



# **NATURE-BASED SOLUTIONS**

**FOR COMMUNITY-BASED  
DISASTER RISK REDUCTION  
AND RESILIENCE**

**The International Federation of Red Cross and Red Crescent Societies (IFRC)** is the world's largest humanitarian network, with 192 National Red Cross and Red Crescent Societies and around 14 million volunteers. Our volunteers are present in communities before, during and after a crisis or disaster. We work in the most hard to reach and complex settings in the world, saving lives and promoting human dignity. We support communities to become stronger and more resilient places where people can live safe and healthy lives, and have opportunities to thrive.

### **Nature-based Solutions**

Nature-based Solutions (NbS) are 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 (IUCN, 2020). NbS are an institutional priority for the IFRC network – recognized in its Plan and Budget 2021–2025; the Global Climate Resilience Programme of the IFRC; and the Climate and Environment Charter for Humanitarian Organizations. IFRC builds on its decades of expertise in community-based disaster risk reduction as a unique entry point for community-led NbS, focused on disaster risk reduction and climate change adaptation. IFRC has already applied NbS in various contexts, as showcased in this case study – and is actively capturing lessons learned as a basis for scaling up its work and partnerships in this area.

Cover photo: Aurélie Marrier d'Unienville/IFRC

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## KEY MESSAGES

- Nature-based solutions (NbS) support **resilience-building at the community level** by addressing the environmental drivers of risk, reducing vulnerability, and/or directly reducing their exposure to hazards.
- NbS are one option among many to **increase community resilience** and are especially useful where environmental degradation affects communities' exposure and vulnerability to disasters.
- NbS **can be integrated in Community-Based Disaster Risk Reduction** through the Roadmap to Community Resilience.

## Introduction

Communities are at the core of the International Federation of Red Cross and Red Crescent Societies (IFRC), with 192 National Societies engaged in, and 48.8 million people reached by, its disaster risk reduction (DRR) activities worldwide. The increased integration of DRR alongside its response activities, respects the IFRC's emerging role in fostering community resilience in addressing humanitarian crises.

### WHY NATURE-BASED SOLUTIONS WITHIN THE RED CROSS AND RED CRESCENT MOVEMENT?

The triple planetary crisis of climate change, biodiversity loss, and pollution has shown that environmental degradation is a key driver of disaster risk. The [Charter on Climate and Environment for Humanitarian Organisations](#), to which the Movement is committed, was founded on this realisation. The Charter sees Nature-based Solutions (NbS) as one way of working towards DRR by helping communities proactively mitigate and adapt to rising environmental and climate risks. This is reflected in the IFRC's Strategy 2030 vision to scale up climate action, and Plan & Budget 2021-25 which aims for 100 National Societies to be employing NbS with DRR, climate change adaptation (CCA), and climate change mitigation functions.

### NATURE-BASED SOLUTIONS (NbS)

The 5th United Nations Environment Assembly (2022) defined **NbS** as “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, resilience and biodiversity benefits”.

The Global IUCN (2020) NbS Standard requires that NbS

- 1) address societal challenges;
- 2) adopt a whole system approach;
- 3) support net biodiversity gain and ecosystem integrity;
- 4) be economically feasible;
- 5) entail inclusive, transparent, and empowering governance;
- 6) equitably balance trade-offs;
- 7) be managed adaptively; and
- 8) be sustainable and mainstreamed.

Within the Movement, several regional resilience visions express a desire to prioritise NbS in their operations (IFRC, 2022a). With climate and environmental concerns outlined as institutional goals, related policy commitments must be actively translated into action on the ground.

Working with Nature as part of community-based DRR (CBDRR) is not new to National Societies. The Vietnam Red Cross, for example, has been restoring mangroves since 1994 (GDPC, 2022), with other National Societies planting trees in East Africa to strengthen community resilience (IFRC, 2013).

Experiences within the IFRC network have shown that Nature can be an ally in building resilience. Yet, different concepts and practices surrounding Nature have been used within the IFRC network. Some of these need clarifying because they can have different outcomes. Take, for example, natural resource management (NRM), or the sustainable utilisation of natural resources (or natural assets), such as water, air, land, forests, fisheries, and wild flora and fauna through practices such as forest management, soil management, fisheries management or agro-forestry. These are human-centred practices, with a focus on utilising resources for economic purposes, which may require trade-offs between competing objectives. Nature-based Solutions (NbS), as per its definition by IUCN, aims to increase resilience, maintain or increase ecosystem functions, services and biodiversity while upholding sustainability targets, per IUCN Global Standards (see above text box on definitions of NbS).

In other words, NRM practices are primarily undertaken with an economic goal. Whereas NbS may have more than one goal, such as increasing resilience to climate and disasters, providing livelihoods benefits, while protecting biodiversity. NbS to increase resilience to climate and disasters for examples aims to reducing hazard impacts, vulnerability and even exposure in some cases, alongside other measures such as early warning. Thus, not all NRM are considered NbS, and vice versa, not all NbS are considered NRM practices, yet both correspond to various landscapes and represent different ways of interacting with Nature. A landscape is referred to as is the visible features of an area of land, its landforms, and how they integrate with natural or man-made features. Whereas a watershed has defined natural boundaries set by ridges which demarcate waterflow, converging into a single point, such as a river, lake or sea. To better understand NbS, NRM and landscapes, here are a few examples:

**Examples of objectives of NbS for resilience to climate and disaster risks and NRM in different landscapes**

<b>Landscape</b>	<b>Natural Resources Management</b>	<b>Nature-based Solutions for resilience</b>
A <b>forest</b> in an upper watershed (or river catchment) with similar functions and properties.	Forestry management for timber, non-timber forestry products	Forestry management for reducing erosion and landslides through deep-rooted species, intercropped with fruit trees for food security.
A <b>watershed or river catchment</b> with similar functions and properties.	Water is managed through IWRM practices for water supply and water quantity.	Water is managed through Integrated Water Resources Management (IWRM) to reduce flooding and drought while addressing water quality and health issues.
A <b>coastal landscape</b> is a section of coastline that has a range of coastal features, distinct from adjacent ones.	Fish are managed to ensure sustainable fish supply.	Coastal mangroves are protected or restored to protect fish and crab spawning grounds, reduce coastal erosion and provide fiber resources.
<b>Agricultural fields</b> (possibly mixed with forests) within a watershed (or catchment) with similar soil properties and natural vegetation.	Soil is managed to ensure soil health for sustainable agriculture and food security.	Soil is managed to reduce erosion, landslides and flooding, while ensuring soil health for sustainable agriculture and food security.
An <b>urban area</b> with similar functions and properties.	No real equivalent	Urban areas implement NbS by restoring wetlands areas for retaining excess rainwater and planting shade trees to reduce urban heat, physical and mental health.

