



APFNet

Annual Report

2022

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About APFNet

Mission

The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) is committed to helping the economies and people of the Asia-Pacific region by promoting and improving sustainable forest management (SFM) and forest rehabilitation.

Objectives

APFNet aims to:

- Contribute to the efforts of member economies and organizations to substantially increase the area of restored multifunctional forests in line with APFNet's mission and the objectives of its members, and the framework of multilateral aspirations and processes such as the Bonn Challenge, the UN Strategic Plan for Forests, the UN Decade on Ecosystem Restoration, and the Asia-Pacific Regional Strategy and Action Plan for Forest and Landscape Restoration.
- Help enhance forest carbon stocks and improve forest quality and productivity by promoting the rehabilitation of existing but degraded forests and the reforestation and afforestation of suitable lands in the region.
- Help reduce forest loss, degradation, and associated greenhouse gas emissions by strengthening SFM and enhancing biodiversity conservation.
- Help increase the socio-economic benefits of forests in the region.

Priorities

Priority 1. Contributing to forest restoration

Priority 2. Reducing forest degradation

Priority 3. Enhancing forest ecosystem functions

Implementation tools

APFNet pursues its goals and priorities through:

- Capacity building
- Demonstration projects
- Regional policy dialogues
- Communication and information sharing

APFNet in 2022

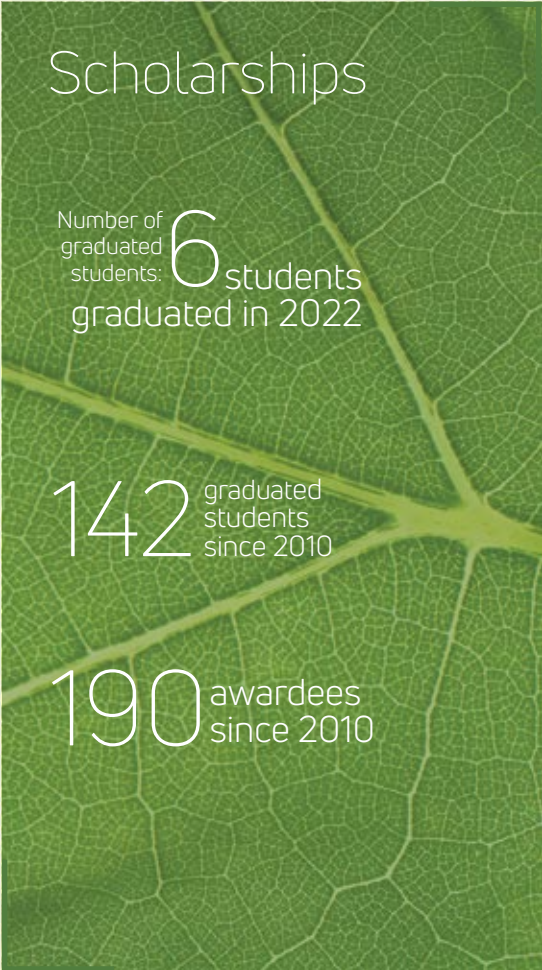
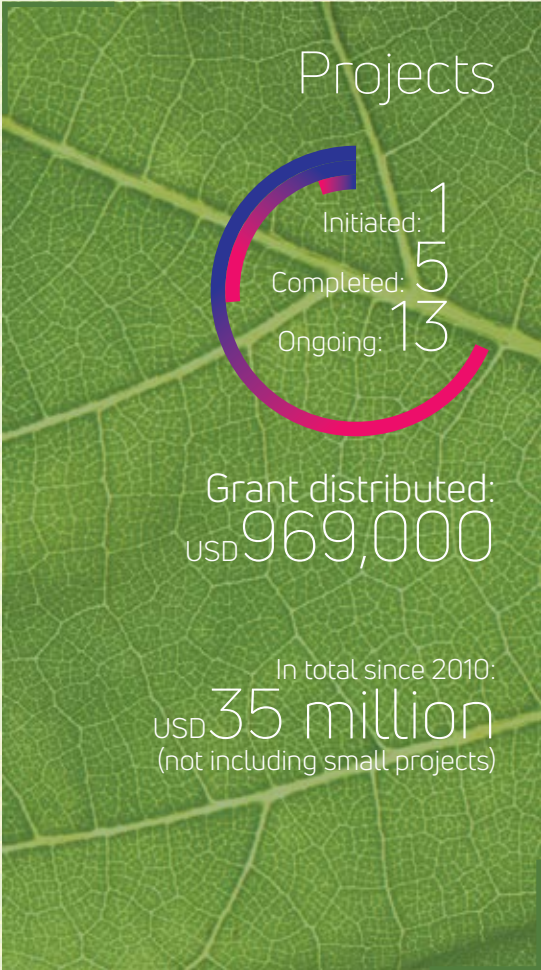


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Message from the executive director



We said goodbye to 2022 which could be defined as a reflection of the APFNet as an institution and for individuals in this world. While we are moving forward to the globally committed common goals such as the UN Strategic Plan for Forests, UN Decade on Ecosystem Restoration, Sustainable Development Goals, Glasgow Leaders' Declaration on Forests and Land Use, and Post-2020 Global Biodiversity Framework, there were times to take a deep breath and think about what we have right now and what we need to fix or update, and renew as an institution or an individual to achieve bigger goals. So APFNet proposed an initiative called the Global Network for Sustainable Forest Management (GNSFM) to foster a global development partnership for the new era.

In the first half of 2022, APFNet Council members selected a new Chair and Vice Chair and approved five nominees for the APFNet Board of Directors and Chile's membership application in the sixth council meeting. Later in the second half of the year, the sixth meeting of the APFNet Board of Directors was also held virtually, five nominees were appointed as the APFNet Board of Directors and Dr Guan Zhi'ou was selected as the new Chair.

Although the Secretariat staff haven't been able to travel outside of China and meet representatives of member economies and project partners, colleagues, and friends, through some high-level dialogue, regional and international workshops, APFNet shared its recent work progress and discussed with partners and members on regional and economy-level contributions for restoring the earth. APFNet Secretariat staff have been working



on several policy and regulation updates that will strengthen our further cooperation and demonstration for the contributing forest restoration in the Asia-Pacific region.

As one of the main pillars, demonstration projects have always been a vital part of the APFNet work. In 2022, the project management team put more concern into maximizing the effectiveness of demonstration projects. Some of the good practices and outputs of demonstration projects have been evaluated under the new guidelines and highlighted in this report to promote forest restoration in the Asia-Pacific region.

At the edge of global COVID-19 recovery approaches, the APFNet Scholarship students continued their study online in 2022, and six of them graduated with the support of APFNet, collaborating universities, professors, family and friends. The Asia-Pacific Forestry Education Coordination Mechanism also provided a platform to discuss the challenges, opportunities and solutions in forestry education for the young researchers and students in the region. The Alumni network of the APFNet Scholarship Program (ASP) carried its constant communication on social media platforms, including a thoughtful conversation and experience sharing on biodiversity conservation involving some graduated students.

Several reports and publications were produced in 2022 both in Chinese and English, some for Chinese researchers and forest officers to learn from international experiences such as "Study and Analysis of Forest Management and Forest-

ry Development in Asia-Pacific Region", "Achieving the APEC 2020 Forest Cover Goal: A synthesis of economy reports" while some others to share APFNet project output to demonstrate sustainable forest management and empowering women in the community forest. Additionally, recognizing the regional need for further support on forest carbon accounting and the role of forests and trees in the context of climate change, thematic papers and reports were published and shared.

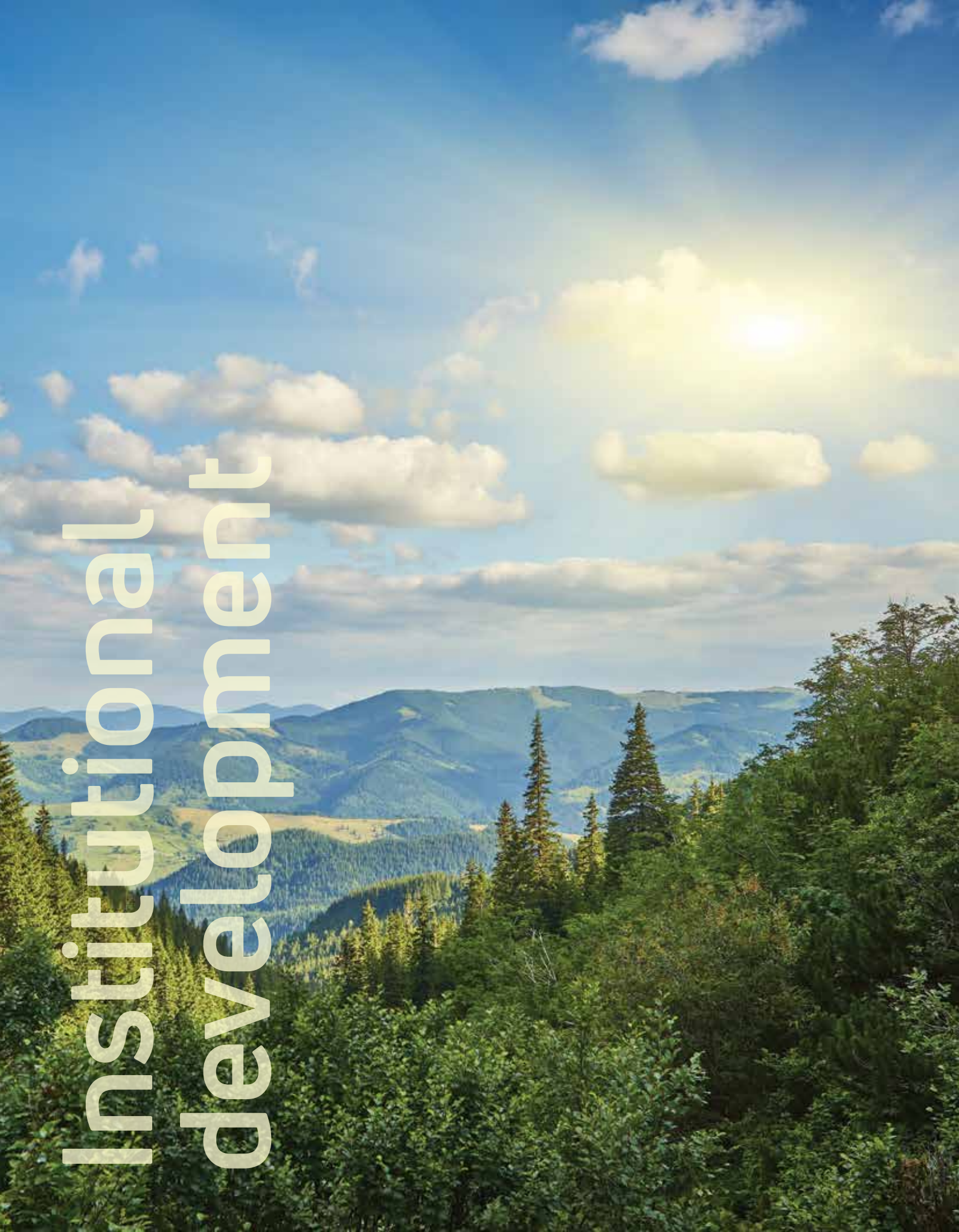
I want to express my appreciation to our members, Board of directors, Council representatives, partners, and all others who have been part of the APFNet throughout the year. APFNet will diligently continue its close collaboration with all members and partners while expanding and providing a stable network for sustainable forest management and rehabilitation in the Asia-Pacific region. With the commitments to improve forest restoration and reduce forest degradation, following up the globally agreed above-mentioned consensuses, the APFNet will keep providing support for the sustainable management of forests to the economies and people who need it. So in the end, I urge everyone to be part of this in these coming years to make it happen.

