GLOBAL ENVIRONMENT FACILITY
INVESTING IN OUR PLANET

GLOBAL ENVIRONMENT FACILITY

Financing Adaptation ACTION

Foreword

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Climate change is here, and its impacts on our planet are becoming more serious at an ever increasing pace. Most scientists predict the world will dramatically warm compared to preindustrial levels over the next several decades; even a 2°C increase will likely generate irreversible impacts on both man and nature.

No one knows yet how far-reaching the damage may be, although if one looks over the past 50 years as a guide, natural disasters made more severe by climate change have caused 800,000 deaths and over a trillion dollars in economic loss already. Worse, those least responsible for global warming are the ones most vulnerable to suffer, with growing threats to water and food security, agricultural production, disaster-related safety, and public health. The UN Intergovernmental Panel on Climate Change (IPCC) predicts that up to 150 million people, the majority of whom reside in the world's poorest countries, could

be displaced by climate change by 2050, largely because of sea levels rising between 26 and 59 cm (10-23") in their highest emissions scenario.

There are clear and compelling moral and economic reasons why we need to act now to give the world's most vulnerable the tools they need to adjust to melting glaciers, drier lands, and higher seas.

As a financial mechanism of the United Nations Framework Convention on Climate Change (UNFCCC), the GEF has a unique mandate to deliver on-the-ground benefits to countries needing to adapt to climate change. In recent years, consistent with the increasing recognition of the impact climate change has on development, the GEF established a *Strategic Pilot on Adaptation (SPA),* a pioneering step in climate change financing. The GEF was also entrusted with managing the *Least Developed Countries Fund* (LDCF) and the *Special Climate Change Fund* (SCCF), both established by the Climate Convention. The GEF also provides interim secretariat services to the Kyoto Protocol Adaptation Fund Board.

GEF projects have been a catalytic force for change, helping to deepen decision makers' understanding of how to develop an adaptation project and integrate adaptation measures into development sectors. Thanks to the LDCF's and SCCF's pioneering work, we have financed projects that have balanced the GEF's mandate on adaptation with the development mandate of our implementing agencies. Today we have early results to show for this successful collaboration.

Through its adaptation financing program, the GEF supported the first practical adaptation actions on the ground, working with countries to gather valuable experience that could be leveraged to reduce vulnerability in ecosystems and core development sectors, such as agriculture, water, and health. This publication offers a snapshot of this experience. We trust it can be part of the toolkit countries can use as they seek to manage the next generation of adaptation projects.

What Is the Global Environment Facility?

The Global Environment Facility (GEF) unites 178 member governments—in partnership with international institutions, nongovernmental organizations (NGOs), and the private sector—to address global environmental issues. An independent financial organization, the GEF provides grants to developing countries and countries with economies in transition for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, and persistent organic pollutants. These projects benefit the global environment, linking local, national, and global environmental challenges, and promoting sustainable livelihoods.

Established in 1991, the GEF is today the largest funder of projects to improve the global environment. The GEF has allocated US$8.6 billion, supplemented by more than US$36.1 billion in cofinancing, for more than 2,400 projects in more than 165 developing countries and countries with economies in transition. Through its Small Grants Programme (SGP), the GEF has also made more than 10,000 small grants directly to nongovernmental and community organizations.

The GEF partnership includes 10 agencies: UN Development Programme (UNDP); UN Environment Programme (UNEP); World Bank; UN Food and Agriculture Organization (FAO); UN Industrial Development Organization (UNIDO); African Development Bank (AfDB); Asian Development Bank (ADB); European Bank for Reconstruction and Development (EBRD); Inter-American Development Bank (IDB); and International Fund for Agricultural Development (IFAD). The Scientific and Technical Advisory Panel (STAP) oversees the technical and scientific quality of the GEF's policies and projects.

The GEF and Global Environmental Conventions

The GEF operates as a financial mechanism for implementing the international Conventions on Biodiversity, Climate Change, Persistent Organic Pollutants, and the Convention to Combat Desertification, and collaborates closely with other treaties and agreements.