The aim of this paper is to demonstrate how NbS link to the IFRC’s approach to CBDRR and resilience programming and showcase examples from National Societies which have implemented them. This paper also serves as an entry point to NbS for National Societies, to increase awareness of the opportunities and challenges of implementing NbS in IFRC CBDRR and resilience building efforts. It draws on key IFRC guides, most notably the Nature Navigator (Bolte and Ikkala-Nyman, 2022) – a resource aimed at facilitating National Societies’ engagement with NbS. Integrating NbS in ongoing and future initiatives will help communities interact with Nature in ways that contribute to DRR by upholding resilience and targeting humanitarian issues in *climate change, food/water insecurity, and health* (IUCN, n.d.).

# NbS, Resilience, and CBDRR: fundamentally intertwined concepts

A community’s capacity to reduce impacts associated with disasters is tightly bound to its resilience. DRR strategies aim to reduce risk and strengthen resilience by targeting drivers of risk in the economic, social, and environmental spheres (UNDRR, 2022). Resilience is also closely tied to capabilities to sustain lives and livelihoods. Globally, many people’s livelihoods and basic needs in terms of food and water depend on natural resources which require healthy ecosystems.

Healthy ecosystems contribute to DRR by addressing each disaster risk factor (Table 1). **NbS** essentially help communities to ensure that ecosystems are healthy and resources are managed sustainable in ways that **reduce community exposure to hazards, reduce the impact of certain hazards and reduce vulnerability** by providing essential goods and services such as food, water, timber and livelihood opportunities. NbS are thus intrinsically tied to resilience.

**NbS is a people-centric approach.** It is not conservation of the environment for the environment’s sake, but specifically aims to support people in addressing challenges such as DRR and food security. Those who live near and work with natural resources are the key stakeholders for NbS. Thus, CBDRR is the ideal vehicle for NbS. And indeed, NbS is not viable without community engagement nor without input from communities on their resilience needs (Coppola, 2011). Disregarding community priorities will in fact lead to accentuating vulnerabilities.

Overall, NbS are also a useful tool in combating and adapting to climate change. Compared to hard engineering options (such as dikes and sea walls), nature-based and hybrid options (so called “green” and “blue” options, where infrastructure is combined with nature, such as living weirs) have more benefits in terms of adaptability and socio-economic benefits.

**Table 1:** How ecosystems address disaster risk

Disaster Risk factors	Ecosystem function	Examples
<b>Exposure</b>	Reduce exposure	Coral reefs, mangroves, sand dunes and coastal wetlands attenuate wave force and height, buffering against storm surges.
<b>Hazard</b>	Reduce hazard likelihood	Forests on slopes can reduce the likelihood of a landslide. Intact wetlands and vegetation in a water catchment can reduce the likelihood of flooding.
<b>Vulnerability</b>	Reduce vulnerability	Ecosystems provide food, water, and other goods vital to people’s survival and livelihoods.

# How NbS fit into IFRC’s approach to CBDRR and resilience

IFRC works closely with communities through its branches and volunteer networks. Local presence in communities before, during, and after crises, facilitates the alignment of its humanitarian, development, climate, and environment operations (IFRC, 2022b). This supports IFRC’s two-fold responsibility to both respond to disasters, and support community resilience to future threats through climate-smart DRR efforts (IFRC, 2020a).

## THE ROADMAP TO COMMUNITY RESILIENCE

The Roadmap to Community Resilience (R2R) (IFRC, 2021) is a directional guide to ensure IFRC activities contribute effectively to resilience, guided by the Fundamental Principles. The roadmap comprises four stages and seven milestones to guide resilience programming. Five landmarks characterise the roadmap to ensure processes are: *Risk-informed; Holistic; Demand-driven; People-centred & inclusive; and Climate-smart & environmentally sustainable.*

R2R aims to take a **system-oriented DRR approach** to ensure the inclusion of multi-scale and sectoral outlooks, without which systemic risk cannot be addressed (UNDRR, 2022). NbS tie in well with this approach as addressing drivers of environmental degradation require taking a landscape and systems approach (ibid.; GNDR, 2020). However, in practice R2R intervention areas tend to be at one community level, while for NbS, the scale of intervention might need to extend over several communities because of landscape connections (e.g. upstream-downstream).

R2R also introduces 11 resilience dimensions which cover the IFRC network’s operational fields, to ensure a measurable and systematised approach to resilience-building in complex risk landscapes. Natural resource management is one of the key resilience dimensions. As mentioned above, while not all NRM are NbS, NRM is one way of working with nature and thus provides an entry point for NbS.



### IFRC RESILIENCE DIMENSIONS

1. Risk Management
2. Health
3. Water and Sanitation
4. Shelter
5. Food and Nutrition Security
6. Economic Opportunities
7. Infrastructure and Services
8. Natural Resource Management
9. Social Cohesion
10. Inclusion
11. Connectedness



## THE ENHANCED VULNERABILITY AND CAPACITY ASSESSMENT (EVCA) APPROACH

EVCA should shape, and form an entry point for, all community work. The EVCA facilitates resilience-enhancing initiatives, by grounding itself in local understandings of risk to identify suitable, effective, and demand-driven DRR and adaptation (IFRC, 2018). An EVCA usually starts with one community and collects information in a participatory manner on sources of risk exposure, and existing coping capacities (ibid.). Within this process, the 11 resilience dimensions are analysed.

“Through the Greening DRR project, we at the Philippines Red Cross, with the support of IFRC, have been complementing the EVCA process with an ecological assessment team with environmental research expertise.”

**Charmille Senica,**

National Project Coordinator, Philippines Red Cross

**The EVCA provides an opportunity to assess the role of nature in DRR.** However, to ensure resilience programming is sufficiently risk-informed and climate-smart, ecosystem data (including its services and levels of degradation) and climate data are integral to determining focus areas and selecting communities based on overall risk (Bolte and Ikkala-Nyman, 2022). Assessments must consider present and future disaster risks, including climate variability, alongside an assessment of ecological assets and local risk management capacities (IFRC, n.d.).

Ecological and climate assessments must go beyond the community itself and consider wider landscapes. This is because the drivers of risk in the environment may be remote from the community. For example, logging on slopes above the community may result in landslides, or pollution may spread from industries and agriculture through the ecosystem network (water, soil or air). Making such assessments may require tools and expertise that are outside of the Movement. Implementing NbS therefore likely requires partnerships with environmental NGOs, authorities and universities.

