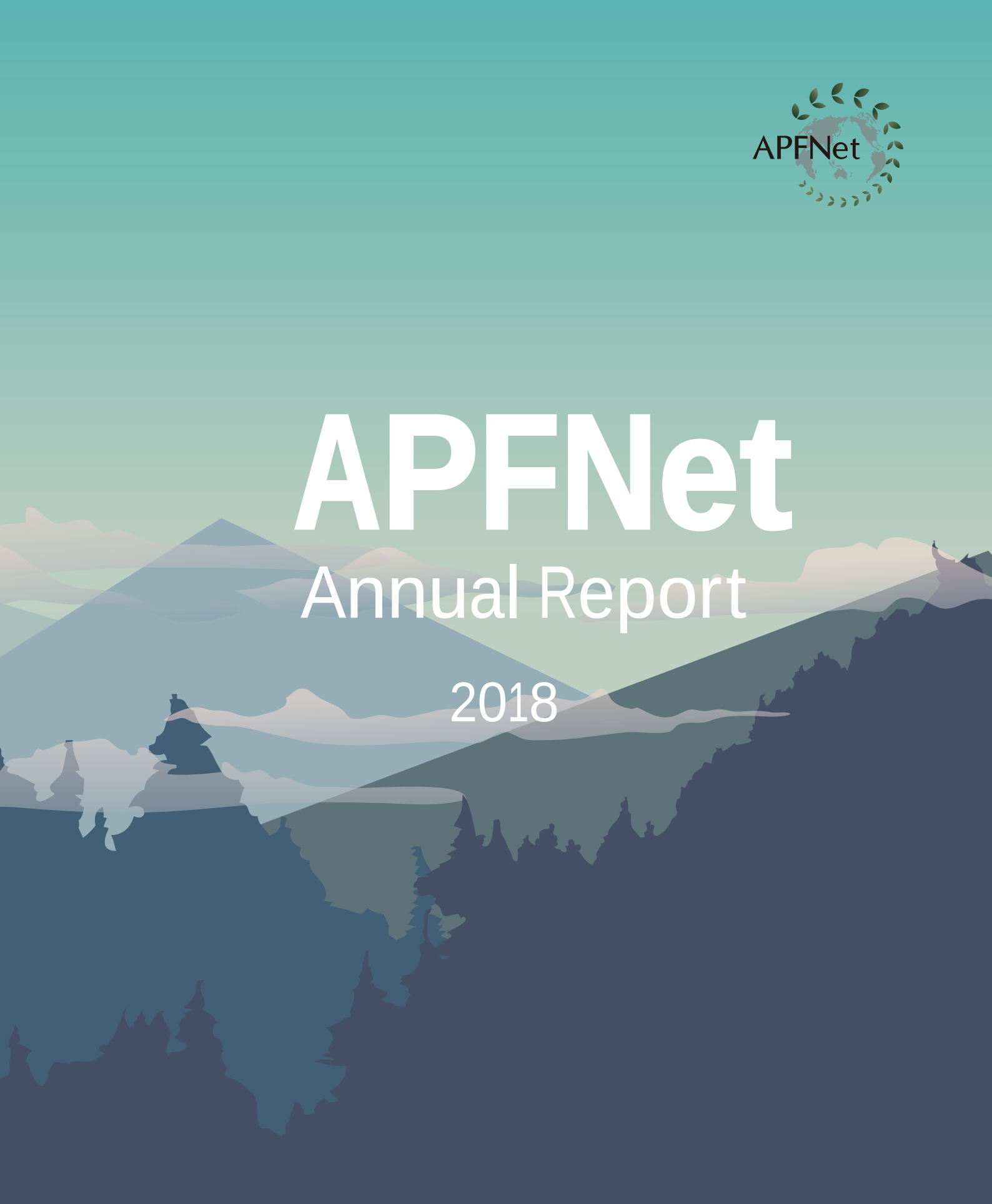
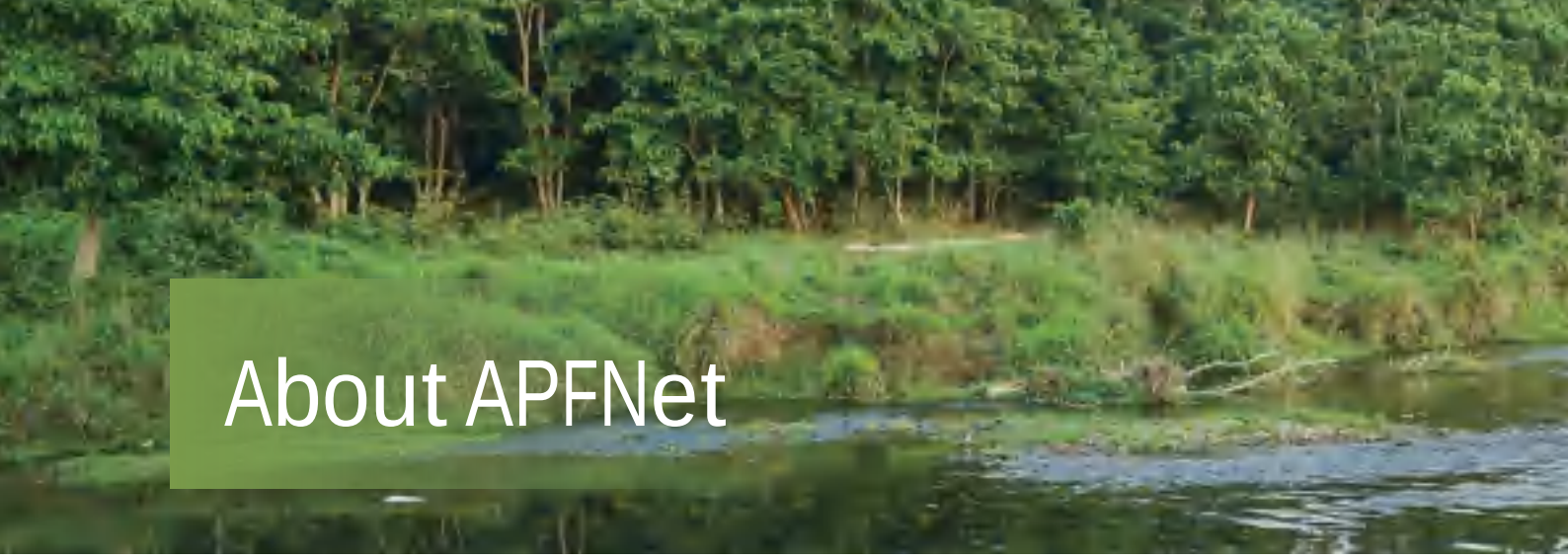


APFNet

Annual Report

2018



About APFNet

Mission

Valuing “respect for diversity in development, being action-oriented and thinking innovatively”, APFNet is committed to helping the economies and people of the Asia-Pacific region by promoting and improving sustainable forest management and rehabilitation.

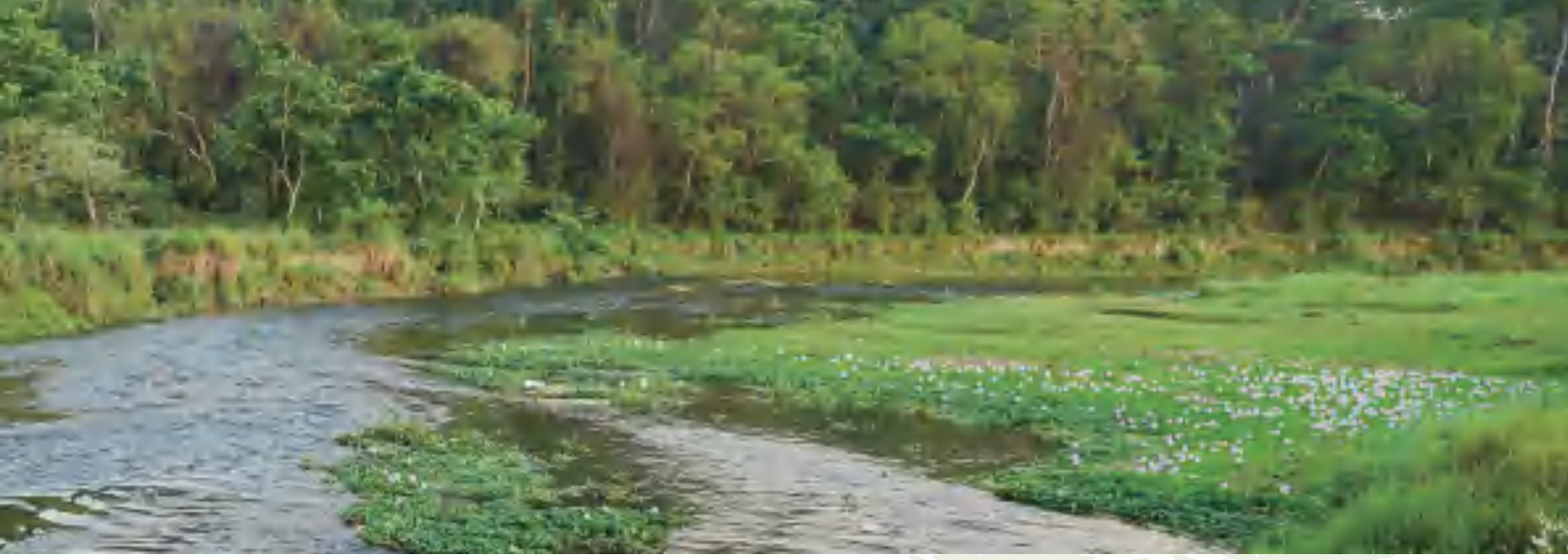
Objectives

A Contribute to the achievement of the aspirational goal of increasing forest cover in the region by at least 20 million hectares of all types of forests by 2020;

B Help to enhance forest carbon stocks and improve forest quality and productivity by promoting rehabilitation of existing but degraded forests and reforestation and afforestation of suitable cleared lands in the region;

C Help to reduce forest loss and degradation and their associated emissions of greenhouse gases by strengthening sustainable forest management and enhancing biodiversity conservation;

D Help to increase the socio-economic benefits of forests in the region.



Priorities

Priority 1 Rehabilitating degraded forests and increasing forest cover;

Priority 2 Promoting sustainable forest management to enhance ecological functions and ecosystem security of forests; and

Priority 3 Enhancing forests' contribution to socio-economic development and to the improvement of local livelihoods.

Implementation Tools

- Capacity Building
- Demonstration Projects
- Policy Dialogues
- Communication and Information sharing

APFNet in 2018

10 YEARS

125	362	14	43
			USD 24 million disbursed
YEAR 2018			
22+	43+	1+	25
Scholarship students	Trainees of thematic workshops	Strategic partnerships	Projects USD 3.6 million disbursed

Message from the Executive Director

In the year of 2018, APFNet continued to contribute to the focus of the Asia–Pacific region on increasing forest cover and enhancing forest carbon stocks, reducing deforestation and forest degradation, and bringing improvement to socio–economic conditions through a range of programs and projects. Twenty–five active projects received USD 3 million funding. Scholarships from APFNet's forestry Master's Degree program reached another 22 forest officials and trainings were offered to 43 people in both Asia–Pacific and Greater Central Asia. This year also saw some new developments of APFNet:

- Efforts were made to plan for the future. The ten–year anniversary celebration was held in March to bring our donors, partners, members, project executing agencies and experts together for reviewing APFNet achievements, as well as exploring experiences and lessons learned in the past decade. Based on these discussions, the ten–year review and the mid–term review of the APFNet Strategic Plan 2016–2020 were initiated.

- Demonstration project management was further strengthened by putting more resources on summarizing achievements and impacts, strengthening communication with implementing agencies and shifting focus to the restoration of degraded forests in the stage of project planning.

