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INTEGRATING BIODIVERSITY AND CLIMATE CHANGE ADAPTATION IN ACTIVITY DESIGN

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This brief is aimed at USAID staff responsible for programming biodiversity conservation and/or global climate change adaptation funds. It highlights strategies to ensure that integrated biodiversity/adaptation programming is done properly and effectively, and that reciprocal co-benefits are captured, where appropriate, when just one of these funding streams is used.

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Cover photo: Livelihoods in Siem Reap, Cambodia. Photo by Apiwat Sukpimontri, USAID

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CHIANG RAI, THAILAND- 2014: Two young boys in northern Thailand's Chiang Rai province slice the bark off a stalk of sugarcane. In this region, the growth of sugarcane and other crops are threatened by rising temperatures and more frequent flooding projected for the near future. Photo by Josephine Green, USAID

INTRODUCTION

In 2012, USAID missions launched 11 new activities receiving both biodiversity conservation (BID) and global climate change adaptation (GCC-AD) funding. Activities using only one of these funding streams are also increasingly seeking to identify **co-benefits** for the other area. 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.

This brief provides recommendations that can be implemented at various stages of the USAID program cycle to achieve appropriate and effective integration. It should also be useful to other funding and implementing organizations. We focus primarily at the activity level, but scoping recommendations and approaches also apply to the project design (PAD) level.[1] For convenience, however, we will only refer to "activities" in subsequent references. Note that we are using a definition of integration that includes a) activities that use both sources of funding, or "integrated programming," and b) activities with only one source of funding (BID or GCC-AD) where there is potential for capturing and reporting co-benefits for the other areas, some of which may qualify as attributions to the other funding source.

This brief is accompanied by four case studies of USAID activities with i) BID and GCC-AD funding, ii) BID funding only and iii) GCC-AD funding only. Approaches and best practices learned from those activities (in the Nepal, Southern Africa Regional, Ecuador, and Asia Regional missions) have informed this brief.

1 In the USAID program cycle, an "activity" is the body of effort undertaken by one agreement or contract, while a "project" is a coherent collection of activities working towards an agreed set of results and outcomes. For more information, see www.usaidlearninglab.org/learning-guide/project-design.

II SHOULD I INTEGRATE?

Integration can amplify an activity's impact and sustainability when done appropriately; however, it can also conflict with the intended goals of adaptation and biodiversity programming when done poorly. Forced integration can result in suboptimal performance in one or both sectors, and complicate management. When considering opportunities for integration, it is important to ask whether it will lead to improved, measurable results and make the sum of an activity greater than its parts. Co-funded, or integrated, programming should take place only when there is a multiplicative effect and activities are consistent with the intended objectives within the individual sectors.

Adaptation funding should be used to address the impact of climate stressors on development priorities, with a particular focus on the human components of a socio-ecological system even when used in combination with biodiversity funding. Biodiversity funding should be used to address the most important threats to biodiversity, which may or may not include climate change. Using key assessments and applying a systems analysis in scoping and activity design can help to decide whether to integrate and to identify strategies and specific interventions that achieve effective and appropriate integrated programming.

MEKONG RIVER- 2007: The Mekong River indirectly supports livelihoods, like this mother and child selling fruit, and cultural ties and serves as a conduit for the transport of people, their goods, services, and ideas.

Photo by Dan Rathbun, USAID

Importantly, activities that use only BID funding should always take account of a changing climate regardless of whether GCC-AD funding is available. This is simply good conservation practice. These activities may or may not have co-benefits that are attributable to GCC-AD funding according to the definition of the funding requirements. Similarly, GCC-AD activities may or may not have co-benefits that are attributable to BID funding. Indirect attributions and their requirements will be discussed further in Section III.

Use assessments to scope rationale and potential opportunities for integration. Development priorities, problems and opportunities should flow out of critical assessments including the congressionally mandated tropical forests and biodiversity assessment (118/119)[2] or a more detailed, broader Environmental Threats and Opportunities Assessment (ETOA), and a climate vulnerability assessment (VA).[3] If these assessments do not exist at the scoping stage, they must be included as early as possible within the design or implementation stage. Appropriate integration opportunities may arise during these analyses, or other non-integrative approaches may be recommended.

Including cross-sectoral considerations in 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 potential climate stressors may exacerbate existing threats to biodiversity or introduce new threats over time. Likewise, a VA that considers the vulnerability of key ecosystems to climate change and includes some consideration of ecosystem-

2 For guidance and examples for the 118/119 assessments, see www.usaid.gov/biodiversity/impact/country-profiles. A paper on integrating adaptation into these assessments is being completed by the Africa Bureau.

3 A 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 and even preferable in terms of saving time and resources. The E3/GCC Office and regional bureau climate advisors are available to help assess existing VAs or design new ones. Also see USAID's Climate Vulnerability Assessment: An Annex to the Climate-Resilient Development Framework (will be available at www.climatelinks.org).

based adaptation approaches (see Mekong ARCC case study) can facilitate an integrated design. When relevant, it is advisable for the VA to address more subtle climate stressors such as 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. We recommend using some version of a systems analysis to 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 (see Concept Models for Integration). A systems analysis may also reveal other development threats and opportunities that can inform the decision of whether or not integration makes sense.

ECUADOR- 2010: A boy in a crabbing community in the Gulf of Guayaquil. Photo by USAID

III BIODIVERSITY AND ADAPTATION FUNDING PARAMETERS

Funding Requirements

Assuming that it makes sense to pursue integrated biodiversity and adaptation programming, the activity must still be designed and implemented within the constraints imposed by USAID funding streams. Below, we briefly review the requirements for biodiversity and adaptation funding to ensure appropriate programming.

Biodiversity

USAID has a Biodiversity Code[4] to ensure that the Agency meets the intentions of the legislative imperative to support global biodiversity conservation. The congressional biodiversity earmark was $250 million for fiscal year (FY) 2015. The Code has four key criteria, all of which must be met if the biodiversity funds will be attributed to the earmark:

- The activity must have an explicit biodiversity objective; it isn't enough to have biodiversity conservation result as a positive externality from another activity.
- Interventions must be identified based on an analysis of drivers and threats to biodiversity and a corresponding theory of change.
- Site-based interventions must have the intent to positively impact biodiversity in biologically significant areas.
- The activity must monitor indicators based on the stated theory of change for biodiversity conservation results.

Activities using funds not earmarked for biodiversity, with or without a biodiversity objective but otherwise meeting the requirements of the Code, may be attributed as indirect biodiversity programming.

GCC Adaptation

GCC-AD funds must be spent on activities where the explicit, primary goal or objective is increasing the resilience of people, places and livelihoods to climate change, and should respond to a particular climate stressor(s). Activities with focused GCC-AD funds should directly support one or more of the following Intermediate Results (IRs) from USAID's Climate Change and Development Strategy:

- Improve access to science and analysis for decision making;
- Establish effective governance systems to address climate risks;
- Identify and promote actions that increase resilience to climate change.

Generally speaking, GCC-AD funds should have an additive effect, leading to something being done differently than under a business-as-usual scenario. They should not be used to support activities that could be carried out with other types of funding.

Adaptation activities that are funded without GCC-AD money are also encouraged to support the above IRs. To be attributed as indirect adaptation programming, they should have the effect of increasing the resilience of people, places and livelihoods to climate change. All adaptation activities, whether they use direct funding or are indirectly attributed, should be informed by a vulnerability assessment, existing or new. Consult the Supplementary Guidance for Global Climate Change, which is an annex to the annual Operational Plan Guidance, for the latest requirements.[5]

4 For more information about requirements and best practices for biodiversity programming, consult the USAID Biodiversity Policy (**http://www.usaid.gov/biodiversity/policy**) and the Biodiversity Handbook (**www.usaid.gov/biodiversity/impact/tools-and-guidance**).

5 Available at **https://programnet.usaid.gov/topics-sectors/global-climate-change** (link for USAID staff only).

Funding Models for Integration

A review of ongoing activities in USAID identified two primary funding models being used in the design of integrated biodiversity and adaptation activities: i) both sources of funding, i.e. co-funding or integrated programming; and ii) single funding source with co-benefits, attributable or not. Along with the following sections, a Decision Tree included in an annex to this document may be useful in reviewing potential options.

Co-funding

Used together, BID and GCC-AD funds can synergistically address different vulnerabilities and threats across time horizons, geographic areas, and/or sectors within a single project or activity.

Where a biologically significant geographic area has ecosystem services that can help to reduce a specific climate change stressor or vulnerability for the benefit of people and/or livelihoods, the two funding sources can address threats on different temporal scales to achieve more sustainable results. For example, in a mangrove ecosystem, BID funds could be mobilized to address current direct threats, such as overharvesting for fuelwood, illegal fishing and conversion to aquaculture. Meanwhile, GCC-AD funds can address longer-term climate risks for nearby communities – for instance, by supporting improved coastal zone management and the restoration of degraded mangrove areas to reduce the threats of more intense storms, saltwater intrusion into crops and sea level rise.[6]

If the funding streams are being applied in different geographic locations, or the GCC-AD funds are being used to support activities at a national scale while the BID funds are being used to support activities at a more local scale, then the interventions can still be coordinated and explicitly linked through objectives such as improving basin-scale management, institutional capacity, governance, access to relevant climate information or ecological connectivity. Note that spatial segregation of biodiversity and adaptation interventions can pose challenges for managing an integrated activity. Here again, we advise using a systems analysis to detail the appropriate connections and make those connections explicit within the overall objective. See Section V for more suggestions.

In the annex, the Hariyo Ban and RESILIM case studies fit the co-funded design model, with examples of both co-localized integrated interventions and spatially segregated but linked biodiversity and adaptation interventions.

BARDIYA, NEPAL- 2013: A member of the Community Based Anti-Poaching Unit (CBAPU) patrols the Shiva Community Forest in Suryapatuwa, bordering the Bardiya National Park. Members of CBAPU are being offered trainings to better their life prospects and encourage participation in conservation.

Photo by Nabin Baral for USAID

6 It is important to select sites and species for restoration that will be resilient to climate change impacts themselves, such as sea level rise or decreased salinity.

Single Funding Source with Co-Benefits

Biodiversity Funding with Adaptation Co-Benefits: With BID funds, interventions must be designed to reduce important threats to biodiversity. As noted before, all biodiversity programming should consider the impacts of climate change; it is best practice. When climate change is identified as a primary threat to biodiversity, adaptation strategies can be developed and applied using biodiversity funds. Design teams should remember to weigh climate change against other threats, and consider where USAID has a strategic advantage. If there are more urgent and significant threats to biodiversity than climate change, then they need to be given the priority for the use of BID funds.

One should not assume that all conservation or natural resource management (NRM) activities and interventions, including those that help biodiversity or ecosystems adapt to climate change, qualify for indirect attribution to GCC-AD results. While healthier and better managed ecosystems are generally more resilient to climate change, you must be able to respond "yes" to the following questions to attribute GCC-AD co-benefits:

- Does the activity have the effect of reducing the vulnerability of people to an identified climate change risk?
- Is the activity informed by a vulnerability and adaptation assessment, existing or new?
- Does the activity report on one of the required standard indicators, e.g., number of stakeholders [individuals] with increased capacity to adapt to the impacts of climate change?

The Operational Plan (OP) Guidance provides further information on indirect GCC-AD attributions.

In the annex, the Forests and Coasts case study provides an example of this funding model.

Adaptation Funding with Biodiversity Co-Benefits: Adaptation programming is not sector-specific and can take many forms. USAID's approach emphasizes that GCC-AD funding should address key development goals/priorities and begin from a VA. Incorporating ecosystem-based adaptation approaches to address specific climate vulnerabilities of the country or region's development priorities may be a promising entry point for integration. However, design teams should consider these approaches next to other adaptation approaches, and consider whether USAID has a strategic advantage and an opportunity to achieve lasting impacts. Again, not all adaptation activities with a focus on ecosystem approaches will have a biodiversity co-benefit. Even where there is a benefit to biodiversity, in order to qualify for indirect BID funding attribution, actions must meet the criteria of the Biodiversity Code (see Section III) with the exception that they do not need to have an explicit biodiversity conservation objective. You should be able to respond "yes" to the following questions:

- Was the activity identified based on an analysis of drivers and threats to biodiversity and a corresponding theory of change?
- If site-based, does the activity have the intent to positively impact biodiversity in biologically significant areas?
- Will the activity monitor indicators based on the stated theory of change for biodiversity conservation results?

Consult the OP Guidance for further information on indirect GCC-BID attributions.

In the annex, the Mekong ARCC case study provides an example of this funding model.

Why Indirectly Attribute?

You may ask yourself why go through the steps to determine whether an activity has indirect attributions to either GCC-AD or BID funding. You may wonder whether it isn't enough to have considered either adaptation or biodiversity co-benefits in your programming without reporting an indirect attribution. However, indirect attributions are very valuable for both types of programming; they help tell a story about the results of your projects, which demonstrates the success of your work and helps USAID/Washington to identify how to better support you. They enable USAID to demonstrate the reach of our funding streams to Congress, the U.S. public and the international community, which can help build support and justify continued programming. They also enable us to tell our story as an Agency of how we are supporting biodiversity and climate change efforts globally; for example, indirect attributions to GCC-AD funding are shared during the international climate change negotiations to demonstrate the breadth of the actions that the U.S. is supporting.

KHAMMOUAN PROVINCE, LAO PDR- 2014: A woman searches for tadpoles in the river, a source of protein that the community enjoys in soup or stir-fried dishes. Tadpoles are just one of many food sources that people in this community derive directly from their surrounding natural environment for their well-being. Photo by Lenkate Saenghkaew, USAID

IV CONCEPTUAL MODELS FOR INTEGRATION

Once funding parameters are clear, a critical step in activity design is establishing an overarching conceptual model or framework. The following examples may be helpful in developing an integrated activity.

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.[7] 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 interventions.

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 always take account of a changing climate. It may be possible to develop activities that support the adaptation of species and ecosystems to climate change, such as protecting areas that are less vulnerable (known as "refugia") or altering approaches to fire management. (Note that because this is good conservation practice, it should be done using just BID funding; GCC-AD funding should not be used to implement activities which do not provide a clear adaptation benefit to people.)

E3 staff can provide support on how to apply available funding appropriately to develop activities based on these models.