“At the Swedish Red Cross, we have utilised the Nexus Environmental Assessment Tool (NEAT+) in our long-term programme for resilient communities to advance environmental considerations and to complement the EVCA”

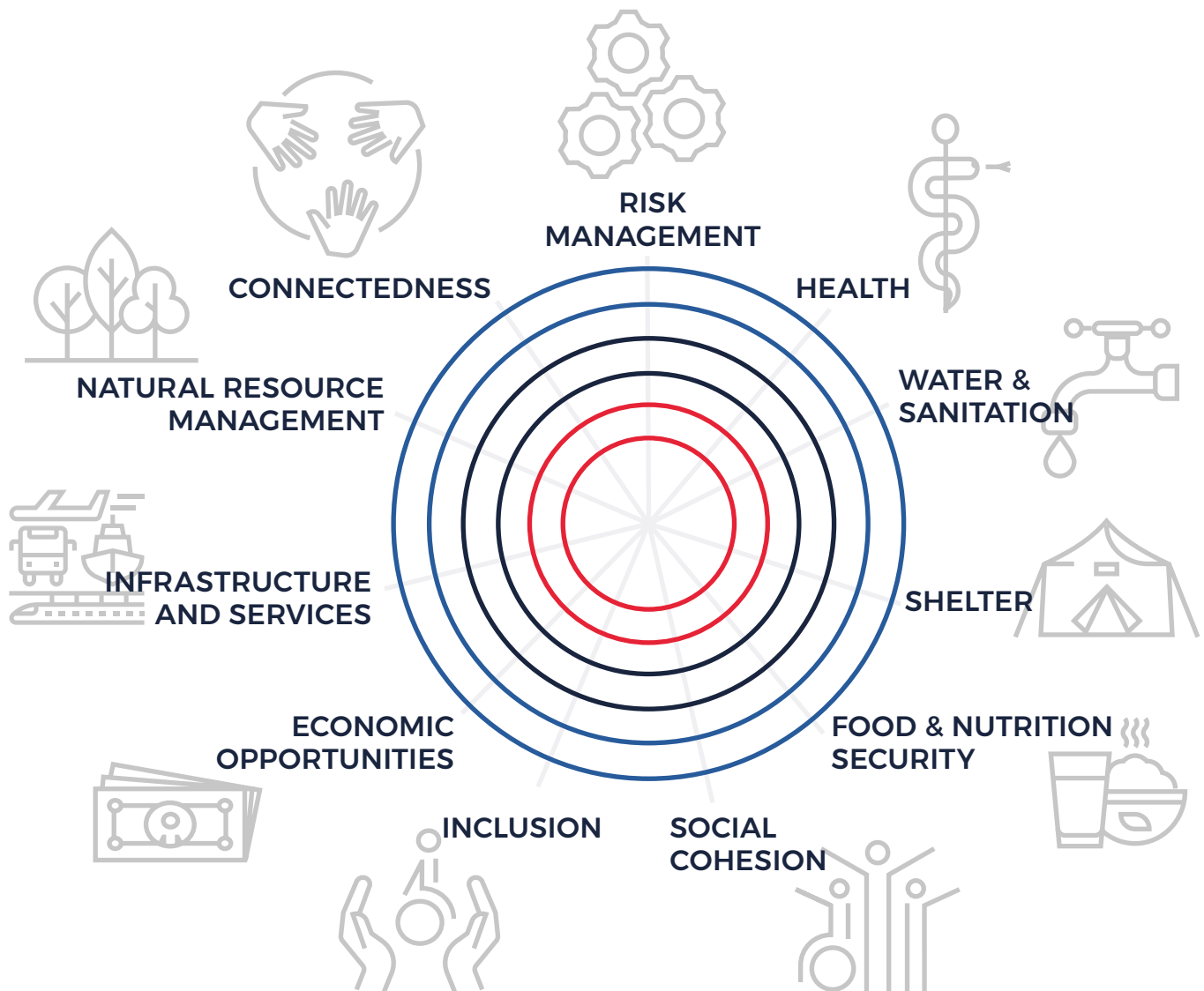
**Kristoffer Ristinmaa,**

Advisor Environment and Green Response, Swedish Red Cross



# Nature-based Solutions and the IFRC Resilience Dimensions

NbS can be a valuable way to sustainably address disaster risks in many contexts. It is important to point out upfront that NbS is one among many resilience building tools and is by no means a silver bullet. Yet, addressing environmental degradation and unsustainable NRM practices is often not prioritised in CBDRR projects. Implementing NbS can provide benefits to all 11 resilience dimensions, while explicitly accounting for emerging environment and climate-related risks.



## RISK MANAGEMENT

### 'A RESILIENT COMMUNITY KNOWS AND MANAGES ITS RISKS'

Empowering communities to recognise and address the risks they face will enhance their resilience to these risks. NbS can support this dimension by enhancing community awareness of and engagement with risk management through their everyday livelihood practices that utilise environmental resources. However, eliminating all climate and disaster risks is not possible and NbS, along with many other DRR measures, also have limitations. It is thus important to understand and manage expectations by communicating risks scenarios with and without DRR interventions. Integrating parallel DRR measures, such as early warning systems and early action, should further help negate misguided risk perceptions, while also enhancing resilience through heightening prevention and preparedness.

#### **FLOOD AND EROSION RISK MANAGEMENT IN TIBURON VILLAGE, HAITI**

##### **- PFR (2020)**

Seeing the importance of increasing ecosystem, climate change, and DRR awareness at the community level, youth have been engaged by the Haiti Red Cross Society in discussions on environmental protection. In Tiburon village, a youth-developed CCA plan was presented to the mayor, resulting in the establishment of a reforestation program to protect the community from slope erosion and flood risks. This activity is part of a UNEP-PfR Project (2019-2023) on 'Upscaling Community Resilience through Ecosystem-based DRR'. See also: <https://www.unep.org/explore-topics/disasters-conflicts/where-we-work/haiti>

At the Swiss Red Cross, we are striving to work around limitations in NbS' mitigative potential, by supporting sister national societies to discuss protection goals with the community, likely return periods, and the expected hazard intensities NbS will protect against."

**Anton Jöhr,**  
DRR Advisor,  
Swiss Red Cross

## WATER & SANITATION, SHELTER, AND HEALTH

### **'A RESILIENT COMMUNITY CAN MEET ITS BASIC WATER AND SANITATION NEEDS', 'ITS BASIC SHELTER NEEDS', AND 'IS HEALTHY'**

The regulation of water quality and quantity is intertwined with how the environment is managed. While climate obviously has a role to play in the quantity of available water in the system, vegetation cover supports infiltration and purification of water and minimises run-off and hence flooding. NbS are therefore central to supporting Water and Sanitation.

Health risks can be addressed by working with NbS to uphold safe water provision, reduce air pollution, address heat risks by providing shaded collective spaces, and reduce the risk of zoonotic diseases.

Ensuring sustainable solutions for displaced persons enhances their long-term resilience (IASC, 2010). This means the environmental sustainability of relocation sites must be considered to ensure 'basic shelter needs' are met. Limiting long-term natural resource and environment degradation through NbS will reduce associated risks. Protecting shelter building materials, for instance, will enable future needs to be met, promoting long-term resilience.

