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Bamboo and Rattan Update

Volume 1 I Issue 2

Sharing the latest news and activities from the bamboo and rattan sector

CONSERVATION AND COMMUNITIES

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Cover Image
Credit: Raphael Paucar & Noelia Carolina Trillo Mendoza, winners of the INBAR 2020 photography competition.

Editorial Team
Wu JunQi
Charlotte King

Contributors
Charlotte King, Jake Owens, Zhou Shiqiang, Bouavanh Phachomphonh

To Submit
www.inbar.int/bru-magazine/
bru-magazine@inbar.int

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About INBAR
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INBAR Headquarters: Beijing, China
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B R U

Editorial

Welcome to the second issue of* Bamboo and Rattan Update*: a magazine that aims to bring together diverse voices for nature-based solutions around the world.

"Healthy biodiversity is the essential infrastructure that supports all forms of life on earth, including human life." - Dr. Cristiana Paşca Palmer, Executive Secretary, Convention on Biological Diversity

If COVID-19 has a silver lining, it is this: as a much-needed wake-up call for humans to re-evaluate our relationship with nature.

Human activity is eroding the world's ecological foundations. Zoonotic diseases are one symptom of this problem: by destroying or encroaching on other species' habitats, we are encouraging the spread of new animal-to-human transmitted diseases.

As ever, our solutions lie in nature. A study published in *Science* this June laid out a groundbreaking plan to decrease the risk of future pandemics by 27% or more, at a fraction of the cost of current COVID-19 response efforts. How? By protecting the natural world.

This issue of *BRU*, then, is themed around conservation. Authors in this issue look at the complex, interwoven relationships between bamboo, rattan, and the species which depend on these plants, including humans.

In the first article (page 4), we consider bamboo and rattan in the context of forest ecosystems. Bamboo and rattan grow across some of the most biodiverse and carbon-rich areas of the tropics and subtropics, meaning their conservation is of critical importance. But while these plants are often discussed as valuable non-timber forest products, providing millions of people in rural, mountainous areas with a source of income, their role in biodiverse landscapes and ecosystem services is of equal importance. This article considers the role bamboo and rattan play in supporting other species, and how to overcome the threats to their conservation.

Elusive and iconic, the giant panda is widely regarded as a symbol of conservation, and synonymous with bamboo. Jake Owens, Director of Conservation at Los Angeles Zoo and former 'panda wrangler', recounts

the evolutionary path of the panda, and its relationship with the bamboo forests in which it lives (page 6). In recent decades, this relationship has become increasingly strained: the giant panda has suffered from its not-so-giant habitat, which has shrunk considerably. While this is cause for alarm, Dr. Owens believes that the giant panda's continued existence shows "what is possible through collaborative conservation efforts." Numerous organisations have stepped up to conserve this species, including the China Conservation and Research Center for the Giant Panda. In an in-depth profile, Zhou Shiqiang discusses the Center's work, and main achievements since its establishment in the 1980s (page 8).

To be successful, conservation measures need to find a balance between human activity and ecosystem health. This is particularly critical in parts of the world where people rely on forest resources for food, fodder, fuel or income. In our final feature, conservationist and sustainable rattan expert Bouavanh Phachomphonh describes ongoing efforts to create more sustainable rattan practices in the Lao People's Democratic Republic (page 12). As she shows, a healthy, sustainable supply of rattan is helping forest-dependent communities earn more money, while also protecting the forests.

With many of us home-bound this year, the INBAR annual photography competition has focused on celebrating our relationship with the natural world. INBAR received 100 entries from participants around the world, on the themes 'Bamboo in nature', 'Livelihoods, lifestyles and people' and 'Made with bamboo'. You can see the winning entries, which were judged by an expert panel of photographers, on pages 10 and 11 of this magazine. Thank you to everyone who submitted a photo, and congratulations to Raphael Paucar & Noelia Carolina Trillo Mendoza for their winning image (see cover).

Finally, we hope this issue will inspire you to continue promoting nature-based solutions, including bamboo and rattan, as a way to live more sustainably in harmony with nature.

Seasons greetings, and a happy new year.

THE EDITORS

INTERWOVEN

More countries are finding innovative ways to incorporate bamboo and rattan into forest protection.

They are a ubiquitous sight across many parts of the tropics and subtropics. Bamboo, the fast-growing grass plant, and rattan, the spiky climbing palm, comprise many species—the World Checklist of Bamboo and Rattan identifies 1642 known species of bamboo, and 631 of rattan—and even more uses.

While both plants are best known as a particularly valuable material and source of income for rural communities, their role in biodiversity conservation is equally critical.

Fruit and fibre

A range of animals, including a number of the world's most iconic and endangered species, rely on bamboo and rattan as a source of food. Aside from the giant panda, whose specialised bamboo diet is well known, other bamboo-eating mammals include the red panda, mountain gorilla, Indian elephant, South American spectacled bear and Madagascar bamboo lemur. Rattan's small and sour-tasting fruits also provide nutrition to a number of birds, bats, monkeys, and the Asian sun bear, which help disperse the seeds across the forest.

In recent years, humans have employed more inventive ways to exploit animals' reliance on bamboo. In parts of India, forest officials throw soil balls stuffed with bamboo seeds into vacant areas of the forest: a way to keep wild elephants fed, and reduce the risk of them raiding nearby villages and agricultural fields. In Africa, INBAR is conducting research and training work on bamboo leaves as a year-round source of nutritious fodder for livestock; one recent study in Madagascar showed that bamboo leaves could provide an important component of cattle diets and ensure milk production throughout the year, including seasons of fodder shortage. And researchers at Aarhus University in Denmark are researching giant pandas' digestion, as a way to better convert tough, cellulose- and lignin-rich materials into bioethanol.