A Sample of the GEF's Impact on Climate Change

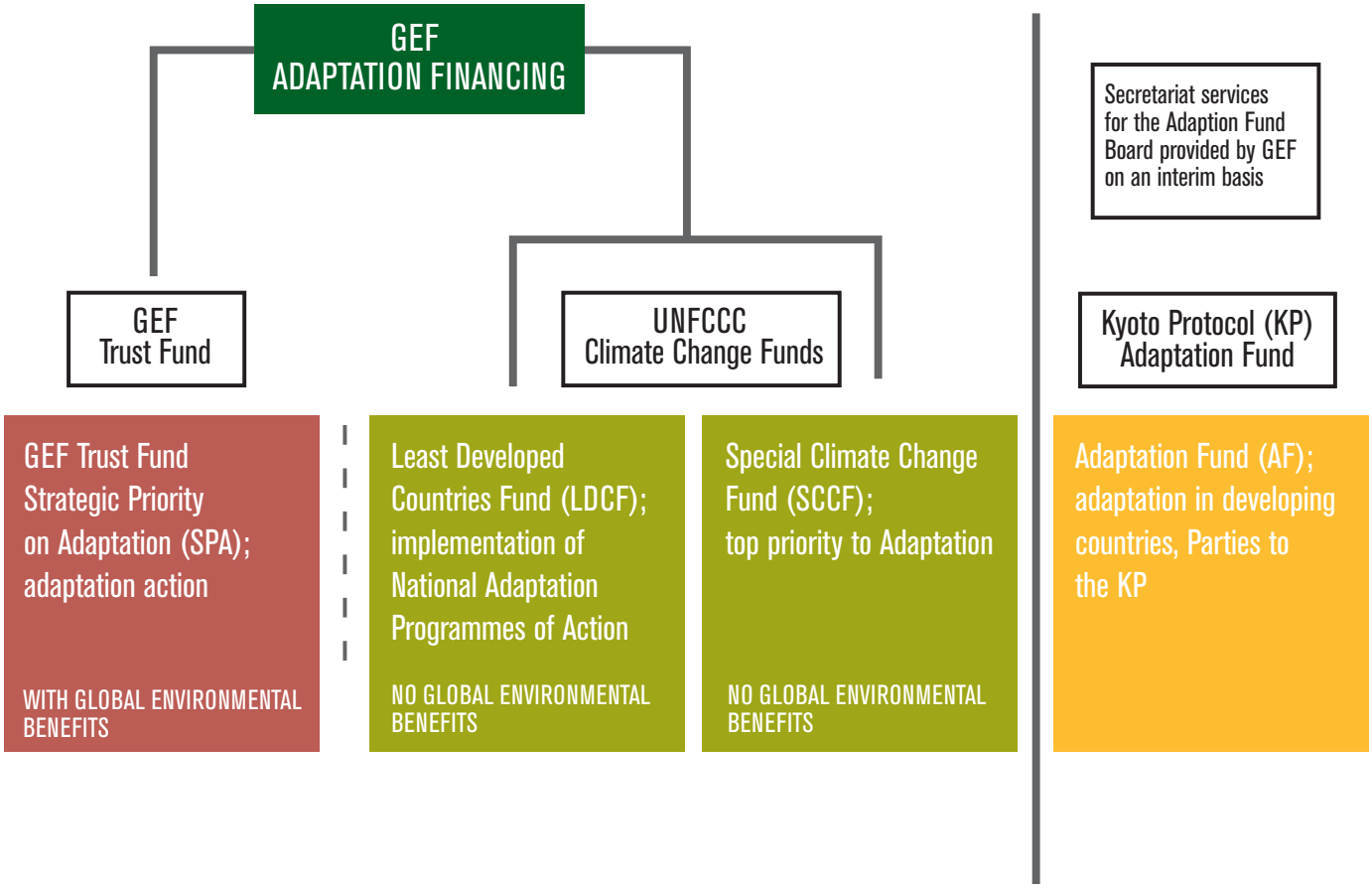
Mitigation

- To date, the GEF has allocated US$1 billion to renewable energy projects and leveraged an additional US$7.9 billion. GEF efforts currently include 186 projects in 88 countries around the world. The investments lead to an installation of renewable energy power capacity of 3 GW and to direct greenhouse gas emission reductions of 1 billion tons of carbon dioxide equivalent.
- The GEF is also one of the largest public sector funders of energy efficiency in the world, with direct investments of US$850 million in more than 90 developing and transition countries and an additional US$5.9 billion in cofinancing. These investments are expected to reduce carbon dioxide emissions by 1.3 billion tons by 2020.
- For its projects dealing with transportation, the GEF has allocated US$201 million and leveraged an additional US$2.47 billion. GEF efforts currently reach 73 cities around the world with a combined population of 244 million. The GEF's transport-related financing has grown more than four times, from US$30 million in GEF-2 to US$126 million in GEF-4, constituting the world's largest sustainable urban transport program.

Adaptation

- The GEF has mobilized US$400 million for adaptation to climate change through the Strategic Priority for Adaptation, the Least Developed Countries Fund, and the Special Climate Change Fund. The GEF also provides secretariat services to the Adaptation Fund Board.

FIGURE 1 THE THREE GEF-ADMINISTERED FUNDS ADDRESSING ADAPTATION



History of GEF Support for Adaptation

Following guidance from the UN Framework Convention on Climate Change (UNFCCC), the GEF originally adopted a "staged approach" toward adaptation. Stage I encompasses studies and assessments and Stage II focuses on capacity building.

Also of note is that GEF has financed vulnerability and adaptation assessments through its support of National Communications under the UNFCCC. Since its inception, the GEF has disbursed more than US$120 million for National Communications, of which a significant amount is allocated by the countries to vulnerability and adaptation studies and assessments.

In addition, GEF-financed projects under Stages I and II have built the capacities of developing countries, and especially small island states, to gather and process data. The projects have also helped establish the institutional and local capacities to move to the next step and start implementing adaptation projects on the ground.

The GEF received the mandate in 2001 to finance adaptation projects on the ground. Thanks to this guidance, the GEF began piloting adaptation action under three financing avenues: 1) Strategic Priority on Adaptation (SPA), a US$50 million pilot within the GEF Trust Fund; 2) Least Developed Countries Fund (LDCF), whose resources are accessible only to the 48 LDCs that have ratified the UNFCCC; and 3) Special Climate Change Fund (SCCF), whose resources are accessible to all developing countries. The funds integrate adaptation measures into development practices.

TABLE 1 PROJECTS IMPLEMENTED BY THE GEF UNDER STAGE II

Project Title	Implementing Agency	GEF Funding ($million)
Caribbean Planning for Adaptation to Climate Change (CPACC)	World Bank	6.5
Pacific Islands Climate Change Assistance Programme (PICCAP)	UNDP	3.44
Mainstreaming Adaptation to Climate in the Caribbean (MACC)	World Bank	5.345
Capacity Building for Stage II Adaptation to Climate Change in Central America	UNDP	3.315
Assessments of Impacts of and Adaptation to Climate Change in Multiple Regions and Sectors (AIACC)	UNEP	7.5
China: Targeted Research Related to Climate Change	UNDP	1.72

Financing Adaptation Action: The New Climate Change Funds

Strategic Priority on Adaptation

The Strategic Priority on Adaptation (SPA) was created in response to Climate Convention guidance in 2001 asking the GEF to finance adaptation "pilot and demonstration projects that have real benefits on the ground." The SPA was a groundbreaking initiative, not only within the GEF context, but also worldwide, because until that time multilateral and bilateral organizations had mainly focused on research, assessments, and screening tools, rather than on-the-ground adaptation interventions. Through this program, the GEF has financed the first concrete adaptation projects, implementing measures for the specific purpose of reducing vulnerability and increasing the adaptive capacity of vulnerable communities and the ecosystems on which their lives depend.

Following are examples of adaptation projects that the GEF has financed through the SPA.

COMMUNITY-BASED ADAPTATION PROJECT — **Helping villagers to define and implement local responses to climate change impacts in their communities in Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger, Samoa, and Vietnam**

It is increasingly recognized that small communities are likely to be the most severely affected by climate change and yet are the least equipped to cope and adapt. This pilot project is designed to implement community-based projects that seek to enhance the resilience of communities, and/or the ecosystems on which they rely, to climate change impacts. It will essentially create small-scale "project/policy laboratories" and generate knowledge about how to achieve adaptation at the local level. Lessons learned from these community projects will then be leveraged to promote replication of successful community practices and integration of lessons learned into policies that promote increased community adaptive capacity.

Eight to twenty small-scale projects will be funded through the Community-Based Adaptation Project in each of the ten participating countries. As the approach is fundamentally bottom up, the funded projects cover a wide spectrum of activities related to climate change adaptation at the junction of biodiversity, land degradation, water resources, and human development—and cannot be described generically. Projects are ultimately defined by specific community needs and priorities, and are developed and implemented directly by community-based organizations. One example of a CBA project being funded in Samoa is described in Box 1.

