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Bamboo for Carbon Neutrality in Rural Areas

2022 Call for Case Studies on the
Innovation and Practices in Carbon Reduction and Low-Carbon Development in and around World Heritage Sites

Collection of Selected Case Studies

Executive Summary

China is home to 56 World Heritage sites, among which there are 14 natural and 4 mixed World Heritage sites, the highest number of sites in any country in these categories. These World Heritage sites cover hundreds of protected areas at various levels, such as national parks, nature reserves and scenic and historic areas, which play an important role in addressing the diverse range of environmental issues the planet is facing, and in progressing the Goals and Targets envisioned in the UN 2030 Agenda for Sustainable Development. In 2020, President of China Mr. Xi Jinping announced at the 75th UN General Assembly that China commits to peaking carbon emissions by 2030 and achieving carbon neutrality by 2060 (also known as China's "Dual Carbon Goals"). In 2021, the State Council laid forth the roadmap to achieve this through five main objectives, including building a green and low-carbon economic cycle, improving energy efficiency, increasing the proportion of non-fossil energy consumption, reducing carbon emissions and improving the carbon sink capacity of the ecosystem. It is high time to accelerate the mandates of China's protected areas in general and World Heritage sites in particular to realize these commitments.

China is one of the countries with the most abundant bamboo resources in the world, and is in the top tier in terms of bamboo species resources, bamboo forest area, bamboo stock and production. It also constitutes an integrative and unique feature of many World Heritage sites in China, and paves the ground for developing green and cultural tourism industries. Since ancient times, bamboo has been closely related to people's production and life, and has been widely used in architecture, diet, clothing, transportation, agricultural production, daily life, musical instruments, etc. As a result, people are becoming more aware of the potential of bamboo in mitigating and adapting to climate change, and its prospect in providing nature-based solutions to low-carbon development and sustainable management of World Heritage sites.

The Call for Case Studies on "Bamboo for Carbon Neutrality in Rural Areas: Innovation and Practices in Carbon Reduction and Low-Carbon Development in and around World Heritage Sites", jointly organized by UNESCO and International Bamboo and Rattan Organization (INBAR) from August to October 2022, aims to explore and share good ideas and practices of site management using bamboo, to encourage the civil society to gain awareness on the issues of carbon reduction and climate change, and to contribute to China's efforts in attaining the "Dual Carbon Goals".

Theme 1: Fostering of low-carbon and sustainable environment at World Heritage site
Theme 2: Development of low-carbon cultural tourism products and concepts
Theme 3: Education programmes for youth on sustainable management and low-carbon development of World Heritage site
Theme 4: Communication of the culture and its values of the World Heritage site

A total of the 89 case studies from 37 entities / individuals from 16 provinces were submitted to the call, including narratives of proposals and implemented projects, visual designs, mobile applications, creative product designs, photography, video productions, drawings. The submissions were evaluated based on the following four criteria:

Criteria 1: Innovation
The case study should be innovative in concept and design, and should demonstrate creative thinking and new solutions in response to existing challenges.

Criteria 2: Practicality
The case study should be practical in concept and design, and should be founded on actual needs and scenarios.

Criteria 3: Exemplary in nature and adaptability
The case study should be adaptable to other scenarios or locations, and could provide inspirations to other stakeholders in responding to their respective needs and challenges.

Criteria 4: Viability and market potential
The case study should be viable and demonstrate good market value for better transformation and commercialization of achievements; this criterion particularly applies for low-carbon cultural tourism products.

The 15 case studies presented in this booklet collectively demonstrate the breadth of potential that bamboo has on sustainable development of protected areas, innovative nature-based solutions worthy of further exploration, and the good practices of World Heritage sites and Hometown of Bamboo in China in promoting low-carbon development that we could draw important lessons from.

An expert panel consisting of specialists with a diverse range of backgrounds was formed and was responsible for the review and evaluation of the submissions. **Professor Shahbaz Khan**, Director and Representative of UNESCO Beijing Office, **Professor Lu Wenming**, Deputy Director General of INBAR, Ms. Duong Bich Hanh, Programme Specialist for Culture of UNESCO Beijing Office, and Mr. Durai Jayaraman, Director of INBAR Global Programme, provided strategic and technical guidance.

Strategic Guidance

Professor Shahbaz KHAN

Director of UNESCO Beijing Office and Representative to China, DPRK, Japan, Mongolia and ROK

Professor LU Wenming

Deputy Director General of INBAR

Technical Guidance

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Programme Specialist for Culture of UNESCO Beijing Office

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Head of Intangible Cultural Heritage Communication Research Center

SinoCarbon Innovation & Investment Co., Ltd.
Mr. MENG Bingzhan
Deputy General Manager

Introduction to Selected Case Studies

» Transform bamboo into assets for a zero-carbon Shunchang: an innovative approach to bamboo industry and carbon finance

By Shunchang County People's Government of Fujian Province

Comment from Expert Panel

Shunchang is a forerunner in China in developing innovative and market-driven approaches such as bamboo carbon credits trading, and has developed a county-wide bamboo industrial chain. The "Transform bamboo into assets for a zero-carbon Shunchang: an innovative approach to bamboo industry and carbon finance" case study demonstrates Shunchang's good practices in uncovering new developmental breakthroughs through bamboo resources, and in synergizing county-wide resources to develop low-carbon economy, which could become practical and valuable reference for other places in China.

