

South-South Cooperation for Upscaling Nature Based Solutions for Climate Adaptation

Technology Transfer through Long-term Research of Pilot Projects in Mauritania, Nepal, and Seychelles

PROJECT FULL NAME	COUNTRY & REGION	IMPACT AREAS	IMPLEMENTING AGENCY
Enhancing Capacity, Knowledge and Technology Support to Build Climate Resilience of Vulnerable Developing Countries (EbA South)	Global (Mauritania, Nepal, Seychelles) 	<ul style="list-style-type: none"> ▪ Biodiversity ▪ Land Degradation ▪ Sustainable Forest ▪ Poverty Reduction ▪ Food Security ▪ Socio-economic Benefits ▪ Health ▪ Education 	United Nations Environment Programme (UNEP)
	FOCAL AREAS		EXECUTING AGENCIES
GEF PROJECT ID: 4934	<ul style="list-style-type: none"> ▪ Climate Change Adaptation 		National Development and Reform Commission of China through the Institute of Geographic Sciences and Natural Resources Research – Chinese Academy of Sciences (IGSNRR-CAS)
PROJECT TYPE: FSP			
GEF PERIOD: GEF-5	GEF Project Grant \$4,900,000	Co-financing Total \$34,700,000	GEF Fund SPECIAL CLIMATE CHANGE FUND (SCCF)

Summary

This SCCF project is recognized as a flagship initiative for South-South cooperation, enabling an exchange of technology transfer, capacity-building, policy support or fundraising between countries in the Global South. The project catalysed global and regional collaboration on Ecosystem-based Adaptation (EbA), especially sharing China's experience and research know-how in ecological restoration and climate change adaptation. Nature-based solutions for climate adaptation were piloted in key vulnerable ecosystems, like deserts in Mauritania, mountains in Nepal, and coasts in Seychelles. The project demonstrated various best practices, such as collaborating with local universities on long-term research, which resulted in the publication of many research papers that share key lessons from pilot EbA

in three countries. In addition, the project produced a wide range of tools and knowledge products to encourage nature-based solutions for adaptation through South-South cooperation. As a result, 450 ha in the deserts of Mauritania and 20 ha of mangroves in Seychelles are going to be restored ecologically once the trees have matured; 840,000 seedlings were planted in Nepalese watersheds to increase water supplies and reduce soil erosion; 34 technical reports and research papers were developed; and almost 4,900 people were reached through public awareness activities. A dedicated website for the project focused not only on sharing project approaches and outcomes but also lessons, toolkits, and best practices on EbA for a broad audience: <http://www.ebasouth.org/>.



Tree nursery on Praslin Island in the Seychelles. @UN Environment Programme / Aidan Dockery

The project generated several key lessons. First, project preparation needs to be rigorous and scientifically based to generate valid and reliable evidence for interventions; early capacity-building would help for sound implementation. Second, continuous consultation with local communities to understand local socio-economic conditions, and consensus building and communication with local communities and governments about long-term benefits and trade-offs, are critical for sustainability of EbA. Third, adaptive management is necessary to ensure the sustainability of interventions and needs to be integrated into project design. Fourth, EbA investments are still experimental in nature, which means it is critical to document lessons learned. Finally, cross-nation exchanges were important due to limited local EbA experiences and to improve quality of South-South cooperation; professional interpreters help improve the flow of knowledge and learning.

Results and benefits

The project's key results to date are below.

- Successfully promoted South-South cooperation on EbA, particularly through exchanging knowledge and experience from China to the pilot countries and beyond, as well as peer to peer learning among the pilot countries. This created a community of practice for further replication and extension of the EbA approach.
- Ecologically restore 450 ha in the deserts of Mauritania and 20 ha of mangroves in Seychelles once the trees have matured and planted over 840,000 seedlings on the mountain slopes in Nepal, with multiple alternative livelihood options piloted.
- Established long-term research programs in partnership with local universities in three countries to measure the short- and long-term effects of EbA interventions within the project and developed 34 technical reports and research papers.
- Developed a large number of knowledge products, such as EbA planning tools, handbook, education curriculum, good practice case studies, lessons learned from the project, and an interactive web-based platform for effective EbA planning and implementation.
- Reached almost 4,900 people through climate change awareness-raising at international, national and community levels.

