USAID BIODIVERSITY AND DEVELOPMENT HANDBOOK

IV BIODIVERSITY AND DEVELOPMENT INTERSECTIONS

Families rest in the shade while Northern Rangelands Trust community rangers pass by on patrol in Kenya. Nature-based enterprises and improved management earned about $1.3 million in 2013, in an area with low annual incomes and few economic options.

Photo: Juan Pablo Moreiras, Fauna & Flora International

IV BIODIVERSITY AND DEVELOPMENT INTERSECTIONS

Fishermen of the Hail Haor wetland in Srimongol, Bangladesh, have much to celebrate. After USAID helped local people participate in decision making and management of Hail Haor, fish diversity went up significantly, waterbirds that hadn't been seen for years returned, and fishermen regularly caught more fish in less time than they used to. This success with community co-management led the Government to change national policy on the rights of communities and initiated a large scale up in effort with USAID support.

Photo: Sirajul Hossein

IV BIODIVERSITY AND DEVELOPMENT INTERSECTIONS

4.0 OVERVIEW

This chapter supports Goal 2 of the Biodiversity Policy, "integrate biodiversity as an essential component of human development," as well as Agency integration goals and emerging best practices. Virtually all USAID programs are integrated with other sectors, whether intentionally or not, because they operate within socioeconomic systems. Biodiversity conservation programs are no exception. Conservation activities impact other sectors and vice versa. This chapter provides information on these linkages and impacts, for consideration in increasingly common multi-sector programming. Programmers and managers may also find this information useful in considering how working in different sectors contributes to sustainability. In addition, biodiversity and environment experts need to know enough about other sectors to be able to engage appropriately, though they do not have to be experts.

Integration does not mean doing everything; it means being strategic. Resources presented in this chapter can help planners make these strategic choices – identifying entry points and actions in other sectors that can lead to and enhance biodiversity conservation outcomes. For example, in the context of a threats-based approach, planners and practitioners could engage with efforts to strengthen legal and justice systems and apply best practices to specific conservation challenges such as trafficking or illegal, unreported, and unregulated (IUU) fishing.

As explained in Chapter 3, it is also evident that conservation approaches require knowledge about and engagement with the sectors to be covered here. Broad-scale landscape and seascape approaches often dictate integration of agricultural considerations; these could involve a mix of ecoagriculture, agroforestry, and intensification techniques, as well as improved fisheries management in seascape settings. Community-based natural resource management (CBNRM) approaches can improve conservation impacts and results by incorporating and facilitating the positive evolution of land tenure and property rights concerns. Similarly, many practitioners are increasingly realizing the importance of governance in biodiversity conservation programs: Integration of such basic principles as transparency and accountability can lay the foundation for more equitable, positive, and sustainable results. Finally, the crosscutting issue of global climate change has profound implications for natural resource management (NRM) and the conservation of biological diversity. Integrating climate change adaptation measures into conservation programs will be a necessity. At the same time, healthy and diverse ecosystems will provide resilience to climate change for other sectors.

4.4 GLOBAL CLIMATE CHANGE

4.4.1 Overview

Definition and Significance

Climate change is defined as a change in global climatic patterns, primarily caused by increased levels of atmospheric greenhouse gases (GHGs) and produced by such human activities as burning of fossil fuels, clearing and burning of forests, and grazing of livestock. Climate change impacts are highly variable and unevenly distributed around the world. Greenhouse gases refers to a number of different gases, including carbon dioxide, methane, and nitrous oxide, that collectively increase the amount of solar radiation trapped in the Earth's atmosphere.

Climate change has implications for biodiversity and natural ecosystems around the world. Loss of biological diversity is one of many impacts associated with changing climatic conditions, and planning for effective biodiversity conservation will mean helping species and the ecosystems on which they depend adapt to the expected changes. In the terrestrial realm, changes in rainfall quantity and seasonality mean that conditions will no longer allow certain plant or animal species to exist in portions of their current ranges, changing the

functionality of entire ecosystems, such as forests or grasslands. When these changes make wilderness or pastoralism a better use of land than cultivation, wildlife and native plant species can benefit. In marine systems, changes in ocean temperature and acidity can lead to mass die-off events, such as coral bleaching.

Key Questions

What is the global response to climate change?

