**SHELTER:** Greenbelts provide socio-ecological connections or pathways within camps as well as between camps and host communities • Open/public spaces can be in areas otherwise not safe to be habitable (e.g. flood plains) that still support natural functions to occur without putting people in harm's way • Tree planted along roads and public spaces to intercept rain and reduce stormwater runoff while also providing shade and cooling.

**FOOD SECURITY AND NUTRITION (FSN):** Integration of community gardens in public green spaces, agroforests, etc. improves FSN.

**HEALTH:** Safe access and walkability within camps is beneficial for physical, mental, psychological and social health and well-being • Large green spaces can provide clean air and water, as well as regulating diseases, promoting One Health approaches • Urban forests and other green spaces detoxify air, contaminated soils and groundwater.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## SUSTAINABLE DRAINAGE SYSTEMS IN SETTLEMENTS

**Sustainable drainage systems such as the following:**

- **Permeable pavements**
- **Bioswales**
- **Infiltration trenches**
- **Green ditches**
- **Urban wetlands**

Reduced risk of flooding through increased infiltration.

Reduced degradation of the settlement.

Furthermore, urban designs that make extensive use of green areas and wetlands help reduce heat and protect against heatwaves while also improving air quality and biodiversity.

**WASH:** Improved water security during times of drought.

- Reduction of flash floods.

**SHELTER:** Design of shelters and settlements to be flood-resistant, and integration of landscape design and plants to maximise infiltration and stormwater redirection.

**FOOD SECURITY AND NUTRITION (FSN):** Increased FSN and livelihood/income generation with water security for productive landscapes.

**HEALTH:** Reduced incidence of injury and death through flood risk reduction

- Benefits related to improved FSN
- Improved mental, physical and psychosocial health
- Reduced heat/cooling effect of watersheds.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## GREEN ROOFS AND FACADES AND RAINWATER HARVESTING

**Green roofs and façades** add a green surface layer to the roofs and/or facades of buildings, providing cooling/insulation; can be integrated into new building designs or retrofitted to existing buildings such as shelters or camp coordination centres.

Main types:

- Extensive and intensive green roofs.
- Ground-based green facades or walls with climbing plants rooted in planters (the most likely strategy for camp-based settings).
- Facade-bound greening, which uses planters at varying heights on walls.

#### Rainwater harvesting

Small-scale solutions such as rainwater harvesting into tanks, rain barrels from shelter roofs and other infrastructural catchment systems can provide fresh water for storage for times of drought.

Green roofs and façades assist in temperature control and providing creative vertical, horizontal and other mixed-use spaces for growing food and plants that provide multiple services.

Can help control stormwater runoff.

The collected rainwater can be used for drinking (after filtering), other domestic use, livestock and irrigation

Rainwater harvesting can make households more drought-resilient, especially where storage capacity exceeds the typical water demands over dry seasons.

**WASH:** Green roofs (especially intensive green roofs) help control stormwater runoff and thus the risk of pluvial flooding.

**SHELTER:** Retrofitting green roofs and facades can add to the market value of buildings, offer spaces for recreational activities if applicable, and provide shelters or other buildings with structural longevity and resilience to climate and weather-related hazards • Rooftop water harvesting systems can be combined with green roofs and thus extend the “sponge” (slow release) effect; if applied at scale, harvesting can contribute to a reduction in flood risk.

**FOOD SECURITY AND NUTRITION (FSN):** Biodiversity benefits and, depending on the design, can be used for food production for households • Improved opportunities for household and community gardens to flourish with additional access to household water.

**HEALTH:** These offer energy savings for heating/cooling and assist in coping with heat waves • If applied at scale, they help reduce the urban heat island effect • Improved mental health through having nature integrated into the design of shelters and settlements.

## NBS STRATEGIES/ACTIONS

## CROSS-SECTOR BENEFITS

## BENEFITS BY SECTOR

## INTEGRATED FLOOD MANAGEMENT FOR ENVIRONMENTAL AND SOCIAL RESILIENCE AND SAFETY

**Integrated flood management**

(IFM) is a broad concept that employs strategies to maintain or augment the productivity of floodplains or coastal zones, while at the same time providing protective measures against human losses due to flooding.

IFM seeks to integrate five types of measure:

- **Reduction of flood hazard** (e.g. through wetland and watershed restoration).
- **Flood protection** (e.g. embankments, flood barriers).
- **Land use regulation** (e.g. setback lines, building restrictions, flood proofing).
- **Raising preparedness** (e.g. early warning systems, evacuation plans, refugee/IDP-led disaster risk reduction committees).
- **Residual risk mitigation** (e.g. emergency response, insurance, recovery plans).

Reduced risk of floods, heatwaves and droughts, and associated follow-on impacts to all sectors.

Improved local early warning systems and evacuation and response teams.

**WASH:** Reduced exposure of WASH infrastructure/ assets (and improved continuity of WASH services provided) to coastal/riparian hazards • Reduced risk of environmental contamination from seepage of effluent from toilets and other wastewater systems that could have resulted from floods.

**SHELTER:** Building shelters away from the flood zone to ensure dynamics of perennial and annual waterways and drainage paths can occur without damaging shelters and people.

**FOOD SECURITY AND NUTRITION (FSN):** Potential for improved security of home gardens, community gardens and productive riparian vegetation (for fuelwood or fibre harvesting, or fruit/nut trees) resulting in improved FSN and livelihood/income-generating activities

**HEALTH:** Direct and indirect benefits from related WASH/environmental health and FSN benefits.

## TABLE 2: NATURE-BASED SOLUTIONS BY SECTOR ACROSS THE DISASTER MANAGEMENT CYCLE STAGE

Table 2 provides an analysis of specific nature-based solution strategies (for example, restoring riparian areas such as drainage ditches or streams within settlements) and actions (for example, cash-for-work stream management teams) that can be adapted and applied in different humanitarian contexts.