- The role of networking was further improved. The existing regional cooperation mechanisms including the Forestry Planning Network (FPN) and the Trainers in Forestry (TIF) Network were further improved by repositioning their tasks, objectives, operation and financial support. Meanwhile, two new sub–regional cooperation mechanisms, the Sino–ASEAN Network of Forestry Research Institutes (SANFRI) and the APFNet Transboundary Wildlife Conservation Initiative in the Greater Mekong Sub–region (@Wild) were initiated.

- The contribution of APFNet activities to regional and global goals was mainstreamed. The linkage of APFNet demonstration projects, policy dialogues and capacity building activities with the forest–related goals of the Asia–Pacific Economic Cooperation (APEC), the Sustainable Development Goals (SDGs) and the United Nations Forum on Forests (UNFF) were enhanced.

- Partnership development was more action–oriented. Cooperation with the Food and Agriculture Organization of the United Nations (FAO), the International Tropical Timber Organization (ITTO) and the International Union for Conservation of Nature and Natural Resources (IUCN) in projects and capacity building were more productive and effective.

We take this opportunity to express our sincere appreciation to our members, Council representatives, Board Directors and those who were involved in and supported our activities in 2018.

The year of 2019 marks our new journey towards the next decade in which your support and participation is badly needed.

Lu De

Table of Contents

Restoring Our Forests 1

Preparing Forest Managers for Climate Change 12

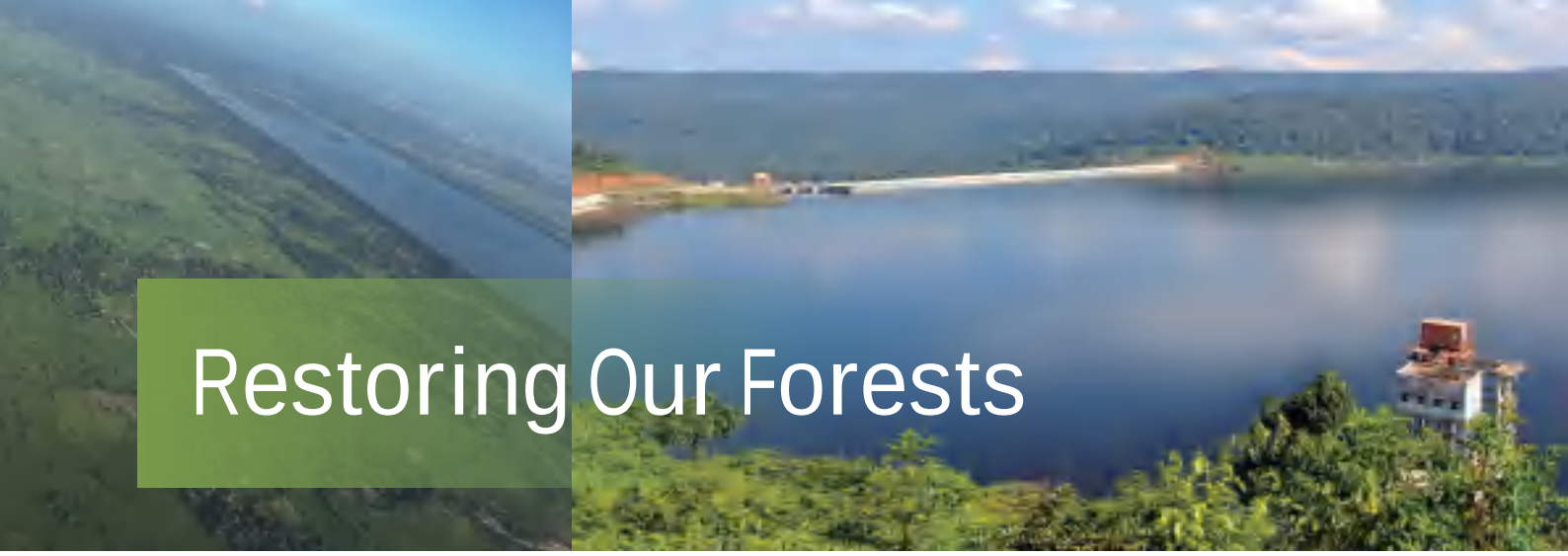
Improving Community Forest Management and Livelihoods 21

Strengthening Capacity and Building Synergies 27

Publications 32

Institutional Development and Partnerships 34

Financial Information 36



Restoring Our Forests

Developing Integrated Forest Ecosystem Management Planning in Cambodia

Project title

Integrated Forest Ecosystem Management Planning and Demonstration Project in Greater Mekong Sub-region (Cambodia)

Supervisory agency

Forestry Administration of Cambodia

Executing agency

Institute of Forest and Wildlife Research and Development

Project duration

06/2017–06/2021

Project grant/APFNet grant

USD 1,792,663.60/USD 1,515,465.60

Target economy

Cambodia

Site location

Siem Reap and Takeo province, and Damrey Chak Thlork Community Forest in Kampong Speu province

Tradition is a cornerstone of society and has special significance for the group practicing it. While traditional ways of managing forests should not be easily dismissed, these ways should be closely examined as to whether they achieve the desired goal. In Cambodia, local communities have managed forests in traditional ways for a long time, however, those managed forests continue to be degraded, leaving local people to deal with damaged ecosystems, diminished production and limited provision of forest ecosystem services.

As a result, in 2017 APFNet and the Cambodian Forest Administration implemented this project under the “Integrated Forest Ecosystem Management Planning and Demonstration Project in Greater Mekong Sub-region” series, aiming to rehabilitate forests. The project helps the Damrey Chakthlork Community Forest (in Dokpor village, in the Krangdeivay Commune of the Phnum Srouch District in Kampong Speu province) to demonstrate the improvement of community forest management through the development of new restoration techniques and demonstration of integrated management models.

New forest restoration models in community forestry

To improve sustainable forest management, a comprehensive management plan will be developed and implemented in all forest areas (1,452 ha). This plan will combine modern techniques and traditional practices, provide an analysis of forest conditions and recommend specific actions to further improve future management. Moreover, it will be a showcase for restoration based on different specific needs and based on different stages of degradation. In the new project a trial of 16 ha for three restoration models and one form of silvicultural treatment will be developed:

A **Restoration of a deforested (open) area:** divided into four blocks (1 ha each) and planted with high value tree species such as *Pterocarpus macrocarpus, Dalbergia cochinchinensis, Dalbergia oliveri,* and *Tectona grandis* using a total of 6,000 seedlings.

B **Restoration of a severely degraded forest:** intended for a firewood plantation using a single species, *Cassia siamea*. Dominant trees with straight trunks in the top forest layer will remain, while small trees, shrubs and weeds under remnant trees are cleared out.

C **Restoration of a moderately degraded forest:** vigorous high–value trees with straight trunks remain while non–commercial or damaged trees that cannot be used commercially will be cleared out. This model incorporates multistory management using a crop like pepper and other rosewood tree species such as *Pterocarpus macrocarpus* and *Dalbergia cochinchinensis*.

D **Silvicultural treatment of dense forests:** this model is applied through tending, thinning and enrichment planting using timber species such as *Pterocarpus macrocarpus, Dalbergia cochinchinensis*, and *Diptercarpus* species to speed up forest succession.

Restoration activities in the open area and in a moderately degraded forest

Value-added traditional practices for local livelihoods

In addition to forest management and restoration, providing more livelihood options to local communities is crucial to mitigate their dependence on the forest. Agroforestry farming systems and home gardens are great ways to improve local livelihoods since farmers already practice farming and many have home gardens. The key challenge is using the right techniques. The current ones prevent farmers from using the land to its full potential as on any given piece of land farmers only one type of crop or one tree species is planted.

The project will involve farmers who are interested and have land available to use for sustainable agriculture and agroforestry according to international best management practices. A portion of the farms will be used for multistory cropping using vegetables and other cash crops; the home gardens will be set up in open areas and degraded secondary forests in the farmer's land using cash crops and vegetables as well. The cash trees, i.e. macadamia nut and Taiwan green jujube will be imported from China and introduced to the farmers. These practices will provide immediate and long–term income for the farmers.

Finally, in order to be more effective in protecting forests from burning, two sets of a forest fire monitoring system called the forest watcher have been installed in the Khun Ream Research Station and Tamao Zoo in Siem Reap and Takeo Province respectively.

Fighting Desertification with Innovative Restoration Models

Project title

Demonstration Project of Vegetation Restoration and Management and Utilization of Forest Resources in Greater Central Asia (Chifeng sites)

Supervisory agency

Chifeng Municipal Forestry Bureau

Executing agency

Sanyijing State-owned Forest Farm, Aohan Banner

Project duration

01/2017–12/2019

Project grant/APFNet grant

USD 744,000/USD 500,000

Target economy

China

Site location

Aohan Banner, Chifeng City, China

Desertification is a looming threat in many parts of the world. More than a billion people are under threat of desertification, with a number of them living in Greater Central Asia. With about a third of the province classified as deserts and even larger parts categorized as "degraded land", the fight against desertification is one of the key concerns in the area. While in the past significant achievements have been made, there is still a strong need for new reforestation models that sustainably combat desertification, as well as provide methods to increase the production of local non-timber forest products without negatively impacting the land.

In 2017, APFNet in cooperation with the Sanyijing State-owned Forest Farm started a demonstration project in Aohan Banner, Inner Mongolia, to address these issues.

Restoration of Masson pine with the herb roseroot (*Rhodiola rosea*)

Defeating the Yellow Dragon

Many methods to combat desertification have been tried in the past with more or less desirable results. Now, building on these previous efforts, the project aims to summarize and evaluate a number of different forest restoration models that aimed to achieve multiple benefits, such as combatting climate change, controlling desertification, improving livelihoods and improving the overall environment of the region.

Different reforestation models were tested and will be analysed. They are categorized by type:

Restoration Type	Restoration Model
Physical	Grass/Tree planting sand barrier Stones & Gravel sand barrier Willow twig/metal net sand barrier Organic biodegradable fibers sand barrier Plastic net sand barrier
Chemical	Liquid mulch plastic covers
Combined	Shelterbelt forest Topography–based planting Integrated mosaic restoration
Fenced off	Fencing Fencing + seeding Fencing + seedling planting

Based on the analysis of the different restoration approaches, a research report evaluating those models will be produced.

Additionally, 70 ha of a demonstration forest, using species such as yellowhorn, Xinjiang poplar and Mongolian scots pine, have been established.

Bringing fruit to the desert

Apricots and Armenian plums have long been grown in Aohanqi, and are considered a traditional non–timber forest product. Unfortunately, yields from the apricot and plum orchards have been exceedingly low. Through site–preparation, grafting, pruning, application of fertilizer and additional watering, together with regular tending as the project proceeds, the fruiting rates and yields will be significantly increased.

One particular “fruit” tree cultivated during this project is yellowhorn, which shows great commercial potential.

Yellowhorn

Yellowhorn *(Xanthoceras sorbifolium)*

Yellowhorn, despite its long history, has remained an underappreciated non–timber forest product. With increasing aridity threatening the survival of other species, however, the extremely drought–resistant and generally very hardy yellowhorn has been able to survive temperatures as low as –41 °C, and grows on both sandy and rocky soils. It has moved to the centre stage when it comes to fighting desertification while providing a livelihood for local people.

While only growing up to 5 m tall, this member of the soapberry family (the same family as maple or horse chestnut) grows large fruits containing 6–18 seeds, of which up to 70 percent of each seed can be made into oil. This oil can then be used as medicine for relieving pain and swelling, lubrication or be made into paint, plasticizer and skin care products. Having such potential for versatility, the average price per 100 ml of oil is CNY 100 or USD 15, which is likely to increase as the product becomes more well–known. Another product is tea made out of the tree's leaves and flowers.

In Aohanqi one of the mixed demonstration forests built will contain a block mixture of Mongolian pine and yellowhorn. Mongolian pine will be used as the shelterbelt while yellowhorn is planted inside, achieving multiple uses by curbing desertification and producing products that can contribute to local livelihoods.