TAJIKISTAN — **Protecting naturally climate-resilient crop varieties in one of the basic centers of origin for cultivated plants worldwide**

Tajikistan is a major storehouse of globally important agrobiodiversity and represents one of the basic centers of origin for cultivated plants worldwide. At present, 1,880 plant varieties of global significance are cultivated in Tajikistan for food, forage, technical and medical use, and decorative purposes. Biodiversity of Tajikistan's agroecosystems is significant, with nearly 50 percent of cultivated crops being of local variety, (including many common cereal and fruit crops). The richness of the agro-ecosystems is complemented by a large concentration of wild relatives of agricultural plants present in Tajikistan's mountain ecosystems, (including barley, almond, pomegranate, grapes, apples, pear, cherry, and plum). Many of the locally adapted varieties and the wild relatives in Tajikistan are known to have natural resistance to

diseases, harsh climates, and pests and as such constitute a valuable source of genetic material. Tajikistan's agricultural biodiversity is thus not only of importance to the livelihoods of rural communities, to the local economy, and to local long-term food security in the country, but also to global food security, particularly in light of the global challenges of climate change.

These unique agricultural and natural ecosystems in Tajikistan are now facing numerous threats, including conversion of previously marginal land to agriculture leading to rapid land degradation, overharvesting of wild species, habitat destruction from overgrazing, and conversion of traditional land-use practices, based on locally adapted crop species, to a modern system dominated by alien species and heavy application of agrochemicals and irrigation. Climate change is now threatening to further exacerbate the stresses faced by these unique agroecosystems. Key climate change-related threats include an increasingly arid and warm climate and dwindling water resources in the summer period, caused by rapid glacial decline in the neighboring high mountains.

Through SPA and Biodiversity funding, this project will address both baseline and climate change threats to Tajikistan's agrobiodiversity. This will be done by providing farmers and local authorities with the knowledge and skills to address climate change and protect important agrobiodiversity. Farm-based adaptation practices will be piloted, including the demonstration of techniques for water harvesting, soil conservation, and flood protection;

A. Tumbled mangrove trees scattered around the beach
B. Active coastal erosion encroaching on the mangrove forest
C. Freshwater pool threatened by saltwater intrusion
D. CBA team consulting with villagers during field visit to Fasitootai

BOX 1 COMMUNITY-BASED ADAPTATION IN SAMOA

Fasitootai village in Samoa has experienced rapidly accelerating coastal erosion in recent years, destroying the rich local mangroves where villagers harvest mud crabs and fish for food, threatening key infrastructure such as the village school, which is now located only a few meters away from a steep, advancing coastal cliff, and causing fresh water pools providing the main source of drinking and bathing water to the village to be polluted with sea water. Villagers have clearly identified the source of these recent problems as impacts of climate change. Most notably, they have experienced increases in sea levels at high tide; changed wind patterns; and increased frequency of storm surges, cyclonic activity, and high-intensity rainfall—all of which have aggravated coastal erosion. Through the Samoan part of the CBA program, Fasitootai is now receiving funding for a community project to address the impacts of climate change on its coastal resources. The CBA project will assist the village in implementing the first steps toward more climate-resilient coastal resources and livelihoods, including: (i) developing and implementing a climate-resilient natural resource management plan for the village; (ii) upgrading the existing offshore seawall to better mitigate high energy wave impacts during storm surges and high tides; (iii) protecting coastal springs from sea water intrusion; and (iv) building mangrove resilience through targeted and climate-resilient mangrove replanting in strategic areas.

reintroduction of stress-resistant local varieties; and improved cutting practices in forestry. Also, a seed insurance scheme will be tested in selected communities to promote the advantages to local farmers of agrobiodiversity in relation to climate change.

Least Developed Countries Fund

The Least Developed Countries Fund (LDCF) was established in response to guidance from the seventh Conference of the Parties to the Climate Convention in Marrakesh. It is aimed at financing the special needs of the LDCs under the Climate Convention with the priority of preparation and implementation of the National Adaptation Programmes of Action (NAPAs). To date, the GEF has mobilized US$200 million for the LDCF. Developed with the LDCs. This Fund applies a streamlined procedure —including principles, modalities, and criteria to access the funds—that meets the needs of the LDCs. The results speak for themselves. Although these countries are some of the poorest in the world, and the least capable of adapting to the adverse impacts of climate change, 41 of them have already developed and submitted their National Adaptation Programmes of Action (NAPAs), and 32 of them have submitted a concrete adaptation project to the GEF under the LDCF, which will be implemented soon (table 2).

The LDCs have made impressive progress in reducing their vulnerability to climate change. They are now positioned to provide examples of adaptation experience and lessons learned to other countries around the world.

TABLE 2 NATIONAL ADAPTATION PROGRAMMES OF ACTION (NAPAS) IMPLEMENTATION PLANS IN 2008–11

ONGOING IMPLEMENTATION	
1. Bangladesh	5. Cape Verde
2. Bhutan	6. Eritrea
3. Burkina Faso	7. Niger
5. Cambodia	8. Samoa
IMPLEMENTATION START 2009–11	
9. Benin	22. Malawi
10. Burundi	23. Maldives
11. Comoros	24. Mali, two smaller projects by UNDP and FAO
12. Democratic Republic of Congo	25. Mauritania
13. Djibouti	26. Rwanda
14. The Gambia	27. São Tomé and Príncipe
15. Guinea	28. Sierra Leone
16. Guinea-Bissau	29. Sudan
17. Haiti	30. Tuvalu
18. Kiribati	31. Vanuatu
19. LAO People's Democratic Republic	32. Yemen
20. Lesotho	33. Zambia
21. Liberia	

NIGER — **Improving the efficiency of dwindling water resources at the edge of the Saharan desert**

The Sahelian eco- and agricultural systems are very sensitive to even small changes in climate and climate variability. Rainfall patterns are extremely erratic, and can cause floods one year and drought the next. The projected increase in temperature, leading to increased evapotranspiration, and decrease in rainfall will thus further increase climate vulnerability in a society that is already heavily dependent on rainfed agriculture and pastoralism for survival. The adaptive capacity of the Nigerien farmers and pastoralists to deal with such challenges is at best marginal, and non-climate-driven problems such as maladaptive farming practices, for example, overstocking with livestock and plowing of erodible soils, low market access due to poor or nonexistent roads, and rapidly increasing rural populations, leading to expansion of agriculture into previously marginal areas, further exacerbate the situation. Existing problems such as periodic food shortages, unsuitable agricultural practices, and recurrent water shortages will undoubtly only increase unless climate-resiliance strategies are integrated into development efforts in Niger.

Based on top priorities identified in the Nigerien NAPA, this LDCF project will increase the resilience of food production systems and food-insecure rural communities faced with the impacts of climate change. This includes a wide spectrum of new adaptation initiatives implemented in selected pilot communities. Innovative water harvesting measures are being tested for increasing crop productivity and thereby increasing resilience to climate change, for example, the Zai methodology, which entails digging holes of 0.5 m in diameter at intervals of 1–2 m, and filling these holes with a mixture of compost, manure, and topsoil. Rainwater runs off the bare soil surface between the holes and ultimately drains into them. In this way, each Zai hole becomes a biological hotspot, with greater soil-water and nutrient content than the surrounding soil. Crops such as millet, sorghum, and maize are sown in the Zai holes, and their productivity is greatly increased relative to plants sown outside of these holes.

