# BRU

INBAR

## Bamboo and Rattan Update

Volume 2 | Issue 3

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



*BAMBOO: FIBRE OF THE FUTURE*

*Bamboo and Rattan Update*
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**Cover Image**
A drainage pipe made of winding bamboo. Credit: Engineering Research Center of Bamboo Winding Composites (ERCBWC)



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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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**Regional Offices:** Yaoundé, Cameroon; Quito, Ecuador; Addis Ababa, Ethiopia; Kumasi, Ghana; New Delhi, India

BRU

# EDITORIAL

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

The September 2021 issue of *BRU* considers bamboo's role as a 'fibre of the future': as a material which can replace timber, plastics and steel in a wide range of applications.

The world needs more sustainable materials. Unsustainable consumption models are driving climate change, resource depletion, deforestation, biodiversity loss and pollution. Bamboo offers a fast-growing, biodegradable and versatile material, which can be used in everything from cutlery, cups and straws, to construction materials.

New uses for bamboo are being developed every year. Our striking cover image shows a large storm drainage pipe made from bamboo fibres. These pipes have already been laid underground in certain parts of China, and the same company is exploring the use of this material in high-speed train carriage fuselage.

The first article in this issue In 'Power Plant', considers a particularly new application of bamboo. Researchers from the **International Centre of Bamboo and Rattan, China (ICBR)** evaluate a factory which uses bamboo grid packing, rather than PVC, in its cooling towers (page 4). As the research shows, bamboo packing has a similar cooling capacity, but a lower environmental impact and cumulative energy demand, to PVC. It is one of the more exciting ways in which bamboo can replace other materials.

Despite its advantages, bamboo faces several obstacles to becoming a widely used material. A **new INBAR report** considers international timber trade legislations, and how they impact the trade of bamboo products ('Growing Pains', page 7). Ironically, attempts to combat the import of illegally harvested wood often interfere with other non-timber forest products, such as bamboo. The report ends with some recommendations for countries which are currently putting together their own regulations.

In the last few months, INBAR has been busy promoting bamboo as a sustainable fibre, particularly in place of plastic. Page 15 summarises the recent seminar 'Replacing Plastics with Bamboo', which INBAR hosted in Beijing in September. And page 10 introduces the winners of this year's **INBAR photo competition**, showing the many different ways in which bamboo and rattan are being used in houses and workplaces around the world: a perfect example of how natural materials can be future fibres.

As usual, this issue contains a summary of the most recent news for the bamboo and rattan sector (**Internode**, page 12); INBAR work (**INBAR Spotlight**, page 15), and recent and upcoming events (**Events and Meetings,** page 19).

**THE EDITORS**






*This study should be an important step forward... for power plants and processes looking for effective, more environmentally friendly solutions.*

*- 'Power Plant', Page 4+*

*Considering that bamboo consumption has a positive effect on the preservation of endangered forests... there is an urgent need to amend timber trade regulations to exclude bamboo.*

*- 'Growing Pains', Page 7+*

# POWER PLANT

***A new study shows how grid material made from bamboo compares to PVC as a packing material in cooling towers.***

Evaporative cooling has long been used as part of industrial processes. Cooling towers are widely used in power plants, petrochemical, refrigeration and air conditioning processes, extracting waste heat from the system and ejecting it through evaporation.

Cooling tower packing is an important part of the cooling process. It provides a large surface area for evaporative cooling to take place. While there are several types of packing material used in cooling towers, including concrete and wood, since the 1970s polyvinyl chloride (PVC) has become a popular choice, coming to dominate over 96% of market share in cooling towers on account of its low density, high strength and good cooling performance.

However, PVC packing also has drawbacks, such as deposit buildup and low durability. In addition, PVC's extremely long duration of decomposition makes it environmentally unsustainable from a circular economy perspective.

## Bamboo grid packing

Bamboo grid packing is a 'vertical grid apparatus' type of packing made using bamboo slivers, rods and polypropylene piping. Although bamboo grid packing technology was first developed in the 1970s in China, for several decades it was not widely used, because the traditional bamboo packing production process was inefficient and the raw materials were not standardized. However, in recent years, product developments have made bamboo grid packing a more attractive option for industrial use, and it is being used in an increasing number of power plants across China.

Compared with PVC packing, the operation and transportation costs of bamboo grid packing are higher because of bamboo grids' different manufacture methods, and the weight of bamboo. However, bamboo grid packing also has many advantages. The outline of a bamboo culm's outer surface is an irregular arc, which can easily break up the water flow into small drops and makes it difficult to build up fouling for bamboo grids. The modulus of elasticity of vertical bamboo grid slats decreased by only 25% after a nine-year service period, which meets standard application requirements.

## Cooling performance: bamboo versus PVC

Despite its uptake, however, there has been no comprehensive evaluation of bamboo grids' environmental performance.

The authors of this study, published in *Journal of Environmental Management*, set out to measure

*In recent decades, cooling towers of power plants have been lined almost exclusively with PVC grid packing.*


*Life-cycle analysis steps for bamboo grid packing in a cooling tower. Credit: Ma Xinxin et al.*

the energy efficiency of bamboo grid packing, and to assess the environmental impact. These results were compared with PVC packing in cooling towers.