Watermelon at the time of planting and harvest

Restoring Soil with Rare Tree Species in Cambodia

Project title

Reconstruction and Sustainable Management of Degraded Forest Based on the Combination of Inter–planting Rare Nitrogen–fixing Tree Species and Thinning

Executing agency

Experimental Center of Tropical Forestry, Chinese Academy of Forestry

Implementing agency

Institute of Forest and Wildlife Research and Development

Project duration

01/2019–12/2021

Project grant/APFNet grant

USD 503,000/USD 378, 000

Target economy

Cambodia

Site location

Bos Thom village, Khna Por commune, Soth Nikum, Siem Reap province, Cambodia.

Restoring degraded forests in Cambodia remains challenging due to financial issues and a lack of experience with using different restoration technologies. Most degraded forest areas in Cambodia, often community forests, are covered with infertile soil, that means they are low in soil nutrients, sandy, low in soil organic carbon, and have a poor water holding capacity. True restoration of a forest ecosystem is a complicated process, so the selection of suitable methods which are appropriate for local site conditions and can increase economic value while restoring ecosystem services should be considered.

Sharing a similar fate with other community forests, the Bos Thom Community Forest is located 30 km from Siem Reap city and has 445 ha of degraded forests. The forests have been over–exploited due to a lack of management and supervision, allowing the illegal cutting of valuable tree species and firewood collection. This resulted in large forest canopy gaps, reduced biodiversity and soil erosion. In short, this site is in dire need of effective forest restoration that not only restores the trees, but also the soil.

This APFNet–funded project demonstrates new approaches on integrated forest restoration that restore the soil through the use of nitrogen–fixing tree species while improving local livelihoods. This project will showcase new forest restoration approaches in different forest ecosystem conditions to help practitioners in Cambodia find a restoration solution that works for them.

Restoring forests by restoring their soil

APFNet has tested several different restoration models across Cambodia, especially enrichment planting, agroforestry, assisted natural regeneration, and general silviculture techniques in Siem Reap, Kampong Thom, and Kampong Speu province.

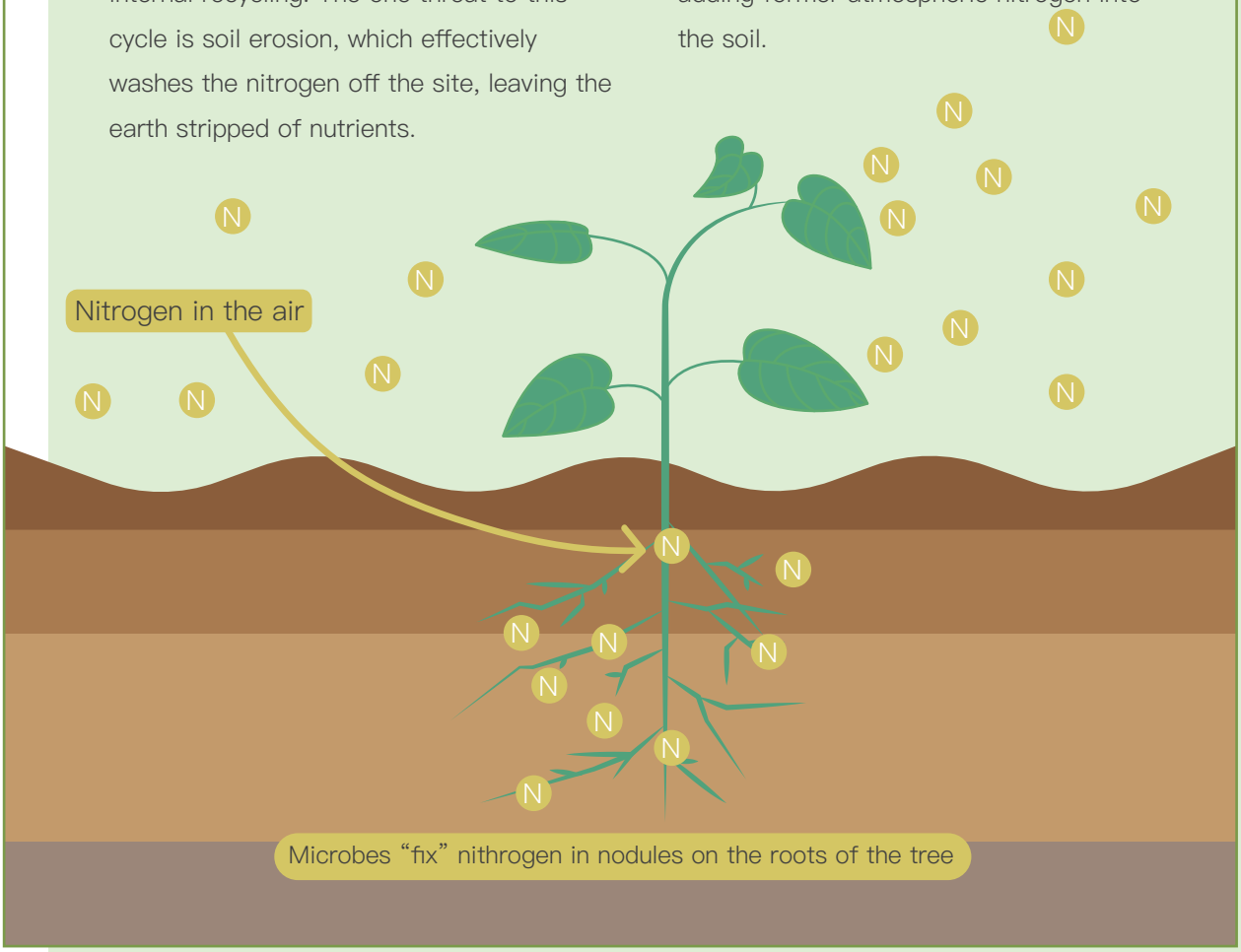
In contrast, the degraded forests of Bos Thom Community Forest in Siem Reap province will adopt a new method with technical support and experiences from the Experimental Center of Tropical Forestry under the Chinese Academy of Forestry. The method will focus on close–to–nature forest management through group inter–planting in forest gaps with rare tree species that have a nitrogen fixation ability such as the rosewood species *Dalbergia cochinchinensis*, and *Senna siamea*. This approach using nitrogen fixing trees is one of the most promising and low–cost measures for restoring degraded forests both above– and below–ground. The method involves removing poorly growing or damaged trees to make space, and inter–planting the stand with nitrogen fixing species.

Gradually, in the community forest, the approach will promote a resilient uneven–aged mixed forest, enhanced productivity, stand quality, stand stability and ecological function of the forests, accelerate forest succession and provide timber resources through the thinning of non–target tree species.

What are nitrogen-fixing tree species?

Nitrogen is one of the key nutrients in soil and is essential for plant growth. Generally, the way soil obtains nitrogen is through the surmise and subsequent break–down of organisms on the forest floor (that is: falling leaves or other dead plant and animal tissue), but importantly forests cannot use atmospheric nitrogen directly, despite being generally fairly good at keeping the nitrogen levels stable through internal recycling. The one threat to this cycle is soil erosion, which effectively washes the nitrogen off the site, leaving the earth stripped of nutrients.

Nitrogen–fixing tree species form a unique symbiosis with certain types of bacteria and archaea called rhizobia within the nodules of their root systems. These organisms are able to transform atmospheric nitrogen into molecules such as ammonia that can then be used by trees. Eventually these trees die and their dead plant material will be added into the overall nitrogen cycle of the site, effectively adding former atmospheric nitrogen into the soil.



Preparing Forest Managers for Climate Change

Modeling the Future of Forests

Project title

Adaptation of Asia–Pacific Forests to Climate Change

Executing agency

University of British Columbia

Project duration

01/2016–12/2018

Project grant/APFNet grant

USD 899,200/USD 499,200

Target economies

China, Chinese Taipei, Malaysia, Lao PDR and Myanmar

Climate change threatens the survival of our forests. This is particularly true in the Asia–Pacific region, where air temperature increases to date have exceeded the global average. With rapidly warming temperatures pushing species ranges generally further north in the coming decades, at this rate, forest ecosystems will not be able to adapt to climate change fast enough. Given that more than 450 million people in this region are directly dependent on forests for their livelihood, maintaining resilient forest ecosystems is critical.

Why is ClimateAP needed?

Exactly how a changing climate affects valuable species and forest ecosystems in the Asia–Pacific is largely unknown, thus making it difficult to devise suitable adaptation and mitigation strategies. One of the biggest hindrances to addressing this problem is the lack of a strong scientific basis and credible, yet user–friendly modelling tools that can help local and regional forest managers develop and evaluate viable adaptation solutions.

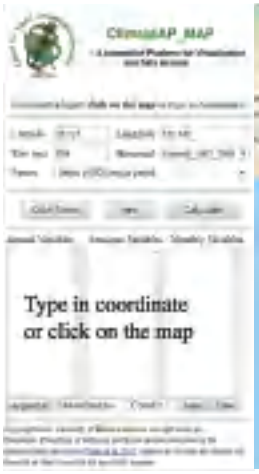
Therefore, starting from 2011, APFNet has funded two phases of a project focusing on enhancing forest adaption to climate change in the Asia–Pacific region through scientific modeling and capacity building. The target region expanded from the temperate region of phase I (China, Canada and Australia) to tropical and subtropical regions in Southeast Asia in phase II (Chinese Taipei, Lao PDR, Malaysia, and Myanmar); the number of target species increased from five in phase I to 11 in phase II. Additionally, the temporal range of ClimateAP also expanded.

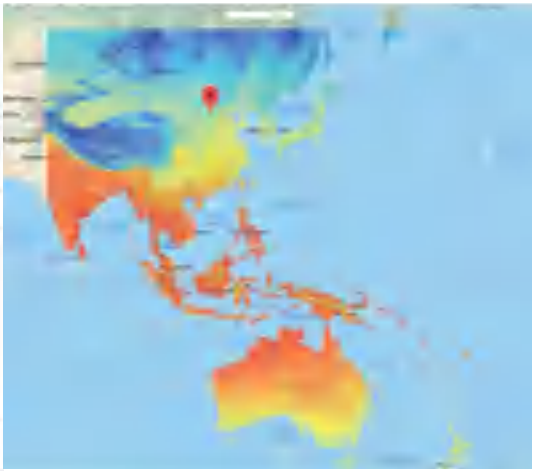
ClimateAP and the Climate Niche Model

The project successfully developed smart tools to predict future climate conditions and their effects, which help to identify locations with favorable climate conditions for tree species.

ClimateAP is a web–based tool that predicts large–scale future climate conditions at any location in the Asia–Pacific. The temporal range of ClimateAP covers the period from 1901 to 2012, and while during phase I it covered only three future years (the 2020's, 2050's and 2080's), it can now model a continuous annual time series until 2080.

The **Climate Niche Model** predicts large–scale future ecological niches of selected tree species and forest ecosystems in Asia–Pacific.