The global community has begun to address climate change in a number of ways; the most notable is the United Nations Framework Convention on Climate Change (UNFCCC), which was adopted in 1992 and which more than 190 nations have now signed. According to Article 2, the purpose of the Convention is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

What are some of the impacts of climate change on natural and human communities?

The impacts of climate change on biodiversity and ecosystems are highly variable globally and depend, in part, on the geographical context. Examples include low-lying coastal areas that are susceptible to rising sea levels, areas at each of the poles that are most susceptible to rapid warming, areas closest to the equator and dry areas that are most susceptible to drought and heat extremes, areas at high elevation that are susceptible to species loss, degraded areas that are susceptible to invasive species and disease, and fragmented areas that are susceptible to disruptions in migratory patterns. Even where short-term climate conditions are compatible with the persistence of species, the current speed of climate change is expected to outpace many species' ability to migrate or adapt, especially in the case of species with highly restricted ranges or those whose habitat has been severely fragmented. Climate change is expected to be one of the main causes of biodiversity loss this century.

The effects of climate change on ecosystems and biodiversity will also have profound impacts on human communities. These impacts, which are also variable and context-dependent, include decreased productivity in fisheries, grazing lands, forests, and agriculture; increased incidences of human disease; increased numbers of forest fires in proximity to human habitations; increased frequency and intensity of catastrophic storms; increased numbers of floods and droughts; and impacts to coastal cities through sea-level rise.

What are some strategies for incorporating climate change considerations into biodiversity conservation strategies?

Although the impact of climate change on natural and human communities will likely be profound, conservation planners can take steps to help strengthen resilience to climate change and promote adaptation:

- Identify long-term biodiversity conservation and development goals for an area, focusing on the ecosystem goods and services that will require conservation, restoration, protection, and/or management. Planners should keep in mind that climate change will continue for decades, even if the emissions of greenhouse gases are dramatically decreased in the near future.
- Reduce the impact of other stressors, such as pollution, overexploitation, land use change, and invasive species. A comprehensive approach to biodiversity conservation will increase the capacity of species to adapt to climate change, and a more diverse, functional ecosystem will be more resilient to its impacts.
- Assess how climate change may impact an area's biodiversity, ecosystems, and ecosystem services. Biodiversity responses to current or recent climate-related events offer some guidance. It is valuable to consider future scenarios of key environmental variables, such as temperature and precipitation, and how they may be expected to impact biodiversity and ecosystems. Planners also should account for predicted changes in demand for ecosystem services that may magnify or moderate climate impacts and likely human adaptation actions that may affect ecosystems.
- Focus on connectivity and spatial distribution. Species and ecosystems will tend to shift their habitats and ranges toward areas that will remain cooler, including poles, higher elevations, and sheltered areas. This may also entail identifying areas of refugia – places that have survived or are likely to survive extreme weather

conditions. Planners can consider how to facilitate ongoing and future range shifts in their spatial planning efforts. This process makes conservation outside formally protected areas more important; current and future habitats can be connected by creating corridors between protected areas and increasing the size of areas being managed for biodiversity.

- Maintain and expand large, intact landscapes and blocks of habitat. By focusing on landscape-scale conservation, planners can provide the best safety net for species and ecosystems and encourage a more resilient, robust landscape. This can be accomplished through transfrontier conservation areas.

What is the relationship between ecosystem management and climate change?

Although climate change is largely caused by the consumption of such non-renewable fossil fuel resources as oil and coal, the management of various ecosystems also plays a key role in affecting the amount and types of GHGs in the atmosphere and, therefore, the severity of climate change. The most obvious example can be found in tropical forests, which store large volumes of carbon and have experienced high rates of deforestation during the last century. Other ecosystems, such as tundra, peatlands, and wetlands, may store a very large amount of carbon-rich biomass below ground, so the conversion of these areas has the potential to release large amounts of GHGs as they dry out, are exposed to air, and/or are burned. Terrestrial ecosystems have the potential to both store large amounts of carbon, which could otherwise end up in the atmosphere, and release carbon, if poorly managed.

The dual role of ecosystems as both potential carbon sources and sinks means that their proper management represents an accessible, low-technology mechanism by which atmospheric carbon content can be regulated. This is especially the case with tropical forests. Tropical deforestation, forest degradation, and agriculture together account for as much as 30 percent of all GHG emissions globally. Considering that the clearing of tropical forests is often a result of increased demand for agricultural production, their management has become an important focus of climate change mitigation. In many tropical developing countries, forestry and land use are by far the most important sources of GHG emissions.

