

APFNet Annual Report 2021

Asia-Pacific Network for Sustainable
Forest Management and Rehabilitation

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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 sustainable forest management 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





 **Projects**

4
Launched

5
Completed

19
Active

USD **2.1** million distributed

 **Scholarships**

11 graduated

136 graduated students since 2010
190 awardees since 2010

 **Online**  **Offline Training**
160 Trainees

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Lu De

APFNet Executive Director

While facing lots of uncertainties and challenges during the pandemic, we were also able to see lots of certainties and opportunities in 2021. World leaders agreed to strengthen the shared efforts to conserve forests and join forces in a sustainable land use transition during the 26th Conference of Parties (COP26) of the United Nations Framework Convention on Climate Change Conference (UNFCCC) held in Glasgow, United Kingdom. With the theme “Ecological Civilization: Building a Shared Future for All Life on Earth”, the 15th Conference of the Parties (COP 15) of the Convention on Biological Diversity (CBD) was held in Kunming, China and expanded more consensus on the post-2020 global biodiversity framework. Leaders, businesses, and individuals have recognized and accepted the climate change impacts, and it has become clear that the world needs to be more united to achieve these shared goals.

Despite the challenges, APFNet achieved most objectives with support from partners worldwide. APFNet adjusted some activities timely due to ongoing lockdowns and international travel restrictions and adapted to the new normal with online meetings, discussions and email conversations about project progress and reports while managing the time differences and work schedules. APFNet also explored cooperation areas and forms to promote forest rehabilitation and sustainable forest management in the Post-COVID-19 with partners.

APFNet Strategic Plan 2021-2025 was developed and circulated to the Board members and Council Representatives for their valuable input and implementation approval. In the strategic plan, APFNet will maximize the organizational potential to galvanize practical actions on the ground to support the efforts of member economies and organizations to achieve our common goals. Priorities focus on forest restoration, reducing forest degradation, and enhancing ecosystem functions. In addition, the Action Plan for Greater Central Asia Forestry Cooperation Mechanism (2021-2030) was reviewed and supported by member economies and partners.

Still, the ongoing COVID-19 pandemic did not stop the APFNet Scholarship Program (ASP) students from earning their respective academic degrees. In 2021, 11 students from the five economies successfully obtained their master’s degrees from four host universities. As our ASP

Alumni members grow, the network bridges alumni and students through newsletter dissemination, an online portal and social media outreach.

In recent years APFNet has put a great effort to establish the infrastructure necessary to provide comprehensive capacity building and share experiences for all types of forests in the Asia-Pacific region. APFNet launched Multifunctional Forest Management Demonstration and Experience Base in Wangyedian Forest Farm in 2019, located in Inner Mongolia, China. The ecosystems it represented ranged from temperate to boreal forests. The Pu'er Sustainable Forest Management Demonstration and Training Base, located in Yunnan, China, was launched in July 2021, showcasing best practices in sustainable forest management in tropical and subtropical areas.

Many economies, including China, have already promised to achieve the carbon-neutrality targets to combat climate change. Forests can play an essential role in achieving these targets through long-term carbon storage in plant biomass and forest soils. In this context, APFNet established an expert group and selected two forest farms in China to estimate the current forest carbon storage and forecast the carbon carrying capacities in the future. The first report of carbon sink potential at the state-owned forest farm level, Carbon Sink Potential of Wanzhangshan Forest Farm Report, was completed and issued by APFNet. Carbon neutralization and forest carbon sequestration measurement training were organized to improve the capacity of local forestry staff in China.

The Asia-Pacific Economic Cooperation (APEC) economies had a total net forest cover gain of 27.9 million ha in 2007–2020, exceeding the target, according to a concluded assessment led by APFNet in collaboration with the Food and Agriculture Organization of the United Nations (FAO). It was also welcomed by the APEC Ministers' statement issued in November 2021. Eighteen APEC economies have endorsed the Glasgow Leader's Declaration on Forests and Land Use announced at the COP26 of UNFCCC and commit to halting and reversing deforestation and land degradation by 2030. Learning from the experience of achieving the APEC 2020 Forest Cover Goal and China's expertise shared in the APFNet e-poster session at the International Union for Conservation of Nature (IUCN) World Conservation Congress, a range of recommendations were provided for economies to consider further increasing forest cover and improving forest management.

APFNet will keep strengthening actions and activities by expanding its institutional potential and standing as a stable network for sustainable forest management and rehabilitation in the Asia-Pacific region. Once again, I take this opportunity to send greetings to our members, Council representatives, Board directors, partners, and others who have been part of the APFNet. At the same time, I want to urge each reading person to contribute to our shared goals for the shared future for all life on earth.

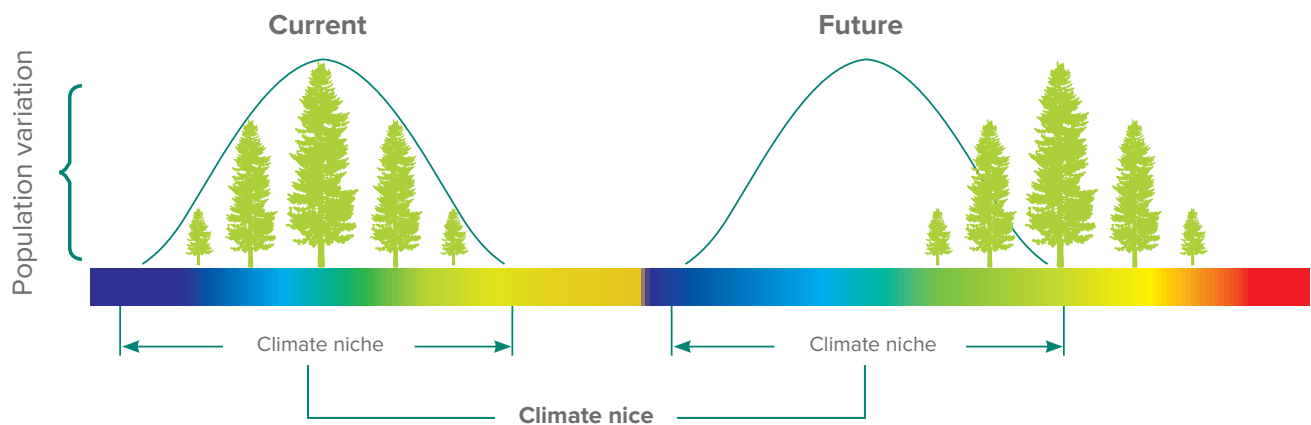




**CHANGE OF ENVIRONMENTAL
CONDITION - TRANSFORMING
CHALLENGES INTO
OPPORTUNITIES**

Strategies and Approaches for Sustainable Forest Management: Developing and Promoting the Compilation of Modeling Tools for Forestry under a Changing Climate

Climate change is now widely acknowledged as a significant problem caused primarily by human activity. More frequent droughts and windthrow events, ice storms, more significant fire dangers, increased pest infestation and weed invasion, and consequently diminished forest health are possible consequences of climate change. There are numerous ecotones or boundaries between forests and other systems across the landscape in the Asia-Pacific region. There is an expectation that climate change will drastically impact these community margins. Any difference in climatic variables (i.e. moisture, temperature, wind) will alter ecosystems or forests. The magnitude of the climatic change and its variability will largely dictate the changes in forests or ecosystems. Although global climate model outputs are often called "predictions", each result represents one possible outcome or 'scenario' in the future. Understanding the species and ecosystem's climate niche and projecting their potential suitable habitats where they will survive is crucial to developing adaptive forest management strategies.

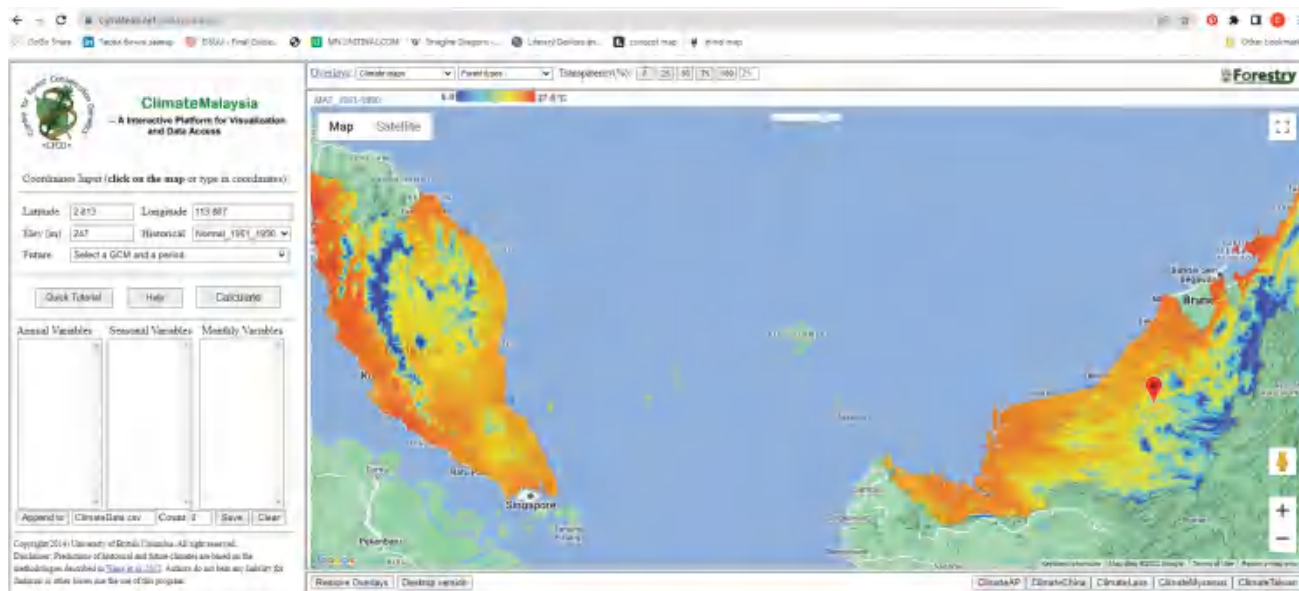


Climate change causes mismatches between the climate that trees adapt to and the climate that trees will experience.

*Photo:
Project director
Dr Wang Tongli.*

Since 2011, APFNet has funded two phases of projects on the Adaptation of Asia-Pacific Forests to Climate Change. There are seven economies and regions targeted and 15 tree species and ecosystems examined. By developing several essential tools, including a scale-free climate model called ClimateAP and climate niche models of two GHG emission scenarios for 15 tree species in four forest ecosystems, FORECAST models would predict the impacts of climate change. The project executing agency developed a web platform (climateap.net) to facilitate easy access to climate data, spatial visualization, and species distributions. FORECAST models can assess the long-term impacts of climate change on forest growth rates and mortality of given tree species, and the models also predict adaptation strategies for forest management practices and species selection.

The first two phases thus assisted policymakers and practitioners in better understanding the complex systems with which they are dealing and giving chances to fill policy and data gaps to develop alternative adaptive forest management plans.



Web platform for data access and visualization of one of the target economies--Malaysia.
Photo: <http://climateap.net/malaysia.aspx>

APFNet has supported the third phase of the project, "Adaptation of Asia-Pacific Forestry to Climate Change-Phase III Synopsis, updating and extension of forest adaptation tools", carried out by the University of British Columbia (UBC) in 2021. It summarises climate niche models and their projections for 15 key species and four forest ecosystems to develop a framework for simultaneously managing multiple species. An additional analysis of the projections will be conducted, in consideration of soil effects, and the analysis will integrate individual species into a framework that shows species availability for any planting site for current and future climates in conjunction with forest ecosystem projections. The project will convert the Google Maps-based application to an ArcGIS-based web platform for greater engagement and global accessibility, particularly for users in China, to disseminate model predictions and their applications in forest management for climate change adaptation. There will be four policy briefs for economies: China, Chinese Taipei, Malaysia, and Myanmar, with the forest adaptation tools presented by implementing partners at international conferences. Overall, the project's third phase will push the tools developed beyond their previous applications, allowing them to reach and engage a larger audience.

Connecting project partners: experiences sharing from APFNet project implementation and management during the COVID-19 crisis

Undoubtedly, the COVID-19 pandemic has changed the world. APFNet and project partners had to adapt to this new normal. APFNet projects were influenced by the COVID-19 related factors in 2021, including travel restrictions, delay or cancellation of project activities, difficulties in providing international support and expertise, and an inability to conduct training and conferences. However, APFNet projects continued and, while perhaps delayed, have achieved the majority of their project objectives. Some projects even showed how to use the pandemic as an opportunity to disseminate project key insights further. To connect project partners and increase their ability to conduct projects during the pandemic effectively, APFNet organized the online workshop "COVID-19 Pandemic Impacts in Forestry in the Asia-Pacific Region" on 17 November 2021. The workshop covered four topics, including **(i)** forestry education, training and career; **(ii)** construction of infrastructure and technology development; **(iii)** community forestry and forest restoration; and **(iv)** project management during the pandemic. Fifty regional and sub-regional partners from 12 APFNet member economies improved their networking and communication throughout the seminar. Further, they minimized the adverse effects of COVID-19 on APFNet projects by sharing ideas and views on both the positive and negative influences of the pandemic during project implementation.



