



Adapting to **Climate Change**

Ecosystem-Based Approaches for People and Nature

Climate Change Threatens Vulnerable People Who Rely on Nature



Why Adapt? In the Coral Triangle, higher ocean temperatures could kill off 80% of coral reefs and collapse their fisheries, potentially causing 100 million people earning a living off the sea to leave inundated coastlines and find new jobs.¹

The most vulnerable people are those whose livelihoods directly depend on nature and on the ecosystem services that nature provides.

The impacts of climate change are no longer a future threat.

Right now, climate change is affecting the very basis of life on Earth. It is affecting the resources and ecosystems upon which all of humanity relies—our food and water supplies, erosion and flood controls and the productivity of our oceans, forests, grasslands and agricultural landscapes.

The most vulnerable people are those whose livelihoods directly depend on nature and on the ecosystem services that nature provides. Rising sea levels and more frequent and intense flooding threaten coastal communities and small islands. Extended droughts stress grasslands that provide food for people and their livestock. Longer and hotter dry seasons reduce the availability of freshwater for drinking and for agriculture. More frequent, catastrophic wildfires destroy forests and grasslands that people rely on for fuel and food. Warmer ocean temperatures increase incidents of coral bleaching, which threatens coral systems, fisheries and marine-based economies and livelihoods.

The impacts are real and are happening now. They are also increasingly urgent and likely to worsen. Swift action is needed to protect all people. But the poorest communities—which depend most on nature—are the first and most severely affected, and thus the most vulnerable. Solutions are urgently needed that empower people and nature to respond.



The Power of Nature Can Empower People



The best options help people to maintain or restore the integrity of natural ecosystems so that they can continue to provide food, fuel, shelter and security.

There is growing global consensus that long-term mitigation strategies are needed to reduce the emissions that cause climate change. However, even the most ambitious mitigation efforts will not halt the consequences already underway for our world's water supplies and food resources.

The world's most vulnerable communities need lasting adaptation approaches that provide for their livelihoods and protect against an ever-changing climate. Stakeholders are recognizing that the best options help people to maintain or restore the integrity of natural ecosystems so that they can continue to provide food, fuel, shelter and security.

- Indigenous peoples have handed down knowledge through generations about the ability of natural resources to provide for their communities and to regenerate, even under changing conditions.
- Governments and international institutions are realizing that ecosystem-based solutions can be cost-effective complements to engineered solutions to climate impacts.
- Scientists and conservationists have shown that healthy natural systems provide invaluable ecosystem services and have a unique ability to adapt.
- Development and aid agencies are realizing that ecosystem-based solutions that are also community-based can empower local people to address the impacts of climate change.
- Local communities understand that traditional knowledge, natural resources and modern technology can be blended and balanced to safeguard their livelihoods.
- The engineering community has acknowledged that engineered solutions cannot eliminate all risks from climate change.

Rather than letting people down, nature can empower people and provide solutions to the climate crisis.

Ecosystem-based Solutions for Adapting to Climate Change

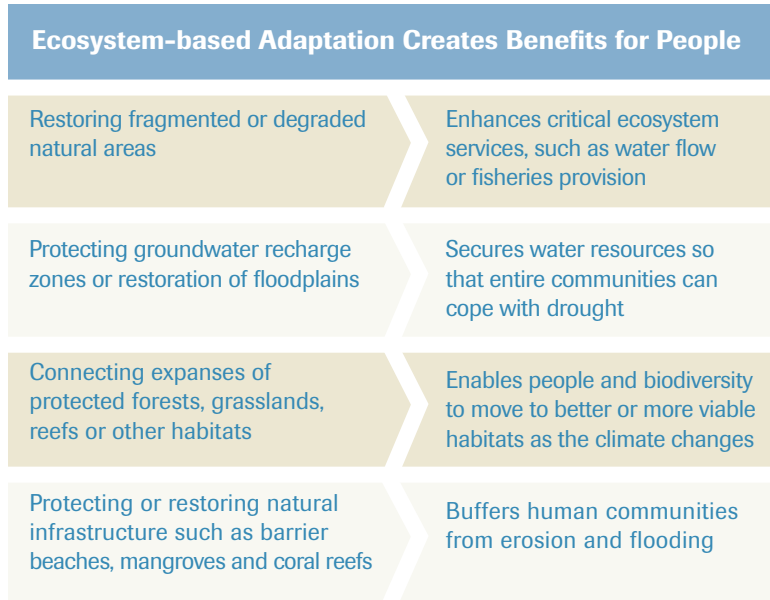
Efforts to protect and restore natural habitats around the world have demonstrated effective strategies that build nature’s resiliency and contribute to sustainable livelihoods for people. Now, similar types of ecosystem-based efforts are proving to be effective strategies for climate change adaptation.

