IFRC

PLANTING TREES

TO PROTECT PEOPLE AND NATURE

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: Jamaica Red Cross

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Tree planting is often promoted as an effective tool to combat climate change and environmental degradation while protecting people and improving livelihoods. Indeed, from mangrove replanting in Viet Nam, to slope reforestation in the Democratic People's Republic of Korea, Honduras and Ethiopia, creating green shelterbelts in Gambia and Kenya, to holistic landscape restoration in Haiti, the Red Cross Red Crescent has a long track record of successful tree planting and restoration initiatives.[i]

Trees provide a wide array of benefits for local communities and adjacent ecosystems. Well-planned afforestation and reforestation initiatives can help sequester carbon, reduce risk, and provide benefits for people's health, food security, and livelihoods (Figure 1).

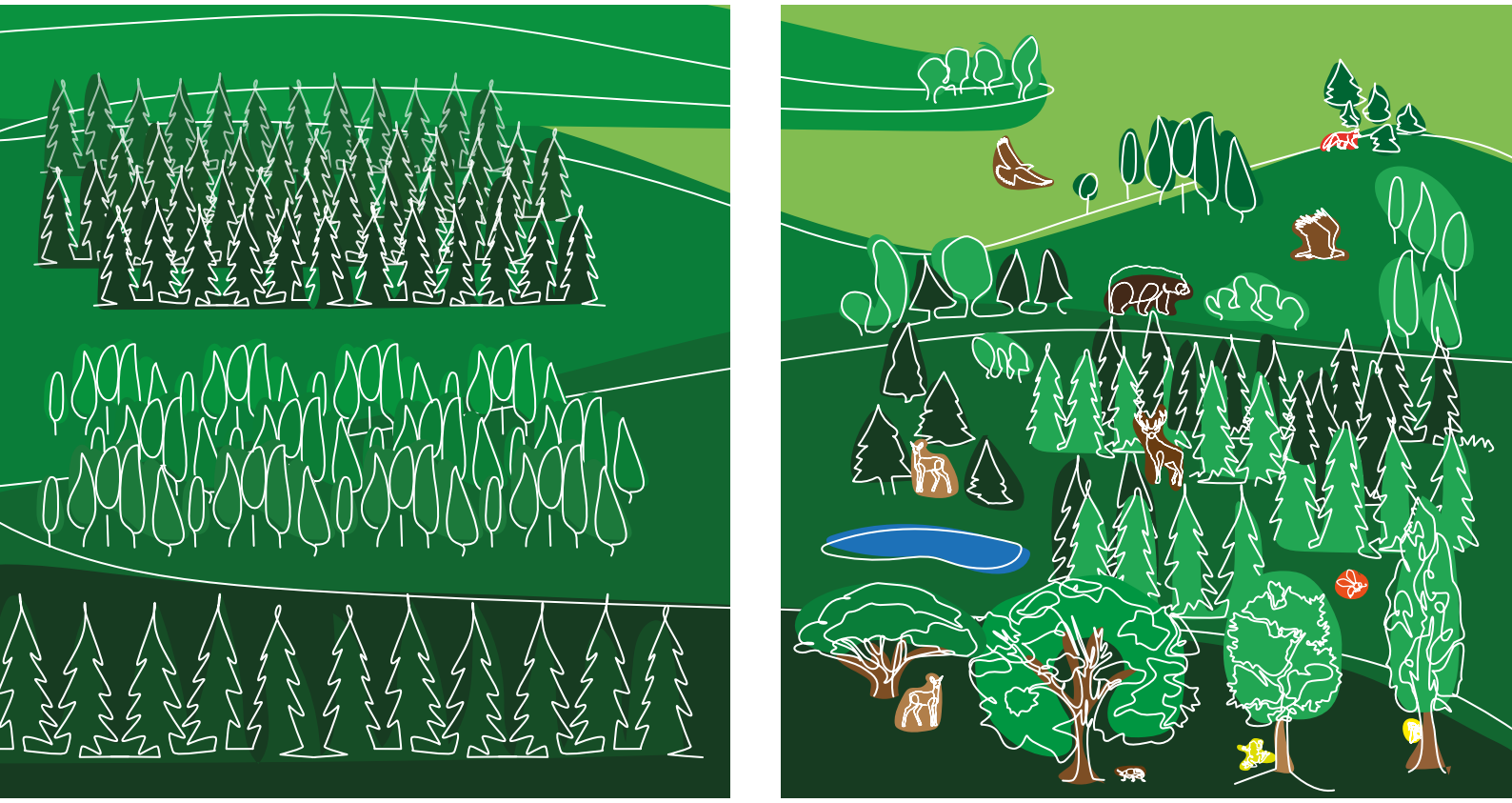


Figure 1: The Benefits of Trees

Healthy forests can:

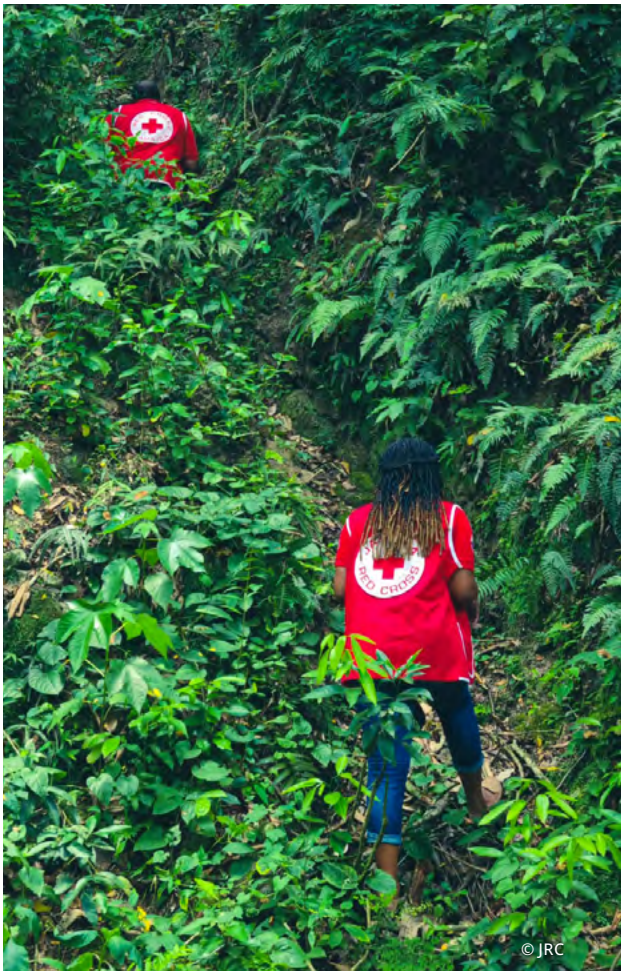
- **Increase food security and support livelihoods:** Approaches like agroforestry (the integration of trees and shrubs into crop and animal farming systems) can restore and strengthen food systems. This can help to improve crop yields, lessen food insecurity, and provide additional income sources during the lean season or times of drought.
- **Reduce risk by:**
  - Providing food, medicines, building materials, shade, and other goods and services that reduce people's *vulnerability* and increase their *resilience*.
  - Reducing people's *exposure* to natural hazards such as storm surges or windstorms.
  - Preventing soil erosion and land degradation, thus reducing *hazards* like rockfalls and landslides.
- **Mitigate climate change:** Growing trees are natural carbon capture and storage machines.
- **Foster environmental benefits:** Regrowing trees can help restore soil structure and fertility, attract pollinators, rehabilitate water tables, and increase biodiversity.

Yet, while tree planting can be part of a sound approach to creating healthy ecosystems that support nature and people, simply putting trees in the ground doesn't necessarily make tree planting a nature-based solution, or even a good idea. In fact, poorly planned projects can do more harm than good by increasing carbon dioxide emissions and having long-term damaging impacts on the environment and livelihoods.

For example, up to 30% of the world's carbon is stored in the soil under savannas and other grasslands.[ii] Afforestation efforts (planting trees where previously there weren't any) that fail to consider the benefits that intact grassland ecosystems have can end up releasing large stores of locked-up carbon into the atmosphere, as well as threaten native species and harm the livelihoods of millions. Planting trees can be a good idea in some places, but not everywhere, and sometimes choosing not to plant trees can be an even better option.

This brief outlines when tree planting initiatives are – and are not – nature-based solutions. It clarifies key concepts related to tree planting and offers practical advice that National Societies should consider when planning tree planting projects. Planning *if*, *where*, and *how* to plant trees is very much contingent on the ecological context you are operating in. Red Cross Red Crescent Societies are encouraged to seek the guidance of specialists familiar with the environment around them.

- **AFFORESTATION** is when tree planting occurs in an area, which historically have not contained forests before, creating a new forest or forest stand. For example, planting trees in a grassland biome.
- **REFORESTATION** is the process of planting trees to restore an existing forest impacted by deforestation.
- **NATURE-BASED SOLUTIONS** are actions that protect, sustainably manage, or restore ecosystems to address societal challenges and benefit human well-being and biodiversity.[iii]
- **ECOSYSTEM SERVICES** are essential services provided by ecosystems that ensure the wellbeing and survival of people. These include supporting, regulating, provisioning, and cultural services.[iv] For example, the ecosystem service of pollination is crucial for the development of fruits.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WHEN IS TREE PLANTING A NATURE-BASED SOLUTION?

