

Mountain City's Vitality: The path of biodiversity conservation and shared industrial prosperity¹

Exploration of Pan'an (Zhejiang Province) as a biodiversity-friendly city²³⁴

Abstract: Pan'an County, located in central Zhejiang Province, China, is a key area for biodiversity conservation in Zhejiang Province. It boasts abundant biological genetic resources but faces challenges, such as habitat loss caused by urbanization and prominent conflicts between development and conservation. In 2021, Pan'an launched the first biodiversity-friendly city pilot project in China. By constructing a biodiversity-friendly index, promoting the digitalization of the traditional Chinese medicine herb industry, and creating a research tourism and cultural tourism system, it has explored a win-win path for ecological protection and economic development. This can provide valuable experience and reference for other biodiversity-friendly projects in which cities are the main

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² Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment; Pan'an Branch of Jinhua Municipal Bureau of Ecology and Environment. Priority Action Plan for Biodiversity Conservation in Pan'an County [R]. Jinhua, 2024.

³ Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment; Pan'an Branch of Jinhua Municipal Bureau of Ecology and Environment. Pilot Work Manual for the Construction of Pan'an Biodiversity-Friendly City [Z]. 2024-03.

⁴ China Environmental Protection Association. Creating "Unique Homes" for Birds and Insects [EB/OL]. 2024-05-15. http://zhb.org.cn/hbzx/news_2/2024-05-15/19441.html.

actors.

Keywords: Biodiversity; Biodiversity-Friendly City; Pan'an; Ecological Protection; Economic Development

1. Background

Pan'an, located in central Zhejiang Province, sits at the intersection of the mountainous area and hilly region in eastern Zhejiang and at the convergence area for the distribution of northern and southern plants. It has a total area of about 1,195 square kilometres and a water area of approximately 20 square kilometres. Pan'an is rich in biological genetic resources and is the origin of Pan'an Five Flavors and Longjing tea. The authentic medicinal materials represented by Pan'an Five Flavors, such as *Atractylodes macrocephala*, *Corydalis yanhusuo*, *Paeonia lactiflora*, *Fritillaria cirrhosa*, and *Scrophularia ningpoensis*, enjoy a high reputation at home and abroad. There are 1,219 species of cultivated and wild Chinese herbal medicines in Pan'an. The city Pan'an is located in a key area for biodiversity conservation in Zhejiang. With the acceleration of urbanization, natural habitats are being lost, the tension between economic development and ecological protection is becoming more prominent, and issues such as climate change and the invasion of alien species are intensifying. Thus, biodiversity

conservation faces challenges. Against this background, in 2021, Pan'an took the lead in carrying out China's first pilot project to construct a biodiversity-friendly city to explore a win-win pathway for ecological protection and economic development.



Figure 1 Pan'an Zhebawei Medicinal Materials City

Credit: Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment.

2. Main Practices

(1) Constructing a Biodiversity-Friendly City Index Based on Local Practical Experience

By drawing on international approaches and integrating local practices, Pan'an has developed a biodiversity-friendly city index. This index focuses on ecological security, ecological balance, and the improvement of the living environment, providing guidance for identifying and solving conservation problems and promoting the ecological-friendly transformation of the city. The index is continuously optimized by incorporating the latest scientific research results and practical experiences to ensure its scientific rigour,

practicality, and forward-looking nature. Through demonstration and leadership, it stimulates more cities to participate in conservation actions.

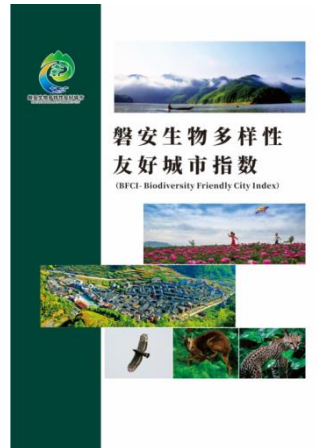


Figure 2 Pan'an Biodiversity-Friendly City Index

Credit: Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment.