Another initiative to be implemented is the dissemination and testing of more drought-resilient varieties of traditional crops such as millet, sorghum, and maize. The barriers to widespread use of such crop varieties include technical capacity and financial constraints. Seeds need to be bought, and poor rural farmers cannot afford this cost. The proposed project can therefore be instrumental in establishing mechanisms for the sustainable diffusion of drought-adapted crop varieties to vulnerable communities.

The facilitation of food banks is another activity implemented to increase the climate change resilience of local food security. Food shortages often occur for a brief period at the end of the dry season in rural communities, a phenomenon that is likely to increase with climate change. Food banks are one method of supplying food during critical periods. This activity is sustainable, because once the food bank is established, a self-sustaining business is generated, whereby food is bought at a discounted rate from the government, stored in the bank, and then sold to the rural communities.

A final measure implemented to counter the threat of climate change-induced impacts on crop productivity is to improve water management practices. The Niger River is currently underused as a source of irrigation water for several reasons. One is that rainfall patterns have been predictable, and therefore reliance on more expensive alternative sources of water has not been a priority. Second, underutilization of surface water resources through irrigation has been constrained because of a shortage of funds. At present only 10 percent of the 270,000 ha of land suitable for irrigation has been developed in Niger.

A second leg of the project focuses on increasing the institutional capacity of the agricultural sector, especially in regard to information and extension services to farmers. This includes, among other things, distributing seasonal weather forecasts and providing local advice on the design of water and crop management strategies. The project also supports the incorporation of adaptation to climate change issues into provincial and local development and risk management plans.

DEMOCRATIC REPUBLIC OF CONGO — **Helping farmers adapt food production to a shortened rainy season**

Climate change is projected to have highly variable impacts in different regions of the Democratic Republic of Congo (DRC) because of its large size and geographical richness. While temperatures are generally expected to increase, annual rainfall will increase in some central regions around

the equator, while other regions, for example the tropical savannah region in the south of the country where more than 70 percent of the population lives, will experience more frequent and longer-lasting seasonal droughts and a shortening of the rainy season. As rainwater availability drops in these regions, harvests are threatened and populations rendered vulnerable, in both cities and countryside. The consequences of climatic changes and variability, through yield changes, have already been felt in some of the agroecological zones of the DRC. For example, the farming season at the end of the 2005–06 rainy season saw many farmers from the city of Moanda, in the Bas Congo province, harvesting barely a basket of maize for the equivalent of 15 kg of old seeds, as rainfall became rarer in the region.

Considering these impacts on the Congolese agricultural sector, a number of urgent adaptation measures to secure food crop production have been identified in the Congolese NAPA. Two categories of NAPA priorities will be implemented by this LDCF project. First, the project will improve the capacity for meteorological monitoring and forecasting at the national and subnational levels, which in turn improves the foundation for anticipative planning for climate change. Some of the key outcomes from this category of activities are (i) the provision of updated vulnerability/risk maps and impacts maps for use in local and regional planning; (ii) the improvement of seasonal forecasts and agrometeorological bulletins for agricultural services; and (iii) the establishment of an agrohydrometeorological assistance system, which enables the development of dynamic agricultural calendars and calendars to project dates marking the beginning and end of the rainy season. Second, pilot interventions are implemented at the local level among farmers, communities, and agricultural extension services to ensure improved reactivity and resilience to climate change-induced pressures in the agricultural sector, and to facilitate learning that can later be upscaled to the national level. Some of the key adaptation measures to be piloted under this category include (i) diffusion of climate-tolerant varieties of maize, cassava, and rice; (ii) selected farming techniques and climate-resilient soil, water, and crop management techniques; and (iii) updating of crop calendars and technological packets available to farmers for better coping with climate variability.

SUDAN — Helping small-scale farmers and pastoralist to maintain national food security in the face of a drying climate

In Sudan, agriculture, including livestock production, provides the primary means of livelihood for more than 80 percent of the population, accounts for almost all of the domestic supply of staple food, sorghum, millet, and animal production, is responsible for more than 70 percent of the national energy consumption in the form of fuel-wood and other biomass sources, and is overwhelmingly, roughly 90 percent, dependent on rainfed agricultural practices. With projected increases in average temperatures and increasing rainfall variability particularly during the rainy season, the Sudanese population is extremely vulnerable to the impacts of climate change in the agricultural sector. Agroclimatic zones will shift southward, rendering small-scale farmers and pastoralists living in many parts of the country increasingly unable to sustain current production levels of sorghum, millet, and fodder for livestock. The potential impact of these changes on national food security could be severe, especially for the livelihoods of small-scale farmers and pastoralists.

The major objective of the first Sudanese NAPA implementation project under the LDCF is therefore to implement an urgent set of measures that will minimize the effects of climate change on national food security by enhancing the adaptive capacity of small-scale farmers and pastoralists. In meeting this objective, the LDCF project will implement key adaptation activities across three key areas identified in the NAPA as urgent and immediate priorities and which are intimately linked to food security, namely: (i) water resource management; (ii) rainfed agricultural production, and (iii) rangeland productivity. The priority adaptation measures that have emerged from the NAPA consultation for improving food security in the face of climate change include improved water harvesting techniques, heat-resistant plant varieties, new commercial crops, improved small-scale irrigation techniques, wind barriers, intensification of tree planting along irrigation channels, rehabilitation of vegetation cover, and communal rangelands for enhancing livestock resilience.

BHUTAN — **Preventing catastrophic glacial flash floods in Bhutan's heavily populated Himalayan valleys**

Glacial retreat caused by rising temperatures is one of the most urgent concerns across the Himalayas, including in Bhutan. Climate-induced disasters such as landslides and floods have always been widespread in Bhutan, but glacial melt water from rapidly retreating glaciers promises to significantly exacerbate such problems for the densely populated and economically important communities in the main river valleys. The main concern raised in Bhutan's NAPA is that the current holding capacity of high mountain glacial lakes could reach a critical threshold, leading to catastrophic flash floods downstream when natural dams fail under increasing water pressure. Massive flash floods, for example, from the collapse of the huge Thorthormi and Raphstreng lakes' natural dams, would pose a major threat to life as well as infrastructure and economy in the affected valleys.