Bamboo and rattan are also a component of human diets. Bamboo shoots, a traditional delicacy in many parts of Asia, are one of the bamboo sector's most highly valued exports: in 2018 alone China exported USD 308 million to other countries. While rattan fruits are typically too sour to be palatable for most humans, they have important medicinal uses, and the shoots are a nutritious source of food which can be fried, boiled and mashed.

Home sweet home

With their thick canopy, branches and hollow culms, bamboo plants, stands and forests provide an important source of habitat to many creatures. The

Bamboo and rattan are common to some of the most biodiverse and carbon-rich landscapes of the tropics and subtropics.

endangered ploughshare tortoise in Madagascar, the South American bamboo rat, and at least 5% of bird species in the Amazon rainforest live amongst bamboo. The African mountain bongo relies on bamboo thickets for food and shelter during the dry season. 'Bamboo fungus', a delicacy in parts of Asia, grows exclusively within bamboo forests.

Bamboo culms also provide important habitat for numerous invertebrates. Certain species of frog lay their eggs in broken bamboo culms; one species of spider lives inside bamboo; and some kinds of butterfly rely on bamboo culms as food during caterpillar stage.

A tool for forest management

As well as providing food and shelter to other species, bamboo forests help regulate their environment. Their extensive, shallow root and rhizome systems grip the top layer of soil and enable the plants to grow on steep slopes, making bamboo a much-used plant for preventing soil erosion and restoring degraded land.

An increasing number of countries are turning to bamboo for support in soil stabilisation, flood prevention and land restoration. In November of this year, Rwanda's Environment Minister urged people to plant bamboo to protect riverbanks from flooding; in the same month, Reuters published a story about 1000 families in Kenya's Murang'a County, who are using bamboo to forestall deadly landslides. In the Philippines, one of the most mineralised countries in the world, the Department of Natural Resources issued a memorandum in June calling for bamboo to be planted on quarried soils in all mining areas. Bamboo plantations must now cover at least 20% of all mining areas.

Rattans provide a different role in forest protection. Because the majority of rattans are climbing plants, they are literally intertwined with the trees along which they grow in primary rain and monsoon forests. This means that, in areas where rattan is harvested and used sustainably, forests—and their biodiversity—are also valued and protected.

Conserving forests, enhancing incomes

But while bamboo and rattan are hardy plants, which spread quickly, grow fast, and regrow after harvesting without the need to replant, their conservation is by no means guaranteed.

Because most species grow in forests, bamboo and rattan species are intrinsically vulnerable to deforestation; and because they are such valuable non-timber forest products, harvested and used by millions of people for food, fuel, construction materials and more, they are often overexploited or harvested in an unsustainable manner. Both actions have important impacts on wildlife. The IUCN Red List counts a number of bamboo lemurs, as well as the red panda, among its vulnerable or critically endangered species. The mountain gorilla and giant panda are two iconic mammals who have been driven into smaller and smaller pockets of habitat by encroaching human life. Several species of rattan are also endangered, some critically so, through overexploitation.

A fine balance is needed for these plants to benefit rural communities while also sustaining natural systems in the long term. Fortunately, if managed well and harvested sustainably, bamboo and rattan can actually improve the health of surrounding forests: providing a valuable source of income and alternative to timber products, including furniture, cooking fuel and construction materials. One study estimates that sub-Saharan Africa has strong potential to produce about 9 million tons of bamboo charcoal on a sustainable basis, which could potentially replace 64% of the region's wood consumption for charcoal production: an important contributor to preventing deforestation.

Such efforts are already being seen. In Laos, community management of rattan plants has resulted in Forest Stewardship Council (FSC) protection for more than 10,000 ha of tropical forest in 2020 alone. Likewise, in the famous 'Danxia' UNESCO World Heritage site in Guizhou province, China, artisans are reviving traditional bamboo weaving craftsmanship as a sustainable livelihood replacement for mining, logging and hunting, all of which are now banned.

This, then, is the fine line that bamboo and rattan conservationists must walk: balancing the protection of these plants, and the forests in which they grow, with the sustainable use and promotion of non-timber forest products. In a time during which deforestation, forest degradation and climate change are threatening the diversity of life in forests, this synergy is more important than ever before.

CHARLOTTE KING
Charlotte King has an MSc in energy and climate policy. She works at the International Bamboo and Rattan Organisation.

ON THE TRAIL OF THE GIANT PANDA

Dr. Jake Owens reflects on his experiences working with giant pandas, and on the intimate, evolving relationship between the animal and bamboo.

One spring day in 2016, Bi Wenlei, my colleague from the Chengdu Research Base of Giant Panda Breeding, and I left our home base in Liziping Nature Reserve just as the sun began to crest the jagged montane horizon of western Sichuan province. After hiking upward for hours, through elevational bands of habitat easily discernible by their characteristic bamboo species, beginning in Fargesia ferax *and through the* Yushania lineolata*, we entered the* Arundinaria faberi *forests, starting 3000 m above sea level. We paused to catch our breath in the cool, thin air. Now the real work began, for we were there to find signs of the elusive giant panda.*

*

The giant panda's journey

While bamboo is not the only food that giant pandas eat, it does comprise 99% of their diet. The giant panda lineage split from other bears roughly 19 million years ago, and the earliest known direct ancestor of modern giant pandas evolved in Spain 7.6 million years later. Bamboo specialisation, for which giant pandas are perhaps best known, began only after pandas settled in China two million years ago. Since then, panda species became increasingly adapted to bamboo, which dominated the wet, topographically diverse landscape of southeast Asia.