LIMPOPO RIVER ESTUARY- 2014: Mangroves in the Limpopo River Estuary are under threat from land use change, more frequent high floods, and a growing population that uses the wood for fuel and construction. The Centre for the Sustainable Development of Coastal Zones, with support from RESILIM, is actively working to replant and conserve mangrove ecosystems in the estuary.

Photo by Lara Rall for USAID

7 A good database of such activities is maintained by the UN Framework Convention on Climate Change's Nairobi Work Program. http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/6227.php

V INTEGRATED DESIGN PROCESS ESSENTIALS

Integrated activity design requires a sound conceptual approach. Design teams should keep in mind the following fundamentals as they begin this process.

Think about Timescales. Are you trying to increase resilience to recurring extreme events, like floods or droughts, or prepare for longer-term changes like sea level rise? Is your goal to protect existing sites from climate impacts, or map out which areas may be more resilient to future change? Sometimes the same interventions will contribute to both objectives, or interventions can be linked but accomplished using different funding sources (see Co-funding discussion). Identifying activities that build resilience across multiple time scales is ideal, as they may contribute to shorter-term disaster risk reduction (DRR) and longer-term adaptation outcomes, and increase the sustainability of conservation efforts.

Make Smart Site Selections. Design teams should consider landscapes/seascapes where biodiversity converges with areas where people are vulnerable to climate change impacts or depend significantly on ecosystem services. Good potential sites could include:

- Sites where biodiversity and people are both highly vulnerable to a shared climate change impact, such as river basins that are expected to see increased variability of flows and more frequent floods and droughts (e.g., Southern Africa Regional's SAREP and RESILIM activities);
- Sites where vulnerable and biodiverse ecosystems provide important goods and services to people, such as freshwater fisheries (e.g., RDMA's Mekong ARCC and Cambodia's HARVEST activities);
- Sites where biodiverse ecosystems have the potential to buffer projected impacts of climate change, such as mangrove forests and wetlands which can help mitigate storm surge (e.g., Vietnam's Forests and Deltas activity).

It is important to remember that the ecological values of a given landscape/seascape may already be changing due to climatic factors. Today's conservation hotspots may look very different in the future; site selection and activity design should take account of this where possible. One useful approach may be to identify and focus on climate refugia (where particular ecological functions are more likely to persist despite projected climate changes) and/or corridors that facilitate migration of key species. Another approach is to develop activities that focus on sustaining particular ecosystem values or services and that can be managed more dynamically if those values or services move within or between landscapes. With site-based programming, it is important to remember that the Biodiversity Code stipulates that site-based programs must have the intent to conserve biologically significant areas.

Create Multidisciplinary Design and Implementation Teams. On the design side, a scoping/design team should include an adaptation specialist and a biodiversity and ecosystems expert, where possible. On the implementation side, it is critical to consider the technical composition and management structure of the consortium implementing an integrated activity. For example, a current USAID activity, which has a conservation non-governmental organization (NGO) heading the biodiversity component and a community development NGO leading the adaptation component, has struggled to integrate effectively due to differing organizational priorities and approaches. A team with the prime contractor or lead partner taking an overall integrating role by overseeing technically focused sub-grantees may obtain better results. Some even suggest including an integration specialist position among the key personnel to act as a neutral and objective arbitrator in driving integrated programming.

Avoid Stovepiping in the Results Framework. Disaggregating activity components by funding streams may lead to easier reporting and logistics, but it may also hinder activity integration and success. Design teams should consider including an integrated activity objective

within their results framework (RF) and integrated results within the sub-IRs, to encourage a strong focus on integration from the outset. See the RESILIM case study for an example of an integrated objective that maintains funding objectives with each IR but also incorporates integration throughout the RF.

Use Custom Indicators. Standard indicators are designed to roll up across the Agency for high-level reporting, but can be poor indicators for activity-level monitoring and integration. Indicators should be derived from your (integrated) results framework and theory of change for the activity. Integrated indicators can bind together a diverse team around a shared goal and prioritize integration. Creating custom indicators can also help build integration into the monitoring and evaluation (M&E) system and show more detailed impact. For example, the Mekong ARCC's M&E plan includes measuring the number of *community adaptation plans completed across five to six representative ecosystems across the Mekong River Basin*. This situates adaptation planning within an ecosystem framework, helping drive integration at the activity level.

Carry Out Additional Analyses When Appropriate. You may have already carried out certain required assessments to assist with activity design. If a 118/119 or VA is not available, then it should be completed as soon as possible. Additional, more focused analysis may be warranted during the design stage or the early stages of implementation, as a way to further prioritize activities. This could include additional systems analysis, a more focused assessment of biodiversity threats and key ecosystem services, a more focused VA that looks at a smaller geographic unit or a specific sector, or an adaptation options analysis that includes consideration of ecosystem-based approaches.

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 adaptation results to activity interventions, actions must explicitly seek to measurably reduce vulnerability and increase resilience to specific climate threats identified in a VA. For example, choosing a

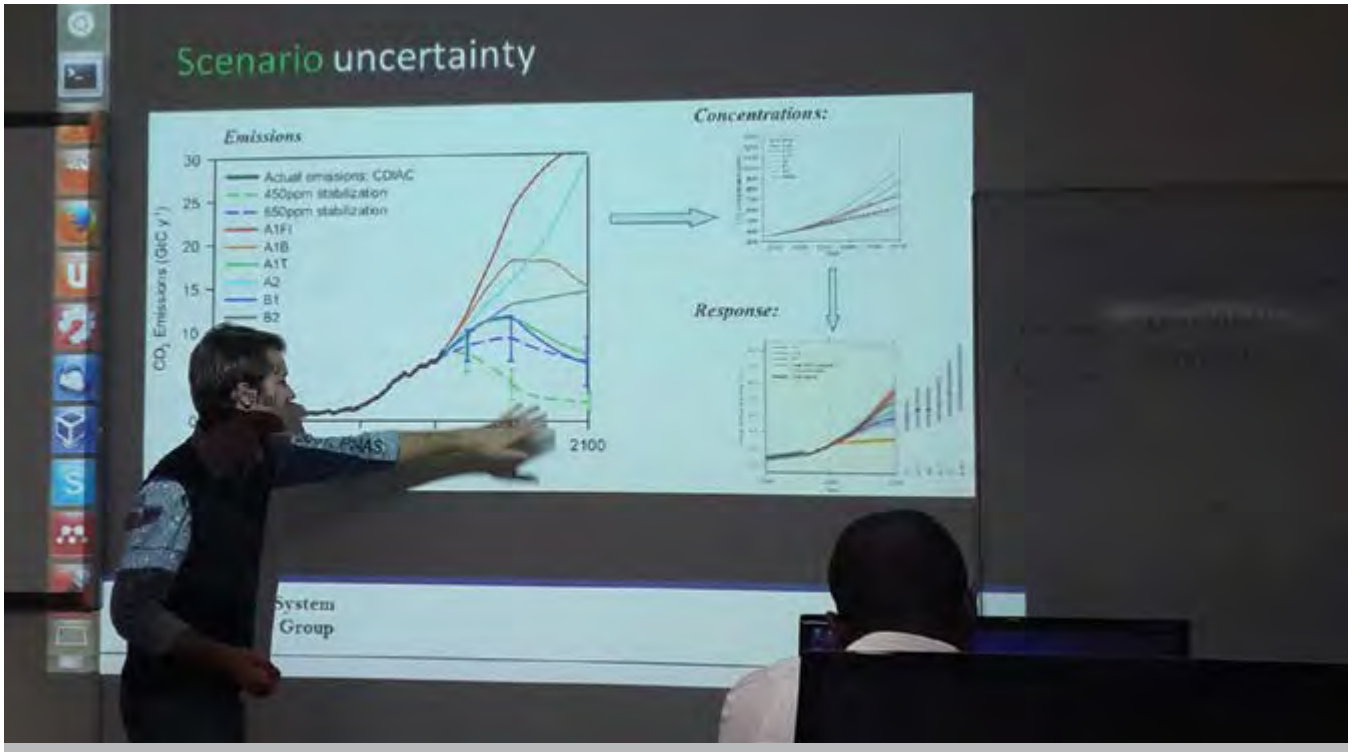
The Challenge of Integrating in Mid-Stream – Gambia-Senegal Ba Nafaa

The Gambia-Senegal Ba Nafaa activity (2009-2014), which focused 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, it was challenging to identify local climate vulnerabilities that aligned with ongoing biodiversity conservation and fisheries management activities, limiting the ability to successfully integrate at an implementation level. This suggests the importance of integrating at the design phase of an activity, where appropriate, and not in mid-stream.

mangrove site based on the diverse benefits provided to surrounding communities does not mean activities there are necessarily achieving adaptation outcomes. The team should consider critical questions, such as: 'What are the most important development threats facing those sites, both climate and non-climate?' 'Have we identified and prioritized critical climate change stressors in this landscape, such as storm surge, increased flooding, or sea level rise?' 'Are the mangroves likely to reduce the impacts of those stressors to nearby people and infrastructure?' and 'Is this particular mangrove area viable in the future given potential climate change impacts?'

Conversely, one cannot assume that adaptation interventions automatically contribute to biodiversity results. For the mangrove example, the team should also ask: 'Have the sites chosen been identified as biodiversity priority sites?' 'Did our interventions reduce the identified and prioritized threats to mangrove biodiversity?' (These may or may not be different from threats to the climate-related services provided by the mangrove area.) This will help clearly articulate real integration opportunities from the outset rather than assuming that the two will converge upon implementation – which can lead to incorrect attribution.

See the Single funding source discussion for additional questions to answer to qualify for indirect attributions.



UNIVERSITY OF CAPE TOWN, SOUTH AFRICA- 2013: RESILIM co-hosted the Using Climate Information for Adaptation and Policy Development course at the University of Cape Town. The training raised the awareness, built capacity and created dialogue with and among policy and other decision makers and stakeholders, in an attempt to influence the increased integration of climate change adaptation strategies into long-term management plans and climate change adaptation policies. Participants indicated their enriched appreciation and understanding of not only the environment but also the economic and social sectors of the basin which are more exposed and sensitive to the threats of climate change.

Photo by Lara Rall for USAID

VI INTERVENTIONS WITH HIGH POTENTIAL FOR INTEGRATION

In this section, we move from the activity design to a focus on specific interventions. The following examples are representative of actions being undertaken in current USAID field activities focused on biodiversity conservation and adaptation. Note that some of these illustrative examples could be applicable to multiple funding models (co-funding or single-source), depending on the programmatic circumstances and the recommendations from guiding analyses (118/119 and VA) and prioritization processes.

Ecosystem Valuation for Decision-Making: As ecosystem services have become a more recognized concept, there has been a growing interest in how to demonstrate their value to policy-makers 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 intervention. 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.

Mekong ARCC – Quantifying the Link Between Shifting Ecosystems and Livelihoods

The Mekong Adaptation and Resilience to Climate Change (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 could impact local livelihoods. In the face of rising average temperatures, these ecosystem boundaries are generally projected to shift upland. The study analyzes how this is likely to impact species migration, invasive species, reproductive rates in fisheries, availability of non-timber forest products and productivity of lowland rain-fed rice, among other livelihoods-related goods and services. Understanding how a shifting climate regime might impact ecosystem services and thereby livelihoods will contribute to an analysis of the value of those services for the region, which will help governments to identify smart adaptation and conservation options.

MEKONG DELTA, VIETNAM- 2007: A farmer crosses a field in the Mekong Delta where sea level rise threatens production of rice. Rice is a key local source of subsistence food in this region. Irrigation of rice paddies is the leading use of water in the Lower Mekong Basin. Diversions threaten downstream water flows for biodiversity and people as agriculture continues to intensify.

Photo by Dan Rathbu, USAID

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 we have encouraged 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 and box 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 and economic development 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 reduce the vulnerability of local communities who depend on those resources.

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 by balancing socioeconomic and ecological needs to optimize land use practices, and integrating climate information, river basin landscapes will be able 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.

LIMPOPO RIVER ESTUARY-2014: Communities living in the estuary rely on fish and other aquatic animals such as crabs and prawns for food and income. Mangroves provide a habitat and breeding environment for this marine life.

Photo by Lara Rall for USAID

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 relative to other, non-climate stressors. Climate-related 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 climate stressors and their impact on key species - like red crab stocks in coastal Ecuador (see Forests and Coasts box below) – and can begin identifying adaptation responses themselves. Furthermore, climate data collected by local communities can contribute to larger datasets being maintained by national governments, universities or research initiatives.

Sustainable Agricultural Practices: Helping farmers to adopt methods that reduce 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 BID funding). Reducing land conversion contributes to improved watershed management around critical habitats while also potentially providing a buffer for people against storms and/or 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.

Forests and Coasts (Costas y Bosques, Ecuador) – Monitoring Red Crabs

The Forests and Coasts activity in Ecuador (2009-2014), worked 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 used 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.

ECUADOR- 2011: A red crab is measured. Crabbers learn how to measure their catch to monitor stocks for a more sustainable fishery.
Photo by USAID

Ecosystem Management and Restoration: Activities in this area might include interventions such as restoring corridor connectivity, removal of invasive species, reforestation on degraded lands or fire line maintenance. While reducing threats to biodiversity, these activities can also maintain ecosystem services, improve livelihoods and increase ecosystem resilience so they can serve as a buffer against climate-related impacts for nearby communities. Since many of these activities deal primarily with non-climate stressors, any GCC-AD funding would need to be paired with BID 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 ecosystem 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.'

Hariyo Ban (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 were vulnerable to increased flood events, in part due to degraded wetlands and waterways that exacerbated impacts from large rainstorms. To address these issues together, the team designed a wetland restoration activity to remove invasive species and improve management of rivers and streams.

NAMUNA BUFFER ZONE COMMUNITY FOREST IN AMALTARI, NAWALPARASI DISTRICT IN NEPAL- 2013: Men and women work to clear dense water hyacinth and water cabbage growth from a small section of the Sano Narayani (known locally as Bhutaha Dhaab) river. The water source has become severely depleted, and is now little more than a pond.