- Supported 187 households to diversify their food production through vegetable farming and beekeeping, which increased resources for personal consumption and extra income in Nepal.
- Put forward the revision of related policy, which was later approved as the Seychelles wetland policy and action plan (2018-2022) by the Ministers of the Cabinet. The policy defines wetlands and the types of wetlands, as well as their status, trends, and threats.
- Developed sustainable financing plans for ecological restoration in Seychelles based on market assessments of ecosystem services (e.g. ecotourism), which have been used for cost-benefit analyses of adaptation interventions.¹
- Create multi-use greenbelts once the trees have matured in Mauritania using indigenous drought-resilient species. These greenbelts protect crops from wind erosion and desertification by holding the soil and retaining moisture in the ground.
- Built community-managed tree nurseries to supply the required trees for desertification control in Mauritania. Training was also provided to understand which trees to plant for desertification control.

Environmental challenge

Climate change has substantial impacts on local communities in Asia-Pacific and Africa regions because communities heavily rely on ecosystems for their livelihoods. Temperatures are rising and the frequency and intensity of climate-related disasters such as floods, landslides, fires, and droughts is increasing. Thus, associated negative effects include, inter alia, a decline in agricultural productivity, deterioration in the natural resource base, and undermined livelihoods. Furthermore, communities have limited capacity to cope with the effects of climate change. Given that livelihoods of vulnerable local communities are integrally linked to natural resources, EbA potentially offers low risk and cost-effective means of building the resilience of such communities to climate change. This is because such an approach focuses on maintaining the flow of goods and services provided by well-managed ecosystems such as hydrological regulation, soil retention, climate regulation, and the provision of food, building materials, or medicinal plants.



In Seychelles, Planting mangroves@ EbA South

However, there is limited information and technical capacity available for effective implementation of EbA—guided by evidence-based decision-making—across Africa and Asia Pacific. This is because i) information on the long-term efficacy of climate change adaptation and ecosystem management interventions is not being collated, synthesized, analyzed, and disseminated; ii) EbA interventions are not being implemented within a rigorous scientific framework of long-term research; iii) policy and legal frameworks are not incentivizing large-scale EbA; and iv) training on good practices for EbA is not being provided to ecosystem managers and adaptation practitioners. This SCCF project aimed to enhance the climate resilience of communities in Mauritania, Nepal, and Seychelles by building institutional capacity, mobilizing knowledge, and transferring appropriate EbA technologies. The project also planned to address these gaps by catalyzing large-scale implementation of EbA technologies across Africa and Asia-Pacific regions.

Integrated approach and key features

EbA interventions for technology transfer and long-term research

Although EbA intervention and post-project maintenance vary according to social, economic, and biophysical contexts, knowledge sharing and practical learning on EbA technology took place mainly through the joint development and implementation of the Long-Term Research Programme (LTRP) and EbA

¹ Based on ecosystem services assessment, the analysis provided comparative information of human benefit and cost on EbA between the “2028 Without Intervention scenario”, “2028 With Intervention scenario”, and “2028 Catchment management + Drains scenario”, which could be good quantitative information for decision making on continuous intervention. A detail of ecosystem services assessment is in the “Ecosystem Services Supply, Demand and Values at Petit Barbarons, Seychelles - Final Report (September 12, 2028)”, available at http://www.ebasouth.org/sites/default/files/attachments/Seychelles%20EbA%20Ecosystem%20Services%20Scenarios%20Final%20Draft%20v2_cleared.pdf.

interventions. In Nepal, for example, the development of EbA interventions started with assessing local practices and determining whether these practices can be improved or upscaled before introducing new approaches. A local expert identified practices through extensive field visits and interviews with local stakeholders, including community forest groups, women's groups, farmers, and district officers. Based on these findings, the Chinese and South African experts designed possible interventions together with the local expert and advised on their implementation and monitoring against project indicators and targets. The EbA interventions included setting up plant nurseries and seedling propagation; mixed plantation of bamboo, banana, and salix on degraded riverbanks for soil erosion control; and cardamom plantations and crop diversification to improve livelihoods.

