Special Volume

BRU

Bamboo & Rattan Update

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INBAR 25th Anniversary

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世界竹藤大会

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

ASIA AND THE PACIFIC: REFLECTIONS ON 25 YEARS

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Cycling in the bamboo forest. Credit: Luo Lianyong

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About INBAR
INBAR is an intergovernmental organisation which promotes the use of bamboo and rattan for sustainable development.
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B R U

EDITORIAL

Welcome to the second issue of* BRU *2022, part of a special volume commemorating INBAR's work over the last 25 years. In this issue, we focus on Asia and the Pacific, a global region home to 16 INBAR Member States, and the base of INBAR's Headquarters.

From the rattan furniture markets of Indonesia to the soaring bamboo scaffolding of southern China, bamboo and rattan are embedded in countries and cultures across Asia and the Pacific.

These non-timber forest plants play a critical role in economies and ecosystems alike. Some of Asia's most iconic and reclusive species rely on bamboo, and rattan are a critical part of the forest ecosystems in which they grow.

Bamboo and rattan are also big business. In 2019, the Asia-Pacific region exported USD 2.769 billion-worth of bamboo and rattan products. Crucial to Asian economies, China is the world's largest bamboo exporter, and Indonesia the world's largest rattan exporter.

INBAR's work has long been intertwined with the Asia-Pacific region. INBAR was first established as the result of research exchanges and workshops, many of which took place in Asia. It is the first intergovernmental organisation to have its headquarters in China, and its Regional Office in India is almost 25 years old. Reaffirming INBAR strong commitment to the Asia-Pacific region, INBAR is excited to announce the imminent joint launch of the 'Bamboo as a Substitute for Plastic Initiative' in collaboration with the Government of China, which aims to reduce global plastic use and address climate change while accelerating efforts toward achieving the UN 2030 Agenda for Sustainable Development.

In this special issue, Ministers from a number of INBAR's Member States share their own thoughts on bamboo and rattan's importance for sustainable development (page 4). Several countries have been Member States for over two decades, and have worked with INBAR across a wide range of research, projects and training events. All Member States plan to make bamboo and rattan a more integral part of their national sustainable development and environmental protection strategies in the years to come.

Bamboo and rattan continue to play a critical role in supporting rural development. In 'A Bank in the Backyard' (page 10), the non-profit organisation RECOFTC describes how better resource management techniques have helped communities in Viet Nam create a lucrative, sustainable livelihood from local 'lung' bamboo. Not only have average incomes doubled, but the bamboo forests are now in a much better shape to provide a long-term source of revenue.

Support to rural areas is also the theme of Professor Fei

Benhua's article. In 'The Promise of Rural Revitalisation' (page 13), Professor Fei considers one country which has gone above and beyond to support its bamboo sector. China has provided huge political support and investment to its bamboo resources, growing its forest by over 800,000 hectares from 2013 to 2020 alone. Bamboo is a key resource in environmental protection programmes and is part of national strategies to revitalise rural areas and help China become carbon neutral.

But new bamboo uses could be just as important to sustainable development as traditional ones. In 'Bending, Not Breaking' (page 16), the founders of Filipino non-profit Base Bahay Foundation introduce how their new bamboo construction technology could pave the way for more secure housing. Houses made with 'Cement-Bamboo Frame Technology' (CBFT) are affordable, sourced from local materials, and resilient in disaster scenarios, capable of resisting typhoon winds and withstanding earthquakes, with great potential in the Philippines and across the Asia-Pacific region.

Like bamboo, rattan could be a fast-growing replacement to timber in many materials. So why is it not more widely used? Part of the problem, according to experts at CIFOR-ICRAF, lies in truly understanding 'sustainable' management. The authors of 'Rattan Resurgence' discuss a new framework for understanding sustainable rattan production, in terms of both environmental and institutional support, and why even environmentally sustainable rattan has yet to capture international markets. The answer, CIFOR-ICRAF researchers suggest, might include greater support to rattan harvesters, who perform backbreaking labour to bring this spiky climbing palm out of the forests.

THE EDITORS

BAMBOO AND RATTAN IN ASIA AND THE PACIFIC

- According to its most recent Global Forest Resources Assessment, the Food and Agriculture Organization of the United Nations estimates there are **24.877 million hectares** of bamboo in Asia.
- INBAR includes **16 Asia-Pacific Member States**: Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Tonga and Viet Nam, including **one Regional Office** in India, and its **Headquarters** in China.
- When it was established in 1997, INBAR was the **first intergovernmental organisation to be headquartered in China**.
- INBAR will host the **Second Global Bamboo and Rattan Congress** in Beijing, China in November 2022.
- According to the latest UN Comtrade data from 2019, the Asia-Pacific region dominates bamboo and rattan exports, accounting for **81% all bamboo and 82% all rattan exports**.
- Unveiled at the 14th BRICS Summit, China and INBAR are now poised to jointly launch the **'Bamboo as a Substitute for Plastic Initiative'** to jumpstart progress toward achieving the UN 2030 Agenda for Sustainable Development.

REFLECTIONS ON 25 YEARS

INBAR turns 25 this year. To mark its anniversary, BRU has invited representatives from across its Member States to comment on their country's bamboo and rattan sectors. Here, 11 policymakers from Asia share their thoughts on how these plants are being used to promote pro-poor, environmentally sustainable development in their countries, and share their visions for the future.

Administrator, National Forestry and Grassland Administration, the People's Republic of China*

His Excellency Guan Zhi'ou

**China is the host of INBAR's Headquarters.*

China has some of the most abundant bamboo resources in the world, with a long history of bamboo production and a deep-rooted bamboo culture. In the time-honoured history of Chinese culture, bamboo, with its unique biological and ecological properties, is symbolic of Chinese values and virtue. Bamboo has been planted and widely used in China for ages. As modern technology develops, bamboo applications are being expanded, industrial utilisation is being rapidly scaled up, and processing technologies are constantly improving.

In November 2021, guidelines for the bamboo industry development in China—*Opinions on Accelerating the Innovation and Development of the Bamboo Sector*—were co-signed and released by 10 Chinese central government agencies. The guidelines call for more efforts to conserve and cultivate high-quality bamboo resources, establish an integrated modern bamboo industry system and give full play to bamboo's role in building beautiful rural areas, with the aim of contributing to achieving key national strategies such as ecological civilisation, rural revitalisation, emissions peaking and carbon neutrality. The Chinese government has attached great importance and given the utmost support to the bamboo sector's development. Through years of efforts, China now boasts some of the most advanced techniques in bamboo processing and has a wide range of innovative bamboo products, and the bamboo sector has grown into a green industry with great vitality and potential that has brought tangible economic benefits to local farmers. More Chinese enterprises are developing new technologies and producing bamboo alternatives to timber, plastics, steel and more. As such, the bamboo industry in China has a promising future ahead. According to China Customs data, China's total international trade of bamboo and rattan products reached USD 2.78 billion in 2021, with exports accounting for USD 2.75 billion and imports accounting for USD 260 million.

> ***"...bamboo [plays] a unique role in preserving ecosystems, developing a circular economy, and promoting green growth and sustainable development."***

In recent years, following the idea that "lucid waters and lush mountains are invaluable assets" put forward by Chinese President His Excellency Xi Jinping, bamboo, as a low-carbon, fast-growing, renewable and degradable bio-based material, has played a unique role in preserving ecosystems, developing a circular economy, and promoting green growth and sustainable development. For example, bamboo has contributed to many national initiatives such as the Natural Forest Protection Programme, the Grain for Green Programme and the Yangtze River Shelterbelt Programme.

INBAR is the first intergovernmental organisation to be headquartered in China. Since its founding in 1997, INBAR has made significant contributions to driving the development of the global bamboo and rattan sectors and has made remarkable achievements over the past 25 years. On the occasion of INBAR's 20th anniversary, President Xi Jinping sent a congratulatory message to INBAR, saying that "Over the past 20 years since its founding, INBAR has played a positive

role in accelerating the development of global bamboo and rattan resources, promoting poverty alleviation in producing areas, boosting trade in bamboo and rattan products and facilitating sustainable development. China will continue to support INBAR's endeavours and work with the international community to implement the 2030 Agenda for Sustainable Development and help bring about global ecological progress, a community of a shared future for mankind and a more beautiful world."

As the focal agency of INBAR in the host country, the National Forestry and Grassland Administration has been keeping close communication with INBAR and providing full support to INBAR's work. On behalf of the National Forestry and Grassland Administration, I wish to extend warm congratulations to INBAR on the occasion of INBAR's 25th anniversary! We will continue to join hands with INBAR and collaborate with all other Member States to accomplish more across the bamboo and rattan sectors, to achieve the Sustainable Development Goals and build a more beautiful world!

Minister of Environment, Forest and Climate Change, the People's Republic of Bangladesh

His Excellency Md. Shahab Uddin

The Bangladesh Forest Research Institute (BFRI) has been working on the propagation and utilisation of bamboo for decades under the guidance of the Ministry of Environment, Forest and Climate Change. BFRI has generated a good number of technologies and information about bamboo and rattan propagation and utilisation. Based on its good work, a Regional Bamboo Research and Training Centre has been established at Domar, Nilphamari, to strengthen research capabilities and disseminate bamboo-related technologies to the local people. The Bangladesh Forest Department has been implementing a rehabilitation programme since the 1980s to address the challenge of rattan resource depletion, using technologies generated by BFRI.