NATURE-BASED SOLUTIONS (NBS) PRIORITIES	BENEFITS BY SECTOR: WASH; SHELTER AND SETTLEMENT (SS); FOOD SECURITY AND NUTRITION (FSN); HEALTH	OTHER FACTORS (protection, cash/markets, assessments, cross-sector/cluster coordination, joint response plans)	GUIDING QUESTIONS/ CHECKLISTS PLUS RELEVANT TOOLS
<b>EMERGENCY PHASE, SHORT-TERM</b> <b>Time frame: Hours to days post-shock event</b>			
<p><b>NBS entry point:</b> <i>the principle of do no harm to people or the environment that protects and sustains them.</i></p> <p>Save and sustain lives.</p> <p>Integrate environmental safeguarding measures across sectors.</p> <p>Avoid unnecessary environmental degradation/do no harm where possible.</p>	<p><b>WASH:</b> Identify environmental impacts to WASH.</p> <p><b>SHELTER AND SETTLEMENT:</b> Avoid unnecessarily engaging in mass environmental degradation of critical ecosystems, or placing shelters in hazard zones (e.g. flood plains).</p> <p><b>FOOD SECURITY AND NUTRITION:</b> Understand options for locally sustainable food production and livelihoods that were in place pre-shock to ensure resiliency is supported for those systems during the relief stage.</p> <p><b>HEALTH:</b> Train and equip local DRR teams (search and rescue, evacuation, first aid skills).</p>	<p>Ensure cash distributions aren't inadvertently incentivising environmental degradation.</p> <p>Focus on avoiding dumping of hazardous materials in environmentally sensitive areas or habitats.</p> <p>Possible use of provisioning services from ecosystems (food, wood, shelter, etc.).</p>	<p>See UNDRR Scaling Up DRR in humanitarian action (<a href="https://bit.ly/nbs-en-028">bit.ly/nbs-en-028</a>) for additional questions, checklists and tools.</p>

## NATURE-BASED SOLUTIONS (NBS) ACROSS THE STAGES OF THE DISASTER MANAGEMENT CYCLE AND PROTRACTED CRISES

### NBS PRIORITIES

### BENEFITS BY SECTOR

### OTHER FACTORS

### QUESTIONS/CHECKLISTS, TOOLS

**EARLY RECOVERY** once life-saving measures secured; this can include the following scenarios (which can be overlapping and dynamic): 1) post-acute shock contexts are stabilised; 2) previously stable contexts are experiencing massive stresses (e.g. drought and famine).

**Time frame: Weeks to Months**

**Nbs entry point:** *During programme assessments, activities and evaluation, include innovation and learning via small-scale “learning plots”, testing out strategies for NbS. (see [Table 1: Nature-based solutions strategies and benefits in humanitarian clusters/sectors](#)).*

Ensure NbS expertise is embedded within agencies and clusters.

Understand impacts to the environment and ecosystem functions, and what the state of the environment was pre-shock or stress.

**WASH:** Design risk-informed water points and toilets (e.g. composting toilets) that take into consideration climate and hazard models, groundwater modelling, and energy access.

**SHELTER AND SETTLEMENT:** Make existing and future infrastructure (grey and green/hybrid) climate-resilient.

- Expand and link site management actors’ emergency preparedness and contingency planning and training with community-based protection using a DRR and resilience approach with community members.

**FOOD SECURITY AND NUTRITION:** Cash-for-work programmes could support vegetable gardening, and NbS in addition to WASH and site management support roles for all

- Secure livelihoods in tandem with supporting environmental functions.
- Design and test communal gardens and plots for subsistence for food security.

**HEALTH:** Increase eco-safe road access to improve movement to safer locations when necessary.

Integrate rapid assessments to understand and ensure implementation (during the relief phase) of protective nature-based solutions.

Reduce natural resource-based conflict through combined NbS resilience-strengthening and community-based DRR protection strategies.

Link emergency preparedness to overall community-based disaster risk.

Is there an environmental expert being deployed?

Have rapid environmental assessments been undertaken? See Nexus Environment Assessment Tool (NEAT+ [neatplus.org](https://neatplus.org))

Does the country have an environmental contingency plan?

Have appropriate sites for disposing of waste been chosen with consideration for the environment?

Have environmental impact assessments been undertaken for the humanitarian operation?

Are materials sourced from sustainable materials?

## NATURE-BASED SOLUTIONS (NBS) ACROSS THE STAGES OF THE DISASTER MANAGEMENT CYCLE AND PROTRACTED CRISES

## NBS PRIORITIES

## BENEFITS BY SECTOR

## OTHER FACTORS

QUESTIONS/CHECKLISTS,  
TOOLS

## NEW PROTRACTED CRISES, INCLUDING ACTIVE CONFLICT ZONES AND REFUGEE AND IDP SETTLEMENTS

Time frame: Weeks to months

**NbS entry point:** *During programme assessments, activities and evaluation, include innovation and learning via small-scale “learning plots”, testing out strategies for NbS. (see [Table 1: Nature-based solutions strategies and benefits in humanitarian clusters/sectors](#))*

Ensure NbS expertise is embedded within agencies and clusters.

Understand impacts to the environment and ecosystem functions, and what the state of the environment was pre-shock or stress.

**WASH:** Design risk-informed water points and toilets (e.g. composting toilets), that take into consideration climate and hazard models, groundwater modelling, energy access and Protection Principles • Source sustainable materials for recovery, waste management and waste recycling (e.g. encouraging composting of biodegradable waste for use as fertiliser, building bio-toilets that recycle methane gas for household energy use).

**SHELTER AND SETTLEMENT:** Support the integration of NbS in the design of the new community/ settlement.

**FOOD SECURITY AND NUTRITION:** Develop nature-based technological strategies (vocational training and livelihood skills development) • Restore the ecosystem • Develop small-scale “learning plots” of climate-smart agriculture/ NbS in settlements (for example, block, camp, household, school, public gardens and green spaces, or permaculture and agroforestry).

**HEALTH:** Incorporate environmental health questions into assessments • Consider reforestation of erosion-prone areas. • Avoid fragmenting forests and use of buffer zones to protect against wildlife and disease spread • Improve psycho-social well-being through connection to nature.

Use NbS strategies to support improved social cohesion and protection outcomes within refugee/IDP settlements, and reduced conflict between refugee/IDPs and host communities.

Use rapid environmental assessments to track ecosystem recovery post-impact.

Integrate rapid assessments to understand and ensure implementation (during the relief phase) of protective, nature-based solutions.

Is there an environmental expert being deployed?

Have you checked which are the environmentally sensitive areas in the region where you are going to provide relief?

Does the country have an environmental contingency plan?

Have appropriate sites for disposing of waste been chosen with consideration for the environment?

Have environmental impact assessments been undertaken for the humanitarian operation?

Are materials sourced from sustainable materials?

