



Kenfu Model: Poverty Alleviation Through Relocation in the Karst Region of Southwest China









Key poverty alleviation data in Huanjiang County

Kenfu model	Huanjiang Demonstration Zone of Karst Relocation and Industrial Poverty Alleviation was supported by the Huanjiang Observation and Research Station for Karst Ecosystems. It developed technologies for new economic activities in the zone adapted to local conditions, and provided services to support eco-environmental poverty alleviation.
Poverty reduction achievements	Huanjiang Demonstration Zone of Karst Relocation and Industrial Poverty Alleviation covers an area of 300 hectares. It relocated 513 people from 97 households. Their per capita net income was raised from less than RMB300 (US\$44) in 1996 to RMB14,660 (US\$2,174) in 2019. The Kenfu poverty alleviation model provides scientific and technological evidence and can serve as a useful model for large-scale relocation.





Overview

Located in Guangxi Zhuang Autonomous Region, Huanjiang Maonan Autonomous County (Huanjiang County) suffers from a fragile eco-environment due to its karst landscape. The Institute of Subtropical Agriculture of the Chinese Academy of Sciences (CAS) cooperated with the Department of Science and Technology and the Office of Poverty Alleviation and Development of the Guangxi Zhuang Autonomous Region to reduce poverty through relocation efforts, development of eco-environmental economic activities, and research into the karst ecosystem in Kenfu village. The per capita net income of residents of the Huanjiang Demonstration Zone increased from less than RMB300 (US\$44) in 1996 to RMB14,660 (US\$2,174) in 2019, and the development of eco-environmental activities such as animal husbandry and farming and processing medicinal herbs helped 4,000 farmers out of poverty.

Difficulties Faced by Huanjiang County

Located in a karst area on the foothills of the Yunnan-Guizhou Plateau, Huanjiang is home to a population of 378,000, of whom 58,000 are Maonan ethnic people. Poor soil, low resource and environmental carrying capacity, and frequent droughts and floods make for a fragile environment. As a seriously impoverished county in the rocky and desertified karst area in southwest China, the per capita annual income in Huanjiang was less than RMB300 (US\$44) in 1996. The local residents lived on corn paste, drank unclean water, and sheltered in dilapidated thatched cottages. Many families could not even afford clothes for their children.

In 1996, researchers from the Institute of Subtropical Agriculture (ISA) of the CAS visited Huanjiang with an aim to help local people out of poverty. One of them was Zeng Fuping, who was assigned to work in the capacity of deputy county mayor of Huanjiang in 1998. He has witnessed its transformation from an impoverished county to a zone of prosperity.

Wang Kelin, Party Committee Secretary of ISA and head of the Huanjiang Observation and Research Station for Karst Ecosystems, recalls his first visit to Guzhou Village in Xianan Township, "There were rocks everywhere, and farmers had to plant corn in the slivers of soil between the rocks to make a living."

Faced with such daunting conditions, the ISA researchers racked their brains. "We realized that poverty alleviation was not about donating clothes and food. It was important to develop technology and economic activity so that poverty reduction could become self-supporting," Zeng Fuping recalls.





What measures could be taken to slow down the advance of rocky desertification and improve the livelihoods of the local people?

Kenfu Model: Poverty Alleviation Through Relocation

Following in-depth analysis and visits to local households to communicate with the residents, the ISA researchers finally came up with a bold idea: move the poor out of the mountainous areas and set up poverty alleviation businesses. This approach adopts the model of “a scientific research institution + a company + farming bases + business”. Wang Kelin and other researchers suggested breaking the vicious circle of poverty and establishing a relocation pilot zone in Kenfu Village, which lies on earthen hills three kilometers north of the Huanjiang County seat.