Lu De

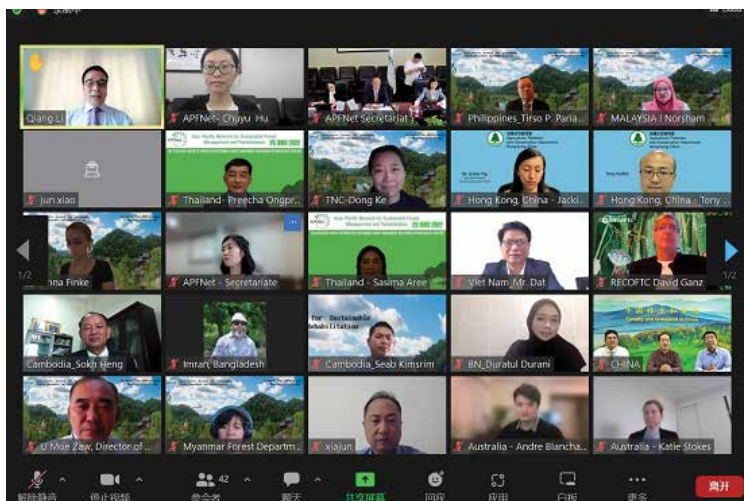
APFNet Executive Director



Institutional development



Institutional development



Group photo of the Sixth Meeting of the APFNet Council, photo: Hu Chuyu, APFNet

The sixth meeting of the APFNet Council

The Sixth Meeting of the APFNet Council was conducted online on 25 May 2022. About 40 representatives from 19 member economies and organizations, one observer and the Secretariat attended the meeting. Dr Preecha Ongprasert, the outgoing Chair of the APFNet Council, hosted the meeting and expressed his appreciation to members for their support over the last six years. Dr Lu De, the APFNet Executive Director, briefed the members on the Secretariat's work in 2021 as well as the work plan and budget for 2022. Based on Dr Lu's highlights, members commented on the progress of the APFNet-funded projects and adopted APFNet's proposed work plan in 2022.

During the meeting, Dr Sokh Heng, Director of the Institute of Forest and Wildlife Research and Development in Cambodia, and Mr Tirso Parian Jr., Director of the Forest Management Bureau in the Philippines, were elected as the new Chair and Vice-Chair of the Council; five nominees from Cambodia, China, Canada, Malaysia, and Nepal were selected as new Board of Directors of the APFNet. The Council approved Chile's membership application. With the decision of this Council meeting, APFNet membership comprises 27 economies and five international organizations in the Asia-Pacific region.



Here are some interesting facts about Chile's forestry sector:

- Forests occupy 21.5% of the total land surface, equivalent to 16.2 million hectares.
- About 86% of forests correspond to natural forests and 14% to plantations.
- It is one of the economies in the world with the highest percentage (29.0%) of protected forests.
- The forestry sector is the second-largest exporting industry which represents 7.3% of the GDP.
- Approximately 400 thousand people are directly and indirectly employed in the forest sector.

The Board of Directors sixth meeting

APFNet's decision-making body, the Board of Directors, selected Dr Guan Zhi'ou as the new Chair of the Board of Directors and four other new Board of Directors by consensus at its sixth meeting, which was held online on 25 August 2022.

Apart from Dr Guan Zhi'ou, the new Directors include Dato' Indera Mohd Ridza bin Awang, Director General of Forestry Peninsular Malaysia; Mr Chan Ponika, Deputy Director General of Forestry Administration of Cambodia; Prof. John Innes, Forest Renewal British Columbia Chair of Forest Management, University of British Columbia, Canada; and Dr Pem Narayan Kandel, Secretary of the Ministry of Forests and Environment, Government of Nepal.

Four Board Directors, including the former Chair, Mr Zhao Shucong, Mr Patrick Durst, Mr Jack Hurd, and Mr Stephen Midgely finished their second term and retired from the Board of Directors.

During this meeting, the Board of Directors also approved the renewal of the term of the current Executive Director, Dr Lu De, for another three years until 18 September 2025.



Dr Guan Zhi'ou (Chair)
Administrator, National Forestry and Grassland Administration, P.R. China
Term: 2022-2025



Mr W.T.B. Dissanayake
Additional Secretary, Ministry of Mahaweli Development and Environment, Sri Lanka
Term: 2019-2023



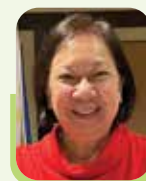
Mr John Leigh
(May 1953 - February 2023)
Former Executive Director of Forest and Wildlife Service, Peru
Term: 2019-2023



Dr C.T.S. Nair
Consultant (Former FAO official)
Term: 2019-2023



Mr Nor Akhrrudin Bin Mahmud
Director General of Forestry Peninsular Malaysia
Term: 2019-2023



Ms Novia Widyaningtyas
Senior advisor to the Minister for Industry and International Trade, Ministry of Environment and Forestry, Indonesia
Term: 2020-2024



Ms Margaret M. Calderon
Professor and Director, Institute of Renewable Natural Resources College of Forestry and Natural Resources University of the Philippines Los Baños
Term: 2020-2024



Mr Mohd Ridza bin Awang
Director General, Forestry Department Peninsular Malaysia
Term: 2022-2025



Mr Chan Ponika
Deputy Director General, Forestry Administration, Cambodia
Term: 2022-2025



Dr John Innes
Chair of Forest Management, Professor (former Dean) Faculty of Forestry, University of British Columbia, Canada
Term: 2022-2025



Dr Pem Narayan Kandel
Secretary, Ministry of Forests and Environment, Nepal
Term: 2022-2025



Mr Fan Kejun
Deputy Director General, Department of Natural Resources and Ecological Environment, Ministry of Finance, P.R. China (Non-voting Director appointed by the host economy)
Term: Since 2016



Dr Lu De
Secretary of the APFNet Board (Non-voting Director), Executive Director of APFNet
Term: 2017-2025

Current APFNet Board of Directors, Photo: APFNet

APFNet policy and regulation update

Update on Monitoring and Evaluation (M&E) policies

In 2022, APFNet developed and posted the first overall “Monitoring and Evaluation Policy” on the APFNet website. This policy will ensure that APFNet staff, consultants and partners have access to learn the general concepts and standards of M&E policy at APFNet, and better conduct or facilitate the M&E work of the organization. Criteria for selecting an evaluator were further explored. In addition to the required expertise, the following factors were also considered when selecting an evaluator, familiarity with APFNet, previous experience, and communication and interpersonal abilities. The M&E consultant database was established based on the expertise and region respectively.

APFNet explored measures and strategies to further improve the effectiveness of project evaluation in 2022, such as discussing with the project evaluator about APFNet’s concerning points, asking the evaluators to assess more on the project outcome and impacts, adding the procedure of giving feedback to the evaluation results and making action-taking plans.

APFNet Project Evaluation Guidelines updated

Aiming at improving the APFNet project evaluation system, and better support project planning, implementation and management, the second edition of APFNet Project Evaluation Guidelines was developed building upon the first one that was formed in 2013, and taking into account the evaluation experiences of APFNet projects in the past ten years.

The new Guidelines further regulate the project evaluation criteria, rules, priorities, and procedures and improve relevant formats, which mainly include

- 1)** setting evaluation criteria and indicators;
- 2)** regulating evaluation frequency based on different project budget categories;
- 3)** expanding the evaluation lifecycle by adding the step of giving feedback to the evaluation results and making follow-up action plans, ensuring that the results will be widely shared and effectively used;
- 4)** further specifying and upgrading the evaluation preparation and execution process to control the evaluation qualities, and
- 5)** adding and improving the templates to strengthen the utility and value of project evaluation work, including the template of ToR, Evaluation plan and Evaluation report.



Building regional synergies

Building regional synergies



Photo: Xinhua news

APFNet proposal adopted as an outcome of the high-level dialogue on global development

The High-Level Dialogue on Global Development, under the theme, “Foster a Global Development Partnership for the New Era to Jointly Implement the 2030 Agenda for Sustainable Development” was held successfully in China on 24 June 2022, and the consensus was achieved on numerous issues by 18 economies. In response to the serious challenges facing global

development, including ecosystem degradation, food insecurity, exacerbated poverty and uneven development, the Global Network for Sustainable Forest Management (GNSFM), proposed by the APFNet, was adopted as an early harvest project of the Dialogue and welcomed by participating leaders.

Improving economies’ forest governance ability in the Asia-Pacific region respond to the post COP26

In the 26th Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC), Glasgow Leaders’ made a Declaration on Forests and Land Use in the face of the severe challenges of climate change and forest degradation in the world. In more densely populated areas in the Asia-Pacific region, this kind of challenge is particularly severe, diminishing the capacity of forests to provide the full range of goods and services to the whole society.

Therefore, in this context, on 20 January 2022, APFNet hosted the Pu’er workshop on Forest Restoration and Sustainable Forest Management in Response to International Commitments on Climate Change to call for its members to react to the recent world leaders’ endorsements. A total of 73 from seventeen members of the Asia-Pacific Region attended the event, which includes FAO,

RECOFTC and TNC and 14 regional economies.

The Glasgow Leaders’ Declaration on Forest and Land Use, regional progress in forestry for the APEC 2020 goal as well as the APFNet Strategic Plan 2021-2025 were introduced to provide a general overview of highlights in global and regional forestry dynamics. Representatives from eight member economies kindly contributed to their efforts in response to restoring forest ecosystems and mitigating and adapting to climate change through an introduction to ongoing and planned forest-related actions and policies at the economic level. Mr Lu De, Executive Director of APFNet, underpinned that the priorities of APFNet Strategic Plan 2021-2025 are much accorded with the Glasgow Leader’s Declaration on Forest and Land Use and the 2021 APEC Ministerial Meeting and emphasized that APFNet



Group photo

will continue to help support regional member economies by promoting and improving forest restoration and sustainable forest management. An active and open discussion has interacted among all members and they agreed on the significance of collaboration and information-sharing for the region.

APFNet participation in the workshop “Key outcomes for the land use sector after COP26 (glasgow): An Asia-Pacific perspective”

APFNet Executive Director Dr Lu De was invited and attended as one of the panellists in a workshop on “Key Outcomes for the Land Use Sector after COP26 (Glasgow): An Asia-Pacific Perspective”, which was virtually held 1-3 March 2022 by RECOFTC, FAO, the ASEAN Climate Resilience Network, the ASEAN Secretariat, and UN-REDD. This virtual meeting brought 70 participants and many experienced negotiators and leading thinkers from the region to discuss and reflect upon critical issues raised during COP26 in Glasgow.

In the meeting, Dr Lu De briefly reviewed the primary outcomes of the APEC 2020 Forest Cover Goal assessment report, which APFNet and FAO implemented. In addition, he informed participants about APFNet’s latest workshop on “Forest Restoration and Sustainable Forest Management in Response to International

Commitments on Climate Change”, which was held in February 2022. He highlighted that APFNet Secretariat would keep following the critical progress and outcomes from the forestry sector regarding post-COP26.