4.4.2 Biodiversity and REDD+/Sustainable Landscapes

What is REDD+ and what is its impact on biodiversity conservation and development outcomes?

In recognition of the importance of preventing forest degradation and loss, climate change scientists and policy experts developed a mechanism known as Reduced Emissions from Deforestation and Forest Degradation (REDD+). REDD+ describes a mechanism by which forest conservation and/or restoration, as well as the sustainable management of forests and enhancement of forest carbon stocks, can play a key role in reducing atmospheric GHGs. Site-level projects or policy-level interventions to reduce deforestation are an increasingly common part of national and international climate mitigation strategies. Early projects sold carbon credits, representing tons of CO2 sequestered as a result of avoided deforestation, on the international voluntary market as a way to finance forest conservation or reforestation activities in specific sites of interest. Carbon credits are purchased by companies or individuals in order to meet voluntary or required reductions in the amount of GHGs they emit from their operations.

A well-designed REDD+ program has the potential to deliver benefits for local communities, including indigenous peoples and forest-dependent populations, by providing direct PES. Sources of subsistence and livelihoods, such as small-scale agriculture, agroforestry, and non-timber forest products, depend on the reliable provision of forest ecosystem services. Successful REDD+ programs may also assist communities with adaptation to climate impacts.

What are some key issues for USAID to consider when supporting the development of REDD and REDD+ mechanisms?

There are several key areas where USAID programming, in synergy with efforts from other donors and national programs, could advance the development of REDD+, including

- supporting the development of national REDD+ strategies while helping to build capacity at the provincial/state or local government level to engage in the program

- supporting the effective engagement of forest-dependent communities, private enterprise, and other civil society actors in the development of REDD+
- providing technical support to the development of national GHG inventories, national forest inventories, and national or subnational reference scenarios ("baselines"), as appropriate
- providing technical assistance on the legal, financial, and regulatory structures necessary for participation in the REDD+ mechanism
- developing demonstration projects at the site level to test methodologies, strategic approaches, and safeguards to inform the development of the national REDD+ strategy

What are some examples of conservation projects that address climate change?

In the Congo Basin of Central Africa, maintaining the region's carbon sink potential is a key objective of USAID's Central African Regional Program on the Environment (CARPE), a long-term initiative to promote improved forest management and biodiversity conservation. With its vast forest reserves, Central Africa is the most important African sub-region for storing carbon and mitigating carbon dioxide emissions. The CARPE Program creates and executes on-the-ground land use management improvement, coupled with a satellite imagery monitoring system supported by stakeholder participation and good governance tools. At the same time, national governments in the CARPE region are moving forward with the design and implementation of their national REDD+ plans, providing opportunities for USAID to support key elements while informing emerging priorities with years of successful conservation work at the subnational landscape scale. A United Nations Development Programme/Global Environment Facility (UNDP/GEF) project in Namibia focuses on increasing the capacity of protected area managers to improve climate resilience and adaptation by promoting activities that reduce bush encroachment and maintain water supplies for forests, even under climate threats, thereby reducing water demand. The project also aims to increase the size and representativeness of the protected area system to extend protection of climate refugia, such as mountainous areas with south-facing slopes, and increase connectivity through the north-south corridors.[1]

4.4.3 Biodiversity and Clean Energy/LEDS

What is LEDS?

LEDS refers to low emission development strategies. USAID's climate change mitigation work seeks to help countries accelerate the transition to low emission, sustainable economic development through investments in clean energy and sustainable land use. A country pursuing a low emission development path will grow its economy and improve the lives of its people in a way that achieves economy-wide reduction in net greenhouse gas emissions, compared to a business-as-usual trajectory. Changes will be achieved through sector-specific improvements in key areas, such as energy, forests, agriculture, and transportation. Countries that pursue low emission development will be the best positioned to benefit from a new global low carbon future. USAID accomplishes LEDS work through two mitigation pillars: clean energy and sustainable landscapes.

What is the relationship between LEDS and biodiversity?

