



Promising cases of forest and landscape restoration in Asia and the Pacific

**Based on the guiding principles of the United Nations
Decade on Ecosystem Restoration**



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Abbreviations and acronyms

APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
CBEMR	Community-based ecological mangrove restoration
CFUG	Community forestry user group
COMDEKS	Community Development and Knowledge Management for the Satoyama Initiative
ERC	Ecosystem Restoration Concession
FAO	Food and Agriculture Organization of the United Nations
FLOURISH	Production-driven forest landscape restoration under REDD+ through private sector - community partnerships in Viet Nam
FLR	Forest and landscape restoration
FORRU-CMU	Forest Restoration and Research Unit at the Chiang Mai University
FSM	Framework Species Method
FUG	Forest user groups
GEF	Global Environment Facility
Ha	hectare
IDRC	International Development Research Centre
IUCN ARO	IUCN Asia Regional Office
LI-BIRD	Local Initiatives for Biodiversity, Research and Development
MSN	Mangrove Service Network
NGO	Non-governmental organization
NTFP	Non-timber forest product
RECOFTC	Center for People and Forests
REDD	Reducing emission from deforestation and forest degradation
RMB	Renminbi (Chinese Yuan)
SDG	Sustainable Development Goal
TAL	Terai Arc Landscape of Nepal
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Education, Scientific and Cultural Organization
UNWTO	United Nations World Tourism Organization
USD	United States dollar
WWF	Worldwide Fund for Nature

Summary

Forest and landscape restoration (FLR) is gaining momentum through the United Nations Decade on Ecosystem Restoration, 2021–2030. National commitments for FLR are increasing under the three Rio conventions (United Nations Framework Convention on Climate Change, Convention on Biological Diversity, United Nations Convention to Combat Desertification), the Bonn Challenge, the New York Declaration on Forests, the Glasgow Leaders' Declaration on Forest and Land Use, and the Forest and Climate Leaders' Partnership. These restoration-linked targets and declarations at the global level also include countries in Asia and the Pacific, with a wave of regional-level FLR targets and initiatives such as the ASEAN Green Initiative, Landscape Partnership Asia and the Regional Strategy and Action Plan for FLR in Asia-Pacific.

FLR ambitions and efforts on the ground are strong. Many different types of approaches, tools and innovative financing methods are being employed. Interest is also robust in upscaling successful FLR that can contribute to enhancing or maintaining the delivery of ecosystem services, addressing climate change and biodiversity loss, and promoting poverty alleviation, food security and economic development. However, better understanding of enabling conditions for successful FLR is needed to help decision-makers and project formulators facilitate the replication and upscaling of effective FLR, especially in the context of the FAO Regional Strategy and Action Plan for Asia-Pacific region.

In this context, the FAO Regional Office for Asia and the Pacific, with support from IUCN, has examined FLR experiences in the region to identify promising FLR cases in various country settings and ecosystem types. This publication presents 15 promising cases, selected from 150 projects, based on their alignment with the ten principles of the UN Decade on Ecosystem Restoration. These cases exemplify a diversity of approaches, objectives, sizes and costs. The per-hectare (ha) costs of FLR vary from USD 11/ha to USD 70 000/ha, where infrastructure development played a major role. Successive grants funded most of the longer-term projects based on convincing results during the first 3 or 5 year project cycle. In some cases, projects have been ongoing for 20 years or more, evolving over time in response to changes and lessons learned.

The cases, while highly diverse, also contain commonalities. For example, all 15 cases are participatory and strive to be inclusive from the planning to the monitoring stage by engaging closely with the government, local communities and marginalized groups. Likewise, land tenure security is a determinant of success and long-term sustainability of project results. Furthermore, nearly all cases established their own native seed collection and seedling production facilities to fulfil project seedling requirements. Project planners integrated landscape restoration activities and local peoples' priority livelihood objectives, and during planning anticipated and addressed potential threats such as grazing, fires, drought, unusually heavy rainfall and poaching. They developed strategies to ensure community and stakeholder commitment to the activities and continued to achieve results even after formal project conclusion.

1. Rationale



Ecosystem degradation negatively impacts billions of people and undermines sustainable development. Stakeholders can derive multiple benefits from integrated restoration efforts across scale, and restoration can advance several goals of sustainable development, including mitigating climate change, protecting biodiversity and preventing desertification. The Bonn Challenge, the Kunming-Montreal Global Biodiversity Framework, the G20 Global Land Initiative and other agreements converge on restoring degraded lands. Integrating FLR into existing and upcoming initiatives can ensure a healthy natural resource base for agrifood systems and make them more efficient, inclusive, resilient and sustainable. With the United Nations Decade on Ecosystem Restoration underway, FLR is gaining prominence as a comprehensive landscape-level and multistakeholder-oriented approach for repairing damaged and degraded environments. The momentum for restoration is accelerating with significant global, regional and national commitments.

Figure 1. The 10 principles guiding the United Nations Decade on Ecosystem Restoration



Global commitments, although aspirational, have produced a wave of regional-level FLR targets and initiatives, such as the ASEAN Green Initiative, Landscape Partnership Asia, and the Regional Strategy and Action Plan for FLR in Asia-Pacific (FAO and APFNet, 2018). Efforts on the ground are using many approaches, tools and innovative financing methods. Consequently, stakeholders have developed a strong interest in upscaling successful FLR that can contribute to enhancing and maintaining the delivery of ecosystem services, including those that address climate change and biodiversity loss and promote poverty alleviation, food security and economic development. Decision-makers and project formulators need a better understanding of enabling conditions for successful FLR to help facilitate the replication and upscaling of effective FLR, especially in the context of the Regional Strategy and Action Plan for Asia and the Pacific.

More than 500 million hectares of deforested and heavily degraded land needs urgent restoration actions in the region, according to some estimates (Minnemayer et al, 2011). Dense and growing rural and urban populations, coupled with the conversion of forest lands for agriculture and other degradation drivers, are putting pressure on already strained ecosystems and natural resources. The Third Asia-Pacific Forest Sector Outlook Study (FAO, 2019) emphasized that to achieve transformational environmental change, large investments will be needed to restore forests and landscapes. To ensure good practices during this process, the ten principles of the UN Decade on Ecosystem Restoration in Figure 1 are useful.

Identifying and assessing inspirational FLR cases across countries, ecosystems and institutional settings can inspire future FLR investments. Therefore, FAO, with support of IUCN Asia Regional Office, initiated a review of FLR projects in the region that best feature the ten principles of the UN Decade on Ecosystem Restoration. This publication describes 15 projects that serve as promising examples of FLR in the region and practical application of the ten UN Decade principles. Project formulators may find value in them for replicating and scaling up good FLR practices to advance the Regional Strategy and Action Plan for Asia and the Pacific, which is endorsed by the Asia-Pacific Forestry Commission.

2. Methodology



In line with the Regional Strategy and Action Plan for FLR in Asia-Pacific, FLR is a means to achieve diverse benefits (FAO and APFNet, 2018). These include biodiversity conservation, watershed protection, timber production, climate change mitigation and livelihood enhancement. The benefits are manifested at both the site and landscape levels. Across the mosaic of land uses, different FLR technical approaches can be adopted depending on the needs and conditions, for example reforestation, afforestation, ecological restoration, natural regeneration, assisted natural regeneration, enrichment planting and agroforestry.

For this publication, experts identified 150 FLR projects in Asia and the Pacific, for which the authors reviewed the available documentation.¹ Records included periodic project reports on their results, scientific publications and articles, external evaluation reports (mid-term evaluations, final or terminal evaluations), monitoring mission reports, planning mission reports and other materials such as documented and photographic evidence of project results before, during and after the restoration. The main technical focus was to identify promising projects that have carried out restoration activities in the field rather than projects mainly or only dealing with planning or capacity building but with few or no field activities.

The initial long list of projects was first reduced to a short-list of 41 based on i) the sufficiency of project documentation and other materials available that describe the achieved results, ii) a review of the results described in the documentation, and iii) subsequent interviews with in-country and regional key informants who could independently confirm that the projects are considered either in-country or more widely as good examples of promising restoration and sound results on the ground. The 41 shortlisted projects reflected a diverse set of successful FLR cases across countries, ecosystems and institutional settings where success was gauged by the extent to which the projects comported with the principles of the UN Decade of Ecosystem Restoration.

To maximize the potential for replicating, up-scaling, and covering the broadest possible range of conditions, another objective was to include as many Asia-Pacific geographical subregions, ecosystems, and production systems as possible. For this purpose, the 41 short-listed projects were classified according to i) geographical subregions, ii) ecozones (FAO, 2012), iii) ecoregions (Olson and Dinerstein, 2002) and iv) agroecological zones and production systems.² As ecoregions cover more limited geographical areas and local ecosystems than ecozones, only ecoregions are presented in the project profiles of Chapter 2. All the 41 short-listed projects were assessed using a scoring system based on the ten principles of the UN Decade on Ecosystem Restoration.³ Each principle was disaggregated into its sub-components, totalling 60 for all the 10 principles. The IUCN expert team developed the scoring system and carried out the actual scoring based on project documentation of achieved results, external evaluation reports, monitoring mission reports and planning mission reports.

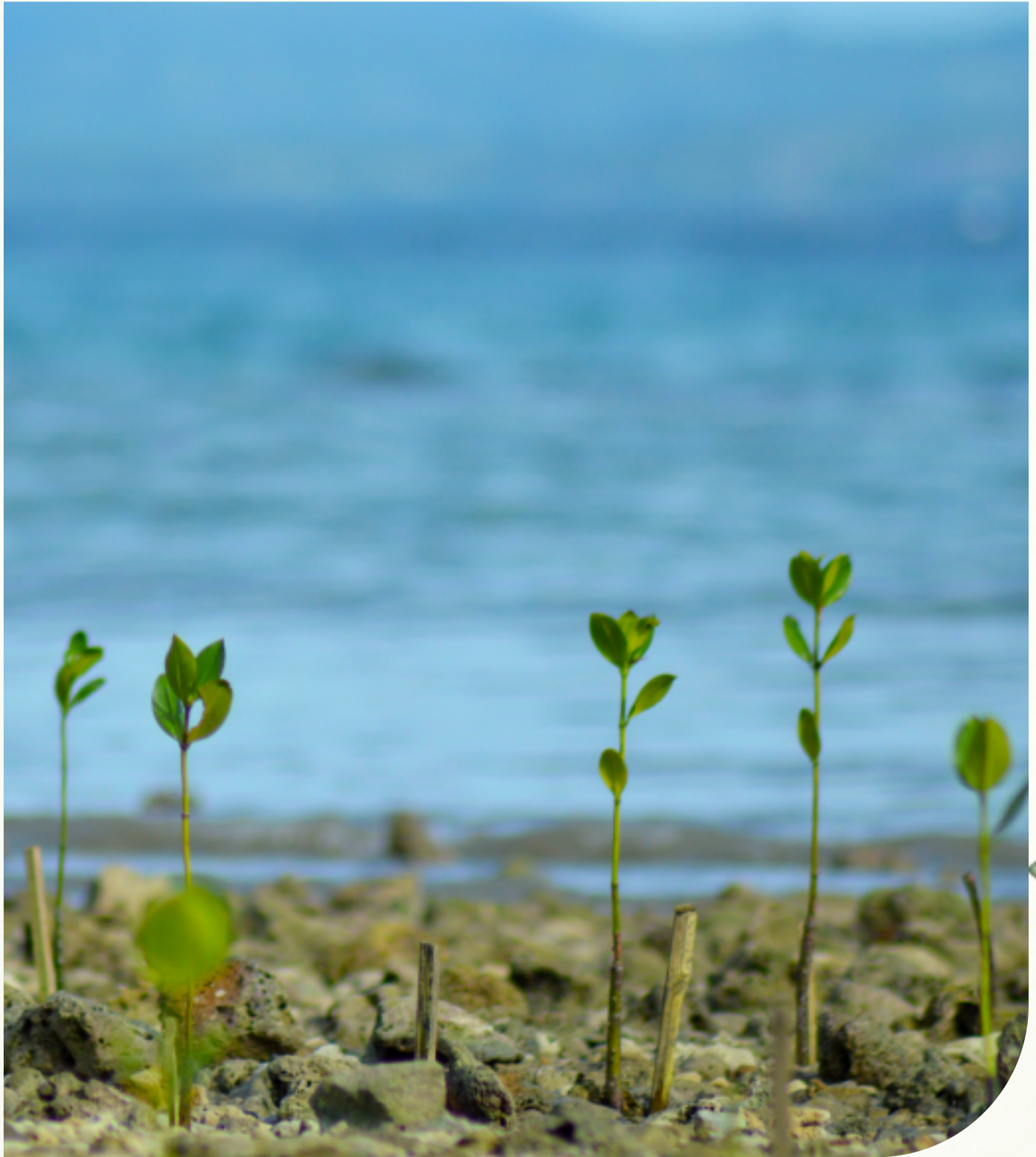
Based on the first round of scoring, 20 projects were selected as best reflecting the successful application of the UN Decade principles. For an in-depth analysis of what makes an FLR project successful, the 20 projects were narrowed down to 15 through a more elaborate, second scoring round of the UN Decade principles sub-components that considered the level of importance and success of each of the sub-components. For these 15 projects, stakeholder consultations were held with project implementers, beneficiaries and other stakeholders to verify and validate the findings. Lastly, the findings were further validated by confirming the project results and overall performance through country and regional specialists.

¹ Most of these projects correspond with the definition of FLR as per the Regional Strategy and Action Plan for Forest and Landscape Restoration in Asia-Pacific.

² The application of ecoregions was included into the classification given the FAO ecozone classifications cover broad geographical areas while the ecoregions are smaller and have more localized characteristics.