*Attendees of the online meeting "COVID-19 Pandemic Impacts in Forestry in the Asia-Pacific Region".
Photo: Zhang Shiyi, project manager/APFNet.*

Enabling Online Capacity Building

Capacity building is an essential component in almost all APFNet projects. Under the pandemic, the projects having forestry education, training, and career met tremendous difficulties, but the partners positively sought alternative solutions to conquer the challenges. Despite much improvement needed, online learning is anticipated to develop further as a tool to augment and enhance

traditional knowledge in forestry and natural resources. The online SFM courses created by the APFNet project "Innovative Sustainable Forest Management Education in the Asia-Pacific Region" illustrated how classroom education could be substituted with online education. It can be especially beneficial if the lessons are pre-recorded for international audiences, as it avoids '3

am' time zone-related study times. Additionally, as some people find online classes and meetings are less interactive, providing reading materials and other instructions beforehand and recordings afterwards. APFNet Kunming Training Centre, transformed the challenges into opportunities by upgrading its training products by re-examining the design of the programme when training workshops were cancelled. They also used the addi-

Building during the Pandemic

APFNet has supported related construction projects, such as several forest experience and training bases, a high-value tree species breeding centre, greenhouses, arboretums and several high-tech forest fire monitoring systems in 2021. Periodical inter-province travel restrictions in China affected the ability of APFNet to manage



*During the pandemic, wooden house construction in APFNet Pu'er SFM Demonstration and Training Base in China.
Photo: Li Zhaochen, project manager/APFNet.*

tional staff capacity to produce two relevant publications for the forthcoming fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity in 2022. Despite less in-person exchange, the APFNet visiting scholar programme under the Sino-ASEAN Network of Forestry Research Institutes kept ongoing on-line collaboration with the support of Yunnan Academy of Forestry and Grassland – a partner institution.

the construction progress from its headquarters in Beijing such as the lack of field visits resulted in inadequate supervision of the new APFNet Pu'er Training Base. Construction progress under APFNet projects in other economies such as Cambodia and Myanmar was also affected by the pandemic.

Given that some delays occurred in several processes, including approval, construction, and project activity implementation, due to the pandemic, it's crucial to keep work plans and project activities more flexible during the project implementation to ensure the project's overall achievements to the goals. Construction activities are highly dependent on approval processes which may involve a more significant number of approval entities than usual. Developing a clear understanding of those approval processes and how the pandemic may impact them can help minimize project delays. It is also essential to understand the broader context of the project, for instance, to study the culture, the contextual information of local sites and the local construction company selected, also obtain some external expertise to make construction as efficient as possible. High-tech solutions that do not need people on the ground can be an excellent remote alternative for forestry activities such as fire monitoring during the pandemic.

Restoring Forests during the Pandemic

Balancing ecological management and socio-economic benefits has been a prominent theme in most APFNet projects. When COVID-19 dramatically impacts the global economy, APFNet has paid particular attention to rural populations, particularly those vulnerable local communities who rely on forests for their livelihoods. Factors such as reduction in job markets, drop in the price of timber and non-timber forest products, and limited access to markets have hindered their livelihoods to various degrees.

In the workshop, project partners from Indonesia, Lao People's Democratic Republic (PDR) and Cambodia demonstrated how APFNet forest restoration projects have helped local communities cope with the adverse economic influences. They emphasized that local teams and communication are essential to conducting projects concerning forest restoration, livelihoods, and sustainable forest management during lockdown and travel restrictions. Market income from forests can, just like other products, be reduced when travelling (and thus

trade) is restricted and demand is less due to economic considerations. Forests' most significant contribution in these times may be the subsistence provision of food. Where possible, consider delaying the harvest of forest products or conservation of products, such as drying, and selling them at a more opportune time.



Hiring local forestry officials to distribute seeds to communities in Indonesia for the APFNet project "Development Participatory Management of Micro Catchment at the Bengawan Solo Upper Watershed" (Phase II).

Photo: Watershed Management Technology Centre (WMTC).

The Secretariat's Response

The headquarters of APFNet Secretariat is located in Beijing, China. During the online workshop, it is explained that how, local lockdowns and restrictions on travel had been a common factor influencing APFNet's project management under China's zero-COVID policy. The current quarantine policy does not allow APFNet staff to travel internationally and visit project sites out-

side China. This affected project practices, such as a reduced number of new international projects, remote consultation, increased Zoom communication and training and workshops transferred online.

Through this workshop, project partners shared their experiences and gave each other additional ideas and tools to respond to these challenges effectively.

Undoubtedly, APFNet international projects will continue to face difficulties imposed by the pandemic. APFNet and partners can minimize adverse effects and ensure that most projects achieve their aspired goals. Challenges would be transformed into opportunities and constraints into incentives to think outside the box for sustainable forest management. Once the pandemic is over, those projects and teams can emerge more robust and resilient.



APFNet Scholarship Program: Hurdled the challenges to earn Master’s Degrees

In 2021, APFNet scholarship students had to face the shift from the usual face-to-face learning setup to distance learning. However, challenges, such as weak internet connectivity, varying time zones, and limited access to laboratories and forest practice sites due to physical and travel restrictions, did not hinder the desire of the students to achieve their academic goals.



Prabal Birjung Rana
(Nepal)
Forestry, Nanjing
Forestry University



Satval Dinesh (Nepal)
Forestry Nanjing
Forestry University



Vannak Chroek (Cambodia)
Forestry Economics and
Management
Beijing Forestry University



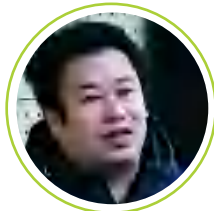
Nay Yu (Myanmar)
Forestry, Nanjing
Forestry University



Sammang San
(Cambodia)
Forestry Protection
Northwest A&F University



Milon Barmon (Bangladesh)
Soil & Water Conservation,
Northwest A&F University



Sourav Chakma
(Bangladesh)
Forestry Economics and
Management ,
Beijing Forestry University



Suwash Kunmar
(Nepal)
Forestry, Nanjing
Forestry University



Aung Wunna Tun
(Myanmar)
Forestry Economics and
Management, Beijing
Forestry University



Jannatul Ferdousi
(Bangladesh)
Forestry Economics and
Management,
Beijing Forestry
University



Yang Kaiyan (China),
Environmental
Development and
Sustainability,
Chulalongkorn
University of Thailand

From the economies of Bangladesh, Cambodia, Myanmar, China, and Nepal, 11 students from four host universities have successfully obtained their master's degrees, majored in Forestry, Forestry Economics and Management, Soil and Water Conservation, and Forestry Protection in 2021. After getting their degrees, they returned to their respective work assignments in government agencies, international organizations, research institutes, academies, and non-governmental organizations. In the meanwhile, three continued their doctorate degrees in China. These graduates are a great addition to the increasing number of forestry professionals and are expected to contribute to sustainable forest management in the Asia-Pacific region.

Strategies of host universities to help students to adopt online study

ASP students have gradually adapted to the distance learning setup for the past years. Despite hardships brought by online learning, this offers opportunities for students to accommodate to innovative learning methods, participate in webinars and free online courses to supplement their knowledge, and expand their professional network with experts and scientists in forestry and environmental conservation.

The ASP host universities such as Beijing Forestry University (BFU), Nanjing Forestry University (NFU), Northwest Agriculture and Forestry University (NWAUFU) in China, and Chulalongkorn University in Thailand have laid strategies to address the challenges in the shift of learning setup without compromising the quality of education. Host universities established virtual classrooms for easy access to course materials, discussions, and feedback to instructors.

“
Since the outbreak of the COVID-19, NFU took the initiative to conduct training workshops for teachers on effective methods and tools of online teaching. Thanks to the training, the professors and lecturers in our university have adapted to the online teaching module, and they improved online teaching capability much.

said Ms Zhang Ying,
ASP coordinator from NFU.

“
I completed eight relevant courses of my program thanks to good time management and continued assistance from my university and professors in 2021. It has offered opportunities to participate in several online symposiums and seminars that enrich my knowledge on forestry research – the thing that I am passionate about.”

said Pham Thi Trang from Viet Nam,
a 2020 batch student in NFU.

One of the significant barriers to online learning is the restriction on conducting laboratory activities which resulted in the delay of thesis works of some students, especially those outside China who don't have access to facilities. In response, NFU and NWAUFU have allowed students to extend their studies.

In addition, universities organized online conferences and symposiums to allow students to share their research works. On November 4-5, 2021, the 2021 International Academic Forum on Green, Low Carbon and Sustainable Development, organized by NFU in collaboration with the UBC, Canada, allowed ASP students to present their research works. More than 1,200 experts and scientists in forestry and environmental conservation attended the forum. Two ASP students from NFU won third place in the oral presentation category.

Bringing together our alumni family - APFNet Alumni Network

APFNet has supported forestry talents development in the Asia Pacific region for over a decade. To date, the APFNet Alumni Network has grown into a family of 190 members covering 21 economies, with 79 being female. In 2021, our network continued with its commitment to bridging ASP alumni and students through newsletter dissemination, the online network portal, and social media outreach.

Newsletters were published and disseminated quarterly in the past year to allow alumni to get to know the network members' life and work. An exciting and intriguing section is where alumni present their research works.

For example, one issue featured Dr Siriluck Thammanu's work on the potential of community forests in generating additional income for rural communities in Northern Thailand through the Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks (REDD+). Another issue showcased the research of Mr Aung Wunna Tun on the contribution of community forestry management in boosting the rural livelihood of communities along the Ayeyarwaddy Delta, Myanmar – one of the significant ecologically and economically critical tropical deltas in the world.



*An agricultural area at Ayeyarwaddy Delta, Myanmar
Photo credit: Aung Wunna Tun, ASP Alumnus of 2019 batch at BFU*



*Ban Mae Chiang Rai Lum Community Forest, Northern Thailand
Photo credit: Dr Siriluck Thammanu, ASP Alumna of 2012 batch at BFU*



APFNet Alumni online portal has created an accessible environment for alumni and students to share their career and academic achievements, post job vacancies, and even recollect their study experiences years ago. The online portal has an interactive dashboard for students to have meaningful discussions about research, career opportunities, partnership, collaboration, and scholarship programs for further studies. "Through the portal, we were able to share and talk about actions and initiatives taken by organizations where we work in the fields of forests, climate change, and biodiversity. Then we could all benefit from learning best practices and even adapting them in our economies." said Ricmar Magarin, a Philippine alumnus of the 2018 batch.

Apart from posting forestry news, the APFNet Alumni network pages on Facebook, Twitter, and Instagram bring ASP students closer and they often share own ideas, achievements and experiences on these platforms. For example, during the 2021 International Day of Biological Diversity, Ms Utharat Suksumake, ASP alumna of the 2020 batch, shared her work on biodiversity conservation. Her work has paved the way for the proclamation of Khao Sok National Park as Thailand's seventh ASEAN Heritage Park and the 50th in the ASEAN region. Beyond information sharing, the alumni network has become a bridge connecting the geographically scattered ASP alumni across the Asia-Pacific region. Fayzmamadda Vlatbekov, a Tajikistan PhD candidate, expressed that "I feel that we are in a big family where members care about each other. Our bond is growing closer and closer despite physical distances."





BUILDING FOR THE FUTURE – MOVING FORWARD

*Aerial view of the Pu'er training base.
Photo: Wanzhangshan Forest Farm*



Official Launch of the Pu'er Sustainable Forest Management Demonstration and Training Base

In recent years, APFNet has increased its focus on establishing the infrastructure necessary to provide comprehensive capacity building to partners in the Asia-Pacific region. Training bases, combining training facilities with demonstration projects focusing on various aspects of SFM and forest restoration, were identified as a vital component of this new strategy. With the establishment of the APFNet Multifunctional Forest Management Demonstration and Experience Base in Wangyedian Forest Farm in Inner Mongolia, China, in 2019, this concept was tested for the first time and proved to be a tremendous success.

The APFNet Pu'er Sustainable Forest Management Demonstration and Training Base, focusing on showcasing best practices in sustainable forest management in the tropical and subtropical areas and being a platform for forestry policy dialogue and environmental education, was launched on 27 July 2021 with continuous and joint efforts from APFNet, the forestry authorities in Yunnan province and Pu'er city and the Southwest Forestry University. Best practices from the previous base were also applied during this phase. In line with acknowledging and celebrating local differences, several themed living quarters, such as the Asia-Pacific Ecolodges, the Eco-culture Lodges and the Yunnan Folk Village, were constructed.