Display of "Forest Eco Bank" pilot project
© Shunchang County People's Government

Registration of Shunchang County's Fujian Forest Certificated Emission Reduction (FFCER) credits at the Fujian Emissions Trading System
© Shunchang County People's Government

Shunchang County, located in the northwest of Fujian Province, is in the periphery of Mt. Wuyi mixed World Heritage site. As one of the "Ten Hometowns of Bamboo" nominated by the Ministry of Agriculture, Shunchang has over 440,000 hectares of bamboo forests with 78 species. Utilizing the abundant bamboo resources, Shunchang has developed a rigorous chain of bamboo-related industries from raw material production, bamboo product manufacture, and cultural tourism on the theme of bamboo, contributing over 2.12 billion CNY (approx. 300 million USD) to the county's GDP in 2021 alone.

Shunchang County began its explorations in forest carbon finance programs as early as in 2015. Since the launch of China's eighth pilot carbon trading market in Fujian in 2016, Shunchang has successfully traded 224,500 tons of forest carbon credits, and has implemented innovative county-wide initiatives, including the "1 Yuan Carbon Credit" poverty alleviation program that benefits local forester households through public purchase of carbon credits, the "Forest Eco Bank" pilot project that revitalize and integrate scattered forest resources, and the "Carbon Credit +" modality that enables creative synergies among various sectors, including sustainable tourism, jurisdiction, etc. In collaboration with commercial banks and insurance companies, Shunchang has launched a range of innovative loan and insurance products that values carbon sink products and their expected profits. These pilot initiatives provide valuable experience and useful reference in promoting green development.

» Open a new path of green inclusiveness and contribute to shared prosperity with bamboo forest carbon sink

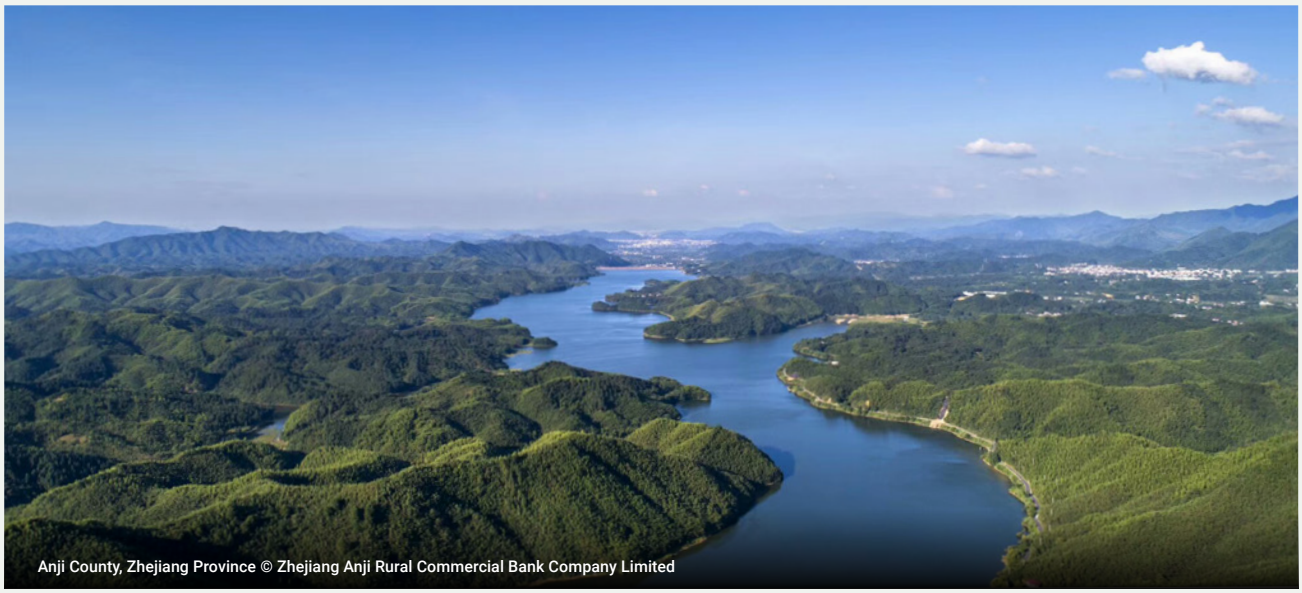
By Zhejiang Anji Rural Commercial Bank Company Limited

Comment from Expert Panel

This case study demonstrates good practices in the assetization and digitization of bamboo forest carbon sinks, and the development of green finance through bamboo forest credits to support low-carbon economy and industrial development presents an innovative mechanism, and could serve as a good practical example to be promoted to other areas.