Over millennia, the morphology of pandas changed to increase their bamboo foraging efficiency. In addition to evolving a thumb-like protrusion on their paws, which improved their dexterity and handling of culms, leaves, and shoots, they developed specialised molars, massive jaw muscles, and a unique skull. Despite not having the specialised guts of many grass-eating herbivores, pandas thrive on bamboo thanks to these and other features. As such, the ecology and behaviour of giant pandas is intrinsically linked to bamboo. Unfortunately, so is their conservation.

During the Pleistocene epoch (ending 11,700 years ago), giant pandas were found throughout much of southeast China, into northern Myanmar and Viet Nam. Although subsequent climate change and shifts in bamboo distributions reduced this range, pandas were still recorded in Hubei and Hunan provinces as recently as the 1860s. However, as a result of intensified human activity, and the over-exploitation of land and natural resources, habitat loss and degradation altered the habitat of giant pandas at a rate far exceeding their capacity to adapt. Between 1950 and 2004, a further 30% of the total forests in China were lost and what remained was heavily fragmented.

As giant panda habitat contracted, so did their population. In recognition of their rarity, the Chinese government led an unprecedented effort to save them from extinction. The first protected area for giant pandas, Wolong Nature Reserve, opened in 1963. In 1977, the Chinese State Forestry Administration published the first National Giant Panda Survey (NGPS), to assess and monitor the wild population every ten years. Between 1977 and 1988 the surveys estimated that the total number of giant pandas range-wide fell by approximately 55%, from 2459 to 1114 individuals. This decline motivated the development of the Law of the People's Republic of China on the Protection of Wildlife, which prioritised wildlife protection in public and private activities. Numerous laws have subsequently been enacted to

Dr. Owens worked for several years in Sichuan province, China. Credit: Jake Owens.

protect giant pandas and their habitat, including outlawing all panda hunting and bans on logging in protected areas.

These efforts have resulted in significant achievements. Today, 67 nature reserves protect more than 33,600 km squared of giant panda habitat, and the fourth NGPS, published in 2015, indicates that the population has rebounded to approximately 2000 individuals. Science-driven efforts to build a healthy, genetically diverse, and self-sustaining population of giant pandas in human care have been successful. Today, over 550 pandas exist at facilities like the Chengdu Panda Base, securing the future of the species regardless of their fate in the wild. However, serious challenges to the long-term conservation of giant pandas remain.

Conservation challenges

Past timber harvesting has had long-term impacts on the forest structure, reducing the total number of trees and their average size, and altering the sub-canopy structure. Within the post-harvested secondary forests, bamboos take advantage of altered light regimes and grow in dense ubiquitous swaths that inhibit the regrowth of other species.

Pandas avoid these open, hyper-dense bamboo landscapes and compete for the small remaining patches of primary forest. The species is now divided into 33 heavily fragmented subpopulations, 18 with fewer than 10 individuals. Small populations are fragile and susceptible to extinction from even minor environmental changes or disease outbreaks. As such, fragmentation and small subpopulation sizes are key threats to giant panda conservation.

The biggest concern for the future of giant pandas is undoubtedly climate change. Alterations in temperature and moisture are expected to shift panda habitat upward in both latitude and elevation, increasing habitat loss and fragmentation up to 60% range-wide in the next 70 years. Moreover, climate change is altering the timing of specific changes in the bamboo lifecycle, on which the reproductive behaviours and survival of pandas rely. It is unclear what effects this uncoupling will have on wild panda populations, but it is essential to mitigate its future impacts.

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So there we were, 3000 m above sea level, slowly pushing through a bamboo forest roughly three metres high and so dense we often had to crawl or climb through. Small cuts checkered our wrinkled hands from the struggle. A welcome breeze made its way through the bamboo and carried with it a faint odour of milk and fresh-cut grass: the characteristic "bamboo-ice cream" odour of the giant panda. Forgetting our cuts and exhaustion, we quietly continued on until we found a small clearing where all that remained of the bamboo were short stalks, scattered leaves, and a steaming pile of faeces. Suddenly, a loud "huff" froze us in our tracks; a wild panda was only a few metres away. Bamboo obstructed our view and our escape, if one was needed. For our safety I confirmed our presence calmly, saying a gentle but confident, "Hi panda," and it fled. In just a few seconds it ran nearly the same distance we had trekked in the last hour. After a wide-eyed high fives we collected our day's rewards, including field notes, photos, and several bags of faeces, and began our journey home.

*

The future: far from black and white

For decades, organisations like the Chengdu Panda Base in Sichuan province have been an integral part of the efforts to save this unique species from extinction, through a combination of cutting-edge research, expertise in the breeding and welfare of pandas in human care, and public education and engagement. One particularly key component of the long-term conservation of giant pandas is currently under development. The Giant Panda National Park, which will cover 27,134 km squared of land across Gansu, Sichuan and Shaanxi provinces, will link most of the existing panda reserves under a single management structure and facilitate the restoration of native bamboo forest ecosystems. Its development is made possible by many organisations in China, including the Panda Base, setting an example for the magnitude of what is possible through collaborative conservation efforts.

The future of the giant panda remains uncertain, but thanks to the unwavering dedication of the Chinese government, non-profit organisations like the Panda Base, and public support, the world can rest more assured that they will live amongst the bamboo in perpetuity.

JAKE OWENS
Dr. Owens is a conservation biologist and the first Director of Conservation at Los Angeles Zoo. He previously spent five years in Sichuan province, China, working on giant panda conservation at the Chengdu Research Base of Giant Panda Breeding.