Main lake area with Asia-Pacific Ecolodges
Photo credit: Anna Finke/APFNet

During the launch ceremony, the base received a great endorsement from various sides, such as Mr Peng Youdong, the deputy administrator of the National Forestry and Grassland Administration, China, Mr Wan Yong, the Director of the Yunnan Forestry and Grassland Administration, and Mr Liu Yong, the mayor of Pu'er City, as well as some forestry research institutes, universities and in-

ternational organizations. Mr Zhao Shucong, the Chair of the APFNet Board, described the new base as “an important platform for promoting forestry cooperation in the Asia-Pacific region, especially the Greater Mekong Subregion (GMS) region”. Mr Peng Youdong praised the base’s contributions to China’s goal of creating an ecological civilization.

The official opening ceremony
of the APFNet Pu'er Sustainable
Forest Management
Demonstration and
Training Base
Photo: Liu Chengye/
APFNet





A painting by Zhao Baokun, titled "Wanzhangshan's Immortal Residences."

The Carbon Sink Potential of Wanzhangshan Forest Farm Report officially launched during the final part of the Pu'er base launch ceremony, illustrated how Wanzhangshan's forests could reduce climate change emissions. It is the first report at the state-owned forest farm level.

In the ensuing week, several workshops covering relevant topics for the GMS and a seminar on how forest management policy is translated into practice in China were held. Furthermore carbon neutralization and forest carbon sequestration measurement training was held for local forest staff in line with the increased focus on forests' role in climate mitigation and carbon neutrality. Some talented artists from all over China also were invited to experience the new base and create work of eco-culture based on their impressions. Students from local schools in Pu'er were invited to get forest experience and environmental education. The students visited the forests surrounding the base to experience them with all their senses and used their creativity to decorate stones they found during their hike.

Overall, the launch of the new base was more than successful, with more events scheduled in the future.

Forest experience activities for students



Construction to conserve ecological resources and mitigate forest degradation

Cambodia used to be an economy with rich forest resources. Unfortunately, forest cover decreased to 54.48 percent in 2015, and most forests have become fragmented. Many indigenous, precious timber species continue to be exploited and are now listed as vulnerable or endangered species. Enrichment planting of some valuable tree species mitigate forest degradation and fragmentation and provide seed sources for local communities, which strongly depend on forest resources and need to generate both short- and long-term income. In this context, APFNet launched the eight-year project “Establishment of High-Value Tree Species Breeding Center in Cambodia” in January 2020. The executive agency is the Institute of Forest and Wildlife Research and Development (IRD) under the Forest Administration in Cambodia. This project focuses on conserving and developing genetic resources of rare and endangered tree species in Cambodia through building new, high-tech tree breeding facilities, enhancing the capacity and knowledge of local staff and foresters and promoting sustainable economic development in rural areas. The total budget is USD 6.86 million, among which APFNet grants up to USD 5.49 million.

Constructing a high-value tree species breeding centre in Phnom Penh and practising ex-situ conservation in Siem Reap



The general layout of the high-value tree species breeding centre was constructed for this project. Photo credit: IRD.

Conserving and propagating germplasm, which is living genetic resources such as seeds or tissues, is vital for animal and plant breeding, preservation, and other research uses. The rapid economic development seriously threatens germplasm resources in natural habitats in Cambodia.

A tree breeding centre can serve as a shelter for valuable forest genetic resources. Understanding the necessity of conserving and researching forest genetic resources, APFNet supported IRD to build a 1,755-m² high-value tree species breeding centre on the IRD campus in Phnom Penh. The breeding centre includes

an 806.4-m² nursery greenhouse and a 480-m² comprehensive business building with a tissue culture lab and auxiliary facilities. Besides the breeding centre and the business building, a 100-ha forest genetic resource conservation garden is included in the research station of IRD in Siem Reap to demonstrate forest restoration, using seedlings of scarce and valuable species

cultivated in the breeding centre. Establishing such breeding and conservation facilities will strengthen the scientific research capability of IRD on tissue culture, pathogen screening and ex-situ cultivation. The plantation demonstration of valuable tree species in Siem Reap has become a critical ex-situ conservation site.

Establishing an eco-forest farm to practice agroforestry and improve local livelihoods

This project emphasizes improving local livelihoods and showcasing sustainable land management by establishing a 20-ha eco-forest farm near IRD's Forest station in Siem Reap. The eco-forest farm will feature fruit trees and a high-value native timber trees plantation, agroforestry, animal husbandry, fish farming, and lodge construction. It also serves as a site for eco-tourism and caters specifically to tourists who want a rural experience.

The project team plans to assist the lodging house construction, eco-tourism training, and infrastructure developments.

The eco-forest farm is still under construction, it will generate income through entrance fees and lodging fees. The collected fees will be shared among the farmer cooperators. Farmers can also benefit by selling agricultural produces, such as fruit trees, vegetables, chicken, and fish.

The eco-forest farm will showcase the following agroforestry and sustainable land management practices: **1**) multistory cropping where fruits and vegetables are planted and arranged to utilize maximal vertical space; **2**) integrated farming that combines the farming systems such as fish raising, crop production, livestock, composting, biogas among others; and **3**) soil conservation measures such as mulching and organic farming.



*Planting economic and valuable trees on the eco-forest farm.
Photo credit: IRD*

Providing training and exchanging expertise

Training relevant personnel and broadcasting project results can ensure the project's sustainability and maximize its effect of demonstration. The project aims to focus on capacity building by training Cambodian forestry

officials, researchers, students, and members of the local communities. The project team will hold ten training sessions to share experiences on ex-situ conservation, integrated afforestation techniques, and forest man-



The project team and experts discussing the design of the eco-forest farm. Photo by IRD.

Construction in 2021 under the pandemic

As COVID-19 continued to strike Cambodia, the livelihoods of the local communities were affected by multiple pandemic-related factors such as the reduced demand for forest products, restricted access to markets due to travel bans, higher food prices, and loss of income due to job closures.

For the project specifically, due to slowed down administrative processes partially caused by lockdowns and



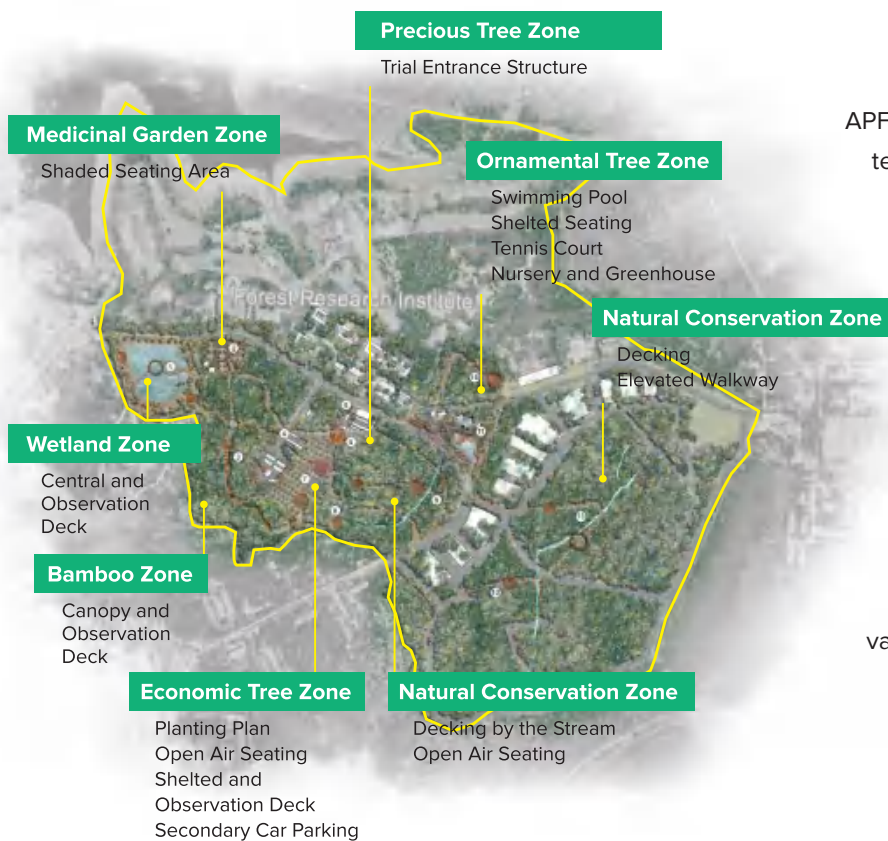
*Construction work of the project in Cambodia
Photo by IRD*

agement. Besides training, the project team also emphasizes dissemination by cooperating with the Royal University of Agriculture to publish research papers on valuable tree species germplasm, effective propagation, and plantation and produce posters, videos, and technical manuals. Additionally, *Major Indigenous Valuable Timber Tree Species* will be published in Chinese and English and translated into Khmer. The main contents will include general natural and socio-economic conditions of Cambodia, forest types, major valuable tree species, biological and ecological characters of the species, distribution and utilization of trees, seedling raising, and plantation management.

other factors, the construction of the Comprehensive business room, the greenhouse, the tissue-culture and diagnostic lab, the tourist houses, and other accessory facilities have all been delayed to various degrees. Additionally, due to travel restrictions and regulations prohibiting the gathering of large groups, multiple training sessions had to be postponed. Only a few people were allowed to work in the office, with the rest working from home with often slow WiFi. Most meetings were moved to online platforms to overcome before mentioned challenges. Although staff could not travel across provinces to collect precious tree germplasm resources, proactive communication ensured field staff properly managed seeds within their areas. During the pandemic, IRD learned that field project staff play a crucial role in implementing activities when the economy-level project team cannot visit the sites. However, while online platforms provide alternatives to in-person communication and monitoring, meeting in person and tracking in the field are more effective and have their irreplaceable roles.

Building for conservation, research, and education in Myanmar

An arboretum not only condenses nature by showcasing different ecosystems within a small area, but it also has a mission of forest conservation and biodiversity conservation. It provides ex-situ and in-situ conservation of forest tree resources and thus plays a significant role in forestry research. A well-designed arboretum also considers the public by providing education and recreation opportunities. Therefore, it's critical to assess biodiversity, forest restoration, research, public education, recreation, and conservation when designing an arboretum.



APFNet project “Integrated Forest Ecosystem Management Planning and Demonstration Project in GMS (Myanmar)” has established an arboretum to fulfil the purposes of conserving forest germplasm resources, forestry research, biodiversity conservation, and public education at the Forest Research Institute (FRI) site in Yezin, Nay Pyi Taw, Myanmar. This 5-year project was launched in 2019 by the Forest Department of the Ministry of Natural Resources and Environmental Conservation of Myanmar.



The design of the arboretum. Photo by FRI.

Starting by conducting an ecological survey at the project site, FRI has learned the importance of conserving the forest resources and preserving the ecosystem services at the site. According to a vegetation survey conducted by FRI, 131 plants belonging to 40 families are on-site. A rich diversity of plants provides habitats for many water birds and migratory birds in the wetland and medicinal plant garden zones. Additionally, the trace of wildlife can be found in the thematic garden sometimes. Constructing the arboretum would harbour the biodiversity at the site, provide a location for ecological research, and showcase a wide array of species to the public.

The arboretum also plays a crucial role in conserving forest germplasm resources. FRI values germplasm conservation because it protects plant species from genetic erosion (the decrease in population variation due to random genetic drift and inbreeding) and preserves genetic diversity. As collecting and preserving germplasm resources requires supporting facilities, APFNet has funded FRI to construct a greenhouse and upgrade an existing nursery in the arboretum. The nursery has increased its holding capacity from 50,000 seedlings to 100,000 seedlings. By 2021, germplasm resources of 50 species, about 1,000 seedlings in each species, have been collected and raised in the APFNet nursery. Some of these seedlings have been distributed to farmers for agroforestry purposes, and others are reserved for genetic conservation.



The greenhouse at the FRI Arboretum. Photo by FRI.

Besides building the arboretum, the project also aims to protect the Paunglaung watershed through agroforestry demonstration plots and improve the socio-economic benefits of Leinli village. To formulate a management plan specifically for the village, the project team has adopted a participatory approach. In total, 103 villagers participated in this project and were divided into different groups to establish and maintain agroforestry sites for three years. Considering the farmers' desired crops and species, a demonstration site of 36 hectares has been selected to showcase intercropping systems on former shifting cultivation land using locally preferred timber tree species, fruit trees and crops (including both perennial food crops and seasonal crops). The project has provided the initial investment for land preparation, seedling production and follow-up field

activities like planting, weeding, and maintenance. Any benefits generated from the agroforestry demonstration plots go to the respective participating villager.



Focus Group discussion to develop the participatory watershed management plan. Photo credit: FRI.