Photo by Pallavi Dhakal for USAID

VII CONCLUSION

The first years of USAID's Global Climate Change Initiative have revealed some of the potential benefits and challenges of integrating adaptation and biodiversity programming. Missions rightly have an increasing interest in integrated programming but need to think carefully about whether, why and how to integrate. Many challenges have originated from forced integration, or from adding a new funding stream in the middle of an activity. When possible, future activities should enable integration from the outset rather than trying to back into it later. We encourage readers to refer to the case studies that accompany this document for more detailed examples of successes and challenges in designing integrated activities.

The intersection between adaptation and biodiversity will continue to evolve in USAID programming. As current USAID activities test various approaches – such as climate modeling, ecosystem valuation, decision support tools and systems analysis – future activities will benefit from new evidence on the effectiveness of those approaches, as well as emerging trends in integration. We need to establish a learning cycle and maintain the dialogue between Washington and missions to collect better examples, iterate on the best results for frameworks and indicators, and decrease the management burden of integration.

We encourage readers to reach out to E3 staff in Washington to share experiences and lessons learned from integrated activities, including specific examples of results frameworks and indicators. E3 staff can provide relevant tools, guidance, trainings and technical support, and will continue to develop additional resources that can assist missions with the design and implementation of successful integrated activities.

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TANAHUN, NEPAL- 2012: Water scarcity in Huslangkot made the area one of the most vulnerable to climate change. As part of a Community Adaptation Plan of Action, solar powered pumps were installed to bring water to the community so women and children didn't have to walk for hours to fetch water.

Photo by Nabin Baral for USAID

KEY TERMS

climate stressors
Climate factors that can affect the functioning of a system.

climate change vulnerability
The predisposition to be adversely affected by climate stressors. It is a function of a system's exposure, sensitivity, and adaptive capacity.

climate vulnerability assessment (VA)
A review or analysis of how specific human and natural systems are vulnerable to projected shifts in climate (e.g. temperature and precipitation regimes) and extreme weather events.

co-benefits
Positive impacts that occur in addition to the primary goal of an activity or intervention. In many cases, these additional benefits can be just as important as the primary benefit and projects and policies can be explicitly designed to maximize specific co-benefits.

ecosystem services
Functional benefits provided to people by intact ecosystems, classified in four categories that include provisioning, regulating, supporting, and cultural benefits.

ecosystem-based adaptation
The use of biodiversity and ecosystem services to improve the resilience of people and communities by reducing their vulnerabilities to the effects of climate change.

integrated design
Framing an activity to pursue multiple objectives – adaptation and biodiversity objectives, for example – and thereby enabling an implementation team to identify interventions that contribute to both sets of objectives.

systems analysis
A conceptual approach of considering the connections and interactions within an entire system - ecosystems, hydrological systems, political and socioeconomic systems, etc. - to identify pressure points, key relationships, and the system-wide consequences of interventions.

RESOURCES

USAID. *Biodiversity Policy.* 2014.
http://www.usaid.gov/sites/default/files/documents/1865/USAIDBiodiversityPolicy.pdf

USAID. *Biodiversity Handbook.* 2015.
www.usaid.gov/biodiversity/impact/tools-and-guidance

USAID. *Climate-Resilient Development: A Framework for Understanding and Addressing Climate Change.* 2014.
pdf.usaid.gov/pdf_docs/PBAAA245.pdf

USAID. *Integrating Adaptation into Biodiversity and Forestry Assessments and Programming.* Forthcoming.

United Nations Framework Convention on Climate Change. *Database on Ecosystem-Based Approaches to Adaptation.* http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/6227.php

The World Bank. *Convenient Solutions to an Inconvenient Truth: Ecosystem-Based Approaches to Climate Change.* 2011.
http://siteresources.worldbank.org/ENVIRONMENT/Resources/ESW_EcosystemBasedApp.pdf

WWF. *Buying Time: A User's Manual for Building Resistance and Resilience to Climate Change in Natural Systems.* 2003.
http://d2ouvy59p0dg6k.cloudfront.net/downloads/buyingtime_unfe.pdf

Millennium Ecosystem Assessment.
http://www.millenniumassessment.org/en/index.html

Secretariat of the Convention on Biological Diversity. *Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change.* 2009.
https://www.cbd.int/doc/publications/cbd-ts-41-en.pdf

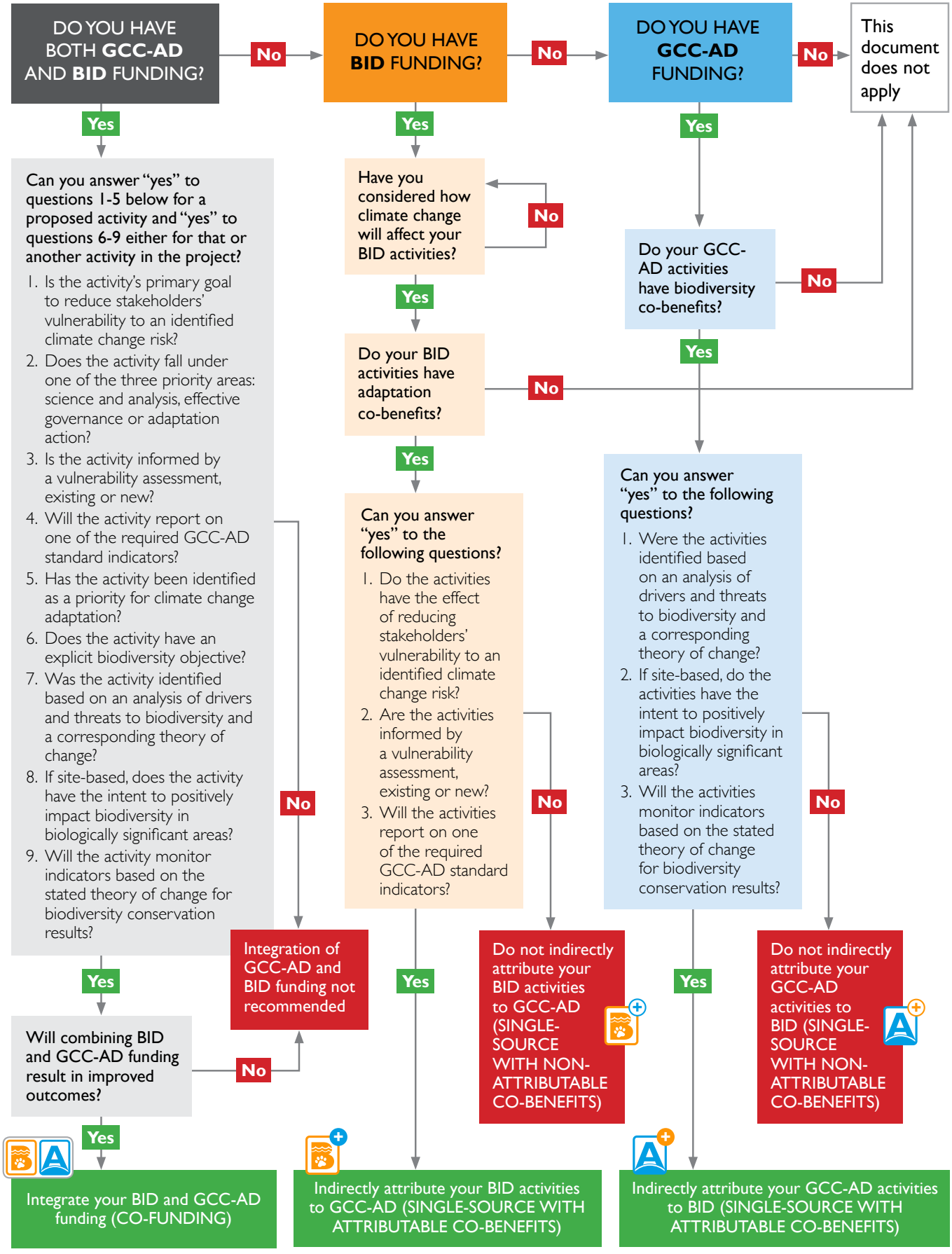
The Environmental Law Institute. *Strategic Options for Adapting Biodiversity Management to Climate Change.* 2011.
http://www.eli.org/sites/default/files/eli-pubs/d21-05.pdf

IUCN *climate change publications.*
http://www.iucn.org/about/work/programmes/gpap_home/gpap_capacity2/gpap_pub/gpap_natsolpub/index.cfm?uPage=1

Adaptation Learning Mechanism.
http://www.adaptationlearning.net

Climate Prep. http://www.climateprep.org/

ANNEX: DECISION TREE FOR INTEGRATION DECISIONS



MEKONG RIVER- 2013: Sunset over the Mekong River, which indirectly supports livelihoods and cultural ties as a conduit for the transport of people, their goods, services, and ideas. Photo by Paul Hartman, USAID

MEKONG ADAPTATION AND RESILIENCE TO CLIMATE CHANGE (MEKONG ARCC)

USAID RDMA (REGIONAL DEVELOPMENT MISSION FOR ASIA)

Funding: GCC-AD
Integration Model: Single source with potential co-benefits

Placeholder Photo

MEKONG DELTA- 2010: A fisherman casts his net. The Mekong River supports highly biodiverse fisheries that are vulnerable to climate change. Photo by USAID

SUMMARY

Mekong Adaptation and Resilience to Climate Change (Mekong ARCC) is a five-year activity (2011-2016) focused on identifying and responding to social, economic and environmental vulnerabilities to climate change in the four Lower Mekong Basin (LMB) countries. It is implemented by a consortium of partners led by Development Alternatives Incorporated (DAI), the International Center for Environmental Management (ICEM) in Hanoi and the World Resources Institute (WRI). The impetus for the activity was the 2009 launching of the Lower Mekong Initiative, which emphasizes close cooperation between the United States and Thailand, Cambodia, Lao PDR and Vietnam to support regionally sustainable and environmentally responsible growth.

Funded entirely by GCC-AD funds, Mekong ARCC was designed as a pioneering USAID investment in "applied climate science," with the central objective of linking high-level climate science with on-the-ground, community-led responses to a changing climate. As the Mekong River is the lifeline of the agricultural systems and fisheries in the basin, Mekong ARCC focuses on reducing climate-related threats to communities dependent upon agricultural and ecological systems through an ecosystem framework that integrates climate change adaptation and rural income generation initiatives.

As a relatively early GCC-AD activity, a core challenge has been the lack of documented best practices to follow; translating climate science projections into practical community-based decision support tools is a work in progress throughout the adaptation space. To advance these efforts, the Mekong ARCC team spent the first 18 months generating a comprehensive study: the ***Climate Change Impact and Adaptation Study for the Lower Mekong Basin***. The study applied a mix of downscaled climate, land use suitability and hydrological models to illustrate projected shifts in LMB ecosystems due to climate change and explained how shifting ecosystems may impact key income-generating sectors such as agriculture, livestock, fisheries and non-timber forest products (NTFPs) – all critical to LMB livelihoods.

In its field phase, Mekong ARCC is translating key messages from the study into community planning tools to provide a practical evidence base for community-level adaptation decision making. Field sites seek to capture best practices from ecosystem-based adaptation approaches[1] in a variety of LMB ecosystems. The team anticipates that this will help showcase the biodiversity, livelihoods and social co-benefits from reducing climate vulnerabilities through the use of ecosystem-based adaptation.

During Mekong ARCC's early stages, the implementing team (alongside stakeholders and beneficiaries) gained an understanding of pitfalls and best practices in adaptation programming. As the activity transitioned towards full implementation, the team learned key lessons such as how to drive cross-sectoral adaptation planning through an ecosystems lens. The following sections detail Mekong ARCC from the design stage to early achievements and lessons learned, helping to inform smart strategies for designing future ecosystem-based adaptation programs with biodiversity co-benefits.

CENTRAL CAMBODIA- 2010: The USAID Mekong ARCC Climate Impact and Adaptation Study for the Lower Mekong Basin projects that communities in Cambodia will experience wetter wet seasons and drier dry seasons, in addition to rising temperatures. These changes will negatively impact their yields of rice, cassava and soybean, and lead to more frequent flash floods. Photo by USAID

1 The use of biodiversity and ecosystem services to improve the resilience of people and communities by reducing their vulnerabilities to the effects of climate change.

II ACTIVITY DESIGN

Mekong ARCC was designed to advance adaptation programming by identifying and applying methods to incorporate the best available climate science into community-level planning, with a focus on the rural poor and ecologically sensitive areas of the LMB. As articulated in the RFP, emerging climate modeling techniques were beginning to support the shift from making broad qualitative statements to more quantitative ones; however, "*despite the availability of these tools, there has not been wide application to provide guidance to i) vulnerable communities, like those in the Mekong River basin, or ii) major development initiatives in water resources, agriculture and livelihoods, which are moving forward based solely on historical data.*"

With this in mind, and using GCC-AD funds, RDMA's lead – a newly hired climate change adaptation advisor with a background in civil engineering – set out to create the mission's first full climate change adaptation activity. The basic concept and focus of the design were derived from priorities set out in the *Asia-Pacific Regional Climate Change Adaptation Assessment*, published by USAID in April 2010.[2] The mission design team credits a report written by the International Center for Tropical Agriculture on climate change and coffee,[3] which highlights the sensitivity of coffee to shifting eco-agricultural zones, as the genesis of the idea to frame Mekong ARCC around climate impacts on agricultural systems and ecosystems upon which local communities depend.

Because ecosystems can provide benefits for livelihoods and buffer the impacts of extreme weather events, the design team posited that using an ecosystem framework would help integrate climate change adaptation and rural income generation initiatives in the LMB. Further, they sought to achieve sustainability by building in an objective to complete a pre-feasibility study for an ecosystem-based adaptation investment project – one that relies on the vibrancy of natural systems to reduce people's vulnerability to climate risks – that could access funding from international climate financing facilities. Since these facilities may award funds to adaptation programs with the best benefit-to-cost ratio, the design suggested that capturing the economic benefits of adaptation projects, in part through the use of ecosystem service valuation, would help LMB governments access emerging sources of climate finance.

As Mekong ARCC uses only GCC-AD funding, the design was not constrained by other funding parameters. However, one notable challenge from an internal procurement standpoint was the push to justify how this effort would be more than another assessment-based regional learning activity. To address this, the design team included in the scope a detailed plan to connect the research agenda (critical to building the evidence base for an integrated adaptation approach) with proof-of-concept actions at the regional and community levels.