A) IT FOLLOWS THE 8 CRITERIA OF THE IUCN NBS STANDARD™

One main aspect of a true nature-based solution is its focus on addressing societal challenges and improving human well-being. This ties well into the humanitarian imperative to alleviate suffering and distinguishes nature-based solutions from nature conservation. In terms of priorities of IFRC, the main societal challenges relate to disaster risk reduction, climate change adaptation, food and water security and health.

The International Union for Conservation of Nature (IUCN) has outlined 8 criteria that defines a nature-based solution (Table 1) that ensures good biodiversity and social outcomes. Therefore, any tree planting initiative must not only be environmentally sound, it must be planned in such a way that it addresses a societal challenge, while ensuring engagement and empowerment of indigenous peoples and local communities.

Table 1: IUCN Global Standard for Nature-based Solutions outlines eight criteria that provide a common understanding and consensus on what constitutes a good nature-based solution.

Issue being addressed		Criteria
1	Societal challenges	NbS effectively address societal challenges.
2	Design at scale	Design of NbS is informed by scale.
3	Biodiversity net gain	NbS result in net gain to biodiversity and ecosystem integrity.
4	Economic feasibility	NbS are economically viable.
5	Inclusive governance	NbS are based on inclusive, transparent and empowering governance processes.
6	Balance trade-offs	NbS equitably balance trade-offs between achievement of their primary goal(s) and the continued provision of multiple benefits.
7	Adaptive management	NbS are managed adaptively, based on evidence.
8	Mainstreaming and sustainability	NbS are sustainable and mainstreamed within an appropriate jurisdictional context.

B) IT FOLLOWS AN ECOSYSTEM APPROACH

An ecosystem-based approach involves managing natural landscapes and seascapes in a way that promotes their conservation and sustainable use in a holistic and equitable manner. Biodiversity and the full array of interactions within an ecosystem, including those between people and the environment, are recognized and prioritized, as opposed to considering a single species or ecosystem service in isolation.[v]

It is very important to consider the **ecosystem** in which you are considering planting trees. Protecting existing forests is crucial and should be the first priority. Reforestation does not easily compensate deforestation. Restoration of degraded forests can take place through natural regeneration and/or tree planting, but reforestation or afforestation requires the planting of a large number of new trees. It can be very useful to enhance semi-natural ecosystems, such as agricultural or urban areas, by including trees. Regardless of where trees are planted it is important to keep in mind the interconnectedness between the biotic (e.g., living) and abiotic (e.g., non-living, such as light or

temperature) components that make up that ecosystem. As an example, when planting mangroves for reducing storm surge, it is important to consider if there is suitable space for expansion and migration as well as a continued supply of sediment and nutrients from fresh-water flows, otherwise replanted mangrove forests may fail to thrive.[vi]

It is also important to be aware of the many ways in which tree planting can fail. For instance, it is critical to choose the correct **tree species** for the ecology, geology, and climate of the area, as a wrong choice could result in lower survival rates, damage to the local biodiversity, or even a decrease in water availability. An often-cited example is that of Eucalyptus tree plantations. This species comes from Australia and has been planted in many countries across Africa as it is a fast-growing multipurpose tree. While Eucalyptus plantations provides some benefits, they are not a good choice for erosion control, can deplete the water table, and also have shown to deplete soil nutrients.[vii] Another mistake to avoid is planting or replacing natural mixed forests with monocultures (just one species), which may be harmful to the environment and also are more vulnerable to disease. Using a diversity of seeds from different individual plants increases resilience of species due to genetic diversity.

AIM FOR:

- ✓ Natural regeneration of trees
- ✓ Reforestation of previously forested areas
- ✓ Agroforestry, the integration of trees into agricultural systems
- ✓ Urban forestry
- ✓ Afforestation of abandoned lands, where appropriate
- ✓ Planting biodiverse stands that include a mix of trees, shrubs, and other plants
- ✓ Planting multipurpose trees (that deliver many benefits including economic benefits)
- ✓ Planting native species

AVOID:

- × Afforestation in historically non-forested ecosystems (e.g. grasslands, shrubland, or desert)
- × Planting large areas with single species
- × Planting invasive species
- × Planting species ill-suited to the climate, soil, ecology, and purpose

10 golden rules of reforestation

Figure 2 summarises best practice in 10 key rules

1. Protect existing forest first

- Reforestation doesn't easily compensate for the losses of deforestation
- Old- and second-grown forests are all valuable