Although the project has made tremendous progress, COVID-19 impacted the project sites heavily in 2020 and 2021 and delayed the implementation of some activities. For instance, the construction of an arboretum in the FRI compound has been bogged down due to several COVID-19-related issues. Also, the Yangon-based design companies could not travel to Nay Pyi Taw to attend meetings due to inter-provincial travel restrictions. Additionally, the price of construction materials increased during the pandemic due to inflation. The travel restrictions affected construction, but they also imposed difficulties on seed collection across the economy to subsequently raise seedlings. However, FRI has learned some important lessons while tackling issues posed by the pandemic. First, when formulating a project that involves construction, even if it's primarily forestry-related, bureaucratic procedures, designs, costs, and workload need to be considered meticulously. Second, as the construction involves different stakeholders, such as various ministries, local construction companies, and experts from other fields, proactive communication is crucial to ensure practical cooperation and integration of knowledge. Finally, establishing an arboretum, can serve as a form of public education, allowing the public to connect with and learn from nature.

APFNet supports installing forest fire monitoring systems to reduce fire risks

Building for a better future also means building with a changing world in mind. Over the past few years, more frequent and catastrophic forest fires have occurred worldwide. Forest fires tore across the Brazilian Amazon, imperilling the world's most biodiverse forests, and even the frozen lands of Siberia and Alaska have suffered unprecedented wildfires. While small-scale fires are a natural process to help the forests clear off the understory shrubs and allow the forest to regenerate, large-scale, hot fires can cause considerable destruction to forest ecosystems and human communities and thus, prevention is crucial. Therefore, the early detection of active forest fires is vital in protecting forest resources and human communities whose livelihoods depend on the forests. Fortunately, with the digitalization of spatial information and new remote sensing technologies, the detection and monitoring of forest fires have become more efficient.

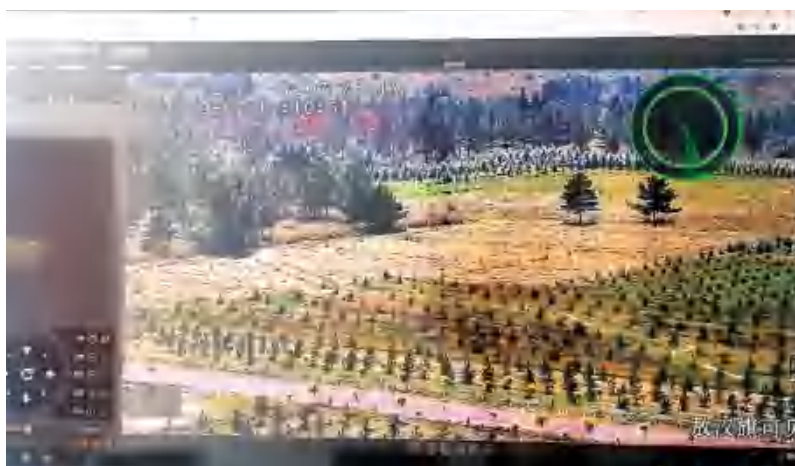


Forest fire monitoring towers (L&R) in Pu'er, Yunnan, and Aohanqi, Inner Mongolia, and forest watcher (M) in Pu'er (Photo by Li Zhaochen & Xin Shuyu, APFNet)

APFNet has contributed to installing the “Forest Fire Monitoring and Early Alarming System” (FFMEA) in several economies, including Lao PDR, Cambodia, and China, through its demonstration projects since 2014. The FFMEA system is a state-of-the-art solution for monitoring forest fires. It uses an infrared-sensitive camera installed on a tower in the forest area (called the “Forest Watcher”) and back-end command and control platforms in the control centre to monitor fire outbreaks automatically. The forest fire monitoring tower can be left unattended, tracking in real-time throughout the day. The forest watcher can cover a radius of 15km within 30 minutes and has a target positioning accuracy of 100 meters.

During 2020-2021, other APFNet projects installed two sets of this system in Pu'er City, Yunnan Province, and Chifeng City, Inner Mongolia, China, are being implemented to maximize synergies.

Forest fire remote video monitoring system in Sanyijing Forest Farm of Aohan Banner (SFFA), Inner Mongolia. (Photo by Yu Xingnan, SFFA)



In Pu'er Wanzhangshan Forest Farm, four forest fire monitoring towers and two control centres allow the monitoring of 50-60% of its total forest area. In Sanyijing Forest Farm of Aohan Banner, Inner Mongolia, one forest fire monitoring system and one control centre were installed, monitoring the full size of its main sub-forest farm.

Since the system monitors forest fire automatically in real-time, it replaced the traditional manual fire monitoring with auto-detection. Geographic Information System (GIS) will locate the fire and automatically inform the responsible person at the control centre when the forest fire is detected, displaying a map with its exact location. The system can also analyse and forecast possible trends of the fire, such as in which direction it will burn, which supports the decision making in fire fighting.

Facilitating economy-level and regional dialogues to strengthen sustainable forest management

As of 2021, APFNet has launched more than ten demonstration projects in China, with the total fund topping 18 million USD. They have gathered experiences on the ground working in different forest types. Many projects explicitly aimed to try new treatments to further improve regulations regarding forest management in the future by demonstrating new and innovative approaches. APFNet's executive agencies have thus accumulated a rich knowledge of managing different forest ecosystems. While practitioners earn profound experiences, some lessons learned through forest management are restricted to a small group if lacking a platform to exchange this knowledge. Facilitating dialogues among practitioners widens the overall knowledge base but can also help interpret current forestry regulations and rules. When policymakers and other relevant stakeholders are engaged in the conversation, bottom-up messages and suggestions can be adopted to revise forestry policies.

Representatives participated in the discussion forum.

Photo credit: Liu Chengye



On 30-31 July 2021, APFNet hosted a discussion forum titled “Forest Management in China: Balancing Conservation and Utilization”. More than 30 participants, including officials from the Department of Forest Resources Management of the National Forestry and Grassland Administration, Inner Mongolia, Autonomous Region, Yunnan, Zhejiang, and Anhui Provinces, and representatives from APFNet Chinese projects and forestry experts were invited.

This forum enabled a critical exchange and exploration of policies and regulations in two main forest categories defined by the Chinese Forest Law: Public Welfare Forests and Commercial Forests and contrasted them with sustainable forest management experiences.

Participants shared successful cases of balancing ecosystem services and economic outputs under current regulations, emphasizing the necessity of reinforcing the current legislation and practice of multifunctional forestry. They gave valuable recommendations to help enhance Chinese forestry policy at the economy-level and the local level.



The representatives were divided into three groups to discuss questions regarding forest management in China. Photo by Liu Chengye



Economy-Level

The recommendations are to improve the scientific value and the practicality of forest management plans and secure the legal status of these plans. As state owned forest farms and other forest properties develop forest management plans, they are not legally recognized, often leading to a disparity between the goals in the programs and actual practices. These plans also lack sufficient scientific data to support the design. Thus, the forum suggests that relevant agencies standardize developing forest management

plans, ensuring they are based on science and consider local ecological, economic, cultural, and political conditions. There should be regulations enforcing the practice of the management plans. Participants also emphasized the necessity to enhance the understanding of forest policies and regulations by local governments. When local governments have gaps in understanding economy-level forest laws, they will not conduct forestry practices to maximize ecological and socio-economic benefits. Central forestry agencies should provide plat-

forms to assist local governments in digesting economy-level laws and regulations through discussion sections, forums etc.

The last recommendation on the economy level is to modify the regulations on managing plantations, early-aged forest management, and timber harvesting.

Local Level

The forum discussions suggest increasing the harvest intensity of Public Welfare Forests when permitted. Due to the restrictions on harvest intensity and the ecosystem services of particular Public Welfare Forests, some APFNet projects can't be maximized to their full potential. Therefore, raising harvest intensity reinforces forest regeneration and enriches the understory's diversity when ecological conditions are permitted.

It is also critical to construct landscape-level forest management plans. Current management plans typically cover ten years, but the goals and objectives of two 10-year-plans of the same forest could change substantially. The forum suggests constructing an overarching landscape-level strategy with a 30-year or 50-year duration. It would ensure the integrity and consistency of each 10-year management plan as the ultimate goals are covered by the landscape-level plan.

It is essential to increase the quality of forest inventories. During the Chinese Tier 2 inventory, research methods should be designed based on the objectives of the inventory. Tier 2 inventory should be more scientific and incorporate the needs of multifunctional forestry.

The other issue mentioned was to shorten the process of harvesting applications. When state owned forest farms apply for a harvest quota, the process is often too slow to pay off the harvesting cost and respond to the market. The applications process could be migrating to online platforms. The harvesting quota should be more flexible among different forest types and incorporate the market price of timber.

As the current regulations retain gaps or conflicting regulations regarding plantations, early-aged forest management, and timber harvesting, the forum suggests verifying standards from different years and levels and modifying them to eliminate the conflicts. Particular focus should be on the new “multifunctional forests” and near-mature forests.

All recommendations were made specifically for forests in China; however, other economies can benefit from them in several cases. For instance, other economies in the Asian-Pacific region should also secure the legal status of forest management plans and ensure their consistency and scientific value. Having long-term landscape-level goals can help identify priorities of different forest areas within each landscape. In any economy, the communication between local and central governments should be practical and transparent to eliminate misunderstandings of forestry regulations.

This forum exemplifies APFNet's efforts in reinforcing conservations and cooperation at the local, economy-level, regional, and international levels. APFNet will continue to facilitate dialogues between practitioners, policymakers, and experts and improve forest restoration and the socio-economic development of the region.



Zhang Jingfeng explaining the management practices to the representatives in the field. Photo by Liu Chengye

A scenic view of a park with a pond, trees, and a path under a blue sky with clouds. The foreground shows a dirt path leading towards a pond. On the left, there are lush green trees with vibrant pink flowers. In the background, there are more trees and a clear blue sky with scattered white clouds. A person is visible walking on the path near the pond.

THE POTENTIAL OF FORESTS IN CLIMATE CHANGE MITIGATION

Forest's role in achieving carbon-neutral target and the approach to realize it

Many Economies have promised to achieve the carbon-neutrality targets to limit carbon dioxide in the atmosphere to combat climate change. Forests can play an essential role in achieving these targets through long-term carbon storage in plant biomass and forest soils. China has committed itself to becoming carbon-neutral by 2060; as such, the carbon storage capacity of each forest is vital to contributing to such a target. However, despite China's massive expansion of forest cover and plantation forests, its forest quality and growth rate remain low because of a lack of appropriate and adequate management. The average stocking volume of Chinese forests is 94.83 m³/ha. The mean annual increment is 4.73 m³/ha (based on China's 9th national forest inventory), less than half of the world averages under similar natural conditions. Moreover, China's mean forest carbon storage (not including the carbon stored in soil) is 42.04 ± 5.39 tons/ha, much lower than the whole world's (71.60 tons/ha). On the upside, the low forest quality also means China's high potential to increase its forest carbon storage through more optimized management approaches in the coming decades.

State-owned forest farms are a vital forest management unit and represent the forest management level in China. A total of 4,855 forest farms are currently managing 56.67 million ha of forest land, which is more than a quarter of the total forest area in China. However, the forests, especially plantation forests managed under most forest farms in China, still, feature-poor stand structures in spacing, density, species composition, age distribution, and competition control, resulting in low growth, yield, and productivity.

An accurate and efficient forest carbon accounting and identifying the options to increase the carbon carrying capacity through optimized forest management strategies at the forest farm level is crucial to determine their actions in mitigating rising climate change and contributing to the 2060 carbon-neutrality commitment.

To estimate their current forest carbon storage, forecast the carbon carrying capacities in the future, and explore effective forest management options to increase carbon storage capacities while balancing them with other forest values, APFNet selected two forest farms in China.

Wanzhangshan Forest Farm: Analysing forest carbon carrying potential

Many forest carbon storage research ignored forest management and temporal scales. The temporal scale considered may not be long enough because a forest may be a source of and sink for carbon at different points in time. But, through proper forest management and utilization of wood products, forests can be kept as stable carbon sinks in the long term. In the case of Wanzhangshan Forest Farm (located in Pu'er City, Yunan Province), a Forest Simulation Optimization System model, which uses simulated annealing to generate optimized forest management plans, was used.

According to this study, by 2060, the carbon storage of Wanzhangshan Forest Farm will increase its total carbon storage to 4.03 million tons from the current 2.59 million tons. The average annual carbon sequestration of the farm is estimated to be 36,000 tons. By 2120, the carbon storage of the farm is estimated to reach 4.44, 5.19 and 3.69 million tons for scenarios 1-3, respectively. The average annual carbon sink of scenario two (26,200 tons) is 2.5 times as much as scenario 3 (11,000 tons). The average timber amount harvested per year of scenario two can reach 24,000 m³ in 2120.