## NATURE-BASED SOLUTIONS (NBS) ACROSS THE STAGES OF THE DISASTER MANAGEMENT CYCLE AND PROTRACTED CRISES

NBS PRIORITIES	BENEFITS BY SECTOR	OTHER FACTORS	QUESTIONS/CHECKLISTS, TOOLS
<b>SUSTAINABLE RECONSTRUCTION OR ONGOING PROTRACTED CRISES</b> , including active conflict zones, refugee and IDP settlements <b>Time frame: Months to years</b>			
<p><b>NbS entry points:</b> <i>integration and extension of the successful NbS strategies used in the small-scale learning plots or pilots, into ongoing and new programme activities, joint response plans, operational strategies.</i></p> <p>Ongoing NbS innovation, adaptation, evaluation and learning within the project management cycle.</p>	<p><b>WASH:</b> Design risk-informed water points and toilets. • Improve waste management alongside ecosystem restoration. • Use water harvesting and recharge of ecosystems to minimise the likelihood of drought • Protect watersheds for water safety and security.</p> <p><b>SHELTER AND SETTLEMENT:</b> Ensure environmentally sensitive reconstruction. • Source sustainable materials.</p> <p><b>FOOD SECURITY AND NUTRITION:</b> Integrate terrace crop planting/ permaculture and other climate-smart agriculture strategies. • Restore the landscape to improve food production. • Use local plant varieties or animal breeds resistant to disease and pests.</p> <p><b>HEALTH:</b> Protect the habitats and species involved in disease regulation • Avoid the introduction of invasive species • Ensure that green spaces are accessible for physical activity • Use vegetation to filter pollutants.</p>	<p>Consider climate models, ecosystem assessments and population growth estimates to determine carrying capacity of the environment and NbS to support sustainable development.</p> <p>Design protected or off-limits sites, via area-based conservation approaches, including protected area management.</p>	<p>Is there an appropriate waste management plan that takes the environment into account in place?</p> <p>Are natural resources for recovery being used in a sustainable way?</p> <p>Are energy provisions for the population sustainable?</p> <p>Is there an environmentally sensitive reconstruction plan in place?</p> <p>Is ecosystem restoration in degraded areas being undertaken?</p>



## NATURE-BASED SOLUTIONS (NBS) ACROSS THE STAGES OF THE DISASTER MANAGEMENT CYCLE AND PROTRACTED CRISES

## NBS PRIORITIES

## BENEFITS BY SECTOR

## OTHER FACTORS

QUESTIONS/CHECKLISTS,  
TOOLS

## PREVENTION, MITIGATION AND PREPAREDNESS (INCLUDING ANTICIPATION, RISK REDUCTION AND RESILIENCE CAPACITY STRENGTHENING)

Time frame: Ongoing

**NbS entry point:** *ongoing NbS integration into risk reduction and resilience-strengthening strategies within and across structures.*

For example:

- Improve resilience of ecosystems and their services to people.
- Improve readiness of people and the humanitarian systems that support them (e.g. through early warning systems that are informed by nature indicators among other sources) for future hazard events.
- Include ecosystems in environmental emergency preparedness programmes.

**WASH:** Support activities that relate to reducing WASH-related risks from flooding, drought and other hazards; for example, increasing water catchment through vegetation absorption.

**SHELTER AND SETTLEMENT:** Design shelter and settlements in a landscape risk-aware approach:

- reducing exposure and vulnerability (by using green infrastructure as buffers);
- fostering resilience capacity strengthening (e.g. incorporating permagardens and edible slope stabilisation vegetation interspersed amongst the shelters).

**FOOD SECURITY AND NUTRITION:** Create seed banks • Support with household, community gardens, agroforestry, and other means listed above for reducing FSN-related risks.

**HEALTH:** Run community health awareness campaigns to improve knowledge about climate- environment and hazard-related, seasonal threats to health and well-being.

Integrated participatory risk and resilience assessments and analyses across sectors, considering ecosystem services (**see Table 3**).

Results inform joint response plans and cluster coordination, land management plans, and restoration.

Ensure response is climate- and nature-informed

Ensure sectors incorporate a strong understanding of the linkages between natural resource management, conflict and protection needs and capacities.

See Sphere Thematic Sheet 1 ([bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en)) for additional questions, checklists and tools.

Do risk maps that consider ecosystems exist for the country? If not, see the PEDRR Opportunity Mapping tool ([bit.ly/nbs-en-021](https://bit.ly/nbs-en-021)).

Are appropriate areas under sustainable management?

Are green and blue areas that are important for disaster risk reduction being protected and/or restored or created?

Are ecosystems included in environmental emergency preparedness plans?

Has an environmental contingency plan been set up?

**TABLE 3: RECOMMENDED GUIDANCE**

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
N/A	FEBA	EbA Tools Navigator, FEBA, IIED, IUCN and UNEP-WCMC, <a href="https://bit.ly/nbs-en-032">bit.ly/nbs-en-032</a>	Knowledge hub	Database of EbA tools to help practitioners and policymakers incorporate EbA into their climate adaptation planning.
N/A	EHA Connect	Environment and Humanitarian Action Connect, EHA Connect, <a href="https://ehaconnect.org">ehaconnect.org</a>	Knowledge hub	Digital repository of tools and guidance allows environmental actors to get involved in the disaster management space and humanitarian actors to mainstream environmental considerations in preparedness, response and recovery.
N/A	UNEP and OCHA JEU	Environmental Emergencies Centre, UNEP and OCHA JEU, <a href="https://ecentre.org">ecentre.org</a>	Knowledge hub	Online hub for responders and humanitarians provides information relevant to the preparedness, prevention and response stages of an environmental emergency.
N/A	PEDRR	Virtual Library & trainings, Partnership for environment and Disaster Risk Reduction, <a href="https://www.pedrr.org">www.pedrr.org</a>	Knowledge hub	Digital repository of knowledge products, video case studies and trainings on ecosystem-based disaster risk reduction and adaptation.
N/A	Stanford University	Integrated Valuation of Ecosystem Services and Trade-offs (InVEST), Stanford University, <a href="https://bit.ly/nbs-en-020">bit.ly/nbs-en-020</a>	Web-based tool	Modular suite of free, open-source software models maps goods and services from nature, including assessment of trade-offs and opportunities for investment in natural capital to enhance development and conservation.
N/A	UNEP	Opportunity Mapping: The first global geospatial tool for Nature-based Solutions. PEDRR, UNEP and UNEP GRID-Geneva, <a href="https://bit.ly/nbs-en-021">bit.ly/nbs-en-021</a>	Web-based tool	A geospatial tool that overlays global datasets on ecosystem distribution and hazard exposure to highlight geographic locations where ecosystem restoration or protection are particularly appropriate for reducing the impact of certain hazards.