The objective of this LDCF project is to reduce climate change-induced risks and vulnerabilities from Glacial Lake Outburst Floods (GLOFs) in the Punakha-Wangdi Valley and Chamkar Valleys. This objective is being achieved through a two-pronged strategy. First, the project is implementing measures to directly reduce the risk of GLOFs by preventing GLOFs from taking place in the first place. This part of the project will focus upon artificially lowering the water levels of the critical Thorthormi glacial lake. This activity will also build the necessary technical capacity and serve as a demonstration example for potential replication at other dangerous glacial lakes around the country. Second, the project builds disaster risk preparedness, that is, the capacity to deal with GLOFs if/when they happen. This part of the project sets up an early warning system in the heavily populated Punakha-Wangdi Valley, involving automated sensors monitoring lake levels and the stability of the natural moraine dams holding back the lake water, and the connection of those sensors to a network of sirens warning local inhabitants in case of impending GLOF danger, and develops local evacuation plans that establish escape routes and safe areas where residents can take refuge within reasonable time in case of a GLOF.

Special Climate Change Fund

The SCCF, a separate Fund established by the UNFCCC in 2001, addresses the special needs of developing countries under the climate regime. The Fund includes four avenues of financing: (i) adaptation, which is the top priority; (ii) technology transfer; (iii) energy, transport, industry, agriculture, forestry, and waste management; and (iv) economic diversification. The resources mobilized for adaptation now amount to about US$100 million.

PACIFIC ISLANDS ADAPTATION TO CLIMATE CHANGE PROJECT (PACC) — **A cooperative cross-sectoral approach to adaptation in the Pacific region in Cook Islands, Federated States of Micronesia, Fiji, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu**

Pacific Island States are among the most vulnerable countries in the world to the negative effects of climate change. The potential magnitude of the problem threatens the very existence of some Pacific Island States, and the achievement of sustainable development and Millennium Development Goals. Key impacts include destruction of coastal resources and infrastructure as a result of sea level rise, storm surges, and increased frequency of tropical cyclones; diminishing fresh water resources as a result of reduced rainfall and sea water intrusion into aquifers; and reduced agricultural yields owing to lower and more variable rainfall patterns that lead to increases in drought and flooding episodes.

Vulnerabilities and risks associated with climate change are not currently being addressed in a systematic way in the region. Only very few demonstrations of direct adaptation action in key development sectors have been implemented, and as a consequence little is being replicated and scaled up at the national and regional levels.

The PACC Project will address the lack of practical experience in adaptation in the Pacific region and will provide the foundation for effective and efficient future investment on climate change adaptation. As many of the countries in the region face similar issues related to climate change, the project is based on a regional cooperative model in which each of the participating countries focuses on one specific approach to adaptation in one of three key development sectors targeted by the project: coastal management (Cook Islands, Federated States of Micronesia, Samoa, Vanuatu); food production and food security (Fiji, Palau, Papua New Guinea, Solomon Islands); and water (Marshall Islands, Nauru, Niue, Tonga, Tuvalu). Lessons learned from the individual country pilots will subsequently be captured and disseminated across the region along with more overarching capacity-building activities, both nationally and regionally.

The project in Vanuatu will demonstrate how climate change risks can be taken into consideration when redesigning and relocating local roads. In Solomon Islands the project will focus on climate-resilience of subsistence food production systems on small isolated islands. In Nauru the project will focus on providing alternative water resources and water storage facilities for a raised atoll island. The collective effect of these national pilots will be a comprehensive, cross-cutting set of regionally relevant adaptation pilot experiences.

MONGOLIA — **Managing risks on the steppes; helping Mongolian livestock herders cope with climate change impacts**

Livestock herding is the traditional livelihood activity in Mongolia, contributing about 90 percent of Mongolia's agricultural GDP. Livestock and the nomadic lifestyle are deeply engraved into the Mongolian culture, and, until recently, the majority of Mongolian herders lived nomadic lives, traveling with their herds across the vast grass-covered steppes. However, with post-Soviet modernizations and the transition to a free market economy, many herders have abandoned their traditional nomadic life and settled into a more sedentary livestock pattern. The result has been overgrazing and degradation of pastures, permanent occupation of reserve pastures and areas close to water supply, and destruction of the overall ecological balance on which herding in Mongolia has relied for centuries. On top of these serious problems, Mongolian farmers are now faced with the impacts of climate change, of which the primary concern is projected to be decreasing water availability and desertification caused by decreasing rainfall and lower melt-water volumes from mountain glaciers.

Building on existing efforts to improve pasture and livestock management, countering land degradation, and achieving

more sustainable livelihoods across rural Mongolia, this SCCF project will add measures to help vulnerable herders adapt to the additional risk of climate change. These measures will include (i) climate-resilient restoration of degraded pastures in selected sites to pilot and demonstrate the techniques and potential benefits to herders, for example, weed control and increased vegetation cover with drought-resistant varieties of perennials; (ii) reintroduction of traditional pasture management techniques and modification of the schedule of grazing; (iii) innovative water harvesting techniques built on solar power; (iv) updated natural resource maps adjusted for projected climate change impacts; (v) climate change training and awareness raising through existing local Rangeland Monitoring and Management Committees; and (vi) introduction of an index-based weather insurance product to complement other insurance products issued in the country responding more specifically to the need for addressing climate change risks.

BOLIVIA, ECUADOR, AND PERU — **Adapting to receding glaciers and a less water-abundant future in the Andes region**

Millions of people throughout the Andes region depend on runoff from glacial melting in the highlands for their daily fresh water needs. As Andean glaciers are projected to rapidly recede over the coming years, fresh water access will be severely strained in the region, threatening agriculture, hydropower generation, and public health. The GEF has financed, through the SCCF, a project that will implement measures to meet the anticipated consequences of the catastrophic glacier retreat induced by climate change.

The activities funded by this project include the updating of local and national water management policies, plans to address the long-term impacts of climate change and receding glaciers on water availability, and concrete adaptation pilots to demonstrate how climate change impacts can be integrated into practical development activities across the Andes. Also, funding is provided for an improved system to monitor the state of glaciers and its impacts on the hydrological cycle in the region. Among the pilots being implemented is a new drinking water supply system in Quito, including developing an alternative drinking water source, implementing an integrated monitoring and management system for the catchments supplying the city's water, improving the efficiency of the city's water distribution network, and reducing consumer demand through campaigns and awareness raising. Another pilot, in Peru, targets agricultural production planning and includes measures such as testing and promoting crops that are less water-demanding, demonstrating more water-efficient land and water management practices, and export promotion of new and more drought-resistant crops.