³ Further details about the scoring approaches and results are provided upon request to FAO's Regional Office for Asia and the Pacific: Result-Asia-Pacific@fao.org

3. Promising FLR cases in the Asia-Pacific



This section highlights the key features, achievements and methods employed by the 15 promising FLR projects. Their geographic locations are shown in Figure 2, and their main focus area and alignment with the UN Decade principles are summarized in Table 1.⁴

Figure 2. Map of the 15 FLR project locations that were profiled and assessed



Project site locations compiled from various sources

Table 1. UN Restoration Decade Principles coverage and key focus areas of profiled projects

Project / Decade Principles	1. Global Contribution (SDGs, Rio)	2. Broad Engagement	3. Diverse Activities	4. Benefits Nature/ People	5. Address degradation causes	6. Knowledge Integration	7. Measurable Goals	8. Local Context	9. Monitoring/ Management	10. Policy Integration	Key Areas of Focus*
1. BINHI: The Greening Legacy, the Philippines	.	.	.	.	.	.	.		.	.	C, I, H, I, J, L
2. Production-driven Forest Landscape Restoration Under REDD+ through Private Sector-Community Partnerships, Nghe An, Viet Nam	.	.	.	.	.	.	.	.	.	.	B, C, E, J
3. Afforestation and Reforestation in Bangladesh: Mangrove Plantation for Environmental Sustainability	.		.	.	.	.	.	.			A, B, E, G, H, J
4. Hutan Harapan Rainforest—Supporting the Sustainability of the First Ecosystem Restoration Concession in Indonesia	.	.	.	.	.	.		.		.	B, C, E, H, J, L
5. Phewa Tal Watershed Management Project, Nepal	.	.	.	.	.	.		.	.		A, B, C, D, F, H, J, K
6. Khata Corridor Terai Arc Landscape (TAL) Program, Nepal	.	.	.	.	.	.				.	A, B, C, E, H, J, L

Project / Decade Principles	1. Global Contribution (SDGs, Rio)	2. Broad Engagement	3. Diverse Activities	4. Benefits Nature/ People	5. Address degradation causes	6. Knowledge Integration	7. Measurable Goals	8. Local Context	9. Monitoring/ Management	10. Policy Integration	Key Areas of Focus*
7. Model and Technology of Rocky Desertification Control and Eco industry Poverty Alleviation in South China Karst	.		.	.	.	.	.	.	.	.	A, B, D, H, J, K, L
8. Huangshan Forest Landscape Restoration based on Sustainable Development Goals, People's Republic of China	.		.	.	.		.		.	.	B, H, I, J, L
9. Million Tree Forests: Building Climate Resilience through Urban Forest Experiences, India	.		.	.	.	.	.	.			H, I, J, L
10. Environmental Conservation Program for Mangrove Forest Restoration and Protection in Kyaukpyu Township, Myanmar	.	.	.	.	.	.	.	.	.		A, B, C, G, H, J,
11. Aneityum Forest Restoration, Vanuatu	.	.	.	.	.	.	.	.		.	A, B, C, D, E, G, H, I, J
12. Rupa Lake Watershed Restoration, Nepal	.	.	.	.	.	.					A, B, C, D, E, H, J, K
13. Ban Mae Sa Mai Forest Restoration, Thailand	.	.	.	.	.		.		.		C, E, H, I, J, L
14. Nepal Australia Forestry Project, Nepal	.	.	.	.		.	.		.	.	C, D, H, I, J
15. COMDEKS Stung Siem Reap Integrated Watershed Management, Cambodia	.		.	.				.			A, B, C, E, H, I, J, K
Total	15	10	15	15	13	12	10	9	8	8	

⁴ Based on review of the 15 promising cases against the 10 Decade principles, projects that scored highly for their attention to and successful implementation of activities described under each principle are credited for having done so in the matrix. This does not imply that projects not afforded bullets for some principles did not give these principles attention or did not succeed to some degree at addressing them

*Key areas of focus: a) Poverty alleviation; b) Environmentally sustainable livelihoods; c) Forest, land and natural resource governance; d) Soil conservation and rehabilitation; e) Women and minorities' empowerment; f) Sustainable water resource management and potable water supply; g) Disaster risk reduction; h) Local leadership development; i) Partnerships and networking; j) Policy influence; k) Whole of landscape approach; and l) Biodiversity.

Project 1: BINHI The Greening Legacy, the Philippines

Country	The Philippines
Area restored or under restoration (ha)	10 140
Tenure	Formal long-term tenure arranged with 25-year renewable Forest Management Permits provided by the Department of Environment and Natural Resources, Memorandum of Understanding for Geothermal Reservation management with the Philippines National Oil Company. Government-owned land in upper watersheds and formal tenure in upland farms.
Budget (USD)	13.69 million
Cost per hectare (USD)	1 350
Ecoregion	Philippines Moist Forest
Production system/Land Use	Upland agriculture, lowland agriculture, agroforestry, NTFPs and forest products, livestock/grazing agriculture
Main implementer; funding source	BINHI Foundation (BINHI: Tagalog word meaning 'seeds') Energy Development Corporation of The Philippines (EDC)
Estimated number of beneficiaries	2 600 farmer group members; 12 500 family members
Best represented UN Decade principles	1- 7, 9, 10
Website links and sources of additional information https://binhi.ph/ ; https://www.energy.com.ph/ ; https://www.facebook.com/EDCBINHI ; EDC's Binhi Greening Legacy EDC BINHI Tree for the Future; https://www.facebook.com/watch/?v=734997517301992 https://www.facebook.com/watch/?v=4230896843618162	

Project summary and context

In the Philippines, BINHI's FLR project is implemented in sixteen of the country's eighteen regions. Their aim is to restore severely damaged forests and watersheds, while improving the lives and livelihoods of the indigenous resident communities in the project area. Using a public-private partnership model, BINHI works with a range of partner organizations, including government and non-government organizations, academic institutions, civil society and local people's organizations. BINHI employs natural and assisted forest regeneration using native tree species and a focus on biodiversity conservation and restoration. They have restored a range of biodiverse habitats that are home to dozens of threatened species of flora and fauna, while increasing the incomes of thousands of local and indigenous households. The approach integrates livelihood development with environmental education, community health and well-being through extensive consultation and collaboration with communities and local government before, during and after the project.

The project has contributed to the establishment of community nurseries, forest user groups, youth anti-poaching patrols and community enterprises.

Key achievements:

- Over 10 000 ha have been restored through reforestation and enrichment planting with native species.
- Close collaboration has been forged with the Department of Environment and Natural Resources, local government agencies, farmer associations, academic institutions, non-governmental organizations (NGOs) and the private sector.
- Tens of thousands of community-level beneficiaries have gained improved access to forest products, training and capacity-building on environment and development topics, sustainable agricultural practices and agricultural/agroforestry productivity.
- Livelihoods have improved (cash crops and marketing, community enterprises), and substantive engagement and collaboration have been established with local communities including youth, women and the poorest groups.

How was it done?

Upon entry to a new area, BINHI seeks out partnerships with a range of government agencies, non-government organizations, farmer associations, the private sector and academic institutions with an interest or expertise in forest and landscape restoration or conservation of threatened Philippine native trees. To date, BINHI has forged nearly 300 such partnerships nationwide, establishing a nationwide forest landscape restoration constituency.

With its partners, the project takes care of ex-situ (arboreta and tree parks of native trees) and in-situ conservation areas (critical habitat and local conserved areas). Partners have collaborated in many ways, including on comprehensive social and environmental site assessments in conjunction with local communities to understand the original site conditions before forest degradation, and on the causes of degradation and the current threats to the ecosystems, species and habitats. Assessments of community problems and opportunities were instructive for project design, as were local and indigenous technical knowledge. Site assessment results informed project design and initial phases. They provided the basis for determining seed and seedling requirements and other required conservation actions. These assessments also offered insights on community priorities for project support including training and seed funding to improve local lives and livelihoods.

Community behavioural change with regard to sustainable forest management was brought about through training, awareness raising and project support for livelihood development activities. Species were selected to enhance biodiversity and wildlife habitats while contributing to local livelihoods through provision of non-timber forest products (e.g. rattan, resin, honey, medicinal plants) and ecosystem services. Local farmer associations were formed or reinvigorated and, with project support, have successfully planted high-value cash crops including coffee and cacao into site-ameliorating agroforestry systems.

Scientific and community participatory monitoring feed into the project’s adaptive management so that issues can be addressed promptly before they jeopardize progress. Monitoring results inform strategy alterations and remedial measures that need to be applied to achieve the project objectives. Restoration sites, livelihood-improvement activities and overall environmental and socioeconomic impacts were regularly monitored by BINHI field staff in conjunction with beneficiaries, project partners and stakeholders.

Figure 3. Landscape change over 2011–2020 in Mt. Zion Area, Mindanao, Philippines



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Figure 4. Community Coffee Enterprise Cooperative



© BINHI, The Greening Legacy

Non-perishable crop and agroforestry enterprise development for remote area communities is supported by BINHI as a catalyst for community engagement in forest protection and restoration.

Project 2: Production-driven Forest Landscape Restoration under REDD+ through private sector–community partnerships, Nghe An, Viet Nam

Country	Viet Nam
Area restored or under restoration (ha)	35 462
Tenure	No formal tenure: Government provided user rights on the basis of approved sustainable management and restoration agreements.
Project duration	4 years
Budget (USD)	540 972
Cost per hectare (USD)	15.25
Ecoregion	Tropical Moist Forest
Production system/Land use	Tropical upland forests and bamboo forests, upland and lowland crop fields, non-timber forest products (NTFPs)
Main Implementer; funding source	Center for People and Forest (RECOFTC); Government of Germany
Estimated number of beneficiaries	18 000
Best represented UN Decade principles	1-8
Website links and sources of additional information https://www.recoftc.org/stories/lung-bamboo-viet-nam%E2%80%99s-bank-backyard https://www.recoftc.org/projects/flourish/stories/how-bamboo-builds-resilience-my-life ; https://youtu.be/7INV9RokVV4 https://www.recoftc.org/index.php/ne/stories/lung-bamboo-viet-nam%E2%80%99s-bank-backyard https://www.recoftc.org/flr-guide-southeast-asia/who-are-stakeholders-forest-landscape-restoration-and-how-might-they-benefit https://www.recoftc.org/recoftc-annual-report-2019-2020/restoring-viet-nams-bamboo-forests	

Project summary and context

Nghe An is a mainly mountainous province in north-central Viet Nam, home to rich forests and ethnic minority communities. The RECOFTC supported project worked with ethnic minority communities to assist them in mitigating and adapting to climate change as changes in local rainfall patterns have reduced subsistence crop production, resulting in increasing food insecurity. Local people traditionally depended on forest hunting and gathering, which is now prohibited by stricter enforcement of forest protection laws. The harvest and sale of loong or “lung” bamboo (*Bambusa longissimi*), on which communities depended for cash income, was declining due to unsustainable exploitation. Overharvest caused by economic duress, lack of technical know-how, weak enforcement against illegal harvesting and insufficient bargaining capacity by local communities with buyers have resulted in the rapid depletion of natural stocks.

To accomplish the project objective of mitigating and adapting to climate change through market-driven forest landscape restoration, the project supported the community in drafting communal forest protection and development plans that helped qualify them for legal permission to sustainably manage local forests and the loong bamboo stocks. The plans integrated payments for environmental services, sustainable forest management, and livelihood improvement through the development of partnerships with private-sector handicraft producers. The aims were to enhance sustainable forest and bamboo management, provide additional income for communities, and reduce exploitation pressure on forest resources. RECOFTC's facilitators, community members and government authorities were involved throughout the process of problem assessment, plan preparation, project implementation and monitoring of integrated sustainable forest management and community development activities.

Key achievements

- The project has facilitated household forest tenure and partnerships between private handicraft enterprises and communities to leverage sustainable resource management agreements (see, for example, Kim Dung, Bush and Mol, 2016) as required by the government to issue forest land use rights certificates, and by private sector partners as the basis for purchase contracts.
- Fairtrade⁵ contracts offering preferential pricing compared to standard market rates were established with environmentally and socially responsible bamboo handicraft enterprises, leading to increased household incomes.
- The project has helped provide 35 000 ha of sustainably managed forests, naturally regenerating bamboo forests and loong bamboo plantations.
- Four districts and hundreds of households engaged with and benefited directly from the project, with many more within and beyond the project area seeking to join.
- Hundreds of households have been granted formal leasehold (government "Red books") over household forest plots.

How was it done?

After helping villagers to obtain "Red Books" for forest areas covering 1 550 ha, RECOFTC conducted capacity-building needs assessments to inform community trainings. The project supported villages and households to develop bamboo nurseries, sustainable forest and bamboo management, fire protection and bamboo enrichment planting. The private sector handicraft company Duc Phong taught villagers simple primary processing techniques, increasing the prices paid by the company for villagers products from USD 57 to USD 174 per tonne. The project's regular updating and posting of price information, volumes, optimal harvest times and selling locations have improved the quality of villagers' products and helped them receive market prices for the same.

⁵ "Fair Trade is a trading partnership, based on dialogue, transparency and respect, that seeks greater equity in international trade. It contributes to sustainable development by offering better trading conditions to, and securing the rights of, marginalized producers and workers – especially in the South." (Fair Trade Advocacy Office, 2018)

⁶ In Viet Nam, the central state ultimately owns all the land. The Red Book is similar to a certificate of land use rights in other countries; it is a form of communal land certificate allocated by the government to promote Community Forest Management under Viet Nam's 2004 Forest Protection and Development Law.

Households were organized into forest management groups that conduct regular monthly meetings to monitor progress and agree on required approaches to address problems and improve production. The project team conducted frequent monitoring of project activities with local authorities, assisting with conflict resolution when needed. The project supported the local government to develop a web-based tool and mobile application for remote forest status monitoring, including for timely detection and reporting of forest fires and other illegal forest activities.

Participatory site assessments, study tours, and sharing of knowledge and experiences among communities in the area contributed to integrating grassroots' inputs in government and policy decision-making and more research-based recommendations. A joint monitoring report on the project's impacts on forest management by World Health Organization concluded that community forest management proved that providing communities with legal rights to manage forests contributed to the protection and sustainable management of local forest resources, and that the recognition of customary laws and traditions are an essential element for forest protection and sustainable management.