First, the study looked at the thermal performance and resistance performance of both bamboo and PVC packing, to understand the materials' overall cooling capacity. While bamboo grid packing's thermal performance was slightly less effectivee than that of PVC, its resistance performance—as in, the ability of the air to flow through the packing—was better. In addition, bamboo grid packing's longer durability means it offers more consistent cooling over time.

These results were borne out by looking at the cooling capacity of bamboo grid in a real thermal power generation plant. Dongfeng Motor Thermal Power Plant, in China, previously used PVC packing in its cooling towers. However, the PVC began to collapse after four years of service, and so in 2013 the company transitioned to using bamboo grid materials. (Pictured on page 6.)

Dongfeng's experience showed that bamboo grid packing had stable cooling properties. Even in the hottest months of the year, the temperature of 'outlet water', as in water leaving the cooling tower, was lower than the outside temperature. Moreover, bamboo grid packaging posted more consistent temperatures over time; by contrast, the PVC packing degraded after several years' service, meaning that its cooling performance worsened, and the outlet water temperature increased. In total, the actual outlet temperature of bamboo grid packing was 0.98 C lower than for PVC packing, and the bamboo grid packing saved 529.2 tons of coal compared to PVC packing between the months of March and August.

## Unpacking bamboo grids' carbon footprint

The study conducted a life-cycle assessment (LCA) of bamboo packing materials, based on a cradle-to-grave analysis of bamboo, from its harvesting to the various stages of manufacturing—cutting, splitting, treatment, sliver making, transportation, packing assembly and installation—and the eventual disposal of bamboo packaging. A similar assessment was done for PVC.

Once the data was collected, it was evaluated using two LCA methods: a method to work out the cumulative energy demand (CED) of each type of packing, and an analysis of their overall environmental and economic sustainability.

The data showed that PVC requires more energy than bamboo grid packing across its lifespan. The CED of PVC packing was 3420 megajoules (MJ), while the bamboo grid packing was 561 MJ, meaning that bamboo grid packing used 6.1 less

*Bamboo grid packing being installed at the Dongfeng Power Plant, one of 80 companies in China to use this equipment. Credit: Ma Xinxin et al.*

energy to manufacture and dispose of. As well as this, bamboo packing lasts longer than PVC: its service life could be more than 15 years, whereas PVC lasts for five to eight years. This further reduces the environmental impact of bamboo grid packing, as less material needs to be consumed to achieve the same cooling capacity.

Similarly, bamboo packing has a lower environmental impact overall when measured on the Building for Environmental and Economic Sustainability (BEES) tool. The BEES measures more than just the energy demands for a certain material: it also takes into consideration a diverse range of 13 possible environmental impacts from manufacturing products, such as natural resource depletion, human health risks, water intake, and ozone depletion, and quantifies these into a carbon dioxide equivalent. On the BEES index, the environmental impact index for one cubic metre of bamboo grid packing was 26,000 grams CO2 equivalent (g CO2-eq): more than six times lower than PVC packing, which was 160,000 g CO2-eq.

By assessing the environmental impact and energy efficiency of bamboo grid versus PVC-based packing in cooling towers, the authors of this study were able show that bamboo grid packing has a similar cooling capacity, but lower environmental impact and cumulative energy demand, than traditional PVC. The study should be an important step forward, not just for manufacturers looking to improve their bamboo grid packing design, but for power plants looking for effective, more environmentally sustainable cooling solutions.

This essay summarises the main findings of an article published in *Journal of Environmental Management* in 2021: Ma Xinxin, Cai Liping, Chen Lisheng, Fei Benhua, Lu Jiping, Xia Changlei, Su Shiung Lam, 'Bamboo grid versus polyvinyl chloride as packing material in cooling tower: Energy efficiency and environmental impact assessment.'

Read the article at:

**https://tinyurl.com/BambooPVC**

## FEATURED ARTICLE

# GROWING PAINS

***A new report analyses the impact of various timber legislations on bamboo trade.***

The world needs more sustainable materials. In recent decades, increasing concerns about deforestation, unsustainable resource use and plastic pollution have led to a host of laws which limit illegal logging and ban or restrict single-use plastics. In 2018, at least 127 countries had issued or adopted some form of legislation to regulate the use of plastics by 2018. Countries and blocs are also making large commitments to build carbon-neutral and circular economies: the European Union and China have agreed to become carbon-neutral by 2050 and 2060, respectively, while the European Union has also adopted a circular economy action plan, which aims to "reduce pressure on natural resources and… create sustainable growth and jobs."

Timber protection laws have also proliferated. In 2003, the European Commission presented the EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, which aimed to eliminate the trade of illegal timber into Europe, and takes into account the shared responsibilities of exporters and importers. Another key initiative came from the United States, which amended its Lacey Act in 2008 to prohibit the import of illegally sourced timber products. Other importing countries such as Australia, China, Japan and South Korea are following this trend of regulating illegal timber entering their markets and have either already enacted relevant regulations or are in the process of doing so.

*Bamboo stick bundles ready for processing. Credit: Wang Changyu.*

Unfortunately, few of these legislations make specific exceptions or specify particular rules for bamboo. In fact, many jurisdictions include bamboo within their defined scope of 'timber products'. This has led to situations where bamboo and bamboo products must meet strict requirements and conditions that were initially designed for timber products, despite the fact that bamboo is a non-timber forest product.