Anji County, Zhejiang Province is rich in forestry resources and known as a "Hometown of Bamboo in China". As China progresses towards the "Dual Carbon Goals", the bamboo industry, which brings both ecological and economic benefits to the society, is facing new opportunities. Over the past two decades, 50,000 local people have directly benefited from the growing bamboo industry. However, the industry is facing bottlenecks in recent years, due to the industrial development and the emergence of substitute materials. The low price of raw bamboo and the declining incentives for foresters in cultivating bamboo have led to forestland abandonment, bamboo forest degradation and ecological damage.

Against this background, Zhejiang Anji Rural Commercial Bank Company Ltd. took bamboo forest carbon sink as an entry point to a new mode of green finance that facilitates the effective transformation of ecological product values and promotes shared prosperity. To tackle the problem, the bank took three measures. First, the bank engaged with forestry management entities to formulate a bamboo forest carbon sink measurement methodology to quantify clients' bamboo forest carbon sink. Second, the bank launched a "Bamboo Forest Carbon Sink" pledged loan in July 2021 to encourage bamboo forest managers to combine the improvement of quality and the increase of foreign exchange with the increase of income, thus promoting the monetization of bamboo's ecological value and the formation of bamboo forest carbon sink industry. Third, the bank created a closed-loop carbon sink saving and trading market as a foundation for joining the Chinese Certified Emission Reduction (CCER) plan, introducing a series of "bamboo carbon sink" credit products to support local green supply chain. These practices serve as an example for other bamboo habitats in China and could become a useful reference for other developing countries, especially African countries, to increase income and enhance capacity in response to climate change.



Anji County, Zhejiang Province © Zhejiang Anji Rural Commercial Bank Company Limited

» Substituting bamboo for plastic and carbonizing bamboo as a new material to create a carbon-reducing green environment

By "Substituting bamboo for plastic and carbonizing bamboo as a new material" research team (incl. Dai Wujun, Tan Yimin etc.) and industry application team (incl. Aoda Co., Ltd., Hongwei Co., Ltd., Chuangde Co., Ltd., Zhuchuang Co., Ltd., Xiangneng Co., Ltd.)

Comment from Expert Panel

Substantiated by examples of mature products that fully explores and demonstrates the multifunction of bamboo, this case study presents a series of good practices in quantifying the carbon sequestration effect of bamboo forests and provides concrete evidence on bamboo as an effective substitute product in reducing carbon emissions. Based on a series of substantial fundamental research and patents, the pilot action contributes to enhancing public understanding of the bamboo industry of carbon sequestration. The innovative product-based applications of new technologies could also offer a wide range of options for local projects.

Application of carbonized bamboo in corridor platform, which is propped above the ground and thus causes no damage to the underlying soil © Dai Wujun

In contrast to trees that could grow and flourish for hundreds of years, bamboo takes only 2 to 4 years to grow into usable building material, but ages and dies after 8 to 9 years. Therefore, bamboo needs to be regularly harvested, and the more it is used, the denser it grows and the larger its carbon sequestration capacity becomes. However, in many bamboo habitats, especially World Heritage sites, rural areas and scenic spots, bamboo is not yet fully utilized as building materials, and high carbon emission materials such as plastics, wood and concrete are still extensively used. In addition, commonly-used antiseptics to preserve bamboo also pose potential harm to soils and the human body.

This case study presents two major solutions to the challenges above from the field and perspective of material science. Carbonized bamboo and bamboo new materials have received 22 national patents (14 granted and 8 under processing) and have been piloted in the bamboo habitats in and around Danxiashan World Heritage site in Renhua County, Guangdong Province. These include new technologies in bamboo carbonization, which is a non-chemical and eco-friendly pyrolysis process that allows the bamboo material to both retain its original form and mechanical functionalities and gain strong resilience against corrosion, cracks, decay, extreme weather, etc. The solutions also include new bamboo composite materials such as textiles, mulches, pipes, etc., that could reduce the use of plastics in daily consumption, infrastructure, interior and exterior decorations, etc. Many of these patented new technologies have been tested and mass produced. For example, Danxiashan World Heritage site and surrounding areas is using carbonized bamboo as construction material in many of its tourism infrastructure; automated production lines that produce bags and bottles made with micro bamboo filaments are in the process of marketization; carbonized bamboo mulches are now being used in large scale in replacement of plastic ones in sand curing and fixation projects in ecologically vulnerable areas (including World Heritage sites); pipes made with bamboo composite materials are also being used in replacement of conventional plastic and metal bellows. With the progression of China's strategic actions such as the achieving the "Dual Carbon Goals", ban on plastic waste, rural revitalization, etc., these new technologies, which are maturing into fully-fledged industries, can be applied to World Heritage sites and areas rich in bamboo resources.