Climate change poses direct and indirect threats to species and ecosystems across the globe. Climate change mitigation seeks to lower the rate of accumulation of GHGs in the atmosphere by reducing emissions and increasing sequestration of GHGs. Mitigation lowers the probability that the Earth's temperature will rise to dangerous levels, and that humans and other species will experience the worst consequences of warming. Two main sources of GHG emissions are burning fossil fuels for energy and land practices that release GHGs into the atmosphere. By adopting a low emissions development pathway, countries can reduce their emissions with benefits for biodiversity, as well as human communities. The clean energy and sustainable landscapes pillars both interact with biodiversity. See Section 4.4.2 for more on sustainable landscapes.

1 GEF, Strengthening the Protected Area Network (SPAN) in Namibia.

What are the impacts and benefits of clean energy on Biodiversity?

USAID works to strengthen countries' abilities to use indigenous or regional clean energy resources, including wind, solar, biomass, and hydropower, at both small and large scales, and supports improvements in efficiency of buildings, appliances, and industrial applications – all of which can reduce greenhouse gas emissions. Alternative energy sources can have impacts on biodiversity. For example, in addition to land that may be flooded and other land conversion caused by infrastructure development, dams for hydropower can disrupt river and stream ecosystems and impede fish migrations. In addition, wind turbines and some types of solar arrays are a threat to birds, bats, and insects that are killed in collisions. Some of these threats can be ameliorated through informed siting based on thorough analysis of species migration and movement corridors and by designing infrastructure that mitigates negative impacts on biodiversity (e.g. fish ladders on dams or bird-safe wind turbines). Improvements in efficiency of appliances, buildings, etc., reduce the amount of fuel or other energy sources needed, potentially relieving pressure on resources. For example, improved cook stove efficiency could lead to less wood or charcoal collection, reducing forest and habitat degradation.

Where do LEDS and biodiversity work together?

The U.S. Government's flagship interagency program Enhancing Capacity for Low Emissions Development (EC-LEDS) has established partnerships with more than 20 developing countries, including Albania, Bangladesh, Colombia, Costa Rica, Gabon, Indonesia, Kenya, Macedonia, Mexico, Moldova, the Philippines, Serbia, and Vietnam. Where these countries overlap with biodiversity priorities, there are opportunities for integration. Many USAID clean energy and biodiversity projects have been successful in reducing carbon emissions, conserving biodiversity, improving human health, and raising household income (see Nepal case study in Box 59).

HEALTH IS WEALTH: A member of the Samjhana Community Forest User Group in the Terai Arc of Nepal examines her "crop" of medicinal plants. In addition to producing a valuable harvest, they are easier to maintain than food crops because wildlife don't eat them. Photo: Helena Telkanranta, WWF-Canon

BOX 59. TERAI ARC LANDSCAPE, NEPAL – BIOGAS TECHNOLOGY

One example of a clean energy project that conserves biodiversity is in the Terai Arc Landscape of Nepal. In 2003, WWF-Nepal and the Khata Community Forestry Coordination Committee, an entity comprising 32 forest user groups in the Khata area, began incorporating health services into conservation work in the southern region of the Terai Arc Landscape (TAL), Nepal. The Khata corridor is a critical area connecting Bardia National Park in Nepal and Katarniaghat Wildlife Sanctuary across the border in India, and a suite of activities was planned to restore degraded forest land in the corridor by relieving the main threats to the forest and promoting community forest management. Subsequently, WWF-Nepal expanded this program and began introducing the use of biogas technology more widely in the region to produce an efficient, environmentally friendly, locally constructable, and healthy energy source for local communities.

Biogas would be used to combat biodiversity loss in the landscape due to increased agricultural grazing and deforestation for firewood. WWF-Nepal signed an agreement with the Alternative Energy Promotion Centre and Biogas Sector Partnership-Nepal to develop its own WWF-Nepal Gold Standard Biogas VER project in 2006. Starting in January 2007, the program's goal was to build 7,500 biogas plants in buffer zones throughout the TAL. With preliminary funding from WWF-Germany, WWF-US, WWF-Finland, Johnson & Johnson, and the USAID Nepal Mission, and seeking matching funds from carbon financing, WWF-Nepal introduced micro-financing loans so that villagers could afford to install biogas plants.