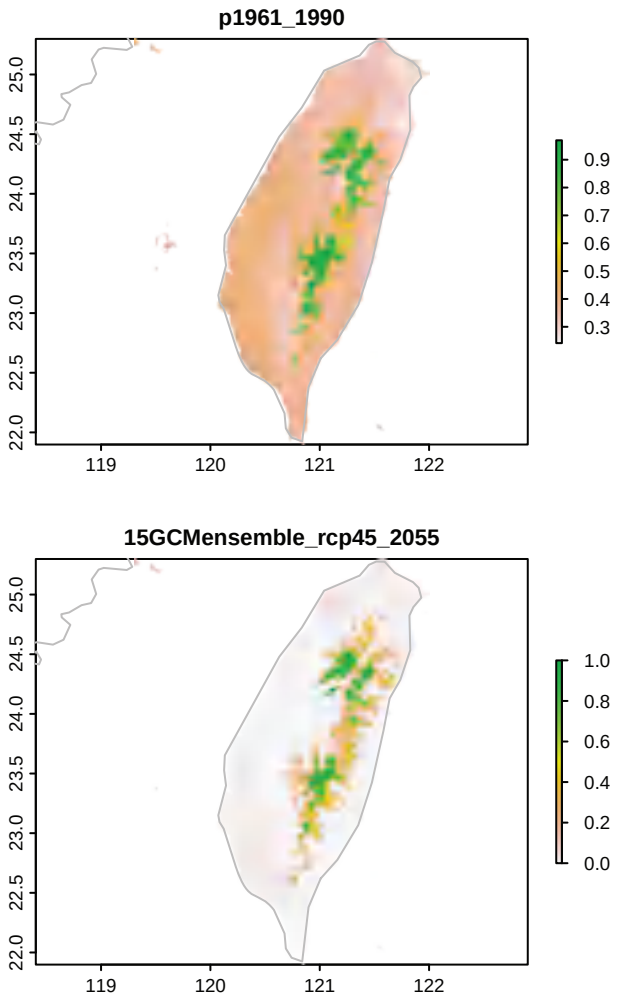




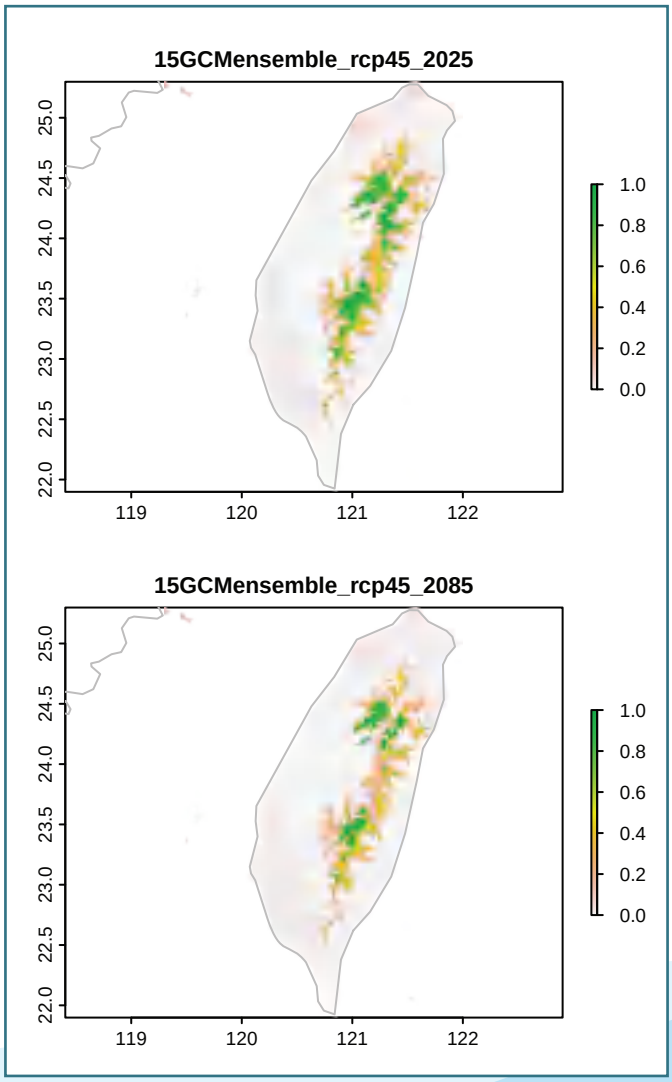
ClimateAP in action: Chinese Taipei case study

Aiming to test the new tools on concrete examples, the climate niche models developed under the project were used in a case study assessing the current and future distribution of montane forest vegetation in Chinese Taipei under a changing climate. In Chinese Taipei, this type of ecosystem is the most sensitive and vulnerable to climate change, thus effective conservation and mitigation strategies are sorely needed. Data from literature and existing plots was used to develop more finely scaled climate niche models. Additionally, the case study used the "Random Forests Model", which has nothing to do with actual forests, but rather uses "decision trees" in an ensemble machine–learning approach to model the relationships between species and climate data.

The results showed clearly that under different climate change scenarios, the vegetation would generally move to higher altitudes and northwards in an attempt to find cooler climates. Subalpine juniper forest and montane beech forests have been identified as the most vulnerable forest ecosystem in Chinese Taipei, while it is predicted that the potential habitats of subalpine fir–hemlock forests and montane cypress forests will also decrease.



Maps showing changes in probability of occurrence (PO) for *Chamaecyparis formosensis* over the three future periods 2011–2040, 2041–2070 and 2071–2100 relative to the present



How is this information useful for policy makers?

The outcomes from these models and tools provide opportunities for filling the data gaps required for policy formulation to integrate climate–smart, alternative, ecosystem–based and adaptive forest management strategies and actions. For instance, the Climate Niche Model can help policymakers develop assisted migration of forest tree species to avoid maladaptation and develop genetic conservation strategies under climate change on a large scale, while outcomes of the FORECAST model can help decision makers and managers to evaluate alternative adaptation solutions to address climate change effects on teak plantations at a local scale.

Developing Carbon Equations in Thailand

Project title

To Demonstrate the Development and Application of Standing Tree Carbon Equations to Improve the Accuracy of Forest Cover Carbon Stock Estimates in Thailand

Supervisory agency

Royal Forest Department of Thailand

Executing agency

Kasetsart University Faculty of Forestry of Thailand

Project duration

01/2017–12/2018

Project grant/APFNet grant

USD 253,345/USD 199,045

Target economy

Thailand

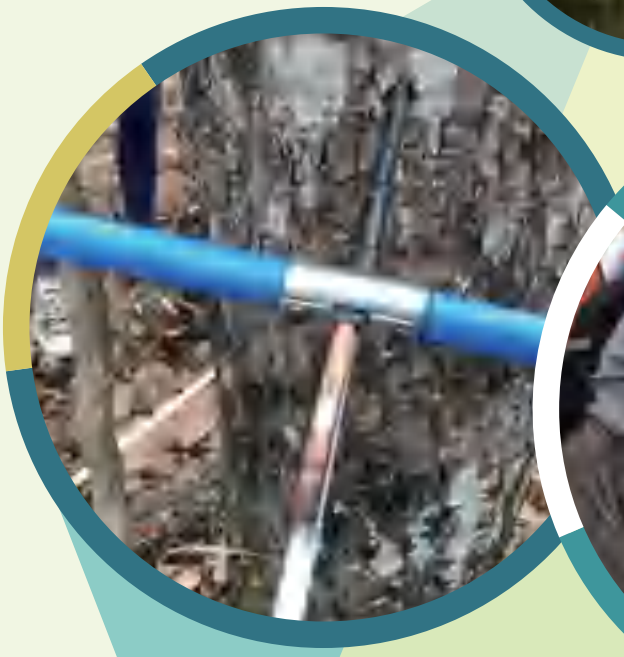
Site location

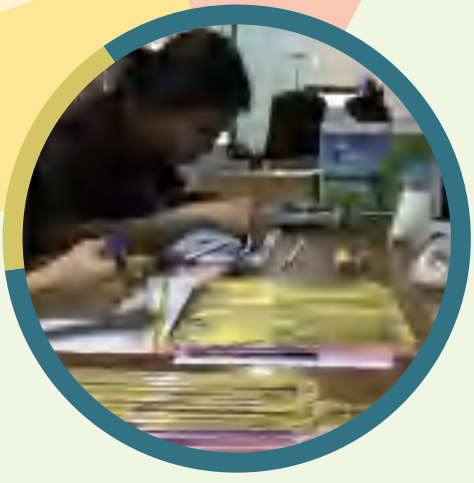
Ngao Demonstration Forest, Lampang Province

As economies all over the globe have come together to commit to climate actions to reduce or compensate for carbon emissions to combat climate change, it has become clear that the reporting of the carbon stored in forests requires accurate carbon accounting. This is both because in the long term, often through forest restoration programs, forests can act as carbon sinks, and because deforestation would cause carbon release that should be part of an economy's reported carbon emissions.

While Thailand has been reporting to the United Nations Framework Convention on Climate Change (UNFCCC) for a number of years, there is still some uncertainty about the accuracy of the national estimates of Thailand's forest carbon stocks. The reporting of carbon stocks has been incomplete, and there remains limited knowledge of the best method to assess carbon stocks. This, of course, affects the quality with which Thailand can assess its own contributions to climate change.

Thus in January 2017, APFNet funded a project that was spearheaded by the Kasetsart University Faculty of Forestry (KUFF) to develop new standing tree carbon equations that are expected to result in more accurate data about forest carbon stocks. Subsequently, a pilot map of above-ground forest carbon stocks in the Ngao Demonstration Forest in Lampang Province was developed, which can later be scaled up for the entire economy.





Taking stock of Thailand's forests

In 1992, the researchers Pochai and Nanakorn developed local tree volume equations based on upper stem diameter measurements of standing trees. While being a good tool at the time, those equations were developed for only one local area in northern Thailand using a small sample of trees. Additionally, only the diameter at breast height (DBH) of the trees was used as an independent variable, while tree height — now the minimum standard for any volume equation — was simply not considered at all. Finally, sets of species were simply grouped together by tree family grouping rather than based on wood density, thus potentially skewing the accuracy of the equations. Yet subsequently those equations were applied to carbon stock estimation across the whole economy.

With the increasing importance of assessing carbon stocks accurately, these rough calculations are simply not enough and need to be replaced. The new equations to be developed by KUFF will instead incorporate both the total height and DBH and refine the base equations through taking base tree cores samples. This way the equations for major tree species groups subdivided by wood density in evergreen, mixed–deciduous and dry dipterocarp forests can be developed. Subsequently, the focus group created an action plan for the development of the standing tree carbon equations for all the major species groups of Thailand.

Visualizing carbon stocks

Creating improved equations is certainly a great achievement on its own, however in order to ensure that those new estimates are actually used by policy makers, visual tools that combine the power of geographic information system (GIS) and remote sensing with the newly calculated data need to be employed in the form of carbon stock maps. With such maps government officials can make better informed policy decisions, as well as have a visual tool that displays forest carbon stocks across the economy.

To demonstrate the possibilities of such maps, a pilot map of the Ngao Demonstration Forest in Lampang Province was developed using Landsat data with a basic 30x30 m resolution on multi–spectral mode and one fine 15x15 m resolution on panchromatic mode, considering the areas' normalized difference vegetation index (NDVI). Combined with various GIS data regression relationships between satellite data and ground data (collected during the development of the equations), the maps were developed.

Scaling up

Both the newly calculated equations and carbon stock maps are only the start of a push to replace all of the old equations and maps of the economy. Thus, towards the end of the project, a workshop involving about 40 participants from relevant government and private agencies was held to disseminate knowledge and get more buy–in. Using this new methodology to create carbon stock equations in the future, forest inventories of carbon stocks can be calculated and displayed more accurately, helping Thailand to meet its domestic and international reporting commitments and implement its strategic plan for sustainable forestry.