In the face of change, ecosystem-based approaches, unlike engineered solutions, can provide for people’s basic needs—such as water, food, fuel and fiber—as well as protect people by buffering storms or reducing erosion. Scientists recommend that ecosystem approaches to adaptation aim to achieve one or more of the following objectives:

- Maintain intact and interconnected ecosystems so they can adjust to changing environmental conditions and continue to provide services to people;
- Restore or rehabilitate fragmented or degraded ecosystems and re-establish critical environmental processes;
- Ensure that any use of renewable natural resources is sustainable under changed climate conditions;
- Adjust resource management programs to deal with climate-induced impacts, such as the increased threat of fire or invasive species.



Why Adapt? Drought threatens much of the tropics; southern Africa could lose more than 30 percent of its maize crop in the next two decades, while south Asia could lose 10 percent or more of its millet, maize and rice.²



Why Adapt? Coral reefs in Indonesia safeguard coastal settlements from storms and wave damage to an estimated value of US \$314 million for the country as a whole.³

Adapting to Climate Change

With Ecosystem-based Adaptation

Without Ecosystem-based Adaptation

COASTS AND CORAL REEFS

- Restored natural shorelines with seagrass beds or mangroves provide a buffer from storm surges and enable nurseries for key fisheries to survive.
- Protected inland habitats allow plant and animal species to move inland as sea level rises, maintaining ecosystem integrity.
- Linked networks of coral reefs are systematically protected to increase the chances that some will survive and reproduce as the ocean warms and acidifies.
- Upland forests are sustainably managed to reduce erosion and sedimentation and enhance fresh water supplies.
- Coasts and coral reefs continue to provide for the needs of local communities, support subsistence and commercial fisheries, maintain nature-based tourism revenues and protect important inland infrastructures.

- Wetlands and mangroves are degraded or disappear, leaving local communities vulnerable to more intense storm surges.
- Sea walls are built, but cannot always hold back unpredictable climate extremes.
- Unprotected coral reefs fall victim to disease and to bleaching, and remain vulnerable to overfishing.
- The nurseries provided by mangroves and coral reefs are lost, and fisheries decline.
- Saltwater intrudes into low-lying lands, destroying crops and livelihoods, and damaging buildings and infrastructures.
- Upland forests are overharvested, leading to sedimentation—which damages water supplies, reefs and mangroves—as well as increased risk of landslides and flooding.
- Dead or dying coasts and reefs cannot sustain the natural resources that people rely on for their livelihoods nor provide natural protection from storms and floods.

GRASSLANDS

- Community-conserved grasslands, or “grassbanks,” allow overgrazed lands to rest and recharge while other grazing areas are used, increasing the productivity of the range.
- Upland forests are replanted, helping retain water by preserving recharge zones.
- Protected grasslands and upland forests help replenish underground aquifers that provide crucial water resources.
- Wildlife center within community-conserved areas, reducing conflict and increasing potential tourism revenues.
- During times of drought, communities decide if livestock grazing should be allowed on grassbank areas, providing insurance in times of increased stress.

- Grasslands are grazed heavily, reducing productivity and thus reducing health of livestock and increasing wildlife conflict.
- People rely heavily on irrigation techniques and wells that drain the water table.
- Upland forests are harvested and lose their ability to store water during the rainy season.
- It is harder for people to raise crops or livestock, and pastoralists are forced to roam further in search of better grazing or to meet their basic needs.
- Local people may be pushed away from their traditional way of life, and migrate to over-swelling cities or other territorial areas.
- There is no buffer (or insurance) in times of drought.

FORESTS

- Sustainably managed forests provide fuel and other resources for local people.
- Healthy and intact forests help provide a consistent flow of water into their water systems.
- The threat of destructive wildfires is reduced through climate-savvy fire management techniques.
- Through conservation agreements on communal and private lands local communities protect the resources on which they depend.
- Intact forests store carbon dioxide and help minimize global warming.

- Climate change increases other threats to forests, bringing more diseases, pests and catastrophic wildfires.
- Forests are cut down, releasing carbon and causing dam failures, mudslides and erosion.
- Deforestation reduces connectivity of large tracts of land, making it harder for species to migrate.
- The forest is not able to hold rainwater, directly impacting freshwater resources that people rely on.
- The forest is not able to provide sufficient food, fuel and resources for current or future generations.