#### **GREEN BELTS FOR DROUGHT RECOVERY IN DADAAB REFUGEE COMPLEX, IFRC & KENYA RED CROSS (GLOBAL DISASTER PREPAREDNESS CENTER, 2022)**

Population pressures resulted in land degradation across the Dadaab Refugee Complex in Kenya. Instances of respiratory disease increased due to heightened exposure to wind and dust. The restoration of 'green belts' of land has lessened the impact of sandstorms and associated respiratory diseases. Health benefits were also attained through produce from the agroforestry sites improving local diets.

#### **REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS (RISE) IN MAKASSAR, INDONESIA – ASIAN DEVELOPMENT BANK (ADB, 2021, P.130)**

This pilot project (2018-21) integrated NbS in informal settlements' water systems. Households with limited access to a reliable, centralised water and sanitation system were targeted with bio-filtration gardens, water harvesting, and paved paths. The project was implemented by ADB through their Urban Climate Change Resilience Trust Fund and the Southeast Asia Urban Services Facility in partnership with Monash University's Cooperative Research Centre for Water Sensitive Cities.

## ECONOMIC OPPORTUNITIES, FOOD & NUTRITION SECURITY, AND NATURAL RESOURCE MANAGEMENT

**‘A RESILIENT COMMUNITY HAS DIVERSE ECONOMIC OPPORTUNITIES’,  
‘CAN MEET ITS BASIC FOOD NEEDS’ AND ‘HAS ACCESS TO, MANAGES AND  
USES ITS NATURAL ASSETS IN A SUSTAINABLE MANNER’**

Although people are less likely to die from natural hazards than 20 years ago, livelihoods losses have increased significantly (IFRC, 2020b). Natural resource-based livelihoods face combined threats from environmental degradation, climate change and pollution. Thus, supporting livelihoods by improving ecosystem health through NbS is critical to increasing resilience (IFRC, 2022b). Indeed, not only do improve agricultural yields through improving soil fertility, for example, but it also can improve fish stocks in mangrove forests.

### **COASTAL COMMUNITY RESILIENCE AND DRR PROJECT IN DEMAK, INDONESIA (IFRC, 2018)**

Ecological losses from coastal erosion in Demak led to Community-Based Action Teams being set up in 2016 by the Indonesian Red Cross with the support of USAID, American Red Cross, and Bogor Agriculture Institute Centre for Coastal and Marine Resource Study. The project restored mangroves, not only reducing coastal hazard risks but providing extra income to communities through ecotourism and crab cultivation. The livelihood focus ensured that DRR measures were more sustainable and generated community-wide interest in the project. These income sources also supported the maintenance of mangrove plantations.

### **RESTORING MANGROVES IN VIET NAM (IFRC, 2011)**

The “*Community-based Mangrove Reforestation and Disaster Preparedness Programme*” has been implemented by Viet Nam Red Cross since 1994 with support from the IFRC, Danish and Japanese Red Cross. This project helped livelihoods prevail in the face of typhoons and flooding, by generating sustainable economic opportunities in aquaculture and non-timber forest products and protecting losses in commodities to salination.

NbS can also generate alternative economic opportunities and possibilities for livelihood diversification with activities such as ecotourism, beekeeping, essential oil production, etc. This is important because some economic activities such as charcoal production can severely degrade the environment, increasing associated disaster risks from soil erosion and water run-off. Therefore, engaging communities to use more sustainable practices or supporting them to branch out into new NbS-related sectors can be win-win situations.

Indeed, successful NbS projects show that it is crucial to ensure that economic benefits to the community arise from the NbS interventions. Communities are much more likely to manage natural resources sustainably if they see direct benefits. While reducing disaster risk is a direct benefit, oftentimes communities may not prioritise such risks as compared to immediate food security risks.

“The Sudanese Red Crescent Society has worked intensively on livelihoods, creating opportunities through the management of shelter belts and riverbank restoration projects. These operations have increased food production capacities, generating additional income sources and local food security.”

**Abdelrahman Ibrahim Eissa,**

Senior DRRCCA Officer, Sudanese Red Crescent

Improving agriculture, fishing and economic opportunities will also improve food security. Increased food security and improved NRM practices will also reduce displacement caused by depleted key livelihood resources, and/or enhanced hazard exposure (Norwegian Refugee Council – NRC, 2020). As well as reducing the number of people at risk of displacement, NbS can mitigate risks arising from post-displacement by providing benefits to health, food/water security, economic opportunities, and social cohesion in temporary or protracted shelter locations (NRC, 2020).

**‘TERRA PETRA’ RAISED GARDENS PROJECT, SWISS-HAITI RED CROSS (2017)**

Raised garden beds enriched with biochar and organic fertilisation in the community of Léogâne, Haiti, have reduced soil degradation in densely populated mountain zones, improving food production and thus improving food security and reducing malnutrition.

See [Terra Petra hill gardens video](#) by the Swiss Red Cross.

## SOCIAL COHESION, INCLUSION, AND CONNECTEDNESS

A scarcity of natural resources upon which livelihoods and food security are dependent can fuel the risk of conflict (UNEP, 2011; Peters and Vivekananda, 2014). Improving natural resource governance and management (e.g. through Integrated Water Resource Management Committees) is one way of increasing social cohesion and mitigating associated conflict risks (ibid.).

NbS necessitates an interdisciplinary, cross-sectoral, systems approach. This means it can draw connections and enhance relations between communities, DRR bodies, government, and environmental partners. Nature offers cultural, spiritual, recreational and aesthetics which connect people and contribute to their physical and mental well-being. Enhanced awareness and understanding of the services it provides creates an enabling environment for associated CBDRR action.

“A British and Swedish Red Cross, Bangladesh Red Crescent, & IFRC supported Vulnerability-to-Resilience project in Uttar Chalitabunia, Bangladesh led to community members feeling ‘organized and united’ through (sub)committees for (e.g.) cyclone preparedness and community resilience.”

**Thomaz Carlzon,**

Former DRR Advisor, Swedish Red Cross

National Societies can work with governments on the development or enforcement of environmental protection legislation and incorporation of NbS in local DRR plans to reduce environment degradation, and associated disaster risk (Chavda et al. 2022; PfR, 2020). Community’s opinions and priorities may differ from local governments, so including at-risk persons in associated policy development is critical to sustaining resilience (UNDRR, 2022).

NbS can build social cohesion by encouraging a common commitment to envisioned resilience outcomes (IFRC, 2011). Engaging women in NbS activities that draw on their livelihood skills (e.g. in rice planting – UNDRR, 2021) can promote their engagement in DRR by creating a sense of ownership (IFRC, 2021).

### **GREEN BELTS FOR DROUGHT RECOVERY IN DADAAB REFUGEE COMPLEX, IFRC & KENYA RED CROSS (GLOBAL DISASTER PREPAREDNESS CENTER, 2022)**

Involving both refugee and the host communities in the planting of greenbelts and fruit trees has increased social cohesion as well as a sense of connectedness with the environment.