"The ecology and behaviour of giant pandas is intrinsically linked to bamboo. Unfortunately, so is their conservation."
Credit: Jake Owens.

IN PROFILE:
PROTECTING THE PANDA

The China Conservation and Research Center for the Giant Panda has been at the forefront of researching, and protecting, these elusive animals.

Founded in the early 1980s in Sichuan province, 'the home of the panda', the China Giant Panda Conservation and Research Centre is located in the scenic Wolong National Nature Reserve. Its main purpose is to study the ecological and biological characteristics of giant pandas in the wild, to promote their breeding, and to cooperate and exchange knowledge about these creatures at home and abroad.

In the years since it was established, the scope of the Center has grown hugely. It has now evolved into a laboratory for research into field ecology, reproduction physiology, cytogenetic research, and disease prevention and control, as well as a hub for international knowledge exchange and conservation cooperation, and a base for managing giant panda breeding.

Since its establishment, the Panda Base has made a number of important achievements regarding humans' understanding of pandas, and their protection. The first comes from the ecological study of wild giant pandas, their habitats, and staple food. By systematically studying wild pandas' behaviour, habitat selection, and the growth of bamboo species, the Base has been able to improve international knowledge about these animals' survival on the ground.

The second big breakthrough has been to ease the "trilemma" of artificial breeding of giant pandas. Conservationists have faced three central difficulties in promoting panda reproduction: difficulties with oestrus (the female panda's period of sexual

Not so giant: The primary forests in which the giant panda lives have shrunk in recent years, giving way to much denser forests where bamboo dominates. Credit: Jake Owens.

PANDA WEBINAR

On 22 December, INBAR spoke to experts from a range of universities, organisations and local governments, about the critical role of bamboo in the conservation of the giant panda. Professor Lu Wenming, Deputy Director of INBAR, and Mr. Wang Hongjia, Chief Planner of Sichuan Provincial Forestry and Grassland Administration, gave introductory speeches emphasising the giant panda's importance as a symbol of international conservation, and the ongoing efforts to conserve and improve this creature's world. Following these speeches, speakers presented on a range of topics, including: the giant panda habitat, the changes it is undergoing, and how to 'design' landscapes which best benefit these animals; how bamboo resource assessment technologies can be used to better map panda habitat; efforts to reintroduce giant pandas into the wild; panda diet; and how we can balance wildlife conservation and socio-economic development in rural areas. You can find a recording of the event, and other webinars, online at: **www.inbar.int/inbar-webinars/**

receptivity and fertility) and breeding, difficulties with pregnancy, and difficulties ensuring cub survival. A better understanding of these challenges, and how to overcome them, has contributed to the increase in giant panda population: the number of giant pandas in the Center has grown from 6 in 1983 to 332 by 30 November 2020, accounting for nearly 60% of the global captive population, and creating the world's largest artificial captive population.

The third achievement of the Conservation and Research Center for the Giant Panda has been to build an important platform for international and domestic research cooperation. So far, the Center has cooperated on scientific research with 15 zoos in 13 countries. The Center has also become a hub for knowledge and information about the giant panda. More than 400 scientific research papers and 10 books have been published, the results of which have been widely promoted and applied in the industry.

The Center's work has led to a leap in the number of pandas being reintroduced into the wild. Since 2003, when reintroduction work started, 11 pandas have been successfully released into the wild, of which 9 have survived. In addition, the team has released 12 captive giant panda mothers into the wild; of these mothers, 7 litters of cubs have survived, which improved the genetic diversity and viability of the captive giant panda population.

The Chengdu Panda Base is currently focusing its efforts on training conservationists to reintroduce captive giant pandas into the wild. The training integrates the Base's understanding of giant panda behaviour with innovative tracking equipment, geographic information system technologies, and classic animal ecology research methods, to conduct training.

With further training and continued support, the Base will continue to help these iconic animals survive and thrive in the twenty-first century.

ZHOU SHIQIANG
Professor Zhou works at the China Conservation and Research Centre of the Giant Panda. He has worked on a number of research programmes, and focuses on wild panda populations, habitat and ecology.

THE WINNERS:
PHOTOGRAPHY COMPETITION 2020

The winners of INBAR's annual international photo competition reflected on how bamboo is an integral part of lives and landscapes.

FIRST PRIZE

WINNER: ''The best inheritance for our children and grandchildren is to teach how to take care of nature and bamboos.' Credit: Raphael Paucar & Noelia Carolina Trillo Mendoza.

Taken in Peru, this photograph encapsulates the wonder of learning about bamboo, and the long relationship between humans and this grass plant.

SECOND PRIZE

'Transportation of bamboo culms in rural Ethiopia'. Credit: African Bamboo (Anthony Wood).

A woman transports freshly harvested bamboo.

'The Journey Portal'. Credit: Jessica Devnani.

This conference zone was built for the Cosmic Festival in Guatemala, by students on a 14-day bio-construction course. The poles were later used to build an eco-salon 28 km away.

Clockwise from top left:

'Bahay-kubo'. Credit: Anthony Into.
Bahay-kubo, or nipa-huts, are a traditional form of housing in the Philippines.

'Four generations'. Credit: Kelly Cristina Michels Exterkotter.
"As a bamboo family, our ancestors strengthen and inspire us."

'Nurse school, Stephason, Uganda 2018'. Credit: Silvia Aratun Bertos.
A child plays in a bamboo structure in Uganda.

And finally...
The judges awarded 14 additional entries with special mention, for their composition and relevance to the themes 'Bamboo in nature', 'Livelihoods, lifestyles and people', and 'Made with bamboo'. Congratulations to **Dennis Munyeti Munyao, Edouardo Calvo, Eliza Carneiro, Francesco Intrieri, Josué Samol Navichoc, Ivan Davila, Muwanga Allan, Raphael Paucar & Noelia Trillo** for their submissions. All entries can be found online.