From January 2007 to August 2009, more than 3,628 biogas plants were constructed and operational in buffer zones and corridors across the Terai. To finance the installations, micro-financing institutions now work in 13 different sites across the TAL. The village of Badreni in Chitwan has earned the title of First Biogas Village in the TAL, as 80 of the 82 houses in the village now have biogas plants. Due to the nature of the project, hundreds of jobs for local Nepalese residents have been created for planning, construction, and maintenance of the biogas plants. The hope is for the project to prevent as much as 148,000 tons of carbon dioxide from being emitted into the atmosphere.

More information on clean energy biodiversity projects can be found at
http://wwf.panda.org/what_we_do/footprint/climate_carbon_energy/energy_solutions22/renewable_energy/bioenergy_access/

4.4.4 Biodiversity and Climate Change Adaptation

How can integrating biodiversity conservation and climate change adaptation improve programs?

Among many possible connections, a vulnerability analysis (VA) can spur stakeholders to protect coasts or make sure water recharge occurs in the face of a changing climate, which can motivate them to apply coastal and watershed conservation approaches. Additionally, conservation of landscapes – corridors – helps to climate-proof areas while encouraging greater engagement with people living around and between high biodiversity areas.

What are some key resources and issues for USAID to consider when planning integrated conservation and adaptation programs?

Required assessments can help scope opportunities for integration. Congress mandates that operating unit strategies be informed by an analysis of threats to biodiversity (FAA Section 119) and the extent to which planned programs will address those threats. This assessment is usually associated with a tropical forests assessment (FAA Section 118) in tropical countries, and sometimes is part of a broader environmental threats and opportunities assessment (ETOA). The 118/119 or ETOA is a good first resource, often recommending opportunities to integrate funds or approaches, including those associated with biodiversity and adaptation.

Conduct a vulnerability analysis. A vulnerability analysis (VA) can often be done as a desktop exercise, and need not be done by USAID; if a VA that is relevant to the targeted sector or geographic area already exists, it may be sufficient. The E3/GCC Office is available to help assess existing VAs or design new ones.

Including cross-sectoral considerations into a 118/119 assessment and a VA will help to identify appropriate points for integration. A high-quality 118/119 assessment would include information on how climate stressors acting directly on biodiversity and climate stressors acting on human communities could exacerbate existing threats or introduce new threats to biodiversity. Likewise, a VA that considers the vulnerability of key ecosystems to climate change and includes some consideration of ecosystem-based adaptation approaches (see Mekong ARCC case study below) can facilitate an integrated design. It is advisable for the VA to address more subtle climate change issues, such as expected gradual shifts in temperature or precipitation, and not just extreme events like floods and droughts, as they may be important for ecosystems.

Consider the whole system. A systems approach can identify linkages and common pressure points for adaptation and biodiversity conservation. Intersections where vulnerable ecosystem services have a large impact on human well-being and where biodiversity and people rely on a shared vulnerable resource may serve as good areas for integration. A systems analysis may also reveal other threats and development opportunities that can inform the decision of whether integration makes sense.

Ensure that requirements associated with biodiversity and/or GCC-Adaptation funds are met. Beware of incorrect attribution! While conserving biodiversity or improving the management of natural resources often positively impacts nearby communities, one cannot assume that any biodiversity or NRM activity automatically contributes to GCC-AD outcomes. To attribute GCC-AD results to activity strategic approaches, actions must explicitly seek to measurably reduce vulnerability and increase resilience to specific climate threats identified in a VA. Conversely, one cannot assume that adaptation strategic approaches automatically contribute to biodiversity results. There must be intent to positively impact biologically significant areas, and activities must address threats identified in an analysis of threats to biodiversity.

The following conceptual models may be helpful in developing an integrated activity, regardless of funding streams:

adaptation for people through ecosystem goods and services – Often called ecosystem-based adaptation, this involves the conservation, management, or restoration of biodiversity and ecosystem services to increase the resilience of people, places, or livelihoods to climate change. With biodiversity funds, reducing threats to biodiversity should be the main objective, but increased resilience due to more sustainable ecosystems

and their services could be a co-benefit of, or synergistic with, adaptation-funded strategic approaches.

adaptation for people and biodiversity – People and biodiversity use shared natural resources, such as land and water, which can be vulnerable to climate change stressors. Activities designed to reduce the vulnerability of these shared resources to climate stressors can benefit both people and biodiversity.