As a founding Member State of INBAR, Bangladesh has worked with INBAR for 25 years on a number of programmes: from technology transfer of bamboo shoots production and processing, to capacity building on a variety of topics related to bamboo and rattan. We will continue to work to increase bamboo and rattan resources and their sustainable utilisation. Since Bangladeshi people need bamboo products in every sphere in life, it is imperative to speed up the bamboo plantation and development programme. This way, we can take the bamboo of this country to far greater heights.

This is an edited version of the statement sent to INBAR. The complete statement can be read here: www.inbar.int/reflectionson25years/bangladesh

Minister of Agriculture and Forests, the Kingdom of Bhutan

His Excellency Lyonpo Yeshey Penjor

Bamboo and rattan play a vital role in sustaining the rural livelihoods of local communities in Bhutan. These are important forest resources that are used for making houses and handicraft items, thus contributing to household income and providing employment on a seasonal basis.

> ***"As a highly renewable resource with excellent construction properties, bamboo is well placed to substitute for timber in construction."***

Bhutan became a Member State of INBAR in 2009 and since then has received assistance in human resource development for the utilisation of bamboo, as well as technical assistance in construction technology. With support from INBAR, the Government of Bhutan has constructed the [country's] first engineered bamboo model house. We would like to promote the cultivation and propagation of commercially important bamboo species to expand Bhutan's resource base.

Furthermore, we would like to educate students

and younger generations on the use of bamboo for environmentally friendly construction, and to help them understand conservation closely through observation. As a highly renewable resource with excellent construction properties, bamboo is well placed to substitute for timber in construction. The development of bamboo commodities will help in providing existing Community Forest Management Groups with new livelihoods and income-earning opportunities.

We wish INBAR a very happy 25th anniversary.

This is an edited version of the statement sent to INBAR. The complete statement can be read here: www.inbar.int/reflectionson25years/bhutan

Minister of Agriculture, Forestry and Fisheries, the Kingdom of Cambodia

His Excellency Veng Sakhon

Bamboo and rattan grow and germinate dominantly in the north-eastern and north-western parts of Cambodia. They have made a vital contribution to local livelihoods, [and as a source of] food, handicrafts, furniture, and household products for the Khmer people since the Angkorian period. They are also considered as [key parts of a] green and national development strategy, protecting the forest and its ecosystem services.

The Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries has been the national focal point for INBAR since Cambodia joined in 2019, and has been working closely with INBAR on bamboo- and rattan-related training programmes and projects. These programmes and projects are a platform for Cambodia to share its domestic bamboo resources, policies, experiences, technologies, and models of cultivation and civilisation with INBAR and its Member States.

Based on forest cover estimates, bamboo covered almost 123,705 hectares in 2018. This amount is quite low compared to other [countries]. Therefore, Cambodia requires more support, investment and collective actions in terms of bamboo and rattan planting, restoration and plantations, to sustain the supply chain for bamboo sector development. It is my most earnest hope that we will receive more support from INBAR in the near future.

I wish INBAR a very happy 25th anniversary.

This is an edited version of the statement sent to INBAR. The complete statement can be read here: www.inbar.int/reflectionson25years/cambodia

Minister of Environment, Forest and Climate Change, the Republic of India*

His Excellency Bhupender Yadav

**India is the host of INBAR's South Asia Regional Office.*

As per the Food and Agriculture Organization of the United Nations' 2007 report, there are about 1200 species of bamboo in 90 genera across the world. India has about 125 indigenous and 11 exotic species of bamboo from 23 genera. Bamboos are found in abundance in the deciduous and semi-evergreen forests of the north-eastern region of the country and tropical moist deciduous forests of northern and southern India. As per the recently released India State of Forests Report (ISFR) 2021, the total bamboo-bearing area of the country is estimated as 1,49,443 square kilometres [14,944,300 hectares]. The total estimated green weight of bamboo culms at the national level is 402 million tonnes. Compared to the ISFR 2019 estimate, an increase of about 124 million tonnes-equivalent green weight of bamboo has been observed in the present assessment

> ***"It is estimated that in India, there are about two million traditional artisans whose livelihoods depend on harvesting, processing, value addition and selling bamboo products..."***

The contribution of bamboo to the socio-economic, cultural and ecological development of certain geographies is significant. Bamboo contributes to the subsistence needs of about 2.5 billion people around the world, the majority of whom are tribal, forest dwellers or communities dependent on forest resources. It is estimated that in India, there are about two million traditional artisans whose livelihoods depend on harvesting, processing, value addition and selling bamboo products such as baskets, mats and handicrafts.

The major advantage of bamboo is its versatility in making a variety of products by small entrepreneurs without requiring major initial investment.

The Government of India promulgated the Indian Forest (Amendment) Ordinance in 2017 to exempt bamboo grown in non-forest areas from the definition of 'tree', by amending Section 2(7) of the Indian Forest Act 1927 and thereby doing away with the requirement of felling/transit permits for its transport and economic use. The major objective of the amendment is to promote the cultivation of bamboo in non-forest areas to achieve the twin objectives of increasing the income of farmers and also increasing green cover across the country.

India is one of INBAR's oldest Member States, joining in 1998, and is proud to host INBAR's South Asia Regional Office in New Delhi. Through the INBAR network, India has also been able to share its unique bamboo knowledge and technologies with other Member States, particularly in Africa and South Asia. India wishes INBAR a very happy 25th anniversary.

Minister of Energy and Natural Resources, Malaysia

His Excellency Takiyuddin bin Hassan

Since March 1998, Malaysia has been a member of INBAR. Here, I would like to acknowledge the important role of INBAR in the promotion of the environmentally sustainable development of bamboo and rattan. Malaysia is fortunate that bamboo and rattan can be found in abundance throughout the country. The total export of bamboo products has also shown a positive growth trend, and we believe that these two non-timber forest products have the potential for further capitalisation.

Malaysia is committed to enhancing the potential of bamboo and rattan from the manufacturing point of view of furniture-making, curing, nanotechnology, biotechnology, chemicals and genetics in tandem with the development of modern technologies. As a member of INBAR, we have received many benefits from conducting scientific research and development, exchanging expertise, promoting technical training at the international and domestic level, and contributing articles in journals and publications. We hope that INBAR will continue to expand support and strengthen cooperation with Malaysia to study other potential uses of bamboo and rattan.

By diversifying sources, it could help conserve and reduce dependency on existing natural resources. We wish INBAR a very happy 25th Anniversary.

Union Minister of Natural Resources and Environmental Conservation, the Republic of the Union of Myanmar

His Excellency U Khin Maung Yi

Myanmar is blessed with high forest cover occupying 42.19% of the country's total area (according to the Food and Agriculture Organization of the United Nations' Forest Resource Assessment, 2020). Bamboo and rattan grow abundantly across the country, and Myanmar is recognised as the third largest bamboo forest area in the world after China and India.

Myanmar is one of INBAR's founding Member States, joining INBAR in 1997. Myanmar has taken part in a number of INBAR projects and training courses about the market development of bamboo and rattan products.

About 70% of Myanmar's population live in rural areas, and most people have been using bamboo and rattan for the construction of housing and bridges, and the manufacturing of furniture, woven products and handicrafts, agriculture utensils and food. In the domestic market, there is a sizeable trade of bamboo poles for various uses.

Despite Myanmar's long history and culture of bamboo use, the country's export of bamboo and rattan commodities only occupies a tiny fraction of the world's total, so there is great potential to be further explored.

The Government is taking steps to grow Myanmar's bamboo sector by encouraging private investors and local communities to establish bamboo plantations and bamboo-based community forests, as well as to support the bamboo-based industries in Myanmar.

We wish INBAR a very successful 25th anniversary.

Designed by Vo Trong Nghia Architects with associate architect Takashi Niwa, the eye-catching Viet Nam Pavilion at the Milan Expo in 2015 used bamboo cladding on its columns. Credit: Fred Romero.

Former Minister for Climate Change, the Islamic Republic of Pakistan

His Excellency Malik Amin Aslam

Pakistan is investing heavily in nature-based solutions, particularly on land restoration and climate change mitigation. The 'Ten Billion Tree Tsunami Programme' shall restore about one million hectares of degraded forest land by 2023, and the protection status of land with vulnerable ecosystems shall be enhanced from 12% to 15% through the 'Protected Areas Initiative'.

The area under bamboo cultivation has increased from 9000 hectares to 20,000 hectares over a period of two decades. Pakistan has a number of bamboo species, and uses bamboo as a source of roofing material, scaffolding and temporary shelters, as well as paper and pulp, and household items such as baskets and mats. Bamboo has also been used to construct buildings, including schools. In 2020, Pakistani architect Yasmeen Lari won the Jane Drew prize for her work creating buildings using natural materials including bamboo.