A TRULY GLOBAL GRASS...

The annual INBAR bamboo photo competition provides budding photographers, as well as bamboo enthusiasts, architects, artisans and more, a chance to showcase their work. People have a very tactile connection with bamboo plants and products, and a well-judged or beautifully shot image says a thousand words about our relationship with this impressive grass plant.

In 2020, judges received more than 100 entries from across the world, on a wide range of themes. From reflections on the calming ambience of bamboo forests, and the creatures which live in them, to vignettes of the people making and using bamboo products, entries displayed the stunning diversity of what bamboo can do.

The photo competition is always international, and this year was no different. Winning or highly commended photos were submitted from Brazil, China, Ethiopia, Guatemala, India, Kenya, Mexico, Peru, the Philippines, Thailand, Spain, Uganda and more.

Thank you to all who contributed to this competition!

Browse the full results online at: tinyurl.com/INBARPhotoComp2020

OUT OF THE WOODS

A project has been balancing the conservation of wild rattan and biodiversity with local wellbeing and prosperity for 15 years.

Rattan landscapes, rattan livelihoods

It has long been used as a material for furniture, handicrafts and construction in the tropical regions of Africa and Asia. Rattan, the spiky palm, is a particularly high-value non-timber forest product, offering a critical source of income for some forest-dependent communities in the tropics and subtropics: young shoots provide a source of food and more mature fibres are used to build furniture and make handicrafts, such as baskets.

In the Lao People's Democratic Republic (Laos), sustainable management of natural rattan is critical if this way of life is to continue and forests are to remain viable habitats for wildlife.

Because it is usually a climbing palm, rattan's fate is quite literally interwoven with the trees along which it grows. Unfortunately, like many other places, Laos' forests and the wildlife that inhabit them are threatened by illegal and commercial logging, and the expansion of agricultural land. According to Global Forest Watch, Laos lost 773,000 ha of humid primary forest between 2002 and 2019, and has seen an 18% decrease in tree cover since 2000.

Unsustainable rattan harvesting practices are also threatening natural rattan forests in Laos. In some areas, people cut down the tree on which the rattan palm is climbing to access the stem, harvest all of the palms in one area, or cut palms only to find they cannot be extracted from the plant on which they are growing. These practices lead to a reduction in the long-term availability of natural rattan, on which people's livelihoods depend. Locals report having to go further and further from the village to harvest rattan every year.

Inevitably, unsustainable harvesting of rattan has a negative impact on the ecosystem services provided by forest landscapes, and results in a loss of wildlife habitats and, by extension, of biodiversity.

The sustainable rattan project in Laos

As part of its forest conservation efforts in the Greater Mekong region, particularly Cambodia, Laos and Viet

Rattan can be a fast-growing alternative to timber, if managed well and harvested sustainably. Credit: WWF-Laos.

A community in Thaveng village, Khamkeut district, Bolikhamxay province creates handicrafts from sustainably harvested rattan. Credit: WWF-Laos.

Nam, the World Wide Fund for Nature (WWF) has been working to establish sustainable rattan supply chains and improved systems for rattan forest management.

WWF-Laos has been working with around 1500 households, as well as government officials, in Bolikhamxay province since 2006, and Sekong and Salavan provinces in southern Laos since 2009. The project aims to develop a viable and sustainable management and supply chain model that ensures the forest is protected while also contributing to local livelihoods and the protection of wildlife.

Creating value

With support from international furniture retailer IKEA, the Swiss Agency for Development and Cooperation, and the Swedish International Development Cooperation Agency, WWF trains local villagers and authorities to sustainably harvest natural rattan, grow rattan for production purposes, manage rattan forests and produce value-added goods.

At the start of the project, WWF-Laos realised that the communities had only been selling rattan as a raw material to external producers, thereby missing out on opportunities to produce more lucrative value-added products. In order to give them control of the entire supply chain, the project ran training programmes to teach communities how to properly process rattan, by boiling and splitting palm fibres, as well as how to weave and create finished products. These products were then sold to distributors in Laos, for further sale domestically or export to countries like France, Sweden, Switzerland, Thailand and the USA.

Improving forest management

The project team, in collaboration with local authorities and communities, has also created and implemented a rattan forest management plan, which includes a system for classifying rattan based on length and type, and provides guidance on sustainable harvesting practices: only rattan stems more than 5 m long should be harvested; only 20% of commercially viable stems occurring in natural forested areas can be harvested at any one time; and the plant on which the rattan stem is growing must not be cut.

To increase the density of rattan in forested areas, as well as in individual gardens, the project established rattan nurseries, in which rattan seedlings are grown and transplanted into natural forests, reducing the need to harvest natural rattan. Communities are trained to take inventory of the rattan plants in the forests, in order to improve overall forest management and understanding of

what to harvest for commercial purposes. The extra seeds, seedlings and shoots can also be sold to generate additional income, either for future production of rattan products or as food.

Finally, the project has promoted Forest Stewardship Council (FSC) certification as a way to ensure forest management standards are upheld. Using this certification process, the project has been able to enhance the environmental conservation of rattan forests: in 2020, some 11,000 ha of rattan forest were certified in Bolikhan District, Bolikhamxay province.

Branching out

More sustainable rattan stewardship is reaping rewards. From August 2019 to July 2020, communities' expanded range of rattan livelihood activities—producing handicrafts, harvesting rattan cane, selling rattan seeds and seedlings, and selling rattan shoots for food—generated LAK 726,358,000 (about USD 78,000) in income across 365 households: a significant boost in incomes. Of these households, the 222 specifically engaged in making handicrafts earned LAK 675,796,000 (USD 73,075).