Improving Community Forest Management and Livelihoods

Empowering Women in Nepal

Project title

Supporting Community–based Sustainable Forest Management and Economic Empowerment of Women in the Central Region of Nepal

Executing agency

Consortium: Himalayan Grassroots Women's Natural Resource Management Association (HIMAWANTI), Ashmita and Community Resources Management Center (CRMC)

Project duration

10/2014–3/2018

Project grant/APFNet grant

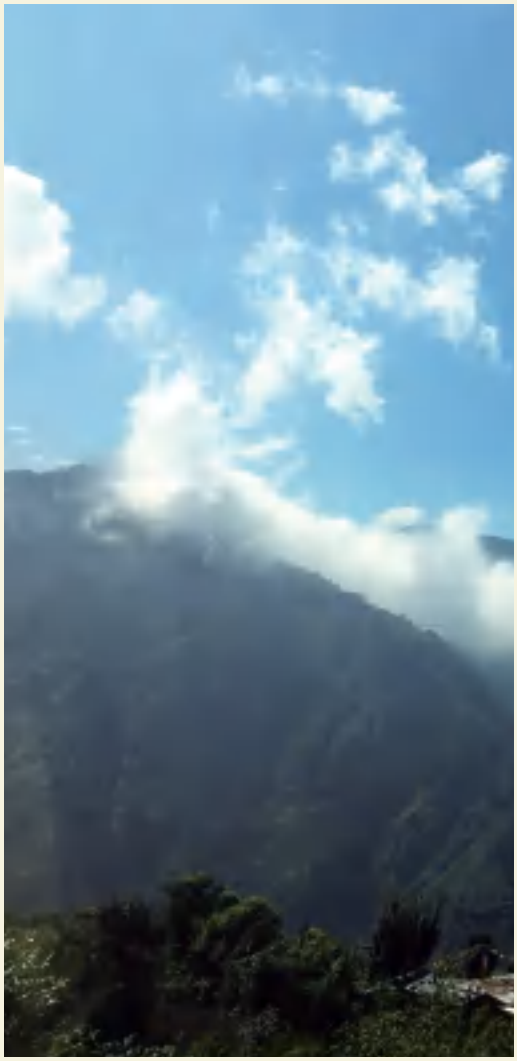
USD 559,208/USD 412,238

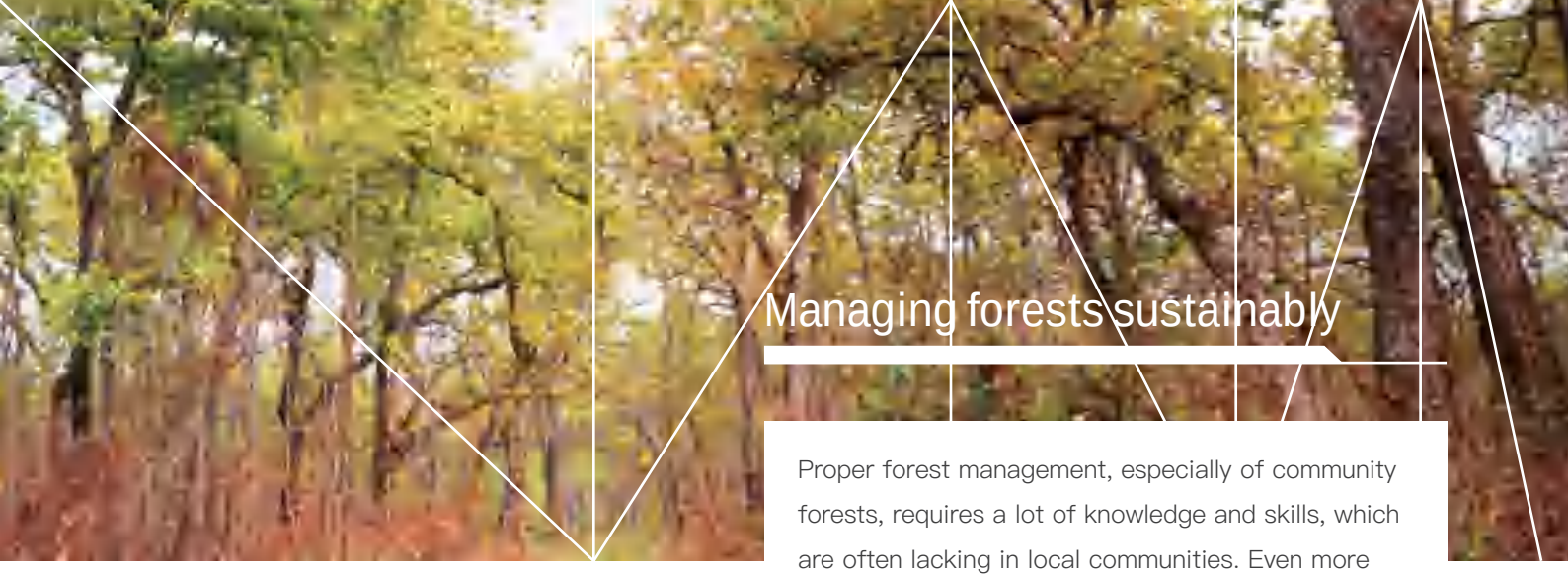
Target economy

Nepal

Site location

Kathmandu, Makwanpur and Sarlahi, Central Nepal





Managing forests sustainably

Women throughout the world, and especially in developing economies, have long been led to believe that they do not have any power. However, as Alice Walker, a famous novelist, once said:

"The most common way people give up their power is by thinking they don't have any."

Empowering rural women to take ownership of their lives, improve their own livelihoods and learn new skills is an internationally recognized goal captured in the SDG 5 to "achieve gender equality and empower all women and girls".

In Nepal, women are strongly dependent on community forests for their livelihoods, however opposed to men, they use the forest primarily for satisfying subsistence needs rather than carrying out commercial activities that would lead to greater economic independence. Thus, in the Kathmandu, Makwanpur and Sarlahi districts of central Nepal, together with HIMAWANTI, Ashmita and CRMC and the Nepal Ministry of Forest and Soil Conservation, APFNet has taken on the challenge to empower local women by teaching them how to sustainably manage their community forests while also developing new handicraft enterprises and promoting eco-tourism.

Proper forest management, especially of community forests, requires a lot of knowledge and skills, which are often lacking in local communities. Even more frequently, "heavy" forest management, such as thinning or planting trees often falls to men, so that women have limited involvement in forest management. Throughout the project, members of local communities, with a majority of women, were taught how to develop forest management plans, establish nurseries and manage forests.

Forest management plans were developed for 13 community forest user groups and based on field surveys and stakeholder discussions regarding the goals for their forests. Those plans were, upon completion, endorsed by the District Forest Offices.

Additionally, three nurseries were established, which focused on rearing not only fast-growing trees, but also species that can be of medicinal use or provide food. Some of the species grown include *Eucalyptus spp., Tectona grandis, Phyllanthus emblica, Shorea robusta, Aegle marmelus* and *Syzygium cumini*.

Finally, key to managing forests sustainably is removing timber while causing as little impact as possible. Thus, 130 people were trained on low-impact harvesting, targeting women. On the established demonstration plots, weeding, pruning and a "3D extraction" (of dead, decayed and diseased trees) were conducted as well.

Getting women into business

Empowering women also means empowering them economically. Getting women into business not only leads to a higher income. It also helps them to acquire new skill sets that make them more independent, and increases their capacity to support their families.

In this project, women learned three different ways to improve their livelihoods: wooden handicraft making, aromatic herb enterprises and eco–tourism.

A community woman making wooden handicrafts

“Now, neighbors call me entrepreneur”

Sarita Lama is a 38–year–old married woman, a mother of two sons and a daughter, and now also a member of a handicraft microenterprise in Makwanpur. After sending their children to school, she goes to the Piple Pokhara Community Forest User Group to make wooden handicrafts, something she has now been doing for two years.

She recalls that she previously made a living carrying bricks, which was extremely exhausting and bad for her health. Although she worked very hard every day, the resulting income remained low and it was still very difficult to afford her children’s education.

However, two years ago, she was selected for wooden handicraft training, the first round of six months of basic training. Because she wanted to learn new skills and improve her economic condition, she joined Piple Pokhara Community Forest User Group for the training, specializing in producing wooden frames. Soon she realized she could go even further if she underwent the five–month–long advanced training, which she was selected due to her devotion and strong work ethic. While she could have started a business on her own, she felt more comfortable doing it together with a group. In the group the tasks were shared, so that each person was responsible for a different task. Sarita did a variety of jobs during her time in the group, such as helping to cut logs, making drafts and choosing the design of the frame based on the specifications of the customer. Frames were not sold individually but through the community forest user group and the income earned went into a group bank account, which was then distributed among the members.

One of Sarita’s proudest achievements is a handicraft she made that was also chosen to be exhibited during World Wood Day in 2015.

Combining Mangrove Restoration and Aquaculture in Myanmar

Project title

Integrated Planning and Practices for Mangrove Management Associated with Agriculture and Aquaculture in Myanmar

Supervisory agencies

Forest Department of Myanmar;

Department of Agriculture and Water Resources of Australia

Executing agency

University of Queensland

Project duration

01/2018–12/2020

Project grant/APFNet grant

USD 547,070/USD 309,670

Target economy

Myanmar

Site location

Pyindaye Mangrove Forest Reserve

Myanmar, while rich in natural resources and natural beauty, is one of the economies most threatened by the adverse effects of climate change, including more extreme weather events, sea level rise and flooding.

Mangrove forests are an important natural barrier to locally mitigate both sea level rise and the negative effects of flooding. At the same time, mangrove forests are often an important part of local livelihoods. In fact, in the Pyindaye Mangrove Forest Reserve, which covers over 48,500 ha, mangrove forests contribute about 25 percent to local household incomes – the highest ratio compared to other income sources. However, the extraction of timber and firewood and conversion to other land uses like cropping and aquaculture have threatened these ecosystems.

This APFNet–funded project set out to find new ways to balance the livelihood needs of people and the needs of the ecosystem.

Aquaculture and mangrove restoration areas combined

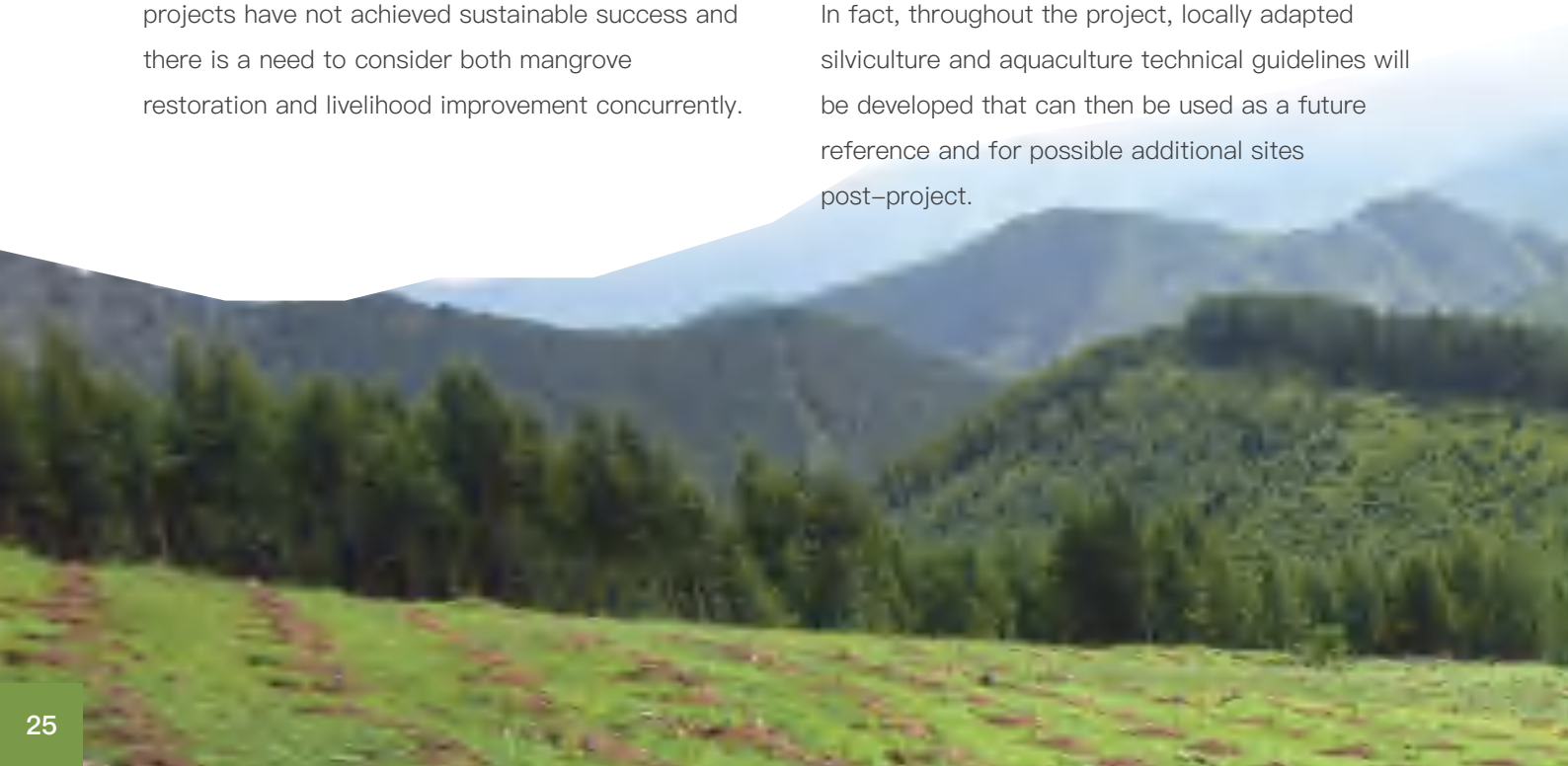
Aquaculture in restored mangrove forests

Aquaculture, while being an important component of Myanmar's economy since 1953, is traditionally regarded as the detriment of mangrove forests. This is due to the fact that mangrove forests have generally been cleared in order to make room for aquaculture, while people have focused much less on integrating both due to technical difficulties.