In the final design, the team sought to highlight the importance of achieving outcomes in rural livelihoods, food security and disaster risk reduction derived from ecosystem services (fisheries, NTFPs, etc.), all nested within the context of two primary climate change risks: shifting eco-agricultural zones and increased extreme weather events. The biodiversity dimension was articulated in the design through the lens of preserving biodiversity that provides ecosystem services to people. In sum, cross-sectoral integration of activities was implicit from the outset, and would ultimately help inform the site selection process for field activities.

Theory of Change

The overall objective of Mekong ARCC is to "*increase adaptive capacity and resilience of communities to the negative impacts of climate change.*" The design itself challenged the activity to serve as the nexus between climate science and community decision making – an approach in need of testing and refining during this early phase of USAID GCC-AD programming. The theory of

2 *Asia-Pacific Regional Climate Change Adaptation Assessment; Final Report: Findings and Recommendations,* 2010, http://pdf.usaid.gov/pdf_docs/PNADS197.pdf

3 *Predicting Impact of Climate Change on Coffee Supply Chains,* International Center for Tropical Agriculture, 2010, http://www.uci.ac.cr/descargas/conferencias/Predicted-impact-of-climate-change-on-coffee-supply-chains.pdf

change suggests that if a team can move beyond broad projections and create practical strategies for applying findings from a scientifically rigorous basin-wide climate downscaling study, then local leaders could begin to incorporate future scenarios into their decision-making processes.

Activity Framework

Building from this theory of change, the Mekong ARCC design was nested within the mission's overarching Strategic Objective *Improved Response to Environmental Challenges in Asia*. The diagram below shows the original design and expected outcomes and outputs:

To achieve these outcomes, the activity framework includes three core tracks of work designed to channel scientific research into field and policy-level decision making. Each is framed around ecosystems, which underpins the potential for adaptation activities to yield co-benefits for biodiversity.

1. Conduct a Climate Change Impact Study: Carried out in partnership with regional research centers and universities, the study focused on how shifting temperature and precipitation patterns are likely to impact important ecosystems in the Lower Mekong Basin, whose shifts will in turn impact key livelihood-generating sectors such as agriculture, livestock, fisheries and NTFPs.

SO 4: IMPROVED RESPONSE TO ENVIRONMENTAL CHALLENGES IN ASIA

PROGRAM OBJECTIVE: To identify and respond to the environmental, economic, and social vulnerabilities to climate change in the four Lower Mekong Basin countries

IR 1: Enabling Conditions Improved	**IR 2:** Human and Institutional Capacity Strengthened	**IR 3:** Model Actions Demonstrated	**IR 4:** Regional Networks Strengthened
INDICATORS			
1.1 # of laws, policies, strategies, plans, agreements or regulations addressing Climate Change Agreement (CCA) proposed, adopted, and implemented	**2.1** # of stakeholders with improved capacity to adapt to CC **2.2** % reduction in childhood malnutrition **2.3** # of CCA activities designed to reduce gender specific vulnerabilities	**3.1** # of CCA tools technologies, and methodologies developed, tested, and/or adopted	**4.1** # of regional platforms created or strengthened

EXPECTED OUTPUTS

a. *A CC impact and adaptation study for agriculture subsectors, livestock, & ecosystems in the LMB completed.*

b. *National sectoral policies developed to specifically value ecosystem services in economic development planning for each of the four riparian lower Mekong Basin countries; namely, Cambodia, Lao PDR, Thailand and Vietnam.*

c. *Integrated adaptation plans developed for five to six representative ecosystems and implemented in at least five to six communities located in those ecosystems with at least one project in each of the four lower riparian countries.*

d. *Methodologies for integrated ecosystem-based adaptation in at least five distinct ecosystems developed and field tested.*

e. *A regional learning platform sustained to serve as a knowledge center for integrated ecosystem based adaptation.*

2. Pilot Adaptation Interventions: Through a mix of pilot programs across representative ecosystems within the basin, the team is working to translate key messages from the study into community planning tools that provide a practical scientific base for community-level adaptation decision making, where feasible ecosystem-based adaptation approaches can be used to highlight cross-sectoral benefits.

3.Value Ecosystem Services in Economic Planning for the Lower Mekong Basin: Incorporating the projections from the study, Mekong ARCC is developing ecosystem service valuation guidelines and preparing country-specific recommendations on how to incorporate the economic value of natural resources into national-level policy and decision-making. A regional report was released recently.

Adaptation-Biodiversity Integration Strategy

Since Mekong ARCC uses only GCC-AD funds, the design team addresses biodiversity conservation indirectly through the connection between climate-induced shifts in ecosystems and their direct impact on income-generating activities and livelihoods in the LMB. These ecosystem services can reduce the vulnerability of surrounding communities to the impacts of climate change. Thus, the integration strategy can be described as seeking ecosystem-oriented interventions that provide community-level co-benefits. The activity captures these connections among climate, natural and human systems across three key dimensions:

Geophysical: The study analyzes projected shifts in eco-agricultural zones – usually moving upland in the face of higher temperatures – and captures impacts such as species migration, invasive species and lower reproductive rates in fisheries, among others. Biodiversity impacts are analyzed in the study to detail sensitivity to projected climate shifts.

Social: The pilot programs address human dynamics of biodiversity loss, and are being carried out across a mix of representative ecosystems in the basin. Biodiversity loss that impacts livelihoods, such as declining fish stocks or reduced availability of NTFPs, is addressed through pilot interventions. Three of the five pilot sites are located in close proximity to protected areas, and all are situated in areas where the intersection of livelihoods and ecosystem services is critically important. This facilitates the testing of ecosystem-based adaptation responses to climate threats.

Policy: On a national level, the ecosystem service valuation work incorporates a 'Values at Risk' analysis (often used in the financial risk management sector) as an effort to translate projected climate change impacts on ecological systems into economic terms that speak to national policy makers from various backgrounds. Recommended guidelines for national-level valuation of ecosystem services are also being produced.

Though Mekong ARCC has no direct biodiversity outcomes to achieve, positive biodiversity outcomes were expected from some of the pilot field interventions. However, those outcomes will be context-specific and tied to the needs and vulnerabilities of communities in those landscapes.

III ACTIVITY IMPLEMENTATION

During several years of implementation, the Mekong ARCC team has faced the challenges of programming in an emerging technical area (climate change adaptation) while actively refining activity strategies to mesh with implementation realities. For example, the initial design focused heavily on climate-related shifts in ecosystems and the testing of ecosystem-based adaptation strategies, given the dependence of so many people in the region on ecosystems and natural resources for their livelihoods. But field interventions now include adaptation strategies focused on agriculture, animal husbandry, water resource management and other sectors to address specific needs in stakeholder communities. The following section highlights similar practical strategies adopted in implementation to address key programmatic challenges, and includes examples of how the team envisions achieving both adaptation outcomes and biodiversity co-benefits.

CHIANG RAI, THAILAND- 2014: Chiang Rai is projected to experience the largest relative increases in precipitation in the Lower Mekong Basin – increasing the likelihood of flooding, waterlogged soil and other negative impacts on crops such as rice, maize and soybean, which local communities heavily rely on for their food and income. Mekong ARCC has worked with the local community to install a water filtration system to address water turbidity that results from soil runoff after heavy rainfalls. Photo by Josephine Green, USAID

Key Challenges & Implementation Strategies

1. Transforming the Climate Change Impact Study into a Practical Tool for Decision Makers: A central challenge arose in the Mekong ARCC theory of change as it hinges on the activity's ability to serve as the bridge between climate science and community decision making. The climate impact study analyzed how climate and ecological shifts will lead to changes in LMB ecosystems; these shifts will impact various sectors, from agriculture to fisheries, in different yet interconnected ways. The team used data from LMB protected areas to project impacts on critical ecosystem services and the availability of NTFPs in the context of local livelihoods. The study found that climate change-induced ecosystem shifts are likely to impact species ranges, the seasonality of life cycle events (such as flowering), species body sizes (to cope with extreme temperatures) and fish migration (due to a shifting onset of the flood season), among others. To go beyond projections and engage decision makers, the team needed a strategy to make such projections relevant to community concerns.

Strategy: The Mekong ARCC team's response to this challenge was to highlight how climate-related ecosystem shifts were likely to impact natural resources and other assets of direct concern to communities and policymakers. To do this, the study team selected nine "hot spot provinces" in which to conduct in-depth analyses of four key livelihood sectors: agriculture, animal husbandry, fisheries and NTFPs. By illustrating projected impacts on these income-generating sectors, the team anticipated more robust community engagement to incorporate study findings into planning and decision-making processes.

2. Designing Integrated Adaptation Interventions: The team created a "light touch" grant structure called *Climate Planning*, which overlays the study findings onto existing sectoral activities by local implementing partners including around rural livelihoods and biodiversity conservation. The method integrates climate and weather data into existing decision-making processes rather than attempting to create new ones, thus providing flexible field programs with added value.

Strategy: The team is testing promising ecosystem-based adaptation strategies that highlight the role intact ecosystems can play in buffering communities against the impacts of climate change while providing habitat for biodiversity. For example, pilots showcase the role mangrove forests play in supporting fisheries while protecting coastal communities against storm surge, and how the use of integrated cropping systems – such as the traditional system of raising ducks and fish in rice paddies – increases the resilience of both farmers and ecosystems that provide habitat for key species. With this strategy, field activities aim to demonstrate how ecosystem-based adaptation approaches can reduce risk to climate stressors, improve livelihoods outcomes and provide co-benefits for biodiversity.

THUAN HOA, VIETNAM- 2014: Dr. Khiem, a Livelihood Specialist, shows a community shrimp pond. Photo by USAID

3. Creating a Site Selection Method to Capture Co-Benefits: The primary geographic constraint the team faced in selecting sites was RDMA's mandate to work in each of the four LMB countries. While site selection could be driven largely by technical considerations, there was still a challenge of identifying landscapes with the opportunity to achieve direct adaptation results and potential biodiversity and livelihoods co-benefits with a prioritized suite of interventions.

Strategy: The team's approach to site selection incorporated both a) ecosystem representation and b) linkage between livelihoods and protected areas. To start, the selection criteria were driven by broad coverage of LMB ecosystems with the idea that ecosystem-based adaptation activities should capture best practices from different ecosystem types. From a social perspective, the activity seeks to leverage the association of many of the communities that are poorest and most vulnerable to climate change with proximity to protected areas and important habitat for biodiversity. Selected sites provide an opportunity to build climate resilience in communities that receive benefits from the ecosystem services provided by nearby protected areas while also helping reduce threats to biodiversity.

4. Defining Methods to Apply Climate Science at the Community Level: This is a common issue within the relatively new adaptation space, and best practices are still relatively diffuse. Translating information about climate risks into local decision making and achieving cross-sectoral benefits are central challenges being tested through Mekong ARCC's field interventions.

Strategy: While the nuances differ in each landscape, Mekong ARCC facilitates the use of applied climate science through clear communication of practical methods for integrated planning, using concepts such as threshold markers, scenario planning, climate directionality and comfort zones. For example, shifting comfort zones are likely to decrease the productivity of key crops such as coffee in Vietnam, as well as impact stocks of white fish in all but the deepest refuge pools in Lao PDR. This could also impact key species such as the Siamese crocodile, whose sex is determined by ambient temperature around its eggs, making it extremely sensitive to projected warming trends. Integrated planning methods can help build capacity to monitor local climate trends and identify adaptive responses; importantly, they highlight the connectivity of agricultural and ecological systems and the potential benefits of ecosystem-based adaptation approaches.

IV KEY RECOMMENDATIONS

Nearly four years into implementation, Mekong ARCC continues to learn and capture best practices as it evolves to test its theory of change in the field. To date, the case offers some critical lessons and recommendations for achieving biodiversity co-benefits from adaptation programming, which include:

Framing projected climate change within the context of shifting ecosystems can highlight the connectivity of ecosystem services with key income-generating sectors – agriculture, livestock, fisheries, NTFPs – and showcase the cross-sectoral benefits of ecosystem-based adaptation approaches.

Allowing site selection to be driven by the intersection of livelihoods and ecosystem services, such as through proximity to PAs, underlines the interconnectedness of communities and natural systems and helps to emphasize their shared exposure to climate risks and opportunities for ecosystem-based adaptation approaches.

Applying practical integrated planning methods is a linchpin for making climate science and information more relevant and useful to local decision makers, whether analyzing projected biodiversity loss or planning scenarios for crop selection and disaster risk reduction.

Linking climate projections with ecosystem, livelihood and commercial values at risk through the use of ecosystem service valuation methods can help elevate adaptation planning at the national level by using a common monetary denominator.

The Mekong ARCC team is learning alongside counterparts and beneficiaries how best to incorporate climate science into adaptation planning and community-level field programs. The team will also continue to identify and share best practices for combining community- and ecosystem-based adaptation programming.

For more information, please contact Saengroaj Srisawaskraisorn (ssrisawas@usaid.gov).

KIEN GIANG- 2014: Women in a village of Vietnam's coastal Kien Giang province identified desired livelihood adaptation outcomes they would like to see in the future and discussed possible ways to achieve these as part of a community participatory decision-making exercise. Actively engaging communities in participatory adaptation planning, while also raising their awareness on the impacts of climate change, is an important aspect of the Mekong ARCC approach.

Photo by Pakprim Oranop-na-Ayuthaya, USAID

RACH GIA, VIETNAM- 2014: Buildings along the water. Photo by Donald Bason, USAID

RESILIENCE IN THE LIMPOPO RIVER BASIN (RESILIM)

USAID SOUTHERN AFRICA REGIONAL

Funding: BID and GCC-AD
Integration Model: Integrated programming

LIMPOPO RIVER AT THE MOLEJI FARM SITE, BOTSWANA- 2013: Water hyacinth trapped during floods in a filtering facility set up by the Botswana Department of Water Affairs. Water hyacinth is free floating and highly mobile, especially during the flood season. Photo by Dr. Nkobi Moleele for USAID

SUMMARY

Resilience in the Limpopo Basin (RESILIM) is a five-year (2012-2017) activity with the overarching objective of improving transboundary management of the Limpopo River Basin (including portions of Botswana, Mozambique, South Africa and Zimbabwe) to enhance the resilience of people and ecosystems. RESILIM is a two-part activity, consisting of an overarching contract focused on analysis, policy support, stakeholder engagement and transboundary coordination, and a sister grant program focused on sub-catchment level interventions. The contract, which we focus on here, is implemented by a Chemonics International consortium that includes Global Water Partnership South Africa, OneWorld and Overseas Strategic Consulting, among other partners. Funded with BID, GCC-AD and water funding, the activity's integration strategy is based on an integrated water resources management (IWRM) framework focused on water-based ecosystem services.