During the discussion session on how Asia-Pacific economies positioned themselves within the context of COP26 concerning agriculture and forestry, Dr Lu De mentioned that some of the economies in the region have already initiated domestic forestry policies and plans to address forestry issues. For example, Sustainable Development Goals Framework 2016-2030 and National Forestry Program 2010-2029 in Cambodia; Rehabilitation and Reforestation Program (2017-2027) and Natural Habitats Program 2019-2029 in Myanmar; and China’s National 14th Five-year Plan for Protection and Development in the Forest and

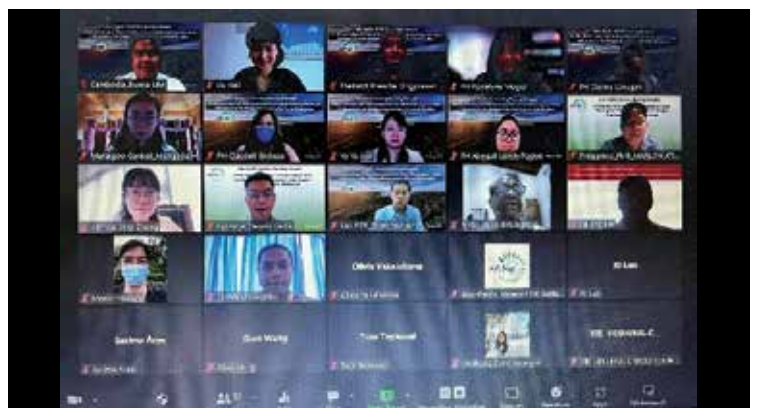
Grassland Sector. These actions are active adaptations and contribute to achieving the Paris Agreement and Glasgow Pact goals. He suggested that UNFCCC could play a more critical role in financial support and technology transfer for balancing the current forestry management and land-use gaps among developed and developing economies. His comments were echoed by other experts and panellists, especially on improving economies’ forest governance ability in the Asia-Pacific region.



The Forest Planning Network (FPN) sixth meeting

The Forest Planning Network (FPN) of APFNet also virtually hosted its Sixth Meeting on 12 July 2022, to explore insights on new developments in forest planning and policies in response to the Glasgow Leader’s Declaration on Forests and Land Use, which included a strong endorsement of forest restoration.

This workshop was structured into three segments, including a review of FPN’s work since 2020, presentations by the different member economies to update other members on new progress and movements on legal frameworks and policies related to forest restoration, as well as an open discussion of how forest policies and planning in response to the Glasgow Declaration can move forward. In the meeting, APFNet emphasized the tremendous value of information-sharing and networking, particularly



Group photo during the opening ceremony

among forestry planners and forest policy makers in the Asia-Pacific Region, to better reach a consensus on concrete actions for effectively halting and reversing deforestation and forest degradation. Many economies introduced their new forest goals, strategies and ambitious tree-planting initiatives, such as the “Billion Tree Movement” of Mongolia or the Enhanced and Expanded Greening Program of the Philippines. Some members, such as Mr Preecha Ongprasert of the Royal Forest Department

of Thailand, emphasized the difference between deforestation and forest restoration, saying that true restoration goes beyond planting trees but should rather focus on re-establishing key ecosystem functions. More importantly, among the participating economies, they clearly show that the Glasgow Endorsement has been mainstreamed into their new forestry planning in the next five years.

Sino-Asean Network of Forestry Research Institutes (SANFRI) mechanism activities

The Sino-ASEAN Network of Forestry Research Institutes (SANFRI) Third Steering Committee Meeting was concluded on 13th January 2022 and updated the progress of SANFRI activities during 2020-2021, adopted the work plan for 2022-2023 through active discussion and upon agreement among all members. The Vietnamese Academy of Forest Sciences (VAFS) and the Forest Research Institute of Malaysia (FRIM) were elected as new Chair and Vice-Chair of the Steering Committee respectively. The Yunnan Academy of Forestry and Grassland of China has been elected as the coordination office to serve as a linkage between member institutes and APFNet, and especially assist with the rotating presidency to carry on their performance if needed.

On the same day, the Second Early Career Academics Forum of SANFRI was concluded by joint efforts among APFNet, Yunnan Academy of Forestry and Grassland of China and VAFS during the afternoon session. Representatives from eight SANFRI member institutes and 24 young scholars attended the event. The forum was designed for young forestry researchers to promote a mutual learning process through many presentations focusing on three project outputs of 2020-2021 APFNet Small Grant Research and the introduction of member institutes. Participants appreciated the Forum providing such an opportunity for research idea incubation and the improvement of capacity through information-sharing.



A photo of Mr De De Jajat Sudrajat (Indonesia) delivering a presentation on his research project under the APFNet Small Research Grant



A group photo of member institutes of SANFRI

With the successful completion of the 2020-2021 APFNet Small Research Grant projects, to further promote regional forestry scientific research cooperation and better serve the restoration of forest ecosystems in the Asia-Pacific region, APFNet launched a new 2022-2023 round of Small Research Grant under SANFRI mechanism. Scholars from different member economies submitted four project proposals. After expert review, three projects finally passed the assessment and will receive funding from APFNet in 2023. The three projects are:

1. Vietnam & Laos: Research on Policies to Promote Natural Forest Restoration Towards Sustainability in Vietnam and Lao PDR
2. Indonesia: Tree Seed Supply Management Model and Policy for Supporting Forest and Landscape Restoration in Indonesia
3. Malaysia: Documenting the insect natural enemies of insect pests in ex-situ germplasm conservation of *Aquilaria malaccensis*

A vibrant, lush green forest scene featuring a waterfall cascading down a rocky ledge. The waterfall is the central focus, surrounded by dense, vibrant green foliage and trees. The foreground is filled with various green plants and leaves, some of which are slightly out of focus, creating a sense of depth. The overall atmosphere is fresh and natural, with soft lighting filtering through the canopy.

Contributing to
restoring the earth

Contribution to restoring the earth



Aerial photo of one of the valleys in the Micro Catchment

Large-scale deforestation and land clearing for intensive farming on the highly erosive and steep-sloped uplands of the Bengawan Solo Watershed in Indonesia have caused severe land degradation and soil erosion. Nevertheless, local communities in these rural areas depend on farming for their livelihoods and non-land-based sources of income are rare. How to rehabilitate this fragile ecosystem and prevent soil erosion became an economy-level concern for Indonesia.

To solve this problem sustainably, an integrated farming approach using agroforestry, combined with grey infrastructure using civil engineering methods was implemented at the micro-catchment level. Starting in 2017, APFNet funded two phases (2017-2019, 2020-2022) of the project “Development of participatory management of a micro-catchment in the Bengawan Solo Upper Watershed”, which have now both been completed. The project selected the Naruan Micro Catchment (NMC) in the upstream area of Bengawan Solo River as a pilot site to showcase participatory measures to tackle soil erosion. To make sure that the needs of the local community and existing knowledge were sufficiently considered, this project used a participatory approach that involved local farmers in decision-making during planning, implementing and subsequent monitoring.

Participative soil and water conservation at a micro-watershed level in Indonesia

Project title: Development of micro catchment participatory management in the Bengawan Solo Upper Watershed (Phase II) [Project ID: 2020P1-INA]

Project duration: August 2020–July 2022, 24 months

Supervisory agencies: Extension and Human Resources Development Agency, Ministry of Environment and Forestry, Indonesia (BP2SDM)

Executing agency: Watershed Management Technology Center (WMTC)

Budget in USD (total/ APFNet grant): 245,324/99,820

Project Location: Naruan Micro Catchment (NMC), upstream of Keduang Watershed, Upper Bengawan Solo River Basin. Situated in Wonogiri and Karanganyar Districts, Central Java Province, Indonesia





Agroforestry with Albizia trees, established by APFNet project in Naruan Micro Catchment, Central Java, Indonesia



Before and after the construction of a gully plug for controlling water erosion in fields along steep slopes

Controlling Erosion while Benefitting People

The upstream watershed, where the project was located, plays a crucial role in erosion control as slopes there are often steep and unsuitable land use causes erosion, affecting not only the local population but all downstream areas. Unfortunately, due to the complex interaction between topography (steep slopes, insufficient land cover) and hydrology (rainfall and run-off), soil erosion and land degradation in the NMC are difficult to fully halt and reverse on a large scale in the short term. Complicating this, most of the people living in this rural area depend on farming for their livelihoods, inevitably causing soil erosion. As such, it was the task of the APFNet project to find measures that can control

erosion while also allowing people to earn a living sustainably. For this, a practical and operational plan was developed and demonstration sites were established.

To find a compromise between preventing erosion by turning agriculture back into forests and traditional agriculture rotating seasonal crops that have been practiced so far, the project team developed a participatory management plan that mostly uses agroforestry. In response to participating farmers' needs, timber trees like albizia and limpaga and multi-purpose trees, such as avocado, coffee or lemon, were integrated with the cropping designs, with a greater focus on non-timber trees to minimize soil disturbance caused by farming. Through the APFNet project, in



total, about 90 ha, involving more than 200 land owners from three villages, have been planted and managed according to these principles. Besides the support of participating farmers, the project succeeded in bringing together various stakeholders, such as the regional and local government, watershed research institutions, NGOs and the local, state-owned water supply company, who are committed to continuing soil and water conservation practices post-project.

In addition to those vegetative measures, erosion was addressed through the construction of 23 units of grey infrastructure using civil engineering measures. These included check dams and gully plugs for erosion control, built from various materials, like cemented stones, gabion or bamboo. By installing a series of these in gullies, the project was able to stabilize them and prevent them from further deterioration.

All measures were implemented with the local community, namely the farmers from the three villages in the NMC. To enable them to act effectively both throughout and post-project, the participating farmers were trained on several relevant topics, such as sustainable land management, construction of gully plugs, as well as additional skills that would enable them to diversify their income generation, such as apiculture, coffee and avocado cultivation and waste treatment. This way they do not need to rely on cash crop production alone. The training and workshops were held in each village and were well received by the local communities. All pieces of training were a combination of

theory and practice and were conducted by experienced trainers. As an incentive to apply the new skills, after the beekeeping training ten colonies of *Trigona laeviceps* (the stingless bee) were handed over to each village. The coffee workshops included training on cultivation, post-harvest processing and how to make different types of coffee drinks. After the avocado grafting training, the participants can reproduce avocado seedlings themselves and through learning grafting techniques plant productivity is expected to increase.

The analysis of data generated in Phase I already shows the advantages of using agroforestry (compared to tree monocultures or traditional agriculture) as it offers the best cost-benefit ratio to farmers. In this project phase, a policy brief on village-based participatory micro-watershed management addresses potential improvements in watershed management planning regulations, e.g. concerning the size definitions of managed areas and integration into village development programs. Moving forward, the NMC and its watershed management will function as a model for participatory watershed management in Indonesia. The methods for community participation and participatory intercropping designs are further shared through upcoming scientific papers and publications. The approach of agroforestry in combination with physical barriers, such as gully dams, will provide long-term erosion control and reduce the sediment load in rivers in downstream areas.



Supporting the rehabilitation of arid ecosystems and barren lands through agroforestry systems in Peru

A first demonstration project in South America

Project title: Rehabilitation of arid ecosystems and wastelands through agroforestry systems on the southern coast of Peru [Project ID: 2022P1-PER]

Supervisory agency: National Forest and Wildlife Service (SERFOR)

Executing agency: Costa Verde NGO

Implementing agency: Fundacion Para El Desarrollo Agrario (FDA)

Budget in USD (total/APFNet grant):
520,294.00 / 348,540.00

Duration: October 2022 to September 2024 (24 months)

Project sites: Chala, Camana and La Joya, Arequipa Department; Locumba, Moquegua Department, Peru



Barren and degraded landscape on the southern coast of Peru. Photo: COSTA VERDE

Peru is one of the most biodiverse economies on earth, invoking images of tropical rainforests. However, what is less known is that the economy is also home to many arid and semi-arid forests. In fact, in the southern region of Peru an arid coastal belt, which is one of the world's most ancient arid regions, is located. It is also considered one of the driest that can be easily degraded. Unfortunately, precisely this has been the case in the past decades due to unsustainable use, including illegal mining and crops, overgrazing, and shifting cultivation.