By cooperating with the Department of Science and Technology and the Office of Poverty Alleviation and Development of Guangxi, and establishing the Huanjiang Observation and Research Station for Karst Ecosystems, ISA started the project, and established the 300-hectare Huanjiang Demonstration Zone of Karst Relocation and Poverty Alleviation in 1996. In September 1996, 513 villagers from 97 impoverished households in the mountainous townships of Xianan, Shangshan, Mulun and Longyan moved to the zone in Kenfu Village.

CAS and Huanjiang County set up Kehuan Poverty Alleviation Development Co. Ltd (Kehuan Company). CAS conducted scientific and technological research to support the four main local economic activities – fruit, sugar cane, livestock and vegetables farming – in the demonstration zone, and Kehuan Company was responsible for infrastructure, operations, management, technical training, supplying seedlings, and agricultural product sales, providing one-stop services for the relocated residents before, during, and after production. Instead of receiving relief money from the government, the resettled households contracted for land and applied for loans to buy agricultural materials.

This model promoted an economic ecosystem dominated by fruits, sugar cane and vegetables on more than 200 hectares of well-developed land in the demonstration zone. Within one year the local people could afford adequate food and clothing, and after 10 years the per capita net income in the zone exceeded the county average.

After more than 20 years of development efforts, the Kenfu Demonstration Zone has achieved remarkable results. By 2019 its annual per capita net income had increased to RMB14,660 (US\$2,174). Praised as the “Kenfu Model” by UNESCO experts, it has created a new concept of eco-environmental poverty alleviation in Huanjiang County, provided the scientific basis and technological support for the Huanjiang program to relocated 100,000 poor people (the largest such program in China), and served as demonstration for similar large-scale relocations.

Compound Agriculture and Animal Husbandry: A New Approach to High-Quality Green Development

Only 20 years ago, Kenfu Village was a barren hilly hamlet. Environmentally sustainable industries offered the best prospect of getting rid of poverty. With





Grass grows on the floor of a forest in Huanjiang County. (↑)

A cattle and grass farming demonstration base in a karst region (→)

control of soil erosion, restoration of vegetation and other methods to tackle rocky desertification, Huanjiang County has developed industries such as forestry, orchards, cultivation of medicinal herbs, and animal husbandry to help increase the incomes of relocated people.

Based on research into the Karst ecosystem, Wang Kelin's team proposed a protective development model of "planting grass to raise cattle". Guzhou Village and Xiatang Village established a cattle breeding demonstration base, a circular eco-environmental agriculture demonstration base for restoring farmland to forest and planting grass to raise cattle, a silkworm breeding demonstration base for restoring farmland to mulberry, and an eco-environmental forest demonstration base. A total of 91 households engaged in managing 2,770 square meters of cattle sheds and 34 hectares of high-quality pasture.

"When planting perennial forage grass, farmers need to plough the land just once to minimize land disturbance," says Zeng Fuping. "A hectare of grass can feed 15 cattle. Selling cattle can increase farm incomes, and cattle manure, a kind of organic fertilizer, can be used for biogas production. This kills several birds with one stone."

To help incapacitated households out of poverty, Wang Kelin's team proposed a creative "loan for cattle" model. Poor households can raise beef cattle bought with interest-free loans, or entrust them to family farms or cooperatives, and get dividends after the cattle are sold. A total of 45,000 beef cattle were sold in Huanjiang in 2018, to a value of more than RMB400 million (US\$59 million).

Animal husbandry increased farming incomes, but brought problems such as rural environmental pollution and the treatment of breeding waste. To solve these problems, Huanjiang County established a demonstration base that used an aquatic plant, *Myriophyllum elatinoides* Gaudich, for sewage treatment. The purified water reached Grade III quality standard. This practice was later introduced into the rural environmental governance program in Guangxi.

Wang Kelin is now convinced that the compound agro-pastoral ecosystem can strike a balance between eco-environmental restoration and economic development, and achieve harmonious coexistence between human and nature in a fragile environment. This is a new approach to high-quality green development in poverty-stricken karst areas.