RESILIM was designed in part to support the Limpopo Watercourse Commission's (LIMCOM) five-year IWRM Plan, which focuses on "*disaster management, water quality and water allocation*". This contributed to the design of the activity, which was built on an IWRM framework that emphasizes the need to maintain appropriate ecological water flow to support biodiversity and ecosystem goods and services in the Limpopo Basin. In a region marked by a history of floods and droughts, RESILIM's starting point for conservation and adaptation activities is sound water management.

While similarly funded activities address climate change through a threat-reduction approach, RESILIM's use of IWRM frames the integration of adaptation and biodiversity within a "systems approach" that binds human, economic and ecological needs through their shared dependence on water-based ecosystem services. The strategy drives activity integration, drawing together ecological and hydrological systems, with the objective of providing the appropriate balance to fulfill the needs of natural landscapes and the people living within them. This integration strategy was informed by another ongoing activity in the Mission – the Southern Africa Regional Environmental Program (SAREP, 2010-2015) – which faced the challenge of integrating a mix of four funding streams (BID, GCC-AD, WASH and HIV/AIDS).

While the activity is not yet complete, it offers an early glimpse into how adaptation and biodiversity conservation can converge through a focus on water resources. For example, RESILIM has led a *Limpopo Basin Environmental Flow Requirements Analysis* to improve understanding of the water flow regime needed to maintain aquatic and riparian ecosystems across the basin, and help predict the potential effects of flow modifications from a shifting climate on ecological processes and the livelihoods of the people benefitting from ecosystem services.

The following sections lay out the genesis of RESILIM's innovative design and provide early best practices and guidance on developing an integrated activity around a systems approach.

LIMPOPO RIVER ESTUARY- 2014: Communities living in the Limpopo River Estuary rely on fish and other aquatic animals such as crabs and prawns for food and income. Mangroves provide a habitat and breeding environment for this marine life. Photo by Lara Rall for USAID

II ACTIVITY DESIGN

RESILIM was designed in 2011 with the overarching goal of improving transboundary river basin management to enhance the resilience of people and ecosystems. While funded by GCC-AD and BID funding, the design is built around an integrated water resources management (IWRM) framework, focused on supporting "*equitable access to water that balances urban and rural needs with ecosystem requirements under changing climate scenarios*."

The RESILIM design team, consisting of a mix of experts with backgrounds in biodiversity, climate change adaptation and environmental governance, set out to achieve a very participatory design process, with the idea that early cross-sectoral input was essential to integrated design. Upon generating feedback from universities, regional experts and river basin management organizations, it was clear there was a critical mass of support for the idea of breaking down sectoral silos through a systems approach. To the USAID design team, taking such an approach was critical to addressing the challenge of achieving a sound and socially acceptable approach to managing the natural resource base.

The activity was designed to fit within and advance the Southern African Development Commission's (SADC) Climate Change Adaptation Strategy and Revised Protocol on Shared Watercourses, under which the regional river basin organizations (RBOs) provide a forum for riparian countries to coordinate on water-related issues. Given the geographic scope, the Limpopo Watercourse Commission's (LIMCOM) five-year IWRM Plan also influenced the design – the plan specifically focuses on "*disaster management, water quality and water allocation*".

Working within the context of these regional initiatives, and with BID and GCC-AD funding to program, the design team was challenged to identify a common thread on which to hang its integrated strategy. That became water. From a biodiversity standpoint, maintaining appropriate ecological water flow is fundamental to the integrity of natural systems and the ecosystem goods and services they provide to the Limpopo Basin. On the adaptation side, the increasing climate variability projected for the region is largely manifested through water (quantity and timing). As such, they identified floods, droughts and fires as the primary climate risks increasing the vulnerability of people and the ecosystems that help sustain their livelihoods, and contributing to biodiversity loss. With this approach, the RFP states that "*there is a need to bolster participatory processes that are built on sound science that effectively incorporates ecological, social and economic aspects of water resource management in the face of climatic changes*."

The design team highlighted overlapping thematic areas relevant to the Limpopo Basin that contribute to exacerbating biodiversity loss and people's climate vulnerability. Poor land use decisions and mining practices, for example, negatively impact ecosystem services and the quality of water consumed by local populations. The significant system of protected areas across the Basin "*support the maintenance of healthy ecological systems that are critical for regulating climate and water flows and safeguarding livelihoods in the region*," such as tourism. There were many potential areas in which to work, so to keep the design focused, the team incorporated experiences and lessons from recent and ongoing activities at the mission.

Two activities informed the design process: the Okavango Delta-focused Integrated River Basin Management program (IRBM, 2004-2009) and the Southern Africa Regional Environmental Program (SAREP, 2010-2015). SAREP was designed prior to the 2010 launch of President Obama's Global Climate Change Initiative, with a mix of funding streams (BID, GCC-AD, WASH, HIV/AIDS). The broad funding mix and relative newness of adaptation within USAID contributed to SAREP's biodiversity and adaptation elements being quite siloed in design. However, these activities have been gradually integrated in practice through the unifying themes of land use and ecosystems. With RESILIM, the mission design team framed the activity from the start around systems rather than funding streams. The RFP emphasized this integrated

approach, stating that "*USAID resources will focus predominantly on supporting intact, healthy ecosystems and climate adaptation aspects of an IWRM approach.*"

Theory of Change

RESILIM was designed using an IWRM framework overlaid with conservation and adaptation objectives. It tests the theory that if river basin authorities move toward sound, science-based water planning and management based on rationalized, equitable access to and utilization of water resources, then the people and ecosystems in that basin will be more resilient to a changing climate. By balancing human land use decisions and ecosystem requirements, river basin landscapes will be able to support appropriate water flows critical to the integrity of biodiverse habitat and the corresponding well-being of the population benefiting from its ecosystem services.

Framework

Building from this theory of change, and working at the nexus of *water-ecosystems-people-climate*, the activity design is nested within the Mission's overarching Strategic Objective *Increase Sustainable Economic Growth in Target Areas*, and suggests the need for adaptation-biodiversity integration across each of its three components.

SO: INCREASE SUSTAINABLE ECONOMIC GROWTH IN TARGET AREAS		
PROGRAM OBJECTIVE: To improve transboundary river basin management to enhance resiliency of people and ecosystems		
IR 1: Climate Vulnerability of the Limpopo River Basin Reduced	**IR 2:** Conservation and Management of Ecosystems Improved	**IR 3:** Capacity to Manage Water and Ecosystem Resources Improved
SUB-IRs		
1.1 Improved science, technology and capacities for decision-making and the development of adaptation strategies in the Basin **1.2** Improved water conservation and water demand management that responds to climate change **1.3** Integration of climate change adaptation strategies into long-term management plans and policies	**2.1** Improved natural resources management practices that mitigate threats to biodiversity **2.2** Improved ecological integrity and resiliency to climate change for priority areas, including protected areas **2.3** Integration of climate change adaptation and biodiversity conservation into Basin water and resource management plans	**3.1** Improved capacity of regional, national, and local governments to manage the Limpopo River Basin and formulate integrated water, ecosystem, and climate change adaptation policies and strategies **3.2** Increased knowledge and awareness of climate change impacts and adaptation measures **3.3** Increased knowledge and awareness of integrated sustainable water management strategies and practices

Adaptation-Biodiversity Integration Strategy

Unlike other activities that address climate change through a biodiversity threat-reduction approach, the RESILIM design uses an IWRM framework and explicitly requires the implementation team to integrate adaptation and biodiversity (Sub-IR 2.3 and IR 3). Water was a thematic thread through which to address conservation and adaptation needs, with the idea that sustainably managed water resources would reduce vulnerability of people and support vibrant biodiversity (water for wildlife) and its associated tourism industry. The linked adaptation and biodiversity benefits of water would serve to motivate and incentivize integrated interventions.

By situating the activity within an IWRM framework, the RESILIM design shifts the conceptual approach from one of "loss prevention" and "threat reduction" to a longer-term and holistic "systems approach" strategy that binds human, economic and ecological needs through their shared dependence on water-based ecosystem services.

BOTSWANA- 2014: RESILIM continued to train members of the Botswana National Climate Change Policy and Strategy Technical Reference Committee in climate change and risk and vulnerability in April 2014. The training looked at adaptive capacity as a critical success factor for building resilience to climate change and how decision-makers can apply the risk and vulnerability and systems analysis research outputs as decision making tools on climate policy and strategy development in the Basin's four riparian countries. Photo by CSAG for USAID

III IMPLEMENTATION

It is important to note that RESILIM consists of bundled implementation mechanisms including a contract responsible for regional stakeholder engagement, transboundary coordination, targeted analysis and the policy agenda, and a cooperative agreement used to demonstrate integrated water, adaptation and natural resource management strategies in biodiversity-rich areas at the sub-catchment level. To manage these many moving pieces, the implementation team kicked off the project with a sustained outreach push to coordinate with numerous stakeholders in the region, such as LIMCOM, SADC and others. Out of a detailed work-planning process, the team decided to push the boundaries for an integrated activity by seeking to define the various dimensions of resilience and focus interventions on building the resilience of socio-ecological systems to climate stresses.

RESILIM interventions are broad in scope but thematically unified by water through the IWRM framework. In the following section, we highlight adaptation-biodiversity integration through a snapshot of selected interventions.

Integrated Adaptation-Biodiversity Interventions

These integrated interventions fall within RESILIM's efforts around environmental flows, ecosystem services, water allocation and climate change adaptation. The strategy draws together ecological and hydrological systems, with the objective of providing the appropriate balance to fulfill the needs of natural landscapes and the people living in them now and in future scenarios.

Limpopo Basin Environmental Flow Requirements Analysis: The assessment seeks to increase the understanding of linkages between hydro-ecological and socio-economic relationships under climate change scenarios. Taking into account the varied habitats in the basin – such as perennial channels, weirs/dams, permanent swamps, seasonal swamps and channels – it focuses on the water flow regime needed to maintain aquatic and riparian ecosystems across the basin, and helps predict the potential effects on ecological processes of projected climatic flow modifications and of subsequent human modifications for adaptation and risk reduction purposes.

Analyzing Impacts of Water Allocation on Ecosystem-Livelihoods-Resilience: RESILIM is assisting LIMCOM to capture vulnerabilities and best practices in water allocation across the basin, including the recognition of riparian ecosystems as legitimate water users when developing water allocation regimes. This is needed because while existing Limpopo River dams provide critical functions – water supply, flood control, irrigation, navigation, sediment control, tourism and hydropower – they can cause unintended consequences to downstream systems. For example, landowners, farmers and tourism operators in Botswana express concern over operation of the Ntimbale Dam (built in 2006) as they experience water scarcity in the dry season and exacerbated riverbank erosion during the rainy season. These changes directly impact the livelihoods of downstream communities, increasing their vulnerability to extreme weather events. Addressing such complex dilemmas at the nexus of environmental and socio-economic needs is being guided by this data-driven analysis at LIMCOM.

Basin-Wide Analysis on the Intersection between Natural and Human Systems: This comprehensive analysis seeks to define social, economic and environmental thresholds and identify and quantify 'tipping points' in both social and environmental systems. Using a systems approach, the activity attempts to capture the '*biophysical and socio-political and economic factors related to climate change and biodiversity conservation*' by identifying vulnerability hotspots and systems bottlenecks for future RESILIM interventions. Along with the *Environmental Flow* activity, this is framing biodiversity and climate threats within a single integrated basin-wide system that shares the fortunes of a common watercourse.

Priority Mangrove Restoration: Mangrove ecosystems at the mouth of the Limpopo River provide a nursery for prawns, crabs and other marine and coastal wildlife; serve as a barrier to storm surge, as they have a great water retention capacity; and help reduce saltwater intrusion into crop fields. Through a grant to the Center for the Sustainable Development of Coastal Zones (CDS-ZC), RESILIM is addressing the factors behind mangrove degradation in the estuary, using approaches like mapping, environmental and economic valuation, mangrove restoration and increasing awareness of mangrove conservation. Together, BID and GCC-AD funds can address short- and long-term issues related to these ecosystems.

Water Quality Improvement for Biodiversity and Ecosystem Health: While water quality work is often associated primarily with human consumption and water treatment under Water, Sanitation and Hygiene (WASH) activities, RESILIM seeks to improve the overall water quality of the river by restoring ecosystem services and critical habitats, and contributing to adaptation through flood control measures. One area of work entails the removal and control of invasive water hyacinth, which hinders entry of sunlight into the water, reduces the occurrence of photosynthesis, depletes oxygen availability and threatens the existence of other native species. Besides being detrimental to aquatic biodiversity, hyacinth can exacerbate flooding events by slowing water flow through irrigation channels, which increases risk for surrounding communities. The RESILIM team is also in the early stage of piloting an effluents trading scheme between the Botswana Water Utilities Corporation (BWUC) and the private sector, aimed at reducing fertilizer and mining effluent contamination in the waterway that impacts the integrity of basin ecosystems.

LIMPOPO RIVER ESTUARY- 2014: The RESILIM program is building the resilience of the estuary through the rehabilitation and conservation of mangroves in the river mouth. The Center for the Sustainable Development of Coastal Zones in Xai-Xai, Mozambique, through support from RESILIM, is upgrading the community mangrove nursery to increase the number of mangrove seedlings for replantation. The nursery cultivates seven species of mangroves of which two species have already disappeared in the estuary.

Photo by Lara Rall for USAID

IV KEY RECOMMENDATIONS

RESILIM offers a suite of recommendations for how to enable integrated adaptation-biodiversity programming through an IWRM framework, such as:

A systems approach can help balance human, economic and ecological needs. The traditional method of addressing one sector's needs and then searching for potential co-benefits with other sectors can impede true programmatic integration. Using a systems approach to identify a common thread between those systems – here, water – reinforces connectivity, facilitates trade-off analysis, and can lead to more integrated interventions.