As such, despite abundant natural resources, out of the total of 128.5 million ha of land, amongst which 78 million ha are forests, there are more than 10 million hectares of degraded land in Peru. While most of this degraded land is located inland and only 0.6 million hectares at the coast, more than 60% of the economy's population lives in this region, making it a high priority for restoration efforts. Transforming these degraded lands into healthy and productive areas through the use of livelihood-

friendly systems, such as agroforestry, thus becomes imperative. A continuation of local degradation puts at risk whole ecosystems, species, and people's quality of life while increasing the pressure on nearby landscapes.

Additionally, Peru has made commitments to the 20x20 Initiative in 2014 to restore and rehabilitate a total of 3.2 million hectares of degraded land, comprising 2 million hectares for reforestation and 1.2 million hectares for rehabilitation in the coastal, Andean (highlands), and Amazon (rainforest) regions.

To address these issues and help Peru meet its commitments, in October 2022, APFNet launched its first demonstration project in South America, Peru, called "Rehabilitation of Arid Ecosystems and Barren Lands through Agroforestry Systems in the Southern Coast of Peru".

The project aims to develop agroforestry systems in degraded and barren lands to restore landscapes while improving the



Peruvian carob, as to be planted at the project site. Photo: Jorge Malleux/Costa Verde NGO

livelihoods of poor rural families and mitigating the negative effects of climate change in four provinces of Peru (Chala, Camana, La Joya and Locumba). Local communities in these provinces are lacking food, water, and energy, and are relying on loans. People make a living via grazing and agriculture. Specifically, alfalfa, rice, corn husk, onion, potato, dry grain beans, and prickly pear are locally popular crops. Thus, to rehabilitate the degraded ecosystems and improve the livelihood of its rural population, key project activities will be based on developing small-scale agroforestry production systems, relying on species that have proven effective for ecosystem services rehabilitation, as well as being adaptable to the extremely arid conditions on the sites. Additionally, the project aims to connect stakeholders and partners, like Costa Verde, SERFOR, the local government, and experts, all of which will contribute to reactivating local economies and promoting wellbeing across the communities involved. Specifically, this translates into the following 4 key outputs:

1. Establishment of 20 demonstration sites of 5 ha each (a total of 100 ha) for conservation, reforestation, and agroforestry in degraded lands

This project will not only focus on restoration and sustainability but also implement participatory management that will enable the communities to increase their resilience and adaptability in the context of climate change. Through the implementation of project activities, the project will establish 20 demonstration sites of 5 ha each to conduct conservation, reforestation, and

agroforestry in degraded lands on two different ecosystem types, loamy and barren lands. Local experts will be invited to obtain environmental and socioeconomic baselines at the demonstration sites, after which the Executing Agency Costa Verde will also directly interview and consult the participants and stakeholders regarding their interests in the design of the agroforestry plots while considering the ecological characteristics of the terrain, water supply, and soil type. To address the lack of water in the arid zone, the project is going to install drip irrigation systems and water catchment meshes to provide water and capture fog water. Five native species will be planted to restore the degraded land. All the experimental plots will be monitored by beneficiaries which are the small farmers who participate in the project, monthly, and biannually by project technical staff.

2. Design of a value chain from cultivation to final products ready for consumption

Once the demonstration models are in place, the project will plan production, harvesting and post-harvest processing for each model. All stakeholders will take part in workshops to learn how to restore degraded lands and generate additional, sustainable income during this period, but the greatest focus lies on the small farmers who will directly benefit from the initiative. Participants will also receive training in sales and marketing techniques. Before, during, and after the training activities, the project will develop technical manuals and guidelines to provide technical assistance in collaboration with and interaction with beneficiaries.



3. Establishment of a small experimental unit for adding value to the non-timber forest products (NTFPs)

Once the value chain is designed and adopted, the next stage is to add value to the products. For this, an experimental processing unit for processing NTFPs, such as seeds, fruits, and leaves that come from the demonstration plots, will be set up. All the participants must be informed of the specifics, capabilities, and operational features of this equipment to evaluate its effectiveness and practicality and collect data for future bigger plants. All beneficiaries will be able to utilize the processing unit as long as they do so by the volumes and timetables that have been specified in advance, especially for processing goods that come from the experimental trial.

4. Elaboration of a project proposal to scale up for the rehabilitation of degraded ecosystems and barren lands based on the models demonstrated in this project

Lessons learned from this project will be summarized in several knowledge products for the management of agroforestry systems in arid lands and the restoration of natural loams. Since the project focuses on the rehabilitation of arid or semi-dry ecosystems in the southern coastal region of Peru, a policy guideline on multifunctional rehabilitation based on the best practices made in the area will be developed as this project aims to introduce a new region-wide practice for the sustainable rehabilitation of the coastal region of Peru. If successful, the current barren lands may be transformed into green, lush mountains.



18-month-old pitahaya planted close to the project site. Photo: Jorge Malleux/Costa Verde NGO

To address these issues and help Peru meet its commitments, in October 2022, APFNet launched its first demonstration project in South America, Peru, called “Rehabilitation of Arid Ecosystems and Barren Lands through Agroforestry Systems in the Southern Coast of Peru”.

The project aims to develop agroforestry systems in degraded and barren lands to restore landscapes while improving the livelihoods of poor rural families and mitigating the negative effects of climate change in four provinces of Peru (Chala, Camana, La Joya and Locumba).



Community participation for restoration plantings. Photo: IRD.

Community forest management and rehabilitation in Cambodia

Project title: Integrated Forest Ecosystem Management Planning and Demonstration Project in Greater Mekong Sub-region (Cambodia) [Project ID: 2017P2-CAM]

Supervisory agency: Forestry Administration

Executing Agency: Institute of Forest and Wildlife Research and Development (IRD)

Budget in USD (total/APFNet grant): 1,792,663.60 / 1,515,465.60

Duration: June 2017 to June 2022 (60 months)

Project sites: Siem Reap and Takeo province, and Damrey Chak Thlork Community Forestry in Kampong Speu province, Cambodia

Each community forest needs to create its community forest management plan to properly manage the forest sustainably, protect land tenure, and enhance lives. However, much of Cambodia's forests did not get better using traditional techniques of planting trees. APFNet funded a project called "Integrated Forest Ecosystem Management Planning and Demonstration Project in Greater Mekong Sub-region" in Damrey Chak Thlork Community Forest, Kampong Speu province of Cambodia to improve the ecological and provisioning services of forests in Cambodia from 2017 to 2022, to contribute to sustainable forest management in Greater Mekong Sub-region. The project has strengthened community forest management by establishing forest restoration models, practicing agroforestry farming systems and home gardens, as well as and strengthening state-owned forest conservation.

Established forest restoration models

To improve sustainable forest management for the CF, a comprehensive management plan has been developed and implemented in the demonstration area. This plan combined modern techniques and traditional practices and provided an analysis of forest conditions and recommends specific actions to be taken to improve management in the future. In this project, a trial of 16 hectares for 3 restoration models and one silvicultural treatment was developed as follows:

- Restoration of a deforested (open) area: this area was divided

into four blocks (one hectare each) to grow high-value timber plantation using a total of 6,000 seedlings.

- Restoration of a severely degraded forest: this area was ideal for restoring it with a coppice system, where the community could collect firewood. For this, a single re-sprouting species was used.
- Restoration of a moderately degraded forest: this system was to be restored and transformed into a multi-story, high-value forest. For this, precious trees with straight trunks were maintained, while non-valuable trees were cleared out. Additionally, the NTFP pepper and other high-value rosewood tree species were planted.
- Silvicultural treatment of overly dense forests: the forests were treated with silvicultural measures, such as tending and thinning to reduce density and decrease shading. Then via enrichment planting timber species were introduced to speed up forest succession.



Practiced agroforestry farming systems and home gardens

In addition to a forest management plan and restoration models to improve forest ecosystems, increasing the livelihood alternatives available to local populations is a great method to lessen their reliance on the forest. Since farmers already engaged in farming and home gardening, agroforestry farming systems and home gardens were viewed as acceptable approaches to enhance local livelihoods; nevertheless, the main problem was identifying the most effective methods. Farmers were unable to utilize the land to its maximum potential due to only one kind of crop or tree on any given area of land. As a result, the project involved farmers who were interested and had land available, to adopt sustainable agriculture and agroforestry according to international best management practices. Agroforestry provided shade and a cooler environment to sensitive crops resulting in higher yields and increasing the resilience of agriculture to climate change. Therefore, a portion of the farms used multistory cropping to plant vegetables and other cash crops. The agroforestry model was established with plantations of cashew, macadamia, pomelo, sweet bamboo and bananas as upper-story crops and vegetables including eggplant, pumpkins, gourd, cucumber, and string beans as understory crops. A combination of crops like sorghum and elephant grass, lemongrass, moringa and mango has effectively prevented soil runoff. The understory grasses were used to reduce the impacts of raindrops on the soil surface.



Seeds for establishing the agroforestry farming system. Photo: IRD.

Home gardens were set up in open areas and degraded secondary forests within the areas of farmers' households. All agricultural inputs and skills on chemical-free farming were provided to the local community people, so they could produce their foods and savings from marketing. Unlike before when their production was only enough for home consumption, farmers now sell about half of the vegetables that they produced. The health care costs were also saved during this process because local households are healthier due to the improved food availability. The home gardens have improved and diversified the diets of the farmers by consuming more nutritious foods like vegetables. Both agroforestry and home garden practices have provided immediate income for the local community in the short term as well as in the long term in the Damrey Chakthlork Community Forest.

Strengthening forest conservation

In Cambodia, forests play important roles in many people's lives. With around 80

percent of the population living in rural areas, forests are a source of food, medicine and building products, and materials for small business ventures. Forests also have cultural and spiritual importance for many people. However, a significant area of Cambodia's forests is affected by population and socioeconomic growth, expansion of agriculture and residential areas, infrastructure development, illegal logging and unsustainable firewood collection. Therefore, a large number of employees are required to maintain proper supervision of forest resources. However, due to a lack of financial and human resources, this is not achievable. Modern technology can be used to get around these limitations. In this project, APFNet was funded to build the Forest Watcher System to conduct real-time forest monitoring for better forest management.

A typical illustration of a state-owned forest that is continually in danger of encroachment is the 4,368 ha Tamao Zoo Forest in Takeo province and the Khun Ream Forest Research Station in



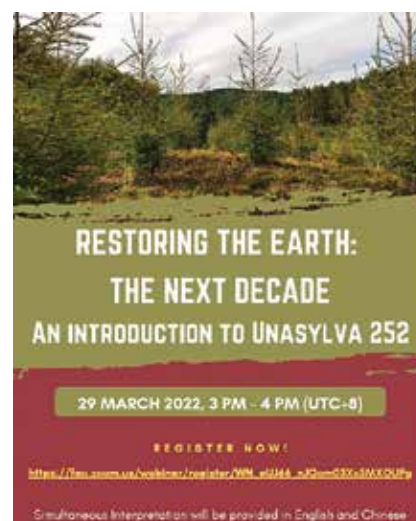
One of the reported forest fires by the Forest Watcher system in the Tamao Zoo Forest. Photo: IRD.