Lessons Learned from Initial Experience on the Ground

The projects described above are some of the first concrete adaptation projects on the ground. Designing, preparing, and implementing these projects have been challenging at different levels. First, countries had different capacities, and the early proposals received by the GEF were mostly framed as studies and assessments. Moreover, only a few countries had identified the adaptation measures to be implemented and were ready to ask for financial support. Through an ongoing dialogue among the countries, the agencies, and the GEF, momentum was created to move from assessments to action. A pipeline of projects started to be developed and submitted that included concrete adaptation practices. The solution involved accepting projects that would include a combination of preparation work and implementation measures.

Thanks to the new climate Funds, innovative approaches are being promoted among the GEF agencies that integrate adaptation into development, programs, and policies.

From the GEF's early experience on adaptation action, here are some lessons learned:

First: The capacity and knowledge baseline vary significantly among countries. Each country has a unique situation that must be taken into account before designing an adaptation project. In some cases, a project will include preparation work aimed at improving knowledge, collecting missing data, or better processing the data before acting. All projects, however, eventually include concrete adaptation actions.

> Although there is still a lack of adaptation knowledge, climate data, and data processing skills, all countries, including LDCs, have collected enough information to start implementing adaptation actions and utilizing the SPA, LDCF, and SCCF to finance their plans.

Second: Climate change affects all sectors of development. Adaptation projects financed under these Funds are aimed at ensuring that food security, access to drinking and irrigation water, sound public health, coastal infrastructure, and other basic needs are preserved despite a changing climate and future challenges that have no precedent in human history. The large majority of projects reviewed under these three programs address the impacts of climate change on agriculture and water supply.

> Adaptation is linked to development; therefore an adaptation project portfolio is aimed at achieving climate-resilient development.

Third: A significant scaling up of adaptation experiences and much larger resources are needed.

> Nevertheless, it is worth noting and taking into account the first results from the GEF experience, because these results are concrete and represent the first interventions on adaptation action on the ground. This initial adaptation portfolio establishes solid ground for future adaptation financing and inspires similar initiatives worldwide.

ANNEX I PROJECTS APPROVED UNDER THE STRATEGIC PRIORITY ON ADAPTATION (SPA)

Country/Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
Albania	Identification and Implementation of Adaptation Response Measures in the Drini-Mati River Deltas	UNDP	1,099,890	984,525
Armenia	Adaptation to Climate Change Impacts in the Mountain Forest Ecosystems of Armenia	UNDP	1,045,000	900,000
Colombia	Integrated National Adaptation Plan: High Mountain Ecosystems, Colombia's Caribbean Insular Areas and Human Health (INAP)	World Bank	6,171,300	9,500,000
Global	Adaptation Learning Mechanism: Learning By Doing	UNDP	788,724	645,000
Global (Bangladesh, Bolivia, Niger, Samoa, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Vietnam)	Community Based Adaptation (CBA) Programme	UNDP	5,510,516	4,525,140
Hungary	Lake Balaton Integrated Vulnerability Assessment, Early Warning and Adaptation Strategies	UNDP	1,131,000	3,090,000
Kiribati	Kiribati Adaptation Program — Pilot Implementation Phase	World Bank	2,070,019	4,800,000
India	Sustainable Rural Livelihood Security through Innovations in Land and Ecosystem Management	World Bank	4,400,000	88,000,000
India	Sustainable Land, Water and Biodiversity Conservation and Management for Improved Livelihoods in Uttarakhand Watershed Sector	World Bank	154,000	83,000,000
India	Integrated Land and Ecosystem Management to Combat Land Degradation and Deforestation in Madhya Pradesh	UNDP	220,000	95,523,750
Mozambique	Zambezi Valley Market Led Smallholder Development	World Bank	1,689,500	21,200,000
Namibia	Adapting to Climate Change through the Improvement of Traditional Crops and Livestock Farming	UNDP	1,100,000	5,795,806
Regional (Dominica, St. Lucia, St. Vincent & the Grenadines)	Implementation of Pilot Adaptation Measures in Coastal Areas of Dominica St. Lucia, and St. Vincent & the Grenadines	World Bank	2,616,000	3,370,000

Country/Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
Regional (Argentina, Bolivia, Brazil, Paraguay, Uruguay)	Sustainable Management of the Water Resources of the la Plata Basin with Respect to the Effects of Climate Variability and Change	UNEP	1,090,000	51,914,711
Regional (Kenya, Madagascar, Mozambique, Rwanda, Tanzania)	Integrating Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation in Southern and Eastern Africa	UNEP	1,090,000	1,265,000
Regional (Senegal, Gambia, Guinea-Bissau, Mauritania, Cape Verde)	Adaptation to Climate Change — Responding to Coastline Change and its Human Dimensions in West Africa through Integrated Coastal Area Management	UNDP	4,360,000	9,729,517
Regional(Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname, Venezuela, R.B.de)	Integrated and Sustainable Management of Transboundary Water Resources in the Amazon River Basin	UNEP	2,200,000	43,780,000
Regional (Papua New Guinea, Solomon Islands, Palau, Federated States of Micronesia, Fiji, Timor Leste, Vanuatu)	Coastal and Marine Resources Management in the Coral Triangle of the Pacific	ADB	1,000,010	15,150,000
Regional (Indonesia, Malaysia, Philippines)	Coastal and Marine Resources Management in the Coral Triangle: Southeast Asia	ADB	1,000,000	76,000,000
Sri Lanka	Participatory Coastal Zone Restoration and Sustainable Management in the Eastern Province of Post-Tsunami Sri Lanka	IFAD	2,101,447	7,569,450
Tajikistan	Sustaining Agricultural Biodiversity in the Face of Climate Change	UNDP	1,100,000	4,000,000
Tunisia	MENARID — Land and Water Optimization Project	World Bank	699,600	75,700,000
Uruguay	Implementing Pilot Climate Change Adaptation Measures in Coastal Areas of Uruguay	UNDP	1,100,000	2,922,900
Yemen	Adaptation to Climate Change Using Agrobiodiversity Resources in the Rainfed Highlands of Yemen	World Bank	4,620,000	4,080,000
TOTAL			**48,357,006**	**613,445,799**

ANNEX II PROJECTS APPROVED UNDER THE LEAST DEVELOPED COUNTRIES FUND (LDCF)