Pakistan is INBAR's newest Member State, joining INBAR in July 2021. Pakistan's accession to INBAR comes at a fortuitous time that shall benefit in increasing cultivation of bamboo and rattan to overcome the problem of land degradation and also explore trade and investment venues for its bamboo-related products. We extend our best wishes to INBAR on its 25th anniversary.

This is an edited version of the statement sent to INBAR. The complete statement can be read here: www.inbar.int/reflectionson25years/pakistan

Acting Secretary, Department of Environment and Natural Resources, the Republic of the Philippines

His Excellency Jim O. Sampulna

Cheers to the 25th anniversary of the International Bamboo and Rattan Organisation (INBAR)!

The Philippines takes pride in ranking among the top global exporters of bamboo commodities in recent years. It is a feat worth continuing as key sectors incessantly synergize to strengthen the industry while improving environmental resilience

and augmenting economic development.

Policies have been institutionalized to strengthen our bamboo industry. In 2010, Executive Order No. 879 created the Philippine Bamboo Industry Development Council, which in turn led to the filing of the Philippine Bamboo Industry Development Act in Congress. Meanwhile, research generated relevant technologies, biomass and carbon sequestration studies, and inventory and mapping. We also advanced public awareness of the many benefits of bamboo, especially in climate change mitigation. Bamboo is now a preferred planting material in the government's reforestation program and has been declared to be a high-value crop.

For many of our country's accomplishments, we extend our gratitude to INBAR for its contributions. Moving forward, we envision continued collaboration with the 47 other member states as we set our country's direction towards the creation of bamboo forests in more than 1,500 cities and municipalities to create an environment-friendly, export-oriented and sustainable bamboo industry.

Maraming salamat! Bamboohay!

Minister of Natural Resources and Environment, the Kingdom of Thailand

His Excellency Varawut Silpa-archa

Bamboo and rattan have played a central role in Thai culture for more than [one] hundred years. Furthermore, Thailand has become the fourth largest bamboo commodities exporter in the world, with [an export] value of approximately USD 3 million per year.

Thailand has 16 families and 85 species of bamboo. Bamboo is a fast-growing super grass plant, which is versatile and able to thrive on sloping and degraded soils. It is also considered an important nature-based solution to a number of global challenges, especially climate change and biodiversity loss. Therefore, [Thailand's] National Bamboo and Rattan Long Term Management Plan was put in place to promote their benefit. A bamboo value chain analysis has also been conducted.

Since Thailand has become a Member State of INBAR in 2016, we have cooperated numerous times on research, training programmes and seminars on bamboo and rattan cultivation, sustainable use and conservation. On this auspicious occasion, we congratulate INBAR on its 25th anniversary and wish that our collaboration will be further strengthened.

Minister of Agriculture and Rural Development, the Socialist Republic of Viet Nam

His Excellency Le Minh Hoan

"Green bamboo,
Green since when?
Once upon a time ... there was a green bamboo bank."

- A poem about bamboo by famous Vietnamese poet Nguyen Duy

Bamboo is closely associated with the material and spiritual life of the Vietnamese. From the village to the street, from the past to the present, bamboo is always green in all parts of Viet Nam.

With the critical role and development potential of bamboo resources, the Vietnam Forestry Development Strategy for the period 2021-2030 pays special attention to the development of bamboo: important non-timber forest products that need to be protected, planted and sustainably developed. According to statistics, by 2021, there were nearly 1.4 million hectares of bamboo forests, accounting for 9.6% of the total forest area.

Viet Nam is currently working with INBAR to implement the ongoing FLOURISH project [which is working to improve community management and livelihood opportunities from local Lung bamboo]. We highly appreciate that.

Bamboo does not grow alone, but works with the population: they firmly support each other. With the 'close-knit' spirit of bamboo, Viet Nam wishes to continue to cooperate and share experiences with INBAR and its Member States in developing and using bamboo as strategic resources that support sustainable development and green economy action plans.

This is an edited version of the statement sent to INBAR. The complete statement can be read here: www.inbar.int/reflectionson25years/viet-nam

A BANK IN THE BACKYARD

In Viet Nam, a new initiative is helping villagers to restore bamboo forests and develop sustainable livelihoods.

When Nong Thi Huong talks about what bamboo means to her and her ethnic Thai community in northern Viet Nam, she tells a tale of economic, ecological and personal transformation.

In her village, incomes have risen and people's lives have improved—all because of new ways of managing, using and trading bamboo.

"Whenever I need money, I can harvest and sell it," says Huong. Like many in her community, she calls her bamboo forest "a bank in the backyard".

Huong lives in Xet 1 village in Nghe An province. For generations, people in Nghe An have relied on a species of bamboo known locally as 'lung' (*Bambusa longissima* sp. nov). They use it as a material for making a range of items—from toothpicks to garden fences, baskets and lanterns.

As well as harvesting lung bamboo for their own use, villagers also sell it. This is a major source of household incomes in the mountainous area of Nghe An where lung bamboo is found, accounting for 14.2% of the average annual total.

Yet just a few years ago, local bamboo forests were being depleted so fast they were at risk of disappearing entirely. By the mid-2010s, over-harvesting was devastating the resource on which so many people depended. This was true not only in Huong's village but also across other villages where lung bamboo forests grow.

New approaches

To test solutions to challenges such as these, international not-for-profit organisation RECOFTC began working on an initiative, called 'FLOURISH', with Huong's village and four others nearby in 2019.

Nong Thi Huong harvests lung *bamboo with her community. Credit: RECOFTC.*

Local woman makes bamboo strips at the bamboo pre-processing unit of Duc Phong company, Chau Thang commune, Nghe An. Credit: RECOFTC.

With funding from the German government through the International Climate Initiative, RECOFTC partnered with the local government's Nghe An Forest Fund and the International Bamboo and Rattan Organisation (INBAR) to help communities restore their bamboo forests and use them to secure their livelihoods sustainably.

The four-year project has so far trained hundreds of villagers, including Huong, on bamboo management, harvesting and primary processing techniques, and on a technique for propagating bamboo called 'offset planting', which can aid restoration efforts. This involves selecting a cluster of two or three bamboo culms from a clump, removing them along with their underground parts, and replanting them elsewhere where they will generate new bamboo culms.

The initiative has also supported smallholders in all five villages, 84 men and 37 women, to negotiate and sign partnership agreements with the Duc Phong handicraft company, based in Vinh City. Under these partnerships, the company commits to buy bamboo at agreed prices, guaranteeing sales for people with few other options for generating income. The Duc Phong company uses the bamboo it buys to make lampshades and baskets that it exports to Europe: a growing international market for Viet Nam's bamboo products that is now worth more than USD 300 million a year.

Securing rights

But for livelihoods to be truly sustainable, and for villagers to have incentives to restore their bamboo forests, they need secure rights to forest land.

Under the government's forest land allocation process, villagers can apply for a 'Red Book', a 20- to 50-year title to forest land. Without a Red Book, a villager cannot legally plant and harvest bamboo. But the process of applying for one is not well known among remote communities, and especially among ethnic minorities such as the Thai people in villages where RECOFTC is working.

To address this, the FLOURISH initiative has been training community members on forest mapping, boundary identification and how to apply for Red Books. By the end of 2020, the project helped 241 households in Que Phong district and Quy Chau district to successfully apply for Red Books, covering a total of more than 1550 hectares.

According to Deputy Director Pham Ba Hung of Nghe An Forest Protection and Development Fund, "Before the project, there was a massive waste of resources…Only 50 to 60% of the harvest was used in the production chain.

"By successfully introducing the technique for propagating lung bamboo and raising awareness among local communities, the project has resulted in sustainable management of lung bamboo

There is a growing international market for bamboo products made in Viet Nam. Credit: RECOFTC.

forests. This will contribute to forest landscape restoration and conservation of soil and water resources. It will also help to reduce greenhouse gas emissions in the long term."

Changing lives

Huong says that by restoring local lung bamboo forests, improving how they are managed, strengthening rights and developing partnerships with the private sector, the project has improved local people's lives. She says average incomes from selling lung bamboo have doubled to VND 15 to 17 million [USD 650 to 740] per year after local communities learned and applied sustainable harvesting and pre-processing of Lung bamboo material.

"I can observe our lives becoming better," says Huong. "We have enough money for our children's education, gifts for our relatives and more food, including meat and milk. We have more time to do other part-time jobs."

Huong also says the project has empowered her as a woman. "Before participating in the project, I knew that women should have economic independence, yet I did not know how to gain it," she says. "The training courses improved my awareness about women's independence. They inspire me to establish my own business that can help my sisters."

But Huong says more support is needed to meet the widespread interest in bamboo reforestation in her community.

"While the benefits are clear, many households cannot afford to do it," she says. "They told me that they would definitely apply this method if they had enough financial support."

She also says more people need to take part in training courses to understand the significance of lung bamboo restoration and be motivated to conserve it. Despite her concerns, Huong expects more households will receive grants to replant lung bamboo on their forest land.

"I feel optimistic about our future," she says.