## THE ROLE OF PARTNERSHIPS

IFRCs community-focus places it in a prime position to implement community-driven NbS. National Societies will, however, need to draw on the experience and expertise of external groups to maximise the effectiveness of NbS implementation (IFRC, 2020a). Planting non-native mangrove species may, for instance, undermine resilience if the assumed protective benefits do not materialise. Since IFRC is in the early stages of strengthening its NbS capacities, tools, and trainings, partnerships will help National Societies design NbS that truly enhance resilience.

Strong partnerships emerge where interactions continue outside the project, for example, between the Department of Environment and Natural Resources and a National Society such as in the Philippines Red Cross.

### THE RESILIENT ISLANDS PROJECT – IFRC & TNC (2021)

The Resilient Islands alliance formed in 2017 and has worked with nature-based DRR interventions for coastal communities in the Dominican Republic, Grenada, and Jamaica. Partnerships merged local and national expertise, with the IFRC supported by The Nature Conservancy, University of the West Indies, National Environment and Planning Agency, Office of Disaster Preparedness and Emergency Management, and community-based organisations – combining DRR, environmental, and NbS capacities.

## RESILIENCIA PROJECT IN OLANCHO – HONDURAN RED CROSS & SWISS RED CROSS ([LINK](#))

### CONTRIBUTION BY NbS TO RESILIENCE DIMENSION

1. ✓ Risk Management
2. ✓ Health
3. ✓ Water and Sanitation
4. ✓ Shelter
5. ✓ Food and Nutrition Security
6. ✓ Economic Opportunities
7. ✓ Infrastructure and Services
8. ✓ Natural Resource Management
9. ✓ Social Cohesion
10. ✓ Inclusion
11. ✓ Connectedness

The ‘Resiliencia’ project was set up in the mountainous, rainforest Department of Olancho, Honduras. Although predominantly officially protected land, there are high deforestation and soil degradation rates due to livestock grazing, unsustainable forestry, and agriculture. This results in landslides causing significant material damage and even human deaths.

As part of an overall approach to resilience, the project combined soil bio-engineering to reduce landslide risk with agroecology activities to help recover productive areas, increase food security and provide economic opportunities. The project also improved health by diversifying nutrition, growing medicinal plants and reducing the growth of disease vectors.



The project was implemented with local communities, and the Local Emergency Committees (CODELs) with support from the Honduran/ Swiss Red Cross. Low-income, vulnerable families were prioritised, along with land users living in houses threatened by landslide hazards.



All these stakeholders participated in risk assessments and identification of critical sites. Families implemented soil bioengineering measures on their plots while the CODELs were involved in implementing soil bioengineering techniques to protect community infrastructure, as well as providing some support to household level soil bioengineering works. CODEL also coordinated with the community members themselves, as well as other existing key local groups, in particular health committees and water management committees. The multiple stakeholder approach and working together through alliances facilitates working with different community organisations. This provides improved protection for important community infrastructure such as schools, health units and water systems.



The [soil bioengineering approaches](#) consisted of many measures including [live hedges](#), [V-shaped fences](#) and [fascine drains](#). These approaches combine deep-rooted grasses interspersed with trees to stabilise slopes and mediate runoff by increasing infiltration rates, while at the same time providing fodder and food. In most cases, stabilised slopes and embankments are then transformed into sustainable production areas, such as agroecological family orchards or medicinal gardens. Thus, beneficiaries can diversify their production and diet, and generate income by selling their production surplus. Maintenance is performed by women. They manage medicinal gardens and family orchards. Thus, they perform jobs previously done only by men, thus giving women new roles in their family. Also, they feel empowered by training and by receiving knowledge, and because they manage the medicinal gardens and family orchards. Reforestation, to protect water catchment areas in micro watersheds, combined with legal protection by the respective authorities (here forestry commission) and community-managed maintenance scheme, is also a very effective practice that was applied.

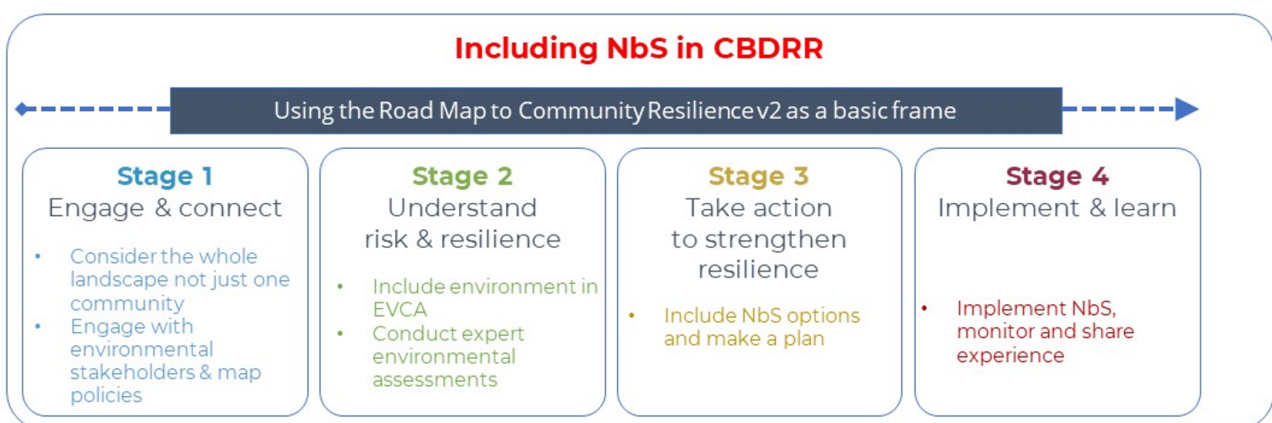


# How to integrate NbS into IFRC’s approach to CBDRR

NbS cover a number of approaches to building resilience through CBDRR because they provide many benefits needed for increasing household and community resilience as described above. **Nature-based Solutions can be in some circumstances a sustainable approach to increasing resilience under a changing climate.**

The [Nature Navigator](#) is IFRC’s guide to Nature-based Solutions and how to implement them following the Roadmap to Community Resilience. It outlines the key additional steps required at each stage (Figure 1). Some external guidelines for operating in specific environmental contexts can be found in the appendix.

**Figure 1:** NbS steps in the roadmap to community resilience (Modified from: Bolte, P. and Ikkala-Nyman, N. 2022).



Integrating NbS into IFRC’s approach to CBDRR has a number of advantages, opportunities but does not come without challenges. While some of these opportunities and challenges have been mentioned in the text above, here we summarise them in terms of issues of scale, time, awareness, capacity.