Water-based ecosystem services can drive integration. Similarly, tying water to ecosystem services can help highlight the impacts of poor natural resource management on both livelihoods and physical vulnerability to climate impacts. This integration strategy highlights how longer-term human, economic and ecological health are a function of their shared dependence on water-based ecosystem services. As the RFP states, "*Healthy, functioning ecosystems are a foundation for the adaptive capacity of people living in the Basin.*"

Integrated design means focusing on the process as much as the results. The RESILIM design started with an integrated process to understand the system and its inter-related challenges. The design team honored the requirements of different funding streams but did not lead with them, which helped expand the boundaries for integration.

Selecting sites near dams offers high integration potential. When using an IWRM framework and working in a river basin, upstream/downstream activities focused around dams can help highlight cause/effect relationships of water management on ecological flows for biodiversity; water allocation for farming, flood control, fishing and tourism needs; and climate change adaptation, among others.

Mangroves may be a "sweet spot" for co-benefits. Selecting project sites that include mangrove ecosystems can offer a sound intersection of biodiversity, livelihoods and climate change adaptation opportunities (where mangroves have the potential to reduce the vulnerability of nearby communities to storms and/or sea level rise). There may also be an opportunity for GCC Sustainable Landscapes (such as REDD+) interventions given the carbon sequestration potential.

As RESILIM moves into its final years, the team has a growing list of experiences and best practices that can help guide the next generation of integrated adaptation-biodiversity activities using approaches based on the linkages within socio-ecological systems.

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COSTAS Y BOSQUES SOSTENIBLES (SUSTAINABLE FORESTS AND COASTS)

USAID ECUADOR

Funding: Biodiversity (BID)
Integration Model: Single source with co-benefits

GULF OF GUAYAQUIL, ECUADOR- 2012:
Crabber communities along the Gulf of Guayaquil.
Photo by USAID

SUMMARY

Costas y Bosques was a five-year (2009-2014) activity focused on conserving biodiversity in critical habitats along the Ecuadorian coast and providing benefits to surrounding communities. Led by Chemonics, the implementation team comprised a host of local organizations including Conservación y Desarrollo, Ecocacao, Bioeducar, Centro Internacional para la Investigación del Fenómeno del Niño - CIIFEN, Altrópico and Ecolex. While Costas y Bosques did not have GCC-AD funding, it nimbly integrated climate change adaptation and biodiversity conservation.

Costas y Bosques worked in critical marine and coastal landscapes with high biodiversity value, concentrating field activities on farmers and fisherfolk in close proximity to protected areas and coastal zones. Following USAID's Biodiversity Code for use of BID funding, the team initially identified the key threats to biodiversity as i) habitat loss, ii) encroachment due to lack of economic alternatives, iii) low institutional capacity for conservation management and iv) climate change.

The Costas y Bosques design used the Nature, Wealth and Power approach developed by USAID,[1] with wealth activities focused on integrated farming methods, strengthening of NTFP value chains and red crab harvesting, among other income-generating activities. Even though the livelihoods focus was largely driven by the need to reduce pressure on critical habitats, it contributed to household resilience given that savings are a critical coping mechanism to deal with natural and social shocks such as those from climate change. Similarly, natural resource management and protection activities aimed at conserving biodiversity, including hillside reforestation and mangrove conservation, provided adaptation co-benefits for human communities by creating healthy ecosystems that act as buffers to projected extreme events and sea level rise.

Since climate change was identified as a major threat to coastal biodiversity, Costas y Bosques assessed adaptation strategies for both biodiverse ecosystems and the people who depend on them. At the request of the government of Ecuador (GoE), the team expanded their initial work by developing adaptation strategies for two national parks and the entire Guayas province, which included consideration of ecosystem-based adaptation options to help people deal with shifting climate regimes. The team analyzed the economic risk associated with the impacts of increasing water temperatures on red crab stocks, integrating biodiversity and livelihoods with potential climate concerns.

Costas y Bosques offers useful lessons on how to address climate change adaptation considerations for both human and ecological communities when a design team only has access to BID funds. The following sections highlight examples of biodiversity interventions, such as mangrove regeneration[2] and species monitoring for sustainable fisheries, which yielded adaptation co-benefits.

ECUADOR- MAY 11, 2011: In exchange for exclusive rights for crabbing within the biodiverse mangroves, the crabbing associations make commitments to protect and manage them. Photo by USAID

1 See http://pdf.usaid.gov/pdf_docs/PNACR288.pdf and http://www.engilitycorp.com/nwp/NWP2FINAL.PDF.

2 Reforestation is sensitive within the Biodiversity Code and can only be done once the threats to the forest/mangrove have been abated.

ACTIVITY DESIGN

As a biodiversity project, Costas y Bosques was developed in adherence to USAID's Biodiversity Code. The overarching objective was to conserve biodiversity in critical habitats along the Ecuadorian coast and to provide benefits to surrounding human communities; the request for proposals (RFP) noted that *"very few projects in Ecuador have simultaneously created long term improvements in both conservation and the lives of the poor...this activity should do both."*

The design team included a mix of technical experts with backgrounds in coastal zone management, forestry and protected area management, all with a sound knowledge of Ecuador. The concept and focus was developed in line with the mission's Tropical Forestry and Biodiversity Strategy Statement (118/119 analysis) and the Ministry of Environment's Strategic Plan for the National System of Protected Areas (2007-2016). Since funding came entirely from the biodiversity earmark, all activities had to contribute to explicit biodiversity objectives, and specifically, help reinforce conservation outcomes through improving the livelihoods of coastal Ecuadorians. While it lacked GCC-AD funding, Costas y Bosques had a mandate to work on climate change since it was identified in the 118/119 analysis as a major threat to biodiversity; as written in the task order, *"activities that adapt to or mitigate climate change are expected"*. Assessing climate change risks in biodiversity conservation programming is considered best practice. With GCC-AD funding, Costas y Bosques could have also directly supported activities that focused primarily on improving the adaptive capacity of human communities.

To engage local stakeholders, the team aligned activity objectives to an incentive structure focused at both the institutional and community levels. Costas y Bosques would help communities access the national Socio Bosque cash-for-conservation program and build linkages to responsible markets (agroforestry, NTFPs, fisheries). As mangroves are a protected ecosystem under Ecuador's Constitution, the design also built from the established GoE incentive of granting exclusive mangrove concessions to crabbing associations, in return for sustainable management of the marine resources. Having political will and the right incentives, regulations, and institutional arrangements in place, such as Socio Bosque and mangrove concessions, were keys to the success of the activity.

The team encouraged site selection based on a mix of criteria, including a) proximity between farmers, protected areas, and the coast; b) representation of marine, estuarine, dry and tropical forest habitats; and c) ability to have impact on biologically significant landscapes. Although climate change did not factor into the initial site selection, many coastal areas are highly vulnerable to sea level rise, increased storm surge and other expected changes. Similarly, climate change adaptation was not directly factored into the procurement. However, through their focus on coastal biodiversity and livelihoods the design team left the door open to adaptation activities since the coast is often highly vulnerable to climate change and protecting coastal ecosystems and strengthening livelihoods can help build resilience.

Theory of Change

Costas y Bosques was designed under the Nature, Wealth and Power approach developed by USAID, based on the theory that if capacity and an enabling environment are built to couple sustainable natural resource management (NRM) with income-generating activities, then communities will respond to these economic incentives by conserving and managing critical habitats along the Ecuadorian coast. The crux of the design was the challenge to achieve livelihoods and biodiversity co-benefits through site-based interventions.

Activity Framework

Building from this theory of change, the Costas y Bosques activity design was nested within the mission's overarching Strategic Objective I*mproved Natural Resource Management, Trade, and Competitiveness*. The diagram below includes an illustrative mix of activities by program intermediate result (PIR):

SO: IMPROVED NATURAL RESOURCE MANAGEMENT, TRADE, AND COMPETITIVENESS		
PROGRAM OBJECTIVE: To conserve biodiversity in critical habitats along the Ecuadorian coast and benefit communities that live in and/or around these areas		
PIR 1: Improved Biodiversity Conservation in Critical Habitats	**PIR 2:** Local Livelihoods Improved	**PIR 3:** Partnerships Formed for Ongoing Support for Biodiversity Conservation
ILLUSTRATIVE ACTIVITIES		
1.1 Improve management of critical terrestrial and coastal marine habitats **1.2** Rehabilitate degraded terrestrial/coastal marine habitat **2.1** Establish/implement climate change response and adaptation measures **2.2** Reduction of GHG and carbon sink conservation	**3.1** Development and promotion of market-based economic alternatives and incentives for critical habitat conservation: – *Facilitate access to environmentally responsible markets* – *Value chain strengthening for red crab, tagua, wood, cacao* – *Improve access to GoE conservation finance mechanism Socio Bosque*	**4.1** Strengthen PA management **4.2** Strengthen local capacity for NRM **4.3** Improve inter-institutional coordination **4.4** Upon MoE request, continue providing input for development of public policies
OVERARCHING INDICATORS		
a. *Number of hectares of biological significance and/or natural resources under improved management.* ***b.*** *Number of people with increased economic benefits derived from sustainable NRM.* ***c.*** *Number of people trained in NRM and/or biodiversity conservation assistance.*		

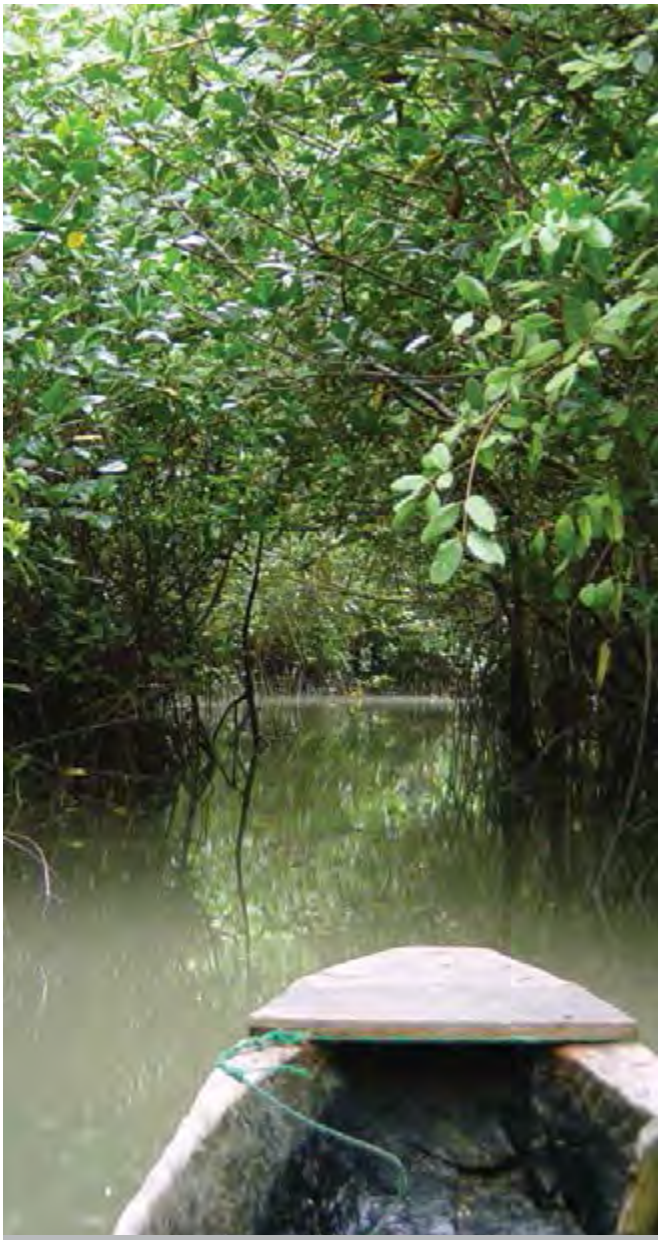
Adaptation-Biodiversity Integration Strategy

As Illustrated in the diagram on the previous page, the design team grouped climate change activities under the biodiversity conservation pillar. The team's strategy was based on an understanding that biodiversity conservation would yield adaptation co-benefits for local communities (which would be required for indirect attribution). This assumption was later confirmed by a vulnerability assessment that was carried out for the El Salado Mangrove Reserve, one of the project sites.

While no explicit linkage between adaptation and biodiversity was articulated in the RFP, a number of potential co-benefit opportunities were evident in the activity design, such as:

INTERVENTION	CLIMATE THREAT (FOR PEOPLE)
Mangrove protection and rehabilitation	Storm surge
Hillside reforestation and watershed	Flooding
Sustainable agricultural practices (e.g., on-farm water management)	Flooding, erosion control
Payment for ecosystem services	Water availability during droughts, flooding

As the activity moved into implementation, the team worked from these windows of opportunity while responding to the GoE's increasing interest in climate change adaptation.



GULF OF GUAYAQUIL, ECUADOR- 2012: Crab fishermen patrol these mangroves along the Gulf of Guayaquil in an attempt to prevent illegal logging and destruction of the blue forests. Photo by USAID

III ACTIVITY IMPLEMENTATION

Following USAID's Biodiversity Code, the team completed a systematic threats analysis to identify common drivers of biodiversity and habitat loss. This analysis was the genesis of the implementation framework, which was driven by the goal of reducing four main threats to biodiversity in six priority sites along the coast of Ecuador:

1. Loss and/or alteration of critical habitats
2. Climate change
3. Lack of economic alternatives
4. Insufficient institutional capacity for biodiversity conservation

While traditional conservation approaches directly address threats 1, 3 and 4, climate change is an increasingly evident threat that needs to be addressed by conservation programs where appropriate. As this is a fairly recent development, the Costas y Bosques team faced a challenge in deciding how to address climate change threats. The preliminary strategy focused on identifying biodiversity conservation activities that might also yield adaptation co-benefits for people. As the activity progressed and adaptation concerns increased within the GoE and USAID, the team added several activities meant to have more specific adaptation outcomes, some of which reported indirect GCC-AD attributions. Below are some of the activities that were implemented under each category:

i. Biodiversity Activities with Adaptation Co-Benefits (First Phase)

Mangrove Protection and Regeneration: The team worked with the Ministry of Environment and communities to advance the GoE initiative of granting concessions to fishing and crabbing associations in the Gulf of Guayaquil, giving them exclusive rights for ten years in exchange for a series of commitments to help protect them. Over 30,000 ha of mangrove concessions in the Gulf of Guayaquil are now being managed by crabbing associations, providing direct biodiversity and livelihood benefits to coastal communities, including more than 4,000 crabbers and their families. Since mangroves serve as a buffer to extreme storms that may increase in frequency and intensity with climate change, nearby coastal communities also realized an adaptation benefit. Further, by strengthening crabbing associations, Costas y Bosques provided a stronger social safety net for improved community resilience from a livelihoods perspective.