Most of the projects conducted in Myanmar so far have, in fact, focused on single issues or a limited suite of aspects associated with mangrove forest conservation or restoration. Some projects and programs have worked on mangrove restoration while others have focused on building community forestry institutions and frameworks. Some projects supported the development of aquaculture but did not integrate mangrove forests as important habitats for aquaculture species. Thus, many projects have not achieved sustainable success and there is a need to consider both mangrove restoration and livelihood improvement concurrently.

This project will review existing issues and problems in some typical mangrove landscapes in the most important delta of Myanmar, and propose planning and practices for the restoration and management of mangrove forests and associated aquaculture and agriculture in the project's target sites. The core idea is to integrate both in the same area, transforming areas of mangrove restoration that are often of limited immediate direct benefit to local communities into new sites that are a source of sustainable income. This will be done by establishing a mini–crab hatchery and connected crab aquacultures that are integrated in restored mangrove areas. While such integrated models require more refined techniques than the separated models, these will be developed by the University of Queensland working in close cooperation with the local communities.

In fact, throughout the project, locally adapted silviculture and aquaculture technical guidelines will be developed that can then be used as a future reference and for possible additional sites post–project.

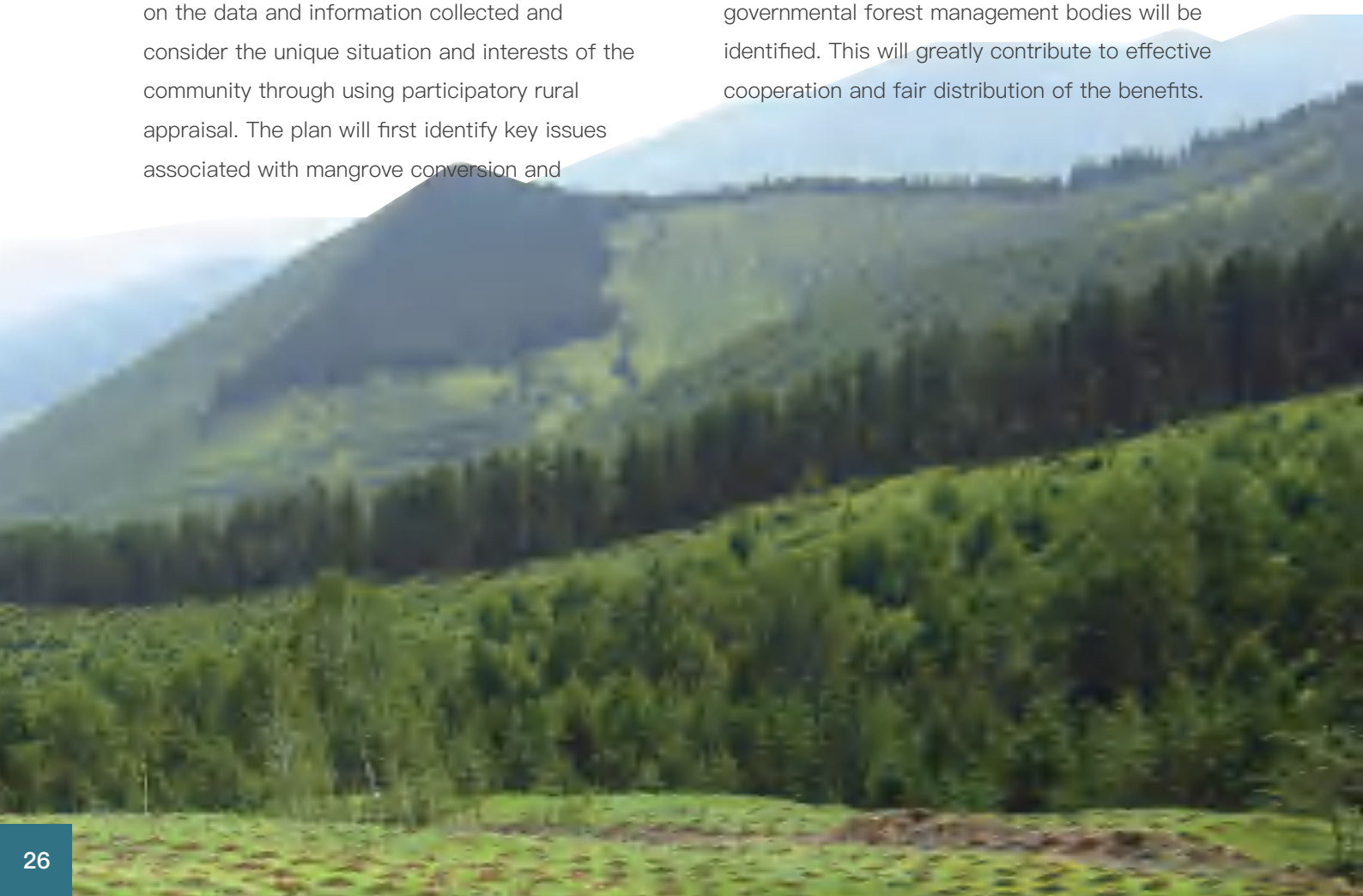


Participatory micro-planning and co-management of resources

In Southeast Asia, often due to resource constraints, strategic planning is mostly only done at the national or regional level. Yet, in order to sustainably manage any given resource, a detailed plan has to be developed at local scale. Of course, the more local the resource, the more local stakeholders should be involved in the development of such a plan.

Based on this knowledge this project aims to develop such plans through participatory micro–planning, where the plan will both be based on the data and information collected and consider the unique situation and interests of the community through using participatory rural appraisal. The plan will first identify key issues associated with mangrove conversion and degradation and then identify how mangrove forests will be able to contribute to a sustainable and resilient landscape. Subsequently, through participatory land use planning with local staff, community leaders and locals, a planning document and pilot model for mangrove restoration within aquaculture production will be devised.

In conjunction with the establishment of such a pilot model, new paths for co–management and benefit sharing between local communities and governmental forest management bodies will be identified. This will greatly contribute to effective cooperation and fair distribution of the benefits.



Strengthening Capacity and Building Synergies

Reinforcing Multilateral Forestry Cooperation

Second Meeting of Ministers Responsible for Forestry in Greater Central Asia

"Animals do not know political borders." said Almaz Musaev, Director of the Department of Specially Protected Natural Territories and Conservation of Biodiversity of the State Agency on Environmental Protection and Forestry of the Kyrgyz Republic.

The Greater Central Asian region is dominated by arid and semi–arid climates, and economies in this region share common environmental challenges including water scarcity, low soil water retention and severe desertification which have subsequently impacted wildlife, habitats and the biodiversity of the region.

Enhancing transboundary cooperation to conserve biodiversity and forest ecosystems, together with combating desertification were two key themes of the Second Meeting of Ministers Responsible for Forestry in Greater Central Asia (GCA MMRF), which was held on 16 and 17 August 2018 in Issyk–Kul, Kyrgyzstan. Forty–one participants including high–level government officials from China, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan attended the meeting.

The high-level participants agreed that the GCA MMRF is a useful platform to tackle the above challenges and collaborate, as well as to focus future actions on biodiversity conservation and combating desertification in the context of climate change. Specifically, the following was agreed:

1. On the theme of biodiversity conservation — to create eco-corridors, conduct research and monitor the movement of wildlife (especially across political borders) and to establish a regional centre for knowledge and information sharing on biodiversity, research and wildlife management experience.

2. On the theme of combating desertification — to examine forest resources across economies and develop green belts, coupled with a regional database to share relevant data on forests and forest genetic resources, and to develop nurseries to aid in reforestation and afforestation.

3. On both themes — to conduct training, capacity building and technology sharing associated with the themes.

4. On the GCA MMRF — to systematize the ministerial meeting mechanism to be held once every two years, create a working group to facilitate and implement actions identified in this and future ministerial meeting sessions and to designate a contact person from each economy to implement agreements and activities.

Furthermore, it was agreed that efforts should continue to strengthen policy communication and coordination, expand inter-departmental exchanges and cooperation in the areas of ecological protection, desertification prevention and restoration of arid areas. Strengthening the coordination and cooperation between economies on forest-related multilateral affairs, ecological security and forestry development promotion were also identified as a priority.

@Wild

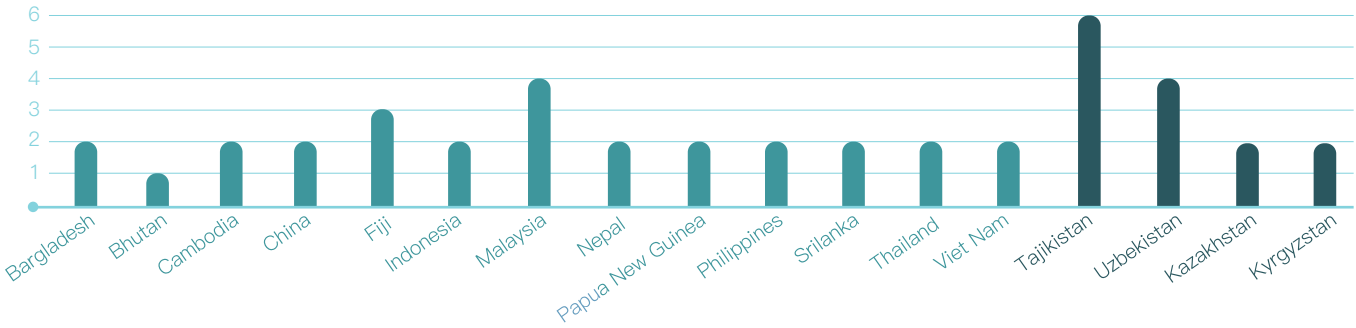
APFNet has been adhering to promoting sustainable forest management as a holistic concept which gives equal attention to management and conservation of the forest ecosystem. As an inseparable part of forests, wildlife should be fully considered and valued in the process of sustainable forest management. Therefore, APFNet launched @Wild in March, aiming to contribute to wildlife habitat protection in the Greater Mekong Sub-region — an undisputed biodiversity hotspot. Taking the first step, in June, a wildlife conservation training workshop, co-organized by the National Forestry and Grassland Administration of China, the International Fund for Animal Welfare (IFAW) and APFNet, was held in Tangjiahe National Nature Reserve, in Sichuan Province of China to promote information exchange and experience sharing among Southeast Asian economies.