This story is a shortened version of the article published in RECOFTC. The original article was produced with the financial support of the International Climate Initiative (IKI) of Germany's Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).

FEATURED ARTICLE

THE PROMISE OF RURAL REVITALISATION

China's bamboo sector is being promoted as a key part of the country's sustainable development strategies.

With the strong support of government, China's bamboo sector has witnessed a rapid development in recent years, in line with the Development Plan for the Bamboo Sector in China (2013-2020). The total amount of bamboo resources has steadily increased, as have their returns. As of the end of 2020, a national land resource survey estimated that China's bamboo forests reached 7,019,700 hectares, an increase of 861,100 hectares compared with 2013. In the same year, the China Bamboo Industry Association estimated the total output value of the bamboo sector reached up to RMB 320 billion [USD 47 billion], exceeding the target specified in the plan.

China's bamboo sector has also made an outsized impact abroad. According to the International Bamboo and Rattan Commodity Trade Report 2020 released by INBAR, China's bamboo imports and exports in 2020 were USD 2.21 billion, accounting for more than 60% of the world's bamboo trade.

These huge achievements are the result of careful, targeted policy support and investment, and could provide important lessons for other countries.

Policy support

In recent years, the state and local governments have attached great importance to the development of the bamboo sector, rolling out numerous policies in support of it. Most recently, this includes the document *Opinions on Accelerating the Innovation and Development of the Bamboo Sector*, which was released in 2021 by the National Forestry and Grassland Administration in conjunction with ministries and commissions. A national-level Development Plan for the Bamboo Sector in China (2021-2030) is also undergoing revision and will be issued soon. These two national policies are a powerful guarantee for the future development of China's bamboo sector.

Bamboo policies have been rolled out at the provincial level, too. Bamboo-rich provinces such as Zhejiang, Jiangxi, Sichuan, Fujian and Hubei as well as cities and counties such as Yibin, Meishan, Lishui, Nanping, Zixi and Jinzhai have together implemented more than 50 policies to spur the development of the bamboo sector, based on local conditions.

Technological innovations

From 2013 to 2020, China made significant scientific and technological progress in the bamboo sector in areas such as research, new product development and standards. By the end of 2020, 135 new scientific and technological

Bamboo can be used instead of plastic to make cutlery, cups and straws. Credit: INBAR.

achievements were made in the bamboo sector, of which six received Second Prize for the National Science and Technology Progress Awards.

So far, more than 200 bamboo-related standards have been formulated by different Chinese bodies, including national and industry-specific standardisation authorities. As well as national standards, China has contributed to developing and promoting international standards for bamboo products: in particular, since the establishment of the Bamboo and Rattan Technical Committee of the International Organization for Standardization (ISO/TC296) in China in 2015, China has led the formulation of four international standards concerning bamboo terminology, charcoal, and bamboo flooring.

Across China, companies and universities are making major breakthroughs in areas such as new varieties of bamboo—19 have been certified so far—as well as new bamboo products, such as bamboo straws and flattened bamboo composite lumber. In addition, new bamboo research institutes, such as Zixi Bamboo Science and Technology Innovation Center and Yibin Research Institute of the Forest and Bamboo Sectors, have been established to help commercialise these scientific and technological achievements.

Creating jobs, storing carbon

At present, the National Forestry and Grassland Administration of China estimates there are more than 15,800,000 people directly employed in the bamboo sector, including 13,900,000 farmers. As such, bamboo can play a critical role in the national effort to promote 'rural revitalisation'. In Jian'ou, Fujian province alone, there are about 300,000 bamboo workers, and sales of bamboo shoots earns farmers an average of RMB 6725 per year, or about 39% of rural residents' annual disposable income.

Bamboo plants and products also boast good carbon storage properties, making them helpful for achieving China's goals of 'carbon peaking' by 2030 and carbon neutrality by 2060. According to research from Zhejiang Agriculture and Forestry University, the annual average carbon sequestration of one hectare of Moso bamboo

Bamboo flooring is a sustainable low-carbon alternative to other materials. Credit: Wang Changyu.

Bamboo shoot-digging competition held in Jian'ou, Fujian. Credit: Wei Yongqing.

forest is 4.91 to 5.45 tons, which is 1.5 times that of Chinese fir plantations.

Because they grow quickly and can be harvested regularly, creating a large range of durable products, bamboo can create a sizeable carbon sink over time. In this regard, China was the first country to propose "bamboo warehousing", whereby bamboo is harvested, pretreated, processed into raw materials and then stored, ready to be released and further processed on demand. This not only ensures the healthy development of bamboo forests and their conversion into products, but also provides a stable source of income for bamboo farmers, and prevents untreated harvested bamboo from rotting or infestation. Sichuan and Anhui provinces have already carried out bamboo warehousing pilot projects.

Looking forward to 2030

It is clear that bamboo could play an outsized role in the Chinese government's plans for carbon neutrality and rural revitalisation. The document *Opinions on Accelerating the Innovation and Development of the Bamboo Sector* proposed that China will build a modern bamboo sector by 2030, and will strengthen every aspect of the value chain: from a focus on commercially important bamboo species and the sustainable cultivation of bamboo forests to the development of industries for shoots, construction materials, handicrafts, charcoal, beverages and paper, as well as tertiary sector bamboo industries such as forest tourism, health care and culture.

The bamboo sector has already made enormous contributions to promoting rural revitalisation. With further support, it can help improve people's wellbeing, protect the environment, and build a more beautiful China and green world.

FEI BENHUA

Professor Fei is the President of the China Bamboo Industry Association and Executive Deputy Director of the International Centre for Bamboo and Rattan.

BENDING, NOT BREAKING

A new Filipino design is providing affordable and disaster-resilient houses for vulnerable communities.

Like many countries in the Asia-Pacific region, the Philippines has been at the centre of natural disasters for many years. The country ranks eighth in the global index of countries which are most at risk from disasters. In 2019 alone, 4.5 million Filipinos and over one million houses were negatively impacted by two major typhoons and a series of earthquakes.

Safe housing can make a big difference to resilience in natural disasters. A recent World Bank report indicates that the impact of disasters is more significant in poor households with weak housing standards. This is a big issue in the Philippines, where 70 million Filipinos are living in substandard housing; the World Bank projects this number will grow to 113 million in 2030.

There is a clear need to have durable homes that reduce the devastating impacts of calamities. This is what Base Bahay Foundation is trying to do.

'Green steel'

Base Bahay Foundation is a non-profit organisation initiated and supported by the Hilti Foundation, a philanthropic organisation based in Liechtenstein. Base elevates the standard of socialised housing through its Cement-Bamboo Frame Technology (CBFT). This technology, supported by intensive research, mixes conventional mortar with locally grown bamboo to build light, resilient structures suited to the needs of local communities in areas prone to natural hazards. It is recognised by the Philippines' 'Accreditation of Innovative Technologies for Housing' (AITECH) as a viable housing technology. This system has also been tested for resistance to

Base Bahay's low-cost bamboo housing design includes a bedroom, bathroom, kitchen and common area. Credit: Base Bahay.

earthquakes, typhoons, fire and insect infestations following standards put out by the International Organization for Standardization.

Using bamboo for temporary housing is a common sight. But in a typhoon-prone country like the Philippines, investing a little more in a permanent and disaster-resilient home pays in the long run. Because of its light weight and flexibility, CBFT has been proven to resist typhoon winds of up to 250km/h and withstand earthquakes, according to the National Structural Code of the Philippines.

An affordable housing solution

In addition to its disaster-resilient qualities, CBFT provides other benefits – such as a more comfortable indoor temperature than conventional cement houses. As the walls only require a thin layer of cement, they have a low thermal mass, which allows less heat to be stored and quickly releases at night. Because of the materials used—bamboo is cheap and widely available—CBFT is also 15% to 20% more cost-efficient than standard houses of the same quality. A Base house will cost PHP 8500 to 9500 [USD 160 to 180] per square metre, or an average of PHP 225,000 [USD 4300] for 25 square metres. The house design includes a common area, kitchen, bathroom and bedroom.

Together with partners, Base has already built close to 1000 houses in the Philippines, providing shelters to 4500 individuals in 12 communities. These communities are composed of families with low incomes, living in disaster-prone areas or typhoon victims.

Base also supports five local bamboo supply facilities by training farmers on the sustainable harvesting and treatment of bamboo. Instead of harvesting seasonal crops, these farmers are now harvesting bamboo year-round, with an estimated production of 10,000 bamboo poles each month.

CBFT is not just a breakthrough technology for the Philippines. Base has also established international collaboration in Nepal, another country with a natural abundance of bamboo and a history of catastrophic natural disasters. Together with Habitat for Humanity and Sahara Nepal, Base has built houses for 35 poor families from the Jhapa District.

A combination of mortar and bamboo are used to create light, disaster-resilient structures. Credit: Base Bahay.

Moving forward

The perception of bamboo as a 'poor man's material' is one of the key factors which makes it an underutilised resource, particularly in the construction industry. Education will play a vital role in turning these challenges into better opportunities.