» Bamboo weaving space station

By Wuyishan Municipality Hongxing Bamboo Weaving Handicraft and Art Gallery

Comment from Expert Panel

The bamboo weaving space station organically combines bamboo resources and living heritage handicraft indigenous of Mount Wuyi with the theme of technological advancement and innovation, and demonstrate creativity in design. It helps promote cultural tourism and sustainable development of the World Heritage site, and presents an exemplary role in promoting the sustainable development of living heritage practices in the modern society.

Mount Wuyi, inscribed to the World Heritage List in 1999 as one of China's mixed World Heritage sites, is the most outstanding area for biodiversity conservation in south-east China and a refuge for a large number of ancient, relict species, many of them endemic to China. The serene beauty of the dramatic gorges of the Nine Bend River, with its numerous temples and monasteries, many now in ruins, provided the setting for the development and spread of neo-Confucianism, which has been influential in the cultures of East Asia since the 11th century.

Wuyi bamboo weaving is a living heritage practice recognized in the Fujian provincial level list for intangible cultural heritage. This bamboo weaving art piece, currently on display at the Wuyishan Municipality Hongxing Bamboo Weaving Handicraft and Art Gallery, is a miniature of China's first space station named "Tiangong-1" or "Celestial Palace-1". It was designed and made by living heritage bearer Mr. Xie Hongxing in 2021, the year that the space station was launched. Utilizing raw materials from 12 indigenous bamboo species in Mt. Wuyi and over 30 weaving techniques, this piece attracted wide reportage by the media as well as online and drew keen attention from the civil society for its creativity, delicate artisanship and genius embodiment of traditional craftsmanship and high-technology, and became an entry point for many people to gain interest in Wuyi bamboo weaving.

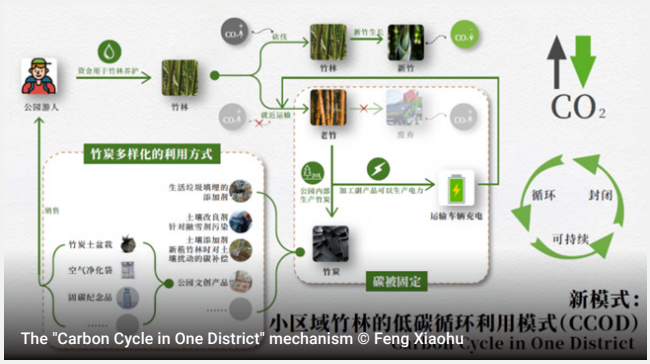
Bamboo Weaving Space Station © Hongxing Bamboo Weaving Handicraft and Art GalleryLimited

» A mechanism of low-carbon recycling in small bamboo forests: case study of Beijing Zizhuyuan Park

By Feng Xiaohu

Comment from Expert Panel

This case study proposes an innovative "low-carbon recycling in small bamboo forest area" mechanism for Zizhuyuan Park (Purple Bamboo Park), which turns bamboo forest waste of the city park into bamboo charcoal for local use, effectively reducing the carbon emissions generated by bamboo forest waste and bringing social and economic benefits. The practice has application potentials in terms of the resource utilization of bamboo forest waste.



The "Carbon Cycle in One District" mechanism © Feng Xiaohu

Bamboo forest ©szefei/Shutterstock.com

Zizhuyuan Park (Purple Bamboo Park) in Beijing is a typical example of China's irrigated monopodial bamboo subregion, which is characterized by small plantation scale and scattered distribution, serving usually the purpose of urban greening. With 60 years of history, the park has 46 bamboo species that cover a total area of 9 hectares. Each year, the park welcomes approximately 7 million visitors from around the world.

As a city park, Zizhuyuan Park faces a key challenge: to ensure the sustainable growth of its bamboo forests, the park administration needs to cut down approximately 50,000 to 100,000 aged and sick bamboos each year, resulting in net carbon emissions both in the form of bamboo waste and in the process of transporting them to suburban landfills, and shrinkage of the park's bamboo carbon sink in the long run. To address this challenge, this case study proposes an innovative low-carbon bamboo waste recycling mechanism named CCOD, i.e. Carbon Cycle in One District, which operates in a sustainable closed-loop consisting of three steps. First, using small-scale bamboo charcoal manufacturing facilities, bamboo disposal is fixated on-site into charcoal, reducing the need for long-distance waste transportation. Second, bamboo charcoal is used inside the park for multiple purposes, including soil remediation, snowmelt agent and electricity generator, and is made into pot plants, air purifiers and other souvenirs for tourists. Third, the revenues generated from sustainable reuse of bamboo charcoal is fed back into bamboo forest cultivation. In addition to increasing the carbon sink capacity of the bamboo forests of the park, the CCOD mechanism also holds other benefits: Multiple CCOD modules could be put in place simultaneously to flexible address the specific needs of individual small bamboo forests; the economic benefits that CCOD generates provide strong incentives for its long-term maintenance and operation; it also synergizes the park's tourism, public education and franchise resources for maximum utility.