Country/ Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
Bangladesh	Community-Based Adaptation to Climate Change through Coastal Afforestation	UNDP	3,740,000	7,150,000
Benin	Integrated Adaptation Programme to Combat the Effects of Climate Change on Agricultural Production and Food Security in Benin	UNDP	3,498,000	7,600,000
Bhutan	Reduce Climate Change-Induced Risks and Vulnerabilities from Glacial Lake Outbursts in the Punakha-Wangdi and Chamkhar Valleys	UNDP	3,980,555	3,496,224
Burkina Faso	Strengthening Adaptation Capacities and Reducing the Vulnerability to Climate Change in Burkina Faso	UNDP	3,300,000	20,144,595
Cambodia	Building Capacities to Integrate Water Resources Planning in Agricultural Development	UNDP	2,145,000	2,050,000
Cape Verde	Building Adaptive Capacity and Resilience to Climate Change in the Water Sector in Cape Verde	UNDP	3,410,000	13,680,000
Comoros	Adapting Water Resource Management in Comoros to Increase Capacity to Cope with Climate Change	UNDP	3,850,000	5,600,000
DR Congo	Building the Capacity of the Agriculture Sector in DR Congo to Plan for and Respond to the Additional Threats Posed by Climate Change on Food Production	UNDP	3,410,000	4,100,000
Djibouti	Reducing Impacts and Vulnerability of Coastal Productive Systems in Djibouti	UNEP	2,277,000	1,950,000
Eritrea	Integrating Climate Change Risks into Community-Based Livestock Management in the Northwestern Lowlands of Eritrea	UNDP	3,410,000	3,460,000
The Gambia	Strengthening of The Gambia's Climate Change Early Warning Systems	UNEP	1,056,000	2,015,000
Guinea	Increased Resilience and Adaptation to Adverse Impacts of Climate Change in Guinea's Vulnerable Coastal Zones	UNDP	3,377,000	5,250,000
Guinea-Bissau	Strengthening Resilience and Adaptive Capacity to Climate Change in Guinea-Bissau's Agrarian and Water Sectors	UNDP	4,543,000	12,840,000
Haiti	Strengthening Adaptive Capacities to Address Climate Change Threats on Sustainable Development Strategies for Coastal Communities in Haiti	UNDP	3,960,000	7,100,000
Lao PDR	Improving the Resilience of the Agriculture Sector in Lao PDR to Climate Change Impacts	UNDP	4,999,995	4,545,450
Lesotho	Improvement of Early Warning System to Reduce Impacts of Climate Change and Capacity Building to Integrate Climate Change into Development Plans	UNEP	1,809,500	1,763,000

Country/ Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
Liberia	Enhancing Resilience of Vulnerable Coastal Areas to Climate Change Risks in Liberia	UNDP	3,300,000	3,000,000
Malawi	Climate Adaptation for Rural Livelihoods and Agriculture (CARLA)	AfDB	3,623,950	24,393,750
Maldives	Integration of Climate Change Risks into the Maldives Safer Island Development Programme	UNDP	4,763,000	4,290,000
Mali	Enhancing Adaptive Capacity and Resilience to Climate Change in the Agriculture Sector in Mali	UNDP	3,410,000	6,865,000
Mali	Integrating Climate Resilience into Agricultural Production for Food Security in Rural Areas of Mali	FAO	2,325,000	4,200,000
Mauritania	Support to the Adaptation of Vulnerable Agricultural Production Systems in Mauritania	IFAD	3,850,000	4,500,000
Niger	Implementing NAPA Priority Interventions to Build Resilience and Adaptive Capacity of the Agriculture Sector to Climate Change in Niger	UNDP	3,960,000	11,060,000
Rwanda	Reducing Vulnerability to Climate Change by Establishing Early Warning and Disaster Preparedness Systems and Support for Integrated Watershed Management in flood-prone areas	UNDP/ UNEP	3,641,000	3,400,000
Samoa	Integrated Climate Change Adaptation in Samoa (ICCAS)	UNDP	2,255,000	2,150,000
São Tomé & Príncipe	São Tomé and Príncipe: Adaptation to Climate Change	World Bank	3,922,800	2,670,000
Sierra Leone	Integrating Adaptation to Climate Change into Agricultural Production and Food Security in Sierra Leone	IFAD	3,074,280	2,935,000
Sudan	Implementing NAPA Priority Interventions to Build Resilience in the Agriculture and Water Sectors to the Adverse Impacts of Climate Change in Sudan	UNDP	3,400,000	3,000,000
Tuvalu	Increasing Resilience of Coastal Areas and Community Settlements to Climate Change	UNDP	3,366,000	3,140,000
Vanuatu	Increasing Resilience to Climate Change and Natural Hazards	World Bank	2,970,000	5,700,000
Yemen	Integrated Coastal Zone Management in the Gulf of Aden	World Bank	4,950,000	10,000,000
Zambia	Adaptation to the Effects of Drought and Climate Change in Agroecological Zones 1 and 2 in Zambia	UNDP	3,905,000	7,100,000
TOTAL			**94,016,285**	**181,092,569**

ANNEX III PROJECTS APPROVED UNDER THE SPECIAL CLIMATE CHANGE FUND (SCCF)

Country/Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
China	Mainstreaming Adaptation to Climate Change Into Water Resources Management and Rural Development	World Bank	5,847,600	50,000,000
Ecuador	Adaptation to Climate Change through Effective Water Governance	UNDP	3,651,500	6,000,000
Egypt, Arab Rep. of	Adaptation to Climate Change in the Nile Delta	UNDP	4,500,000	5,200,000
Ethiopia	Coping with Drought and Climate Change	UNDP	1,084,550	1,866,667
Ghana	Climate Change and Human Health Programme	UNDP	2,000,000	3,850,000
Global	Economic Analysis of Adaptation Options in support of decision making	UNEP	1,100,000	2,475,000
Global (Barbados, Fiji, Uzbekistan, Jordan, Bhutan, Kenya, China)	Piloting Climate Change Adaptation to Protect Human Health	UNDP	5,466,654	16,925,000
Guyana	Conservancy Adaptation Project	World Bank	4,142,000	16,200,000
Kenya	Adaptation to Climate Change in Arid Lands (KACCAL)	World Bank/UNDP	7,401,100	44,844,681
Mexico	Adaptation to Climate Change Impacts on the Coastal Wetlands in the Gulf of Mexico through Improved Water Resource Management	World Bank	5,280,000	21,000,000
Mongolia	Mongolia Livestock Sector Adaptation Project	IFAD	1,815,000	3,640,000
Morocco	Integrating Climate Change in Development Planning and Disaster Prevention to Increase Resilience of Agricultural and Water Sectors	World Bank	4,999,999	100,200,000