Siem Reap province. Consequently, they have been chosen as testing grounds for cutting-edge technology in the project. Two sets of the forest watcher system were established in these locations. The system itself is a dependable high-tech platform that tracks and can detect forest fires using cameras and infrared technologies. It could be left unattended to continually and in real-time monitor the surroundings all day. It is positioned on a tower and independently takes pictures of its surroundings in real-time. It has a target location precision of 100 meters and can cover a 15 km radius every 30 minutes. In addition to rapid picture identification, positional precision, all-weather monitoring, and real-time data transmission, it can “patrol” forests more quickly than a human-based patrol. As a result, the forest watcher system strengthened forest conservation in these two state-owned forests.

Launch webinar of “Restoring the Earth: The next decade” Unasylva 252 Chinese version

The webinar “Restoring the Earth: the next decade” Unasylva 252 Chinese version was held by APFNet, FAO, UNEP on 29 March 2022. More than one hundred participants from China and other economies joined in. This webinar presented some key topics of Unasylva 252 relevant to China and the opportunities associated with restoration and the UN Decade on Ecosystem Restoration 2021–2030. It emphasized the vibrancy of restoration efforts globally to understand better the challenges and opportunities showcased. The edition of Unasylva 252 in Chinese launched this webinar outlines a series of new restoration initiatives and programmes to increase funding, empower local stakeholders, and enhance technical assistance for forest and landscape restoration. It also presents

technical approaches, such as Assisted Natural Regeneration (ANR), to increase the adoption of forest and landscape restoration, and underlines the factors that underpin its implementation. The publication also outlines actions needed to realize the momentum of the upcoming UN Decade on Ecosystem Restoration (2021–2030) to upscale forest restoration across hundreds of millions of hectares. These include developing comprehensive business cases for governments and private-sector investors, new policies and legislation to support investments in restoration, and protocols for restoration tailored for specific landscapes. Effective monitoring at the global, landscape and project scales is also essential for keeping restoration on track.





Exploration and demonstration for future

Exploration and demonstration for future



The research team conducting the studies, including researchers from FOERDIA and UoM, during their first visit to the sites. Photo: Anna Finke

Improved science-based estimates on emissions from Peatland burning

Project title: Improving capacities towards reducing greenhouse gas emissions from peat swamp forest fires in Indonesia [Project ID: 2018P5-IND]

Supervisory agency: Ministry of Environment and Forestry

Executing agency: Forest Research and Development Center, Forestry and Environment Research Development and Innovation Agency (FOERDIA), Ministry of Environment and Forestry

Implementing agency: University of Melbourne, Australia

Budget in USD (total/APFNet grant): 498,170/199,990

Duration: January 2019–December 2021, extended to March 2022

Location: Kalimantan and Sumatra, Indonesia

Indonesia has the largest share of the global tropical peat forest carbon pool (estimated at 65 percent), yet it also experiences the most rapid degradation of peat swamp forests due to strong economic and social pressures for timber and land for agriculture. Clearance and drainage of peat swamp forests over recent decades have resulted in an unprecedented increase in peat fires. The degradation and burning of peatlands contribute to nearly 50% of the emissions from the land-use sector in Indonesia. Yet until recently, the calculations of these emissions were based on remained highly uncertain, preventing the Indonesian government from reporting emissions from peat fires to the UNFCCC under its international commitments to combat climate change.



Recognizing this issue, at the beginning of 2019, APFNet started the project “Improving capacities towards reducing greenhouse gas emissions from peat swamp forests in Indonesia”. The chief goal of this project is to provide the lacking empirical data on carbon emissions from peat fires and improved parameters to calculate those emissions from each part of the combusted landscape more accurately, together with some preliminary results on what the actual emissions likely are and trajectories in terms of how that would influence Indonesia’s emissions long-term.

To improve the accuracy of peat fire emissions estimation, experts started with a comprehensive literature review to determine the parameters that would be required to best calculate GHG emissions from burnt peat forests based on international guidelines. They found that there is a lack of data for parameters to estimate emissions from peat fires in literature, and the contribution of deadwood to peat fire emissions is not properly accounted for. Additionally, it is found that in traditional calculation methods, the pyrogenic carbon accounts for 12% of aboveground carbon (AGC) in repeatedly burnt peat forests yet it is excluded from the AGC balance and peat fire emissions. Because there were no standard operational procedures developed to address the research questions of peat fire emission, the project has developed a unique comprehensive sampling protocol to capture variability and challenges of measuring biomass in forests of contrasting stages of recovery after peat fires. The developed

sampling protocol has been translated into Indonesian and made as a pocket-size booklet for convenience and easier referral by the field crew.

The project team also kept working with the Government of Indonesia and has helped with the revision of the parameters used in GHG emissions estimates. Specifically, the project team revised the peat combustion factor (CF) that varies with the depth of peat burnt and pointed out that the current assumption of complete combustion of peat in fires is an oversimplification leading to greater uncertainties in the peat fire emissions estimates. It is estimated the CFs of peat (from 10 cm to 50 cm depth) can be 30-60% lower than the defaulted CF provided by the IPCC guideline, meaning that emissions resulting from peat itself maybe two to four times lower than the values calculated by the IPCC default CF. Other updated parameters included varying peat bulk density and peat carbon content with fire frequency and inclusion in fire estimates AGC.



Restoration models developed for different stages of forest degradation in Cambodia

Project title: Reconstruction and sustainable management of degraded forests based on the combination of interplanting nitrogen-fixating rare tree species and thinning [Project ID: 2018P4-CAF]

Executing Agency: Experimental Center of Tropical Forestry, Chinese Academy of Forestry (China)

Implementing Agency: Institute of Forest and Wildlife Research and Development (Cambodia)

Budget in USD (total/APFNet grant): 503, 000/378, 000

Duration: January 2019 to June 2022 (42 months)

Project sites: Bos Thom village, Khna Por commune, Soth Nikum, Siem Reap province, Cambodia

In previous projects, APFNet helped develop a variety of restoration approaches in Cambodia, using methods such as enrichment planting, agroforestry, assisted natural regeneration, and other silvicultural techniques. However, no restoration models had been developed to differentially address varying degradation stages in the same location.

This time, starting in 2018, APFNet explored this in the degraded forests of Bos Thom Community Forest (CF) in Siem Reap province. With technical support and experience provided by the Experimental Center of Tropical Forestry of the Chinese Academy of Forestry and the



Institute of Forest and Wildlife Research and Development of Cambodia, the project “Reconstruction and sustainable management of degraded forests based on the combination of interplanting nitrogen-fixating rare tree species and thinning” was completed in June 2022.

The project developed restoration models for different stages of degradation while using nitrogen-fixating, high-value tree species, such as *Dalbergia cochinchinensis* and *Senna siamea* to improve soil health. Additionally, principles from close-to-nature forest management, such as the removal of inferior trees and group-interplanting in forest gaps, were used. In the community forests, the approach has promoted a resilient uneven-aged mixed forest and has led to enhanced productivity, stand quality, stand stability, and ecological functioning of the forests, as well as accelerated forest succession and the provision of some timber through the thinning of non-target tree species.

Bos Thom Community Forest comprises 445 ha of degraded forest and is located 30 km outside of Siem Reap City in Khna Por commune, Soth Nikum district in northwestern Cambodia. Due to poor

management and monitoring, the forests have been overused, including the illegal cutting of valuable tree species and the harvesting of firewood. This resulted in large forest canopy gaps, reduced biodiversity, and soil erosion. The income of villagers in Bos Thom mainly relies on the sale of rice, beans, and cucumbers. However, the average annual income for one household is less than \$300, which indicates an extremely dire financial situation. In this project, APFNet combined lowering forest degradation through effective forest restoration and improving livelihoods for the forest community:

Interplanting targets local tree species with nitrogen-fixating tree species based on the degradation stage

In this project, the interplanting of target tree species with nitrogen-fixating tree species successfully increased the survival and number of target tree species, improved soil health and promoted natural succession in the forest ecosystem. The different forest restoration approaches in the demonstration area were selected based on different forest stand structures and degradation stages.



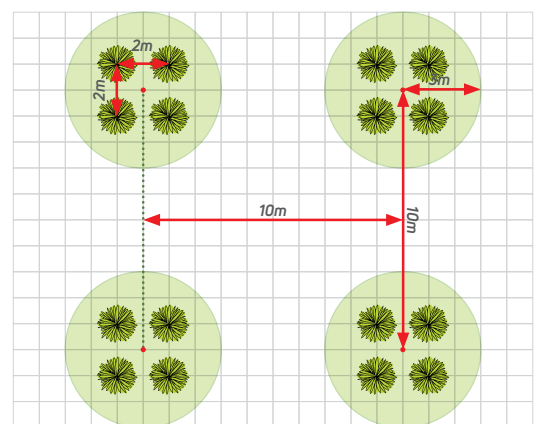
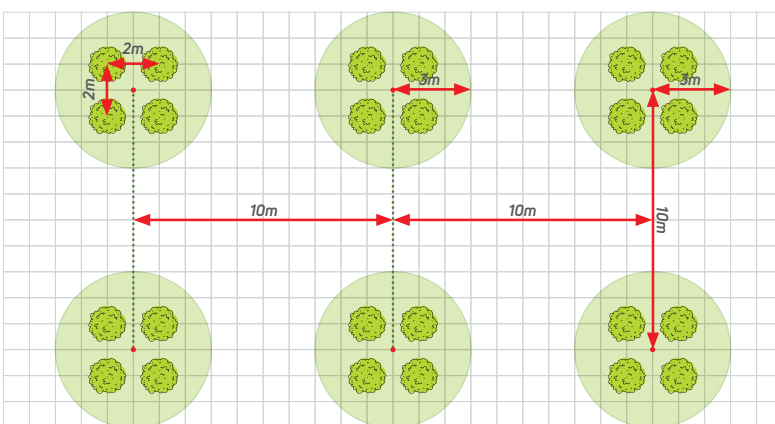
Site preparation (left) and new plantation (right) in severely degraded forests. Photo: IRD.

In the severely degraded forests, native and valuable nitrogen-fixing tree species, such as *Dalbergia cochinchinensis*, *Pterocarpus macrocarpus*, *Azelia xylocarpa*, and *Cassia siameca* were planted because these light-demanding species could make use of the copious light available, and their fast growth and high economic value will lead to a rapid improvement of forest structure and local livelihoods. Specifically, the double-row strip planting method was used, and some native vegetation was retained in the strip during afforestation. This afforestation

was completed in June 2019 with a total area of 5 ha. As a result, it could be seen that the formerly bare land was quickly restored by the planted trees, as well as shrubs and grasses. Forest ecosystem services were improved and the local community will benefit from the high-value timber in the future.

In moderately degraded forests, the same target tree species were planted, but only in the naturally occurring forest gaps. Forest gaps were on average 6 m in diameter and these gaps occurred

roughly every 10 meters. Before replanting, the vegetation in the forest gaps was cleared, and only trees with high value were retained. 4 saplings were planted in each forest gap. This restoration approach adjusted and improved the structure and composition of the former low-quality forests, resulting in a healthy forest ecosystem with multiple layers, including trees, shrubs, and grass. The degraded forest was gradually restored to a complex uneven-aged mixed forest, and now benefits from improved stand stability, quality and productivity.