» Higher&Higher creative education project

By Liu Chenge

Comment from Expert Panel

Through three dimensions of heritage sites, cultural creativity and carbon reduction goals, the "Higher&Higher" creative education project enhances awareness of students living in and around bamboo habitats on their environment. From the project's pilot implementation, it provides systematic course design and modules to guide students' understanding of environment protection. The project is innovative in design, and easily applicable. The project is sustainable and the course content could be further extended in depth.

"Higher&Higher" is a creative education project for children and youth living in and around bamboo habitats that aims to enhance their awareness of the values of bamboo and thus encourage them to engage in conserving bamboo resources. The project addresses a key dilemma, i.e. places with abundant bamboo resources often overlap with economically less-developed regions, and face gaps between existing educational resources and local children and youth's need for nature and environment education. Through taking children into bamboo forests for close observation, encouraging children to draw paintings of bamboo and sharing their art pieces online, and enhancing their knowledge of broader topics such as bamboo-related carbon sinks, heritage conservation and sustainable development, the "Higher&Higher" project combines nature education and art creation to build a positive cycle of inspiration, nurture and contribution, and to promote bamboo's role and values in sustainable development.

The "Higher&Higher" project was piloted in October 2022 at Xi'an Village in Jingdezhen, a place known not just for ceramics but also as a major bamboo habitat in north-east Jiangxi Province. Forest covers 95% of the village, including both bamboo as well as various other trees, some aged from 400 to 1200 years. A total of 41 third-graders from Xianghu Township Center Primary School participated in the program. Guided by facilitators, the students observed the environment, textures and growth patterns of bamboo, learned about the values of bamboo as a building material, cultural environment and green carbon sink, and produced imaginative paintings and crafts on the theme of bamboo. The project has future plans to launch an official website to promote students' past artworks, provide an online platform for art creation on bamboo, and encourage wider public participation.

School children participating in bamboo observation and art creation activities © Liu Chenge

» Research on the application of bamboo design in real-life scenarios

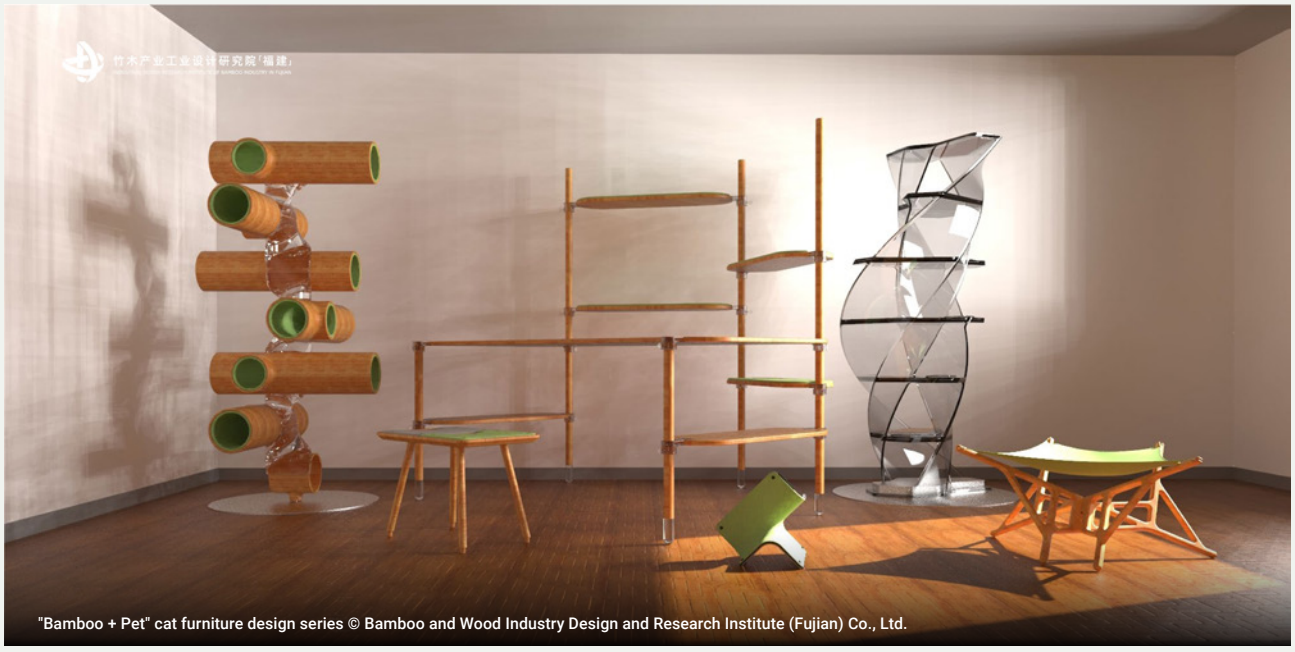
By Bamboo and Wood Industry Design and Research Institute (Fujian) Co., Ltd.