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
N/A	UNEP and OCHA JEU	Nexus Environment Assessment Tool (NEAT+), UNEP/OCHA JEU, 2021, <a href="https://neatplus.org">neatplus.org</a>	Web-based tool	A rapid project-level environmental screening tool that allows humanitarian actors to quickly identify issues of environmental concern before designing interventions.
N/A	EHA Connect	Virtual Environmental and Humanitarian Adviser (VEHA), EHA Connect, 2022, <a href="https://ehaconnect.org/veha-tool/">ehaconnect.org/veha-tool/</a>	Web-based tool	An online resource for practitioners and professionals working in response, planning and management teams to search for sector- or subsector-specific guidance.
2008	Global Shelter Cluster	Shelter Environmental Impact Assessment and Action Tool 2008 Revision 3, Global Shelter Cluster, 2008, <a href="https://bit.ly/nbs-en-039">bit.ly/nbs-en-039</a>	Step-by-step manual/toolkit	Checklist that provides project managers with the means to quickly assess shelter-related environmental impacts and identify practical local actions to address impacts.
2010	WWF and American Red Cross	Green Recovery and Reconstruction: Training Toolkit for Humanitarian Aid (GRRT), WWF and American Red Cross, 2010, <a href="https://envirodm.org/green-recovery">envirodm.org/green-recovery</a>	Step-by-step manual/toolkit and training	Ten-module toolkit and training programme increases awareness and knowledge of environmentally responsible disaster response approaches.
2011	Global WASH Cluster and CARE Netherlands	Disaster Risk Reduction and Water, Sanitation and Hygiene... Comprehensive Guidance: A Guideline for Field Practitioners Planning and Implementing WASH Interventions, Global WASH Cluster and CARE Netherlands, 2011, <a href="https://bit.ly/nbs-en-031">bit.ly/nbs-en-031</a>	Guidance	Guidelines with tools to assist agencies in mainstreaming DRR in WASH.
2014	IUCN & WRI	A Guide to the Restoration Opportunities Assessment Methodology (ROAM), IUCN and WRI, 2014, <a href="https://bit.ly/nbs-en-030">bit.ly/nbs-en-030</a>	Guidance	Presents the ROAM framework for countries to identify and analyse forest landscape restoration potential and opportunities.

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
2017	FEBA	Making Ecosystem-based Adaptation Effective: A Framework for Defining Qualification Criteria and Quality Standards, FEBA, 2017, <a href="https://bit.ly/nbs-en-018">bit.ly/nbs-en-018</a>	Guidance note	Provides decision makers and practitioners with a practical assessment framework for designing, implementing and monitoring EbA measures.
2017	WWF and USAID	Natural and Nature-based Flood Management: A Green Guide, WWF and USAID OFDA, 2017, <a href="https://bit.ly/nbs-en-037">bit.ly/nbs-en-037</a>	Guidance	Supports local communities in using nature-based methods for flood risk management by providing a step-by-step framework.
2018	OCHA	Guidelines for Rapid Environmental Impact Assessment in Disasters (REA), OCHA, 2018, <a href="https://bit.ly/nbs-en-035">bit.ly/nbs-en-035</a>	Step-by-step manual/toolkit	Encompasses a three-module qualitative process to identify, define, and prioritise potential environmental impacts and follow-up actions in disaster situations.
2018	Mercy Corps	Planting Seeds of Resilience in Humanitarian Settings: Rapid Strategic Resilience Assessment Report for the Rohingya Crisis, Cox's Bazar, Bangladesh, Mercy Corps and IOM Bangladesh, 2018, <a href="https://bit.ly/nbs-en-038">bit.ly/nbs-en-038</a>	Report	Summarises the Rapid Strategic Resilience Assessment of the Rohingya Refugee Camp in Bangladesh, which utilised an adapted participatory DRR and resilience framework.
2019	CARE	Climate Vulnerability and Capacity Analysis Handbook (CVCA), CARE, 2019, <a href="https://careclimatechange.org/cvca">careclimatechange.org/cvca</a>	Step-by-step manual/toolkit	Provides a framework for gathering and analysing community-level vulnerability and capacity to adapt to climate change and informs the identification of actions that support communities in increasing their resilience.
2019	IFRC	Enhanced Vulnerability and Capacity Analysis, IFRC, 2019, <a href="https://ifrcvca.org/toolbox">ifrcvca.org/toolbox</a>	Guidance/toolkit/ training materials	Provides a framework for gathering and analysing community-level vulnerability and capacity to reduce disaster risk and informs the identification of actions that support communities in increasing their resilience.

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
2019	UNEP and Cologne University of Applied Sciences	Disasters and Ecosystems, Resilience in a Changing Climate - Source Book, UNEP and Cologne University of Applied Sciences, 2019, <a href="https://bit.ly/nbs-en-009">bit.ly/nbs-en-009</a>	Guidance	Explains the importance of ecosystems and their management for DRR and CCA and provides guidance for planning and implementing Eco-DRR and EbA.
2019	Sphere	Sphere Thematic Sheet 1: Reducing environment impact in humanitarian response, Sphere, 2019, <a href="https://bit.ly/sphere-ts1-en">bit.ly/sphere-ts1-en</a>	Guidance note	Explains the importance of sustainability and environmental impact considerations in humanitarian action through examples and references.
2020	Sphere	Thematic Sheet 2: Disaster Risk Reduction, Sphere, 2020, <a href="https://bit.ly/sphere-ts2-en">bit.ly/sphere-ts2-en</a>	Guidance note	Explains the importance of mainstreaming DRR in humanitarian action through examples and references.
2020	FEBA	Guidebook for Monitoring and Evaluating Ecosystem-based Adaptation Interventions, FEBA, GIZ and UNEP, 2020, <a href="https://bit.ly/nbs-en-015">bit.ly/nbs-en-015</a>	Guidance	Provides an overview of the process needed for designing and implementing effective monitoring and evaluation for EbA.
2020	UNDRR	Ecosystem-based disaster risk reduction: Implementing nature-based solutions for resilience, UNDRR, 2020, <a href="https://bit.ly/nbs-en-014">bit.ly/nbs-en-014</a>	Report	Forms a key knowledge and evidence base on the important role of ecosystem-based approaches in reducing disaster risk.
2020	Global Shelter Cluster	Environmental Checklist for Shelter Response, Global Shelter Cluster, 2020, <a href="https://bit.ly/nbs-en-033">bit.ly/nbs-en-033</a>	Step-by-step manual/toolkit	Designed to guide you through the steps required to ensure that environmental considerations are adequately considered and implemented in humanitarian shelter programmes.