	Challenges	Opportunities
<b>Scale</b>	<ul style="list-style-type: none"> <li>The need for National Societies to shifting from operating in single communities to working with several communities in a landscape scale approach. This is a different way of operating.</li> <li>Integrating a ‘long-term’ climate &amp; ecosystem lens which has not been done before.</li> </ul>	<ul style="list-style-type: none"> <li>A landscape / watershed approach provides a wide-angle lens to understanding root causes of disasters, which are often to be found outside the community’s boundaries.</li> <li>A wider-angle lens may give opportunity for communities to collaborate with other communities in the landscape/ watershed for mutually beneficial CBDRR.</li> </ul>

	Challenges	Opportunities
<b>Time</b>	<ul style="list-style-type: none"> <li>Some NbS can take time before risk reduction or other benefits are seen. Indeed many trees take at least three years to grow to maturity.</li> <li>Communities need to see the immediate benefits of engaging with RCRC to ensure their commitment to longer term programming.</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced understanding of root causes / aggravating factors may open up new perspectives, solutions and may save time and resources in reducing disaster risks</li> <li>It is possible to combine NbS which take longer to implement, together with more immediate benefits to livelihoods (e.g. planting vegetation with deep roots to stabilize slopes can be interspersed with faster growing fruit trees to ensure immediate livelihoods benefits)</li> </ul>
<b>Awareness and capacity</b>	<ul style="list-style-type: none"> <li>Deficient understanding of NbS concept.</li> <li>Sensitising communities to long-term risks</li> </ul>	<ul style="list-style-type: none"> <li>Communities often have expert knowledge of their land and natural assets</li> <li>An approach which integrates NbS may open new avenues for CBDRR</li> </ul>
<b>Capacity of RCRC</b>	<ul style="list-style-type: none"> <li>Limited expertise in NbS.</li> <li>Need external organisations to support the development of quality ecological assessments.</li> <li>Can be resource intensive; most NSs do not have capacities to systematically integrate NbS.</li> <li>Multiple and competing priorities of NSs – environment is not always a priority.</li> <li>Need advanced processes for implementation and learning across multiple communities.</li> </ul>	<ul style="list-style-type: none"> <li>Some National Societies have implemented NbS and learning can be used.</li> <li>Development of partnerships with environmental organisations on NbS can also unlock new types of funding streams not conventionally used by humanitarian sector.</li> </ul>
<b>Advocacy</b>	<ul style="list-style-type: none"> <li>Small-scale stand-alone projects are less conducive for engaging in advocacy for NbS</li> </ul>	<ul style="list-style-type: none"> <li>NbS have sparked considerable interest by stakeholders at all levels and opening up new funding opportunities with non-traditional CBDRR funding sources (e.g. community-based projects for carbon off-sets and resilience)</li> </ul>
<b>Supporting livelihoods</b>	<ul style="list-style-type: none"> <li>Need to provide energy alternatives to reduce deforestation for charcoal.</li> <li>Prioritising all community-identified objectives</li> <li>Accounting for trade-offs and cost-benefit distributions</li> </ul>	<ul style="list-style-type: none"> <li>Natural resources are often the basis for livelihoods in communities as well providing protection from certain hazards. Recognizing this dual role in CBDRR action plans may lead to better support for livelihoods benefits in the short- and long term.</li> <li>Cost-benefit analysis of NbS demonstrate that the benefits for CBDRR far outweigh the costs, within a reasonable timeframe, depending on the enabling conditions (see example in text box below)</li> </ul>
<b>Other</b>	<ul style="list-style-type: none"> <li>Funding constraints</li> <li>Land tenure and security issues</li> </ul>	

## **COST-BENEFIT ANALYSIS (CBA) AND EQUITY ANALYSIS OF NBS ACTIVITIES UNDERTAKEN BY THE NETHERLANDS RED CROSS IN HAITI (2019-2022)**

This study performed an economic efficiency and equity analysis of the project “Up-scaling Community Resilience through Ecosystem-based Disaster Risk Reduction” in Haiti, implemented by the United Nations Environment Programme (UNEP) in collaboration with Netherlands Red Cross and the Haitian Red Cross. Activities focused on community-based forest ecosystem restoration and management; improved flood and landslide hazards response preparedness; and training and support for sustainable livelihood development. The Eco-DRR project increased the resilience of 70,000 women and men to disasters and climate change, chronic food insecurity, and land degradation, while increasing the capacity of 43 community-based organisations to support sustainable community resilience.

An economic efficiency assessment of the project was undertaken through a quantitative CBA and a qualitative analysis of non-monetary benefits. Quantitative estimates showed that the benefits of the Eco-DRR and resilience enhancement interventions outweighed the value of their initial costs, with the present value of net benefits up to 1.6 million USD after 5 years and \$5.4 million USD after 10 years since the project implementation. Benefits included:

- Reduction in property damages from avoided hazards annually
- Avoided income losses from business interruption annually
- Carbon stored in trees
- Pollution reduction

The analysis assumed that benefits exceeded costs after the first two years since the end of the project, with full benefits starting in year 6 once planted trees achieve full maturity. The analysis was based on a 7% discount rate to calculate Net Present Value.

Additional benefits were not monetized:

- New wages and revenues from home garden development, improved sustainable agriculture techniques, development of nurseries / seedlings, apiculture activities and sustainable forest management, health improvements, women empowerment from training and cultural heritage protection.

Lastly, the equity assessment indicated that the project promoted equity by enhancing inclusivity, economic equality, participation, and capacity building. In particular, the resilience interventions implemented resulted in significant education, health, safety and economic improvements for women, children, and economically vulnerable members of the local communities.

*Source: Ecosystem-Based Disaster Risk Reduction And Community Resilience In Haiti A Cost-Benefit And Equity Analysis, University of Massachusetts-Amherst (2022)*

See also the project case study and video: <https://www.unep.org/explore-topics/disasters-conflicts/where-we-work/haiti>

## Conclusions and Ways Forward

Supporting the traditional sphere of operations and responsibilities of the Red Cross and Red Crescent Movement, NbS in CBDRR can aid humanitarian responses by both mitigating hazard exposure, reducing the scale of devastation, and increasing community resilience and coping capacities. Despite existing institutional commitments to resilience-building and CBDRR, wider implementation of related activities, such as NbS, is needed. Following recognition of the systemic nature of risk, the R2R endorses holistic approaches to resilience. This parallels the need for NbS to consider the interconnected components of ecosystems to effectively address societal challenges and increase National Societies' capacities to implement sustainable CBDRR. Identifying community priorities will promote long-term engagement by sensitising communities of the multiple resilience gains to be made from NbS. Approaches must be people-centred and inclusive, ensuring human well-being, ecosystem services and resilience and biodiversity benefits.