Comment from Expert Panel

From the perspective of real-life scenarios and market demand for green consumption transformation, this research on the application of bamboo design in daily life takes into consideration the different target audience and functional characteristics, and provides a comprehensive summary of the serial, intelligent and humanized bamboo product design and their application in real-life scenarios. The case study demonstrates the concept of bringing bamboo into daily life through creativity, which is practical and promotable and has potential of market transformation.

In response to the global call for carbon neutrality and the growing trend of green and low-carbon lifestyles, the bamboo industry as a pillar of green economy faces increasing demands for enhanced synergies across the primary, secondary and tertiary industries to gain added value and competitiveness on the consumer market.

This research highlights the importance of creative design to broaden the functional, aesthetic and technical possibilities of bamboo as a way of adding value to bamboo products in China, and especially the importance of adopting a user-centric mode of design that stems from and speaks to the needs and experience of consumers in real-life scenarios. Through analysis of modern consumer population and new economic trends, the research identified a series of “bamboo+” scenarios, such as “bamboo + independent women” “bamboo + geek men” “bamboo + pet” “bamboo + children” “bamboo + fitness” “bamboo + kitchen”, and presented an extended series of design prototypes that organically combines bamboo with items and environmental components in each scenario. A number of prototypes been test produced, exhibited and piloted, and a market chain including material supply, product design, mass production and brand marketing is foreseen to be developed.



"Bamboo + Pet" cat furniture design series © Bamboo and Wood Industry Design and Research Institute (Fujian) Co., Ltd.

» Sojourn in Xiangxi: Your one-stop Xiangxi bamboo weaving experience center

By Xiangtan University Art Institute

Comment from Expert Panel

The "Sojourn in Xiangxi" application uses technology and media to foster a digitized experience of bamboo weaving art and technique, and to explore a new model for the passing-on of Xiangxi bamboo weaving skills. It offers an innovative solution to the safeguarding, transmission and sustainable development of living heritage in Xiangxi, and has adequate market potential with its adaptability and flexibility.

Xiangxi bamboo weaving is a time-honored handicraft that is passed down for centuries in Xiangxi Tujia and Miao Autonomous Prefecture in western Hunan Province. Although bamboo-woven items such as water baskets used to be indispensable in local households, the popularization of new materials and industrial products is erasing traces of bamboo weaving from local people's lives.

To revitalize Xiangxi bamboo weaving and providing it with a better platform for communication and transmission, the "Sojourn in Xiangxi" mobile application combines online bamboo weaving tutoring using AR (augmented reality) technology and options to book face-to-face experience sessions with living heritage practitioners, highlighting the role of modern technology in leading and supporting the development of culture and tourism in Xiangxi. The introduction of AR allows users to observe bamboo weaving in detail and from all angles, and to produce virtual bamboo weaving products. During this process, the application analyzes the features of the virtual products that users create using big data to generate new insights into market preferences and aesthetics, which could potential guide the development of the bamboo weaving industry. The application also links users with living heritage bearers of Xiangxi bamboo weaving and their e-commerce platforms, where users could make purchases. The application contributes to synergizing the cultural and tourism resources in Xiangxi and the development of local bamboo weaving cultural tourism sector.

Application interface © Liu Mengyun, He Junlin, Song XinGalleryLimited


Mr. Yao Benshun, living heritage bearer of Xiangxi Bamboo Weaving
© Xiangtan University Art Institute

» Cultural tourism service and creative mini-app design based on Pingle Ancient Town

By Lin Yuye and Wang Yixuan

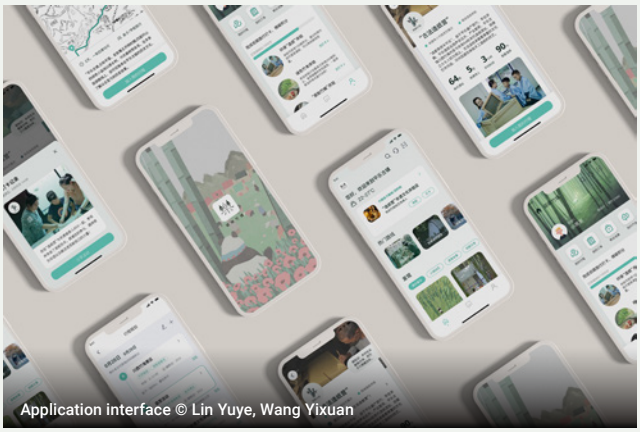
Comment from Expert Panel

The "Go Bamboor" mini-app creatively integrates cultural resources and experience activities of Pingle Ancient Town, and offers a convenient and interactive information platform for tourists. It provides not only a fun cultural tourism experience for tourists, but also contributes to the promotion of bamboo forest carbon fixation and climate action. The innovation in linking online and in-person cultural experience and activities can be seen as an innovative attempt in enriching the content of cultural tourism consumption.