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
2020	IUCN	IUCN Global Standard for Nature-based Solutions, IUCN, 2020, <a href="https://bit.ly/nbs-en-007">bit.ly/nbs-en-007</a>	Guidance	A robust framework of eight criteria and 28 indicators for defining and verifying NbS and strengthening the effectiveness, sustainability and adaptability of NbS interventions.
2020	UNDRR	Words into Action: Nature-based Solutions for Disaster Risk Reduction, UNDRR, 2020, <a href="https://bit.ly/nbs-en-011">bit.ly/nbs-en-011</a>	Guidance	This guide provides practical information on setting up and implementing DRR and CCA and is designed to help implement the Sendai Framework for Disaster Risk Reduction 2015-2030.
2021	UNICEF and UNEP	Water Supply, Sanitation and Hygiene (WASH) Disaster Recovery Framework Guide, UNICEF and UNEP, 2021, <a href="https://bit.ly/nbs-en-040">bit.ly/nbs-en-040</a>	Guidance	Provides an understanding of the steps required to develop a disaster recovery framework (DRF) for the WASH sector that will be included in the overall DRF for the country.
2021	European Commission	Evaluating the Impact of Nature-based Solutions: A Handbook for Practitioners, European Commission, 2021, <a href="https://bit.ly/nbs-en-034">bit.ly/nbs-en-034</a>	Handbook	Provides decision-makers with a comprehensive NbS impact assessment framework and a robust set of indicators and methodologies across 12 societal challenge areas.
2021	IUCN	Nature-Based Solutions for Disaster Risk Reduction and Climate Change Adaptation in Humanitarian Contexts: HNPW 2021 outcomes, NbS in Humanitarian Contexts Working Group (IUCN), 2021, <a href="https://bit.ly/nbs-en-036">bit.ly/nbs-en-036</a>	Report	Summarises a session held at Humanitarian Networks and Partnerships Weeks which provided an introduction to NbS for DRR and climate change adaptation in humanitarian contexts and covered the best practices for implementation and the topic of Covid-19, health, nature and resilience.

YEAR	AGENCY	RESOURCE	TYPE	DESCRIPTION
2021	TNC	The Blue Guide to coastal resilience: Protecting coastal communities through nature-based solutions: A handbook for practitioners of disaster risk reduction, The Nature Conservancy, 2021, download from <a href="https://www.natureprotects.org">natureprotects.org</a> (scroll down)	Guidance	Details eight stages for enhancing coastal resilience through the integration and implementation of NbS in DRR, and provides accompanying tools and guides.
2022	Green Response	Green Response: Environmental Quick Guide, IFRC, 2022, <a href="https://bit.ly/nbs-en-017">bit.ly/nbs-en-017</a>	Guidance	Explains the basics of green response and provides practical advice on how to improve environmental sustainability of humanitarian work.
2022	IFRC	The Nature Navigator: A handbook for Disaster Risk Management Practitioners, IFRC, 2022, <a href="https://bit.ly/nbs-en-002">bit.ly/nbs-en-002</a>	Guidance	A guide for practitioners on working with nature in the disaster risk management field.
2022	IFRC and WWF	Working with Nature to Protect People: How NbS Reduce Climate Change and Weather-Related Disasters, IFRC and WWF, 2022, <a href="https://bit.ly/nbs-en-001">bit.ly/nbs-en-001</a>	Report	Demonstrates how NbS can save lives by working with nature to protect vulnerable communities from the hazards of climate change.

## TABLE 4: EXAMPLE NATURE-BASED SOLUTIONS ACTION PLAN

An example template of a simplified action plan for considering the impacts to, and impacts from, the environment, and the socio-cultural, infrastructural, environmental, and humanitarian systems of concern. It is: **informed by** an integrated, multisector, participatory risk and resilience assessment that considers ecosystem services and nature-based solutions; **used to inform** joint response plans, cluster coordination, and land management plans to be more mindful of nature-based solutions across humanitarian sectors.

SYSTEM	IMPACTS from humanitarian response operations, natural resource degradation, climate change or hazards	NBS, OTHER SOLUTIONS (risk prevention, mitigation, coping, adaptation)	CAPACITIES TO SUPPORT	NEEDS (programmatic, financial, policy)	RESPONSIBLE (lead/support)	TIMELINE (Dates or urgency e.g. short-term, mid-term, long-term)	PRIORITY (high/medium/low)	STATUS
<b>Socio-cultural</b>								
<b>Infrastructural</b>								
<b>Humanitarian</b>								
Food, Nutritional Security								
WASH								
Public Health								
Housing/Site Management								



SYSTEM	IMPACTS	SOLUTIONS	CAPACITIES	NEEDS	RESPONSIBLE	TIMELINE	PRIORITY	STATUS
Protection								
Human Rights and Justice								
Access to Energy								
<b>Ecological (by ecosystem type)</b>								
Coral reef								
Shoreline								
Mountain								
Forests								
Wetland								
Agriculture								
Grassland								
Watershed								
Urban								
Other								
<b>Economic</b>								

Download this table as a spreadsheet, [bit.ly/nbs-action-plan](https://bit.ly/nbs-action-plan)

# Glossary

**Adaptative capacity:** the ability of a person, asset or system to adjust to a hazard, take advantage of new opportunities or cope with change (IPCC, 2014).

**Agroforestry:** practice of deliberately integrating woody vegetation (trees or shrubs) with crops and/or animal systems to benefit from the resulting ecological and economic interactions (A. Pantera et al., 2021, [bit.ly/nbs-en-041](https://bit.ly/nbs-en-041)).

**Biodiversity:** biological diversity – the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (IPCC, 2018).

**Bio-rights:** financial mechanism whereby micro-credits are provided for sustainable development, enabling local communities to refrain from unsustainable practices and be actively involved in environmental conservation and restoration.

**Bioswale:** channel designed to concentrate and convey stormwater runoff while removing debris and pollution.

**Blue infrastructure:** a strategically planned network of water-related natural and semi-natural areas with other environmental features (such as ponds, rivers, lakes or in marine areas, coral reefs, mangroves, seagrasses) designed and managed to deliver a wide range of ecosystem services in both rural and urban settings (EU, 2013). See also green infrastructure.