Regional Trainings in Forestry

Thematic training

Since 2009, APFNet has conducted thematic trainings for forestry officials for its member economies, which gradually evolved into two series. The first is thematic trainings for the Asia–Pacific region targeting APFNet member economies in Southeast Asia, South Asia and the Pacific Islands, focusing on "Forest rehabilitation and management" and "Forestry and rural livelihood development". The second is thematic trainings for the Greater Central Asia, which is open to six economies in the region, focusing on "Combating desertification and sustainable management of dry land" and "Combating desertification and sand–based industry development".

Thematic workshop trainees 2018



TIF Network

Apart from individual trainings, APFNet also strives to facilitate exchanges and experience sharing among training institutes to strengthen forestry capacity development. The TIF Network, initiated by APFNet in late 2014, strengthens the effectiveness and efficiency of forestry in–service training efforts in the Asia–Pacific region. Through connecting forestry human resource development officials, trainers and government affiliated forestry training institutions, the TIF Network facilitates the regional exchange and collaboration to add value to the region.

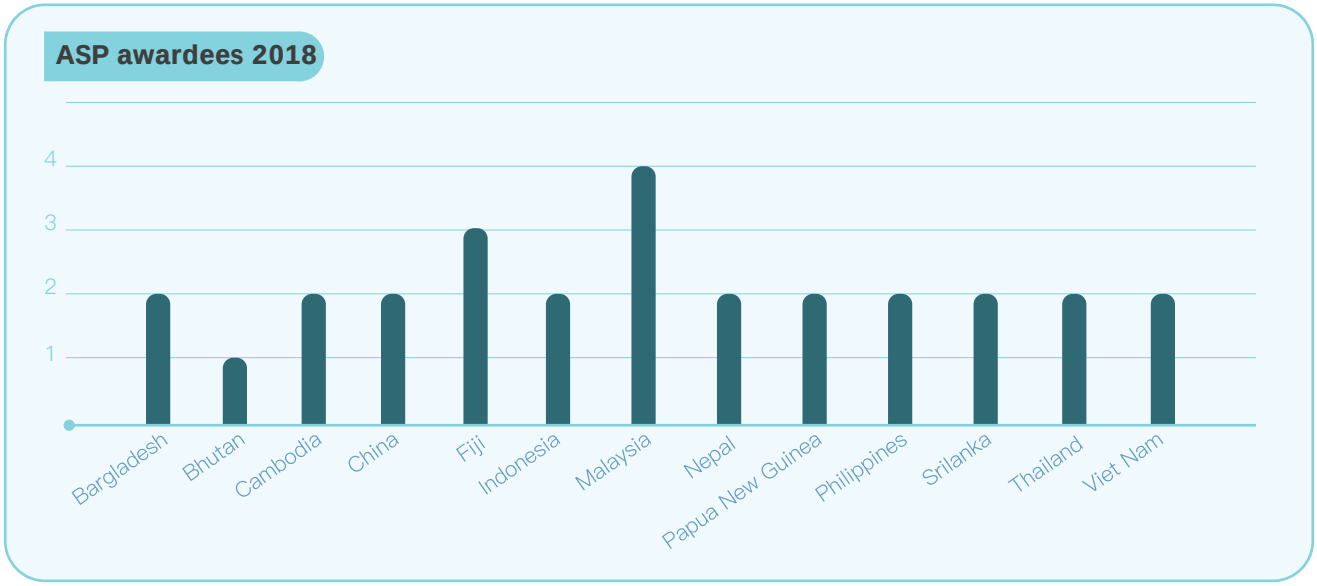
The fourth meeting of TIF "Towards more effective in–service training for public forestry agencies" was held in March. The meeting shared the key findings and results of a recent regional study on the issues, as well as identified possible actions for policymakers to strengthen in–service training. Furthermore, a clear TIF Network strategy for future development was mapped out.

Education and Research

APFNet Scholarship Program (ASP)

Launched in 2010, ASP aims to support capable forestry officials and researchers in the Asia–Pacific region to pursue higher academic degrees in the field of sustainable forest management and rehabilitation in universities and institutions in China and other potential universities in the region. Twenty–two scholarship program candidates have been approved and recruited by three host universities, and they started their master program in September 2018.

To strengthen support for and diversify activities under the ASP, APFNet and the Beijing Forestry University co–organized the "Workshop of New Concepts of China's Forestry Development and University Program Cooperation: Opportunities and Challenges", from 29 to 31 August in Inner Mongolia, China. In addition to enhancing academic exchanges, the event facilitated communications between ASP host universities in China and universities in Thailand to explore cooperation such as student and scholar exchanges, summer schools and academic tours under the ASP frame.



Asia-Pacific Forestry Education Coordination Mechanism (AP-FECM)

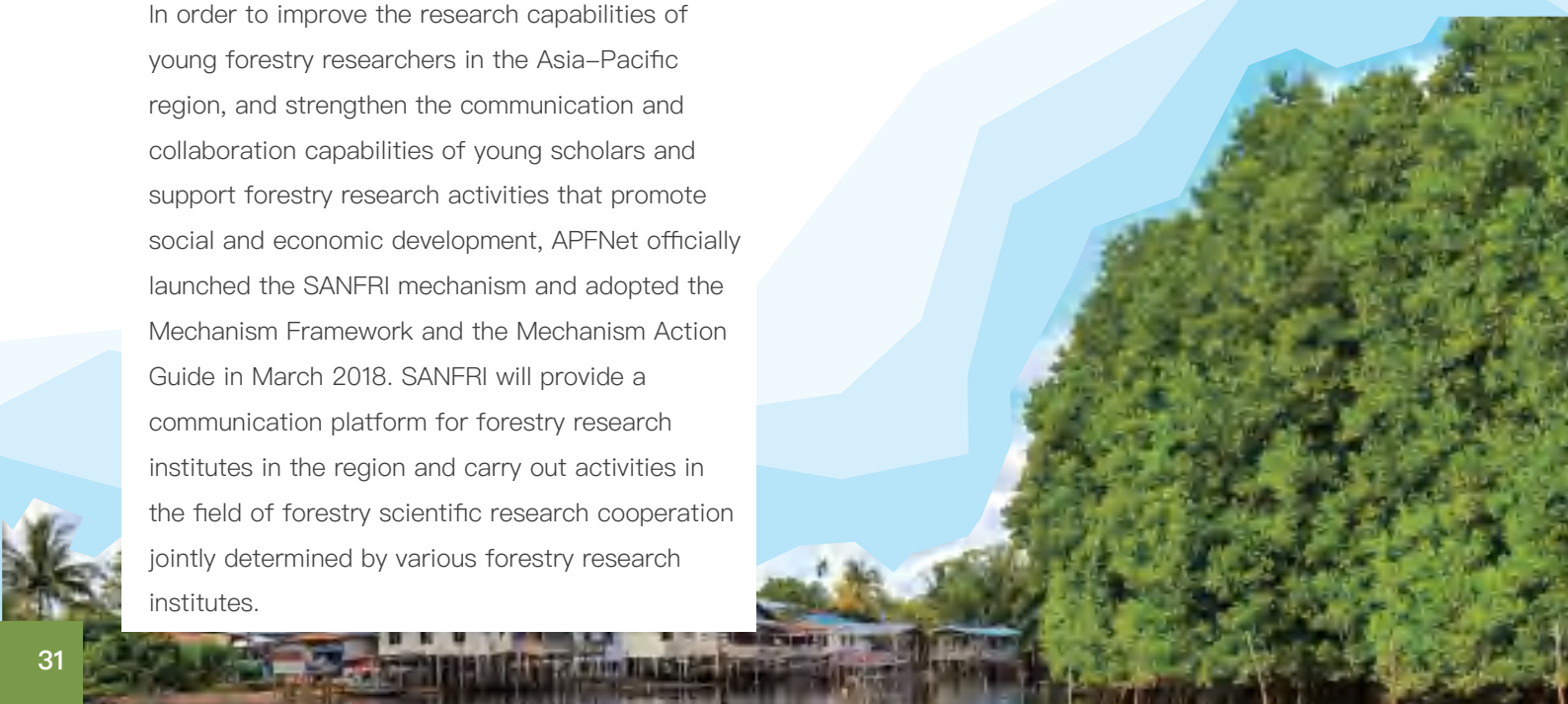
AP–FECM is an initiative proposed by APFNet in 2010 and launched in 2011 to facilitate collaboration among forestry universities and colleges in the region to contribute to the cultivation of the next generation of foresters.

In 2018, the fifth AP–FECM meeting was successfully held on 28 March. The event was centred on the theme of "Globalization of Higher Forestry Education in a Digital Era". This theme is crucial for the development and innovation of higher forestry education as it presents new opportunities to improve forestry education at both regional and global levels. Globalization also allows for increased access to high quality forestry education. In this meeting, the second phase of the sustainable forest management online education project was formally inaugurated, which will continue to be visionary in its multi–university collaboration and open access format.

The meeting shed further light on the state of higher forestry education worldwide, including trends towards a greater use of information technology and online learning tools, as well as interdisciplinary and field–based learning. Innovations in education can help minimize gaps in forestry education in the Asia–Pacific region. This includes the use of virtual/augmented reality technology to conduct virtual field trips in ecologically sensitive forest areas to minimize impact.

SANFRI

In order to improve the research capabilities of young forestry researchers in the Asia–Pacific region, and strengthen the communication and collaboration capabilities of young scholars and support forestry research activities that promote social and economic development, APFNet officially launched the SANFRI mechanism and adopted the Mechanism Framework and the Mechanism Action Guide in March 2018. SANFRI will provide a communication platform for forestry research institutes in the region and carry out activities in the field of forestry scientific research cooperation jointly determined by various forestry research institutes.



Publications

Growing Higher Forestry Education in a Changing World– Analysis of Higher Forestry Education in the Asia-Pacific Region

Based on findings of the Forestry Education Survey conducted under AP–FECM in 2016, this report reviews the status of higher forestry education in the Asia–Pacific region and summarizes the efforts by universities to address emerging challenges in the 2005–2015 period, and recommends solutions for both universities and AP–FECM to further improve the effort. In addition, it presents 11 case studies contributed by member universities offering detailed analyses of forestry education in their home economies and efforts to address the challenges faced.

Forestry Development and Best Practices of Forest Management in Greater Central Asia

This is a set of publications of the overview of the forest sector in the six Greater Central Asian economies: Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan and Uzbekistan. The individual reports give a holistic overview of the current state of forests and forestry, the contribution of forests to economic development, forestry policies and legislation, and forest education and research of the respective economy. Best practices of soil and water conservation, desertification control, forest fire and disease prevention, biodiversity conservation and rehabilitation of degraded forests are covered in–depth.

An Overview of In-Service Training Arrangements of Public Forestry Agencies in the Asia-Pacific Region

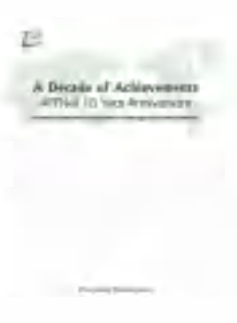
Through consultation workshops under the APFNet TIF Network, forestry trainers and officials responsible for human resource development have identified several challenges, in particular during in–service training. To better understand the status and trends of human capital cultivation in the forest sector in the region and develop long–term strategy for the TIF Network, this report reviews and compares in–service training of public forestry agencies in 11 developing economies in the Asia–Pacific region.

Advancing the Role of Natural Regeneration in Large-Scale forests and Landscape Restoration in the Asia-Pacific Region

This joint publication is the proceedings of the regional workshop "Promoting the role of natural regeneration in large–scale forest and landscape restoration: challenges and opportunities", co–organized by FAO and APFNet on 19–21 June 2017, Nanning, Guangxi Autonomous Region, China. It presents the key conclusions and recommendations from discussions and presentations of the workshop on promoting natural regeneration in forest and landscape restoration (FLR) including key ecological, economic and social aspects, planning and monitoring tools and enabling conditions.