NbS offer sustainable and effective ways to increasing resilience for CBDRR. Integrating NbS does not require a complete shift in existing IFRC approaches. National Societies need to consider the extent to which natural resources are relevant for any or all components of risk: vulnerability, exposure and hazards and then adapt their CBDRR operations to adopt a holistic ecosystem perspective. Taking this approach, most CBDRR risk assessments will probably identify sustainable NRM as a priority and NbS as a beneficial approach for DRR and vulnerability reduction. However before implementing NbS for DRR, they should be considered alongside other solutions, weighing advantages and limitations of all options.

## REFERENCES

- Asian Development Bank – ADB (2021). *100 Climate actions from cities in Asia and the Pacific*. Asian Development Bank, Philippines. <http://dx.doi.org/10.22617/TCS210182-2>
- Barbelet, V. and Wake, C. (2020). *Inclusion and exclusion in humanitarian action: The state of play*. Overseas Development Institute (ODI): Humanitarian Policy Group Working Paper. London. [https://cdn.odi.org/media/documents/Inclusion\\_and\\_exclusion\\_in\\_humanitarian\\_action\\_the\\_state\\_of\\_play.pdf](https://cdn.odi.org/media/documents/Inclusion_and_exclusion_in_humanitarian_action_the_state_of_play.pdf)
- Bolte, P. and Ikkala-Nyman, N. (2022). *The Nature Navigator: A handbook for disaster risk management practitioners*. International Federation of Red Cross and Red Crescent Societies (IFRC). [https://preparecenter.org/wp-content/uploads/2022/06/The-NatureNavigator\\_July-2022.pdf](https://preparecenter.org/wp-content/uploads/2022/06/The-NatureNavigator_July-2022.pdf)
- Chavda, S., Drigo, V., and Taub, J. (2022). *Why are people still losing their lives and livelihoods to disaster? 100,000 perceptions of risk from Views from the Frontline 2019*. United Nations Office for Disaster Risk Reduction.
- Coppola, D.P. (2011). *Introduction to international disaster management*, (2nd ed). Oxford: Butterworth-Heinemann, Elsevier.
- Global Disaster Preparedness Center – GDPC (2022). *Mangrove restoration and protection in North-Eastern Viet Nam*. Accessed via: <https://preparecenter.org/story/mangrove-restoration-and-protection-in-north-eastern-viet-nam/>
- Global Network of Civil Society Organisations for Disaster Reduction – GNDR (2020). *Why are people still losing their lives and livelihoods to disasters? Views from the Frontline: Global Report*. <https://global-report.vfi.world/>
- IFRC (2011). *Breaking the waves – Impact analysis of coastal afforestation for disaster risk reduction in Viet Nam*. International Federation of Red Cross and Red Crescent Societies, Geneva. [https://www.preventionweb.net/files/globalplatform/entry\\_bg\\_paper-mangroveimpactreportfinalapril2011.pdf](https://www.preventionweb.net/files/globalplatform/entry_bg_paper-mangroveimpactreportfinalapril2011.pdf)
- IFRC (2013) The road to strengthening community resilience in East Africa. [https://preparecenter.org/wp-content/sites/default/files/may\\_2013\\_road\\_to\\_strengthening\\_comm\\_resilience\\_in\\_east\\_africa.pdf](https://preparecenter.org/wp-content/sites/default/files/may_2013_road_to_strengthening_comm_resilience_in_east_africa.pdf)
- IFRC (2018). *Enhanced Vulnerability and Capacity Assessment: Version 1*. International Federation of Red Cross and Red Crescent Societies. <https://www.ifrcvca.org/>
- IFRC (2020a). *Disaster Risk Management Policy: From Prevention to Response and Recovery*. International Federation of Red Cross and Red Crescent Societies, Geneva. [https://www.ifrc.org/sites/default/files/2022-05/20210127\\_IFRC-DRM-EN%5B1%5D.pdf](https://www.ifrc.org/sites/default/files/2022-05/20210127_IFRC-DRM-EN%5B1%5D.pdf)
- IFRC (2020b). *World Disasters Report 2020: Come Heat or High Water*. International Federation of Red Cross and Red Crescent Societies, Geneva. [https://www.ifrc.org/sites/default/files/2021-05/20201116\\_WorldDisasters\\_Full.pdf](https://www.ifrc.org/sites/default/files/2021-05/20201116_WorldDisasters_Full.pdf)
- IFRC (2021). *Roadmap to Community Resilience – V2*. International Federation of Red Cross and Red Crescent Societies, Geneva. [https://www.ifrcr2r.org/\\_files/ugd/0e4ccc\\_1bf51f8d5f8542e29a924b0fb8f1b2b6.pdf](https://www.ifrcr2r.org/_files/ugd/0e4ccc_1bf51f8d5f8542e29a924b0fb8f1b2b6.pdf)
- IFRC (2022a). *Scaling Up Locally-Led Climate-Smart DRR and Adaptation*. IFRC Global Programme. <https://www.ifrc.org/sites/default/files/2022-08/220628-Global-Climate-Resilience-Programme-final.pdf>
- IFRC (2022b). *Global Climate Resilience Programme*. International Federation of Red Cross and Red Crescent Societies Webpage. Accessed 12/09/2022 via: <https://www.ifrc.org/global-climate-resilience-programme>.
- Inter-Agency Standing Committee – IASC (2010). *IASC Framework on Durable Solutions for Internally Displaced Persons*. The Brookings Institution – University of Bern Project on Internal Displacement. [https://www.brookings.edu/wp-content/uploads/2016/06/04\\_durable\\_solutions.pdf](https://www.brookings.edu/wp-content/uploads/2016/06/04_durable_solutions.pdf)
- IUCN (2020). *Global Standard for Nature-based Solutions*. A user-friendly framework for the verification, design and scaling up of NbS. First edition. Gland, Switzerland: International Union for Conservation of Nature.
- Norwegian Refugee Council – NRC (2020). *Addressing disaster displacement in disaster risk reduction policy and practice: A checklist*. Norwegian Refugee Council, Platform on Disaster Displacement, and UNDRR. [https://www.undrr.org/sites/default/files/2021-02/WiA\\_Displacement\\_Checklist\\_En\\_0.pdf](https://www.undrr.org/sites/default/files/2021-02/WiA_Displacement_Checklist_En_0.pdf)
- Partners for Resilience – PFR (2020). *Local Action, Global Ambition: Capacity Strengthening & Lobbying and Advocacy for Resilient Communities*. Partners for Resilience. <https://www.partnersforresilience.nl/en/publications/flagship-report>
- Peters, K. and Vivekananda, J. (2014). *Topic Guide: Conflict, Climate and Environment*. The Overseas Development Institute (ODI) and International Alert; UK Department for International Development (DFID). [http://dx.doi.org/10.12774/eod\\_tg.november2014.peterskandvivekanandaj](http://dx.doi.org/10.12774/eod_tg.november2014.peterskandvivekanandaj)
- The Nature Conservancy (2021). *The Blue Guide to coastal resilience. Protecting coastal communities through nature based solutions. A handbook for practitioners of disaster risk reduction*.
- UNEP (2011). *Livelihood Security Climate Change, Migration and Conflict in the Sahel*. Geneva: United Nations Environment Programme.
- United Nations Environment Assembly (2022). *Resolution 5: Nature-based solutions for supporting sustainable development*. United Nations Environment Assembly of the United Nations Environment Programme. Fifth session, Nairobi. Accessed via: <https://wedocs.unep.org/bitstream/handle/20.500.11822/39864/NATURE-BASED%20SOLUTIONS%20FOR%20SUPPORTING%20SUSTAINABLE%20DEVELOPMENT.%20English.pdf?sequence=1&isAllowed=y>
- United Nations Office for Disaster Risk Reduction – UNDRR (2021). *Words into Action: Nature based solutions for Disaster Risk Reduction*. UNDRR, Geneva.