**Carbon footprint:** the total amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions (TNC, 2022).

**Carbon sequestration:** the process of capturing and storing atmospheric carbon dioxide (it is one method of reducing the amount of carbon dioxide in the atmosphere with the goal of reducing global climate change).

**Carrying capacity:** the maximum population that a habitat or ecosystem can support on a sustainable basis and without undergoing deterioration.

**Check dam:** a small dam constructed across a drainage ditch, swale, or channel to lower the velocity of flow.

**Climate change:** a change in the state of the climate that persists for an extended period (typically, for decades or longer); it refers to any change in climate over time, whether owing to natural variability or as a result of human activity (IPCC, 2007; IPCC, 2018).

**Climate change adaptation:** strategies or actions specifically aimed at reducing vulnerability to actual or expected changes in climate (IPCC, 2014).

**Climate change mitigation:** human efforts to reduce or prevent emission of greenhouse gases and to reduce their concentration by enhancing carbon sinks (UNFCCC, 2020).

**Climate-smart agriculture:** an integrated approach to managing landscapes – cropland, livestock, forests and fisheries – to address the interlinked challenges of food security and climate change (IFRC, 2022).

**Controlled burning:** also known as prescribed burning, involves setting planned fires to maintain the health of the forest and reduce wildfire risk.

**Desertification:** land degradation in arid, semi-arid and dry sub-humid areas, collectively known as drylands, resulting from many factors, including human activities and climatic variations ([ipcc.ch/srccl/chapter/chapter-3](https://ipcc.ch/srccl/chapter/chapter-3)).

**Disaster:** a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts (UNISDR, 2009).

**Disaster risk:** the potential for loss of life, injury, or destroyed or damaged assets which could occur to a system, society or community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity (UNDRR, 2022).

**Disaster risk reduction (DRR):** measures aimed at preventing new disaster risk, reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and, therefore, to achieving sustainable development (Sphere, 2019, [bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en), adapted from UNISDR; see also Sphere, 2020, [bit.ly/sphere-ts2-app](https://bit.ly/sphere-ts2-app), for an alternative definition).

**Drainage basin:** an area of land where all flowing surface water converges at a single point, such as a river mouth, or flows into another body of water, such as a lake or ocean.

**Ecosystem:** a functional unit consisting of living organisms, their non-living environment and the interactions within and between them (IPCC, 2018).

**Ecosystem-based adaptation (EbA):** the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change (Convention on Biological Diversity, 2009, [bit.ly/nbs-en-042](https://bit.ly/nbs-en-042), and 2010, [bit.ly/nbs-en-043](https://bit.ly/nbs-en-043)).

**Ecosystem-based disaster risk reduction (Eco-DRR):** the sustainable management, conservation, and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development (Estrella and Saalismaa, 2013).

**Ecosystem service:** ecological processes or functions having monetary or non-monetary value to individuals or society at large; these are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fibre, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation (IPCC, 2018).

**Ecosystem valuation:** assignment of monetary values to the goods and services the environment provides; see Ecosystem service above.

**Environment:** sum total of all the living and non-living elements and their effects that influence human life in a given place.

**Environmental degradation:** Unsustainable natural resource exploitation and pollution that can further threaten disaster-affected populations and ecosystems; examples include land degradation, deforestation, desertification, wildland fires and loss of biodiversity (Sphere, 2019, [bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en)).

**Environmental mainstreaming:** the informed inclusion of relevant environmental concerns into the decisions of institutions that drive national, local and sectoral development policy, rules, plans, investment and action.

**Environmental sustainability:** meeting present needs while not compromising the ability of future generations to meet their own needs (Sphere, 2019, [bit.ly/sphere-ts1-en](https://bit.ly/sphere-ts1-en), adapted from UN Documents, [bit.ly/nbs-en-044](https://bit.ly/nbs-en-044)).

**Exposure:** the presence in places and settings that could be adversely affected of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets (IPCC, 2018).

**Fascine:** a rough bundle of brushwood or other material used for strengthening an earthen structure or making a path across uneven or wet terrain. Typical uses are protecting the banks of streams from erosion, covering marshy ground and so on.

**Fascine drains:** a trench filled with a fascine and then covered with the trench backfill. This can improve drainage on a slope.

**Food security:** a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001).

**Green infrastructure:** a strategically planned network of natural and semi-natural areas with other environmental features (such as parks, forests, hedgerow, fields, etc.) designed and managed to deliver a wide range of ecosystem services in both rural and urban settings (EU, 2013). See also blue infrastructure

**Green response:** actions that improve the environmental sustainability of response including those that avoid, minimise and manage the damage caused to the environment and climate (IFRC, 2022).

**Grey infrastructure:** refers to buildings, roads, tanks, and other concrete/steel/plastic/etc. or engineered constructions. It is usually used in opposition to green or blue infrastructure.

**Groundwater:** water found underground in the cracks and spaces in soil, sand and rock.

**Hafir:** an artificially constructed water catchment basin with a circular earthen wall and diameters of between 70-250 m and heights of up to 7 m. Adapted to semi-desert conditions, the hafirs catch the water during the rainy season to have it available for several months during the dry season to supply drinking water, irrigate fields and water cattle.

**Half-moon agriculture (demi-lunes):** water harvesting agricultural practices for restoring degraded pastureland, where half-moon-shaped basins enabling water capture are created in the earth.

**Hazard:** a potentially damaging physical event, natural phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption or environmental damage (Sphere, 2020, [bit.ly/sphere-ts2-app](https://bit.ly/sphere-ts2-app)).

**Hybrid infrastructure:** natural blue and/or green infrastructure combined with built grey infrastructure or ecologically engineered infrastructure.

**Hydrology:** the study of the distribution and movement of water both on and below the Earth's surface, as well as the impact of human activity on water availability and conditions.

**Institutional greening:** modifying an organisation's awareness, behaviours and activities with the goal of matching them up with the broader principle of sustainability – that is, to be economically, socially and environmentally responsible.

**Integrated coastal zone management (ICZM):** a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning (in its broadest sense), decision making, management and monitoring of implementation. ICZM uses the informed participation and cooperation of all stakeholders to assess the societal goals in a given coastal area, and to take actions towards meeting these objectives. ICZM seeks, over the long-term, to balance environmental, economic, social, cultural and recreational objectives, all within the limits set by natural dynamics. 'Integrated' in ICZM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space (EEA, 2000).