### BAMBOO: A FAST-GROWING TIMBER SUBSTITUTE

From a biological and functional point of view, bamboo is a good substitute for timber. While woody bamboo species have similar properties to wood, bamboo is a grass species, whose rapid growth sets it apart from trees: plants reach maturity within three to seven years. The bamboo harvesting process is also different from wood. Typically, 20–30% of bamboo culms are harvested selectively every year. Upon harvest, bamboo plantations regenerate naturally by producing new shoots the following growing season, and harvesting bamboo culms does not damage the roots and rhizomes.

Bamboo's inherent economic cycle makes it an appealing alternative to timber: the crop-like annual harvesting scheme of bamboo plantations, with a quick return on investment, largely eliminates incentives for deforestation or clear-felling of bamboo, and can protect stressed forest resources.

However, some of the largest potential markets for bamboo exports do not recognise this distinction, and subject bamboo to the same tests

*Bamboo is increasingly being used to replace wood and other materials in a wide range of products. Credit: INBAR.*

and regulations as timber. A new report, published in 2021 by INBAR, analysed some of the most important timber legislations, and their impact on bamboo trade.

## EUROPEAN UNION

By far the most strict system surveyed in the report was that established by the European Union.

The Forest Law Enforcement, Governance and Trade, or 'FLEGT' Regulation, enacted in 2005, aims to reduce illegal logging by strengthening sustainable and legal forest management. To trade timber products with Europe, countries must sign voluntary partnership agreements: as of 2019, 15 tropical timber-exporting countries are negotiating or implementing FLEGT agreements with the EU.

One of the main issues of the FLEGT Plan is that its definitions of timber and timber products all rely on Harmonized Commodity Description and Coding Systems codes, or 'HS codes'. The HS is an international naming system for products, maintained by the World Customs Organization. Currently, few HS codes exist for bamboo products specifically. This is because many HS codes are based on product applications, rather than product materials. For example, HS code 4418 73 refers to: "Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes." If these products, or the top 'wear layer', are made of bamboo, they will also fall under this code.

Because bamboo products are often filed under the same HS codes as wood products, a large number fall within the scope of the FLEGT Action Plan and its derived regulations. To sell products to the European Union, bamboo companies must establish a resource-intensive system of due diligence that includes conducting regular checks, risk assessments, and risk mitigation strategies and measures. Because this process is resource-intensive—one evaluation by the European Commission estimated that establishing a due diligence system could range anywhere between EUR 5000–90,000 [USD 5700–104,100]—it is likely beyond the scope of many small-to-medium-sized enterprises, effectively hampering international bamboo trade.

## AUSTRALIA

The Australian system offers a less prohibitive alternative. Similar to the EU FLEGT Action Plan, the Australian Illegal Logging Prohibition Regulation uses a list of HS codes to determine which products are within its scope. However, the Australian Act expressly states that it only refers to the *timber* products within these HS codes, thus leaving bamboo products aside. The Australian rules offer an example of how it is possible to combat the import of illegally harvested wood without interfering with other non-timber forest products such as bamboo.

While this is good news for bamboo companies exporting to Australia, there are other laws to consider. Due to its isolated location and the extraordinary fragility of its ecosystems, the Australian authorities have imposed additional requirements for wood and bamboo products under the banner of the Biosecurity Import Conditions (BICON) system. Since May 2018, the BICON system requirements apply to bamboo products manufactured with *Bambusa* spp., *Dendrocalamus* spp., *Phyllostachys* spp. and related genera. The rationale is that, if not processed sufficiently, bamboo articles may contain boring insects, fungi and other contaminants that have the potential to introduce exotic pests and diseases to Australia.

## UNITED STATES

The Lacey Act is one of the oldest laws on flora and fauna protection. Originally the Act, which has been active since 1900, focused on the preservation of wild animals and birds and restricted hunting game. In 2008, a revision to the Act stretched its protection to cover a broader range of plants and plant products. Following these revisions, the Lacey Act has become the main legal tool in the United States to prevent the import or spread of potentially dangerous non-native species as well as illegally harvested wood.

The scope of the Lacey Act is broad: it covers "any wild member of the plant kingdom, including roots, seeds, parts or product thereof, and including trees from either natural or planted forest stands". Bamboo is naturally included in this definition. The few exceptions, which include common cultivars and food crops, do not seem applicable to the case of commercial bamboo and bamboo products.

The Lacey Act lays out definitions for what constitutes illegal logging and trade, and requires suppliers to prove their product's legality. However, unlike the EU FLEGT Action Plan, the Lacey Act does not specify a particular due diligence system or requirements for doing this; the specific method of avoiding infringement can be decided by market operators according to their particular circumstances, which can reduce their costs.

Compared with the EU FLEGT Action Plan, then, the Lacey Act gives importers and traders relatively more freedom to determine compliance methods. However, this does not mean that bamboo product operators are completely free to decide the measures they take in order to ensure compliance with the Lacey Act. In practice, it is likely that many big and medium traders dealing both in the United States and the EU would, for the sake of simplicity, apply the same due diligence systems for importing into both jurisdictions; as such, their information requirements to import into the United States will be the same as those for the European standard.