Integrated Farming: With the aim of reducing land conversion in and around protected areas and increasing farmer incomes, the Costas y Bosques team promoted integrated farming methods in focal landscapes. Activities included reducing the use of agrochemicals, water source protection, water storage, riverbank reinforcement, erosion control, agroforestry and reforestation from local nurseries. The overarching improvement in watershed and on-farm water management practices led to biodiversity, livelihoods and food security outcomes, while achieving adaptation benefits for people such as flood control and reduced sensitivity to drought events.

Protected Area (PA) Management: To directly reduce pressure on critical habitats, Costas y Bosques built the capacity of PA staff and designed a national-level PA operations manual for the Ministry of Environment, which was scaled to reach over 20 parks. Some PA management activities, such as regulating land use and maintaining contiguous forest tracts, may achieve adaptation co-benefits for surrounding communities by protecting natural buffers to extreme weather events.

Payment for Ecosystem Services (PES): The project worked extensively with the Government's Socio Bosque Program, a mechanism that pays communities and individuals to set aside a portion of their forest for conservation. Taking advantage of existing national and local incentive structures contributed to more rapid uptake and scaling up of interventions, improved sustainability, and brought together multiple stakeholders. Most PES activities directly address conserving

biodiversity and critical habitat, while offering adaptation co-benefits in terms of reducing vulnerability to extreme events like intense storms.

Species Monitoring: With the National Institute of Fisheries, Costas y Bosques enabled 26 crabbing cooperatives to voluntarily capture data on their catch as a means of monitoring red crab stocks for a more sustainable fishery. While the impetus for the intervention was conservation, the data were used alongside an analysis of weather trends and water temperatures to monitor potential climate change-driven seasonal shifts and their corresponding impact on crab populations and hence livelihoods.

ii. Biodiversity Activities with Adaptation Co-Benefits (Second Phase)

Adaptation Strategy Development: In response to GoE needs, the Costas y Bosques team analyzed climate risks and worked with surrounding communities to develop adaptation strategies, first in El Salado Mangrove Reserve and Machalilla National Park and then for the entire Guayas province. The analyses captured stakeholder input and socio-economic data, then used geospatial data and hydrodynamic simulations to illustrate projected climate change vulnerability and risk for both the ecosystems and human communities around them. This adaptation work was seen to complement the ongoing conservation activities in the area. Since Costas y Bosques highlighted climate change as a principal threat to biodiversity, a vulnerability assessment of the priority areas (including the national park) was considered as an initial step toward threat reduction.

Adaptation Capacity Building: Along with site-based NRM and conservation capacity building efforts, Costas y Bosques delivered training on risk and environmental management that entailed improving understanding of climate threats to both biodiversity and people. Delivered to the staff at Machalilla National Park and local officials from surrounding communities and municipalities, the training helped build foundational knowledge on climate risks and adaptation measures among key local decision makers.

Analysis of Ecosystem Values at Risk: This analysis sought to correlate data on red crab stocks with seasonal shifts in water temperatures to understand whether they have a direct impact on the vibrancy of red crab habitat. The analysis used available secondary/historic data and sought to raise awareness of potential climate risks to key species and local livelihoods.

CAIMITO COMMUNITY OF THE ESMERALDAS PROVINCE, ECUADOR- 2010: Fabiola Mosquera works in a tree nursery in the Caimito community. The project works with local government partners in agro-forestry and the reforestation of farms, rivers and estuaries. Reforestation will not only replace threatened indigenous plant species and restore natural habitats, but also provide a source of income for the local population through agro-forestry.
Photo by Cristobal Rodas, USAID

IV KEY RECOMMENDATIONS

The Costas y Bosques activity highlights how to build climate change adaptation into a traditional conservation activity using BID funding, when climate change is identified as an important threat to biodiversity. Key recommendations from the design team include:

Conservation activities can yield adaptation co-benefits for people. Using the right mix of conservation activities can contribute to positive climate change adaptation outcomes for people, assuming that interventions can be linked to reducing specific vulnerabilities. Examples implemented under Costas y Bosques include forest protection and rehabilitation, hillside reforestation and watershed management, integrated farming methods (e.g., erosion control, on-farm water management) and payment for ecosystem services (e.g., securing water supply).

Mangroves may be a 'sweet spot' for co-benefits. Mangrove ecosystems can offer a sound intersection of biodiversity, livelihoods and climate change adaptation (and mitigation) opportunities, where mangroves have the potential to reduce the vulnerability of nearby communities to storms and/or sea level rise.

Species monitoring can be linked to climate monitoring. Climate change adaptation may require understanding of how subtle shifts in seasonality or water temperature, for example, impact key ecosystems and agro-ecosystems, with subsequent impacts on livelihoods. Necessary monitoring and data collection may dovetail nicely with species monitoring initiatives to assess ecological impact or ensure sustainable harvesting, as Costas y Bosques found with its efforts to monitor red crab stocks.

Sustainable agricultural practices may have adaptation and mitigation benefits. Helping farmers, particularly those around protected areas, to adopt methods that reduce their impact on natural systems can offer a number of co-benefit opportunities. Reducing land conversion, protecting water sources, controlling erosion and reinforcing riverbanks, for example, contribute to improved watershed management around critical habitats while also providing a buffer for people against storms and/or floods. This and other practices, captured under the rubric of 'climate-smart agriculture,' can provide an area of opportunity at the intersection of biodiversity, adaptation, mitigation (where carbon emissions from land use can be measurably reduced) and food security objectives. They can also contribute to economic growth.

Much was learned from Costas y Bosques in terms of how to obtain adaptation co-benefits for people from biodiversity programming, and these lessons should be useful for future activities of this kind.

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HARIYO BAN

USAID NEPAL

Funding: BID, GCC-SL, and GCC-AD
Integration Model: Partially integrated programming with separate IRs

DEVGHAT VDC, NEPAL- 2013: Communities plant broom grass on degraded land that was once used for shifting cultivation. The broom grass is a natural approach to stabilize the hillside, restore the land, and connect an important wildlife corridor. At the same time, the people benefit from improved livelihood opportunities provided by the plant. Photo by WWF Nepal for USAID

SUMMARY

Hariyo Ban is a five-year (2011-2016) activity with the overarching objectives of reducing the adverse impacts of climate change as well as threats to biodiversity in Nepal. This contributes to a broader development objective of "sustainable management of natural resources under changing climate conditions." It is implemented by a consortium led by WWF-Nepal, which includes CARE, the National Trust for Nature Conservation (NTNC) and the Federation of Community Forestry Users in Nepal (FECOFUN). The activity is funded with BID, GCC-SL (sustainable landscapes) and GCC-AD (climate change adaptation) funds, requiring a clear strategy for integration in order to achieve related but distinct objectives. Hariyo Ban offers some early lessons in integrated programming, such as how to use ecosystem services to reinforce the connectivity between human and ecological systems, their shared vulnerability and adaptation needs.

Hariyo Ban works through site-based interventions in two priority landscapes with high biodiversity value – the Terai Arc Landscape (TAL) and Chitwan Annapurna Landscape (CHAL) – to achieve goals related to each funding stream:

- Reduce threats to critical habitat for key species like the snow leopard, including climate change [BID];
- Improve landscape management with a focus on reducing emissions from deforestation and forest degradation (REDD+) [GCC-SL]; and
- Increase the adaptive capacity of human communities [GCC-AD].

The activity design highlights the co-dependence between people and healthy ecosystems at a landscape level. Hariyo Ban's place-based integration strategy addresses threats to biodiversity in the context of a changing climate, and allows site teams to identify appropriate activities – such as sustainable forest management (SFM), erosion control, fire management, etc. – that have co-benefits for conservation, climate change mitigation and adaptation (by people and ecosystems).

The direct link between biodiversity and adaptation that enabled the BID and GCC-AD funding streams to be combined in a single activity is largely tied to disaster risk reduction (DRR) through the key role played by ecosystems in buffering the impact of extreme weather events on people. In addition, Hariyo Ban has used BID funding to advance climate-smart conservation planning through the study ***Climate Change Impacts on the Biodiversity of the Terai Arc Landscape and the Chitwan-Annapurna Linkage***. This study uses climate projections to identify the least vulnerable tracts of upper montane and subalpine forests over various timescales (i.e. climate refugia) – which helped to prioritize conservation decisions and investments.

The following sections detail Hariyo Ban from the design stage to early achievements and lessons learned, highlighting the strategies of an early integrated climate change and biodiversity activity.

NEPAL- 2013: A shy red panda looks out from the branches of a tree. As part of efforts to protect the rare species, the Hariyo Ban Program is supporting the establishment of a community-based red panda monitoring system in Langtang National Park and Buffer Zone.
Photo by Kamal Thapa for USAID

II ACTIVITY DESIGN

The overall goal of Hariyo Ban is to reduce threats to biodiversity and adverse impacts of climate change through interventions at various scales in priority biodiverse landscapes. Hariyo Ban was funded by a mix of funding – BID, GCC-SL, and GCC-AD – so the conceptual integration of these thematic areas was crucial at the design stage. The design team consisted of experts from a mix of technical backgrounds – forestry and biodiversity, climate change, social sciences, law and environmental health – and included staff from USAID/Washington, USAID/Nepal, and the Government of Nepal (GoN).

The concept and focus was motivated by the GoN, as the Request For Applications (RFA) states: "*Although there has been significant progress made in the fields of community forestry and biodiversity conservation.... the GoN has placed high-level priority on climate change.... if current trends in climate changes and the over-exploitation of ecosystems and threats to biodiversity continue unaddressed, Nepal risks reversing past accomplishments and local conflict is likely to reignite*." In building the activity framework, the design team incorporated the vision of the recently finalized Country Assistance Strategy,[1] and the guidance provided by the 2009 Tropical Forestry and Biodiversity Strategy Statement (118/119) and a comprehensive study titled *An Assessment of Climate Change, Forestry, and Biodiversity in Nepal*.[2]

The RFA implied that Hariyo Ban should combine biodiversity, sustainable landscapes (REDD+) and adaptation responses at the site level, though – given that Hariyo Ban was a cooperative agreement, and overall GCC guidance for the Agency was still evolving – the implementing partners were expected to define this further. The direct link between biodiversity and carbon sequestration through forest conservation in important biodiversity areas was straightforward, while the link to adaptation was a bit more nuanced. The RFA, citing shifting temperature regimes and high-intensity rainfall events, depicts climate change as a threat to people who depend on natural systems for their livelihoods and well-being. These threats could be manifested through glacial lake outburst floods, changes in soil moisture and surface runoff, crop failure, seasonal drought and shifts in species ranges and population sizes, for example. With this in mind, Hariyo Ban's adaptation objective is to "*increase the ability of target human and ecological communities to adapt to the adverse impacts of climate change*." (Ideally, such an adaptation objective would specify which climate change impacts will be addressed or prioritized, rather than making a general reference to "adverse impacts." That said, if such information is not available at the procurement stage, a new activity may begin by carrying out a VA to help prioritize adaptation-related activities. A VA should help to identify the most important climate-related threats, so adaptation actions can be targeted and designed appropriately. In the case of Hariyo Ban, the design team utilized the national-level VA carried out by the government of Nepal under its earlier NAPA process, and the implementers carried out more detailed analysis at landscape and site levels.)

In arriving at this adaptation objective, the design team faced challenges in shaping the activity within the funding parameters. In particular, the relative newness of GCC definitions, along with attribution requirements, required extra attention to detail in the conceptual model. Hariyo Ban's focus at the nexus of human and ecological adaptation provided flexibility for the mission and implementing partners to adjust with the evolution of GCC programming within USAID.

In that regard, it is important to note that GCC-AD funds should be used for activities that help people adapt to climate change; which could include activities that increase human adaptive capacity. BID-funded activities must address priority threats to biodiversity, which may include climate change impacts BID funds can be used for activities related to increasing ecological adaptive capacity (which may also have co-benefits for people) as part of an overall approach to addressing priority threats.

1 *Country Assistance Strategy, Nepal.* USG Mission to Nepal, 2009.

2 *An Assessment of Climate Change, Forestry, and Biodiversity in Nepal.* USAID, 2009.

Theory of Change

Hariyo Ban was designed using a threats-based biodiversity conservation framework that was linked, where possible, with activities to reduce the vulnerabilities of local communities to climate change. According to this logic, if activities with adaptation co-benefits can be woven into traditional conservation programming, then both human and ecological communities in target landscapes will become more resilient to the adverse impacts of climate change.

Activity Framework

Building from this theory of change, Hariyo Ban's design is centered on three pillars tied to its funding streams (BID, GCC-SL, and GCC-AD):

Adaptation-Biodiversity Integration Strategy

As illustrated in the below diagram, the design team structured the activity based on funding streams and allowed integration to happen depending on site-specific

SO: SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES UNDER CHANGING CLIMATE CONDITIONS STRENGTHENED		
PROGRAM OBJECTIVE: To reduce adverse impacts of climate change and threats to biodiversity in Nepal		
IR 1: Biodiversity Conserved	**IR 2:** GHG Emissions Reduced and Sequestration Enhanced	**IR 3:** Capacity to Adapt to Adverse Impacts of CC Improved
ILLUSTRATIVE ACTIVITIES		
1.1 Threats to target species or landscapes reduced **1.2** CBNRM governance strengthened **1.3** Forest dependent livelihoods improved **1.4** Creation and/or enforcement of biodiversity policies and strategies	**2.1** Analysis, formulation, and execution of REDD+ strategies **2.2** Forest inventory and GHG monitoring capacity strengthened **2.3** Drivers of deforestation and degradation addressed **2.4** PES schemes for forest carbon and other services tested	**3.1** Public and Civil Society Organization (CSO) understanding of vulnerabilities and CCA increased **3.2** Participatory vulnerability monitoring systems developed **3.3** Pilot demonstration actions for vulnerability reduction conducted **3.4** Creation and execution of adaptation policies and strategies
OVERARCHING INDICATORS		
Ind 1: *Quantity of greenhouse gas emissions, measured in metric tons of CO2 equivalent, reduced or sequestered.* ***Ind 2:*** *Number of people receiving USG-supported training in global climate change including UNFCCC, greenhouse gas inventories, and adaptation analysis.* ***Ind 3:*** *Number of hectares in areas of biological significance under improved management.*		

needs. The integration strategy is largely "place-based", in that a landscape approach is used to identify threats and address them. The responses achieve direct biodiversity conservation, carbon sequestration and adaptation objectives, and, in some cases, co-benefits.