Currently, the rattan project is focusing its efforts on supporting the creation of an enabling policy environment for the development of rattan and bamboo value chains that have both sustainable forest use and fair distribution of profits at their core.

In collaboration with the National Agriculture and Forestry Research Institute (NAFRI), the Ministry of Agriculture and Forestry, and other government agencies, WWF-Laos has been working to improve forest patrols and enforcement of wildlife law which would prohibit unsustainable rattan harvesting, as well as illegal wildlife poaching and logging. It is also working with NAFRI to establish biodiversity surveys so that the impact of improving forest management on wildlife populations can be better understood.

"It is our hope that the rattan project can act as a model for sustainable development," says Bouavanh Phachomphonh, Rattan & Bamboo Project Manager for WWF-Laos. "By sustainable use of locally available non-timber forest products, like bamboo, tea or forest honey, the current "get rich quick" mentality can be changed and replaced with one that considers the long-term benefits of maintaining forest landscapes: for the benefit of people and nature."

BOUAVANH PHACHOMPHONH
Bouavanh is a conservationist and leader of the Laos Rattan and Bamboo Project Team in WWF-Laos. She works closely with government staff and villagers on sustainable rattan forest management, rattan forest certification, and improved livelihoods for forest-dependent communities.

Mr. Khensy Milatid's household earns income from the project, both by growing rattan seedlings, and by participating in the production of handicrafts. His family earned around LAK 41,000,000 this year from handicraft production alone. Credit: WWF-Laos.

INTERNODE

Collating the latest international news and activities about bamboo and rattan sector development.

Credit: Ministry of Environment, Rwanda. Via Twitter.

European Commission President promotes bamboo construction

The President of the European Commission called for a more sustainable construction industry "that uses natural materials such as wood or bamboo", as part of a new architectural movement announced in October.

In an editorial published on the European Commission's website, Ursula von der Leyen set forth a 'new European Bauhaus' movement, which promotes sustainable architecture and design across Europe. Von der Leyen noted that buildings and infrastructure are responsible for at least 40% of all greenhouse gas emissions, and are constructed mainly using emissions-intensive cement and steel.

As a movement "based on sustainability, accessibility and aesthetics", European Bauhaus would include a focus on "natural materials such as wood or bamboo", as well as "near-natural forms and construction principles, that consider ecosystems from the outset, that enable and plan for sustainability and reusability."

Source: European Commission, 15 October.

Giant pandas return from Calgary zoo

Two giant pandas were returned to China from Canada in November, two years ahead of schedule, due to a shortage of fresh bamboo.

Er Shun and Da Mao, the two giant pandas, were sent to Calgary Zoo in Alberta in 2013, as part of a 10-year agreement between China and Canada. However, since COVID-19 grounded most flights in March this year, it has been harder for the zoo to receive imports of fresh bamboo from China.

According to the zoo, 99% of a giant panda's diet is made up of fresh bamboo and each adult giant panda consumes approximately 40 kg of bamboo daily.

Source: BBC, 27 November.

Planting bamboo in Africa

Rwanda's Minister of Environment has said that bamboo should be part of long-term planning to protect riverbanks from the impacts of climate change.

Dr. Jeanne d'Arc Mujawamariya made the remarks in Nyagatare District on 28 November, during a bamboo-planting event (pictured) to mark the launch of a new national climate adaptation planning project.

"Planting bamboo aims to conserve and protect this river bank", Dr. Mujawamariya said. "We have little land; we have to maintain it. That is why we urge the people to be vigilant and take care of these planted bamboos so that they grow quickly and help to avoid floods again."

Rwanda is one of several African countries which are planting bamboo to restore land and prevent water run-off in hilly areas. In December, Kenya Forest Service signed a collaboration framework with Kenya Water Towers Agency to establish a national bamboo demonstration site on just over 100 ha of land. The site will generate seedlings which can be planted in riverine and catchment areas.

Source: TopAfricaNews, 29 November, and Kenya News, 20 December.

STAY UP TO DATE

For regular updates in your inbox on bamboo- and rattan-related news, and the quarterly *Bamboo and Rattan Update,* sign up to the INBAR newsletter.

WWW.INBAR.INT/INBAR-NEWSLETTER-EN/

INBAR commissions research, conducts project work and raises awareness about bamboo and rattan's potential across its 47 Member States.

Member State representatives attended the flag-raising ceremony for INBAR's 47th Member State, Fiji. Credit: INBAR.

Raising the flag for Fiji

On 27 October, a flag-raising ceremony was held outside INBAR Headquarters in Beijing, China, to mark the accession of the Republic of Fiji. Fiji formally joined INBAR in September 2020.

Speaking at the flag-raising ceremony, the Ambassador of Fiji to China, H.E. Mr. Manasa R. Tagicakibau, said that bamboo was already a key part of life and culture for Fiji and other Pacific island states.

Professor Jiang Zehui, the co-Chair of INBAR's Board of Trustees, expressed her belief that Fiji's membership of INBAR "will surely usher in a new era of… sustainable development of the bamboo and rattan industry in Oceania and the world."

Fiji is INBAR's 47th Member State, and 15th in the Asia-Pacific region. INBAR has cooperated with the government of Fiji before on a number of activities. In the past few years, Fiji's Minister for Women, Children and Poverty Alleviation, and Minister for Forestry, have both visited INBAR Headquarters; INBAR also coorganised an event with the government on 'Bamboo for climate change action in Small Island Developing States' at the UN climate conference in 2017, for which Fiji held the Presidency.