As well as this, since the provisions of the Lacey Act apply not only to importers but also to any other entity throughout the value chain, it is even more likely that any of these entities will request elaborate and systematised information on the products, which in all cases will have to be provided in the first place by the bamboo producer or exporter. This would force bamboo industry agents to spend more resources in gathering extensive and detailed records on their products. Because of these requirements, the Lacey Act's inclusion of bamboo and bamboo products can be said to increase market access costs, and in doing so hinders the development of international bamboo trade by bamboo-producing countries.

## THE ROOT OF THE PROBLEM

There is an urgent need to amend timber trade regulations to exclude bamboo. Considering that bamboo can be a substitute material for wood, bamboo consumption has a positive effect on the preservation of endangered forests and their sustainable management: one of the objectives of most timber trade plans. Paradoxically, the inclusion of bamboo under legislations such as the FLEGT Action Plan hinders its consumption, and defeats the very purpose of the regulations.

This is particularly important when one considers other countries which are developing their own timber laws. Currently, China is working towards the development of a national timber legality verification system; in addition, Japan's new Clean Wood Act, which was adopted in 2017, is still pending full implementation, and it is not clear whether bamboo and bamboo products will ultimately be included. These new rules must exclude bamboo plants and products.

Existing timber regulation acts should adapt their scope to exclude bamboo, or recognise bamboo as a common cultivar or food crop (these are exceptions to the legality requirement in the US Lacey Act). Organisations such as INBAR can also cooperate with and support monitoring organisations, to make it easier and less costly for suppliers to prove a bamboo product's legality.

This essay summarises the INBAR report: Guillermo Ramo Fernández, Trinh Thang Long, Li Yanxia, 'A Review of International Bamboo and Timber Trade Regulations: A Multijurisdictional Study'.

Read the report at:

**https://tinyurl.com/INBAR-TimberTradeReview**

*THE WINNERS:*

# THE INBAR PHOTOGRAPHY COMPETITION 2021

***The winners of this year's competition shone a light on how bamboo and rattan are an integral part of lives and livelihoods around the world.***

***'With Brick' by Enamul Kabir (India)***

Enamul Kabir, who won first prize for his picture 'With Brick', explained that bamboo "is easy to work with and harmless for the environment". His photograph shows workers at a brick-making area in West Bengal state of India traversing a sturdy bamboo ramp. The composition, and depiction of bamboo products as a dependable part of everyday life, impressed the judges.

The annual INBAR bamboo and rattan photo competition provides budding photographers, as well as bamboo and rattan enthusiasts, architects, artisans and more, with a chance to showcase the importance of these plants to their lives and landscapes.

In 2021, judges reviewed more than 130 entries from across the world, on a wide range of themes. Prizes were awarded to photographs which were striking, and highlighted a unique or inspiring use of bamboo and rattan. Aside from the three winning images pictured here, the judges also chose 10 highly commended photographs, including a new bamboo gym (pictured on page 13) and a bamboo 'fourcycle' (featured in 'A Picture in 100 Words', page 20).

**The full results can be browsed online at: www.inbar.int/winners-photocompetition2021/**

2

***'Learning From Mother' by Ashiqur Rahman Sakib (Bangladesh)***

This family in Khulna, Bangladesh make bamboo crafts to sell on the local market. According to photographer Ashiqur Rahman Sakib it is their only source of livelihood. Because of the local abundance of bamboo, it is possible to buy poles at a low price. Sakib says: "They have been engaged in this profession for generations. I hope this kind of industry will never be lost from Bangladesh."

Bamboo is a common sight in Bangladesh: according to the Ministry of Environment, Forest and Climate Change, there are at least 22 species of bamboo in the country, and the plant is used to make everything from baskets to housing.

3

***'Productive During the Pandemic' by Bastian AS (Indonesia)***

A worker arranges rattan chairs before the packing process in Cirebon, one of the production hubs of the rattan sector in Indonesia. According to Bastian, " The pandemic situation also influenced the sector but they must keep on questing for buyers." Rattan craftsmanship remains a large source of employment in Indonesia, where much of the world's rattan supplies grow.

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

*Bamboo planting in Ecuador: one of a number of activities to celebrate World Bamboo Day. Credit: INBAR.*

## Pandas no longer 'endangered' species

According to a recent assessment by Chinese officials, the giant panda is no longer classified an endangered species, although it is still considered 'vulnerable'. The classification was downgraded as their number in the wild surpassed 1800.

Experts say that the country managed to save its iconic animal through its long-term conservation efforts, including the expansion of panda habitats. The latest classification upgrade "reflects their improved living conditions and China's efforts in keeping their habitats integrated", said Cui Shuhong, Head of the Ministry of Ecology and Environment's (MEE) Department of Nature and Ecology Conservation, at a news conference.

The new classification comes years after the International Union for Conservation of Nature (IUCN) removed the animal from its endangered species list and re-labelled it as 'vulnerable' back in 2016. At the time, Chinese officials had disputed the decision, saying that it could mislead people into believing conservation efforts should be relaxed. This week's announcement by the MEE is the first time the animal's status was changed on its own endangered species list, which uses similar standards as the Swiss-based IUCN.