Figure 5. Loong bamboo propagation and replanting with commercial enterprise partnership and marketing agreements



© RECOFTC

Project 3: Afforestation and reforestation in Bangladesh: mangrove plantation for environmental sustainability

Country	Bangladesh
Area restored or under restoration (ha)	150
Tenure	Community residential areas and home gardens with formal land tenure; Government-owned land with traditional usufruct; project facilitated approval by Forest Department to restore mangrove forest areas on government land.
Project duration	2018–2026
Budget (USD)	2.03 million
Cost per hectare (USD)	13 533
Ecoregion	Sundarbans Mangrove Forests; Sundarbans Rivers and Swamps
Production system/Land use	Riverine riparian forests/ scrub forests, Riverine mangroves, lowland crop fields, livestock, fresh and brackish water fisheries, NTFPs
Main implementer; Funding source	Friendship Bangladesh; Friendship Luxembourg
Estimated number of beneficiaries	104 Communities (directly 3 140 People, indirectly 67 242 through the protection from storm and tidal surge)
Best represented UN Decade principles	1, 3, 4-8
Website links and sources of additional information https://friendship.ngo/mangroves-against-the-climate-crisis/ https://www.youtube.com/watch?v=kW9EWYdTulY&t=34s https://youtu.be/Wqt_2BGpPKw https://www.youtube.com/watch?v=IYCz5Bpu_DA	

Project summary and context

The project is located along river tributaries within the Sundarbans Delta, a UNESCO World Heritage Site. The area is facing various threats ranging from conversion of mangrove forests to poaching of endangered wildlife species, saltwater intrusion due to rising sea levels, and increasing frequency and intensity of tropical cyclones. The NGO Friendship Bangladesh began collaborating with local communities and authorities in 2018. The initial assistance followed participatory problem assessments on community public health, sanitation and livelihoods. This was followed by training and assistance to mitigate the environmental threats, with continuing assistance on health and livelihood improvement, including agriculture and handicrafts. Friendship, the local communities and local government jointly with the assistance from the Forest Department are addressing the project's goals of mangrove ecosystem restoration, carbon sequestration and climate change adaptation. The project aims to protect and restore mangrove forest habitats through livestock exclusion, fencing, and community patrols to prevent and interdict illegal poachers. The project has made considerable progress, and many communities in the area have approached Friendship, hoping to receive similar assistance.

Key achievements

- 150 ha of mangroves replanted, and more than 1 000 ha intact mangrove forests have been protected by community brigades. Learning-by-doing has increased seedling survival rates to 90 percent.
- Long-term sustainability appears likely based on close working relationships between the project, communities, the Departments of Agriculture and Forestry, and district authorities.
- Farmlands have been protected from saltwater intrusion, which has been reduced.
- Communication and coordination with responsible government authorities and service providers have improved.
- A range of livelihood benefits have been provided with project support, including crab raising, improved fisheries stocks, mangrove seedling production and nursery management, and home gardening.
- Skills and leadership training are increasing women's empowerment. Women's voices have been uplifted by women assuming key project leadership roles with the project providing support and training on primary health care, village sanitation, nutrition, home gardening, nursery management and forest restoration.

How was it done?

The replanting of native mangrove forests along nearby coastlines has protected approximately 67 242 people that live in 104 local communities in the coastal areas of Satkhira District of Southwestern Bangladesh. These communities suffer yearly floods, tropical storms and cyclones. To create barriers against coastal erosion and brackish water intrusion, the project raised embankments and restored barrier forests, protecting fertile farmlands.

Six locally managed community nurseries grow seedlings with Friendship's financial and technical support. Groups of 30 people, mostly women, were formed and trained to raise seedlings through the initiative "Cash for seed", and replant 1–2 ha each of degraded mangrove forests. They erected fencing to protect against livestock intrusion. Plantation areas were divided into smaller units with well-defined responsibilities for better care and management. Local people received cash compensation for seed collection and plant propagation, planting, plantation protection and management. The "One Community, One Caretaker" subproject ensured that villagers visited the developing forest plantations daily to remove weeds and algae, fill gaps from seedling mortality, and to check and repair fencing.

Friendship provided assistance for health, fisheries, agriculture, disaster risk reduction, sanitation, income generation and food-production activities, collaborating with communities and forest authorities to protect against and interdict illegal exploitation of local forests, wildlife and aquatic species. Lessons learned continue to be shared at national and international conferences and workshops.

Figure 6. Simple primary processing raised the farm gate price offered by the private handicrafts enterprise partner



© Friendship Bangladesh

Significant increase in household income from the sale of loong bamboo leveraged agreements to abstain from hunting in the nearby protected area.

Figure 7. Success of fenced embankment reconstruction



© Friendship Bangladesh

Fenced embankment reconstruction (left) and the fenced plantation after six months (right). Although plantation areas between the river channel and embankments are technically owned by the government, these were made available to Friendship and participating communities to enhance protection, restoration and sustainable management of mangrove forests.

Figure 8. Recovered riverine mangrove forests protect farmlands from brackish water intrusion



© Friendship Bangladesh

Project 4: Hutan Harapan rainforest, supporting the sustainability of the first ecosystem restoration concession in Indonesia

Country	Indonesia
Area restored or under restoration (ha)	98 555
Tenure	Government-owned land awarded to the project as a 100-year concession for forest conservation and restoration; Community residential and cultivated lands under traditional usufruct.
Project duration	Phase 1: 2002–2009; Phases 2–3: 2010–2018; 2019–2026
Budget (USD)	17 717 823
Cost per hectare (USD)	180
Ecoregion	Sumatran Islands lowland and mountain forest
Production system/Land use	Upland and lowland farming; non-timber forest products
Main implementer and funding source	Phase 1: UK Royal Society for the Protection of Birds, Burung Indonesia; UK Royal Society for the Protection of Birds, European Union Phase 2: Burung Indonesia; KfW, DANIDA, UK Royal Society for the Protection of Birds Phase 3: Burung Indonesia; KfW, BirdLife International, NABU
Estimated number of beneficiaries	23 760
Best represented UN Decade principles	1-6
Website links and sources of additional information https://hutanharapan.id/ https://www.youtube.com/channel/UCyrDEXp6fjYIWDzPKqs39zA https://www.instagram.com/hutanharapan/ https://twitter.com/hutan_harapan https://www.facebook.com/SahabatHutan/	

Project summary and context

Hutan Harapan (Forest of Hope) is an area of 98 555 ha of mostly logged commercial forest concession areas in southern Sumatra, Indonesia. The Harapan partners – Burung Indonesia, BirdLife International and the Royal Society for Protection of Birds – were given a 100-year license to manage a critically endangered but relatively intact portion of the forest for ecosystem restoration. It was the first of 16 such Ecosystem Restoration Concession (ERC) licenses granted by the Government of Indonesia. The main aim is to protect biodiversity, maintain ecosystem services (water supply, carbon sequestration and storage) and support livelihood development for Batin Sembilan Indigenous Peoples and Melayu communities. The concession covers two Key Biodiversity Areas, not formally designated as protected areas, that are habitats for over 133 globally threatened animals, including the Sumatran tiger, Asian elephant, and Ivory hornbill.

The area is divided based on vegetation mapping into core zones (66 percent) where biodiversity is protected, conserved and ecosystem services are sustained through activities such as fire prevention, anti-poaching, patrolling and control of illegal logging. The remaining portion of the concession (34 percent) is outside the core zone and is designated as a production and utilization zone managed for sustainable NTFP production, agroforestry, land-use stabilization, and reduction or cessation of forest clearance. Forests in most of this zone had been seriously degraded by conversion to other uses. Today, Hutan Harapan represents about 20 percent of the remaining lowland forest in Sumatra and can be described as a “forest island” surrounded by a sea of monoculture commercial plantations.

Key achievements

- A total of 98 555 ha of degraded biodiversity-rich rain forest was brought under long-term restoration with support from the Government of Indonesia, NGOs, local communities and the private sector.
- Based on emerging lessons from this project, the approach has informed the issuance of other ERCs in Indonesia and other Southeast Asian countries totalling over 520 000 ha.
- Designation, establishment and management of ERCs provided opportunities for ecosystem restoration in production landscapes outside the existing protected area networks.
- Twelve forest partnership agreements have been signed with local communities to promote livelihoods and to reduce threats of forest fire and forest conversion. The agreements ensure that biodiversity is protected and hydrology maintained, habitat and species are protected, and ecological connectivity is enhanced, community livelihoods are supported, and ecosystems maintained. Multi-stakeholder support and cooperation have contributed to forest landscape rehabilitation of 4 400 ha.
- Through the Meranti-Harapan multistakeholder forum, established by the project with the solid backing of the provincial government and local NGOs, regular coordination and collaboration were held with six land managers (oil palm and timber plantation concessions) surrounding Hutan Harapan to protect almost 450 000 ha through fighting fires, stopping illegal activities and reducing human-elephant conflicts.

How was it done?

Burung Indonesia, the Royal Society for the Protection of Birds and BirdLife International led an NGO consortium that worked with the Government of Indonesia to develop a policy framework for ecosystem restoration to advance the objectives of biodiversity conservation in Indonesia’s production forests. This ERC, the first of its kind, was granted to the consortium in 2007 to maintain one of Sumatra’s last remaining natural forest areas for 100 years by integrating social, economic and ecological objectives.

Hutan Harapan works closely with local communities, national and local government and other stakeholders to support sustainable forest management and restoration through protection for natural regeneration. Twelve community groups have signed forest partnership agreements with Hutan Harapan to promote community economic development using native and NTFP species and agroforestry while simultaneously protecting the forest from fires, illegal logging and wildlife poaching. The project supports these activities by providing equipment and training to villagers and patrols.

Figure 9. Fire prevention and suppression, community warden patrol planning and preparation



© KfW Hutan Harapan

Figure 10. Trainings on sustainable collection of damar resin and mitigation of human wildlife conflict



© KfW Hutan Harapan

Project 5: Phewa Tal Watershed Management project, Nepal

Country	Nepal
Area restored or under restoration (ha)	12 300
Tenure	Government provided user rights; government owned land in upper watersheds; Some upper watershed areas managed under auspices of Community Forestry Law
Project duration	1975–2006
Budget (USD)	1.65 million
Cost per hectare (USD)	705
Ecoregion	Eastern Himalayan Temperate Forest
Production system/Land use	Agriculture and livestock in the lowland; potatoes, maize-millet in the upper ridges; boating and lake fisheries in the Phewa Lake and tourism.
Main implementer; funding source	Years 1975–1984 village Panchayats and Community Forestry User Groups (CFUGs); UNDP and FAO 1985–1994 CFUGs; Finland 1997–2004 CFUGs; JICA Currently managed by the Basin Management Center, Gandaki, Nepal.
Estimated number of beneficiaries	21 000
Best represented UN Decade principles	1-6, 8, 9
Website links and sources of additional information https://www.jstor.org/stable/24686844 https://www.wwfnepal.org/hariyobanprogram/	

Project summary and context

Phewa Lake watershed (123 km²) is home to one of Nepal's pioneer integrated watershed management initiatives. Dating back to 1980–1985, an Integrated Phewa-Tal Watershed Management Plan was implemented in seven village panchayats (administrative units) and a 10-year strategy was drawn up in 1990. The program continued under different funding and operations modalities and has over several decades been a learning and demonstration site for Nepali watersheds on restoring degraded forests and agricultural lands and maintaining scenic beauty.

Illegal forest felling, wildfires and free grazing of cattle and buffalo were key factors responsible for forest and landscape degradation in the Phewa Watershed. Inflows of silt, fertilizer residues and raw sewage to the lake resulted in lake infilling, eutrophication, weed infestation and dramatic reduction of fish catch. The project's early initiatives focused on restoring degraded watersheds through an integrated program of awareness raising, training of farmers and communities, and the protection and restoration of watershed forests and sloping lands by community forestry user group (CFUGs), which were established with the support of the project.

Nearly all community members are also CFUG members, and CFUG committee members are democratically elected by the members. The CFUGs prepared community forestry operational plans (see, for example, Keshav, n.d.) leading to the handover of local forests to the CFUGs by the District Forest Office.

Watershed forests are now managed and monitored collaboratively by the CFUGs, and the Divisional Forest Office (Kaski). The Pokhara Metropolitan Administration monitors the lake to protect against encroachment, and to maintain water quality and sewage management. Lessons from the Phewa Lake watershed management project have been replicated in other watershed areas in Nepal. The then Ministry of Forests and Soil Conservation adopted the integrated landscape management and participatory community development model from the Phewa Watershed project into national forest policies. Nepal recently declared Phewa Lake a Protected Watershed Area.

Key achievements

- The project resulted in a significant increase in forest cover and cover density. Nearly 82 percent of the degraded forest has been converted to dense forest, with a net forest area increase of 1 455 ha.
- A total of 3 745 ha of watershed forest is now managed by 116 community forest user groups increasing forest area from 28 percent to 55 percent.
- Water body area increased by 3 percent (Keshav, n.d.).
- Significant improvements have been evident in sediment control, recreation and tourism, wood supply, water quality, carbon sequestration, water regulation, biodiversity conservation and landscape beauty in the watershed. In particular, increased forest cover resulting from protection and replanting has reduced the incidence of landslides and soil erosion while improving soil fertility and crop production, helping to minimize the siltation of Phewa Lake.
- Phewa-Tal has been designated as a Ramsar Site.

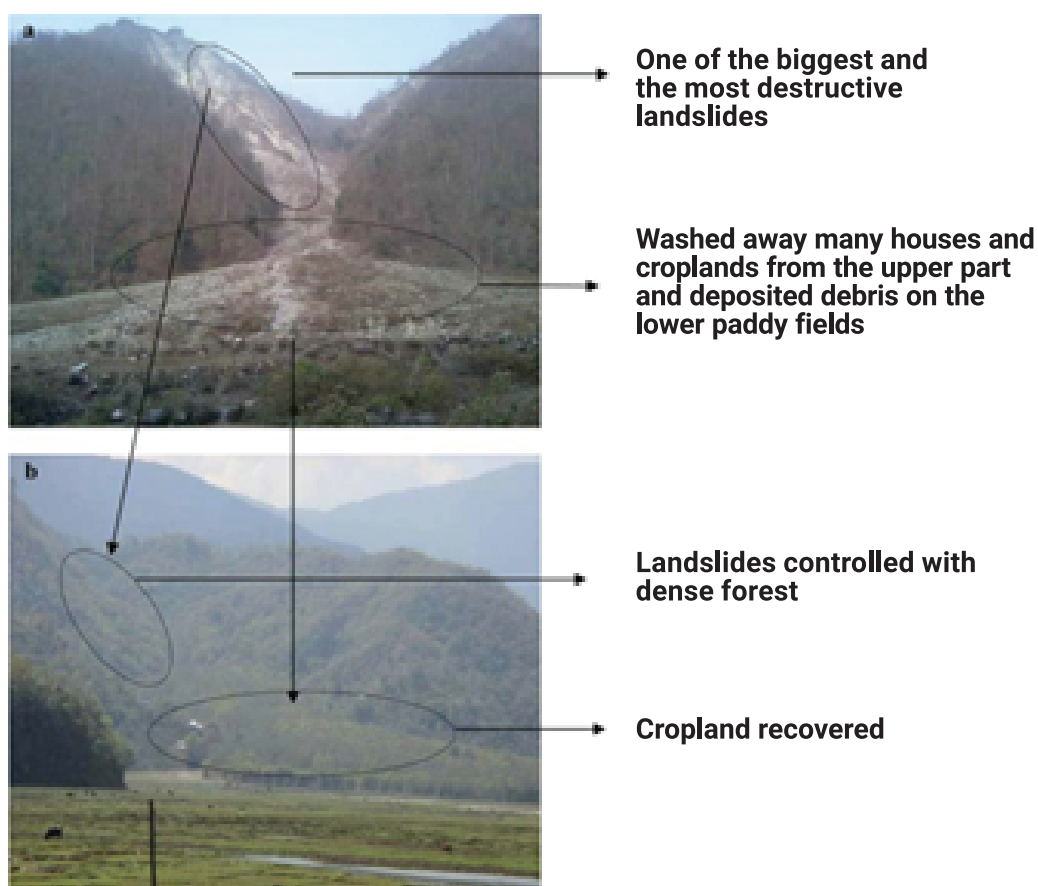
How was it done?