Cluster planting mode in moderately degraded forests (L), Schematic diagram of the gap planting sites (R). Photo: ECTF.

In mildly degraded forests, dominant tree species, including *Peltophorum dasyrrhachis*, *Anisoptera costata*, *Pterocarpus macrocarpus*, and *Sindora Cochinchinensis*, with high economic values were selected as crop trees for cultivation. During this process, the existing structure of the forest was maintained, but the proportion of high-value tree species and natural resilience was increased through the adding of the above-mentioned species. Existing valuable trees were promoted and freed from competitors. This resulted in the thinning of some non-target tree species, and also influenced the direction of forest succession towards the climax community.

Reducing dependence on forests by improving local livelihoods

Successful forest restoration is not just defined by whether the forest itself is restored, but by whether additional economic benefits for local people, who are dependent on forest resources, are provided. Various activities have been conducted to provide benefits and generate income for the local community, such as the establishment of home gardens and the provision of alternative sources of energy to reduce the pressure on forests.

Normally, families in rural villages live in a wooden house on a small piece of land (less than 1ha and sometimes bigger for higher income families) on which several tree species, crops, and vegetables are growing. However, this setup can usually only cover the basic needs of a single household. Transforming these small patches into home gardens can enable families to make profits instead of only barely subsisting on

their land. The concept of home gardens is to combine various trees in multiple stories with crops and sometimes domestic animals around the homestead. This project interplanted fruit trees and palms that provided short-term income including banana, papaya, coconut, or cashew nut, and combined them with the existing plants. This has given local people both

an opportunity to improve the nutritional diversity of their food for daily consumption and enable them to sell to the local market. Each household generated USD 337 annually from vegetable cultivation. Additionally, to avoid cutting trees from natural forests, the project encouraged local people to plant trees for firewood around their houses.



Distributing tree seedlings to local farmers. Photo: IRD.

Furthermore, the installation of small-scale solar equipment provided adequate electricity to reduce overall expenses for the family by saving USD 57 annually on the electricity bill.



Solar systems are provided to farmers. Photo: IRD.

As a result, the combination of alternative sources of income, the availability of alternate firewood resources, and the general decrease in living costs reduced the pressure on the surrounding forests. The project significantly improved the local people’s livelihood by providing fruit trees, crops, solar energy, loans, and salaries for project-related labour to invest in farming, livestock, and extended business.

Multifunctional forestry planning and new integrated models for commercial and public welfare forests in Pu'er

Project title: Integrated Forest Ecosystem Management Planning and Demonstration Project in the Greater Mekong Subregion (Pu'er Project Site, P.R.China) [2016P1-GMS-PE]

Supervisory agency: Forestry and Grassland Bureau of Pu'er City

Executing agency: Wanzhangshan Forest Farm, Simao District, Pu'er City

Budget in USD (total / APFNet grant): 1,210,085.40 / 829,858.24

Project Duration: January 2017 to December 2021, 60 months, extended to April 2022

Project location: Wanzhangshan Forest Farm, Pu'er City, Yunnan Province, China

APFNet holds the idea that multifunctionality is deeply embedded in the nature of forests, and forests could and should be managed with multiple purposes as objectives in mind. Starting from 2011, APFNet has been demonstrating multifunctional forestry in different places (e.g. Cambodia, China), with site-specific multifunctional forest management (MFM) practices demonstrated. However, MFM could be applied on a relatively large scale, for example at a forest management unit level. Such is the case demonstrated in the "Integrated forest ecosystem management planning and demonstration project in the Greater Mekong Subregion (Pu'er Project Site)".

MULTIFUNCTIONAL FOREST MANAGEMENT PLAN FOR WANZHANGSHAN FOREST FARM (2020-2029)

万寨山林场多功能森林经营方案 (2020-2029)



Nanjing Jialin System Engineering Technology Co., LTD
南京加林系统信息技术有限公司

2019.11

The Multifunctional Forest Management Plan for WZSFF (2020-2029)

This project was one among a total of five focusing on integrated forest ecosystem management in the Greater Mekong Subregion that was funded by APFNet. It was launched in 2017 and aimed to integrate strategic multifunctional forestry planning with on-site demonstrations of best practices for the sustainable management of commercial and public welfare forests in China. As such, this project, which ran from 2017 to 2022, was located on Wanzhangshan Forest Farm (WZSFF) in Pu'er, Yunnan Province, a subtropical area that is not only ideal for demonstrating best practices for China but also due to its location in the South of China for the entire Greater Mekong Subregion.

Developing a multifunctional forest management plan

As forestry planning is the first step to realizing sustainable forest management, the project started with developing a medium-term (2017-2036) Master Plan of Integrated Forest Ecosystem Management and a more specific short-term (2020-2029) Multifunctional Forest Management Plan (MFMP) for WZSFF. Based on the forest inventory at the forest farm in this project, these plans outlined the management of the farm's forests to both maximize the sustainable productivity of commercial forests and improve forest ecosystem services provided by public welfare forests. Based on the current forest condition combined with forest management objectives, the MFMP sub-divided the forests area of WZSFF into six different forest management zones 1) a Timber Production Zone; 2) an Ecological Use Zone; 3) a Nature Reserve Zone; 4) an Arboretum Zone; 5) a

Recreation and Urban Forestry Zone; and 6) a Research and Demonstration Zone.

The MFMP gives guidance for all types of forests at WZSFF based on management objectives for the entire forest life cycle.

The associated forest management and silviculture practices are selected based on the forest management zone, the forest type, and stand age. It is estimated that with 10 years of MFM, the stocking

volume of the forests at WZSFF could increase from 1.87 million m³ to 2.16 million m³ with unit stocking volume reaching 150 m³/hm².



Workers conducting thinning in a *Betula alnoides* plantation (Photo: WZSFF)



Before (L) and after[®] the target tree thinning of young *Pinus kesiya* commercial plantation

Optimizing the forest management practices

Pinus kesiya and *Betula alnoides* are two common local species at WZSFF. However, due to the lack of effective silvicultural practices, the stocking volume and timber productivity of both species are far from satisfying, nevertheless, even the natural secondary forests of these two species also display these issues.

To solve this, different demonstration plots were established to showcase best practices for managing both commercial and public welfare forests of these two species. This was an important distinction, as these are the two key administrative forest types in China, each of which has its purposes and management restrictions. Specifically, the models for each forest governance type were shown for *Pinus kesiya* and *Betula alnoides*, for different age groups. This included methods for intensive thinning, large-diameter tree cultivation of commercial plantations to maximum the land productivity and profitability, as well as the integrated management of public welfare forests to maintain and improve the ecological functions, protect biodiversity, provide forest ecosystem services for public welfare and meet the needs for the sustainable development of human society.



Before (L) and after [®] the thinning and enrichment planting treatment of *Pinus kesiya* public welfare forest

In addition, how to treat natural secondary forests and how to integrate understory planting of epiphytes were also demonstrated in the public welfare forests.

As resin tapping from *Pinus kesiya* can be an important opportunity to increase the profitability of pine forests, also, these trees are often commercially tapped for resin before the harvest of the tree

for timber. This process can be done sustainably for years if tapped correctly, unfortunately in practice, due to a lack of knowledge of proper techniques, as well as in pursuit of short-term benefits, resin tapping is done excessively in some resin production areas of Pu'er. Therefore, the APFNet project established a sustainable resin production demonstration site in a *Pinus kesiya* plantation, not only to demonstrate the silvicultural techniques

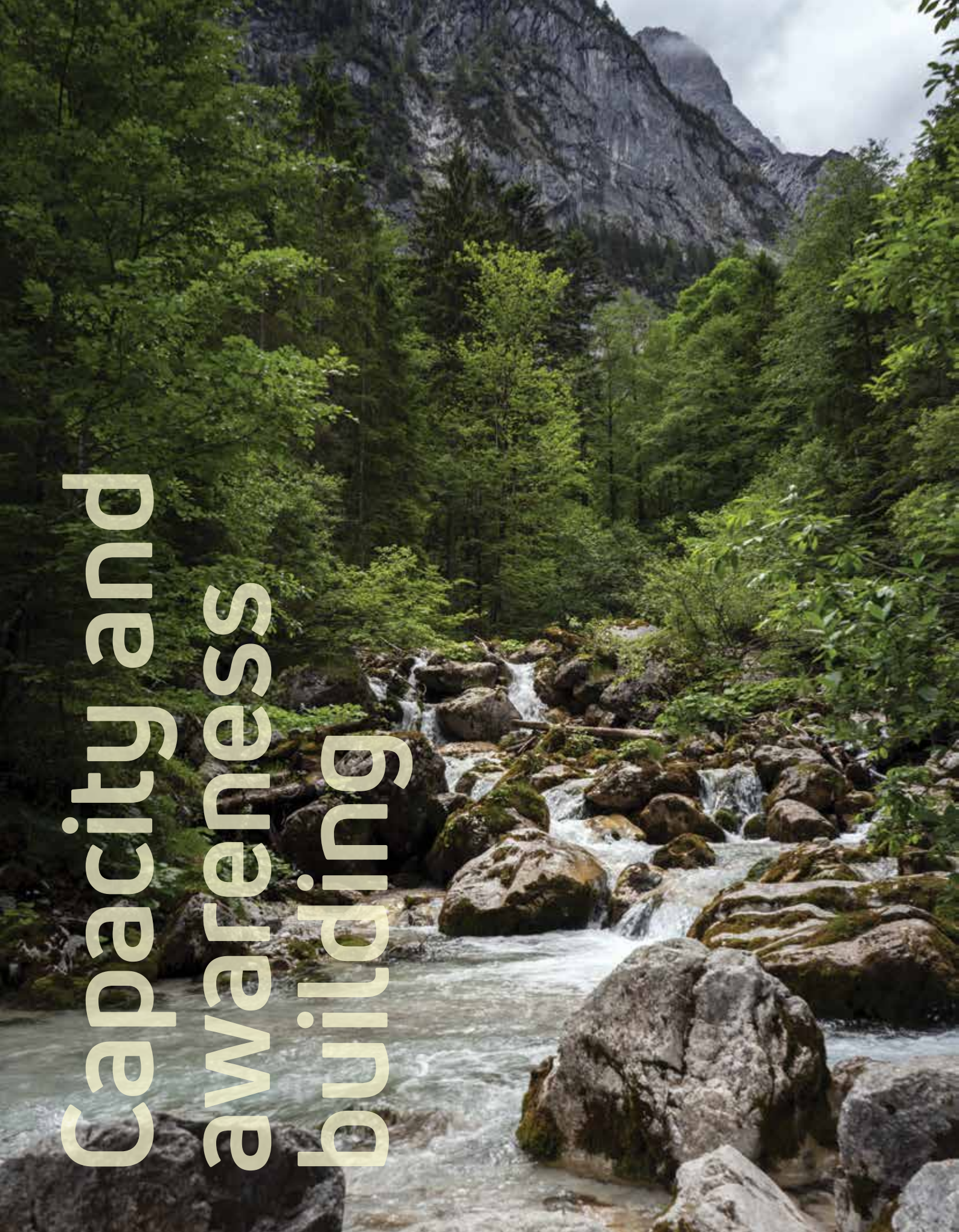
for managing resin production plantations but also to showcase effective resin tapping techniques in terms of collection method, collection volume, and collection intensity.