The LTRP included establishment of a permanent monitoring site, as well as research on the short- and long-term effects of EbA interventions. For instance, to establish the monitoring site in Nepal, the Nepalese experts were first invited to visit the Ecosystem Research Network stations in China to see how the monitoring sites were set up, operated, and contributed to research activities. Specific research data and equipment needs for watershed management from the Nepalese side were jointly identified with South African experts. The Ministry of Population and Environment (now called the Ministry of Forests and Environment), together with Chinese experts, then identified Tribhuvan University as a partner to lead the LTRP. The site with monitoring plots and a meteorological station was established in 2016 and complemented by a hydrological station in 2017. The data collected are used at local level and integrated into the national level through the Ministry of Hydrological and Meteorology. This site will be independently managed by Tribhuvan University together with the Government of Nepal beyond the project period.² The project also contributed to the development of Nepal's national adaptation plan.

Chinese and South African experts on data-collection methodologies provided trainings to develop early capacity in countries. These trainings included developing and conducting household surveys to measure vulnerability and awareness changes in response to EbA interventions. Technology transfer took

place between Chinese and Nepalese experts, as well as between experts from Mauritania and Seychelles through interregional capacity-building workshops, exchange visits, and a web-based knowledge platform. The Chinese technology involving EbA in the Green Wall in the heart of the Takalamakan deserts was of value for the Mauritania work. In addition, Chinese and Mauritanian ecologists and scientists involved in the project held many exchanges.³

South-South cooperation for knowledge exchange and capacity building

South-South cooperation was at the centre of this project. Starting from its design stage, the project jointly developed an EbA implementation plan among the three pilot countries, while interregional cooperation in Africa and Asia-Pacific on knowledge exchange and capacity building was designed in parallel to enable and enhance the EbA piloting process. EbA is considered as one of the most cost-effective, durable and pro-poor solutions for developing countries, hence South-South cooperation allows effective EbA exchange among developing countries that have common challenges and solutions of conservation and livelihoods. Joint development of the plan enabled the three countries to exchange ideas and challenges with others and experts despite different ecosystems and social and political backgrounds. These exchanges continued throughout implementation. The three countries, EbA experts, and the project coordinators regularly met through the steering committee, workshops, training, site visits, and conferences. By trying to achieve the common goal of building climate resilience through EbA, the participating countries created an organic community of practice to address design and implementation challenges.

To exchange EbA experience among the three pilot countries and beyond, workshops for knowledge sharing took place in Asia-Pacific, Africa and Latin America for the benefits of developing countries at large. For instance, "South-South Exchange Workshop: Ecosystems for Climate Change Adaptation and Sustainable Livelihoods Knowledge Sharing" was held in Beijing, China in April 2018. Advanced training workshops on ecosystem monitoring and management for developing countries were organized in 2015 and 2016.⁴ A capacity-building workshop for access to finance for EbA and EbA mainstreaming was also organized in South Africa in 2017. An international

² In Seychelles, the Ministry of Environment, Energy, and Climate Change signed a Memorandum of Understanding (MoU) with the University of Seychelles to develop a long-term research program focused on climate change adaptation. The École Normale Supérieure de Nouakchott and the Government of Mauritania also signed an MoU.

³ Seychelles requested Geographic Information System (GIS) training. Thus, GIS workshops in China were organized for three pilot countries and ten other countries.

⁴ Training workshops were funded by the Chinese Ecosystem Research Network / Chinese Academy of Sciences.