Kenfu Demonstration Zone has built a conservation base for cultivating rare and endangered medicinal herbs in the wild and under trees. Xiakai, Xiajie and Neixi villages planted eight hectares of herbs of multiple varieties in 2016. The growth of medicinal herbs later extended to cover 192 hectares across the county.





Huanjiang County planted high-value fruit orchards, producing red pomelo, tangerines, oranges and macadamia nuts, covering a total area of 9,000 hectares. Red pomelo, one of the “eight major poverty alleviation activities” in the county, occupies 4,500 hectares. It produces a harvest of 7,200 tons with an output value of RMB43.2 million (US\$6.41 million). In 2017, Huanjiang established the first Agricultural Science and Technology Demonstration Park and the first Characteristic Agriculture Demonstration Park, covering an area of 667 hectares.

Aquaculture wastewater that has undergone ecological treatment in Huanjiang County (←)

Ecological wastewater treatment in a karst region (↑)

The Kenfu zone also developed a tea industry. Farmers planted Shiya green tea under forests, which increases their incomes and protects the eco-environment. Mulun Natural Food Company was set up to sell the local products. High-value specialties such as Huanjiang beef cattle and mini pigs were developed, benefiting impoverished households in six townships, with the annual per capita income increasing by over RMB2,000 (US\$297).

Liu Jinyu, one of the first relocated farmers, was in her 40s at the time. “I had been poor for more than 40 years, and I wanted to grab this opportunity,” she says. But her husband was not willing to move, so Liu took the bold decision to move together with her two daughters and without her husband.

Three years after settling in Kenfu Demonstration Zone, Liu’s annual income has increased from RMB800 (US\$119) to RMB1,600 (US\$237). Proximity to the county seat has given her daughters access to better education. The improved circumstances of the family following relocation attracted Liu’s husband, and he followed them to their new home. The whole family, like other resettled villagers, began planting citrus and breeding livestock, further improving their standard of living.

Speaking of the experience in poverty alleviation, Zeng Fuping believes that the most important thing is to bring new ideas to the local people focusing on economic and eco-environmental benefits. It is unwise to rush blindly into development.

Wang Kelin says: “The model in Huanjiang County explored the value of eco-environmental products in the karst region and set them on the path towards the building of a ‘Beautiful China’. Environmental protection and economic development can coexist, be balanced, and even be mutually beneficial.”





A Vietnamese Sophora root seedling base in Huanjiang County (→)

Poverty Alleviation through Science and Technology Promotes Research into Karst Ecosystems

Poverty alleviation supported by science and technology in Huanjiang benefited research into karst ecosystems and promoted the establishment of the Huanjiang Observation and Research Station for Karst Ecosystems. Over the past five years the station has achieved significant results in rocky desertification control and the development of poverty alleviation activities, promoting eco-environmental conservation in China. Many of its research results have been published in international journals including sub-journals of *Nature*. The station gained approval by CAS as a major scientific and technological infrastructure project, and has built a strong karst ecosystem research team.

In the future, according to Wang Kelin, the Institute of Subtropical Agriculture will further consolidate poverty alleviation achievements and establish a long-term poverty alleviation mechanism supported by the Huanjiang Station and the Guangxi Rocky Desertification Control Engineering Technology Center which is affiliated to the Department of Science and Technology of Guangxi.

“The Huanjiang Station serves as a cooperation bridge between CAS and the Guangxi government. It will strengthen research into eco-environmental restoration and protection, green development, and rural revitalization in karst areas on the basis of achievements in poverty alleviation through structural reform and self-driven development. This will make a significant contribution to the economic and social development in karst regions in southwest China,” says Wang.

Wang Kelin has wider ambitions for the future. The karst landscape in the countries along the “Belt and Road” routes accounts for 70 percent of the global total. “Echoing the United Nations 2030 Agenda for Sustainable Development, the Chinese Academy of Sciences is willing to share China’s green restoration model and technology with other developing countries in need,” he says.