More information about the conservation of the giant panda, including articles by leading panda conservation biologists, can be read in Volume 1 Issue 2 of *BRU* (December 2020).

*Source: Xinhua News, 8 July.*

## Celebrating World Bamboo Day

18 September marked World Bamboo Day. Since it was first observed in 2009, World Bamboo Day has become a chance for individuals, organisations and governments around the world to celebrate the importance of bamboo as part of biodiverse landscapes and a critical material in rural areas.

As in previous years, 2021 saw a wide range of activities dedicated to World Bamboo Day. In Cameroon, Colombia, Ecuador, Ethiopia, Ghana and Peru, bamboo planting ceremonies took place to raise awareness about the plant's role as a tool for land restoration, and desertification control. Kenya celebrated the day with a celebration at

the Kibirong Wetland, in Nandi County, with talks about bamboo's role for water preservation, and how the bamboo sector can contribute to post-COVID economic recovery in the country. In Peru's Satipo province, a special radio programme was dedicated to bamboo; a number of indigenous leaders and local authorities spoke about the plant's role in local livelihoods and landscapes. Uganda's Industrial Research Institute and National Forestry Authority worked with INBAR to produce a webinar on the opportunities for bamboo in the agribusiness and forestry sector.

## New bamboo structure at Bali Green School

A school in Indonesia has built a large round-pole bamboo gym. (Pictured.)

Green School, which is based in Bali, Indonesia, is well-known for its innovative bamboo structures. Its latest, a gym and wellness space known as 'The Arc', has a floor area of 760 square metres. It was built in just eight months by Indonesian bamboo design firm IBUKU, in collaboration with bamboo construction specialist Jörg Stamm and the British structural engineering company Atelier One.

The Arc's most unique feature is its roof, which is made of intersecting bamboo arches that span 19 metres. The curving roof is anticlastic, and its design was inspired by a human ribcage. According to Stamm, who first drew up the concept for the building: "The Arc operates like the ribs of a mammal's chest, stabilised by tensile membranes analogous to tendons and muscles between ribs. Biologically, these highly tensile microscopic tendons transfer forces from bone to bone. In The Arc, bamboo splits transfer forces from arch to arch."

This building was made using *Dendrocalamus asper*, a common local bamboo species.

*Source: Original article on INBAR website.*

## DRC launches national bamboo strategy

In August, the Government of the Democratic Republic of Congo (DRC) launched its National Bamboo Policy, in a workshop organised by the Ministry of Agriculture in collaboration with INBAR. The Policy aims to diversify bamboo uses and develop the bamboo sector into a lucrative livelihood option for rural communities.

In a speech, the country's Minister of Agriculture, His Excellency Desiré M'zinga Birihanze, welcomed the Policy, and called bamboo "a tool of development which can help green development for socio-economic and environmental benefits."

Work on bamboo promotion has already begun, with a large training workshop for bamboo artisans which was held in July in Yangambi, DRC. (See page 18.)

*Source: Original article on INBAR website.*

## Progress on the China-Africa Training Centre

The Chinese government has granted USD 54 million to Ethiopia to build a China-Africa Training Centre. The Centre, which was announced by

*A crane lifts an arch into position for the Arc structure at Green School, Bali. Credit: Elora Hardy.*

President Xi Jinping in the Forum on China–Africa Cooperation in 2018, will be used as a hub to train people in how to process bamboo, and create high-quality products.

Although many African countries have native bamboo resources, a lack of skills and technology means the sector is still relatively underdeveloped, and produces mainly low-cost products for household use or domestic consumption. The China-Africa Training Centre is part of plans to scale up Ethiopia's bamboo sector, and promote China-Africa knowledge transfer on bamboo.

While the Centre was announced in 2018, funding has only recently been released for its construction. A site is now being prepared in Addis Ababa.

*Source: AllAfrica, 8 September.*

## New Bamboo and Rattan Unit in Ghana courting private sector investment

A new Bamboo and Rattan Unit, established under Ghana's Forestry Commission, is courting private sector investors and development partners to raise GHS 35.8 million [USD 5.9 million] to implement its five-year strategic development plan.

The Ghana Bamboo and Rattan Development Strategic Plan is a blueprint for growing the country's bamboo and rattan sectors between 2020 and 2024. Its goals include increasing the number of bamboo jobs, and related profits, and making bamboo part of general forestry and biodiversity conservation.

Currently, the Bamboo and Rattan Unit is seeking investment for bamboo plantations, to ensure a stable supply for the sector. The Head of the Unit, Mrs. Faustina Baffour-Awuah, told Business Ghana that she is hopeful investors will take an interest in bamboo, because of its very short gestation period compared with that of timber species.

*Source: Graphic, 26 August.*

## Tripura develops incense stick sector

Tripura state, India, is working to expand its bamboo *agarbatti* (incense sticks) industry.

In 2019, the national government increased the customs duty on imported sticks, as a means to encourage domestic production. In addition, the *Deccan Herald* reports that 14 new bamboo sticks manufacturing units are being established in Tripura, and are scheduled to open in Tripura shortly.

These actions are an attempt to incentivise bamboo stick production in the region. Currently, China andd Viet Nam supply the vast majority of India's bamboo sticks, despite the abundance of bamboo resources in states such as Tripura. According to the *Deccan Herald,* Tripura's production of bamboo sticks for the country's *agarbatti* industry fell from 29,000 tonnes in 2010 to 1241 tonnes in 2017.

