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

Exploration of Pan'an County, Zhejiang Province, as a biodiversity-friendly city

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

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

1. Background

Pan'an County, located in central Zhejiang Province, sits at the intersection of the mountainous and hilly region in eastern Zhejiang and at the convergence area for the distribution of northern and southern plant species. It has a total area of about 1,195 square kilometers and a water area of approximately 20 square kilometers.

Pan'an is rich in biological genetic resources and is the origin of Pan Wuwei medicine herbs and Longjing tea. Five herbs in Pan Wuwei—including medicinal herbs such as Atractylodes macrocephala (Baizhu), Corydalis yanhusuo (Yuanhu), Paeonia lactiflora (Shaoyao), Fritillaria thunbergii (Beimu), and Scrophularia ningpoensis (Xuanshen)—these authentic medicinal herbs enjoy a high reputation at home and abroad. Pan'an has 1,219 species of Chinese medicinal herbs, including cultivated and wild varieties.

Figure 1 Pan'an Zhebawei Medicinal Materials City
(Credit: Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment)

Pan'an County is located in a key area for biodiversity conservation in Zhejiang. With the accelerated pace of urbanization, the loss of natural habitats, the prominent conflict between economic development and ecological conservation, and the intensification of issues such as climate change and invasive alien species, biodiversity conservation is facing challenges. Against this background, in 2021, Pan'an took the lead in launching China's first pilot project to construct a biodiversity-friendly city to explore a win-win pathway for ecological protection and economic development.

2. Main Practices

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

By drawing on international concepts and integrating local practices, Pan'an has developed a biodiversity-friendly city index.

· This index focuses on ecological security, ecological balance, and improvement of the living environment.

· The index is continuously refined by incorporating the latest scientific research results and practical experiences.

· 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

· Join hands with enterprises to build the traditional Chinese medicine herb industry "brain." By applying technologies such as 5G and blockchain, the entire Chinese herbal medicine supply chain is managed digitally. Through traceability codes, it integrates data on the planting environment, production process, and more, facilitating unified supervision.

· The Smart Medicinal Herb Garden is divided into a high-tech incubation area for medicinal techniques, a research and learning extension area, and an ecological planting area. It showcases the application of digital technology in the traditional Chinese medicinal herb industry and builds a platform for teaching, researching, and practical learning.

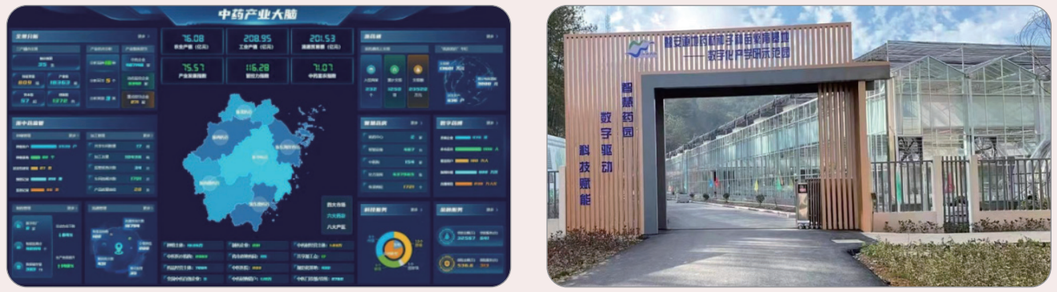

Figure 3 The "Traditional Chinese Medicine Industry Brain" (left) and the "Smart Medicinal Garden" (right) in Pan'an County
(Credit: Nanjing Institute of Environmental Sciences, Ministry of Ecology and Environment)

(3) Promoting the Integration of Research Tourism and Cultural Tourism Through the Construction of Multi-Subject Projects

· The government has led the construction of 10 biodiversity-friendly units and 9 biodiversity experience sites, forming a comprehensive experience zone around Dapan Mountain and launching research and learning tourism routes.

· Enterprises have upgraded ecological products through technological innovation and established research institutions, enabling biodiversity monitoring.

· Through the New Four Unifications model, Pan'an standardizes the development of homestays, leading to the formation of homestay clusters that boost tourism revenue, promote employment, and increase community income—achieving a win-win outcome for both ecological protection and economic development.

3. Insights

Constructing and dynamically optimizing the biodiversity-friendly index provides quantitative guidance for conservation work and balances the needs of ecological protection and urban development. Under government leadership, stakeholders such as enterprises, communities, and scientific research institutions actively participate, leading to the development of an integrated model focused on technology, industry, cultural tourism. Innovative practices based on local resources are an effective path to achieve beautiful ecology, thriving industries, and prosperous communities. As China's first pilot city for biodiversity friendliness, Pan'an County provides valuable lessons and a replicable, scalable, successful model for other cities in China and abroad.

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