**Integrated water resource management (IWRM):** a governance and development process for managing water, land and related resources, in order to maximise economic and social welfare; good IWRM means better policies for improved catchment management, enhanced sanitation services, reduced pollution and good governance (UNEP, 2019, [bit.ly/nbs-en-009](https://bit.ly/nbs-en-009)).

**Landscape approach:** is a term used to describe collaborative initiatives in specific places that span multiple sectors and go beyond the scale of individual farms, forest management units and protected areas. Essentially, it means coherent intervention at a landscape scale to secure food, fibre and energy production, improvements in social welfare, water security and ecosystem conservation.

**Livelihood assets:** the resource base of the community and of different categories of households; they can include human, natural, financial, physical and social assets (A. Stewart Carloni et al., 2005, from FAO, 2005, [bit.ly/nbs-en-045](https://bit.ly/nbs-en-045)).

**Managed realignment:** is able to reduce both coastal flooding and erosion. It is the deliberate process of altering flood defences to allow flooding of a presently defended area. It generally involves setting back the line of actively maintained defences to a new line, inland of the original or preferably, to rising ground.

**Natural assets:** are assets of the natural environment. These consist of biological assets (produced or wild), land and water areas with their ecosystems, subsoil assets and air. See **livelihood asset**.

**Nature-based solutions:** actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits; common societal challenges are climate change, food security, disaster risks, water security and social and economic development as well as human health (IUCN, 2016).

**Natural resource governance:** the norms, institutions and processes that determine how power and responsibilities over natural resources are exercised, how decisions are taken, and how citizens – including women, men, youth, Indigenous peoples and local communities – participate in and benefit from the management of natural resources (Graham et al., 2003, from IUCN, 2021).

**Natural resource management (NRM):** the sustainable use of major natural resources, such as land, water, air, minerals, forests, fisheries and wild flora and fauna; together, these resources provide the ecosystem services that provide better quality to human life.

**One Health:** a collaborative, multisector approach that recognises that the health of people is closely connected to the health of animals and of our shared environment.

**Payments for ecosystem services:** incentives offered to farmers or landowners in exchange for managing their land to provide some sort of ecological service.

**Permaculture:** a holistic approach to agriculture that provides for human needs – high-quality food, fibre, fuel, medicine and building materials – while enhancing the ecosystems and communities from which these derive (FAO, 2018).

**Permagarden:** a garden that provides year-round (FSN Network, 2021, [↪ bit.ly/nbs-en-046](https://bit.ly/nbs-en-046)).

**Preparedness:** activities and measures taken in advance of a crisis to ensure an effective response to the impact of hazards, including issuing timely and effective early warnings, and the temporary evacuation of people and property from threatened locations; it can also apply to the state of readiness to respond, as demonstrated by organisations, NGOs or government departments (Sphere, 2020, [↪ bit.ly/sphere-ts2-app](https://bit.ly/sphere-ts2-app)).

**Protection:** refers to approaches for explicitly safeguarding biodiversity, such as in area-based conservation, whether the areas are nationally listed as protected areas or are conserved through local and community-based approaches (IUCN, 2022).

**Rain garden:** a garden planted in a small depression generally formed on a natural slope that is designed to temporarily hold and soak in rainwater runoff.

**Renaturation/renaturalisation:** to restore to the original condition.

**Resilience:** the ability of a system to cope with adverse impact and return to a state that allows it to resume its original functions (Walker and Salt, 2005); community resilience is the ability of communities to anticipate, prepare for, reduce the impact of, cope with, and recover from the effects of shocks and stresses without compromising their long-term prospects (IFRC, 2014).

**Restoration:** putting back lost or degraded ecosystem goods and services whose absence has deprived communities of important options for their own well-being (IUCN, 2022).

**Ridge-to-reef approach:** aims to provide a holistic intervention for protecting the coastal area by targeting environmental degradation in the uplands (“ridge”) that impact coastal ecosystems through sedimentation, by restoring the shoreline and protecting marine ecosystems (“reef”), thereby mitigating storm surges, coastal and inland flooding and reduce people’s exposure and vulnerability to these hazards.

**Riparian:** the transitional area between an upland dry area and a water body such as a stream or lake, commonly referred to by some as the shoreline region (TUC, 2017, [bit.ly/nbs-en-047](https://bit.ly/nbs-en-047)).

**Risk:** the potential for adverse consequences where something of value is at stake and where the occurrence and degree of an outcome is uncertain; risk results from the interaction of vulnerability (of the affected system), its exposure over time (to the hazard), as well as the (climate-related) hazard and the likelihood of its occurrence (IPCC, 2018).

**Safeguarding:** essential tools to prevent and mitigate undue harm to people and their environment in the development process (FAO, 2022, [bit.ly/nbs-en-048](https://bit.ly/nbs-en-048)).

**Shelterbelts:** natural or strategically planted trees in multi-row settings that help reduce the leeward wind speed over extended areas, up to 40 times the height of the trees (IFRC, 2022).

**Siltation:** the deposition of finely divided soil and rock particles on the bottom of streambeds, riverbeds and reservoirs.

**Soil erosion:** the displacement of the soil by the action of water or wind; soil erosion is a major process of land degradation (IPCC 2019).

**Sustainability:** the reconciliation of environmental, social and economic demands; sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their needs (WCED, 1987).

**Sustainable land management (SLM):** the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions (UNEP, 2019).

**Vulnerability:** the propensity or predisposition to be adversely affected (vulnerability to the same risks may differ based on gender, wealth, mobility and other factors); vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm, and lack of capacity to cope and adapt (IFRC, 2022, adapted from IPCC, 2018; and CARE, 2019).