Mr Lu De, Executive Director of APFNet, introducing the carbon sink potential of Wanzhangshan Forest Farm during the opening ceremony of APFNet Pu'er Training Base (Photo: Liu Chengye)

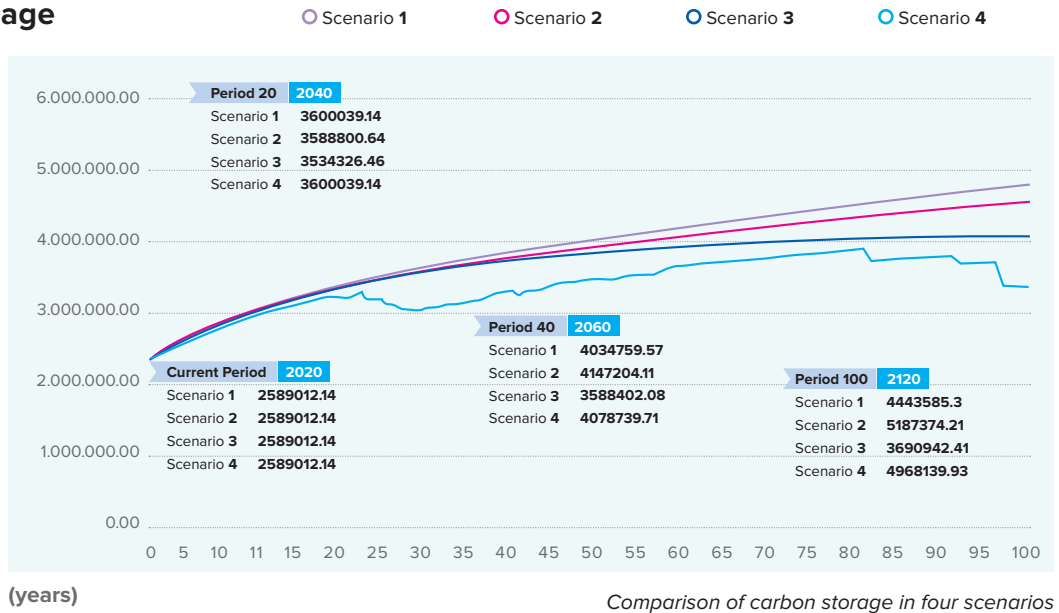
Furthermore, it can develop growth and yield functions of key forest types to analyse and compare different management scenarios in Wanzhangshan Forest Farm in the long run. The methodology used in this study for calculating the forest carbon storage was following the economy-level guidelines for forest carbon accounting in China which uses a volume-derived inventory-based carbon estimation approach. It is the first study at the state owned forest farm level. The study result - "Carbon Sink Potential of Wangzhangshan Forest Farm Report", was launched during the APFNet Pu'er Sustainable Forest Management Demonstration and Training Base opening ceremony.

The average annual revenue is estimated to reach CNY 28 million with an average annual profit of CNY 22 million. The social and economic contributions to the local communities of scenario one are much more than in scenario two and scenario three because of the timber production.

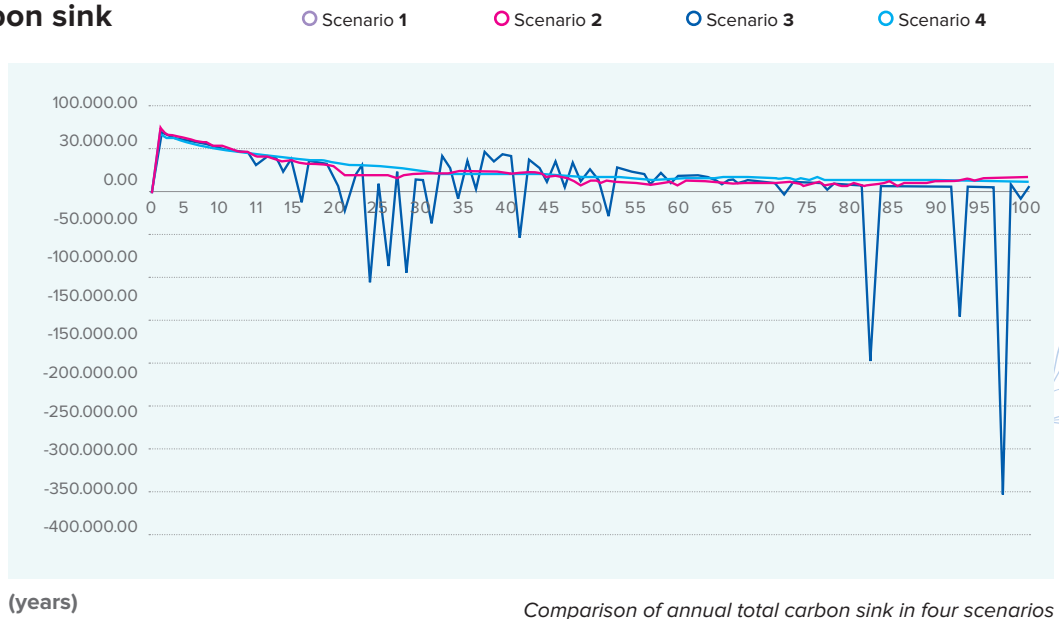
The results clearly show that harvesting forests and using wood properly are the best ways to ensure stable carbon sequestration while enabling forests to sustainably provide wood and make significant economic contributions to the local communities at the same time. In other words, harvesting without a well-thought-out long-term sustainable management plan is not an excellent strategy to create a sustainable carbon sink.

Not harvesting anything at all is not the best strategy, either.

Total carbon storage



Annual total carbon sink



Wangyedian Forest Farm: Assessing forest carbon storage through an inventory-based approach

In September 2021, APFNet started a project entitled “Study on Forest Carbon Storage and Carbon Sink Potential in Wangyedian Forest Farm”. The project uses an on-the-ground forest inventory-based carbon accounting approach to estimate the total carbon stored in the forest

ecosystem, including the above-ground biomass and carbon stored in the soil. Comparing this with the Wanzhangshan case, which also uses a volume-derived method to build a relationship between stock volume and total tree biomass, the biomass conversion factors used in Wanzhangshan are recommended for regional use. In contrast, the Wangyedian study will use the large dataset directly generated from field investigation to build biomass conversion factor functions which will be more accurate for the Wangyedian forest farm. In other words, the expectation for the results of this investigation to be even more valid for forest farm-level carbon estimation. Totally 186 permanent sample plots covering the primary forest and shrub ecosystem types and species in the farm have been established and investigated. In addition, 7,800 temporary plots for each forest sub-compartment in the farm were examined from September to November 2021. The total area of the temporary plots is 1% of the whole plantation forests (as plantations are more homogenous) and 3% of the natural forests. APFNet staff also participated in the forest investigation together with workers from the Forest Farm during a multi-week training session in September 2021.

Inventory-based carbon estimation

Carbon stored in forest ecosystems comprise three parts: the above-ground standing vegetation, the ground (litter and dead wood), and the soil. Inventory-based estimation of forest vegetation carbon stocks is a group of classical study methods of carbon accumulation within forest ecosystems. The methods are applied based on available forest inventory data, such as forest type, stand age, stand density, stand volume, mean tree height and diameter at breast height (DBH). In the past decades, allometric equations, the mean biomass method and volume-derived methods (e.g., biomass regression equation and conversion factor continuous method, etc.) were the most commonly used methods for estimating vegetation carbon storage based on inventory data. However, these methods have their own unique advantages and disadvantages, and there is no one-size-fits-all approach, thus no one method is ideally suited for all estimation goals from individual stand to large scale.



APFNet staff participated in the forest investigation at Wangyedian Forest Farm

The project results are still preliminary, but the research team intends to estimate the carbon storage for all ecosystems. Thus, specific investigations on shrub and grass layers have been conducted in addition to tree biomass estimation. Litter and soil samples were also collected to calculate litter and soil carbon storage. Growth model-based potential carbon projections will be analysed to estimate the future carbon sink potential. It will develop a forest management plan to optimize the silviculture and forest management practices to promote multifunctional forest management on the farm. At the same time, carbon storage will be incorporated into the plan as one of the management objectives.

Facilitating Conversation about Forest Carbon Accounting

Copious evidence has indicated that global climate change has already led to environmental changes and influenced human social and economic activities and is likely to continue to do so. Unmitigated global production of GHGs may make the planet virtually uninhabitable for modern human society in the future. Meanwhile, forests' role in climate change is two-fold due to their complex carbon relationship. They act as an emission source of GHGs when disturbed, degraded, deforested, or burned. Still, they can also become one of the most effective agents to combat climate change by removing carbon from the atmosphere and sequestering carbon on the ground.

While economy-level and international cooperation has adopted cost-effective approaches in the forestry sector to combat climate change, measuring the carbon stored on site is vital to quantify the contributions of these different actions and initiatives.

Recognizing the regional need for further support on forest carbon accounting, APFNet has launched five other projects relating to this topic so far. These projects, situated in different locations in China, the GMS, and Southeast Asia, measure carbon stocks and emissions using ground measurement or aerial images, selecting the most effective and efficient measures that apply to the respective economy and site conditions.

While valuable data on forest carbon has been collected and analysed, further communication between these practitioners and experts would allow them to exchange experiences, share lessons learned, and better understand international standardized carbon accounting methodology.

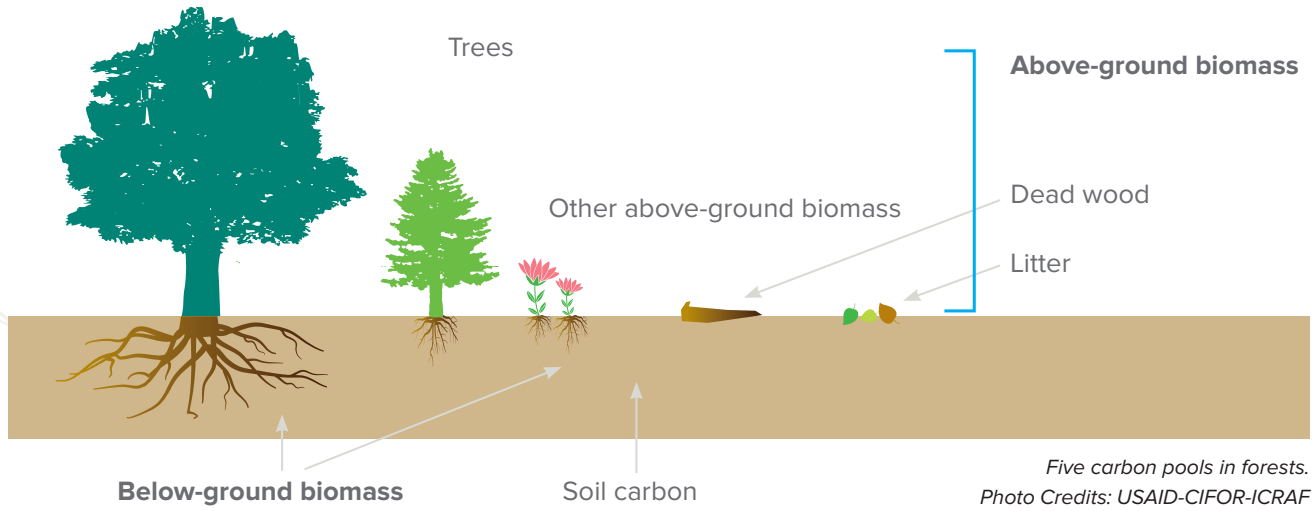


APFNet PMD staff is holding the webinar.
Photo Credits: Li Zhaochen

To enable discussions on the current progress and findings, APFNet held an online meeting, “Holding Forests Accountable - APFNet Forest Carbon Accounting Zoom Webinar”, on 8 December 2021. The forum aimed to provide a platform for the public to learn about APFNet’s carbon projects and for experts and practitioners from relevant fields to exchange experiences on forest carbon measurement and better understand the international standards for forest carbon accounting guidance. Five of the speakers came from APFNet’s carbon-related projects. The other speaker, Dr Wang Guosheng, represented the Academy of Forest Inventory and Planning of the National Forestry and Grassland Administration, China and provided the context of measurement, reporting, and verification and explained the Enhanced Transparency Framework under UNFCCC and the Paris Agreement. During the webinar, speakers illustrated APFNet’s work on strengthening forest carbon accounting in multiple aspects:

- 1) accounting for forest-based emissions,
- 2) measuring forest carbon storage potential,
- 3) developing on-the-ground forest carbon stock measurements,
- 4) conducting GIS-based carbon mapping, and
- 5) reinforcing local, economy-level, regional, and international use and reporting.

The IPCC GPG (2003) - five carbon pools: aboveground biomass, belowground biomass, litter, dead wood, and soil organic carbon



Forest-Based Emissions

Forest-based emissions accounting is one of the three types of internationally standardized forest carbon accounting and carbon stock accounting, and project carbon emissions accounting. Emissions accounting quantifies the exchange of GHGs between the atmosphere, terrestrial vegetation, and soils. Natural processes such as fires, insects, typhoons, etc. and human interactions such as swidden agriculture, burning, and harvesting can lead to the emissions. One such area is emissions from peatland fires, often based on rather crude calculations, assuming complete combustion of all carbon at the first fire. The project “Improving capacities towards reducing greenhouse (GHG) emissions from peat swamp forest fires in Indonesia” covers this issue, developing a better way to measure those emissions. The new insights of this project will provide the Indonesian government with influential new parameters to potentially improve their emissions estimates from peatland fires, which may significantly impact their international reporting.