Activities included awareness raising and training, community mobilization, nursery production, enrichment planting, promotion of natural regeneration and improved forest management. Improved cooking stoves (Paudyal *et al.*, 2017) were distributed, terraces were improved, and on-farm conservation was undertaken. Rehabilitative measures were among the key interventions including landslide stabilization, gully control, irrigation improvement and stream-bank protection.

Restoration of degraded forest was conducted using seedlings prepared in community nurseries. Communities deployed forest community watchers to protect both newly planted and intact forest areas from fire and excessive grazing. Nepal's Community Forest Policy and Forest Act encouraged communities to acquire, manage and sustainably utilize forest resources in a participatory manner. The project supported the formal designation of community forest areas.

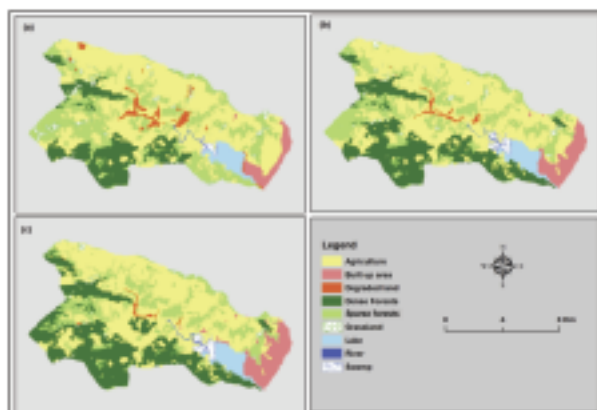
The project introduced improved cattle and buffalo breeds and strengthened access to markets for animal products. Furthermore, a ban was enforced on open grazing in conjunction with the transition into stall-fed livestock systems and the promotion of native fodder-tree planting in forests and on farmlands. Villages put in place regulations imposing fines on owners of intruding livestock. Communities were organized, trained and supported on best conservation practices, including check dam construction and bioengineering in sensitive areas. Farmlands were protected by terrace improvement, and planting fodder and pasture crops or trees to conserve forest areas for watershed protection and supplemental fuelwood and fodder production. The CFUGs were mobilized and trained to control open grazing, plant fodder trees and crops, introduce new fruit and vegetable cash crops, prevent and suppress forest fires, and remove invasive weeds from the lake. Subsistence agriculture has transitioned to a livestock and cash-crop-based system with increased farmer income from tourism as a result of improved ecosystem management. As the impacts of climate change became prominent, the project supported communities in preparing and implementing a local adaptation plan of action including a potential system for payment for environmental services. In addition, run-off monitoring in different land use systems identified the extent of soil loss, demonstrating the best ways of managing agriculture in high rainfall areas.

Figure 11. Examples of main achievements



© Phewa Tal Watershed Management Project

Figure 12. Land and forest cover change in the Phewa Lake Watershed 1975–2015



© Paudyal et al., 2017 (Change in land use and ecosystem services delivery from community-based forest landscape restoration in the Phewa Lake watershed, Nepal).

Project 6: Khata Corridor Terai Arc Landscape (TAL) Programme, Nepal

Country	Nepal
Area restored or under restoration (ha)	20 200
Tenure	Legally managed government land; Government approval for forest and ecosystem protection and restoration in protected area; Residential and farming area under traditional usufruct
Project duration	2001–2025
Budget (USD)	980 380*
Cost per hectare (USD)	48.50
Ecoregion	Tropical and subtropical dry forest
Production system/Land use	Lowland agriculture, forestry, agroforestry and NTFPs
Main implementer; Funding source	Worldwide Fund for Nature (WWF), Department of National Parks and Wildlife Conservation Department of Forest and Soil Conservation under the Federal Ministry of Forest and Environment; Government of Nepal under Terai Arc Landscape Project and WWF Nepal
Estimated number of beneficiaries	More than 6 000 community members organized in 74 community forest groups
Best represented UN Decade principles	1-6, 10
Website links and sources of additional information https://www.wwfnepal.org/knowledge_hub_/blogs/dalla/ https://www.wwfnepal.org/?369536/Connecting-Corridors---Terai-Arc-Landscape#:~:text=Corridors%2C%20which%20include%20defined%20forested,wildlife%20populations%20in%20conservation%20landscapes. https://wwfint.awsassets.panda.org/downloads/wwf_powering_nature_report.pdf https://wwfasia.awsassets.panda.org/downloads/the_x_factor__road_to_tx2__nepal_s_journey.pdf https://tigers.panda.org/news_and_stories/stories/wildlife_corridor_wins_conservation_award/	

* Calculated based on a 10-year budget for 2015–2020, assumed also for the first 10 years.

Project summary and context

The project is a part of the greater Terai Arc Landscape (TAL) located between Katarniyaghat Wildlife Sanctuary in India and Bardiya National Park in the Bardiya district of Lumbini Province, Nepal. It creates a functional transboundary wildlife corridor between two protected areas by conserving and managing forests and grasslands. The riverine forest corridor, with large floodplains and mixed sal forest, covers 20 200 ha of tropical moist and subtropical forest with Terai-Duar Savannah and grasslands ecosystems. The Khata Corridor is managed by the Division Forest Office - Bardiya under the Federal Ministry of Forest and Environment, together with various conservation partners, including WWF Nepal as a key ally with community forestry user groups (CFUGs) and local communities collaborating as custodians.

The Khata Corridor was considered a highly degraded forest area due to repeated floods, forest fires, livestock grazing and deforestation. Human-wildlife conflict is one of the major problems in the corridor where wild animals, particularly elephants and other large herbivores, are damaging agricultural crops. Tigers attacking humans and livestock has resulted in negative attitudes and actions towards wildlife.

Poverty is relatively high among forest-fringe settlers whose principal sources of livelihood have been fishing, hunting, and collection and sale of Non-timber forest product (NTFPs). The project has worked to restore critical wildlife dispersal corridor habitats, developed and supported sustainable livelihoods for local communities, including high value cash crops and ecotourism. Targeted activities to ensure restoration include monitoring biodiversity and forest cover; rehabilitating encroached forest land; establishing agroforestry demo plots; promoting supplemental income-generation activities including honey, rubber, NTFP-seedling production and enrichment planting. The project has encouraged and supported alternative energy sources and livelihoods, such as ecotourism, agriculture and NTFP-based enterprises. In addition, it includes youth and community mobilization for afforestation, agroforestry, anti-poaching activities and income generation.

Key achievements

- Degraded forest was restored to thick forest with 19 km² total net forest gain through a functional wildlife corridor created in 20 years.
- The area is used by over 30 rare and endangered wildlife species, including the Royal Bengal tiger, Asian elephant and rhinoceros, whose populations are increasing.
- Integrated indigenous people and local communities in biodiversity conservation and cultural preservation through ecotourism and livelihood interventions.
- Strong coordination between stakeholders has been generated through a coordination committee for improved transboundary cooperation with India at the landscape level, which also includes representatives of residents and stakeholder groups.

How was it done?

The restoration of degraded forest land was accomplished by protecting the area through project-supported community patrols working in collaboration with the Forest Department to enable natural forest regeneration. Fencing and trenches protect regenerating vegetation from grazing livestock, and villages from wildlife intrusion, while small ruminants are stall-fed rather than free-grazed.

Nepal's Community Forestry Policy, acts and regulations formalize residency rights and community rights to manage local forests sustainably. These have created the enabling environment for the successful development of community forestry. Forest areas have been allocated for sustainable use by local CFUGs. The Khata CFUGs, whose priority activity is forest restoration, conduct public hearings and audits on a regular basis to respond to issues and grievances. Operational plans incorporate local and indigenous technical knowledge. The interests and concerns of local people are integrated into the plans based on the results of community consultations.

CFUGs were provided project support for installing and maintaining biogas and improved cooking stoves, reducing pressure on forests for fuelwood. Training and capacity building have improved community capacity for forest governance, seedling production, cash-crop development, sustainable livestock management, forest protection and ecotourism development. Unpalatable crops such as chili pepper, mint and chamomile have been introduced to minimize crop predation, along with solar wire-mesh fencing and bio-fencing using dense and thorny species as barrier hedges. Project support to establish improved predator-proof cattle enclosures has protected livestock.

Livelihood schemes supported by the project through training and micro-credit helped fund the activities. Given that poverty is one of the root causes of ecosystem degradation, income-generating activities play a substantial role in reducing ecosystem degradation. Through the TAL programme, the Government of Nepal has developed and implemented vocational programmes, including vegetable production, homestay development, haircutting, sweet shops and NTFP processing. The increase in household income enabled families to invest in children's higher education. Local conservation awareness and participation of the underprivileged, along with project and CFUG-facilitated forest patrolling and negotiated equitable benefit-sharing arrangements coupled with alternative income, have reduced forest degradation and wildlife poaching.

All activities are financially supported, closely monitored, and supervised by the implementing agencies in conjunction with the CFUGs. For example, youth-led community-based anti-poaching units developed with support from the project, CFUGs and Forest Department have been pivotal for deterring illegal activities. At the same time, their rapid response teams helped to manage conflicts by bridging information gaps between communities and park and district forest authorities. Their engagement has been critical for deterring illegal activities in the corridor.

Seventy-four CFUGs have consolidated as an area-wide Community Forest Coordination Committee. This committee coordinates constituent CFUGs for forest protection and management, and supports villagers adversely affected by forest conservation activities or human-wildlife conflicts. Multidisciplinary partnerships, transboundary cooperation with regular coordination meetings attended by Nepali and Indian representatives, bottom-up planning and community participation and leadership are among the key lessons that have been shared by the Khata Corridor Project and replicated in other wildlife corridors across the Terai Arc Landscape in Nepal.

Figure 13. Stall feeding and careful tending of livestock



© WWF Nepal

Stall feeding and careful tending of livestock in multiple-use buffer-zone forests have successfully reduced human-wildlife conflict and degradation of vegetation cover in the protected wildlife corridor core zone.

Figure 14. Fences and trenches reduce human-wildlife conflict, while habitats are restored in the transboundary sanctuary



© WWF Nepal

Figure 15. Ecotourism and homestays



© WWF Nepal

Ecosystem and homestays have contributed to improving household and community income, as have the introduction of new commercial crops such as chili pepper.

Project 7: Model and Technology of Rocky Desertification Control and Eco-industry Poverty Alleviation in South China Karst

Country	China
Area restored or under restoration (ha)	17 500
Tenure	Government provided user rights on cultivated lands based on traditional usufruct; Government approval for forest and ecosystem restoration in protected area
Project duration	July 2016–June 2021* (monitoring ongoing)
Budget (USD)	3.93 million
Cost per hectare (USD)	225
Ecoregion	Subtropical/Moist Tropical Karst Forest
Production system/Land use	Upland cropping, grazing, agroforestry, high-value cash crops, NTFPs and artisanal timber extraction
Main implementer; Funding source	State Engineering Technology Institute for Karst Desertification Control, Guizhou Normal University; Government of the People's Republic of China; Administrative Center for China's Agenda 21, Ministry of Science and Technology of the People's Republic of China, and Science and Technology Department of Guizhou Province
Estimated number of beneficiaries	75 705
Best represented UN Decade principles	1, 3-10
Website links and sources of additional information https://sck.gznu.edu.cn/ http://society.people.com.cn/n1/2018/1029/c1008-30367368.html http://www.xinhuanet.com/2020-08/06/c_1126335256.htm http://www.gz.chinanews.com.cn/2021-07-09/doc-ihapaffe4696095.shtml https://www.sohu.com/na/476800390_121106687 http://jgz.app.todayguizhou.com/news/news-news_detail-news_id-11515115434600.html https://www.thepaper.cn/newsDetail_forward_9167733	

* Current phase. Project began in 2000.

Project summary and context

The South China Karst region stretches from South China to Northern Viet Nam and comprises the world's largest contiguous tropical-subtropical karst area. The ecologically fragile landscapes have been widely affected by "rocky desertification" as population increase and poverty have led to overharvesting of forests and expansion of agriculture. Deforestation has disrupted critical ecological functions such as water and soil conservation and biodiversity.

The Chinese government has been paying attention to the issue of rocky deforestation, at least since the 1980s. Some of the projects set up and funded by the government to help alleviate the issue were conducted by local universities. A project conducted by Guizhou Normal University focused on piloting restoration strategies in selected karst areas.

Four desertified karst areas representative of the entire South China Karst ecosystem, and ranging from moderately to severely degraded, were selected as demonstration areas through comprehensive expert-led and participatory assessments. These demonstration areas were used for testing eight restoration strategies: (1) tree-shrub-grass restoration and efficient high-production forestry; (2) grassland establishment and ecological animal husbandry; (3) prevention of soil erosion through physical interventions and agroforestry; (4) optimization of rural energy production and establishment of low-carbon communities; (5) World Heritage Site buffer zone tourism; (6) ecoindustry/high-value crop production through farmer cooperatives; (7) water and fertilizer management for ecoproduct quality improvement; and (8) rocky desertification control ecoproduct promotion and marketing for value addition.