People + Nature = Solutions



Bridging the Funding Gap: A Portfolio and Planning Approach



Why Adapt? Jamaica is experiencing changing weather patterns with more intense extremes, including drought, floods and hurricanes, and predicts that if no action is taken to reduce all impacts of climate change, it will cost the country 13.9 percent of its GDP by 2025, increasing to 27.9 percent by 2050.⁴

Investing in nature now
can help avoid much
higher costs later.

There is an urgent need for action and investment at the same scale as the climate change problem, especially on behalf of the world's most vulnerable people. Bold adaptation measures and reliable funding are needed immediately to deal with the impacts being felt today and for many decades to come. Only ambitious mitigation commitments and actions from the global community that substantially reduce emissions can alleviate some of the long-term needs for adaptation financing.

Developing countries have called on wealthier nations to help them adapt to climate change. Twenty-five countries refer to ecosystem-based approaches to adaptation in their National Adaptation Programs of Action (NAPA), where they identify the most urgently needed adaptation actions.⁵

However, current funding for adaptation falls far short of the needs. The United Nations Framework Convention on Climate Change (UNFCCC) has put adaptation costs in the agriculture, coastal, forestry, fisheries, health, infrastructure and water supply sectors at between US\$44 billion and \$166 billion per year by 2030 globally.⁶

To address the impacts of climate change on developing countries and their citizens, The Nature Conservancy calls for the following actions:

- New, additional and immediate financing for adaptation is available which meets developing countries' needs through dedicated and predictable bilateral and multilateral funding mechanisms.
- A cohesive architecture for adaptation financing is developed that uses and combines the specific strengths of different institutions, organizations, sectors and financial mechanisms.
- Climate change adaptation measures are aligned within national development frameworks and guide development and aid investments.
- Adaptation investments consider practical ecosystem-based solutions that empower local communities to maintain the integrity and functioning of natural ecosystems in their own interest, and avoid inadvertently undermining the resilience of ecosystems.
- Mandates of multilateral institutions and UN agencies are revised to ensure that investments enhance ecosystem and community resiliency to climate change.
- Private sector investments, including innovative economic instruments and positive incentives, are mobilized and directed where possible towards adaptation goals.

Future conditions for development will fundamentally be altered by climate change. Achieving sustainable development will only be possible by making climate change central to budget planning, financial investments and country-owned development.

In particular, climate change will severely impact the natural resource base on which much of development rests, constraining resource-based economies, livelihoods and people's ability to meet their most basic

The Benefits of Ecosystem-based Approaches to Adaptation

- Align with and enhance poverty alleviation and sustainable development strategies.
- Are ready now, are likely to be more accessible to rural and poor communities and are cost-effective.
- Increase local engagement and action, driving resource management to local communities.
- Enable vulnerable communities to participate directly in developing and applying the most appropriate strategies for their location.
- Are precautionary and address risk management, ensuring that long-term natural resources that provide resilience are not destroyed by short-term or emergency responses to a crisis.
- Provide both protective services (such as mangroves buffering storm surges) as well as provisioning services (such as wetlands providing food and fiber) that hard infrastructure cannot provide.
- Improve local livelihoods as people's access to natural resources and jobs are secured.
- Can contribute to climate change mitigation by conserving or enhancing carbon stocks or by reducing emissions caused by ecosystem degradation and loss.
- Build on existing investments in biodiversity conservation, protected area networks and natural resource management by indigenous peoples, local communities and the private sector.

needs. Therefore, ecosystem-based adaptation strategies—those that increase resilience and protect natural resources—must be a critical element of development-centered adaptation strategies and financing for the future.

Investing in nature now can help avoid much higher costs later.

The Nature Conservancy and others have witnessed first-hand how public and private funds—combined with political and local leadership—can be leveraged into powerful forces for carrying out successful conservation initiatives that contribute to the livelihoods of local communities across the globe. Now is the time to apply these same approaches to the challenge of climate change adaptation.



Why Adapt? Vietnam, Thailand, Indonesia and the Philippines need an average of US \$5 billion a year by 2020 to protect agriculture and coastal zones from projected impacts of climate change.⁷

Taking Action to Increase Resilience in People and in Nature



Ecosystem-based adaptation is most effective through collective and coordinated action across stakeholders from many sectors.

How can an international climate agreement under the UNFCCC offer guidance?