1.

Forest Carbon Storage Potential

Mechanisms like REDD+ support the idea that wood that is not harvested but left standing to store carbon also has value. Determining the maximum storage capacity of a forest can have thus given a local community, a company or even an economy the tools to assess their climate mitigation potential and support restoration efforts. APFNet introduced the project to calculate current and potential forest carbon stocks for the entire Wangyedien Forest Farm in Inner Mongolia, China, to improve SFM methods and align the farm’s long-term strategic forest management with China’s carbon neutrality goal.

2.

On-the-ground forest carbon stock measurements

Forest stock accounting estimates the amount of carbon accumulated in carbon pools of a selected forested landscape at a single point in time. International standards recognize five carbon pools, including above-ground biomass, below-ground biomass, deadwood, litter, and soil carbon.

3.

Decisions on which carbon pools should be included mainly depend on the availability of existing data, cost of measurement, and the level of precision desired. The APFNet project in Zhejiang and Anhui Provinces in China measures forest carbon stock in the field. It focuses on measuring carbon stocks on different sites after implementing silvicultural treatments restoration measures.

4.

GIS-Based Carbon mapping

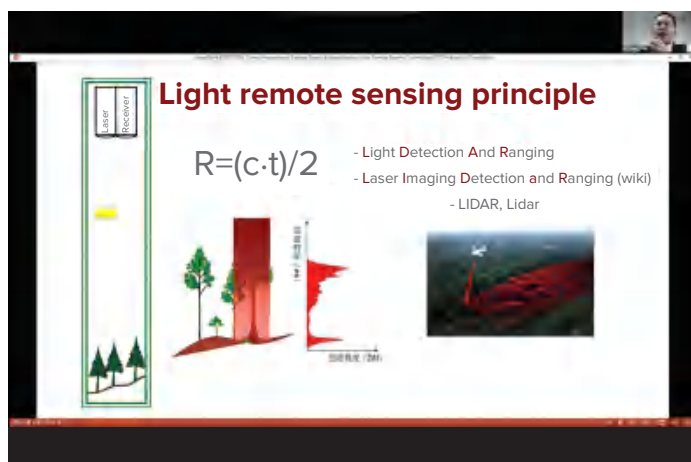
Measuring everything from the ground up can be unfeasible for larger-scale carbon mapping. GIS-based carbon inventory proves to be an invaluable tool to generate such data. In particular, Lidar is a valuable tool in this context. In the APFNet project titled “Forest Cover and Carbon Mapping in the GMS and Malaysia”, the goal was thus to use Lidar to estimate forest biomass and, subsequently, forest carbon stocks. Combined with field measurements and other data for ground-truthing, larger regional areas can be estimated.

5.

Local, economy-level, regional, and international use and reporting

While beneficial to have information on carbon only incites change when integrated into formal reporting and measurement mechanisms. Many APFNet projects, such as a project in Thailand attempting to develop better standing tree’s carbon calculation methods, aim to integrate the developed methods into formal reporting, such as Nationally Determined Contributions reporting to the UNFCCC Secretariat, ultimately increasing the accuracy of their economy-level reporting and moving up a tier.

During the Q&A sections, one participant raised questions about measuring carbon in forests impacted by natural fires. Some audience also showed great interest in the Lidar remote sensing technology introduced by Dr Pang Yong from the Institute of Resource Information Techniques. Another participant was planning to bring Lidar-obtained data into their university curriculum.



One of the speakers, Dr Pang Yong, introduced the mechanisms of Lidar. Photo Credits: Dr Pang Yong

Overall, participants improved their carbon accounting methodologies by increasing their understanding of carbon accounting and learning about the uncertainties and constraints. They gained insights into the carbon storage potential of forests across Asia, enabling them better to integrate forests into their climate change mitigation plans. APFNet aims to continue supporting partners and ideas related to the identified critical issues above. APFNet envisions that carbon projects are to supply partners, members and other professionals with a better understanding of the potential of “green carbon capture” on a local, economy-level and international scale.



**BUILDING REGIONAL
SYNERGIES**

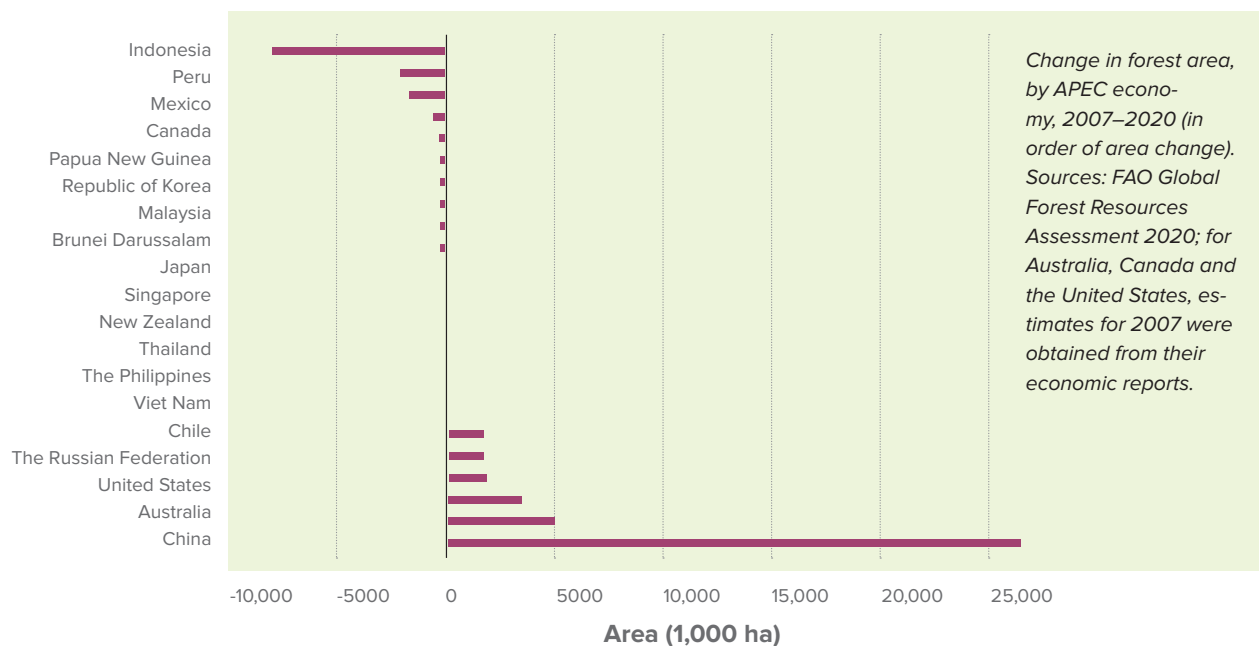


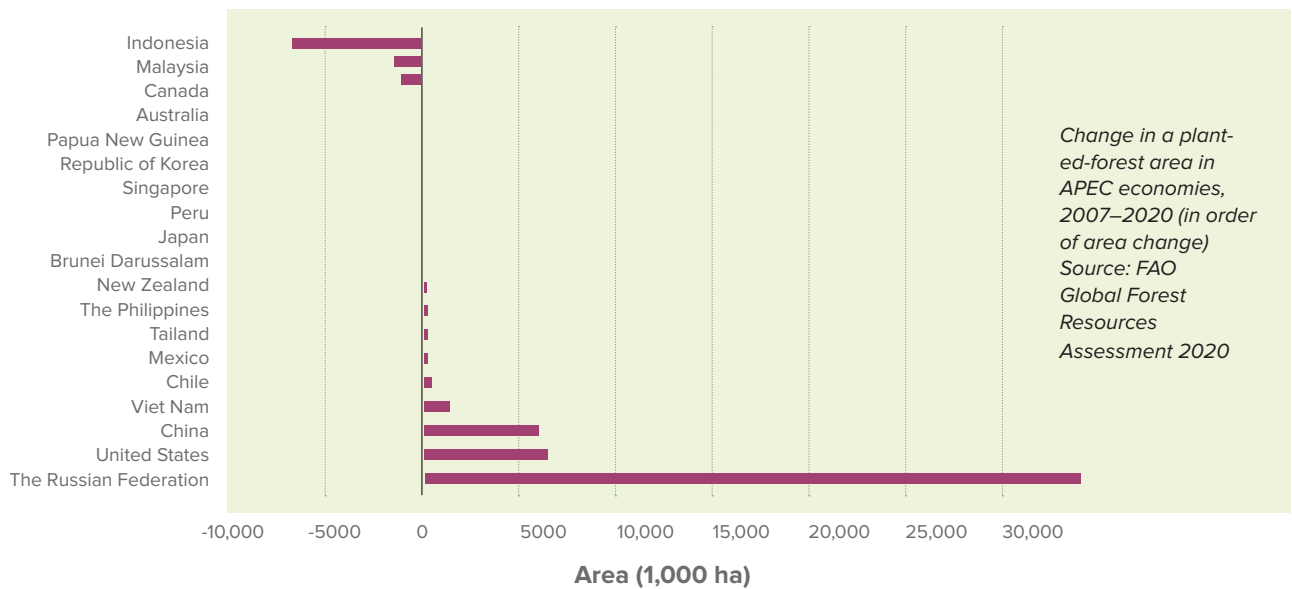
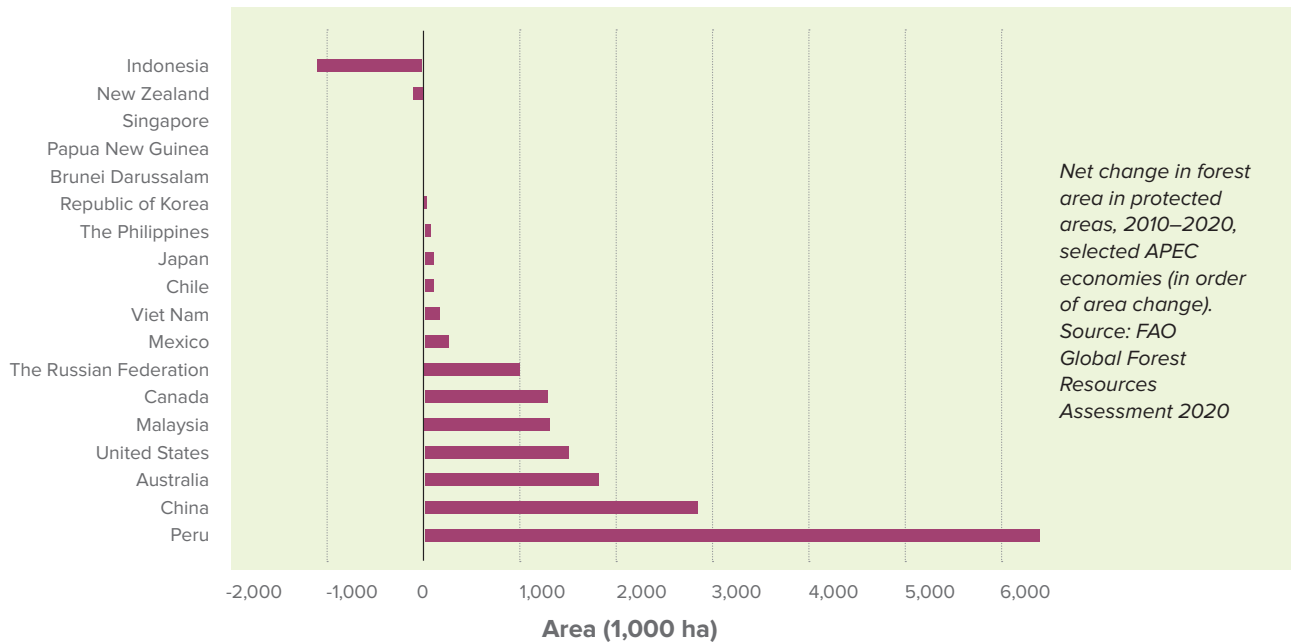
Achieving the APEC 2020 Forest Cover Goal

The APEC economies had a total net forest cover gain of 27.9 million ha in 2007–2020, exceeding the target of the 2020 Forest Cover Goal – to increase forest cover in the region by at least 20 million hectares of all types of forests by 2020 – set by the APEC leaders in 2007. The APEC Ministers welcomed the achievement of the goal in November 2021.

From 2020 to 2021, APFNet conducted the completion assessment in collaboration with the FAO. The assessment was an APEC self-funded project, which was approved by the APEC Steering Committee for Economic and Technical Cooperation in November 2019. The assessment incorporated information provided by participating economies and the FAO Global Forest Resources Assessment 2020.