Key achievements

- Restored natural habitats and soils have prevented erosion, increased infiltration capacity and freshwater yield.
- High rates of poverty have been successfully addressed by an integrated set of activities aimed at sustainable environmental management and economic development.
- A wider assortment of ecosystem goods is provided for forest users, including NTFPs and agroforestry crops.
- Carbon storage increased by more than 3.70×10^4 tonne/year (Guizhou Normal University, 2022).
- Ethnic minorities and small-scale farmers achieved improved livelihoods, income and environmental conditions by participating in ecological restoration.
- The project results were applied to develop the national rocky desertification control programme for poverty alleviation and ecosystem restoration.

How was it done?

Careful technical monitoring by the lead implementing agency and adaptive management enabled optimization over the four demonstration areas. Remote sensing and unmanned aerial-vehicle monitoring (drones) were used to conduct land-use evaluation, landscape-function evaluation and structure analysis; physiological and ecological monitoring of forest, grass and shrubland on both observation and control test plots in each ecosystem, with regular monitoring of soil erosion based on different water and soil management regimes. Questionnaire surveys and in-depth stakeholder interviews were conducted with residents, local government, private enterprises and farmer cooperatives to track socio-economic benefit status. Results were compared and summarized in stages to guide and improve management in the next stage, and to secure support from the Chinese government.

Project technical approaches were carefully tailored to local site conditions, constraints, opportunities and local preferences based on extensive pre-project participatory assessments, multistakeholder consultations, and multidisciplinary scientific assessments resulting in a range of field trial designs. Multisector involvement has included central, provincial, district and commune governments, cooperatives, local communities, and academic institutions at the local and national levels. Collaborative planning with stakeholders facilitated by the project implementing agency elicited local and traditional knowledge that were incorporated into project planning, though plans were dominated by scientific restoration approaches. Substantial investment in local capacity building and project-organized environmental awareness raising were achieved through training and project-guided community and stakeholder consultations, focusing on links between environmental degradation and poverty.

Many local businesses, small-scale producers and cooperatives participated in the business development and marketing of commercially viable eco-products that could benefit all participating stakeholders. Similar programmes are being replicated to mitigate karst rocky desertification elsewhere in China and Southeast Asia.

Figure 16. Landscape changes in Huajiang between 2000 and 2020



© State Engineering Technology Institute for Karst Desertification Control, Guizhou Normal University

Project 8: Huangshan forest landscape restoration based on sustainable development goals, Republic of China

Country	People's Republic of China
Area restored or under restoration (ha)	16 060
Tenure	Government land/protected area; Traditional usufruct on small farms; Government approval of forest protection and restoration activities in gazetted national scenic area.
Project duration	2014–2025*
Budget (USD)	91.38 million
Cost per hectare (USD)	5 690
Ecoregion	Subtropical evergreen broadleaf forests
Production system/Land use	Some tea plantations and small market farms; tea, handicrafts, primary economic product is tourism related
Main implementer; Funding source	Mt. Huangshan Scenic Area Administrative Committee; Public Institution (locally generated park revenue and tourism tax).
Estimated number of beneficiaries	Huangshan District population of 50 000 direct beneficiaries, 200 000 indirect beneficiaries in surrounding areas; 23 million ecotourists since 2014
Best represented UN Decade principles	1, 3, 4, 5, 7, 9, 10
Website links and sources of additional information http://www.globalgeopark.org/homepageaux/list/China/6407.htm https://iucngreenlist.org/sites/mount-huangshan-scenic-area/ http://world-heritage-datasheets.unep-wcmc.org/datasheet/output/site/mount-huangshan/ https://en.unesco.org/global-geoparks/huangshan	

*Current project cycle. Activities began decades earlier.

Project summary and context

Mount Huangshan is one of China's most popular scenic landscapes with annual visitors around 3 million and increasing by 8.96 percent per year. It is protected under several Chinese state laws and is a UNESCO World Heritage Site, Biosphere Reserve, Global Geopark and IUCN Green List Protected Area. The Mount Huangshan Scenic Area Administrative Committee, under Huangshan Municipality's authority, is composed of government officials, community leaders and local people. The committee also cooperates with associations, state-owned companies, and private-sector entrepreneurs from the area.

A special fund supported by government and substantial revenues from tourism admission fees have been set up to ensure adequate financial resources are available to monitor and manage the area to the highest international standards (see, for example, UNESCO, 2016)., and contributed to local infrastructure development and quality-of-life improvements for the local communities.

A management master plan has been established with the objectives of balancing conservation with tourism promotion; ensuring the safeguarding of the scenic area within a framework of sustainable development for the local community; and raising conservation management standards by computerized mapping, systematizing, refining, and humanizing the property's management regime to preserve the artistic, cultural and environmental heritage value of Mount Huangshan (UNESCO, 2016). The project has achieved an innovative, comprehensive area zoning, and an associated regulatory framework based on careful monitoring and plan adaptation in response to monitoring feedback.

Mount Huangshan provides habitat for locally or nationally endemic plant species, several of which are globally threatened. Its rich flora includes one-third of China's bryophytes (mosses and liverworts) and over half its pteridophytes (ferns). The exceptional flora is complemented by important vertebrate fauna of over 300 species, including 73 mammals, 246 birds, 59 reptiles and amphibians and 32 fish. A total of 13 species are under state protection, including the clouded leopard (*Neofelis nebulosa*) and the oriental stork (*Ciconia boyciana*).

The project provides annual training on integrated park management for park managers from other areas throughout China. Mount Huangshan is an observatory for UNWTO Sustainable Tourism. The Sustainable Development case of Huangshan Tourism was included in the publication released by FAO and UNWTO entitled Mountain Tourism – Towards a More Sustainable Path (Romeo et al., 2021). An education project – Huangshan Nature Lecture – was selected as an exemplary case for tackling climate change among UNESCO Global Geoparks.

Key achievements

- Forest coverage has increased from 56 percent of the total area in 1976 to 98 percent currently, while the number of higher plant species has increased from 1 805 in 1990 to 2 385.⁸
- Vertebrate species have risen from 323 to 410 since 1990.
- From 2000 to 2015, the average water reservation of Mount Huangshan increased by 0.15 m³hm⁻² year⁻¹ and the average carbon sequestration for the entire area increased by 25.57 gcm⁻² year⁻¹.
- According to an assessment by the Chinese Academy of Forestry, the ecosystem service monetary value of Mount Huangshan has reached RMB 248 200 (approximately USD 34 909) per hectare per year, creating a value of more than RMB 10 billion (approximately USD 1 406 million) for society every year.⁹ From 2014 to 2023, tourism revenue increased from RMB 2.30 billion to RMB 3.77 billion (approximately USD 323 million to USD 521 million).
- Fifty-thousand people have been employed by the Administration Management Committee, its subcommittees and the municipality involved in park maintenance and management. More than 200 000 people have been employed indirectly as a result of tourism. The per capita income of surrounding communities has increased by more than 300 percent since the start of the project.

⁸ Based on project documents and stakeholder consultation conducted on September 19th, 2022.

⁹ Including from ecosystem services, tourism revenues and local employment.

How was it done?

The initiative is made possible through national, provincial and municipal laws and policy instruments and has received recognition under several international conventions. Early studies of native flora and fauna informed the replanting, habitat protection and restoration activities using both assisted and natural regeneration. The administrative committee, cooperating with representatives of various sectors, agencies and communities each informed by their respective constituents, meets regularly to discuss problems, issues and opportunities, reach agreement on actions to be taken, and adapt the management plan accordingly. The committee contracts ecologists, biologists and environmental scientists to regularly monitor a range of environmental parameters. Monitoring information is fed into the committee's continually adapted management plans.

The area is sustainably managed by closing some visitor trails to tourist traffic based on indications of environmental resource importance and safety, while other trails are reopened following ecological recovery. Area residents have been trained to serve as park rangers and tour guides. Both tour guides and rangers provide photo reports on early signs of environmental degradation to the administrative committee, informing required actions, such as trail and area closures for natural regeneration or replanting. The integrated monitoring feedback system is a centrepiece of Huangshan's exemplary ability to accommodate large numbers of visitors while maintaining and improving the overall ecological integrity of the area.

Tour guides provide orientations for visitors on proper environmental behaviour and respect for nature. Posters developed by the committee on good environmental behaviour, respect for nature, and pride in China's natural heritage are distributed and displayed in the scenic area and at commercial establishments, hotels and guest houses throughout the area. Many area residents are employed by or operate their own tourism-related enterprises. Villagers have been trained to produce high-quality handicrafts popular with tourists, and crops supplying local shops and restaurants.

Figure 17. Rotational trail and area zoning based on monitoring to enable vegetation and ecosystem recovery



© Mt. Huangshan Scenic Area Administrative Committee

Project 9: Million Tree Forests: Building Climate Resilience through Urban Forest Experiences, India

Country	India
Area restored or under restoration (ha)	58.5 (multiple sites)
Tenure	Government lands and private lands
Project duration	2016–2025 (expected to continue)
Budget (USD)	219 000 (for one Oxygen Park in Ahmedabad city)
Cost per hectare (USD)	14 380 for forest restoration; Additional 35 000 – 55 000 USD for park and recreation infrastructure
Ecoregion	Tropical and subtropical broadleaf forests; Tropical and subtropical savannas and shrublands
Production system/Land use	Unused barren public lands, abandoned lands, informal grazing lands, illegal garbage dumping grounds, campuses (educational, industrial, religious), private lands
Main implementer; Funding source	Acacia Eco; Private corporate and individual philanthropic donors through the AcaciaEco Trust and local government administrations
Estimated number of beneficiaries	More than 1 million oxygen park users, and others indirectly as a result of forest restoration, pollution control and air quality improvement.
Best represented UN Decade principles	1, 3–8
Website links and sources of additional information https://www.acaciaeco.com/ https://www.youtube.com/@acaciaeco6859/videos https://restor.eco/platform/organizations/7d1bebbd-29f0-441e-994a-f8c55848447d/ https://uplink.weforum.org/uplink/s/uplink-contribution/a012o00001pTs26AAC/Climatepositive cities, one tree at a time.%E2%9C%AA	

Project summary and context

The objectives of the organization and projects are centred around three main goals: bringing nature back to cities, reconnecting people with nature and reviving degraded soils, and climate and environment amelioration for India's urban areas. It involves a broad range of committed stakeholders, including government agencies, local groups and citizens.

Ecosystem restoration was done by planting native trees, shrubs and grasses and developing and restoring water bodies. It employs a high-density multispecies tree planting technique (3-5 trees/m²; 40-50 native tree species/forest) inspired by the award-winning Miyawaki method (Miller, 2022). This has resulted in faster growth, more biodiverse and dense forests, and higher environmental impact. The “oxygen park” projects are dense forest pockets inserted in highly populated urban areas, creating urban forest experiences and biodiversity hotspots.

The parks include several usable green spaces designed to cater to the needs of urban residents, such as nature trails and rest and recreation infrastructure. They have a significant impact on several critical environmental parameters, such as purification, temperature control, noise and dust reduction, soil fertility, and carbon sequestration. The community-centric approach increases human-nature connection, thereby positively impacting health and well-being.

Key achievements

- Ongoing projects have planted over 1.1 million trees so far on more than 120 peri-urban sites, covering 58.5 hectares in Ahmedabad, Gujarat State, India.¹⁰
- The projects incorporate community engagement through planting drives, specifically focusing on school children and youth.
- The projects have an integrated design with interdisciplinary expertise provided by urban planners, architects, infrastructure engineers, government authorities, and technical experts for soil, ecology, and water.
- Strong stakeholder buy-in and successful collaborations with private and public stakeholders have been achieved, creating employment opportunities for hundreds of people, half of whom are women.

How was it done?

Local and municipal government administrations granted the Acacia Eco organization end-to-end land development projects on public wastelands or unutilized lands for park development. Activities included land identification and acquisition, project planning, fundraising, site assessment and survey, ecological master planning, community engagement, long-term maintenance and impact assessment. A detailed analysis of soil, water and biodiversity informed appropriate inputs for soil enhancement. Enhancement included compost, organic water retention and aeration amendments, organic growth booster (Jeevamrit) and native tree species selection – the two primary principles of the Miyawaki method.

The high-density multispecies-plantation approach with regular monitoring and maintenance has achieved a 90 percent survival rate and an average forest height of 3 to 4 metres after one year of planting. Consultations were held with local community leaders, women's organizations, local and national government officers, the private sector, schools and universities who were engaged at various stages of project formulation and implementation. Donors included banks, private corporations, NGOs, INGOs and private philanthropists.

¹⁰ Most of the unused wastelands are provided to the project free-of-charge by the respective municipalities. In total, there are 88 sites covering over 51.4 ha located in Gujarat State with additional sites in Jharkhand, Uttar Pradesh, Rajasthan and Maharashtra that cover 7.1 ha.

Figure 19. Oxygen Park



© Acacia Eco
Oxygen Park was developed by Acacia Eco on Science City Road, Ahmedabad, India. Barren land before the project (left), tree growth in two years (centre), green and blue infrastructure including trees, shrubs, ponds, walking trails and a playground for children built in the heart of the city (right).

Figure 20. Nursery



© Acacia Eco
Nursery set up by Acacia Eco in Ahmedabad (left); High-density multispecies forest developed with more than 65 000 trees along a 1 km stretch at a prime city landmark, the Sabarmati Riverfront (right).

Project 10: Environmental Conservation Program for Mangrove Forest Restoration and Protection in Kyaukpyu Township, Myanmar

Country	Myanmar
Area restored or under restoration (ha)	1 460
Tenure	Government land approved for restoration with formal government approval.
Project duration	2008–2018
Budget (USD)	2.1 million
Cost per ha (USD)	2 550
Ecoregion	Greater Sundarbans Mangroves
Production system/Land use	Mangrove forests, coastal zone lowland and upland cropping, agroforestry, NTFPs, fresh and brackish water fisheries
Main implementer; Funding source	Mangrove Service Network (MSN); POSCO International
Estimated number of beneficiaries	3 980
Best represented UN Decade principles	1–9
Website links and sources of additional information https://msn-myanmar.org/	

Project summary and context

Coastal communities in Kyaukpyu District, Rakhine State, depend on mangrove forests for livelihood products and ecosystem services, including storm and flood protection and prevention of saltwater intrusion to inland crop fields. According to national law, cutting living mangrove trees and overexploiting aquatic resources is illegal. However, Myanmar's law enforcement on deforestation and environmental legislation is weak. Since the 1990s, coastal-fringing forests have been severely overexploited by outsiders and later by the local communities seeking to secure their own share of the depleted resources. As a result, mangrove deforestation and severe reduction of aquatic products became rampant.