This landscape integration strategy allows the site teams to identify some interventions – such as sustainable forest management, erosion control or fire management – that support a mix of conservation, carbon sequestration and adaptation outcomes. The activity can address shorter-term, non-climate threats (poaching, human-wildlife conflict, etc.) that increase the overall health of these ecosystems, while responding to longer-term climate threats to both people and ecosystems through targeted adaptation measures. In addition, Hariyo Ban has supported the integration of climate resilience into sectoral strategies and actions plans at the landscape level by helping to prepare more than 300 Community Adaptation Plans of Action (CAPAs) and Local Adaptation Plans of Action (LAPAs) under the government of Nepal's official framework.

GADHAWA, DANG DISTRICT, NEPAL: Manju Chaudhari smiles as she cooks on her Improved Cooking Stove (ICS). The installation of a single ICS is estimated to save around 30 head loads (bhari) of firewood per year, thus avoiding logging of critical forest habitat for biodiversity and the emission of 1.5 metric tons carbon. The installation of ICSs is part of the Hariyo Ban Program's efforts to promote alternative energy sources, reducing dependency on firewood and hence helping reduce deforestation and forest degradation. Photo by Nabin Baral for USAID

III ACTIVITY IMPLEMENTATION

At the outset of Hariyo Ban, the team led a site selection exercise that relied on a mix of biodiversity and climate metrics and socioeconomic factors. Ecological factors included traditional elements such as landscape integrity, presence of keystone species, eco-regional representation and ecological process viability. On the adaptation side, selection criteria included an analysis of sensitivity to climate change and opportunities to demonstrate adaptation measures for both people and ecosystems. While the initial selection process did not entail a full vulnerability analysis at different scales, the team analyzed climate concerns by measuring disaster risk based on biophysical conditions and socioeconomic parameters along the selected land and river corridors and sub-basins. Some adjustments to sites and interventions were made in the second year once more detailed studies were completed including VAs at landscape and site levels.

The landscape threats assessment informed targets for the five-year results statement:

a. Over 500,000 hectares of biodiverse area (forest, wetlands, grasslands) brought under improved management
b. Over 3.3 million metric tons of greenhouse gas emissions, measured as carbon dioxide equivalent (CO2e), reduced or sequestered in the program area
c. Over 80,000 Nepalese benefitting from alternative sources of livelihoods/energy
d. Over $500,000 revenue generated from PES schemes in TAL and CHAL

An activity with direct GCC-AD funding should typically have an explicit adaptation result; Hariyo Ban does report on the standard USAID indicator for adaptation ("Number of stakeholders with increased capacity to adapt to the impacts of climate variability and change as a result of USG assistance"), though this was not included in the five-year results statement. The mission felt that it would not necessarily provide a comparatively impressive number to the other anticipated results, and Agency guidance was unclear.

Relevant interventions that have been implemented under Hariyo Ban can be classified into five categories: i) Climate-smart conservation; ii) Biodiversity-focused with potential adaptation co-benefits; iii) Adaptation-focused with potential biodiversity co-benefits; iv) Sustainable Landscapes-focused with potential biodiversity and/or adaptation co-benefits; and v) Integrated adaptation-biodiversity activities.

i. Climate-smart conservation

Because their focus is on understanding and addressing the impacts of climate change on biodiversity, the following interventions were examples of good conservation practice using BID funding. They should not be carried out with GCC-AD funding.

Species Adaptation and Resilience: Hariyo Ban has undertaken a study of tree species to identify species used in forest management and restoration that are likely to be more resilient to climate change in different ecological zones, and is developing guidance on climate-smart species selection for planting. The project also works with protected area managers to understand the vulnerability of protected areas and their focal species to climate change, and propose strategies to build resilience and facilitate adaptation.

Biodiversity and Weather Trend Monitoring: As a part of efforts to build local capacity to assess and monitor vulnerability in target landscapes, the Hariyo Ban team supports communities and citizen scientists in targeted monitoring to understand and potentially help to address the adverse impacts of climate change on ecosystems. This includes monitoring suitable indicator species such as amphibians, butterflies, fish and climate-sensitive plants to understand if a shifting climate is impacting local habitat. Results from this initiative are providing valuable information to devise climate-smart policies and address emerging climate-related issues and challenges for biodiversity (and potentially for local livelihoods). In addition, Hariyo Ban has established permanent plots at four different altitudes to monitor

impacts of climate change on biodiversity (at each altitude, different sites have been selected to encompass both likely refugia and likely vulnerable areas).

Landscape-Level Climate Impact Studies: With the objective of advancing "climate change integrated conservation planning", Hariyo Ban led a scientific study entitled *Climate Change Impacts on the Biodiversity of the Terai Arc Landscape and the Chitwan-Annapurna Linkage*. The analysis uses a mix of ecological and biogeographical information, spatial analyses, climate models and data and species envelope projections to assess the potential impacts of climate change on broadleaf forest vegetation communities in Nepal. Early results suggest the most resilient forest tracts, considered "macrorefugia", are situated in the upper montane and subalpine forests. Maintaining horizontal connectivity along this northern alpine zone will also be critical to the survival of key species like the snow leopard. The study offers a "predicted trajectory" of climate impacts, and by highlighting ecosystems most resilient to these shifts, is helping decision makers focus their conservation investments.

Climate-smart Landscape Strategies: Hariyo Ban is building on climate assessments for protected areas, focal species and corridors to facilitate a TAL-wide vulnerability assessment. This fed into the revision of the ten-year TAL conservation strategy in 2014. "Climate-smarting" the TAL strategy is particularly important because of its focus on large mammal conservation in one ecological zone; some revision of boundaries and approach is likely needed to incorporate refugia and facilitate adaptation. Hariyo Ban also plans to produce a landscape strategy for CHAL that will have a major focus on climate change.

ii. Biodiversity-focused with potential adaptation co-benefits

These interventions also focus on biodiversity conservation, but have potentially attributable co-benefits for adaptation by reducing the risk to surrounding populations from extreme weather events.

Land and Watershed Management: Land and watershed management can facilitate climate-smart biodiversity conservation (as discussed in the previous section) by restoring or maintaining continuous freshwater and forest habitat, facilitating species movement to higher altitudes in response to rising temperatures. These areas may include potential climate refugia (e.g., in some valleys and mountain slopes) where species are likely to survive after they disappear from more vulnerable areas.

Again, such activities are best understood under the rubric of climate-smart conservation, and should typically be accomplished using BID funding. However, a number of interventions under this category may yield attributable co-benefits for adaptation if they help to reduce people's vulnerability to climate stressors by, for example, sustaining ecosystem services such as groundwater recharge and soil stabilization. In Hariyo Ban, examples of such interventions include erosion and landslide control through riverbank reinforcement and broom grass planting on degraded land, water harvesting, fire hazard mapping, constructing and maintaining fire lines and sustainable forest management practices with communities like seedling nursery establishment. For example, good watershed management helps reduce the risk of flash flooding and landslides from more intense rainfall events; it can also help communities to buffer the effects of increasingly erratic rainfall and drought.

iii. Adaptation-focused with potential biodiversity co-benefits

These kinds of interventions focus on adaptation by people, but may have co-benefits for biodiversity conservation assuming they meet the USAID BID indirect attribution requirements.

Training and Awareness Building on Climate Vulnerability: These trainings, provided to government officials, civil society organizations and communities in areas where conservation activities are ongoing, address key concepts such as climate variability, vulnerability, impacts and adaptation. The modules promote an integrated human-ecosystem approach to adaptation, stress the importance of integrating adaptation into conservation strategies and provide techniques for communicating complex scientific concepts at the local level.

Developing Adaptation Plans: Hariyo Ban works with communities to develop rapid vulnerability assessments (RVAs) and transform them into formal community and local adaptation plans of action (CAPAs and LAPAs). They include an important element on community monitoring of climate variability and change at the sub-landscape level. The analyses capture broad concerns like the underlying causes of poverty; and present strategies (which could include ecosystem-based approaches) to address major climate-related hazards (floods, fire, drought, erosion, mudslides). Information from the landscape-level ecosystem vulnerability assessment and suggested adaptation actions are fed into adaptation planning at village and district levels.

DHWACHE KHARKA, NEPAL: Participants establishing transects. The Hariyo Ban Program is building the capacity of local communities to detect and document red panda populations, beginning in the villages of Polangpati, Dhwache and Ghyangphedi. Photo by Gautam Paudyal for USAID

iv. Sustainable Landscapes-focused with potential biodiversity and/or adaptation co-benefits

Some of the interventions associated with IR2, which focuses on the GCC-Sustainable Landscapes objectives of reduced greenhouse gas emissions and increased carbon sequestration, have potential co-benefits for biodiversity conservation and/or climate change adaptation. They still needed to meet the relevant USAID indirect attribution requirements.

On the adaptation side, relevant interventions include the promotion of improved cooking stoves and bio-gas, and improved forest fire management. On the biodiversity side, they include the reforestation and conservation of fragmented natural forests and wildlife corridors, as well as improved forest fire management.

HUSLANGKOT OF DHARAMPANI, TANAHUN DISTRICT, NEPAL: A detailed vulnerability assessment conducted by the Hariyo Ban Program found water scarcity makes the area one of the most vulnerable to climate change. As part of a Community Adaptation Plan of Action, solar powered pumps were installed to bring water to the community so women and children didn't have to walk for hours to fetch water. Photo by Nabin Baral for USAID

v. Integrated adaptation-biodiversity activities

Integrated Community and Ecosystem-based Adaptation: Because vulnerability extends beyond the borders of an individual community, the Hariyo Ban team works to integrate community-based adaptation and ecosystem-based adaptation methods. Each has its specific emphasis, the first on empowering local communities to reduce their vulnerabilities, and the latter on harnessing ecosystem management as a way to help address the impacts of climate change on people.[3] Hariyo Ban takes the approach of highlighting upstream-downstream connectivity of communities within a shared river basin. For example, while an upstream community's adaptation response to irregular rains and flooding irrigation canals was to build a small dam, the Hariyo Ban team supported interactions among upstream and downstream communities to understand negative impacts this dam would have on ecosystem services for important downstream aquatic systems and communities. Through testing the combination of methods, the activity aims to highlight their interconnectivity across a landscape and mainstream ecosystem functions into community-based adaptation planning, while working to avoid maladaptive impacts on ecosystems and people and strengthen resilience of natural systems.

3 Girot, Pascal et al, *Integrating Community and Ecosystem-Based Approaches in Climate Change Adaptation Responses*, ELAN, 2012.

IV KEY RECOMMENDATIONS

Despite some of the challenges along the way, Hariyo Ban offers a suite of recommendations for those integrating adaptation and biodiversity programming, such as:

Adaptation is a means to increase resilience in linked human and ecological systems. Given that communities in developing countries often rely directly on natural systems for food security and livelihoods, adaptation measures should incorporate this linkage and focus on sustaining ecosystem services while building ecosystem as well as community resilience.

An integrated adaptation approach is a vehicle to address differentiated vulnerability among diverse socioeconomic groups. Adaptation approaches that are cross-disciplinary, integrated and holistic in nature allow socioeconomic issues like gender equity and poverty reduction for vulnerable and marginalized rural communities to be addressed. This is particularly important since such communities are often the most dependent on natural resources for their livelihoods and well-being.

DRR and adaptation both benefit from sound management of ecosystems. While the dividing line between DRR and adaptation activities is not always distinct, conservation activities that support healthy ecosystems can provide co-benefit opportunities for both as they may contribute to reducing risk across shorter- (DRR) and longer-term (adaptation) time horizons.

Allowing a landscape context to drive activities may affect the potential for integration. If priority landscapes are selected prior to overlaying threats to biodiversity and climate vulnerability assessments, "place-based" activities may not lead to integration at all sites and levels. This is not necessarily a bad thing, for instance, activities at different scales can be productively linked together, such as site-based interventions and provincial-level interventions to support capacity building or planning. However, these issues should be considered during design. Site selection informed by focused threat and vulnerability and assessments in the design process or very early during implementation will improve the integration potential of place-based activities.

A Results Framework that separates adaptation and biodiversity into individual siloes may hamper integration. If IRs are linked to individual funding streams, there may be less incentive for implementers with different approaches and backgrounds to work together towards common outcomes or objectives. Such an approach is common in USAID given the requirements often associated with different streams of funding. At the same time, in practice it is difficult to maintain such siloes at the community level, where everything is very integrated and interdependent. Targeted beneficiaries are less interested in USAID's funding structure than in getting the holistic support they need to achieve their development goals. (See the RESILIM case for an example of an integrated Results Framework as a different model for integration.)

Reinforce landscape connectivity through integrating community and ecosystem-based approaches. Since vulnerability is often exacerbated by human actions in a larger geographic setting – whether it's upland grazing which is degrading the forest and making the community more vulnerable to floods or landslides, or policies which are affecting broader land uses – ecosystem services are a clear way to link community concerns with broader landscape needs and interventions. This is similar to the systems approach used in the RESILIM case.

Emphasize learning, flexibility and adaptive management. Hariyo Ban's priorities have changed significantly as it gained knowledge and experience and as the activity's broader context evolved. It is important not to over-design activities and to avoid locking into inflexible targets, especially given the dynamic nature of climate change. Instead, we need to recognize "dead ends", respond to opportunities when they arise, and enable adaptive management based on the best available science and information for current and projected future conditions, to achieve optimum results.

With several years remaining, Hariyo Ban will be an important activity from which to learn when designing new landscape-based integrated activities.

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