To educate the network of professionals in the Philippines construction industry on the benefits and technology of bamboo, Base offers a Continuing Professional Development Programme for architects and engineers as well as skills training for workers. The Base Innovation Center also opens opportunities for researchers and experts in the field. Experts from Base frequently participate in different research activities, seminars, forums and other educational platforms to promote the use of bamboo in building environmentally friendly and resilient houses.

Base, as a pioneer of the cement-bamboo frame technology in the Philippines, is striving to include bamboo in the National Structural Code of the Philippines. This, Base hopes, will lead to the wider use of bamboo in construction. The opening

of the Base Innovation Center in January 2021 also paved the way for the collaboration of local and international researchers and specialists to work on alternative green building materials and technologies for sustainable construction.

Base, through its Innovation Center, is currently working with different bamboo species and testing their properties to ensure that they are suitable for construction. All the main elements of a home, such as the walls, connections, roofs and foundation, are tested to optimise costs and ensure resistance to typhoons and earthquakes.

Currently, Base's research includes characterising different bamboo species in the Philippines and Malaysia; conducting a life-cycle assessment of CBFT; and producing a structural design guidebook that will cover load tables for bamboo similar to those commonly used for steel and timber. Base is also working with Coventry University in the United Kingdom to implement the International Organization for Standardization's new standard on bamboo grading, which allows producers to better classify their poles. This research work, which brings together a number of universities and private sector partners from around the world, should help pave the way for mainstreaming bamboo in construction.

Luis Felipe Lopez, Head of Technology at Base, believes that his organisation's work can make a significant impact on construction in the Asia-Pacific region more generally. "With the growing impact of climate hazards, the only way to move forward is to start today. Base is committed to putting bamboo and other sustainable materials at the centre stage of the construction industry."

JOSEPH EMMANUEL LANSANG

Mr. Lansang is Head of Business Development and Marketing at the Base Bahay Foundation. He is an experienced project manager in non-profit organisation and management.

Base's bamboo housing employs a large number of local people across the supply chain: from harvesting and processing to construction. Credit: Hilti Foundation / Fairpicture: Alecs Ongcal.

FEATURED ARTICLE

RATTAN RESURGENCE

New research is helping define sustainable management for an underutilised non-timber forest product.

Trying to eke out a living by gathering rattan in the challenging tropical terrain of the Indonesian island of Sulawesi is far from straightforward, but it serves as an important source of income for local communities.

The thick tendrils grow from the forest floor, wrapping around trees and other vegetation toward the light. When it is mature, harvesters cut it down, bundle it and lug it to market on their backs. Carrying weights of as much as 80 kg, they may have to bear their burden for up to two days of walking. The lucky ones can benefit from a nearby waterway, tying the canes together and floating them along the river in similar fashion to a log boom.

On average, harvesters are 44 years old, although ages range from 20 to almost 70. For their efforts, they earn only about IDR 1,600 [USD 0.10] per kg and IDR 1.48 million [USD 100] a month.

Ecologically considered lianas due to their climbing habits, rattan canes of various diameters are used to make a variety of products, including furniture, baskets, building materials and fabric. They also serve an important role within the forest, enhancing biodiversity by providing a habitat for insects and animals while helping to prevent erosion during heavy rains. Rattan seeds, which are mainly collected by women, form part of the local diet in some areas.

Rattan represents what is often referred to as an 'overlooked' opportunity for sustainable production of furniture and other products. As such, research on the subject fits into the Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) Transformative Partnership Platform, which brings together key stakeholders from public and private sectors and civil society to generate new solutions to pressing sustainability challenges. These includes a focus on bioeconomic-based initiatives, which aim to prioritise the use of renewable materials such as wood—or in this case rattan—rather than concrete, plastic and other industrial products. CIFOR-ICRAF researchers are working with IKEA, the world's biggest furniture brand, to assess the prospects for an ongoing sustainable supply of three rattan species.

Unrecognised potential

Indonesia, which is the largest rattan producer in the world, makes up 80% of global rattan trade. Most rattan harvesting takes place mainly in natural forests. However, despite the requirement for all collections to be undertaken by a permit issued by the Ministry of Environment and Forestry Regulation, supply continues to diminish and deforestation accelerates. In addition, prices are

Rattan harvesting is hard and time-consuming work. Credit: CIFOR-ICRAF.

volatile: between 2012 and 2018, the export value of rattan from Indonesia dropped by 56%, from USD 249 million to USD 109 million. This disparity was driven mainly by a decrease in supply due to a ban that was implemented to address the fact that some rattan did not meet quality standards.

Ideally, rattan would become a more mainstream non-timber forest product. This is a promising prospect for rattan-producing countries throughout the Asia-Pacific Region because it would help 'green' Indonesia's value chains while helping to improve livelihoods of people living in and near forests.

However, to do so, one first needs to assess the obstacles preventing the scaling up of sustainable rattan supply, and understand the feasibility of sustainable harvesting naturally growing rattan in forests over the short and long term.

Defining sustainable rattan

CIFOR-ICRAF assessed the sustainable supply of three rattan species in Central and Southeast Sulawesi in Indonesia, using a combination of field surveys, forest mapping and a comprehensive literature review. The results led to the development of a framework that defines sustainable harvesting, including policies and regulations, as well as a reference table of sustainable harvesting criteria, and a field manual tailored for use by smallholder farmers and community groups involved in rattan harvesting and management.

Rattan's 'sustainability' can be defined from an ecological, as well as an institutional and management, perspective. The two categories are interdependent and together help define overall sustainability of rattan resources. Whereas natural rattan's ecological sustainability is measured by the plant's habitat, forest type, annual biomass growth and other factors, its institutional sustainability is determined by factors such as policies and regulations, annual allowable harvests, sustainability certification and management practices. The latter includes rattan harvesters and their communities, and the supply chain of actors, including harvesters, traders and processors, also influence rattan sustainability.

Sustainable rattan production is an important part of livelihoods in Asian communities. Credit: Eng Mengey/WWF.

Natural regeneration of rattan in a community forest through conservation. Credit: Anisha Rana.

Overall, using the sustainability framework, preliminary analysis of the field survey results, which involved consulting 103 harvesters, indicated that over 90% of the rattan in the study area is harvested sustainably. This can be attributed to several factors: the current low prices paid to harvesters in Sulawesi do not attract over-crowding; rattan is only harvested when canes have matured (within 4 to 6 years), with younger cane being of lesser quality and unmarketable; and harvesters seem to well understand that natural rattan regenerates best in intact forests, resulting in a strong stewardship ethic.

Even being sustainably managed, there are other limitations for manufacturers and retailers of rattan products looking to increase cane supply. These mainly link to the physical limitations of travel distances that harvesters must transport—float and carry—themselves, often less than 20 kilometres from access roads. With higher prices, harvesters can afford to hire help to transport longer distances and access more remote locations.

To become a mainstream non-timber forest product, then, rattan requires more than better management techniques: it will also need efforts to ensure a higher wage for rattan harvesters, and more support to local communities who are maintaining and supplying this material.

MICHAEL BRADY, AHMAD DERMAWAN, JULIE MOLLINS

Dr. Brady and Mr. Dermawan are researchers at CIFOR-ICRAF, working to find nature-based solutions for forest and tree landscapes. They are based in Bogor, Indonesia. Ms. Mollins is a journalist with a long affiliation writing and editing for CIFOR in Bogor and Bonn, now based in Toronto.

INTERNODE

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

Bamboo diplomacy: President of Indonesia, Joko Widodo, and Prime Minister of Australia, Anthony Albanese, take a ride through Bogor Palace on bamboo bicycles. Credit: Prime Minister of Australia Anthony Albanese's Twitter.

Bamboo bicycles as forum for diplomacy

On June 6, Indonesian President Joko Widodo welcomed the Australian Prime Minister Anthony Albanese in Bogor, West Java, and invited him for a bamboo bicycle ride, conveying the importance of environmentally friendly vehicles to achieving a sustainable future.

Prime Minister Albanese said it was an extraordinary experience and further expressed that the cycling activity reflected the friendship between Australia and Indonesia. He revealed that President Joko Widodo even offered to bring the bamboo bicycle to Australia.

Produced by Spedagi, an Indonesian bamboo bicycle manufacturer, the bamboo bicycle is largely made of bamboo betung (*Dendrocalamus asper*), with a sturdy frame capable of withstanding loads in excess of 75 kilograms. In fact, the Spedagi bamboo bike was ridden from Jakarta to Madiun, encompassing a total distance of 750 kilometres while bearing a load of 90 kilograms, suffering neither wear nor tear.

Indonesia has abundant bamboo resources and is well known for its skilfully made traditional handicrafts. Recognised for its good design and improved production processes, bamboo logs have now been transformed into high value-added bicycles that are mostly exported to Europe, the US and many other countries.

Source: Modern Diplomacy, 14 June

More bamboo to grow in Uganda

Uganda is currently home to about 67,000 hectares of bamboo in protected areas. Under the National Bamboo Development Strategy, the government has set its gaze on planting an additional 375,000

hectares of bamboo outside protected areas and on private land.