The project was part of a whole series of integrated forest ecosystem management planning and demonstration APFNet projects, all of which are aiming to demonstrate how such forestry practices can be realized in the greater Mekong Subregion. Additionally, the project was located in areas belonging to APFNet's newest integrated training base, the APFNet Pu'er Sustainable Forest Management Demonstration and Training Base, which was formally opened in July 2021 and now serves as a training and forest experience base for practitioners involved in tropical and subtropical forest management. The demonstration sites of the project will provide important learning sites for pieces of training and workshops.



The *Pinus kesiya* resin tapping plantation (Photo: WZSFF)

Capacity and awareness building



Capacity and awareness building



A new rule, which requires students to submit an HSK3 (Hanyu Shuiping Kaoshi, a Chinese language proficiency test) certificate as one of the graduation requirements, was implemented for the first time during the academic year 2021-2022 at Nanjing Forestry University. HSK3 level equates to the ability to conduct basic communication in daily life, study, and work in Chinese. Ms Pham Thi Trang from Viet Nam said: "Since the entire ASP is conducted in English, the requirement for passing HSK3 may add some difficulties for students, especially during this pandemic period. However, this is also a great opportunity for us to learn a fascinating new language and help us to complete our study and understand better its thriving culture and modern development."

Six APFNet scholarship students (ASP) graduated

Despite the global COVID-19 pandemic during the 2021-2022 academic year, APFNet students' thirst for knowledge was unabated. Overall, six students from Bangladesh, Laos, Myanmar, Indonesia, and Viet Nam completed their studies and obtained master's degrees in 2022 from Nanjing Forestry University and Beijing Forestry University. This event represents a significant professional achievement for each graduate, who will be in a position to make greater contributions to sustainable forest management in their economies respectively based on the knowledge they obtained during their studies.

All graduates expressed their deepest gratitude to APFNet and their host universities for providing them with the amazing opportunity to enhance their professional knowledge and skills through the ASP. APFNet believes that ASP is a beneficial opportunity that helps develop skilled human resources for long-term sustainable forest management and forest restoration in APFNet member economies.

Story about professor's continued support to the students

All the ASP students took online classes and got guidance from their professors for their papers through emails or virtual meetings. What kind of difficulties did they meet during this communication? How did the students and teachers handle these difficulties? Here we followed up on an ASP story from Nanjing Forestry University (NFU).

Mi Mi Ko from Myanmar and Pham Thi Trang from Vietnam was admitted in 2020 majoring in forestry. They were not able to come back to China due to the COVID-19 epidemic. During the first year of theoretical coursework, their supervisor Professor Jiang often communicated with the two students regarding their

learning situations and urged them to conduct literature reviews and research. This process takes time and both sides had to be patient during the frequent communication.

At the stage of topic selection, Professor Jiang suggested them to carry out their research locally because they couldn't visit China in the short term. After many discussions online and subsequent revisions, Mi Mi Ko chose the teak forests in Singu Town, Mandalay Province, Myanmar, as a case study to carry out her research on the carbon sequestration potential of teak commercial forests, while Pham Thi Trang chose to study the relationship between forest structure and

timber volume in Bat Xat Natural Reserve, Vietnam.

After determining the topics, Professor Jiang provided several relevant papers for these two students to read and study intensively. Professor Jiang continued to support them through regular online discussions, questions and answers sessions and helped them design a detailed field sampling plan. However, due to the pandemic restrictions, they were also limited in doing the local experiments and learning data analysis methods while waiting. Fortunately, they all completed the field research work in time with the help of their local forestry departments and graduated successfully in 2022.

New platforms to discuss and practice forestry education issues through online activities

Impacted by the COVID-19 pandemic, The Asia Pacific Forestry Education Coordination Mechanism (APFECM) activities were all conducted online in 2022. Collaborated with UBC Forestry's Asia-Pacific Young Scientists Association (AYSA), the "Weekly Online Teaching/Learning Lecture Series" and "Three minutes thesis competition" have been launched for members of APFECM around the Asia-Pacific region as well as other young foresters and researchers in the region.

From the "Weekly Online Teaching/Learning Lecture Series", some renowned experts in the region shared their insights about the educational techniques, pedagogical strategies, and valuable experiences for coping with the COVID-19 pandemic. About 1000

participants were attracted and joined this series of lectures. The finals of the "Three minutes thesis competition" were conducted in November 2022. Nine students from a group of 18 undergraduate and graduate students from 12 Asia-Pacific universities who completed in the semi-finals have competed for the top prizes. The nine competitors were provided high prizes and certifications.

These online events provided fantastic opportunities for learning and practice forestry knowledge for participants. During the activities, participants learned online teaching and learning experiences during the pandemic. These events also provided a platform to discuss the challenges, opportunities as well as solutions in forestry education under the new normal.

Experiences sharing by ASP Alumni network

During 2022, the ASP Alumni network has been continuously expanding and with a quarterly newsletter on their social platforms current students and graduates, all get the latest information about their professional experiences.

During the International Day for Biological Diversity in May 2022 some of the ASP graduates had a conversation on Biodiversity conservation and shared their views and experiences both in their professional careers and personal life.





1. "With biodiversity and habitat conservation, we can create a shared future for all global organisms. The world equally belongs to all the creatures that nature created; and being the most intellectual of all species, humans are responsible for other species' existence."

Manjit Bista, ASP Master student in Nanjing Forestry University, batch 2018. Now he is a park ranger at the Department of National Parks and Wildlife Conservation (DNPWC) under the Government of Nepal. He shared that Bardiya National Park of Nepal has won TX2 Award for doubling their tiger populations since 2010, in collaboration with India's Sathyamangalam Tiger Reserve. This is a remarkable success for biodiversity conservation in Nepal and the world.



2. "Tree planting is a very urgent initiative for the environmentalists and foresters"

Fayzمامad Davlatbekov, ASP Master student (batch 2017) and Ph. D student (batch 2020) in Northwest Agriculture and Forest University. He is a senior analyst of climate change coordination at Aga Khan Agency, Tajikistan. During the global pandemic, he has done several activities such as organizing a preparation event for the Tajikistan team for the COP26 conference, launching environmental and climate change clubs in 13 schools of Khorog city, and organizing tree planting activities across the region.



Fayzمامad (the first one on the left) in one of the trees planting campaigns, Photo: Fayzمامad Davlatbekov



3. “I believe that in forest management and conservation, it is essential to make sure all law enforcement is strictly implemented. This will ensure the protection of wildlife and their habitats. Stronger knowledge of forestry management from the scholarship brought to greater impact on my profession. This is involving school and experience sharing with students from other economies.”

o Mang Tukla, ASP Master student in Beijing Forestry University, batch 2015. Now he is the manager of the Surveillance and Intelligence Reporting Unit of Rising Phoenix Co., Ltd, Cambodia and working in the field of forest and wildlife protection. This includes law enforcement through regular patrolling and technical inputs in partnership with the Ministry of Environment, Cambodia to ensure the protection of forests and wildlife, allowing sustainable benefits for local communities.

4. “It is urgent to raise public awareness and involve rehabilitation activities under the Re-establishing Natural Habitat Programme (RNH)”

o Nay Yu, ASP Master student in Nanjing Forestry University, batch 2019. He is now working in the Ministry of Natural resources and Environmental Conservation, Myanmar and the Forest Department launched the Re-establishing Natural Habitat Programme (RNH) (2019-2029), to achieve the objectives of protecting ecosystems and biodiversity, and fulfilling the commitments of international conventions and programs such as Convention of Biological Diversity (CBD) and Paris Agreement and Sustainable Development Goals (SDG). Nay Yu has been a programmer of assessment, monitoring and evaluation since 2021 in RNH and she said that her team started a bird survey for diverse bird species and habitat types.

APFNet initiative called on teenagers to be an ambassador of ecological civilization

Ecological civilization as a new development paradigm has been practiced in China and showed great potential in promoting equality, sustainable development, and harmonious co-existence between human and nature. On the occasion of the China National Botanical Garden inauguration on April 18, 2022, an initiative of “Focus on Forests, Build a Green Homeland Together” was issued by APFNet, Chinese Society of Forestry, General School of Natural Education in China and Hainan Nature Foundation. This initiative called on boys and girls to go into forests, cultivate a love for nature, practice a green lifestyle, and strive to be an ambassador of ecological civilization. APFNet will jointly carry out forest-related science popularization and nature education to promote the harmonious coexistence between human and nature with partners.

Publications

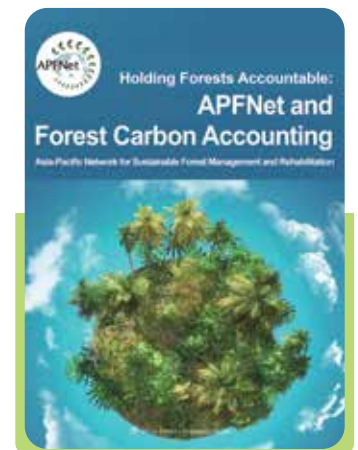
Achieving the APEC 2020 forest cover goal: A synthesis of economy reports

Echoing the theme of APEC 2019, "Connecting People and Building the Future", APFNet conducted the completion assessment in collaboration with the FAO from 2020 to 2021. The assessment was approved by the APEC Steering Committee for Economic and Technical Cooperation in November 2019 and incorporated information provided by participating economies and the FAO Global Forest Resources Assessment 2020. The assessment reported that forest area in the APEC region increased by 27.9 million ha between 2007 and 2020, and APEC economies implemented a diverse range of measures that contributed to the achievement of the 2020 Forest Cover Goal. Conversely, forest area declined in ten economies in the region and the key direct and indirect drivers of deforestation and forest degradation were identified. APFNet produced videos in Chinese and English presenting the forest cover change, drivers of change and actions taken by APEC economies in 2007–2020 and recommendations for economies to expand further forest area, which were the outcomes from the assessment of the APEC 2020 Forest Cover Goal.



Holding forest accountable: apfnet and forest carbon accounting - a new milestone publication

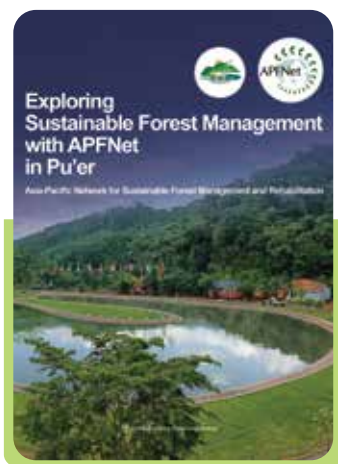
Recognizing the regional need for further support on forest carbon accounting, this book gives a comprehensive introduction to APFNet's carbon-related projects. Ultimately, the aim is to leave the readers with new insights into carbon accounting and a good understanding of APFNet's involvement in this area of work. The book covers mechanisms of international reporting on forest carbon, methodologies with which carbon can be measured, and then introduces methodologies that were tried and demonstrated in APFNet's various projects. So far, APFNet has launched five different projects regarding this topic. These projects, situated in different locations in China, the Greater-Mekong Subregion (GMS), and Southeast Asia, measure carbon stocks and/or emissions through ground measurements or aerial images, selecting the most effective and efficient measures that apply to the respective economy and site conditions. As such, readers will be able to gain deep insights into different ways of measuring or accounting for carbon. Ultimately, knowledge broadens possibilities for action. As such, APFNet hopes to enable more carbon-related action ultimately able to address and mitigate climate change through this publication, which summarizes more than a decade of carbon-related learning.