Country/Region	Project Title	Agency	GEF Total Costs (US$)	Cofinancing Total (US$)
Mozambique	Coping with Drought and Climate Change	UNDP	1,046,400	929,840
Pakistan	Promotion of Rural Livelihoods through Adaptation Support Programme	IFAD	2,889,700	13,350,000
Philippines	Climate Change Adaptation Project	World Bank	5,782,700	25,430,000
Regional (Bolivia, Peru, Venezuela, R.B.de)	Design and Implementation of Pilot Climate Change Adaptation Measures in the Andes Region	World Bank	8,888,000	21,750,000
Regional (Cook Islands, Micronesia, Fiji, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu)	Pacific Islands Adaptation to Climate Change Project (PACC)	UNDP	14,823,000	44,703,799
South Africa	Reducing Disaster Risks from Wildfire Hazards Associated with Climate Change in South Africa	UNDP	3,999,996	32,000,000
Tanzania	Mainstreaming Climate Change in Integrated Water Resources Management in Pangani River Basin	UNDP	1,090,000	1,574,875
Vietnam	Climate-Resilient Infrastructure Planning and Coastal Zone Development in Vietnam	ADB/UNDP	3,850,000	177,065,000
Zimbabwe	Coping with Drought and Climate Change	UNDP	1,071,470	1,156,000
TOTAL			**90,729,669**	**590,160,862**

ANNEX IV PROJECTS READY TO BE FINANCED UNDER THE SPECIAL CLIMATE CHANGE FUND (SCCF)

Country/Region	Project Title	Proposed SCCF Funding (US$)	Proposed Cofinancing (US$)
Azerbaijan	Integrating Climate Change Risks into Water and Flood Management Practices of Vulnerable Rain-Fed Farmers of the Greater Caucasus Region of Azerbaijan	1,000,000	1,000,000
Bangladesh and Western India	Climate Change, Environment and Migration in Bangladesh and Western India	1,072,500	1,850,000
Chile	Targeted Research on Climate Change Impacts on Southern Mid-Latitude Ice Masses	46,000	TBC
China	Rural Water Resource Utilization in Eastern Qinghai	7,000,000	40,000,000
Cook Islands	Cook Islands Infrastructure Development Project (Phase 2) — Increasing Climate Resilience of Island Infrastructure	5,000,000	16,100,000
El Salvador	Integrating Adaptation to Climate Change into Local Development at the Community Level in the Central Coastal Plain Municipality of Jiquilisco	3,000,000	TBC
Georgia	Adaptation Measures for the Black Sea Coastal Zone of the Poti Port Area and Rioni Delta	1,000,000	1,000,000
Honduras	Adaptation to Climate Change	8,050,000	33,000,000
India	Sustainable Coastal Protection and Management Project (SCPMP)	4,000,000	418,400,000
India	Climate-Resilience Development and Adaptation	5,500,000	16,000,000
Indonesia	A Programmatic Approach Supporting Local Government and Communities of the Indonesian Province of Nusa Tenggara Timur (NTT) to Adapt to Climate Change and Cope with Existing Impacts	5,000,000	TBC
Jordan	Agriculture and Rural Livelihoods Adaptation to Climate Change project	3,465,000	9,000,000
Kyrgyzstan	Introducing Climate Risk Management to the Rural Communities of Issyk Kul Region of Kyrgyzstan	1,000,000	1,000,000
Maldives	Enhancing the Resilience of the Maldives to Climate Change through Integrating the Tourism Sector and Associated Communities into National Adaptation Planning	3,030,000	TBC
Mongolia	Adaptation of Mongolia's Livestock Sector to Climate Change	4,000,000	TBC
Nicaragua	Mainstreaming Adaptation toward an Integrated Water Management System	3,000,000	TBC
Pakistan	Climate Change-Induced Risks and Vulnerabilities from Glacial Lake Outburst Floods in Northern Pakistan	4,000,000	TBC
Palau	Adaptation Cluster: a Framework to Support CCA Measures and Investments for Agriculture, Tourism, Water Resources and Infrastructure	6,000,000	23,500,000
Seychelles	Adaptation of the Water Sector to Climate Change	4,700,000	8,000,000
Solomon Islands	Improving the Adaptive Capacity of Communities in Solomon Islands to the Impacts of Climate Change and Climate Variability in the Health Sector	25,000	TBC

Country/Region	Project Title	Proposed SCCF Funding (US$)	Proposed Cofinancing (US$)
Sri Lanka	Strengthening Capacity for Climate Change Adaptation	7,000,000	TBC
Tunisia	Adaptation to Climate and Coastal Changes in Tunisia	1,046,750	2,000,000
Vietnam	Adaptation to Climate Change in Ho Chi Minh City, Phase II	12,000,000	935,000,000
Regional: South Africa, Zambia, Kenya, Ethiopia, Cameroon, Niger, Senegal, Ghana, Egypt Arab Rep. of, Burkina Faso	Microeconomic Costing of Discrete Adaptation Options in the Agriculture Sector: A Sub-National Level Analysis of the Welfare Gains of Dynamic Adaptation	2,000,000	TBC
Regional: South Africa, Botswana, Mozambique, Zimbabwe	Community Adaptation to Climate Change in the Limpopo Basin	4,450,000	12,000,000
Regional: Afghanistan, India, Pakistan	Glacial Melt and Downstream Impacts on Indus-Dependent Water Resources and Energy	25,000,000	2,600,000,000
Regional: Indonesia, Malaysia, Papua New Guinea, Philippines, Solomon Islands, Timor Leste	Adaptation in the Coral Triangle (ACT)	20,000,000	290,000,000
Regional: India and Pakistan	Information Sharing System (ISS) to Enhance Coping Capacities of Farming Communities in Dealing Effectively with Climate Variability and Climate Change	550,000	500,000
Regional: China, Timor Leste, Solomon Islands, Vietnam	Increasing Climate Resiliency of the Transport Sector in the Asia-Pacific	30,000,000	1,089,500,000
Regional: Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan	Central Asian Countries Initiative for Land Management (CACILM) – Incorporating Climate Change Adaptation and Resiliency into Sustainable Land Management in Central Asia	20,000,000	TBC
Regional: Uzbekistan, Tajikistan, Pakistan	Building Climate Resiliency for Irrigation Infrastructure and Agro-Business	20,000,000	TBC
Global (10 countries)	Integrating Climate Change Risks into the Design and Piloting of Social Protection Programmes	10,000,000	TBC
Global: Indicative 10 countries Cambodia, Sri Lanka, Ghana, Tunisia, Tanzania, Uruguay, Peru, Senegal, Albania, Philippines	Supporting Sub-National Level Decision Makers to Prioritize Adaptation Initiatives within Development Planning Frameworks	10,000,000	TBC
Global: Indicative 10 countries Tanzania, Peru, Barbados, Nicaragua, Mali, China, Sri Lanka, Indonesia, Tajikistan, Tunisia	Upscaling and Replicating Successful Approaches to Adaptation at the Local Level (additional 10 countries)	5,000,000	TBC
Global: All regions	Adaptation Learning Mechanism: Interactive Audio-Visual Learning Facility Aimed at Promoting the Exchange of Climate Change Practices	5,000,000	TBC
TOTAL		**241,935,250**	**5,497,850,000**

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