The main objective of the Mangrove Service Network (MSN) project was to reverse these trends and to restore denuded mangrove forests, improve forest ecosystem services and aquatic resources. It employed an integrated set of interventions for forest restoration, livelihood development, and reduced demand for wood fuel through extensive consultations and collaboration with communities and government before, during, and after the project. Replanting and assisted natural regeneration using a mix of closely spaced locally occurring species re-established coastal barrier forests. In turn, these reduced tidal intrusion, wave height and flow of salt water into paddy fields, and improved rice and crop production.

Key achievements

- Mangrove ecosystems totalling 1 460 ha were protected and restored through re-planting and natural regeneration by 47 groups in 21 villages.
- Proven mangrove reforestation techniques were applied, including protection of natural regenerants, close-spacing plantation of nursery-grown native mangrove seedlings and protection of coppice and seed stock for natural regeneration where possible. Over 18 million seedlings were planted between 2011–2017.
- The exploitation of mangrove ecosystems was reduced through alternative livelihood development extension, including crab fattening, near-shore fishing, improvement of agricultural productivity and vocational training.
- Forest user groups were trained, and the wider community has been provided with enhanced environmental awareness through regular project-supported community consultations, multimedia presentations, training and experiential learning.
- Community-based ecological mangrove restoration¹¹ was conducted at 10 sites in three villages (approximately 3.72 ha) to restore mangroves using natural regeneration without planting seedlings. The unit cost of restoration in CBEMR was USD 50 per acre (appx. USD 124 per hectare), compared to USD 600 to 800 per acre (approximately USD 1 483 to 1 977 per hectare) for seedling propagation and planting.

How was it done?

Communities facing environmental and socio-economic challenges from the over-exploitation of mangroves and associated fishery resources were organized by MSN into forest users groups (FUGs), following extensive village-level consultations and collaboration between the government and the coastal resources-dependent livelihood groups. The FUGs were formally registered with district authorities under the auspices of the Myanmar Forestry Law. Following consultations and awareness raising, the communities collaborated with MSN to agree on the project aims and activities. MSN actively engaged nearly all villagers, including women and youth, during the process. The promise of project employment and backing for the development of alternative income generation incentivized communities to be part of the community mangrove restoration and sustainable resource management. The project also enabled their support for inclusiveness, governance transparency and impartial conflict resolution. Local knowledge and wisdom were blended with scientific technical knowledge and activities to tailor the project to suit the local context. Relevant forestry rules and regulations were followed in close consultation with government authorities.

FUGs and communities in the restoration areas received training on the importance of mangrove forests for life and livelihood and collaborated on demarcating and mapping the restoration areas. Capacity building included training on sustainable management of mangrove forests, making fuelwood -saving cooking stoves, environmental awareness campaigns for schoolchildren, mangrove art painting competitions, and school tree planting. FUGs signed agreements to protect the restoration sites as well as nearby intact mangrove forests. Reforestation and regenerating areas were protected by barbed wire fencing. Community woodlots were established, and sustainable management regulations were agreed upon and applied.

¹¹ Read more about the Community-Based Ecological Mangrove Restoration programme in <https://mangroveactionproject.org/wp-content/uploads/2023/11/CBEMR-Intro-for-Enquirers-30-Jan-2023-1.pdf>

Comparisons between planting and the CBEMR method demonstrated that CBEMR was more cost- and time-efficient because it depends on natural regeneration instead of seed collection, seedling propagation and planting. The naturally regenerated species mix was also quicker to establish. Livelihood-improvement opportunities were enhanced by project support for agriculture, livestock and fisheries improvement activities, small business creation and solar drying facilities. Training, production and distribution of improved fuel-efficient cooking stoves contributed to energy saving, reduced tree cutting, and less health hazards from kitchen smoke.

In addition, formal registration of the restoration areas with district authorities was essential for building ownership and responsibility-taking by the community. In turn, community management capacity was strengthened, serving as a stimulus for local leadership development.

Figure 21. Mangrove nursery production and mangrove plantation



© Mangrove Service Network
Mangrove nursery production (top). Mangrove restoration site before 2011 (left) and after 2014 (right)

Figure 22. School tree plantation and energy-efficient cooking stove distribution



© Mangrove Service Network, Myanmar
A total of 1 335 school children participated in school tree planting (left) and energy-efficient cooking stove distribution (right).

Project 11: Aneityum Forest Restoration, Vanuatu

Country	Vanuatu
Area restored or under restoration (ha)	9 200
Tenure	Formal tenure/ local ownership based on traditional land ownership law
Project duration	1995–2002
Budget (USD)	97 000
Cost per hectare (USD)	11
Ecoregion	Solomon-Vanuatu-Bismarck Moist Forests
Production system/Land use	Coastal fringing forests and scrublands, shifting upland cropping, home gardens, fisheries
Main implementer; Funding source	Lambrechtsen Consulting and Vanuatu Department of Forestry; New Zealand Aid
Estimated number of beneficiaries	915
Best represented UN Decade principles	1–8, 10
Website links and sources of additional information https://library.sprep.org/content/soil-erosion-control-aneityum-vanuatu https://cgspace.cgiar.org/bitstream/handle/10568/99000/Exp_Cap7_Bumseng.pdf?sequence=1&isAllowed=y https://www.islandvulnerability.org/vanuatu/miller2009.pdf https://pacificfarmers.com/erosion-control/	

Project summary and context

Aneityum is a remote, sparsely populated island at Vanuatu's southern extremity. Its remoteness and pristine natural conditions, particularly its coral reefs, are a draw for cruise ships and tourism, providing local households with most of their income. However, the combination of forest overexploitation, free grazing and fires resulted in severe soil erosion from coastal slopes. This led to the sedimentation of coral reefs, reduced fish stocks and a near-stoppage of tourist traffic.

Through the project, coastal forest areas and marine ecosystems were restored using innovative scientific approaches to overcome soil toxicity and re-establish the vegetative barrier against soil erosion. It facilitated close cooperation and collaboration among local communities, government and international consultant foresters who designed the project in conjunction with local communities and the Vanuatu Forest Department. The project applied integrated approaches, including empowering local women (inclusion in decision-making, project planning and implementation), training and project handover to local environmentally concerned leaders, and alternative energy development to prevent forest overexploitation.

Key achievements

- Severe soil erosion was attenuated using successional contour plantings to ameliorate toxic soil conditions (low pH and high aluminium content), which permitted the establishment of native grasses, acacia, and later on, sandalwood and other native tree species.
- The health and productivity of marine ecosystems, including coral reefs and near-shore fish populations, were restored by minimizing sedimentation flows.
- Restoration of the marine environment reinvigorated the tourist trade providing substantial economic benefits for poor local communities.

How was it done?

The project sought and obtained free, prior and informed consent and recognized community rights, needs and concerns. Communities were engaged in all decision-making about the restoration activities. Key to the restoration of coastal forests and agricultural lands were community consultation in project design; participation in project implementation; and collaboration among communities, the Vanuatu Forest Department and a private New Zealand consulting firm. Community meetings were regularly convened to review progress and update plans based on lessons and emerging insights from field experience. Traditional authority structures were used to help manage the project, mobilize community participation and resolve conflicts.

The project paid workers from the local community for seed collection, nursery management, planting, and maintenance. It supported income-generating and other expressed development priorities, including sandalwood planting, clean water supply, wind power installation, road improvement and jetty rehabilitation.

Women's inputs were encouraged and facilitated during project discussions, and women played important roles in decision-making and in the management and implementation of project activities. To enable their input, the project made provisions to allow women to work suitable hours in the project so that they could also attend to other household responsibilities. The cash women earned through working on the project was used to cover household expenses and pay school fees so that more children entered secondary school than before the project.

Erosion severity mapping was conducted to categorize soil erosion on a scale of 1 to 5, with 5 being the most severely eroded. Various successional erosion control measures were designed and tested to restore coastal forests based on the severity of site degradation. The main approaches for erosion control included:

- community problem assessment and priorities setting;
- awareness raising on the relation between deforestation and forest fire, soil erosion, soil fertility and potential benefits of soil erosion control;
- the use of simple timber and rock structures to trap gully sediments using vetiver grass, *Acacia spirorbis*, *Pinus caribaea*, *Pterocarpus indicus*, *Syzigium* spp., and *Santalum* spp. for slope stabilization, moisture retention, soil organic matter improvement to reduce aluminium and manganese toxicity, and establishing conditions conducive for natural regeneration;
- using trees to reduce soil moisture evaporation, wind-speed reduced inland crop drying and allow soil microorganisms, including nitrogen-fixing bacteria, to thrive; and
- using coral sand, agricultural lime, compost, nitrogen, phosphorus, potassium and rock phosphate amendments to accelerate the re-establishment of forests, soil and slope-protective vegetation.

Soil amendment field trials informed species selection for various micro-environments. Acid-tolerant indigenous plants were produced in community nurseries. An erosion awareness programme was designed and conducted at local schools. This included developing an educational video illustrating the links between fire, soil fertility, soil erosion and Ciguatera fish poisoning.¹²

The coastal forest-restoration efforts reduced sediment load to marine coral and fisheries ecosystems, thus helping to bring the return of tourism and income. The efforts focused on planting grasses, trees, construction of rock dams, gully control, fire management and enhanced natural regeneration of native species. Furthermore, the coastal barrier vegetation reduced wind speeds, protecting inland crops from storm damage and generally enhancing orchard and crop production. The lessons learned from erosion control field trials and the involvement of local communities through appointing a motivated on-site supervisor and local nursery manager were key for success.

¹² See, for example: European Centre for Disease Prevention and Control
<https://www.ecdc.europa.eu/en/all-topics-z/ciguatera-fish-poisoning/facts-ciguatera-fish-poisoning>

Figure 23. Vetiver contour hedges



© Don Miller
Year one (left) and year eight (right). Vetiver contour hedges served to collect erosion sediment and build soil terraces required to plant successional shrub and tree species.

Figure 24. Mix species vegetative barriers against sediment



© Don Miller
Two metres of eroded sediment accumulated behind mixed species vegetative barriers, preventing sediment from reaching the reefs.

Project 12: Rupa Lake Watershed Restoration, Nepal

Country	Nepal
Area restored or under restoration (ha)	2 700
Tenure	Government land; Residential and cultivated area under approved traditional usufruct; Some upper watershed area part of protected forest estate, some awarded for community sustainable management under the Community Forestry Law
Project duration	1985–2017 (6 different projects)
Budget (USD)	1 636 382*
Cost per hectare (USD)	606
Ecoregion	Eastern Himalayan Broadleaf Forests
Production system/Land use	Upland agriculture, lowland agriculture, agroforestry, NTFPs and forest products, fisheries, livestock
Main implementer; Funding source	Several: 1985–1998 CARE Nepal, Govt Nepal; DGIS Netherlands; 1997–2001 Biodiversity International; IDRC and NEDA Netherlands; 2003–2005 LiBird; UNDP GEF-SGP; 2006–2007; IUCN Otter Specialist Group; 2007–2011 Niche Market Project: LiBird; NORAD; 2014–2017 LiBird; Swiss Resource Foundation
Estimated number of beneficiaries	5 300 people (1 200 households)
Best represented UN Decade principles	1–6
Website links and sources of additional information https://alliancebioiversityciat.org/stories/restoring-rupa-lake-watershed-nepal/ ; https://rcidp.gov.np/ ; https://www.academia.edu/1497837/Towards_an_innovative_approach_to_integrated_wetland_management_in_Rupa_Lake_Area_of_Nepal https://www.jstor.org/stable/26522847#metadata_info_tab_contents https://www.internationalscholarsjournals.com/articles/taking-a-systematic-approach-to-integrated-wetland-management-in-rupa-lake-area-of-nepal.pdf http://www.unep-iemp.org/file/2021/08/24/1629793413776.pdf	

*Based on the budget of 1984–1997 with half assumed having been used for Rupa watershed area.

Project summary and context

Realizing the acute need for restoration of the severely degraded Rupa Lake and the adjacent Begnas Lake watersheds, the Government of Nepal initiated the “Begnas Tal and Rupa Tal Watershed Project” (1985–1998) funded by the DGIS Netherlands and implemented by the Cooperative for Assistance and Relief Everywhere Nepal. The project was then extended over six phases, each with somewhat different objectives and outputs and supported by different donors and technical assistance agencies.¹³ Traditional lake fishery production plummeted because of sedimentation and coverage by invasive weeds due to eutrophication and encroachment.

¹⁴ Subsequent to the initial Netherlands government support, the project received five small and medium project grants from various national and international agencies related to agrobiodiversity and wetland management: In-situ conservation of agrobiodiversity, community biodiversity register (2003–2005), community-based wetland management (2006–2007), linking agrobiodiversity to niche markets (2007–2011), integrated management and utilization of watershed services (2014–2017). All of these projects were implemented by the national NGO, LI-BIRD, in conjunction with the Government.

Farmland erosion and degradation was reduced through soil and water conservation, agroforestry and the introduction of broom grass and coffee for soil conservation and income. Planting fruit and fodder trees transitioned much of the cultivated upland area from monoculture to agroforestry. With upland and lowland communities closely involved in the planning and implementation of all of the restoration efforts, the lake was gradually restored by reducing siltation through protection and restocking of the catchment forests, improving farming practices, protection of water sources, and prohibiting further lake area encroachment. A fisheries cooperative was established, and aquaculture was promoted as part of the efforts to enhance local fish production.

Key achievements

- An extensive area of degraded forests in the lake watershed was successfully restored to dense forests.
- Decreased sedimentation and siltation of the lake occurred, along with eliminating invasive aquatic plants, improved water quality and increased fish harvest.
- A project-facilitated and supported community-run cooperative regulates benefit-sharing between upstream land users and lowland lake users by levying charges on cooperative members. The charges are used to compensate upland farmers for implementing various soil and water conservation measures (payments for environmental services, or payments for ecosystem services).
- The dual conservation and income benefits of agroforestry, improved land management, forest restoration and agro-biodiversification have significantly improved ecological conditions and local livelihoods.