Study and analysis of forest management and forestry development in the Asia-Pacific Region

Sustainable forest management and the development of forestry are playing an important role in social sustainability, especially in livelihood and community development, poverty alleviation, and biodiversity conservation. There are huge gaps in forestry management and development among many developing economies in the Asia-Pacific region. It is very important to realize the gaps and share good practices for those economies. In this sense, APFNet Kunming centre, funded and supported by APFNet, has carried out the literature review and analyzed the development of forestry at the economy-level since 2017, especially focusing on forest laws forestry policies and regulations, forestry strategic planning, forest resources and industries, forestry governance, research and education system. There were 27 economies from the Asia-Pacific area selected, including 21 member economies in the Asia-Pacific region. The book titled “Study and Analysis of Forest Management and Forestry Development in Asia-Pacific Region” has been published in Chinese recently and welcomed by forest officers and researchers in China.



Exploring sustainable forest management with APFNet in Pu'er

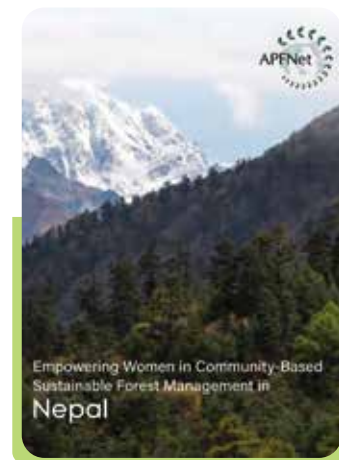
To promote SFM in an integrated manner that combines theory with practice, APFNet established the APFNet Pu'er Sustainable Forest Management Demonstration and Training Base in Pu'er, Yunnan Province, which provides key facilities for forestry training, capacity building, conferences, forest experience, environmental education and much more. At this site, a wide variety of demonstration projects on SFM, integrated forest ecosystem management, agroforestry, and forest fire monitoring were also supported by APFNet. The book entitled ‘Exploring Sustainable Forest Management with APFNet in Pu'er’ has been produced to describe in detail all APFNet activities conducted in Pu'er and give the reader a comprehensive understanding of the knowledge that has been gained so far.

The book first introduces the forestry in China at large and the region of Yunnan, where Pu'er is located, its connection to the Greater Mekong Subregion (GMS), and APFNet's work in the GMS. This includes a look at the short- and long-term forest management plans developed under the project, as well as the demonstration activities that aimed to compare and contrast different forest management models, such as intensive management practices of commercial plantations and management practices for public welfare forests to improve their ecosystem functions, understory planting of epiphytes and different sustainable resin tapping techniques. This report will not only give readers a comprehensive understanding of APFNet's work in Pu'er but also show how an integrated demonstration site can be designed. We wish for the knowledge provided in this book to inspire improved forestry practices among practitioners and policymakers in the Asia-Pacific region.



Empowering women in community-based sustainable forest management in Nepal


In cooperation with three women-led NGOs and supervised by the Nepalese Ministry of Forest and Soil Conservation, APFNet successfully implemented a three-year (2014-2018) demonstration project on sustainable forest management in Kathmandu, Makwanpur and Sarlahi, Nepal. The special approach of this project was the focus on developing new income sources for those who are most dependent on community forests, namely women and poor households. Through providing pieces of training for women, they were empowered to start mini-enterprises for eco-tourism as well as handicraft and essential oil production; at the same time, capitalizing on the existing concept of Community Forest User Groups (CFUG), forest management pieces training was conducted and good governance mechanism within the CFUG were strengthened. All these measures contributed to the sustainable management of 13 community forests, covering 1375 ha in total. Recently, this APFNet project was summarized in a report for forestry professionals, practitioners and the interested public to share both this success story as well as lessons learnt from sustainable forest management practice.



Thematic paper on forests for the resilience of the Pacific Islands in climate change finalized

APFNet started drafting the thematic paper titled “Increasing the resilience of people and landscapes in Pacific Small Island Developing States – the role of forests and trees in the context of climate change” for the FAO Pacific Forest Sector Outlook Study in 2021. In June 2022, the draft was revised based on suggestions from the FAO reviewers and editor and was finalized in July. The paper summarizes the climate projections for the Pacific Small Island Developing States (Pacific SIDS) from the latest IPCC reports and literature, potential impacts on forests and people and the roles forests have played and will play in climate change adaptation and mitigation. It also proposes three possible scenarios for the future, lists recent regional programmes and interventions and puts forward recommendations for the forest sector to improve the resilience of people and forests in the region.





Sharing of national park laws to boost the establishment of a national park administrative system in China

National parks play an important role in natural heritage, such as stunning landscapes, extraordinary wildlife and majestic forests. Therefore APFNet has paid attention to the development of the parks and funded the research of the national parks since 2018. A book titled “A Review of National Park Systems: Lessons Learned in National Park Development in North America and Oceania” was published in Chinese and English in 2020 and 2021 respectively. China has been developing the administrative system of the national parks since 2013. One of the key tasks is the development of laws, policies and regulations related to the national park and abundant resources have been mobilized for it. APFNet has been dedicated to playing a constructive role in this process. APFNet launched a project: translation of ten national park laws developed by eight economies into Chinese. They are the Yellowstone National Park Protection Act 1872 (USA), National Park Service and Related Programs (USA), National Park Service Centennial Act (USA), National Parks Act (Canada), National Parks Act 2000 (Scotland), National Parks Act 1980 (New Zealand), National Parks and Wildlife Act 1972 (South Australia), National Park Act (Japan), The Statutes of the Republic of Singapore Parks and Trees Act (Singapore), National Park Act (Thailand). These are very important knowledge, experience and reference materials for forest administrative agencies, researchers and other stakeholders in China.



Partnerships

Active engagement with APFNet members and partners in 2022

APFNet diligently continues its close collaboration with all members, Board of Directors, and observers in 2022 by inviting them to attend the annual Council & Board Meeting and relevant events, submit and share the APFNet updates regularly, and conduct the ongoing MoU and two MoUs' renewal including MoU's with RECOFTC and CIFOR.

APFNet also actively participated in about 10 virtual or hybrid meetings and workshops for ensuring smooth communication with other partners and stakeholders during the COVID time. These events include the 29th Session of the

Asia-Pacific Forestry Commission, Post COP26 Synthesis of Key Outcomes for Land Use Sector in Asia-Pacific, International Day of Forests 2022, Forestry Education in the New Normal: Challenges, Opportunities and Solutions, FLR Days advancing Forest and Landscape Restoration in Asia and partners annual meeting from IUFRO and ITTO. APFNet provided the necessary support, conveyed APFNet priorities as well as explored potential collaboration opportunities and partners for the near future during these activities.

Appreciation to the partners

Beijing Forestry University

Chaoyang Forestry and Ecological Conservation Association, China

Costa Verde, Chile

Experimental Center of Tropical Forestry, Chinese Academy of Forestry

Faculty of Forestry, University of British Columbia, Canada

FAO

Forest Inventory and Planning Institute (FIPI), Vietnam

Forest Research Institute of Myanmar

Hainan Nature Foundation (HANAF), China

Institute of Forest and Wildlife Research and Development (IRD), Cambodia

Institute of Forest Resource Information Techniques, Chinese Academy of Forestry

Jian Feng Test Station, Research Institute of Tropical Forestry

Ministry of Agricultural and Forestry (MAF), Lao PDR

Nanjing Forestry University

National Forestry and Grassland Administration (China)

Sanyijing Forest Farm, China

Wangyedian Forest Farm, China

Wanzhangshan Forest Farm, China

Watershed Management Technology Center (WMTC), Indonesia

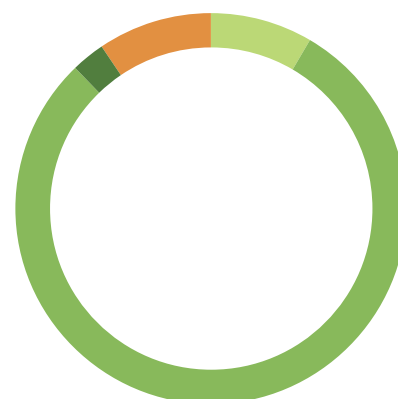
Yunnan Academy of Forestry and Grassland, China

Financial information

ITEMS	USD	
	2021	2022
1. INCOME		
Donation	4,527,055.85	3,869,998.17
Other Income (interest)	5,420.02	4,648.83
Total income	4,532,475.87	3,874,647.00
2. EXPENSES		
(1) Program expenses	3,069,674.87	1,708,538.46
(2) Management expenses	2,111,717.20	2,097,261.29
(3) Finance expenses	(19,143.17)	79,962.65
Total income	5,162,248.90	3,885,762.40
SURPLUS (DEFICIT) FOR THE YEAR	(629,773.03)	(11,115.40)

EXPENSES BY SUBREGION (USD)	2021	2022
Greater Central Asia	1,296,138.80	595,844.81
The Greater Mekong Sub-region (GMS)	1,131,291.25	528,584.85
Southeast Asia (except GMS)	119,458.99	35,625.00
South Asia	24,820.06	682.60
Pacific Islands	0.00	4,818.90
North America	67,750.93	78,854.30
Latin America	0.00	50,581.29
Others	430,214.84	413,546.71
Total	3,069,674.87	1,708,538.46

EXPENSES BY 4 KEY PILLARS (USD)	2021	2022
Capacity building	131,069.63	144,414.89
Demonstration projects	2,514,414.66	1,356,677.51
Regional policy dialogues	119,635.41	47,130.43
Communication and information sharing	304,555.17	160,315.63
Total	3,069,674.87	1,708,538.46




Abbreviations and acronyms

APEC	Asia-Pacific Economic Cooperation	ITTO	International Tropical Timber Organization
AP-FECM	Asia-Pacific Forestry Education Coordination Mechanism	IUCN	International Union for Conservation of Nature
APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation	IUFRO	Interconnecting Forests, Science and People
AGC	Above ground carbon	MFMP	Multifunctional Forest Management Plan
ASEAN	Association of South East Asian Nations	NFU	Nanjing Forestry University
ASP	APFNet Scholarship Program	NWAFU	Northwest Agriculture and Forestry University
AUAO	APFNet-UBC Americas Office	NGO	Non-governmental Organization
BFU	Beijing Forestry University	NMC	Naruan Micro Catchment
CF	Community Forest	NTFP	Non-timber Forest Products
CFUG	Community Forest User Groups	RECOFTC	The Center for People and Forests
CIFOR	The Center for International Forestry Research	REDD	Reducing Emissions from Deforestation and Forest Degradation
CNY	Chinese Yuan	SANFRI	Sino-ASEAN Network of Forestry Research Institutes
CONAF	The National Forest Corporation of Chile	SERFOR	National Forest and Wild Fauna Service
COP26	26th UN Climate Change Conference of the Parties	SFM	Sustainable forest management
FPN	Forest Planning Network	SIDS	Small Island Developing States
FRIM	Forest Research Institute of Malaysia	RNH	Natural Habitat Programme
GCA	Greater Central Asia	TNC	The Nature Conservancy
GDP	Gross Domestic Product	UBC	University of British Columbia
GHG	Greenhouse gas	UN	United Nations
GNSFM	Global Network for Sustainable Forest Management	UNEP	UN Environment Programme
GMS	Greater Mekong Subregion	UNFCCC	United Nations Framework Convention on Climate Change
FAO	Food and Agriculture Organization	USD	United States dollar(s)
IRD	Institute of Forest and Wildlife Research and Development	VAFS	The Vietnamese Academy of Forest Sciences
IPCC	Intergovernmental Panel on Climate Change	WMTC	Watershed Management Technology Center
		WZSFF	Wangzhanshan Forest Farm



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