2. Work together

- Involve local communities with interactive participation in every project phase

3. Aim to maximize biodiversity recovery to meet multiple goals

- Restoring biodiversity will maximize carbon sequestration and help deliver socio-economic benefits

4. Select appropriate areas for reforestation

- Only target previously forested lands
- Connect or expand exisiting forest
- Do not displace activities that will cause deforestation elsewhere

5. Use natural regeneration wherever possible

OR

6. Plant species to maximize biodiversity + 7.

- It can be cheaper and more efficient than tree planting, if conditions are suitable
- Works best on lightly degraded sites or thse close to existing forest

- Always plant a mix of species
- Use as many natives as possible
- Include rare, endemic and endangered species
- Promote mutualistic interactions
- Avoid invasive species

7. Use resilient plant material

- Incorporate appropriate genetic variability
- Pay attention to provenance

8. Plan ahead for infrastructure

- Use the locally available infrastructure, capacity and supply chain, or build it into the project
- Refer to seed standards to ensure maximum seed quality and process efficiency
- Provide training and use local knowledge

9. Learn by doing

- Research existing data and perform trials
- Adapt management accordingly
- Monitor the results beyond project life
- Use appropriate indicators according to project goals

10. Make it pay

- Ensure the project's economic sustainability
- Income can come from carbon credits, non-timber forest products, watershed and cultural services
- Make sure the economic benefits reach rural and poor local communities

Adapted from Sacco and Hardwick et al. (2021) Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits. Global Change Biology, Volume: 27, Issue: 7, Pages: 1328-1348, DOI: 10.1111/gcb.15498

GUIDING QUESTIONS[VIII]

The following questions can be helpful starting points when planning a tree planting project as a nature-based solution.

Why?

CONSIDER THE OBJECTIVES OF THE PROJECT. FOR EXAMPLE, IF IT IS TO...

- ...increase **food security and livelihoods**, consider the length of time it will take for trees to start yielding fruit or nuts, and what is needed to develop diverse, sustainable income streams over the long run. Livelihood forests generally rely on a mosaic of land uses (Fig. 2).
- ...reduce **disaster risk**, remember that not all tree species provide equal levels of protection. For example, the root depth of trees planted on steep slopes influences how well trees stabilize soil and reduce the risk of landslides. Species with deeper roots generally provide more protection.
- ...improve **water management**, consider the type of species (they need to be appropriate for the environment) and their placement in watersheds. Trees can rapidly increase water infiltration and reduce the rate of surface water runoff, reducing peak flows during flood events and improving water quality.
- ...**sequester carbon**, consider natural regeneration first, as carbon sequestration in these areas is up to 40 times greater than in monoculture plantations.[ix] Avoid at all costs replacing natural mixed forests with single-species plantations.
- ...increase **biodiversity**, plant a mix of species, prioritizing native plants, and excluding introduced species. Mixed-species forests can provide livelihood benefits and attract pollinators and animals that disperse seeds, and are more resilient to disease, fire, and extreme weather events.

Where?

- Consider whether tree planting is necessary. Are there ways instead to protect existing forests? Can natural regeneration methods (the process of natural forest regrowth), which are often cheaper and more effective, be used instead?
- Select appropriate areas with suitable soil, climatic and hydrological conditions, for reforestation/afforestation. Consider if the area intended to be planted is previously non-forested land, such as grasslands, which can support high biodiversity, soil carbon sequestration, and livelihood benefits.
- Consider the wider effects of tree planting, such as impacts on groundwater. While in some cases, trees can support water infiltration, reduce flooding and alleviate water scarcity, in other circumstances trees can deplete aquifers and streams, in turn amplifying water scarcity.
- Consider land rights/ownership. Do you have access to the land and permission to plant the trees? And to maintain them in the years to come?


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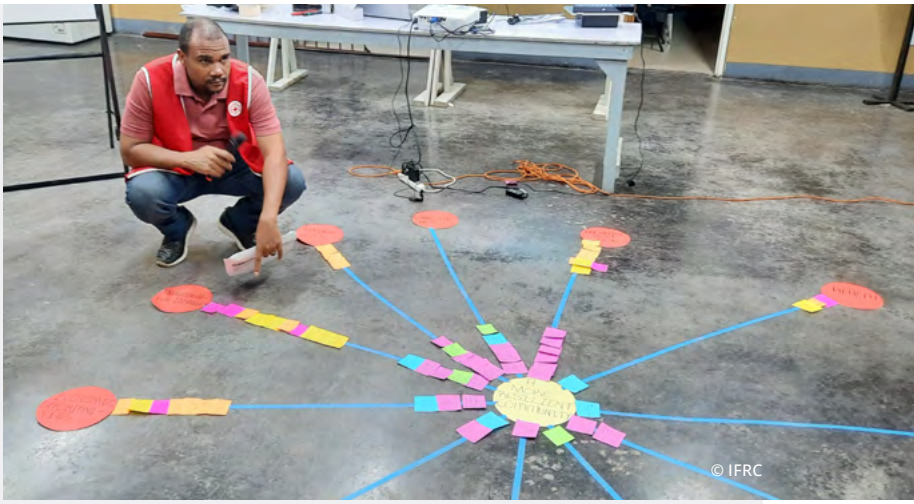
How?