How was it done?

During the project's initial phase, local communities were made aware of the consequences of watershed and lake degradation and the benefits of restoration. They were organized into community forestry user groups (CFUGs). These groups were empowered through the legal government handover of the watershed forest areas. All participating groups proved pivotal for turning conflict into collaboration and ecosystem degradation into restoration, including the CFUGs, the project-supported and community-led Rupa Lake Rehabilitation and Fishery Cooperative, Farmer-to-Farmer Group, and the Bioresource Conservation Movement.

The CFUGs were trained to prepare and implement forest operational plans for sustainable forest and watershed management, including erosion control, stall feeding and rotational grazing of livestock, fire prevention, agroforestry, fodder plantation and crop diversification. The project facilitated volunteer guarding, which also united the communities, in addition to protecting the forests. Forests were restocked by natural and assisted regeneration, enrichment planting, and protection against gully formation and landslides using biological (plant-based, vegetative bunds) and physical means (silt traps, gully plugs, weirs).

Other project activities included a community seed bank and information centre, lake cleaning campaigns, ecotourism, and product branding and marketing for value addition. The Government of Nepal recently launched the “Rupa Lake Conservation and Integrated Development Project,” which supports watershed conservation and sustainable development through the improvement of physical infrastructure, integrated watershed management, environment and social development, providing an umbrella for ongoing Rupa Lake watershed sustainable management and development.

Currently, 17 CFUGs are managing a 30 km² forest area now rich in biodiversity. The payment for ecosystem services mechanism enables the sharing of lake fisheries’ benefits with upstream communities that actively maintain watershed health by protecting catchment forests, reducing chemical fertilizer and pesticide use, and enhancing fish production and income.

Figure 25. Rupa Lake: 1980s and 2020



© Ram Rana

Figure 26. Removing invasive species and agrobiodiversity product branding



© LI-BIRD

Cooperative members remove invasive lake weeds (left); branding of local agrobiodiversity products (right).

Project 13: Ban Mae Sa Mai Forest Restoration, Thailand

Country	Thailand
Area restored or under restoration (ha)	33
Tenure	Government land part of National Park; Local community cooperation enabled via agreements, no formal tenure to communities
Project duration	1996–2013 (main project) Some activities ongoing in 2022
Budget (USD)	96 393
Cost per hectare (USD)	2 921
Ecoregion	Northern Indochina Subtropical Moist Forest
Production system/Land use	Upland subsistence and commercial crop fields, some lowland rice, agroforestry, NTFPs, animal husbandry
Main implementer; Funding source	Chiang Mai University Forest Restoration and Research Unit – FORRU; Multiple sources incl. grants, NGOs.
Estimated number of beneficiaries	3 000
Best represented UN Decade principles	1, 2, 4, 7, 9
Website links and sources of additional information https://www.forru.org/library/0000210 https://www.forru.org/library/0000133 https://www.forru.org/library/0000083 https://www.mdpi.com/1999-4907/10/9/732/htm	

Project summary and context

Chiang Mai University's Forest Restoration Research Unit (FORRU-CMU) has been operating in the university's Biology Department (Science Faculty) since 1994. It has pioneered tropical forest restoration research in Thailand and neighbouring countries, developing and field-testing scientific restoration techniques, particularly the Framework Species Method (FSM) which combines tree planting with assisted natural regeneration. The method was originally developed in Australia. It involves establishing a dense mix of 20-30 of pioneer and late successional tree species, typical of the reference forest ecosystem. Following two years of weeding, fertilizer application and fire prevention, canopy closure can be achieved in about three years, with some of the pioneer trees growing up to 10 meters tall. Above-ground tree biomass and forest structure reaches that of the reference forest within 25 years, and biodiversity recovery is also rapid.

Ban Mae Sa Mai, located in the Doi Suthep–Doi Pui National Park near Chiang Mai city, was among the first test areas developed by FORRU-CMU, in collaboration with the local Hmong ethnic minority community. The project developed an innovative approach for complementing assisted natural forest regeneration with the planting of a diverse selection of native tree species. Test plots were established annually, eventually covering 33 ha of deforested uplands in a vital watershed.

¹⁴ Read more about the method via <https://www.forru.org/sites/default/files/public/publications/resources/forru-0000229-0001-en.pdf>

The project facilitated discussions between the Hmong ethnic minority communities and the park authority, enabling the community to strengthen their case to continue residing within the national park in exchange for their commitment to restore and sustainably manage forests. FORRU-CMU has published dozens of scientific papers and training materials on assisted natural regeneration using the FSM in several languages to enable adoption and adaptation of assisted natural regeneration to local conditions and forest types in Cambodia, Viet Nam, Lao PDR, Indonesia and China.

Key achievements

- The project helped pioneer arrangements enabling community enclaves within protected areas based on commitment to sustainable forest and natural resource management.
- A community tree nursery was established which continues to provide up to 20 000 saplings of indigenous framework tree species to local restoration projects annually.
- Excellent working relationships were developed among key stakeholders, reducing previously strained relations between villagers and forestry authorities.
- Results were shared widely at workshops and training activities throughout Thailand, Asia and beyond. The project published and distributed training materials leading to replication of the restoration methods and research protocols it developed.
- Villagers were able to leverage their participation in the project to gain greater political respect from authorities, leading to funding from local government for village infrastructure development.
- Livelihood benefits for involved communities provide a strong foundation for sustainability of results.
- A rigorous monitoring system continued post-project.

How was it done?

The project facilitated a partnership between the Hmong community members of Ban Mae Sa Mai and national park authorities to test the FSM system. Villagers were trained in basic tree propagation and nursery management, and they established a community tree nursery close to the experimental site. The nursery continues to produce around 20 000 seedlings annually for planting in nearby restoration projects. The project was accepted by the pre-existing grassroot organization “Group for the Conservation of Natural Resources of Ban Mae Sa Mai” primarily to improve the community’s relationship with the park authority and strengthen villagers’ right to remain in the park, hence their willingness to convert former cabbage fields into forest-restoration trial plots. FORRU- CMU in Chiang Mai University served as a neutral actor where villagers could demonstrate their commitment to forest stewardship.

Restoration became integrated into traditional community ceremonies as villagers gradually accepted tree planting and fire prevention as community activities, requiring each household to provide one person to participate or to pay a small fine. Following each planting event, FORRU-CMU donated to the village community development fund, which was mainly used to improve the local water system and village roads. Villagers were engaged in every stage of the restoration and were paid for nursery work, weeding, fertilizer application and monitoring. Fire prevention was supported by providing equipment, food and petrol for patrol vehicles.

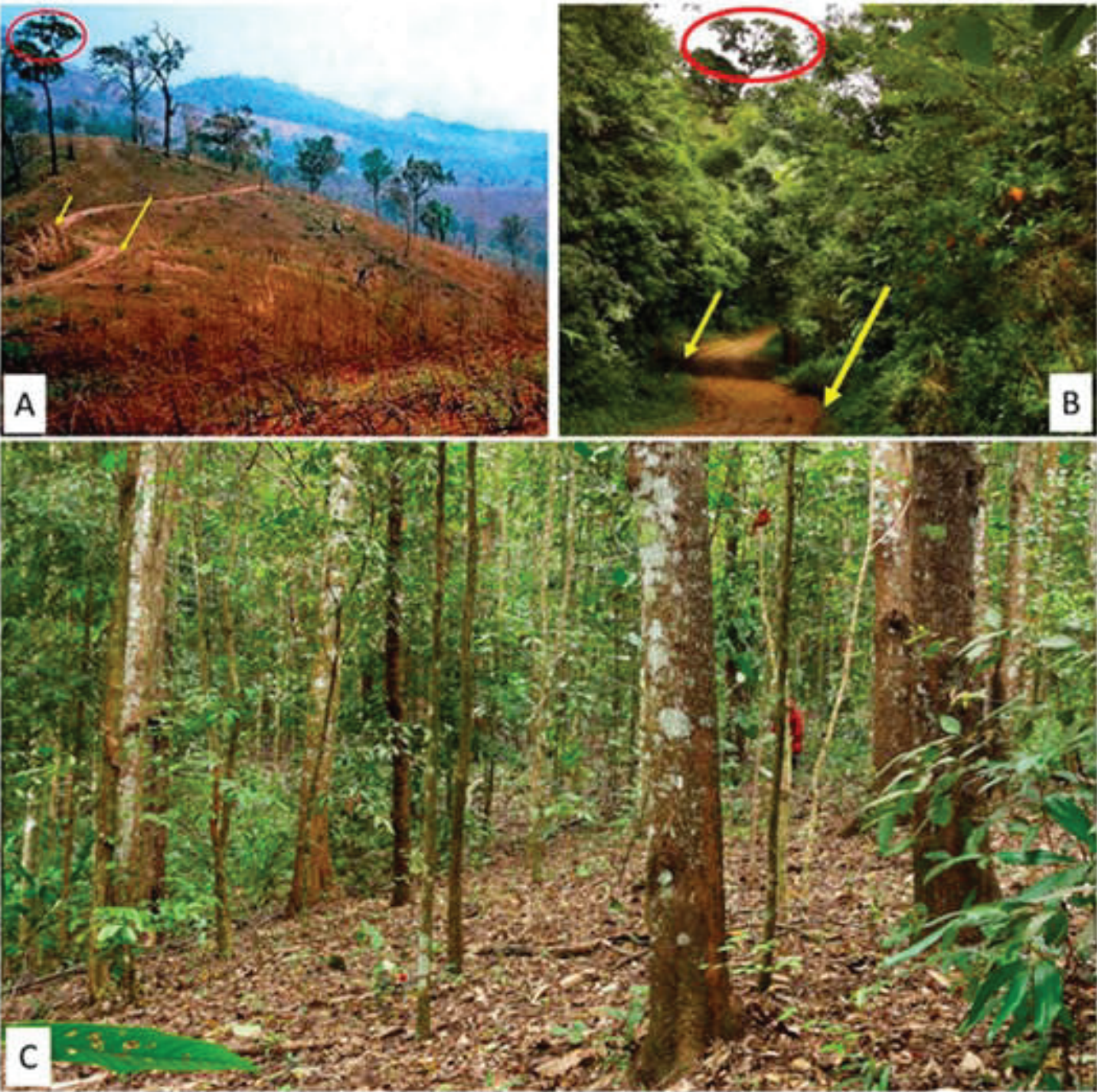
The partnership between academia and local villagers combined technical and traditional knowledge for selecting appropriate species for rapid recovery, wildlife attraction, fruit and seed dispersal and village support for field implementation.

Scientific and indigenous forest-management approaches were amalgamated during collaborative planning. The community-run nursery provided planting stock of a diverse mix of native tree species for developing the experimental plot system. Emerging natural regenerants and coppice stock were carefully protected. Tree planting was combined with assisted natural regeneration to restore severely degraded former forest land. Silvicultural treatments were applied post-planting, to maximize tree survival and growth rates, maintain stocking density and protect seedlings and regenerants from weed competition.

An inventory of tree species in the reference evergreen-forest ecosystem was conducted over several years prior to the restoration project. Rapid site surveys were performed to provide baseline data on pre-restoration natural regenerant density and soil conditions to plan the numbers and species of trees to plant to complement natural regeneration. Control plots were demarcated where no restoration activities were implemented. Long-term, multifactorial replicated experiments were established over 17 years (1996–2013). The total number of tree seedlings to be planted per hectare was calculated to achieve an initial stocking density of 3 100 individuals per hectare (including both planted trees and natural regenerants). Plots were planted annually at the start of the rainy season, with 20 to 30 framework tree species selected for tolerance to site conditions, ability to inhibit weeds and attractiveness to seed-dispersing wildlife. Seeds were collected from as many trees as possible to maintain genetic diversity among the planting stock.

The project monitored the effects of different plant spacing, fertilizer doses, weeding methods and intensity of seedling pruning before planting and types of planting stock (bare root vs. container-raised). It recorded plant survival, biomass production, height and diameter growth. Data were analysed for performance of species and silvicultural treatments, providing an evidence-based set of techniques for restoring tropical evergreen forests. Planting framework tree species complemented pre-existing natural regeneration to accelerate biomass accumulation and recovery of forest structure, biodiversity and ecological functioning above natural regeneration alone (Chazdon, 2021). Canopy closure was initiated by the end of the second rainy season after tree planting and was usually complete after three rainy seasons. Carbon levels returned to those typical of the reference forest within 25 years. The success of the FSM relies on selecting high-performing species and applying effective silvicultural treatments (Elliott *et al.*, 2003).

Figure 27. Restoration of Upper Mae Sa Valley over time



© Forest Restoration Research Unit, Chiang Mai University.
A. Upper Mae Sa Valley, photo taken in May 1998 before restoration; B. same site, photo taken in September 2016, to the left of the track is a 15-year-old restored forest while to the right of the track is a 9-year-old restored forest; C. Inside the restored forest (10 years old), a dense understory has developed beneath the canopy, with up to 70 recruit tree species represented by seedlings and saplings in the ground layer.

Project 14: Nepal–Australia Forestry Project, Nepal

Country	Nepal
Area restored or under restoration (ha)	450 000
Tenure	Government land; Traditional usufruct recognized in settlement and cultivation areas; Designated forest areas allocated to communities for sustainable management and restoration under the Community Forestry Law
Project duration	1966–2006
Budget (USD)	52 million
Cost per hectare (USD)	115.55
Ecoregion	Eastern Himalayan Broadleaf Forests
Production system/Land use	Upland agriculture, lowland agriculture, agroforestry, NTFPs and forest products, livestock, tree plantations
Main implementer; Funding source	Government of Nepal, Department of Forests; Australian National University and AusAID
Estimated number of beneficiaries	400 000
Best represented UN Decade principles	1-4, 6, 7, 9, 10
Website links and sources of additional information https://doi.org/10.1080/00049158.2019.1614805 https://www.aciar.gov.au/media-search/blogs/nepal-australia-forestry-partnership https://www.tandfonline.com/doi/abs/10.1080/00049158.1981.10674320	

Project summary and context

The Nepal-Australia Forestry Project is often credited with having contributed to a major turning point in the management of Nepal's forest estate. For centuries, Nepal relied on a traditional forest management system based on community protection of forest resources. The system began breaking down in 1957 when forest lands were nationalized. Unprotected, they rapidly deteriorated, with nearly 50 percent of the country's original forests having disappeared by 1990. In 1979, the government acted to stem the tide by granting village councils and lessees control over certain forest products. Since then, it has continued to provide legal support for community control of forest resources, an approach at the heart of the Master Plan for the Forestry Sector endorsed by the government in 1988. The Forest Act, revised in 1993, and the Forest Regulations of 1995 provide the legislative framework for handing over control of forests to communities to meet basic needs for fuelwood, timber, fodder and other forest products on a sustained basis; contribute to food production by maintaining supplies of forest produce, such as fodder and mulch that support farming; conserve important ecosystems and genetic resources; and contribute to the growth of local and national economies through good management of forest resources and development of forest-based industries and by creating opportunities for income generation and employment.