- Include ecosystem-based adaptation as part of the adaptation building block within the Shared Vision for Long-term Cooperative Action and as an essential part of the program for Enhanced Action on Adaptation.
- Call for and commit to increased financial resources and sustained investment to support action on ecosystem-based adaptation.
- Give preferential consideration to adaptation strategies, such as ecosystem-based adaptation, that provide multiple benefits and enable community involvement.
- Suggest that guidance and tools for ecosystem-based approaches are developed for use at sectoral levels, for local governments and for communities.
- Include ecosystem-based adaptation as a focus of new technology development and transfer.
- Call attention to regional approaches that provide a framework for adaptation funding.
- Draw attention to fact that ecosystem-based strategies are most likely to be successful when they are local, contextual and incorporate participatory community responses.

What can governments do?

- Implement approaches that incorporate ecosystem-based adaptation and that restore ecosystems to benefit human communities.
- Fully incorporate ecosystem approaches into climate change strategies and action plans at local, sub-national and national levels.
- Integrate adaptation planning into development plans, recognizing the cross-sectoral nature of climate change adaptation.

- Allocate budget resources and responsibilities accordingly within development, planning, finance and/or trade ministries.
- Develop economic instruments and financial mechanisms that substantially increase funding flows for adaptation and direct it to the most vulnerable communities.
- Develop mechanisms for resources to be invested in ways that build, and do not detract from, climate resiliency.
- Use existing management practices and governance infrastructure to apply available best practices in natural resource management.
- Improve the design, governance and management of protected areas systems by recognizing and including governance by communities, the private sector and indigenous peoples in resource conservation, and by building the capacity of managers to deal with the increased risks and uncertainty.
- Strengthen national, sectoral and community-level understanding of the fundamental underpinning of ecosystem integrity for adaptation.
- Involve local communities, resource users and diverse stakeholders in developing climate change strategies and action plans.
- Tailor approaches to the context and needs of individual communities, based on community experience and input.
- Incorporate traditional knowledge and the needs of women and youth.

What can industrial, commercial and economic sectors do?

- Include considerations of ecosystem-based adaptation in their sectoral strategies and plans.
- Employ models of predicted climate change in planning and development for agriculture, water, fisheries and forestry.
- Modify planning and management of natural resources to incorporate likely climate change impacts and support ecosystem-based adaptation.
- Undertake cost-benefit analyses of ecosystem-based or other approaches to adaptation.
- Support the creation of incentives that encourage “climate smart” development and discourage development in vulnerable and sensitive habitats.

What can communities do?

- Implement approaches that incorporate ecosystem-based adaptation and that restore local ecosystems to benefit human communities.
- Document and communicate local experience and knowledge of dealing with climate-induced changes.
- Undertake participatory appraisals of resources, vulnerabilities, needs and options.
- Become involved in local government planning for adaptation.
- Incorporate traditional knowledge and skills into the management of local resources.

Notes

¹ The Coral Triangle and Climate Change: Ecosystems, People and Societies at Risk. 2009. WWF Australia.

² Lobell, D. et al. 2008. Prioritizing climate change adaptation needs for food security in 2030. *Science*, Vol. 319. no. 5863, 607–610.

³ Valuing Nature, Why Indonesia’s Marine Protected Areas Matter for Economic and Human Wellbeing. 2009. Arlington, VA: The Nature Conservancy.

⁴ Bueno, R. et al. 2008. The Caribbean and climate change—the costs of inaction. Medford, MA: Tufts University.

⁵ The Secretariat of the Convention on Biological Diversity and The Nature Conservancy. 2008. Ecosystem-based adaptation: an introduction to benefits and key principles.

⁶ Climate Change: Impacts, Vulnerabilities and Adaptation in Developing Countries. 2007. UNFCCC.

⁷ The Economics of Climate Change in Southeast Asia: A Regional Review. 2009. Asian Development Bank.

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The Nature Conservancy



Protecting nature. Preserving life.™

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The people most vulnerable to climate change are often those most dependent on nature.

Through ecosystem-based approaches to adaptation, nature can empower people and provide cost-effective and enduring solutions in the face of climate change. The Nature Conservancy supports increased funding, planning and action for ecosystem-based adaptation as part of a global solution to climate change and as a necessity for sustainable development. As an international conservation organization dedicated to lasting and sustainable results, we use on-the-ground experience to inform policy development and assist governments and communities in implementing ecosystem solutions to the climate crisis. When nature thrives, people thrive.