(2) Creating a Sustainable Chinese Medicinal Herb Industry Through Technological Empowerment and Industrial Digital Transformation

In collaboration with enterprises, Pan'an has created the “traditional Chinese medicine industry brain.” By using technologies such as 5G and blockchain, it realizes digital management of the entire industrial chain of Chinese herbal medicines. Through traceability codes, it integrates data on the planting environment, production process, etc., to facilitate unified supervision. The Smart Medicinal Garden has been built and is divided into a high-tech incubation area for medicinal arts, research and learning, and ecological planting. It showcases the application of digital

technology in the traditional Chinese medicine industry and serves as a platform for education, research, and training. It provides at least 2,000 visits of skills training for farmers every year, improving the quality of practitioners and promoting the coordinated development of the Chinese herbal medicine industry and ecological protection.

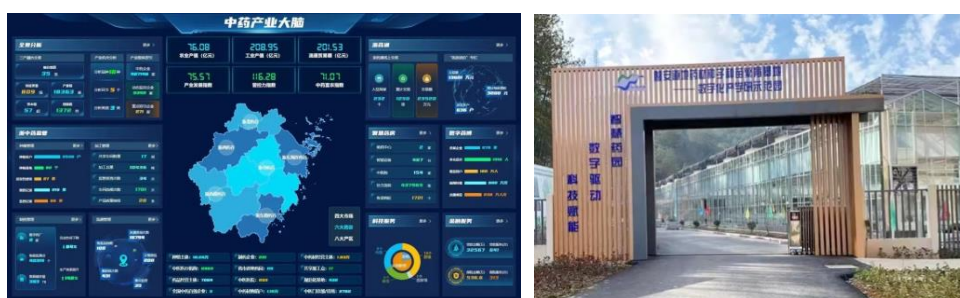


Figure 3 The “traditional Chinese medicine industry brain” (left) and the Smart Medicinal Garden (right) in Pan’an County

Credit: Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment.

(3) Promoting the Integration of Research Tourism and Cultural Tourism Through Multi-Subject Project Development

The government has taken the lead in building 10 biodiversity-friendly units (schools, communities, scenic spots, etc.) and nine biodiversity experience sites (such as the Wild Chinese Herbal Medicine Museum and the Biodiversity Culture of Juxi), forming a comprehensive experience area around Dapan Mountain and launching research tourism routes. Enterprises have upgraded ecological products through technological innovation (such as intelligent birdhouses) and established scientific research institutions (the Dapan Mountain Insect Research Institute), enabling

biodiversity monitoring capacity. Through the New Four Unifications model⁵, this approach standardizes the development of homestays, forms homestay clusters, drives the growth of tourism revenue (for example, the tourism revenue of Huaxi Scenic Area exceeded 40 million yuan in 2022), promotes employment and community income growth, and achieves a win-win outcome for ecological protection and economic development.

3. Lessons and Insights

(1) Guided by a Scientific Index, Laying the Foundation for Conservation

Constructing and dynamically optimizing the biodiversity-friendly index provides quantitative guidance for conservation efforts. It is the key to promoting more targeted and institutionalized biodiversity conservation and effectively balances the needs of ecological protection and urban development.

(2) The Coordinated Efforts of the Government and Enterprises to Stimulate Social Vitality

Under the guidance of the government, stakeholders, such as enterprises, communities, and scientific research institutions, deeply participate, forming an integrated model centred on science and technology, industry, and cultural tourism. This not only improves

⁵ Unified planning, unified investment promotion, unified management, and unified standards.

conservation efficiency but also drives industrial upgrading and enhances people's livelihoods, providing a cooperation paradigm for social forces to participate in conservation.

(3) Leveraging Local Characteristics to Unlock Ecological Value

Drawing on resources such as Chinese herbal medicines and ecological landscapes, the county has integrated conservation with education and cultural tourism. Relevant cases have been selected as exemplary cases of biodiversity conservation in Zhejiang Province, excellent reform cases of the ecological environment system, and "Excellent Cases of the Healthy Zhejiang Action in 2023". This proves that innovative practices based on local resources are effective pathways to achieve beautiful ecology, prosperous industries, and wealthy people. As the first pilot city for biodiversity-friendly construction in China, Pan'an can serve as a valuable reference as well as a replicable and scalable model for other cities at home and abroad.