*Source: Deccan Herald, 26 September.*

## Madagascar steps up bamboo sector development

The government of Madagascar is supporting two new major bamboo initiatives in the country.

New project 'Bambou-antsika', which is supported by the Ministry of Environment and Sustainable Development (MEDD) and bamboo association Valiha Diffusion, plans to develop the bamboo sector in fourteen regions of the country.

The MEDD has also signed a partnership agreement with INBAR and the Madagascar-based Support Programme for Rural Microenterprise Poles and Regional Economies Support (PROSPERER), to provide training for MEDD staff, support the import of bamboo seeds, and identify new sites for bamboo planting.

According to Njaka Rajaonarison, INBAR's project coordinator in Madagascar, there has been real movement for bamboo sector development in the country over the last few years. Bamboo "has been part of the reforestation plants since this year, [and] a special fixed unit for the bamboo sector has been set up within the MEDD."

In particular, bamboo is being encouraged as a tool to support reforestation and land restoration schemes in Madagascar, as well as local job creation. The country already has abundant resources: according to a remote sensing survey conducted by INBAR and partners in 2018, there are 1.1 million hectares of bamboo, and many areas suitable for new plantations.

# INBAR SPOTLIGHT

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


*INBAR's presence at the five-day-long China International Fair for Trade in Services included a seminar about bamboo for plastic replacement. Credit: INBAR.*

## 'Replacing plastics with bamboo'

On 6 September, representatives from governments, development organisations and the private sector took part in an event on 'Replacing Plastics with Bamboo' at the China International Fair for Trade in Services (CIFTIS) in Beijing, China. The event, pictured above, was hosted by INBAR, in coordination with the China Bamboo Industry Association and the International Centre for Bamboo and Rattan, China (ICBR).

Speakers came from a wide range of backgrounds, and spoke on several topics. First, a number of Chinese experts and policymakers introduced recent efforts to control plastic pollution in China, and the opportunities for bamboo as a plastic substitute. Dr. Wei Honglian from China's Ministry of Ecology and Environment provided an overview of the country's recent policies to restrict and recycle plastics, including a ban on importing plastic waste. He described bamboo as a "very important direction" for national plastic reduction efforts. Speakers from ICBR and INBAR then introduced several of China's latest bamboo applications, including eco-friendly bamboo fibre tableware to replace single-use plastics, and bamboo grid packing as an alternative to PVC in cooling towers.

Theory is one thing; practice is another. Following the technical presentations, a number of company representatives shared their experiences of using bamboo to replace plastic. Speakers from international consumer goods business Procter & Gamble, as well as bamboo companies Ningbo Shilin, Hunan Yinshan Bamboo Industry and Tanboocel Union, introduced their range of products and their uses in the home and industry.

All speakers agreed that policy support and investment is needed to incentivise the uptake of bamboo products. In the final part of the event, the Ambassadors from Nepal and Cyprus to Beijing, as well as representatives from the Embassy of the Netherlands in Beijing, the International Fund for Agricultural Development (IFAD), the UN Educational, Scientific and Cultural Organization (UNESCO) and the Food and Agriculture Organization of the UN (FAO) took part in a panel to discuss the biggest opportunities for bamboo, and some obstacles to the sector's development, including: the price point of bamboo products, the need for policy support and investment, and the importance of working with large brands to improve packaging options.

In closing, Professor Lu Wenming, Deputy Director General of INBAR, thanked everyone for the discussion, and reminded attendees of INBAR's work to promote bamboo as an alternative to a number of materials, particularly plastics: INBAR has previously held forums on bamboo as a plastic alternative at UN climate conferences, the 2020 Bo'ao International Plastic Ban Forum, and the 2019 Ibero-Bamboo Symposium held in Spain.

## Pakistan becomes INBAR's 48th Member State

On 1 July 2021, The Islamic Republic of Pakistan formally acceded to INBAR. It is INBAR's 48th Member State, and 16th in the Asia-Pacific region.

Pakistan has a long relationship with INBAR.

The country was an Observer at the organisation's formal establishment back in 1997, and in recent years, has collaborated with INBAR on a number of occasions. A delegation from Pakistan's Ministry of Climate Change visited INBAR in 2019, as part of a trip to China to discuss cooperation on forestry issues. In 2020 and 2021, two delegations from the Pakistan Embassy to Beijing visited INBAR Headquarters: the Ambassador of Pakistan to Beijing, His Excellency (H.E.) Mr. Moin ul Haque, paid a visit in 2020, and a delegation of spouses and staff from the Embassy, led by H.E. Mr. Moin's wife Mrs. Farah Moin, visited in 2021.

Bamboo is already cultivated in several parts of Pakistan, and the country boasts around 15 bamboo species. Bamboo housing has also been used throughout the country to build post-disaster housing following earthquakes and floods. In 2020, Pakistani architect Yasmeen Lari won the annual Jane Drew architecture prize for her work designing a bamboo women's centre in northern Pakistan.

In his speech, INBAR Deputy Director General Professor Lu said: "Bamboo can be a critical part of Pakistan's ongoing efforts to reforest degraded land, including its new Plant for Pakistan programme… and can provide a sustainable material for infrastructure and green job creation. We very much look forward to working closely with Pakistan for green, bio-based development with bamboo and rattan."