climate-smart conservation – To be sustainable, conservation activities should take account of a changing climate. It may be possible to support the adaptation of species and ecosystems to climate change through, for instance, managing or protecting suitable refugia or adaptively altering approaches to fire management.

climate change and water availability/scarcity – A key link for development is how climate change will impact water available for human use, which in turn can be associated with watershed protection. A link to biodiversity is how changing water availability will shape ecosystems and impact wildlife. An example is the Mau Forest, one of Kenya's major "water towers." This watershed not only meets the needs of humans for drinking and irrigation but also those of domestic animals and the globally important biodiversity found in the Serengeti and the Maasai Mara downstream. Reports like this from the BBC on the drying up of the rivers emanating from the Mau Forest created a stir in Kenya and led to considerable investment from donors including USAID to better understand climate links and improved management.

What areas of intervention offer high potential for integrating conservation and adaptation?

The following examples are representative of actions being undertaken in current USAID field activities focused on biodiversity conservation and adaptation:

ecosystem valuation for decision-making – As ecosystems have become a more recognized concept, there has been a growing interest in how to demonstrate their value to policymakers and planners. Quantifying the ecosystem values at risk due to increased weather variability and projected climate change can serve as a sound integrated adaptation and biodiversity strategic approach. A related undertaking is building understanding among decision makers of the role that healthy ecosystems can play in human adaptation efforts and promoting consideration of ecosystem-based adaptation options alongside more typical responses, such as the construction of hard infrastructure.

integrated planning and management – A number of ongoing activities are using capacity building and technical assistance to promote the adoption of systems approaches in local planning, management, and decision-making processes – similar to the holistic approach to program and activity design that has been discussed earlier in this document. In this way, biodiversity and adaptation considerations are incorporated into initial prioritization processes and can be "mainstreamed" into any future actions. An example of such an approach is integrated water resources management (see the RESILIM case study below).

governance – Supporting the capacity of governments and communities to manage biodiversity and natural resources may have direct benefits in terms of their ability to address climate threats. Better coordination between resource management institutions, for instance, can lead to more effective long-term planning and flexible approaches for future droughts or floods. Addressing disputes over rights to natural resources can improve conservation outcomes and may reduce the vulnerability of local communities who depend on those resources.

biodiversity and climate monitoring – Adaptation requires understanding how changes in climate variables, for example shifts in seasonality or water temperature, impact natural and human systems. Climate change data collection and monitoring may dovetail nicely with species monitoring to assess conservation impacts. The effects of climate change are often more tangible for local communities when they become involved in monitoring potential climate stressors and their impact on key species – like red crab stocks in coastal Ecuador (see Forests and Coasts case below) – and can begin identifying adaptation responses themselves. Furthermore, climate data collected by local communities can contribute to larger climate datasets.

integrated farming methods – Helping farmers to adopt methods that lower their impact on natural systems can offer a number of co-benefit opportunities, especially when agricultural encroachment is a threat to

neighboring biodiversity areas. (Note, this linkage is not always sufficient to justify the use of biodiversity funding.) Reducing land conversion contributes to improved watershed management around critical habitats while also potentially providing a buffer against storms and floods. This and other practices, captured under the rubric of climate-smart agriculture, can provide an opportunity for adaptation, sustainable landscapes, biodiversity, and/or food security benefits.

ecosystem management and restoration – Activities in this area might include strategic approaches such as restoration of corridor connectivity, removal of invasive species, reforestation on degraded lands, or fire line maintenance. While reducing threats to biodiversity, these activities can also improve livelihoods and increase ecosystem resilience so that ecosystems can serve as a buffer against climate-related impacts for nearby communities. Since many of these activities deal primarily with non-climate stresses, any direct GCC-AD funding would need to be paired with biodiversity funds and clearly reduce specific vulnerabilities of human and natural systems.

mangrove forest conservation and restoration – Mangroves are often cited as a high-potential ecosystem for programmatic integration. They can serve as a buffer against extreme storms, which may increase in frequency and intensity with climate change. In addition, mangrove habitats are often high in biodiversity value, support food security, and provide other services that underpin local livelihoods. Assuming that storm surge, flooding, sea level rise, and/or food insecurity due to shifting fish stocks are identified as significant climate change stressors, and mangroves are identified as priority areas for biodiversity, activities in mangrove areas could provide a good intersection of biodiversity, livelihoods, sustainable landscapes, and adaptation opportunities. However, not all mangrove areas are biodiverse or viable in the face of sea level rise and other climate change impacts, so activity designers should not assume that any mangrove-related activity is inherently biodiverse or "climate smart."