In the Nepalese mountains, a tree nursery contains seedlings to protect crops from floods, drought, and erosion. @EbA South

exchange visit to Mauritania was organized in July 2018, gathering project members from Seychelles and Nepal.⁵ This visit was an opportunity for project members to share experience and lessons learned from implementation of EbA interventions in a South-South Cooperation perspective. A web-based knowledge platform allows China to share its wealth of ecosystem management experiences with other developing countries. The platform facilitates collaboration via webinars, case studies, and EbA planning tools and other knowledge products.

This South-South exchange of knowledge culminated in an array of publications and tools now used by practitioners across the Global South. For example, the project produced an EbA planning tool, “ALivE – Adaptation, Livelihoods and Ecosystems” in partnership with the International Institute for Sustainable Development and the International Union for Conservation of Nature. The application of this tool and interest in it have been extended beyond the geographical focus of the project, including potential use by government planners through the process of national adaptation plan development. Government staff in the three pilot countries were trained on the planning tool as well. In addition, the “Ecosystem-based Adaptation: A Handbook for EbA in Mountain, Dryland and Coastal Ecosystems” was developed in partnership with the International Institute for Environment and Development (IIED) and widely disseminated through different platforms. The handbook is listed among the top 10 most downloaded IIED publications in

2018. These workshops and knowledge products provided great opportunities to share and exchange various experiences of the project to scientists and practitioners in the wider EbA community. Applying the project experience and knowledge tools, another EbA project with a similar concept has been developed in the Mekong river basin. More importantly, the high-level Forum on South-South Cooperation on Climate Change was initiated by the project on the side-lines of UNFCCC COP during 2013–2017 that has been taken up by the Executive Office of the UN Secretary-General later on. This forum provides a unique complementary avenue for strengthening global partnerships, through cooperation among Southern partners. The importance of South-South Cooperation on Climate Change was highly acknowledged by ministers, principals of UN agencies and other prominent international organizations.

Lessons learned

Science-based intervention and continuous consultation

Preparation of EbA interventions should include rigorously and science-based analyses to generate valid and reliable evidence for intervention, potential benefits, and trade-offs at the project sites. In addition, in-depth stakeholder consultations and agreement for short-term compensation to community members for losing productive land are important. Without clear understanding of long-term benefits and trade-

⁵ It included a two-day field visit and a half-day wrap-up meeting.

offs of EbA and agreement with local communities, sustainability of interventions will be difficult. Project sites in Nepal and Mauritania had potential trade-offs (planting trees for products such as fruit, medicine, and timber and restoring lands versus keeping land as grazing ground for cattle). For example, some local communities in Nepal did not fully recognize they could not use land as grazing ground for cattle after the project. Once they understood the trade-off, they were no longer interested in planting and taking care of trees. As a result, after having spent considerable time and funding on propagating seedlings in nurseries, the project needed other sites.⁶ In Mauritania, the first identified project site was abandoned after several years because of land-use conflict within affected communities, and project sites were replaced. In both Nepal and Mauritania, some community members found that using certain degraded ecosystems for livelihoods was better than restoring ecosystems, which would only result in benefits in the future. Interest of community members in EbA intervention also depends on land tenure.

The project started consulting with local communities at the Project Preparation Grant (PPG) stage, successfully building trust and understanding

of the complex socio-economic situation. The PPG period, however, was not long enough to reach the local communities that would engage on the ground; to build trust between local communities and a project team and governments; or to fully understand the complex socio-economic situation and local governance in project sites. Therefore, it is vital to continue consulting beyond the PPG period. From the project experience, incentives for commitments to EbA included desires to: i) manage climate change for society; ii) claim rights to abandoned agricultural land; iii) increase income from timber and non-timber forest products; iv) improve the aesthetics of the landscape; v) reduce soil erosion; and vi) leave a legacy for future generations.