The National Forestry Authority, using funds from the INBAR-led Dutch-Sino Programme, will undertake a 10-year project to elevate the profile of bamboo farming. The move is part of the government's effort to restore degraded forests. Uganda has committed to restoring 2.5 million hectares of land, 15 percent of which is designated for bamboo.

The numerous potential benefits of bamboo have grabbed the attention of Uganda's leaders. Divine Bamboo, the largest producer of bamboo seedlings in Uganda, is promoting the use of bamboo briquettes as alternatives for clean cooking that mitigate the negative effects from deforestation. They also provide training for smallholders about the establishment of bamboo plantations and production of bamboo briquettes. Given the increased demand for local bamboo, targeted training sessions can help farmers diversify and boost household income, bolstering household resilience.

In addition to bamboo's use for fuel, Ugandan leaders also expect investors to establish paper industries with bamboo pulp, as the country has a good domestic market for paper, according to estimates by the World Trade Organization.

Source: The Observer, 5 April

Bamboo-based composites included in China's national bio-economic development plan

In China, the National Development and Reform Commission (NDRC) is responsible for producing the national five-year plan. In May, the NDRC released the '14th Five-Year Plan for Bioeconomic Development', which calls for bamboo-based composite material to play a prominent role in the development of the bioeconomic sector. The plan mentions that it will cultivate and expand the pillar industries of the bioeconomy, spur the development of bamboo-based composite material technology and promote its exemplary applications in the construction of urban integrated pipe corridors and other infrastructure.

Initiated by the company Zhejiang Xinzhou Bamboo-based Composites Technology in the mid-2000's, bamboo-based composite material is a new type of bio-based material that uses bamboo as the basic raw material, which has an excellent cost-performance ratio that allows manufacturers to save energy and reduce carbon emissions. Bamboo-based composite pipes, integrated modular houses, high-speed rail carriages and other products processed from this material are widely usable in transportation, water conservancy, municipal administration and construction, and more.

Experts have suggested that more research into this new technology is needed for full utilisation, and bamboo-based composite materials should be used more at the national level to improve product quality, variety and develop the sector.

Source: JEC Group

App developed in the Philippines to help sell bamboo products

The Philippines ranks among the top exporters of bamboo. Now, Filipinos can help support bamboo farmers through the "Bamboost" App - a "mobile marketplace" being developed by the University of Science and Technology of Southern Philippines-Cagayan de Oro (USTP-CDO).

On May 24, a user testing of Bamboost was held, also doubling as the soft launch of the online marketplace. The university said in a statement that "user testing is meant to introduce the Bamboost App to bamboo farmers, processors and entrepreneurs who will eventually be the target clients once it is already up and running." One of the bamboo farmers who took part in the user testing remarked that the app would be "a big help for us farmers…If this gets developed well in the future, someday we will have a better economy."

The Bamboost project is funded and supported by the Department of Science and Technology's Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD).

Source: Philippine Daily Inquirer, 7 June

Bamboo industrial demonstration facility to be built in Jamaica

China and Jamaica are now working closely together to establish a Bamboo Industrial

Demonstration Facility. Funding from the bilateral partnership will help grow the untapped bamboo industry for the island nation.

According to Dr. Norman Dunn, State Minister of the Ministry of Industry, Investment and Commerce, it is expected that full project approval will be granted by August. The facility will be the first of its kind in the Caribbean.

Jamaica, as a Member State of INBAR since 2012, is making great strides to develop bamboo as a versatile, environmentally friendly commodity with considerable global growth potential. To support this initiative, the Ministry of Agriculture and Fisheries has recognised bamboo as an industrial crop, allowing for the provision of technical support and extension services. The country has developed bamboo charcoal, furniture, straws, souvenirs and utensils, and is currently promoting bamboo for affordable housing.

Source: Jamaica Information Service, 26 May

India's export prohibition on bamboo charcoal lifted

The Central Government of India lifted the 'export prohibition' on bamboo charcoal in May, allowing the domestic bamboo industry to now fully utilise raw bamboo to develop the sector and generate higher profits.

The change came after persistent lobbying from the Khadi and VIllage Industries Commission, a group that advocates on behalf of bamboo-based industries. The Directorate General of Foreign Trade issued the revised policy as "All the bamboo charcoal made from bamboo obtained from legal sources are permitted for export subject to proper documentation/certificate of origin proving that the bamboo used for making charcoal has been obtained from legal sources."

The decision will empower the Indian bamboo industry to exploit the massive global demand for bamboo charcoal, lower high-input costs associated with raw bamboo and increase profitability of bamboo-based industries, most of which are located in remote rural areas. This will ensure optimum utilisation of bamboo waste and contribute to the national 'Waste to Wealth' strategy for sustainable waste management.

Source: The Pioneer, 21 May

New mechanism to boost rattan sustainability launched

April marked the launch of the new participatory certification mechanism for securing fair prices for sustainable rattan farmers. Known as the Participatory Guarantee System Rotan Lestari (PGS ROLES), it was launched to bolster livelihoods for Indonesian rattan farmers. In Bahasa Indonesian, rotan lestari means 'sustainable rattan'.

In Southeast Asia, many forest-based communities rely upon rattan as an important part of local livelihood strategies. In the past, rattan harvesting was done in a haphazard and unsustainable manner. This new participatory mechanism incentives community members to learn about green rattan harvesting practices, including how to appropriately position in and profit from raw rattan in the marketplace, allowing farmers to differentiate their products from others.

The mechanism is the result of a decade-long collaboration between civil society organisations, government representatives, rattan producers and artisans to ensure the sustainable harvest of rattan and boost farmer incomes.

Source: Non-Timber Forest Products-Exchange Programme, 12 April

Welcome Center built with bamboo grid in Viet Nam

Vietnamese architecture studio VTN Architects has finished construction of the Grand World Phu Quoc Welcome Center, using a grid of 42,000 bamboo culms to complete the structure.

Based in Phu Quoc, Viet Nam, the project is part of a new tourism-resort-entertainment complex on the island. The structure is entirely composed of natural bamboo material without any chemical treatment. The 1460m^2 building features a unique structure that embodies Vietnamese culture and aims to become a landmark to attract tourists.

VTN Architects is known for its intensive use of greenery and bamboo materials in its projects. According to the firm, this is an ideal project, showcasing the significance and originality of their bamboo architecture, using natural, low-cost sustainable material.

Source: World Architecture Community, 7 April

INBAR SPOTLIGHT

INBAR commissions research, conducts project work and raises awareness about bamboo and rattan across its 48 Member States.

New initiative by China and INBAR seeks to reduce plastic pollution and address climate change. Credit: INBAR.

Bamboo at XIV BRICS: New initiative to reduce plastic use and combat climate change

For bamboo experts, advocates, traders, harvesters, users and enthusiasts, 24 June marked a historic occasion.

At the High-level Dialogue on Global Development held as part of the 14th BRICS Summit, China announced to the world it was poised to jointly launch with INBAR the 'Bamboo as a Substitute for Plastic Initiative' as part of a series of deliverables meant to accelerate international progress toward achieving the 2030 Agenda for Sustainable Development.

Global in scope, this exciting initiative represents a breakthrough achievement for INBAR as an unprecedented commitment of support and reaffirmation of INBAR's global mission from its host country. The initiative, driven by the twin goals of lowering plastic pollution and mitigating climate change, will act as a comprehensive roadmap for scaling up sustainable bamboo resources to tackle humankind's biggest challenges.

As a durable and renewable material, bamboo can be used to replace many single-use plastic products, such as cutlery, cups, straws, paper and packaging, with numerous applications in the construction sector as a low-carbon building material. It also exerts a tremendously beneficial ecological impact, capable of restoring degraded soils, sequestering carbon, limiting erosion and feeding wildlife, making it ideal for agroforestry systems. An upswell of trade in recent years also hints at its capacity for delivering new sustainable income streams to rural communities.

Given that 50 million hectares of bamboo are distributed across Asia, Africa and the Americas— where most INBAR Member States operate— its potential for exploitation cannot be understated.

INBAR has a long history working in the field of plastic reduction, touting bamboo as a green alternative for plastics at COP 25, the International Plastic Ban Industry Forum and the 2021 China International Fair for Trade in Services. It is now well positioned to mobilise its Member States and partner organizations to coordinate this initiative in close collaboration with the Chinese Government.

Bamboo and rattan showcased at the XV World Forestry Congress

From 2–6 May, INBAR participated at the XV World Forestry Congress in the Republic of Korea, where policymakers, practitioners, researcher, youth and Indigenous peoples gathered to exchange knowledge on best practices in forestry.

In the opening remarks, His Excellency Moon Jae-in, President of the Republic of Korea, explained that forest restoration only addresses the symptoms of unsustainable development: to pass along a green legacy for our children, we must develop new supply chains that leave forests intact and healthy.

INBAR hosted two side events. At 'Delivering multiple benefits for people and the earth through bamboo', INBAR experts presented case studies from around the world to demonstrate the multifunctional benefits of bamboo in addressing forest degradation, landscape restoration, livelihood improvement, job creation, biodiversity conservation, ensuring food security, and providing clean energy and ecosystem services. At 'Bamboo as sustainable biomass energy for Africa', lessons and experiences were shared on how to best utilise bamboo biomass energy across greater Africa, such as via bamboo pellets and shoot shells.