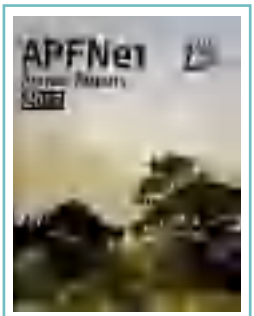
Regional Strategy and Action Plan for Forest and Landscape Restoration in Asia-Pacific

The FLR approach has gained momentum in recent years. It offers new opportunities to scale up efforts to effectively restore vast areas of degraded forests and landscapes of the Asia–Pacific region. Based on outcomes of consultation meetings and inputs from an extensive range of stakeholders, this regional strategy and action plan on FLR has been developed to provide reference for interested economies to define action plans that fit their context, circumstances and implementation capabilities.



A Decade of Achievements– APFNet 10 Year Anniversary

This report gives an overview of APFNet development in the first ten years by stages and achievements of the four pillars: capacity building, demonstration projects, policy dialogue and information sharing.



Annual Report 2017

By embracing opportunities, strengthening collaboration and responding directly to member economies' needs, APFNet continued to advance sustainable forest management and rehabilitation in the region in 2017. In parallel with the continued efforts under its four pillars, APFNet expended its scope in capacity building to cover Greater Central Asia, Southeast Asia and beyond, and in policy dialogues to encompass transboundary wildlife conservation.

Institutional Development and Partnerships

Update from the Council and Board of Directors

During the celebration week of APFNet's 10th anniversary, the Council (advisory body) and Board of Directors (decision-making body) convened their annual meetings respectively on 25 and 27–28 March in Beijing, China, to review the achievements of last year and to discuss the work and priorities of 2018.

Board of Directors approves conduct of a ten-year review of APFNet

This involves a mid-term review of the implementation of APFNet's Strategic Plan 2016–20 and to develop procedures and guidelines to assess APFNet's activities in the first phase of a broader exercise to conduct a ten-year review.

Approval of annual work plan and budget 2018

Four new directors selected to sit on Board 2019

The following were elected by the Council to join the Board of Directors with the term commencing in March 2019.

W.T.B. Dissanayake	Additional Secretary (Environment Policy & Planning), Ministry of Mahaweli Development & Environment
John Leigh Vetter	Executive Director, Peru Forest and Wildlife Service
Nor Akhirrudin Bin Mahmud	Director General of Forestry Peninsular Malaysia
C.T.S. Nair	International consultant (Former FAO official)

Wide review of APFNet' s work for improvements

The Council had broad discussions and raised the issue of further focusing on areas where APFNet can add value, and suggested that ways be found to engage members to a greater extent, through more effective exchanges of experience and expertise at annual meetings, and through quality support for the intersessional work of APFNet.

Other institutional matters

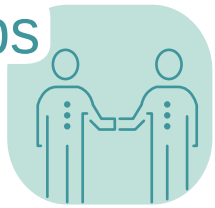
Dr Preecha Ongprasert (Thailand) and Dr Sokh Heng (Cambodia) were elected as the Chair and Vice-Chair of the Council from 2018 to 2021.

The terms of Patrick Durst, Jack Hurd, Stephen Midgley and Zhao Shucong were renewed for another three years as Board directors (2018–2021). Mr Zhao Shucong was re-elected as Chair for a second term, from April 2018 to 2021.

APFNet' s Presence Increased in Latin America

Efforts in enhancing the presence of APFNet in the Americas have been made through partnerships with the University of British Colombia (based in Canada). Visits to a number of economies (Chile, Ecuador and Peru) has extended APFNet' s network in the region. APFNet has received membership application from Ecuador as well.

Partnerships

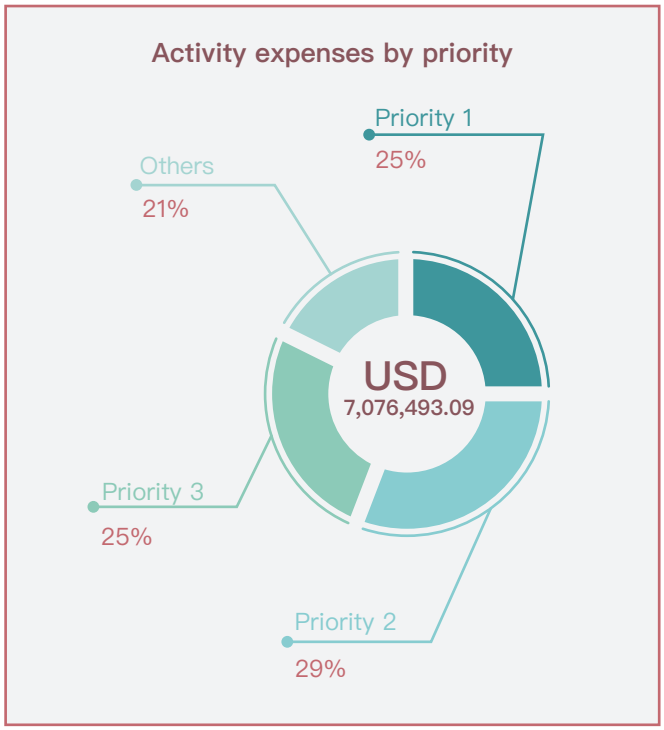


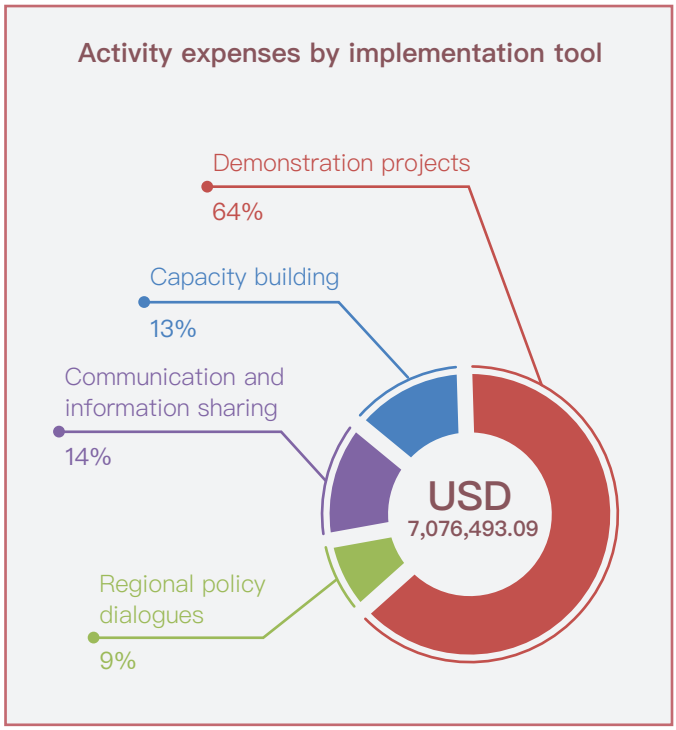
APFNet extended partnership with Beijing Forestry University on supporting forestry education in the Asia-Pacific region and vegetation restoration in Greater Central Asia, through an exchange programme for universities in tropical economies, establishing a forestry journal, implementing new joint projects and holding international events.

Financial Information

	CNY		USD	
ASSESTS	2018	2017	2018	2017
CURRENT ASSESTS				
Monetary Funds	28,011,021.69	3145,3150.42	4,081,335.48	4,813,619.18
Accounts Receivable	7,074.41	1,544.77	1,030.77	23,641.30
Accounts Prepayment		2,664.50		40,777.75
Prepaid Expenses	743,841.20	852,598.72	108,381.11	130,482.50
TOTAL CURRENT ASSETS	**28,761,937.3**	**32,726,676.14**	**4,190,747.36**	**5,008,520.73**
Fixed Assets:				
Fixed Assets	896,281.80	871,923.80	137,282.40	133,440.02
Less: Accumulated Depreciation	497,393.07	332,294.78	74,910.28	50,854.70
Fixed Assets — Net Value	398,888.73	539,629.02	62,372.12	82,585.32
Cultural Assets	8,500.00	8,500.00	1,300.85	1,300.85
Total Fixed Assets	**407,388.73**	**548,129.02**	**63,672.97**	**83,886.17**
Long-term prepayments	29,286.00	48,810.00	4,267.11	7,469.93
TOTAL ASSETS	**29,198,612.03**	**33,323,615.16**	**4,258,687.44**	**5,099,876.83**
LIABILITIES AND NET ASSETS				
CURRENT LIABILITIES				
Accounts Payable	-965,960.72	-112,391.14	-140,744.95	-17,200.44
Tax Payable	-69,877.28	-98,260.84	-10,181.44	-15,037.93
Accrued expenses	-42,500.00		-6,192.45	
TOTAL CURRENT LIABILITIES	**-1,078,338.00**	**-210,651.98**	**-157,118.84**	**-32,238.37**
TOTAL LIABILITIES	**-1,078,338.00**	**-210,651.98**	**-157,118.84**	**-32,238.37**
Net Assets:				
Unrestricted Net Assets	-13,518,477.93	-11,975,872.33	-1,974,019.34	-1,832,798.56
Restricted Net Assets	-14,601,796.10	-21,137,090.85	-2,127,549.26	-3,234,839.90
Total Net Assets	**-28,120,274.03**	**-33,112,963.18**	**-4,101,568.60**	**-5,067,638.46**
TOTAL LIABILITES AND NET ASSETS	**-29,198,612.03**	**-33,323,615.16**	**-4,258,687.44**	**-5,099,876.83**

ITEMS	CNY 2018	CNY 2017	USD 2018	USD 2017
1. INCOME				
Donation Income	–192,618.00	–20,184,900.00	–3,000,000.00	–3,000,000.00
Government Subsidy Income	–34,895,700.00	–36,510,000.00	–5,434,959.35	–5,426,333.55
Fund donation	–200,000.00	–1,238,124.70	–31,149.74	–184,017.46
Sales Revenue	–	–1,202,062.82	0.00	–178,657.73
Other Income (interest)	–87,569.48	–67,249.09	–13,638.83	–9,994.96
TOTAL INCOME	**–54,445,069.48**	**–59,202,336.61**	**–8,479,747.92**	**–8,799,003.70**
2. EXPENSES				
(1) Activity Costs	45,435,331.57	39,514,509.13	7,076,493.10	5,872,881.58
(2) Management Expenses	14,027,282.62	13,909,350.16	2,184,730.81	2,067,290.42
(3) Financing Expenses	–24,855.56	30,415.95	184,593.87	–264,032.10
TOTAL EXPENSES	**–200,000.00**	**–1,238,124.70**	**9,445,817.78**	**7,676,139.90**
3. Restricted Net Assets Transferred To Unrestricted Net Assets	–	–	–	–
4. Net Assets Changes Increase/(Decrease)	**4,992,689.15**	**–5,748,061.37**	**966,069.86**	**–1,122,863.80**





Acronyms

@Wild	APFNet Transboundary Wildlife Conservation Initiative in the Greater Mekong Sub-region
APEC	Asia-Pacific Economic Cooperation
APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
AP-FECM	Asia-Pacific Forestry Education Coordination Mechanism
ASEAN	Association of Southeast Asian Nations
ASP	APFNet Scholarship Program
CNY	Chinese Yuan
CRMC	Community Resources Management Center
DBH	diameter at breast height
FAO	Food and Agriculture Organization of the United Nations
FLR	forest and landscape restoration
FPN	Forestry Planning Network
GCA MMRF	Meeting of Ministers Responsible for Forestry in Greater Central Asia
GIS	geographic information system
ha	hectare(s)
HIMAWANTI	Himalayan Grassroots Women's Natural Resource Management Association
IFAW	International Fund for Animal Welfare
ITTO	International Tropical Timber Organization
IUCN	Conservation of Nature and Natural Resources
KUFF	Kasetsart University Faculty of Forestry
Lao PDR	Lao People's Democratic Republic
NDVI	normalised difference vegetation index
SANFRI	Sino-ASEAN Network of Forestry Research Institutes
SDGs	Sustainable Development Goals
TIF	Trainers in Forestry
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
USD	United States Dollar(s)