According to the assessment, nine economies increased their forest area, with the most significant growth in China, Australia and the United States. Still, the increase was partially offset by forest loss in ten other economies. The major contributor to the increase is the expansion of planted forests. Over half of APEC economies increased their planted forests, and in total, the region’s planted-forest area grew by slightly over 30 million from 2007 to 2020. China, Canada, the United States and Viet Nam recorded the most significant increases. The forest area in protected areas also increased in most economies in 2010–2020, led by Peru, China and Australia. The region had a net 40.2 million ha increase in designated production forest during the same period.





Over the period, the key direct drivers of deforestation and forest degradation in the APEC region included agricultural expansion such as conversion to shifting cultivation for subsistence and commercial plantations for higher profit; legal and illegal forest product extraction; infrastructure development; and biophysical factors such as natural and anthropogenic disasters. The underlying drivers were poverty, population increase, increased demand for wood products, governance factors and urbanization.

On the other hand, increases in forest area were the result of forest area was increased due to a range of policies and actions, including

- Governmental and voluntary afforestation, reforestation and restoration programmes, which significantly contributed to the 30-million-ha expansion of planted forests;
- Market forces that involve competing land use, and, in some economies, forests become favoured due to the carbon trading schemes;

- Provision of direct incentives on afforestation and reforestation, such as subsidies to farmers, small-holders and other private sector;
- Strengthened conservation through promoting sustainable forest management, increasing forests in protected areas – 15.8 million ha increase in the region between 2010 and 2020, enforcing logging bans on native forests, and issuing economy-level logging quota to regulate harvesting;
- Strengthened forest tenure;
- Improved forest law enforcement and governance arrangements; and
- Participation in global and regional processes that support improved forest management.

Achievement of the APEC 2020 Forest Cover Goal is not an end. All APEC economies face climate-related challenges ranging from increased intensity and frequency of disasters to rising food and water insecurity, and forests have an essential role in addressing these. As of 2021, 18 APEC economies have endorsed the Glasgow Leader’s Declaration on Forests and Land Use announced at the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change. They commit to halting and reversing deforestation and land degradation by 2030. Learning from the experience of achieving the APEC 2020 Forest Cover Goal, the assessment report provides a range of recommendations for economies to consider for further increasing forest cover and improving forest management.

Read the report here:
<https://www.apfnet.cn/InformationSharing/Technical-Report/>

1. Review policies and laws to remove impediments to forest restoration and identify new measures to increase forest area and reduce forest loss and degradation.
2. Examine the direct and indirect key drivers of deforestation and forest degradation and implement further mitigation measures.
3. Develop new forest restoration programmes around emerging initiatives, techniques and methodologies.
4. Explore opportunities for new and additional governmental and voluntary planting programmes.
5. Examine current rates of forest expansion and consider whether new direct incentives are needed.
6. Remove structural impediments and operational constraints to create an enabling environment to support forest investment.
7. Increase finance for REDD+, accelerate readiness programmes, and review how Nationally Determined Contributions can help expand forest cover.
8. Review programmes of forest tenure reform to identify and address impediments to successful implementation.
9. Implement new and additional measures to improve forest governance and curb illegal logging.
10. Consider enacting regulations or other instruments and tools to discourage imports of illegally sourced timber.
11. Continue to improve data collection, monitoring and forest inventories, including advanced and emerging technologies.

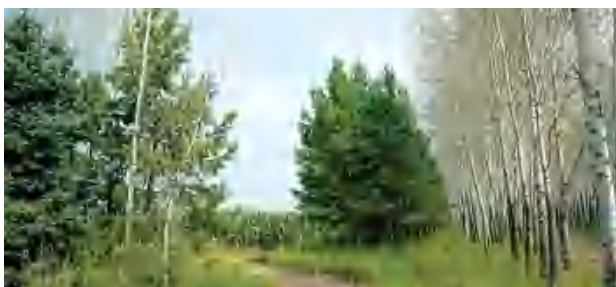


Sharing lessons from China's experience in large-scale forest restoration

According to the National Forest Inventories, China's forest cover grew from merely 8.6 percent in 1949 to 23 percent in 2020, increasing by 138 million ha. Behind such an increase are the reforestation and restoration efforts stretched over four decades. To share the lessons learned from China's experience, APFNet joined the e-poster session at the IUCN World Conservation Congress, which was held virtually in September 2021.

Over the last four decades, China has launched 16 ecoforestry projects, the first and most significant being the Three-north Forest Shelterbelt Programme in 1978. The Three-north Forest Shelterbelt Programme covers over 400 million ha of land and has a planning horizon of 73 years. It locates in northern China – Northeast, North and Northwest, which are in arid and semi-arid zones. This area have suffered from natural disasters and environmental degradation, such as soil erosion, desertification and sandstorms, and consequently, reduced agricultural productivity and unpleasant living conditions.

Over the last four decades, 2.8 million ha of farmland shelterbelt was established under the Programme, protecting over 30 million ha of farmland. It also led to the reclamation of 15 million ha of farmland and pasture. The shelterbelt contributed as much as 20 percent to the economy-level increase in grain harvest over the last 40 years. Landscape-level land-use planning is also demonstrated with integrated block plantings on steep slopes, shelterbelt plantings and riparian zone plantings.



Farmland shelterbelt in Heilongjiang. The first generation of shelterbelt (the degraded poplar) was replaced by a new generation of shelterbelt (pine). Photo: Luo Xi/APFNet



Restoration of a degraded landscape in China for soil erosion control. Photo: APFNet

In terms of erosion control, 9.8 million hectares of soil and water conservation and watershed erosion protection forests were established, reducing the sediment loads in the Yellow River by 90 percent. Economic species – mainly fruit and nut trees – were used in some restoration areas, benefiting local residents. As to combating desertification, restoration has brought 3.4 million ha of sandland under management or converted to fertile farmland. The trend of desertification has been reversed – sandland retreats by 150,000 ha per year. Villages and critical infrastructures such as railway lines and roads are also protected.

What contributed to the success of large-scale restoration is, first of all, sustained political and budgetary support. The ecoforestry programmes were usually a result of the high-level public-policy concern of the implications of continued forest degradation and loss, which ensured the programmes with full policy and legislative support. The second driver of success is mass mobilization and participation. The restoration plans were reviewed and refined before being adopted and implemented through a participatory approach, which involved the planning teams at the province, district and village levels. Some later programmes provided incentives to farmers whose land was affected to retire farmlands in degraded and environmentally sensitive areas. Third, China implemented the programmes with

adaptive management based on learning by doing. The programmes started from pilots and trials, and lastly staged rollouts to enable learning and adapting, hence, increasing the chance of success. Last, the programmes put equal emphasis on livelihoods and ecosystem services. Economic tree crops such as fruit and nut trees were used widely to increase the income of participating farmers and villages.

Learning from China's experience, clearly, significant progress in the management, conservation, development and restoration of the forest is possible.

Economies can move from pious hopes to plausible possibilities. Ongoing political leadership and consistent budgetary support are crucial because environmental sustainability has to be a long-term commitment like education, health, defence and infrastructure. There is a need for a multi-stakeholder approach and a need to integrate ecological, social and economic concerns into restoration strategies. Research and development and adaptive management are essential to respond to challenges and incorporate new knowledge.



The 2021 Info-Exchange Meeting on Strategic Forestry Cooperation in Greater Central Asia successfully concluded

Organized by the 2021 Info-Exchange Meeting on Strategic Forestry Cooperation in Greater Central Asia successfully concluded on 23 June 2021. Representatives from Greater Central Asia Forestry Cooperation Mechanism (GCA FCM) member economies and related partners attended the meeting. The second half of the meeting was devoted to giving comments on the Action Plan and discussing

the arrangements for the Third Meeting of Ministers Responsible for Forestry in Greater Central Asia. Related economies expressed their consent and approval to the Action Plan and gave their comments and suggestions for the document. A consensus has also been reached that the Third Meeting of Ministers Responsible for Forestry in Greater Central Asia will be held in China at an appropriate time in the second half of 2022.



APFNet-UBC Americas Office strengthening the engagement of international collaboration despite the challenges of COVID-19

In 2018, APFNet and the UBC established the APFNet-UBC Americas Office (AO). Despite the continuing challenges of COVID-19, the AO successfully maintained international collaboration in the Latin American region, fostered regional sustainable forest management, and broadened its network.

AO cooperated with the UBC's Faculty of Forestry on a global forest leadership forum discussion in 2021. The Dialogue with Educational Leaders (DEL) series is a new initiative of the Asia-Pacific Forestry Education Coordination Mechanism (AP-FECM) and UBC's Asia Forest Research Center (AFRC). In response to the COVID-19 pandemic, this series seeks to identify common vital challenges to online teaching in higher forestry

education and potential areas for future collaborations in the Asia-Pacific region.

Additionally, AO conducted a literature review to promote Protected Area Management Promotion. National parks have gained popularity as a means of conservation. Economies worldwide have pledged to protect a percentage of their territory in the form of national parks.

Interest in expanding their national parks programs has sparked in other regions such as Latin America. The AO conducted a brief literature review to cover the origins and current state of national parks in Latin America, identify some of the challenges these face, and identify knowledge gaps in the available literature.



INSTITUTIONAL DEVELOPMENT

Strategic Plan 2021-2025



APFNet’s 3rd Strategic Plan (3rd SP) for 2021 to 2025 was developed and approved, which will guide APFNet development in the coming years. The 3rd SP focused on forest restoration and emphasized integrity, stability, and multifunction forest ecosystems. To be more specific, APFNet will endeavour to prevent further degradation of the existing forests, restore degraded forests and woodlands, improve forest structure and quality and enhance the overall function of forest ecosystems. The need for forestry development for social and economic benefits was also embodied in this plan.

Partnerships

In 2021, APFNet Secretariat regularly communicated with Board Directors, member economies of the Council and partners. Quarterly reports were submitted to the Board of Directors timely to update our ongoing activities’ progress. Furthermore, APFNet Secretariat have contacted Council Representatives and Contact Persons regularly regarding their attendance of our virtual activities such as webinars and workshops. APFNet highly appreciate the support from colleagues for their contribution throughout the challenging year. APFNet also kept the sustained communications with those who retired or changed their position in 2021.

APFNet held several virtual meetings among APFNet partners such as the International Union of Forest Research Organization(IUFRO), the Regional Community Forestry Training Center for Asia and the Pacific (RECOFTC), and the UBC to explore cooperation areas and forms in the post-COVID-19 time. In December 2021, the new MOU between APFNet and IUFRO was signed to continue a deepened collaboration from 2021 to 2025; APFNet and RECOFTC agreed to renew their MOU by discussing new collaboration pathways and partnership framework.

APFNet identified opportunities to communicate with members and partners by attending several international meetings and events, including; the 7th Regional Meeting of Pacific Heads of Agriculture and Forestry Services, 60th IUFRO Enlarged Board Meeting, United Nations Forum on Forests (UNFF) Expert Group Meeting and 57th International Tropical Timber Organization (ITTO) Council Meeting, etc. By attending these events, APFNet disseminated its efforts and successes in achieving APFNet’s Strategic vision, thereby broadening its networks and identifying other strategic opportunities for collaboration.

Monitoring and evaluation



Monitoring and Evaluation (M&E) aims to provide accountability to its partners, a more in-depth understanding and an objective basis for their decisions at operational levels. It also contributes to corporate learning, providing a sound basis for improvements in the organization's planning and programming in terms of relevance to the actual needs of its members, the definition of objectives, design and implementation. The function of M&E in 2021, both internal and external, has been further enhanced and reflected in the operation of APFNet.

The Covid-19 crisis changed the way evaluations are prioritised, managed and conducted. Like many others, in 2021, the M&E team had to learn how to rapidly adapt to a different operational environment, in which some of the data collection and stakeholder engagement became virtual. We strived to ensure the continued delivery of evaluative knowledge while preserving the safety of staff, evaluators, and partners. We completed our core work plan of thematic and regular project evaluations.

The thematic Ex-post Evaluation on ASP was completed in March 2021. The review covers various topics, including program application, subjects and quality of teaching, faculty support, off-campus activities, and students' post-career after the program. According to the findings, the achievements and impacts of the program were positively remarked on by the evaluator.

Data collected during the evaluation and the statistics of the information indicated that ASP provides an excellent opportunity for further education for forestry practitioners in the Asia-Pacific region and contributes to the forestry talent development in APFNet member economies. The lessons learned from the ASP evaluation provided the concrete basis for the future direction, strategy, and priorities of APFNet.

In 2021, the systematic and regularized Mid-term and Terminal evaluations on APFNet funded projects and result/feedback sharing ensured the effectiveness and efficiency of APFNet operations, contributing to the better improvement of future activities planning and implementation.