Strategic partnership with FAO

On 18 November, INBAR and the Food and Agriculture Organization of the UN (FAO) signed a five-year partnership to scale up the use of bamboo and rattan for sustainable development.

Speaking at the virtual signing ceremony, FAO Director General Qu Dongyu said: "Through our strengthened cooperation, we will support Members to improve food security and nutrition, transform agri-food systems, create employment and generate income, while protecting biodiversity and ecosystems."

FAO was founded in 1945, as a specialised agency of the UN to lead on international efforts to defeat hunger. It has 194 Member States and works in more than 130 countries worldwide. Both FAO and INBAR have members in sub-Saharan Africa and South Asia, two regions which face serious food insecurity, but which also possess bamboo and rattan resources.

Prior to the signing ceremony, a 30-person task force had already been established, and a detailed workplan drawn up. Key cooperation priorities include: developing joint projects to mobilise bamboo and rattan resources; establishing pilot and demonstration initiatives; developing knowledge products; and exchanging data and information.

Visiting China's 'bamboo hubs'

From October through December, INBAR staff visited a number of China's key bamboo-producing areas. In

Qingyuan county, Zhejiang province, staff attended a bamboo product design competition. The county is a major hub for the sector; according to a 2020 report by China Daily, Qingyuan boasts around 300 bamboo processing enterprises, with more than 20,000 employees. Staff also attended the 3rd China (Zixi) Bamboo Industry Development Forum in Zixi county, Jiangxi. INBAR signed a strategic partnership agreement with the county on 17 December, to further promote regional bamboo cooperation.

In November, INBAR also took part in bamboo festivals held by Meishan, Sichuan, and Yong'an, Fujian: the 2020 China International Bamboo Industry Fair in Meishan, and the 2020 International (Yong'an) Bamboo Expo. Both prefecture-level urban areas are surrounded by thick bamboo forests, and recent improvements in infrastructure and local government support have transformed the plant into one of the cities' most lucrative exports.

Finally, staff conducted bilateral meetings with local governments and companies in Yibin, a prefecture-level city in Sichuan, as well as Hangzhou and Anji, in Zhejiang.

In review: INBAR's bamboo webinars 2020

On Tuesday 22 December, INBAR concluded its webinar series for 2020. The series, which was devised in response to the challenges imposed on INBAR's conventional training courses by COVID-19, was designed to raise awareness and increase knowledge about sustainable bamboo development.

In total, INBAR organised 51 webinars on a wide range of topics. All webinars were provided free following registration, and topics were focused towards training bamboo sector development planners, with sessions looking at the plant's role in environmental management, poverty alleviation, circular economy development, health and welfare. In total, nearly 1700 participants from 85 countries registered for the INBAR webinars. Recordings were also uploaded to INBAR's Youtube channel (@INBAROfficial), on which platform videos have garnered more than 100,000 new views since May.

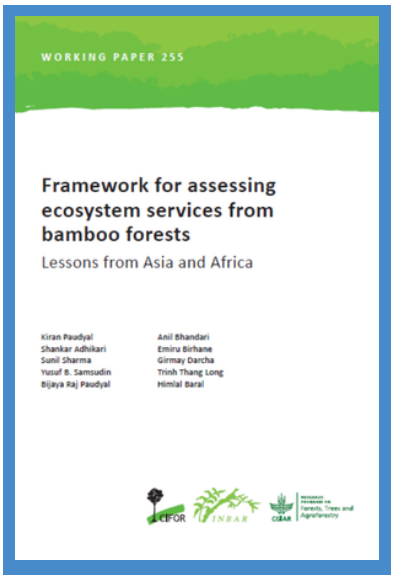
Building sustainable bamboo value chains

In November, INBAR project staff undertook a survey of more than 30 factories across 10 areas of Fujian province, China, as part of a UK-funded project on sustainable value chains.

The 'Trade, Development and the Environment Hub' is an international initiative led by UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), to improve green value chains and promote more sustainable trade. It is funded by the UK Research and Innovation's Global Challenges Research Fund. As part of the Hub, INBAR is focusing on promoting sustainable trade of bamboo and rattan products. Because of its large bamboo sector, Fujian province was chosen as a starting point to evaluate the sector's sustainability. Project staff surveyed Fujian companies about resource supply and efficiency, research and development, standards and trade regulations.

In future months, INBAR will also interview bamboo enterprises in other provinces of China, in order to build a full picture of the current status, trends, and challenges facing the sector. The project team will then identify key policies which can encourage the bamboo sector's development and facilitate international trade of bamboo products.

INBAR Director General Mr. Mchumo visited a bamboo forest in Yong'an, Fujian province, in November. Credit: INBAR.



Framework for Assessing Ecosystem Services from Bamboo Forests (2019)

Bamboo forests have been intimately associated with human wellbeing for thousands of years. As well as supplying food, fodder, timber, construction and bioenergy in rural farming systems, and acting as a crucial part of subsistence livelihoods, bamboo forests also furnish a wide range of environmental services: as a source of carbon storage, a means to stabilise slopes and prevent soil erosion, and a crucial part of biological diversity.

Despite their many uses, there has been little focus on the ecosystem services provided by bamboo forests. As a grass plant and not a tree, bamboo 'falls through the cracks' in many existing ecosystem service analyses, and so bamboo forests' huge role is often underplayed. Statistics given are often poor, inconsistent, or based on different definitions and methods across countries.

In 2019 INBAR and the Center for International Forestry Research (CIFOR) released a framework for assessing bamboo's ecosystem services. The three-part framework allows people to assess what ecosystem services exist based on specific types of bamboo forest management practice. Importantly, the framework can be easily applied, particularly in data-poor regions, and can be tailored to fit different contexts.