Pingle, a town with over 2000 years of history, is situated in the south-west periphery of Chengdu, Sichuan Province, and is known since the Song Dynasty (960–1279) as a town of paper-making as it is blessed with abundant forest and bamboo resources. The ancient town is also home to two living heritage practices on the national list, including “bamboo weaving over ceramics” and “bamboo- and hemp-beating work song”, a type of song that laborers chant while beating bamboo and hemp pulp for papermaking.

Pingle Ancient Town’s bamboo forests and bamboo-related cultural heritage provide abundant resources in crafting a fulfilling and educational cultural tourism experience for visitors. The “Go Bamboor” mini-app is a platform that provides tailored sightseeing route design for tourists visiting Pingle Ancient Town. It uses new media and ways that are easily accessible to visitors to promote the natural and cultural values of the ancient town. Through the mini-app, tourists are able to craft their own visit in the town, while being informed of relevant knowledge on living heritage and sustainability, and being introduced to locations where they could experience cultural activities.

Application interface © Lin Yuye



Application interface © Lin Yuye, Wang Yixuan

Partial artworks by students from Northeast Yucai Beihong School of Art
Left: "Bamboo town" by Hong Yuning
middle: "Bamboo and I" by Wang Yining
right: “Bamboo Ferris Wheel” by Zhang Yao

» Fujian Little Pipe Tea

By Long Bamboo Technology Group Co., Ltd.

Comment from Expert Panel

"Fujian Little Pipe Tea" demonstrates a holistic design integrating concepts of carbon reduction and environmental protection. It presents an innovative and convenient solution to tea consumption by inserting freeze-dry tea powder in bamboo straw pipes, both meeting the needs for tea consumption in a fast-paced lifestyle, and contributing towards the mutual empowerment of tea culture and bamboo culture.

Fujian Province has a long history in tea cultivation, and is home to abundant tea-related living heritage practices and many famous tea types. The "traditional tea processing techniques and associated social practices in China", China's latest inscription (2022) to UNESCO's Representative List of the Intangible Cultural Heritage of Humanity, includes 6 tea-related living heritage elements from Fujian.

"Fujian Little Pipe Tea" is a tea brand targeting young tea-drinking population who prefer high-quality tea but is short of time and skills for the complex process of tea-making. By pulverizing tea leaves through freeze-dry technology and sealing the powder using soluble rice paper inside bamboo-based biodegradable straw pipes, the consumer is able to enjoy a fresh cup of tea in only 30 seconds by stirring the straw in hot water. With 8 tea options available, covering major tea specialties of Fujian, the customer is also able to taste different tea types conveniently. The packaging of the tea pipes is also made of bamboo, and can be reused as containers and serve to further promote tea culture and bamboo culture among young people.

"Fujian Little Pipe Tea" produce design © Long Bamboo Technology Group Co., Ltd.

» Student artworks of Northeast Yucai Beihong School of Fine Arts

A recognition for youth engagement is given to the 40 students and their instructors from Northeast Yucai Beihong School of Fine Arts, who have created imaginative art works on the theme of "Bamboo for Carbon Neutrality in Rural Areas". These artworks creatively portray and imagine the role of bamboo in carbon sequestration and reduction.

Partial artworks by students from Northeast Yucai Beihong School of Art Left: "Sharing with Bamboo" by Bai Enze; right: "Environmental Protection" by He Chuanbo

» Creating a low-carbon and sustainable environment at World Heritage site in Chishui

By Chishui Forestry Administration

Chishui, a town of approx. 250,000 people in the north-western part of Guizhou Province, is known for its typical Danxia landscape and is part of the China Danxia natural World Heritage site inscribed in 2010. In addition to its geological significance, Chishui is also rich in bamboo and forest resources, which consist a pillar industry for local economic growth and also gave rise to many living heritage practices, such as bamboo weaving.

In response to China's "Dual Carbon Goals", and with the support of the UNESCO World Heritage sustainable livelihood activity, Chishui has been taking active measures in promoting low carbon development, especially by mobilizing its bamboo and forest resources, and has since established a provincial-level Forest Carbon Sink Administration. Home to 149,333 hectares of forest resources, Chishui has begun developing forest carbon sinks at 29,333 ha of forest. For example, in September 2022, Chishui issued the first bamboo forest carbon voucher (Tanpiao) in Guizhou Province based on calculated estimation of the carbon sequestration capacity of approx. 7,000 hectares of bamboo forest -- over 1 million tons of carbon valued at 50 million CNY (over 7 million USD). Chishui also developed a mobile application named "Chishui Danqing Tanpiao" for voluntary carbon offsetting for meetings, events, tourism activities, etc., via which 12,000 tons of carbon valued at 600,000 CNY were traded on the launching ceremony. Chishui continues to take lead in consolidating good practices and experience for the eco-civilization development of Guizhou Province.