Adaptive management to ensure the sustainability of Interventions

Opportunities for project sustainability vary according to each EbA site. Thus, adaptive management is key to ensure sustainability of interventions, and should be built into project design. Early-stage design of the project needed to adjust to ecological conditions, extreme weather, socio-economic situations, political changes, and delays. For example, extreme winds and high temperature in Mauritania killed about half the



Tree planting day in Mauritania. @ EbA South

⁶ These seedlings were still used so they weren't wasted.

planted seedlings at some sites. They also reduced the amount of time staff could spend in the field, which greatly delayed planting. This, in turn, led to planting seedlings at the end of the rainy season. The project overcame these issues by irrigating and planting additional trees. Nepal experienced a big earthquake and political change, and Seychelles had serious flooding during project implementation. EbA projects always need to adapt to unexpected ecological and socio-economic conditions in various ecosystems. Thus, adaptive management is indispensable, and documentation of how the projects addressed challenges and lessons learned are vital assets for planning.

Documentation of lessons learned from EbA interventions

EbA investments are still experimental, making it critical to document the long-term efficacy of climate change adaptation and ecosystem management interventions on both successes and failures, particularly for upscaling of EbA. Early capacity-building in countries also helped share scientifically sound data and lessons learned. There are many environmental, economic, and social variables involved in getting EbA to be sustainable, and it is important to document good practices, as well as lessons and challenges from the pilot sites. The project design enabled all three countries to employ LTRP in partnership with local universities. Together, they measured and reported the short- and long-term effects (ecological, hydrological, and socio-economic) of EbA interventions. Activities included establishing monitoring sites, research, collecting data and publishing findings.⁷ Permanent plots to monitor the impacts of interventions (e.g. on run-off, soil erosion, and landscape as a whole) have been established and were taken over by the universities after the project ended. Institutional cooperation with the Chinese Academy of Sciences was strengthened in sharing experience in long-term research and monitoring of climate change and effects of ecosystem management in pilot countries. With this strong data collection and research component, the project identified lessons that can inform scaling up of EbA.

Professional interpreters to improve the flow of knowledge and learning

The project generated significant engagement among EbA practitioners, government officials, and scientists from China, Nepal, Seychelles, and Mauritania. However, flow of knowledge and learning can be

improved with hiring of professional interpreters during expeditions and workshops. Cross-nation and regional scale EbA exchanges were always important due to limited local EbA experiences, and upscaling or policymaking needs to refer to successful experiences. Data, findings, ideas, and experiences from a wide range of ecosystems were shared during field trips and workshops in all four countries. Communication in these engagements was, however, often greatly constrained by the language barrier. English was the medium of collaboration although it was a second or third language of most participants. The language barrier also limited collaboration after workshops. Knowledge exchange in a workshop setting is relatively short-lived unless the experience leads to personal relationships and professional collaborations. Thus, the hiring of professional interpreters with scientific knowledge during expeditions, as well as in workshops, would have increased the benefits of collaboration.

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⁷ In total, 14 technical reports and research papers were developed for Nepal; 7 for Seychelles; 12 for Mauritania; and 1 for the whole project. These included research reports co-authored by government, theses for bachelor's and master's programs, and peer-reviewed papers.



Planting day with school children @EbA South

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The GEF Good Practice Briefs showcase examples of GEF investments that align with GEF strategies and GEF programming directions and policy recommendations. The GEF Secretariat selected featured projects from a pool of nominations by GEF agencies, taking into consideration approaches used to generate multiple global environmental benefits and co-benefits, and to achieve clear results and/or sustainability. Because the Good Practice Briefs include projects implemented under different contexts, the practices highlighted should not necessarily be considered universally applicable.

The Global Environment Facility was established on the eve of the Rio Earth Summit to tackle our planet's most pressing environmental problems. Since then, it has provided more than **\$21.7 billion** in grants and mobilized an additional **\$119 billion** in co-financing for more than **5,000 projects** and programs. The GEF is the largest multilateral trust fund focused on enabling developing countries to invest in nature, and supports the implementation of major international environmental conventions including on biodiversity, climate change, chemicals, and desertification. It brings together 184 member governments in addition to civil society, international organizations, and private sector partners. Through its Small Grants Programme, the GEF has provided support to more than 26,000 civil society and community initiatives in 135 countries