The Nepal-Australia Forestry Project was the first to actualize the potential of community forestry in Nepal and mobilize local communities throughout the country for large-scale forest restoration. In this long-running project, key activities have included the formation of community forest user groups (CFUGs), preparation of community forestry operational plans, forest handover to CFUGs, community nurseries, greening of deforested hill slopes, forest protection for natural regeneration, soil conservation and water source protection, community-based sustainable forest management, tree harvesting and equitable distribution of forest products to households.

Key achievements

- Nearly half a million hectares have been reforested, degraded mountain forests have been turned green, and drinking and irrigation water sources have been protected.
- The project pioneered the conceptualization and institutionalization of Community Forestry approaches in Nepal and beyond.
- The project's success has influenced Nepal's national forest policy and law.
- The sale of forest products has provided alternative income generation and distribution to households; training has increased women's empowerment; CFUG leaders and paid project employment have benefitted rural development and improved livelihoods.
- Over 400 CFUGs were established in two hill districts demonstrating participatory forest management and forest-based enterprise development.

How was it done?

CFUGs are the foundation of community-based forest management. They were established and operate as follows:

- A community meets with Forest Department staff to discuss needs and opportunities for the management of local forest resources.
- A CFUG, representing all households in the community, is formed.
- A forest operational plan is prepared with the assistance of a forest ranger. It defines the area to be managed; spells out agreements for protecting it; describes practices for managing and harvesting forests; identifies the areas and species to be planted, if any; and establishes a community forest nursery, if needed.
- CFUG members either volunteer to take turns as forest watchers or appoint a community member to do the job.
- The forest ranger teaches community members how to care for their forest by planting, thinning, coppicing and harvesting.
- The community harvests in accordance with the operational plan. Products are distributed among CFUG members or sold, with the remaining income going to the CFUG.
- After five years, the plan is revised to reflect changed forest conditions and lessons learned.

CFUGs formulated operational plans and strategies for forest restoration. They established community nurseries to produce seedlings for reforestation and assisted natural regeneration. Species trials were conducted to select the most suitable species. CFUG members then planted small-scale plantations to restore denuded hillsides. Protection of coppice roots and natural regenerants, reforestation and management of remaining forests were carried out by the CFUGs.

The capacity of the CFUGs was built gradually through training on a range of forest-restoration and community-based sustainable forest and ecosystem management subjects, including forest and ecosystem management, organizational management, equity and benefit sharing. CFUG leaders from participating communities in the two project districts benefitted from study and learning visits to other community forest sites in Nepal and the region.

Dialogues initiated with CFUGs in other parts of Nepal contributed to upscaling community forests beyond the project area, and the development of a national community forestry movement. Village regulations based on community consensus banned forest fires, grazing and harvesting tree roots for fuel. Increasingly larger plantation areas were established, initially with conifer species and later, once sites were ameliorated, with mixed conifer and broadleaf species. Enforcement of community rules and regulations was gradually stiffened and later strictly implemented against violators to prevent forest fires and damage to plantations by livestock. Initially, forests were strictly guarded, but this became gradually less necessary over time.

As a result of the project, previously denuded hillsides were converted to productive forests, contributing to the improvement of environmental services, including water resources, soil and slope stabilization, while providing a steady supply of timber and non-timber products for local use. Community forest governance capacity evolved and matured and the empowerment of weaker segments of society, such as poorer households, women and youth, became a priority. In the final phase of the project (2003–2006), issues that gained prominence included strengthening community forest and natural resource governance, equitable benefit sharing, and community-managed forest-based business and livelihood improvement.

Figure 28. Hillsides in Chautara Town, Sindhupalchowk District



© Dr Don Gilmour
Hillsides in this district have been transformed from bare, overgrazed, eroding slopes to healthy forests of local native pine and broadleaved species. Source: Community forestry transforming landscapes and livelihoods.

Figure 29. Mature pine plantation and community forest harvest



© ACIAR community forestry transforming landscapes and livelihoods.
Mature pine plantation (left); community forest harvest, ready to be processed in sawmills (right).

Project 15: COMDEKS Stung Siem Reap Integrated Watershed Management, Cambodia

Country	Cambodia
Area restored or under restoration (ha)	8 400*
Tenure	Formal tenure in settlements and cultivated areas; government ownership in areas zoned as forests and lake fisheries ; some forest and fishery areas under community management and restoration.
Project duration	2011–13; 2014–18; 2020–21 (three phases)
Budget (USD)	1 960 000**
Cost per hectare (USD)	233 (unconfirmed)
Ecoregion	Indochina tropical moist forests; Indochina tropical dry forests
Production system/Land use	Steung Siem Reap watershed: Tonle Sap flood plain, Rainfed lowland crops, Agro -archeological complex, Agroforest mosaic, Upland agriculture (Phnom Kulen National Park)
Main implementer and funding source	UNDP, Community-based Organizations, National and International NGOs Satoyama Initiative, 2017.Government line agencies; UNDP GEF SGP and Satoyama Initiative
Estimated number of beneficiaries	500 000
Best represented UN Decade principles	1, 3, 4, 8
Website links and sources of additional information https://comdeksproject.com/country-programmes/cambodia/ https://satoyama-initiative.org/case_studies/comdeks-project-steung-siem-reap-watershed-cambodia/ https://youtu.be/HYCjkoNTrQ0	

*Total project area 361 900 ha; reported restoration and management activities covered 8 400 ha.

** Based on 2018 budget; field projects via small grants to NGOs (maximum USD 50 000 per grant).

Project summary and context

The Community Development and Knowledge Management for the Satoyama Initiative (COMDEKS) project target in Cambodia is the Steung Siem Reap watershed landscape in the northwestern province of Siem Reap. The watershed covers 362 000 hectares, encompassing elevations from 500 metres above sea level in the upstream area to 15 metres downstream, where it drains into the Tonle Sap Lake. The landscape has a diversity of topography, rainfall, soil type, land use, forest cover and tenure status. The watershed is considered a “biodiversity hotspot.” It comprises 10 districts, 66 communes, and 470 villages with a total population of 500 000. Residents rely primarily on agriculture, but farming is increasingly insufficient to meet subsistence needs. Use of chemical fertilizers and pesticides contributes to land degradation and loss of biodiversity.

Natural resources are mostly co-managed by communities and government. Management schemes include community forestry, community fisheries and community-protected areas in Phnom Kulen National Park. Unsustainable farming and fishing practices, illegal logging and forest conversion to agriculture are pressing environmental problems. Rainfall is limited with insufficient water storage capacity and low soil-water retention. Agricultural diversification is limited, and despite high demand most vegetables are imported from neighbouring countries. Poverty is widespread due to seasonal unemployment and landlessness (UNDP, 2014). Restoration of the area’s diverse landscapes was tailored to suit conditions in different ecozones (flooded forest, protected area forests, farmlands, agroforests – as delineated by the project), together with the expressed needs and expectations of local residents, including ethnic minorities and women. The aim was to develop functional socio-ecological production landscapes.

Key achievements

- The project communities planted 68 000 trees and managed 7 800 ha of degraded forest.
- An additional 2 000 fruit trees and multipurpose tree species were planted for food and income generation.
- Fifteen-year management plans were drawn up for six community forests, five community-protected areas and two community fisheries to be developed. Capacity to implement the plans was strengthened.
- Communities constructed 13 km of fire break roads.
- Communities managed 600 ha of agricultural land under sustainable rice production, with production increasing from 2 mt/ha/year to 3 mt/ha/year during the project.
- More than 6 700 residents benefitted from income-generating activities, including agroforestry, bee keeping and ecotourism, with a 15 to 20 percent income increase.
- Established 52 community-based organizations, including 13 saving groups, 14 self-help groups, six water user groups (rice field irrigation system management), and five rice banks, that formed an area-wide federation of community-based organizations (CBOs).

How was it done?

The collective efforts of CBOs made the restoration of diverse landscapes within the Stung Siem Reap watershed area (total 362 000 ha) possible. Their work was facilitated by NGOs, commune councils, national and provincial government authorities and agencies responsible for agriculture, livestock, forestry and fisheries. Local conditions were determined using participatory appraisal, analysis of strengths, weaknesses, opportunities and threats (SWOT analysis), and participatory problem and solutions assessments. The project analysed the Stung Siem Reap watershed based on topography, rainfall patterns, soil types, land uses, forest cover and land tenure. It then divided the area into six zones: flood plains, rice plain, agro-archeological complex, agroforestry mosaic, upland agriculture and the Phnom Kulen Protected Area. Project designers, working in collaboration with the local communities, used these designations to determine appropriate packages of interventions deemed to be most suitable to the range of social and ecological conditions in the project area.

Project components included biodiversity conservation, livelihood improvement and enhancement of ecological and institutional connectivity. Based on project commitments to assist in responding to their expressed needs, communities were engaged in the preparation and implementation of management plans for community forestry, community protected areas and community fisheries. Communities developed plans for ecosystem management, integrated agriculture, livestock, fisheries, NTFP collection, agroforestry, and tourism development. They also agreed to sustainable resource management rules and regulations. Community initiatives related to biodiversity and ecosystem management based on local and expert technical knowledge were supported and financed by small grants (< USD 50 000) provided by the project and managed by NGOs.

Catalysts for success included community-to-community knowledge and experience sharing and coordination between the NGOs, communities and government agencies. Capacity building encompassed hands-on experiential learning and exchange visits to areas where similar activities had been successfully implemented. Strengthening local CBOs enabled efficient coordination of area-level community-based conservation. The project helped facilitate CBOs into a federation, which helped to organize cross-community consultations among the participating CBOs. This assisted in enabling the integration of community resource management plans into official commune land use plans and district and provincial development plans.

The project devoted at least 50 percent of its focus and budget to livelihood improvement. Economic, environmental and social elements were integrated into project design and people's active participation, along with good governance and capacity development. Gender equity was promoted in project design, organizational representation and leadership, and benefit sharing. All of these factors were integral to the efforts to restore and maintain the watersheds.

Protection and restoration of natural resource systems and rehabilitation of ecosystem services were achieved through community forest establishment supported by community nurseries, reforestation, community forest management protection, and plantation of multipurpose tree species. Inter-community forest management planning sought to create corridors to reconnect forest fragments and stabilize riverbanks. Management plans for flooded forest areas were linked and later integrated into official commune land use plans.

Eco-friendly farming to increase soil, crop and livestock productivity and to reduce the use of agricultural chemicals was reinforced through the production and use of compost, forest humus, manure slurry, green manure, weed and water control, and contour hedgerows of nitrogen-fixing species.

Alternative income-generating opportunities included bee keeping, ecotourism, handicraft production and promotion. Monitoring and adaptive management were supported by application of the COMDEKS standard monitoring and evaluation system.¹⁵ This enabled results and learning to be more effectively shared at the site level across the project area, and globally among participating COMDEKS project countries. Long-term sustainability was ensured by close coordination with government and mobilizing CBOs, and by the area-wide federation of community natural resource management committees serving as a bridge between the communities, commune, district and provincial councils.

Figure 30. Farm-forest interface and villagers’ involvement



© UNDP Cambodia
Projects are located at the farm-forest interface (left). Villagers were substantively involved in project planning, implementation, monitoring and evaluation (right).

Figure 31. Trees in paddy fields



© United Nations Development Programme. 2014.
Communities in Action for Landscape.
Resilience and Sustainability – The COMDEKS Programme. UNDP, New York

¹⁵ The COMDEKS Programme's exemplary monitoring and evaluation system is described in: UNU-IAS, Biodiversity International, IGES and UNDP (2014) Toolkit for the Indicators of Resilience in Socio-ecological Production Landscapes and Seascapes. UNU Tokyo.

4. Conclusion



The 15 promising cases for FLR in Asia and the Pacific presented in this publication provide examples of the broad diversity of FLR in the region. It includes projects with various degrees of site degradation, mix of project components, area coverage, site location, approaches, objectives and other factors. While this poses challenges to providing generic all-inclusive recommendations, it indicates the need for site specificity in FLR project design and implementation. For example, per-hectare restoration costs vary greatly among the 15 cases, from USD 15.50/ha up to USD 70 000/ha (when substantial investment in infrastructure was involved). The costs tend to increase with the level of site degradation and project complexity, and decrease if the project activities are long term, cover a large area, and if there is strong local participation and ownership in the project and activities.

The promising cases also indicate that the degree of land-tenure security in a project correlates with the success and long-term sustainability of project results. Among the promising FLR cases where permanent formal tenure hasn't been established, local communities tend to quickly lose motivation as they aren't recognized as owners or formally acknowledged as sustainable users of the local natural resources. Meanwhile, the most successful of the promising FLR cases have built on and/or changed the formal tenure systems. A future challenge might be balancing possible commercial exploitation secured by community tenure rights with other priorities, such as biodiversity conservation and ecological restoration.

Furthermore, effective FLR requires a conducive policy environment (national policy, legislation, institutions and human resources) to create or strengthen community organizations, engage them in restoration activities, and ensure community user rights. The 15 FLR promising cases exemplify how the participation of indigenous and local communities is essential to building a sense of ownership, which contributes to lower project costs and more sustainable results. Furthermore, environmentally-friendly local livelihood improvement and socio-economic development are driving forces for achieving FLR results.

A detailed analysis of the cases will be disseminated in a separate publication. Still, we can already conclude that the 15 cases have implemented the 10 UN Decade principles on the ground, even though most of them were designed before the UN Decade principles were formally launched. Moreover, the 15 cases represent sound and successful examples of a broad variety of ecosystems whose restoration has already stood the test of time and thus provide guidance for FLR projects implementing the UN Decade principles.

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