United Nations Office for Disaster Risk Reduction – UNDRR (2022). *Global Assessment Report on Disaster Risk Reduction 2022: Our World at Risk: Transforming Governance for a Resilient Future*. Geneva. <https://www.undrr.org/gar2022-our-world-risk#container-downloads>

United Nations Office for Disaster Risk Reduction – UNDRR (n.d.). "Terminology: Disaster risk reduction". Website accessed 24/08/2022 via: <https://www.undrr.org/terminology/disaster-risk-reduction>

Vicarelli, M., Arroyo, A., Htike Aung, H., Georgescu, A., Judge, K., Mooring, J., Nelson, J., Purnata, N., Yin Win, Y. (2022). *Ecosystem-based Disaster Risk Reduction and Community Resilience in Indonesia: a Cost-Benefit and Equity Analysis of UNEP Eco-DRR Upscaling Interventions: Indonesia*. University of Massachusetts Amherst, MA, USA. <https://sites.google.com/site/martavicarelli2/sup-lab/cost-benefit-of-eco-drr>

## APPENDIX

### ALTERNATIVE TOOLS AND GUIDELINES

Some relevant [tools](#) within the [EVCA](#) include: [Mapping](#); [Seasonal calendar](#); [Historical profile](#); [Transect walk](#); [Resilience star](#). Additional VCA resources can be found [here](#).

The [Nature-based Solutions Evidence Platform](#) exhibits NbS for climate change impacts in different contexts.

The [Community Resilience Measurement Dashboard](#) is a new RCRC tool which could guide future or ongoing NbS projects.

[CARE CVCA vulnerability matrix](#).

The [Environment & Disaster Management](#) website shares best practices from a range of contexts and hazards.

[UNDRR's \(2021, pp.80-92\) NbS Words into Action](#) guide exemplifies ecosystem assessment tools.

[CARE and Wetlands International \(2017\) 'A Landscape Approach to DRR'](#).

The RCRC Livelihoods Centre present an [Easy Volunteer Actions Handbook to guide food security and livelihoods activities in at-risk communities](#).

[PfR document outlining examples of resilient communities facing various disaster and climate change risks](#).

[Asian Development Bank document: Integrating NbS for Climate Change Adaptation and Disaster Risk Management – A Practitioner's Guide](#).

[Research Team Performs Analysis of Ecosystem-Based DRR And Resilience Enhancements in Haiti, Indonesia, India, And Uganda](#)

[Working with nature to protect people: How nature-based solutions reduce climate change and weather-related disasters](#)

[The World Bank: NbS for Disaster Risk Management](#)

[Geospatial tool for NbS](#)

[Nature-based solutions for flood risk reduction: A probabilistic modeling framework](#)

### GUIDANCE DOCUMENTS FOR IMPLEMENTING NBS FOR SPECIFIC HAZARDS

[WWE guide for flood management](#)

[ADPC guide for landslide risk mitigation](#)

[Journal article: Avalanche protection by forests](#)

[Ecosystem-Based Tsunami DRR in Indonesian Coastal Areas](#)

[Journal article: Sustainable Use of Nature-Based Solutions for Slope Protection and Erosion Control](#)

[Reversing desertification and land degradation in the community of Abrha Weatsbha](#)

[Case study: Green belt serves as buffer against wildfires and community forest](#)

[Spatial targeting of NbS for flood risk management within river catchments](#)

[The role of riparian trees in maintaining riverbank stability](#)

[Mangroves as Coastal Protection for Local Economic Activities from Hurricanes in the Caribbean](#)

[Sustainable Flood Management and Risk Reduction Action: Applicability of Nature-based Solutions for Flood and Drought Management in Somalia](#)

## GUIDANCE DOCUMENTS FOR IMPLEMENTING NBS IN SPECIFIC CONTEXTS

[CARE guide: 'Caring for our mountains'](#)

[CARE guide: Transformative Approaches for Advancing Gender Equality in Coral Reef Social-ecological Systems](#)

[Journal article: Floods and livelihoods – The impact of changing water resources on wetland agro-ecological production systems in the Tana River Delta, Kenya](#)

[Journal article: Nature-Based Solutions for Coastal Resilience](#)

[A Catalogue of NbS for Urban Resilience](#)

[Urban Nature Based Solutions: Cities leading the way](#)

[Smart, Sustainable and Resilient cities: the Power of NbS](#)

[NbS for Improving Resilience in the Caribbean](#)

[Hydrological services and the role of forests](#)

[The Ramsar Convention on Wetlands: Global Wetland Outlook](#)

[Participatory integrated watershed management in Yunnan province, China](#)

[Community-led sustainable agriculture, land restoration, and DRR in Jamaica](#)

## TABLE OF POTENTIAL PARTNERS

Type of Partner	Examples of potential partners
<b>United Nations (UN) Agencies</b>	UN Environment Programme (UNEP)
	UN Office for DRR (UNDRR)
<b>DRR Groups and Coalitions</b>	Community DRR Groups
	Coalition for Disaster Resilient Infrastructure (CDRI)
	Caribbean Disaster Emergency Management Agency
	510 – An Initiative of The Netherlands Red Cross
	Partnership for the Environment and Disaster Risk Reduction (PEDRR)
<b>Environmental Groups</b>	World Wide Fund for Nature (WWF)
	The Nature Conservancy (TNC)
	Global Mangrove Alliance
	Community-level groups
	Wetlands International
	Caribbean Biodiversity Fund
	International Union for Conservation of Nature (IUCN)
	Commonland
Global Ecosystem-based Adaptation Fund	
<b>Research Institutions</b>	National university research groups
<b>National Governing Bodies</b>	Environmental ministries
	Grenada Ministry of Climate Resilience, the Environment, Forestry, Fisheries, Disaster Management & Information
	The Dominican Republic Ministry of Environment and Natural Resources
<b>Private Sector</b>	ECOTIERRA
	Arbaro Advisors