Beyond the continued development of the M&E, the criteria for the performance evaluation of consultants have been explored to improve procedures further and strengthen the management of evaluation consultants. Indicators cover the overall performance of experts in mission execution, including task inception, practical experience and professional knowledge, task execution initiative, teamwork ability, productivity and quality of work output, personal credibility, ethical conduct and other aspects. The development of the criteria and procedures is expected to be completed and in use by 2022. It will serve as an essential reference document for establishing a consultant's database for the organization.

Visits



APFNet and Shanghai Cooperation Organization strengthen cooperation on forest restoration

The Secretary-General of Shanghai Cooperation Organization, Vladimir Norov, and ED of APFNet Secretariat, Lu De, agreed to strengthen cooperation to enhance ecosystem security in Greater Central Asia. Arid and semi-arid climates characterize GCA and within the region have shared environmental challenges all exacerbated by climate change and economic development. Vegetation restoration and prevention of land degradation will help address drought and desertification problems.



APFNet and Mongolia strengthen cooperation to address environmental issues

On 24 June 2021, His Excellency Mr Badral, Ambassador Extraordinary and Plenipotentiary of Mongolia to the People’s Republic of China, met with Mr Lu De, Executive Director of APFNet Secretariat, at an official visit to the Embassy of Mongolia in Beijing. They exchanged views on bilateral relations and agreed to expand cooperation on forest restoration to address environmental issues in Greater Central Asia.

Publications

Forest Restoration Planning in the Asia-Pacific Region – Stocktaking study on policies, legal frameworks and programmes

As the keystone of Policy Dialogue actions of APFNet, the Asia-Pacific Forestry Planning Network served as an informational knowledge network with the precise aim of strengthening economy-level forestry planning processes among the Asia-Pacific economies through experience exchange, capacity building and the provision of technical support.



Upon joint efforts among concerning economies, APFNet initiated a stocktaking study focusing restoration planning on degraded forests to showcase the current policies, legal frameworks, management structures and existing practices in seven economies in 2020. These economies include Cambodia, China, Mongolia, Myanmar, Nepal and the Philippines. A synthesis of the divergence between forestry policies or planning and practice from each economy helps better understanding of common challenges and approaches to combat deforestation in the Asia-Pacific Region. Additionally, it provides solution-oriented recommendations for the next-step regional restoration work and identifies areas for APFNet that could continue helping member economies contribute to their restoration work.

Forestry biodiversity conservation and rural livelihood development in the Asia-Pacific region (English and Chinese)



Biodiversity is described as life's variation on earth ranging from genes and species to ecosystems, including their interactions. It lays a fundamental basis for maintaining the integrity and functioning of living life and surrounding ecosystems. However, numerous factors such as deforestation, pollution, extraction of natural resources, unsustainable practices, and alien species invasion have led to ecosystem degradation and loss of biodiversity at unexpected rates and further negatively affected human well-being. It is necessary to integrate with the component of rural livelihood improvement, recognizing the significance of biodiversity and the urgent need for biodiversity conservation and ecosystem restoration, especially in developing contexts. APFNet Workshops with a focus theme of “forest biodiversity conservation and rural livelihood improvement” were organized to share the experience and lessons in some economies of the Asia-Pacific region.

These books provide an overview of forest biodiversity and rural livelihood improvement in the Asia-Pacific region and sixteen papers outlining the overall situation in different economies or specific case studies selected from the APFNet Workshops in the past five years. Although these relate to very different socio-economic and ecological settings, key challenges and opportunities were identified, and several widely applicable conclusions and lessons can be drawn from these papers. These books also reveal what should be done to strengthen the linkages between forest biodiversity conservation and livelihood improvement in the region.

Developing an integrated watershed management plan for Cambodia's Prek Thnot watershed

The project report “Developing an Integrated Watershed Management Plan for Cambodia's Prek Thnot Watershed” outlines the process and activities that led to the plan's development. Marking a milestone in the history of land use planning in Cambodia,



policies and practices generated by this plan can be integrated into provincial and community land use plans, allowing for more holistic planning across the watershed.

To effectively manage water resources in large and complex watersheds, policymakers and planners need to work together to build integrated watershed management plans, policies and practices in consultation with the communities who depend on those resources. From 2015 to 2019, APFNet and Cambodia’s Institute of Forest and Wildlife Research and Development and the Forestry Administration implemented a project to build the capacity of government and local stakeholders to develop an integrated watershed plan for Prek Thnot using scientific analysis and participatory land-use planning techniques.

A Review of National Park Systems: Lessons Learned in National Park Development in North America and Oceania

The captioned project was executed by the Faculty of Forestry, the UBC since January 2018. The project goal is to investigate various aspects of developing and managing national park systems in the four economies: Australia, Canada, New Zealand, and the United States. This project aims to provide lessons learned and best practices based on the comparative analysis to encourage their application to economies like China, which wish to scale up their national park systems.



The USA, Australia, Canada, and New Zealand have unique experiences specific to their distinct landscapes and species allocation. The national parks have played a critical role in protecting natural landscapes and biodiversity, conserving carbon stocks, and ensuring local communities’ food security. They share a wealth of knowledge on effectively introducing and managing a coherent national park system. The project has employed an in-depth literature review and an interview analysis with decision-makers and managers of national parks to analyze various aspects of national park management, focusing on these four critical national parks and other highly visited parks in each economy.

Through this review of decades’ worth of challenges and successes experienced in park management of each economy, specific challenges and overlapping keys to success can be identified. In this way, nationwide park systems can be established in different economies more swiftly for the more effective and efficient conservation of vulnerable plants and animals to ensure the future protection of ecosystem services.

The new edition of the Textbook for the International Training Courses on Vegetation Restoration of Arid Lands in Greater Central Asia

Since the GCA training courses started in 2015, 49 forestry officials from five economies under the GCA Cooperation Mechanism (including Mongolia, Tajikistan, Uzbekistan,



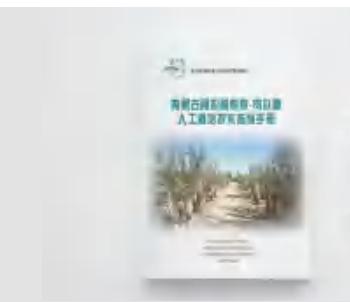
Kyrgyzstan, and Kazakhstan) have participated in the training. To further improve the quality of the training courses, based on summarizing the previous training experience, APFNet, in cooperation with Inner Mongolia Academy of Forestry, hired experts to organize and upgrade the training materials systematically and, at the same time, prepared Chinese and Russian versions based on the language and cultural characteristics of the economies of GCA. The new edition of the Textbook combines the development of new theories and technologies. Based on the high similarity between the arid lands of GCA and the arid lands of northwest China, the Textbook gives detailed introductions and examples of successful experiences in improving the ecological environment and economic development in China.

Boosting local livelihoods through Participatory Watershed Management in Indonesia 2021 Report



In 2017, the Watershed Management Technology Center (WMTC), under the Ministry of Environment and Forestry of Indonesia, submitted a project proposal to APFNet to develop participatory community management of the micro catchment, emphasizing soil and water conservation. The project was completed in 2019 successfully with people's incomes increased and better environmental conditions by using soil and water conservation technology and diversification of farm commodities. The project executing agency and APFNet published an introduction brochure to summarise the project, hoping that this demonstration project will inspire farmers to apply agroforestry practices and soil and water conservation techniques.

Demonstration of cultivation of Saxaul and Cistanche in a desert area of Alashan League, Inner Mongolia



The captioned project was funded by APFNet and improved the capacity of cultivation and management of the *haloxylon ammondendron* plantation and *cistanche deserticola ma*. It also supported the livelihood by establishing demonstration sites of 16.47 ha of haloxylon ammondendron plantation and 40 ha of inoculation of cistanche deserticola Ma to the root system of haloxylon ammondendron. The project success story was summarized into Technical guidance on the cultivation of *haloxylon ammondendron* and *cistanche deserticola* produced by The Institute of Forestry and Sand Control, Alashan League, Inner Mongolia. This guidebook contains knowledge of seed collection, seedling raising, pest and disease prevention of two plants, and cultivation, inoculation and harvesting techniques of cistanche deserticola. It would be used for vegetation restoration, sustainable management of artificial forests, and increasing the income of nomad people in similar desertification areas in GCA.

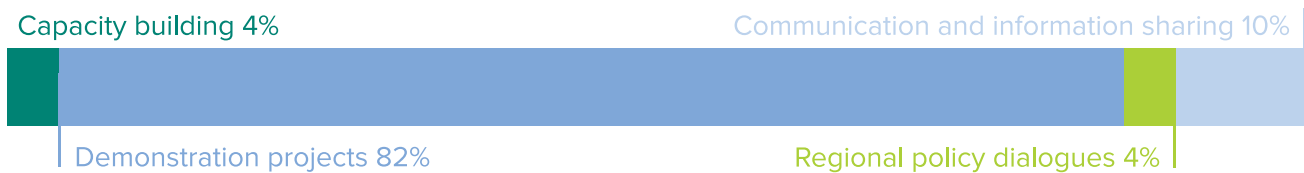
Financial information

ITEMS	RMB		USD	
	2020	2021	2020	2021
1. INCOME				
Donation	19,198,080.00	15,863,526.00	2,700,000.00	2,430,000.00
Grants	42,131,900.00	13,690,000.00	5,925,390.98	2,097,055.85
Other Income (interest)	63,046.40	35,382.97	8,866.79	5,420.02
TOTAL INCOME	61,393,026.40	29,588,908.97	8,634,257.77	4,532,475.87
2. EXPENSES				
(1) Program expenses	58,886,395.03	20,039,451.49	8,281,727.47	3,069,674.87
(2) Management expenses	15,571,388.62	13,785,712.20	2,189,945.52	2,111,717.20
(3) Finance expenses	34,138.42	11,286.74	(55,902.63)	(19,143.17)
TOTAL EXPENSES	74,491,922.07	33,836,450.43	10,415,770.36	5,162,248.90
SURPLUS (DEFICIT) FOR THE YEAR	13,098,895.67	4,247,541.46	1,781,512.59	629,773.03



Expenses by subregion (USD)	2020	2021
Greater Central Asia	1,516,810.90	1,296,138.80
Greater Mekong Sub-region (GMS)	5,247,690.38	1,131,291.25
Southeast Asia (except GMS)	526,395.57	119,458.99
South Asia	261,792.42	24,820.06
Pacific Islands	137,300.24	0.00
North America	18,552.65	67,750.93
Latin America	10,484.51	0.00
Others	562,700.80	430,214.85
Total	8,281,727.47	3,069,674.87

Expenses by 4 key pillars (USD)	2020	2021
Capacity building	804,973.60	131,069.63
Demonstration projects	6,573,564.74	2,514,414.66
Regional policy dialogues	360,755.33	119,635.41
Communication and information sharing	542,433.82	304,555.17
Total	8,281,727.49	3,069,674.87



PARTNERS

APFNet thanks the partners who support APFNet’s work through cash and in-kind contributions:

APFNet-UBC Americas Office (Canada)

Beijing Forestry University (China)

Center for Standardization of Sustainable Forest Management Instruments (Indonesia)

The University of Melbourne (Australia)

Forestry and Grassland Bureau of Chifeng (China)

Department of Forestry, Ministry of Agriculture and Forestry (Lao PDR)

Food and Agriculture Organization of the United Nations

Forest Inventory and Planning Institute (Viet Nam)

Forest Research Institute (Myanmar)

Forestry and Grassland Bureau of Pu'er (China)

Institute of Forest Resource Information Techniques, Chinese Academy of Forestry (China)

Ministry of Finance of the People’s Republic of China

Nanjing Forestry University (China)

National Forestry and Grassland Administration (China)

Sanyijing State-owned Forest Farm, Aohan Banner (China)

The Institute of Forest and Wildlife Research and Development (Cambodia)

University of British Columbia (Canada)

Vietnamese Academy of Forest Sciences (Viet Nam)

Wangyedian Forest Farm (China)

Wanzhangshan Forest Farm (China)

Watershed Management Technology Center (Indonesia)

Yunnan Academy of Forestry and Grassland (China)

APEC	Asia-Pacific Economic Cooperation
AP-FECM	Asia-Pacific Forestry Education Coordination Mechanism
APFNet	Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
ASEAN	Association of South East Asian Nations
ASP	APFNet Scholarship Program
CBD	Convention on Biological Diversity
CNY	Chinese Yuan
COP15	15th meeting of the Conference of the Parties
COP26	26th UN Climate Change Conference of the Parties
GCA	Greater Central Asia
GHG	Greenhouse gas
GSM	Greater Mekong Subregion
IRD	Institute of Forest and Wildlife Research and Development
IUCN	International Union for Conservation of Nature
Lao PDR	Lao People's Democratic Republic
REDD+	Reducing Emissions from Deforestation and forest Degradation, plus the sustainable management of forests, and the conservation and enhancement of forest carbon stocks
SFM	Sustainable forest management
UBC	University of British Columbia
USD	United States dollar(s)



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