INBAR also vigorously participated in the side event, 'Research for a green, healthy and resilient future with forests and trees: Launching a new research-for-development partnership'. Sharing its perspective on bamboo as a key resource for strengthening ecosystems, economies and livelihoods, the session identified emerging issues and key insights from decades of forestry research.

The Africa Bamboo and Rattan Congress

The Africa Bamboo and Rattan Congress was convened from 20–22 April, hosted by INBAR's Central Africa Regional Office and the Government of the Republic of Cameroon.

Sessions at the Congress focused on technical bamboo and rattan development, from certification to standardisation, while others focused on the merits of sustainable policy development and how to promote investment as well as bamboo's utility in storing carbon and acting as an energy source.

At the end of the Congress, attendees published the Yaoundé Declaration, which calls for greater funding and political willpower across the African continent to recognise the benefits of bamboo and rattan, and promotes its use in low-income housing, renewable energy, and as a means for "carbon sequestration, agroforestry and the restoration of degraded landscapes."

INBAR at UNFF 17

The side event titled 'Bamboo as An Effective Tool for Ecosystem Restoration' unfolded at UNFF 17 on 12 May 2022. Hosted by INBAR, the event shone a light on successful instances of using bamboo for ecosystem restoration, as a forest resource capable of soil improvement, water regulation and carbon storage.

INBAR Deputy Director General Professor Lu Wenming gave a keynote speech, describing the great potential of bamboo for catalysing forest and landscape regeneration. He highlighted INBAR's work in undertaking action research, developing demonstration models, building capacity, mainstreaming bamboo into policy agendas and scaling up the bamboo sector.

Speakers shared information about bamboo's broad applications for restoration, from mining sites in Ghana to coffee-growing regions in Colombia. Another important topic was how to design and implement profitable conservation projects.

Broad consensus was reached for bolstering scientific and technical cooperation, creating new policies and financial instruments, and building awareness and capacity.

Bamboo sector development in West Africa

On 3 March, INBAR's West Africa Regional Office hosted a dialogue on development and investment opportunities for the bamboo sectors in West Africa, welcoming over 300 participants from 62 countries. Though the topic focused on West Africa, many participants joined from Asia, Europe, Latin America and North America.

Speaking at the event, Dr. Ernest Nti Acheampong, Director of INBAR's West Africa Regional Office, introduced the distribution of

bamboo species across West Africa and called for increased collaboration between governments and sectoral players to overcome investment challenges.

Other approaches to development and investment were expounded upon, such as the weaving of reforestation objectives into financial services for rural economic development as well as utilising a learning-based model for generating feasible supply chains, mainstreaming bamboo in infrastructure and energy, and creating special economic bases for scaling up production.

At the end of the dialogue, it was announced that INBAR will be advocating for greater bamboo sectoral cooperation and green investment across Member States, donors, partners and e-learning stakeholders using webinar broadcasts.

INBAR collaborates with Lao PDR to host online workshop on sustainable development

10 May marked the beginning of a four-day webinar organised by INBAR in collaboration with the National Agriculture and Forestry Research Institute of Lao PDR. The webinar aimed to raise awareness of and build capacity for the conservation, sustainable management and utilisation of bamboo.

His Excellency Mr. Jiang Zaidong, Ambassador of the People's Republic of China to Lao PDR, spoke at the opening ceremony, celebrating the event and expressing his hope for Lao PDR to join INBAR in the future.

Her Excellency Mrs. Khamphao Ernthavanh, Ambassador of the Lao People's Democratic Republic to China, also spoke, extolling the bountiful bamboo and rattan resources of Lao PDR, and their potential to generate economic activity.

Experts, researchers and entrepreneurs from Yunnan, Sichuan and Zhejiang provinces of China lectured on industry knowledge and techniques to facilitate the growth of the bamboo industry.

Bamboo for Ecosystems Restoration and Green Growth—INBAR at UNCCD COP 15

At the 15th session of the Conference of the Parties of the United Nations Convention to Combat Desertification held from 9–20 May, bamboo was spotlighted for its important role in healing degraded soils and safeguarding tropical ecosystems.

The two-week conference gathered Heads of State and environmental authorities from around the world to discuss how to generate sustainable supply chains while taking crucial steps to combat climate change.

INBAR rose to the occasion, hosting a session on 'Bamboo for Ecosystems Restoration and Green Growth'. In his opening remarks, Professor Lu Wenming, Deputy Director General of INBAR, reaffirmed the integral role of bamboo in forests, cultures and livelihoods. Speakers at the session recognised the intrinsic ecological value of bamboo, noting its far-reaching rhizomes that fortify topsoil, carbon-storing potential and other ecosystem services.

International Seminar on Policies and Industrial Development of Bamboo convenes in Ecuador

From 26–27 May, over 100 people met in Quito, Ecuador to exchange experiences and best practices for facilitating the healthy growth of the bamboo sector in Latin America, including INBAR Regional Director of Latin America and the Caribbean Office Pablo Jácome Estrella.

In the opening ceremony, María Gabriela Aguilera, Ecuador's Deputy Minister of Urban Development and Housing, emphasised the need for targeted and diverse initiatives on bamboo resources. For the sector to expand in Latin America, clear and supportive policy must be developed and implemented to help guide entrepreneurs, traders and farmers.

Topics expounded upon by event speakers revolved around how to use bamboo to mitigate the consequences of climate change as well as strengthen vulnerable communities of the region.

INBAR's Latin America and the Caribbean Office is currently conducting a project in Ecuador to revitalise local economies still recovering from the impact of Covid-19, with bamboo at the nexus of strategic public-private partnerships to develop industry, create jobs and grow the market.

OVER 120 COUNTRIES

...The number of nations that have ratified bans on single-use plastics, per INBAR's 2021 Fact Sheet on Bamboo as a Plastic Alternative. Produced almost exclusively from fossil fuels, single-use plastic items are difficult to recycle and accumulate in the biosphere, where they leach harmful chemicals that wreak havoc on wildlife, ecosystems, and may, as alarming new research has suggested, seriously threaten human nutrition by infiltrating food sources as microplastics.

However, bamboo can play a prominent role in fighting against this environmental scourge. Given the refinement of industrial and technological processes in recent years, bamboo resources, which are non-fossil-fuel-based, can now be scaled up to help fill in the gap left by bans on single-use plastics.

As a low-carbon alternative, bamboo boasts numerous advantages compared to emissions-intensive plastic. Bamboo culms mature quickly and regrow after harvest with minimal labour input. Moreover, products sourced with bamboo are 100% biobased, durable, high-quality and lock in carbon.

Currently, bamboo can be used to replace a wide variety of plastic items, like straws, cutlery, chopsticks, cups, bowls, construction materials, flooring, pipes, food packaging, and more. Continual improvement of industry processes will yield even more sustainable products and materials for future exploitation. And even if synthetic elements are used in bamboo products, their carbon footprint remains far under those of steel, PVC, aluminium and plastic.

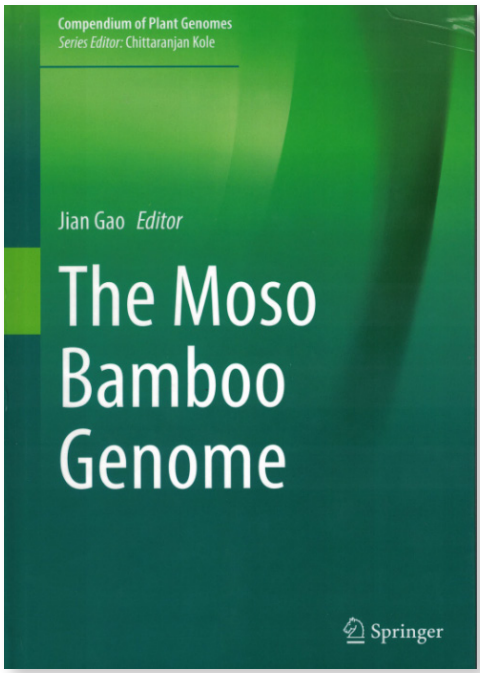
Bamboo is also capable of growth on degraded and sloping soils, allowing farmers to diversity crop portfolios without over-stressing agricultural land. As a multifunctional plant, it is especially suited for cultivation in integrated farming systems like agroforestry, where it can deliver additional ecological and economic benefits to smallholders, making it ideal for strengthening the adaptive capacity of rural communities facing climate change-related impacts.

Momentum for bamboo is building in a big way. Announced at the 14th BRICS Summit in late-June, the Government of China and INBAR are poised to jointly launch a new initiative called the 'Bamboo as a Substitute for Plastic Initiative'. China, as INBAR's host country and founding Member State, will be a critical collaborator in the development and implementation of this project, which seeks to lower global use of single-use plastics while mitigating the effects of climate change.

Read the fact sheet here: www.inbar.int/resources/inbar_publications/bamboo-as-a-plastic-alternative-fact-sheet/

Cups made of bamboo culms. Credit: Jade Joquino.