## A virtual tour of Anji: INBAR's first online course

The first multi-day INBAR online course and virtual study tour began in August. The two-part course aims to showcase the bamboo supply chain in Anji, one of the most famous bamboo-producing areas of China, through a combination of lectures and virtual tours to more than 15 sites, including bamboo forests and factories.

The first part of the course ran from 24 to 26 August, and was attended by more than 200 bamboo development professionals from 53 countries. Participants were taken on a virtual tour of a number of sites, including a bamboo forest, a pre-processing factory, a farmhouse and companies which manufacture a range of products, including laminated bamboo boards, curtains and carpets, chopsticks and charcoal briquettes.

The second part of the virtual study tour will continue in October this year, alongside other INBAR training courses including: an introduction to bamboo weaving, the sustainable management of sympodial bamboo resources and bamboo for shoots production, and a series on bamboo construction.

## New bamboo radio programme in Peru

Peru has launched a radio programme on bamboo. The show will broadcast practical information on the uses and benefits of bamboo once a fortnight. It is hosted by Radio Libertad FM in Satipo province, as part of the INBAR-led 'Bambuzonía' project in Colombia, Ecuador and Peru, which aims to increase farmers' resilience to climate change through diversified bamboo production systems

According to the project manager, Carlos Falconí, the radio programme aims to support the project goals by raising awareness about the advantages and benefits of bamboo, and offering a voice to locals who are using bamboo for income, land restoration or other purposes.

## Supporting farmers and start-ups in East Africa

As part of the ongoing Dutch-Sino-East Africa Programme, a multi-year project which aims to support the development of East Africa's bamboo sector, INBAR staff have been working with bamboo farmers and businesses, as well as policymakers and financial institutions.

In August, INBAR conducted a homestead bamboo farming training workshop for more than 300 farmers in Ethiopia. The workshop was focused on demonstrating pit preparation, weed cleaning, seedling handling, plantation and tending operations for the trainee smallholders. Farmers then planted 4000 bamboo seedlings on their own land. The training aimed to encourage more farmers to use bamboo as a source of income, as well as a tool for local land restoration and desertification prevention.

INBAR also conducted an awareness-raising workshop on bamboo sector development for Ethiopian bankers and financial institutions, in a

bid to invite more investment for the sector. The workshop, which was held on 24 August in Addis Ababa, included participants from Ethiopian banks, micro-finance institutions, line ministries and the private sector.

In a similar effort to promote investment into Ethiopia's bamboo companies, in July, INBAR hosted a consultation workshop between actors in the government and private sector, to discuss establishing a Public-Private Partnership (PPP) business model for improved bamboo processing in Ethiopia. The workshop brought together around 30 participants from leading private bamboo companies and relevant government agencies, to discuss how to set up more PPPs in Ethiopia, and bring together the expertise and resources of both the private sector and government.

Finally, in recent months, INBAR organised a training course for bamboo companies and entrepreneurs in Ethiopia and Uganda, building capacity for business development. More than 50 trainees took part on the course, which focused on building basic business skills to run a successful bamboo company. Training elements included improved financial recording, product quality management, pricing and business registration.

## New knowledge-sharing platform for bamboo nurseries in Kenya

In August, INBAR supported the formation of a knowledge-sharing platform to support bamboo nursery development in Kenya. The platform, or Community of Practice (CoP), links actors from government agencies, the private sector, research institutions and Kenyan bamboo associations. The aim of the CoP is to help share experiences and learn from existing bamboo nurseries, in order to support their further development.

Bamboo nurseries are an important part of a country's bamboo sector development, as they ensure a secure supply of bamboo, and provide an important source of local income. The new CoP is intended to support their growth. It is established as part of the ongoing Dutch-Sino-East Africa Bamboo Development Programme.

## Symposiums and study tours in Africa

In July and August, INBAR organised two multi-day events across Africa: one two-day regional symposium in Ghana, about bamboo and rattan sector development, and a three-day study tour showcasing Ethiopia's bamboo sector.

The first event, 'Investing in Bamboo as a Productive Sector of the Economy', took place from 22–23 July 2021 in Accra, Ghana. It was organised as part of activities under the China–IFAD South-South Triangular Cooperation (SSTC) Facility, which seeks to improve bamboo and rattan value chains through increased knowledge transfer between technical experts from beneficiary countries.


*The Radio Bambuzonía recording set took 45 days to build, and uses two species of bamboo. Credit: INBAR.*

The symposium brought together investors, entrepreneurs, policymakers, programme managers, standards experts and civil society leaders to discuss innovative ways of developing a vibrant bamboo and rattan economy in African countries, and how to leverage more investment and support to create high-quality competitive products for sale. Key outcomes from the symposium included: an agreement to promote networking and knowledge exchange between bamboo and rattan artisans in West Africa; the need to develop bamboo and rattan standards, to boost the creation of market-competitive products for export; and the importance of a sustainably managed bamboo and rattan resource base.

In August, participants from 19 African countries attended a bamboo study tour and policy dialogue in Ethiopia, to explore the country's advanced bamboo sector. Participants on the three-day tour, which ran from 25–27 August, included investors, policymakers, manufacturers, civil society leaders and private sector entrepreneurs.