The authors find that bamboo forests "can provide key ecosystem services with local and global benefits." The study shows that bamboo forests' ecosystem services are often more varied and high-impact than those of other forests, grasslands and agricultural land. In fact, because of their fast growth and higher culm density, bamboo forests supply more biomass than both natural and planted forests: a plantation of giant bamboo (*dendrocalamus giganteus*) with 200 bamboo clumps per hectare can give an annual yield of about 2000 poles, with a biomass of as much as 50 tonnes. Similarly, bamboo forests have a higher production capacity for food, fodder, timber, bioenergy and construction materials, as well as regulating services such as landscape restoration, landslide control, groundwater recharge and water purification.

Millions of people in rural communities around the world rely on bamboo forests for their ecosystem services. This paper uses the new framework to assess bamboo ecosystem services in three countries in Africa and Asia: Ethiopia, Indonesia and Nepal.

> ***Bamboo forests' ecosystem services are often more varied and high-impact than those of forests, grasslands and agricultural land.***

As these cases demonstrate, bamboo is already an important part of local life. In Nepal, bamboo has been planted to control floods from the Rui River and provide natural fencing to prevent wild animals entering the villages adjoining Chitwan National Park; in Ethiopia, bamboo is an important source of forage supply, while both Nepalese and Indonesian communities have important cultural connections with bamboo forests.

Due to their important benefits for humans and the environment, the authors state that bamboo "would be a better replacement [for tree species] in plantation forestry", excluding natural forests.

Overall, the study confirms the role of the bamboo forest in providing key ecosystem services with local and global benefits.

Paudyal, K., Adhikari, S., Sharma, S., Samsudin, Y.B., Paudyal, B.R., Bhandari, A., Birhane, E., Darcha, G., Trinh, T.L. and Baral, H. (2019) *Framework for assessing ecosystem services from bamboo forests: Lessons from Asia and Africa*. Working Paper 255. Bogor, Indonesia: CIFOR.

EVENTS AND MEETINGS

INBAR events

18 September
World Bamboo Day
Global event

22 September
UN South-South Cooperation Day
Global event

3 October
Under the Bamboo Tree
Labirinto dell Masone, Parma, Italy

26-27 October
Bamboo Product Innovation Design Competition
Qingyuan, Zhejiang province, China

27 October
Fiji accession to INBAR ceremony
Beijing, China

28-29 October
Global Landscapes Forum Biodiversity Digital Conference
Virtual event

2-4 November 2020
China International Bamboo Industry Fair
Meishan, Sichuan province, China

5-7 November
2020 International (Yong'an) Bamboo Expo
Yong'an, Fujian province, China

18 November
FAO and INBAR Memorandum of Understanding signing ceremony
Virtual event

16-18 December
Third China (Zixi) Bamboo Industry Development Forum
Zixi, Jiangxi province, China

29-31 December
Bo'ao International Plastics Ban Industry Forum
Bo'ao, Hainan province, China

Find out more about relevant upcoming events at www.inbar.int/event

IN NUMBERS

700,000 full time jobs

... The long-term goal of the new Uganda National Bamboo Strategy and Action Plan for 2019-2029, which also aims for national production of 460 million bamboo poles a year by 2040.

In the shorter term, the Strategy hopes to create 150,000 full-time jobs in the sector by 2024. These ambitious figures will be realised by planting 70,000 ha of bamboo, and restoring 15,000 ha of natural bamboos, according to the document.

The Strategy was developed by the Ugandan Forest Sector Support Division, the Ministry of Water and Environment and the National Forestry Authority in 2019. The overall goal is to ensure the coordinated development of the bamboo industry, to stimulate green economic development and the production of high-value products for domestic, regional and international markets. Planting bamboo will also contribute an estimated 15% towards Uganda's goal of restoring 2.5 million ha of forest landscape by 2030.

Uganda has 55,000 ha of bamboo, according to a 2018 survey produced with INBAR support, but the sector currently remains small and focused on low-value products. The government has already begun work on the Strategy: by the end of July 2020, 2 million bamboo seedlings had been produced and are being circulated to different areas for planting.

The National Bamboo Strategy and Action Plan for 2019-2029 can be downloaded from INBAR's Resource Centre.

A PICTURE IN 100 WORDS

Credit: INBAR

Visitors at the International (Yong'an) Bamboo Expo 2020 watch a demonstration for a bamboo pole transporter. The machine is designed to be easily assembled on steep slopes, allowing bamboo farmers to transport their bamboo quickly down the mountain to the nearest road.

Yong'an, in Fujian province, China, is one of the country's largest centres for bamboo production. Companies assemble everything from handicrafts and furniture to flooring and materials for shipping containers, and have a list of international clients including MAERSK, Triton and IKEA. Vendors and businesses come together every year for the Bamboo Expo, to share the latest products, technologies and innovations.

UPCOMING:

YANGZHOU INTERNATIONAL HORTICULTURAL EXPOSITION

Yangzhou, Jiangsu province, China
April-October 2021

Opening in 2021, the Yangzhou International Horticultural Exposition aims to showcase how horticulture and greening can be an important part of future urban planning and sustainable lifestyles. Yangzhou, a prefecture-level city in central Jiangsu Province, has a long horticultural history. INBAR will have a space at this important event, similar to the Bamboo Eye Pavilion and Garden at the International Horticultural Exhibition 2019, Beijing, China.

The total area of the Yangzhou Exposition is 230 ha; the INBAR Garden covers an area of over 3000 square metres. It is composed of a main building constructed of bamboo, and a traditional bamboo garden.

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