**Wadi:** a valley, ravine or channel that is dry except in the rainy season.

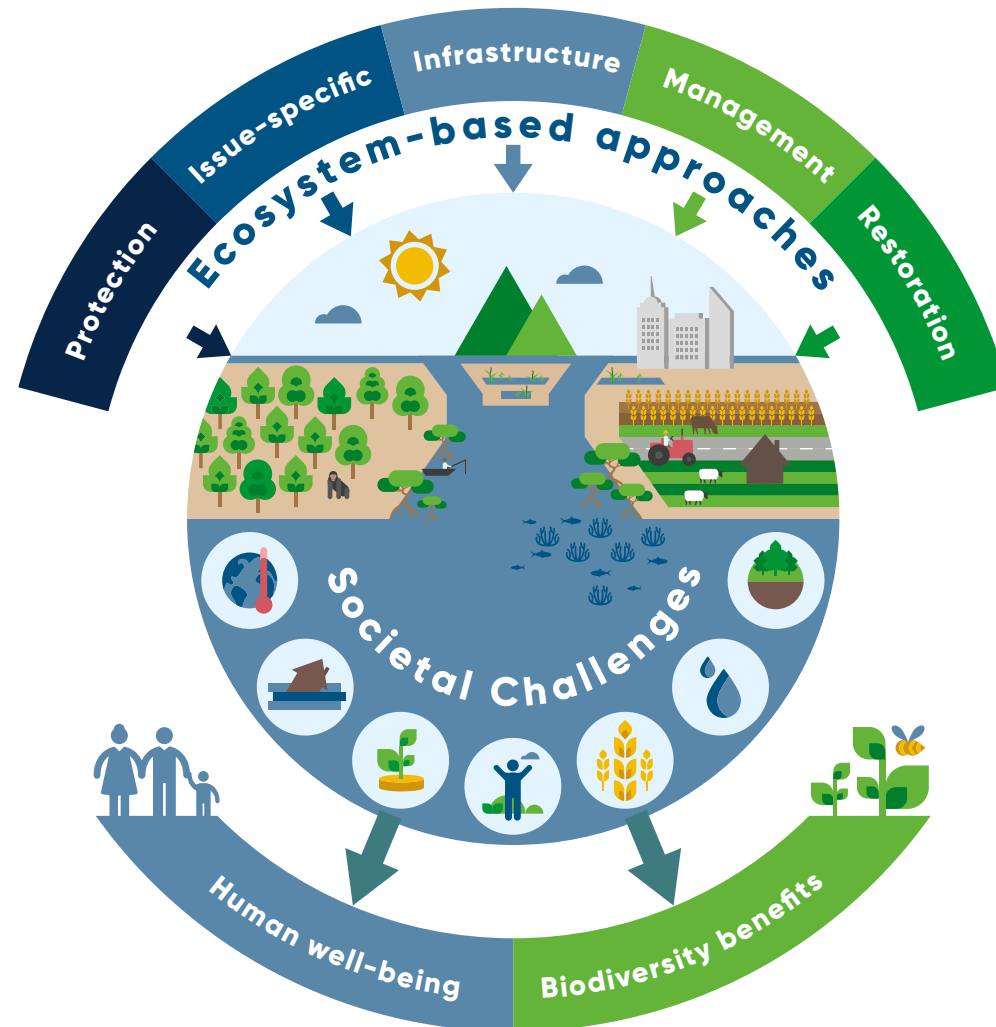
**Water opportunity mapping:** a process which maps all available sources of water at a site along with the water demands at that site so as to identify potential linkages between the two.

**Watershed:** a land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, and the ocean.

**Zoonotic disease:** any disease or infection that is naturally transmissible from vertebrate animals to humans (WHO, 2022).

## Appendix 1: Nature-based solutions: A range of approaches

**Nature-based solutions** is an “umbrella” concept which includes several types of ecosystem-based approaches to deal with societal challenges such as disasters and climate risks.



Source: IUCN, 2020



## Approaches

- **Protection:** site-specific protection of natural or semi-natural ecosystems
  - **Issue-specific**, including:
    - **ecosystem-based adaptation (EbA):** the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people adapt to the adverse effects of climate change (CBD, 2009)
    - **ecosystem-based disaster risk reduction (Eco-DRR):** the sustainable management, conservation, and restoration of ecosystems to provide services that reduce disaster risk by mitigating hazards and by increasing livelihood resilience.
  - **Infrastructure:** enhancing natural infrastructure (such as wetlands) to reduce risk and deliver a wide range of ecosystem services; includes:
    - **blue/green infrastructure:** the restoration or enhancement of ecosystems, such as wetlands, to deliver a wide range of ecosystem services, such as water purification or climate adaptation (adapted from UNISDR, 2017)
    - **hybrid infrastructure:** natural blue and/or green infrastructure combined with built grey infrastructure or ecologically engineered infrastructure.
  - **Management:** managing ecosystems to ensure long-term sustainability and persistence of an ecosystem's function and services, while meeting socioeconomic, political and cultural needs (adapted from IFRC and WWF, 2022)
  - **Restorative:** reversing ecosystem degradation to improve productivity and capacity to meet people's needs
- All approaches focus on using nature to help manage social challenges, including climate change and weather-related disasters.

## Appendix 2: Checklist: Guiding questions

Below are examples of guiding questions for considering nature-based solutions across the different stages of the disaster management cycle. See **Table 2 (Nature-based solutions by sector across the disaster management cycle stage)** for a more detailed list.

### Prevention, preparedness, mitigation

- ✓ Are ecosystems included in environmental emergency preparedness plans?
- ✓ Do risk maps that consider ecosystems exist for the country?
- ✓ Have environmental and biodiversity considerations been incorporated into development plans?
- ✓ Are the appropriate areas under IWRM, ICZM and SLM? (See **Glossary**, page 82, for definitions.)
- ✓ Are green and blue areas important for disaster risk reduction being protected and/or restored or created?

### Response

- ✓ Have you checked if there are environmentally sensitive areas in the region where relief is being provided?
- ✓ Does the country have an environmental contingency plan? ([↪](#) Sample of National Environmental Contingency Plan, UNOCHA, 1996, [bit.ly/nbs-en-049](https://bit.ly/nbs-en-049))
- ✓ Have appropriate sites for disposing of waste been chosen with consideration for the environment?
- ✓ Have environmental impact assessments for the humanitarian operation been undertaken?

## Relief

- ✓ Have rapid environmental assessments been undertaken?
- ✓ Is there an appropriate waste management plan in place that takes the environment into account?
- ✓ Is there an environmental expert in place to advise?
- ✓ Are natural resources for recovery being used in a sustainable way?
- ✓ Are energy provisions for the population sustainable? For example, through using solar cookers instead of firewood.
- ✓ Is agroforestry or permaculture being considered for food provision?
- ✓ Are water sources appropriately protected and managed?

## Recovery

- ✓ Is there an environmentally sensitive reconstruction plan in place?
- ✓ Is ecosystem restoration being undertaken in degraded areas?
- ✓ Are there integrated water resource management (IWRM) or integrated coastal zone management (ICZM) plans in place?
- ✓ Are natural resources being managed sustainably?
- ✓ Are materials being sourced from sustainable materials?
- ✓ Are green areas that provide buffers to natural hazards being protected and/or restored? For example, mangroves, sand dunes, wetlands, coral reefs, forests, and vegetation on slopes.



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