Bamboo forest carbon voucher signing ceremony
© Chishui Forestry Administration

» Innovation and practices in low-carbon cultural tourism at Huangshan

By Huangshan Scenic Area Management Committee, Division of Planning and Land-use

Huangshan is a mountain range in southern Anhui Province in eastern China. It was inscribed as a mixed World Heritage site in 1990 for both the cultural value of its scenic landscape and its magnificent natural scenery and endemic biodiversity. It is also a UNESCO Global Geopark and a UNESCO Man and the Biosphere reserve.

As a well-known site with a long history of tourism development, Huangshan has been implementing a range of multi-dimensional initiatives to promote the sustainable and low-carbon development of the site, including regular biodiversity monitoring, restorative closure periods, digital and dynamic tourist capacity monitoring, bio-degradation facilities for wastes, popularization of clean energy such as solar power and access restrictions against gasoline vehicles, etc., which effectively improved the carbon processing capacity in Huangshan. Additionally, Huangshan institutionalized a restorative rotation mechanism by means of local laws and regulation and provincial standards. In recent years, Huangshan has also launched innovative measures such as the "Public Credit Supermarket", which encourages tourists to pack their own wastes down the mountain to specified waste sorting locations by offering credits to tourists each time they do so, and enabling them to trade such credits for a range of sightseeing coupons.

Waste sorting facility installed as part of Huangshan's Public Credit Supermarket initiative © Huangshan Scenic Area Management Committee, Division of Planning and Land-use

» Conservation and value communication of Jiuzhaigou World Heritage site

By Jiuzhaigou Scenic and Historic Area Administration

Jiuzhaigou, or literally "the Valley of Nine Villages", is located in the north of Sichuan Province in south-western China. It was inscribed in 1992 to the World Heritage List as one of China's first batch of natural World Heritage sites for its magnificent travertine landscape and water system.

For the effective conservation of the Outstanding Universal Values of the site and to mitigate environmental risks, Jiuzhaigou has been actively exploring new ways of building low-carbon scenic areas. As early as in 1999, it began operating eco-friendly sightseeing buses. In 2001, the site eliminated all tourism accommodation services within the World Heritage site area, and grouped all hotels outside the site. In 2004, Jiuzhaigou became one of the first scenic spots in China to utilize digital technology in natural resource data collection, operational management and online ticket reservation.

After the 7.0-magnitude earthquake in 2017, which caused significant damage to the site, Jiuzhaigou prioritized natural and biological methods over engineering interventions in post-disaster restoration, such as using carbonized bamboo in soil fixation and using enhanced sticky rice mortar in dam repair.

Introducing the Jiuzhaigou World Heritage to the media, Jiuzhaigou The Sea of Tranquility © He Xiaoyan

» Nature education in Giant Panda National Park from a low carbon perspective

By Division of Research and Education, Sichuan Forestry and Grassland Administration (Giant Panda National Park Sichuan Province Administration)

The Giant Panda National Park, officially established in October 2021, encompasses over 70 existing nature reserves and has geographic overlaps with the Sichuan Giant Panda Sanctuaries World Heritage site, which was inscribed in 2006 for containing the most important and significant natural habitats for in-situ conservation of biological diversity. Spanning 2.2 million hectares across three provinces of Sichuan, Shanxi and Gansu, the Giant Panda National Park is home to over 70% of the China's wild giant panda population, and 166 other national key protected wildlife species and 150 national key protected wild plant species.

88% of the Giant Panda National Park region lies in Sichuan Province. To promote the low carbon development of the Sichuan pilot region of the Giant Panda National Park, three forest and grassland carbon sink projects registered by Sichuan Province are relevant to the Giant Panda National Park, spanning approx. 6,880 hectares. In addition, Sichuan Province has established over 10 national-level and 22 provincial-level nature education centers, and compiled around 100 popular science courses. Nature education activities, in turn, became a momentum for local development and awareness raising on eco-protection. For example, under the Guanba nature education pilot activity, over 50 local villagers were engaged in the 18 nature education excursions for young people from 2018 to 2021, generating a total revenue of 240,000 CNY, which were used for rural development and wildlife protection programs; through involvement in these activities, 85% of the local villagers enhanced awareness on the correlation between a well-conserved environment and a higher income, and were thus motivated in participating in as many as over 450 natural monitoring sessions.

Nature education activities for youth organized at the Giant Panda National Park in Sichuan © Zhang Liming

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