What are some examples of projects that integrate climate change adaptation and biodiversity conservation?

In 2012, USAID Missions launched 11 new environment activities receiving both biodiversity and GCC-AD funding, up from only two co-funded activities initiated in 2009. In addition, activities using only one source of funds are increasingly looking for co-benefits. In response to this growing trend, the Forestry and Biodiversity (FAB) and Global Climate Change (GCC) offices within the E3 Bureau set out to identify early lessons learned from these activities and begin to develop a set of best practices for integrating adaptation and biodiversity in USAID programming.

Ba Nafaa ("Benefits from the Sea" – Gambia-Senegal) – The Challenge of Integrating in Mid-Stream: The Gambia-Senegal Ba Nafaa activity (2009-2014), which focuses on artisanal fishing and coastal and marine conservation, was designed as a classic biodiversity activity based around USAID's nature-wealth-power framework. When GCC-AD funds were added in year three, the team found it difficult to integrate new adaptation activities with the existing biodiversity activities. The team initiated a VA with the funds, which was quite comprehensive in nature and assessed the sensitivities of some of the critical ecosystems to potential climate shifts. However, the implementation challenge came in identifying local climate vulnerabilities that aligned with ongoing biodiversity conservation and fisheries management activities, limiting their ability to successfully integrate.

The Mekong Adaptation and Resilience to Climate Change (ARCC) – Quantifying the Link Between Shifting Ecosystems and Livelihoods: The Mekong ARCC activity (2011-2016) undertook a comprehensive climate downscaling study in the Mekong River Basin, to identify projected shifts in ecosystems and eco-agricultural zones that impact local livelihoods. In the face of rising average temperatures, these ecosystem boundaries are generally projected to shift upland. The study analyzes how this will likely impact species migration, invasive species, reproductive rates in fisheries, availability of non-timber forest products, and productivity of lowland rainfed rice, among other livelihood assets in the region. Understanding how a shifting climate regime might impact ecosystem services, and thereby livelihoods, will lead toward an analysis of the value of those services for the region, which will help governments to identify smart adaptation and conservation options.

Resilience in the Limpopo River Basin (RESILIM) – Use of the IWRM Approach: The RESILIM activity (2012-2017) was designed using an integrated water resources management (IWRM) framework overlaid with conservation and adaptation objectives. IWRM supports programmatic integration by addressing a critical shared resource, water, when it is vulnerable to climate stressors and essential to biodiversity. Issues, such as water allocation and environmental flow requirements for ecosystem and human needs within a particular catchment, could be addressed within an integrated activity. RESILIM suggests that balancing socioeconomic and ecological needs to optimize land use practices and integrating climate information increases the ability of river basin landscapes to support water flows critical to the integrity of biologically diverse habitat and the corresponding well-being of the population benefiting from its ecosystem services.

Costas y Bosques ("Forests and Coasts" – Ecuador) – Monitoring Red Crabs: The Forests and Coasts activity in Ecuador (2009-2014) works with local crabbing cooperatives whose primary source of income is generated from their respective mangrove concessions. As part of the mangrove concession agreement, crabbing cooperatives are required to capture data on their catch and report it to the National Institute of Fisheries as a means of species monitoring. While the impetus for the activity is tied to biodiversity conservation, the team plans to use the data alongside an analysis of weather trends and water temperatures to monitor potential climate change-driven seasonal shifts and their corresponding impact on crab populations. Indirect GCC-AD results could be attributed to this activity because it uses biodiversity funds to improve the science available to track climate change-related impacts on a natural resource of importance to local livelihoods.

Hariyo Ban ("Healthy Forests"-Nepal) – Ecosystem Restoration as a Co-Benefit Activity: The Hariyo Ban activity in Nepal (2011-2016) identified an invasive species (water hyacinth) as a threat to biodiversity in wetlands and waterways. At the same time, the implementing team realized that local communities are vulnerable to increased flood events, in part due to degraded wetlands and waterways, which exacerbates impacts from large rainstorms.
To address these issues, the team designed a wetland restoration activity to remove invasive species and improve management of rivers and streams.

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