- Often natural regeneration methods, e.g., farmer-managed natural regeneration, can be more effective than planting.
- When selecting species suitable for the local conditions, also ask what type of tree is most appropriate for this context?



  - For example, in rural, peri-urban or urban areas multi-purpose trees that can provide food, medicinal, protective, and other benefits are important.
  - On slopes, the depth and strength of tree roots along with the species' speed of growth is important.
  - Including leguminous trees (such as tamarind) in agroforestry systems improves soil condition, supports crop growth and can improve local biodiversity.
- Consider current and future climate projections and how species planted today will be affected by shifts in weather patterns in the future.
- Consider the time it might take to nurture the trees until they grow to maturity and what might need to be put in place during that time to protect the growing trees. Also, if these trees aim to support disaster risk reduction, whether other solutions such as engineering options (e.g. gabion walls, water tanks, etc.) also need to be put in place.
- Ensure monitoring is undertaken regularly and over time. Tracking survival rate of the trees is crucial to learning and adjusting management for success of the project.
- Consider how the project can benefit from both local or indigenous knowledge and ecological expertise.

For Whom and With Whom?

- Afforestation, reforestation and restoration of degraded forests affect people's livelihoods and such projects should be people-centered. Indeed, good natural resource management is one pillar of resilience building.x Local communities need to be included in all aspects of tree planting, from planning to implementation to care and monitoring.
- Consider how local communities can also be part of the whole value chain for sustainable forest products, from promoting local tree nurseries to final product sales.
- Drivers of deforestation should be identified and solutions to address those drivers sought wherever possible.
- Forest restoration takes time and must be pursued with the needs of communities and stakeholders in mind. Key issues, such as ownership, access to and control of resources, benefits sharing, and long-term sustainability must be addressed. Gender equality is an important cross-cutting consideration.

As this paper hopefully shows, tree planting is not a 'one-size-fits-all' approach, and neither afforestation nor reforestation projects automatically create functional forest ecosystems. Forests are complex ecosystems, and creating healthy forests that deliver on livelihoods, food security, and disaster risk reduction, amongst other benefits, requires **carefully considering both the ecological and human context**. This includes shifting from thinking about trees to thinking about **landscapes** and **integrated land management** (i.e. thinking about the roles of trees/forest in specific landscapes).

TO LEARN MORE

IFRC's The Nature Navigator (IFRC, 2022) includes valuable guidance for forest landscape restoration, and provides various links to other sources of guidance as well.

The IFRC is the world's largest humanitarian network, comprising 192 National Red Cross and Red Crescent Societies working to save lives, build community resilience, strengthen localization, and promote dignity around the world. Nature-based solutions are an institutional priority area for IFRC. By 2025 we have set a target for 100 National Societies to harness the power of nature through nature-based solutions. Visit us online to learn more.

ACKNOWLEDGMENTS

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ENDNOTES

i Small simple actions to address climate change, IFRC, 2016

ii Grassland soil carbon sequestration: Current understanding, challenges, and solutions, Bai & Cotrufo, 2022

iii UNEA resolution 5/5

iv Millennium Ecosystem assessment, 2005

v Words Into Action: Nature-based Solutions for Disaster Risk Reduction. UNDRR, 2022, p. 14.

vi Mangroves as a protection from storm surges in a changing climate. Blankespoor, Dasgupta, & Lange, 2017

vii Ecological and social impacts of eucaplytus tree plantations on the environment, Bayle 2019

viii 'Guiding Questions' draws from multiple works, including: Ten golden rules for reforestation to optimize carbon sequestration, biodiversity recovery and livelihood benefits, Sacco et al, 2020; A multi-disciplinary perspective to nuance the narrative of tree planting as a nature-based solution, Vogel et al, 2021; and Forest and landscape restoration in Africa, Sola, 2022.

ix Regenerate natural forests to store carbon, Lewis et al., 2019

x Roadmap to resilience v2, IFRC 2021