IN REVIEW



The Moso Bamboo Genome (2021)

A new book comprehensively examines and introduces one of Asia's most valuable bamboo species.

The Moso Bamboo Genome provides an in-depth look into the titular bamboo species. Moso bamboo (*Phyllostachys edulis*), as one of the most important non-timber forest products in the world, possesses substantial ecological and economic value. It is the most widely cultivated bamboo species in China. According to data from the 9th National Forest Inventory, the bamboo species currently occupies approximately 4.7 million hectares of land.

This book represents the first exhaustive compilation describing the botanical traits and intraspecific variation of Moso bamboo, along with providing its whole genome sequencing, mitochondrial genome, transcriptomes of different organs with developmental stages, transcription factors, delineating gene evolution of families in Bambusoideae, alternative splicing (AS) and polyadenylation. It also elucidates economically important traits like internode length, fast-growing shoots, flowering, ageing, stress-resistant genes and small RNAs-mediated gene regulation of Moso bamboo flowering.

Applications of transcriptome and genome approaches in Moso bamboo as well as the prospects of transgenic breeding and genome-editing technologies in bamboo are also presented. Altogether, the book comprises eleven chapters spread across 200 pages, 121 figures and 16 tables authored by an interdisciplinary team of researchers with backgrounds in genomics, molecular biology and breeding.

The book possesses wide appeal to a number of different audiences, from graduate students, post-graduate researchers, scholars, plantation industry leaders, bamboo-processing professionals, garden owners and recreational fans of bamboo.

The general purpose of this book is to provide an intuitive, comprehensive and non-technical introduction to the Moso bamboo genome. It sets out to accomplish this with three goals in mind. The first goal is to introduce the economic utilisation of the species in China. Chinese people have created many new products by planting and developing Moso bamboo, generating new income streams for farmers. Second, as a Chinese researcher, I would like to share the germplasm resources of China's Mosu bamboo with the rest of the world. Thus, this book is intended to be a companion to bamboo lovers worldwide. The third goal of this book is to cover different aspects of cutting-edge research on Moso bamboo, including genetics, biotechnology, comparative genomics and other specific topics, such as fast-growing shoots and flower development in transcriptional and post-transcriptional levels, laying the theoretical foundation for breeding bamboo.

The book will be a useful guide for those interested in gene discovery, comparative genomics, functional genomics and molecular breeding. Insightful in both depth and breadth of content, the book will be particularly useful for scientists, breeders and university students as well as public sector institutions and organisations involved in research for the development of the bamboo industry.

Gao, J. (2019) *The Moso Bamboo Genome*. Beijing, China. Springer Cham.

EVENTS AND MEETINGS

21 March–31 August
INBAR International Photo Competition
Online

20–22 April
Africa Bamboo and Rattan Congress
Yaoundé, Cameroon

2–6 May
XV World Forestry Congress
Seoul, Republic of Korea

9–13 May
17th session of the United Nations Forum on Forests
New York, United States of America

17 May
Conference of the Parties of the United Nations Convention to Combat Desertification
Abidjan, Côte d'Ivoire

17–19 May
Engineered Bamboo for Sustainable Construction Conference
Online

21–26 May
Global Land Forum 2022 (GLF)
Jordan

25–27 May
Training: Bamboo Scrimber, Laminated Composites and Value-added Products
Online

June–October
2022 Lancang-Mekong Cooperation Design Award
Countries in Lancang-Mekong Area

17–20 July
5th World Congress on Agroforestry
Québec City, Canada

Early September
China International Service Trade Fair (CIFTIS)
Beijing, China

15–17 September
7th International Bamboo and Guadua Symposium (SIBGUADUA)
Lima, Peru

7–8 November
The Second Global Bamboo and Rattan Congress (BARC 2022)
Beijing, China

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

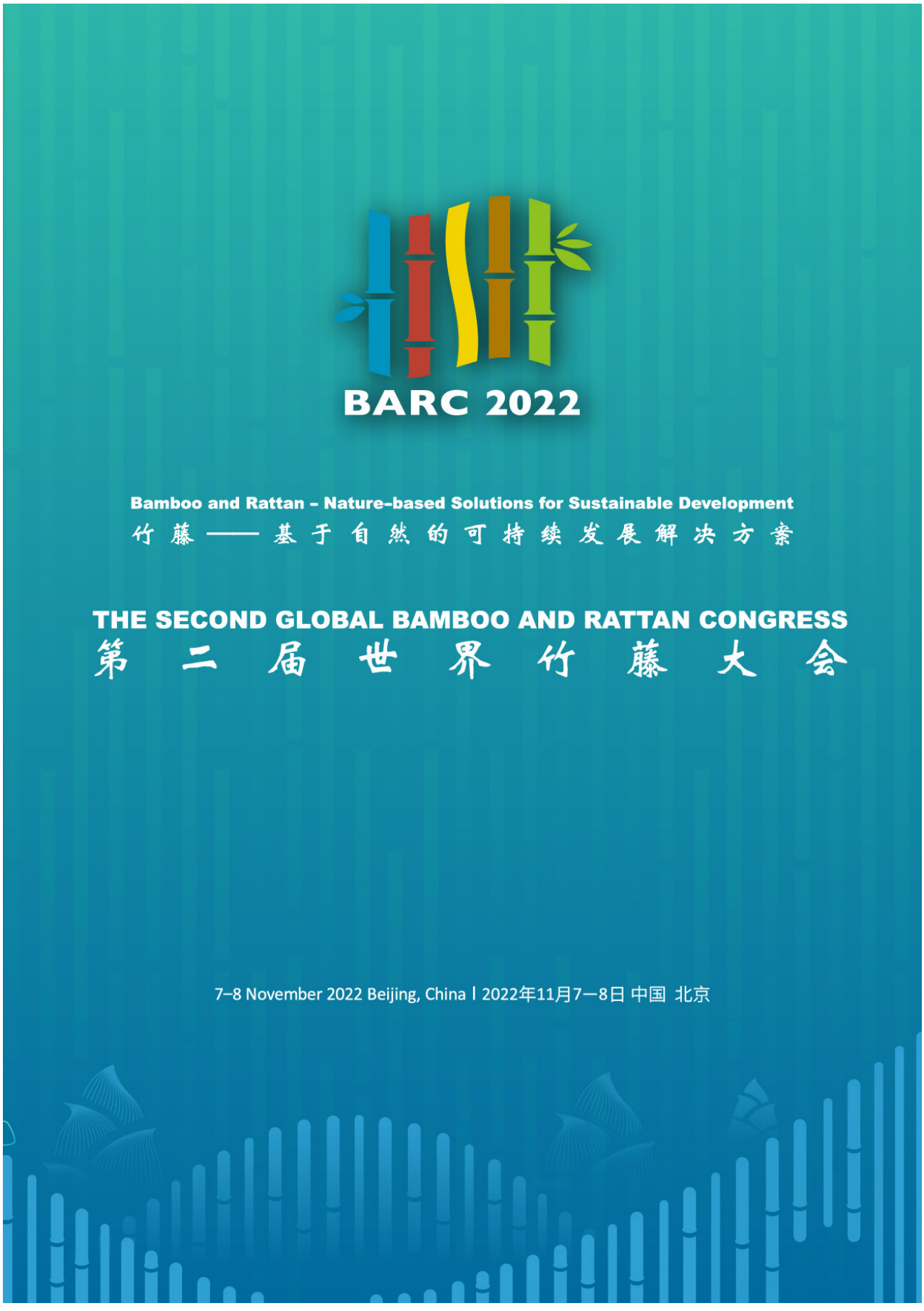
Opening for submissions

INBAR INTERNATIONAL PHOTO COMPETITION 2022

INBAR is looking to showcase the multitudinous ways in which bamboo and rattan are important parts of sustainable development and everyday livelihoods. Consequently, INBAR is calling all bamboo and rattan enthusiasts, architects, artisans, photographers and all others interested in showcasing these natural wonders in INBAR's international photo competition for 2022.

Winning entries will be issued a cash prize, a digital certificate and their photos will be exhibited at the Second Global Bamboo and Rattan Congress (BARC 2022).

For more information visit www.inbar.int/event/photocompetition2022.


BARC 2022
Bamboo and Rattan – Nature-based Solutions for Sustainable Development
竹藤——基于自然的可持续发展解决方案
THE SECOND GLOBAL BAMBOO AND RATTAN CONGRESS
第二届世界竹藤大会
7–8 November 2022 Beijing, China | 2022年11月7—8日 中国 北京

Credit: Shovan Acharyya.

A wide range of bamboo products found across Asia help drive local livelihoods. Millions of people benefit from the production and utilisation of bamboo-sourced materials, which play significant roles in handicrafts, construction, artwork and more. Featured in the image above, this woman from Chittagram, Bangladesh uses her bamboo-weaving skills to capture enough income to afford tuition for her two young children while financially supporting her husband. Empowering women with the skills to develop a profession not only strengthens the financial solvency of families, but also diversifies income streams, boosting household resilience to future economic shocks.

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