Ethiopia's bamboo sector is one of the most developed in Africa. The study tour provided a chance for participants to learn more about the country's bamboo enterprises and sector development, and included field trips to bamboo nursery development sites, furniture and handicraft cottage industries and larger factories, as well as the Ethiopian Environment and Forestry Research Institute.

Importantly, some of the businesses which participants visited had themselves drawn inspiration from previous study tours. Abel, the founder of 'Bamboo Labs', a start-up company that produces bamboo bicycles and wheelchairs, said he took inspiration from a previous visit to 'Booomers Bikes', a bamboo bicycle company in Ghana. It is hoped that future exchanges will only increase this kind of practical knowledge sharing between entrepreneurs and artisans in Africa.

## Training in the DRC

INBAR supported a training workshop on bamboo handicrafts and furniture which took place between 8–16 July in Yangambi, Democratic Republic of Congo (DRC). The capacity-building workshop was funded by the European Union through the 'Nouveaux Paysages du Congo' project, and brought together 36 artisans from nearby areas to support them to develop small- and medium-sized bamboo enterprises.

Over the course of the multi-day workshop, artisans were able to strengthen their skills in post-harvest and processing methods, design conceptualisation, assembly and finishing, as well as the storage and transport of bamboo products to the market. As a result of the training, artisans are already using bamboo to make items such as beds, chairs, wardrobes, baskets and mats. Future sessions may also focus on bamboo for charcoal production in the DRC.

## New bamboo construction 'school' in Ecuador

In Manabí, Ecuador, nine participants took part in a train-the-trainer course about sustainable bamboo handling. The course, which took place in August, taught officials from national and local governments, as well as coffee growers, about the basics of bamboo management, harvesting, treatment and processing. Having completed the course, participants will now set up their own field schools, and share this knowledge with others.

Manabí is also the site of a new 'bamboo construction school'. The school is located in Calderón parish, and was established as part of an INBAR-led project funded by the Spanish Agency for International Development Cooperation (AECID). Over the next year, 80 students will be trained in sustainable bamboo construction, maintenance and repairs. It is hoped that the school will help build a labour force skilled in making safe and resilient bamboo housing, which can be replicated and scaled up in other parts of the country.

# EVENTS AND MEETINGS

**2–7 September**

**'Replacing Plastics with Bamboo', 2021 China International Fair for Trade in Services**

Beijing, China

**7 September**

**'Bamboo Cluster and Supply Chain Development For Strengthening Bamboo Value Chains'**

INBAR online course

**14–25 September**

**FTA 2020 Science Conference**

Virtual event

**15 September**

**'Standardisation Of the Bamboo Industry'**

INBAR online course

**17 September**

**'Making Products Out Of European Bamboo'**

BambooLogic online course

**18 September**

**World Bamboo Day**

International day

**21–23 September**

**GLF Amazonía**

Virtual event

**22 September**

**'Tropical Sympodial Bamboo Resource Management'**

INBAR online course

**27–29 September**

**IUFRO World Day: Digital Forest Science Forum 2021**

Virtual event

**11–15 October**

**15th Meeting of the Conference of the Parties to the Convention on Biological Diversity (Part 1)**

Kunming, China

**12 October**

**Madagascar Bamboo Study Tour**

Madagascar

**12–14 October**

**'Basic Bamboo Weaving Techniques'**

INBAR online course

**18-21 October**

**The 11th China Bamboo Culture Festival**

Yibin City, China

**26–28 October**

**'Anji Bamboo Study Virtual Tour (Part II)'**

INBAR online course

**31 October–12 November**

**26th Meeting of the Conference of the Parties to the UN Framework Convention on Climate Change**

Glasgow, Scotland

**October (TBC)**

**Opening Ceremony of the INBAR Bamboo Science Education Base**

Beijing, China

**2 November**

**Kenya Commercial Forestry Investment Conference**

Muguga, Kenya

**10 November (TBC)**

**Flag-raising ceremony for the Islamic Republic of Pakistan to INBAR**

Beijing, China

**4–29 November**

**'Bamboo: A Very Sustainable Construction Material'**

INBAR online course

**18 November**

**INBAR African Ambassadors' Bamboo Dialogue**

Beijing, China

**23–25 November**

**'Sustainable Management of Tropical Sympodial Bamboo Resources'**

INBAR online course

**7–9 December**

**'Sustainable Tropical Bamboo Forest Management for Shoot Production'**

INBAR online course

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

*Credit: Allan Castañeda.*

This modified "Porsikel" or "Fourcycle" was made by Mr. Obadias in San Juan Batangas, the Philippines. Mr. Obadias repurposed an old vehicle, replacing the metal body parts with less expensive bamboo. The photo was submitted by Allan Castañeda for the INBAR 2021 photography competition, and was highly commended by the judges.

While Mr. Obadias' car was a personal project, more and more international companies are now experimenting with engineered bamboo materials for vehicle parts: the Lexus GS features interior decoration made from bamboo, and one China-based organisation is researching the use of bamboo composite for high-speed train carriage fuselage.

INBAR
INTERNATIONAL BAMBOO AND RATTAN ORGANISATION

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