

Greening campaigns transforming Shanxi's natural environment

Decades of government afforestation programs combat widespread soil erosion and breathe new life into province's previously barren land



By YUAN SHENGGAO

When the Yellow River enters Shanxi in the county of Pianguan, residents of this North China province begin their relay to protect the ecological environment of this Chinese river, as they deem this mission crucial to their own well-being as well as people in the lower reaches.

The 5,464-kilometer Yellow River, originating in the Qinghai-Tibet Plateau and emptying into Bohai Bay, is the second-longest river in China. It is regarded as the mother river of the nation because it has nurtured Chinese civilization for millennia.

The Shanxi section of the Yellow River is 965 km in length. More than 73.1 percent of the land in Shanxi, covering 114,600 square kilometers across 11 cities, belongs to the river's drainage basin. The river's drainage area in Shanxi is also home to 73.4

percent of the province's population and makes up the majority of provincial GDP.

As Shanxi is located on the Loess Plateau, soil erosion has been a challenge to the ecological environment of the Yellow River for thousands of years.

In the early 1950s, the area of soil erosion in Shanxi was 108,000 sq km, of which 67,600 sq km was in the Yellow River drainage basin. Soil erosion-induced annual sediment in the Yellow River was 366 million metric tons during that period.

Pianguan, the first county in Shanxi that embraces the Yellow River, had been one of the regions hardest-hit by soil erosion. During its worst period in the 1970s, about 81 percent of its land suffered from soil erosion.

The county began a massive campaign to curb soil erosion in the 1970s. The move is a combination of land greening and engineering measures for gully head protection and farmland modification.

Tangible progress has been made over the past decades. One remarkable feature is the sustained growth of vegetation coverage. Local statistics

show that the county's forest coverage increased from less than 3.5 percent in 1977 to 48.6 percent in 2022.

Local residents have now reaped dividends from the improved environment.

Yaowangping is one of the villages in Pianguan that began a soil erosion control program in the 1970s by modifying hillside farms into terraced plantations, building gully dams and planting trees and grass on bare hills.

Su Jun, a local farmer, now operates a 21-hectare vineyard along one of the gullies.

"Growing grapes can generate much better revenue than other crops," Su said. "But this was impossible in the past as a heavy rain would wash away everything you planted."

He explained the increasing coverage of vegetation on neighboring hills and the dams built along the gullies have effectively prevented soil erosion from happening. "All these efforts have led to the substantial improvement of farmlands and crop yields have been stabilized."

Pianguan is the place where the Yellow River and Great Wall meet.



The county of Licheng now offers scenery of green mountains and clear waters after decades of efforts in greening and curbing soil erosion. PROVIDED TO CHINA DAILY

The two are now among the top three landmark tourist attractions in Shanxi.

"As the river is becoming cleaner and the mountains near the Great Wall are greener, we are welcoming a growing number of tourists and securing more revenue," said an official of the county.

The county of Xiangning has adopted a similar approach as Pianguan in curbing soil erosion.

Zhang Penggang, an official at the county's water resources bureau, cited the example of Tuojian village to illustrate Xiangning's progress in soil erosion control.

Tuojian is a gully-side village some 2.5 km to the Yellow River. "In the past, a flood can wash everything — soil, crops or even houses — into the Yellow River," Zhang said.

"Over the past decades, we have built four large and medium-sized

dams along the valley, basically freeing locals from such disasters," Zhang said. He added that about 1,000 hectares of terraced farmlands have been developed along the gully, ensuring more stable and higher yields from farming.

At present, nearly 90 percent of land in the gully's drainage area has been covered by vegetation, according to the official.

"We have made similar efforts for other gullies in Xiangning, which helped the county win the honor of 'a national role model in curbing soil erosion in small drainage areas' in 2022."

Experiencing the same transformation is the county of Puxian. It has seen its forest coverage increase from 17 percent in 1984 to 59 percent in 2022. This high rate saw the county gain recognition from the Ministry of Ecology and Environment as a

case of best practice for "developing lucid waters and green mountains into valuable assets".

To further curb soil erosion and protect farmlands, the county government invested 6.3 million yuan (\$880,000) to launch a new gully head protection project in May. It was completed at the end of last month.

In the province as a whole, Shanxi has invested more than 4 billion yuan in controlling soil erosion — including building gully dams and developing terraced farms — over the past five years, according to Cheng Jie'an, deputy chief of the Shanxi Department of Water Resources. He added that this move has protected more than 15,000 sq km of land from soil erosion.

Kang Meixiang contributed to this story.

Pioneering maglev on fast track to success

By YUAN SHENGGAO

After more than two years of construction, the main structures of China's first trial line for a vacuum tube maglev train with independent intellectual property rights were completed in the Shanxi city of Datong late last month, marking a significant breakthrough in this cutting-edge transportation system.

The 2-kilometer line, with 1.55 km built by the Datong high-speed flying train project unit of China Railway Sixth Bureau Group, is the first phase of a laboratory jointly developed by Shanxi and China Aerospace Science and Industry Corp. The inauguration of the lab and groundbreaking of the test line took place in May 2021.

The purpose of the lab is to provide a key test platform for the low-vacuum tube magnetic levitation train technology.

The high-tech train, which is also known as vactrain or high-speed flying train in the industry, is designed to run inside a virtually air-free tube to reduce resistance.

Executives of CASIC said the company began its research into vactrain technology in 2017 and has achieved breakthroughs in key

technologies in the years since.

The test line at the lab in Yanggao county in Datong will be a full-size line with a total length of 60 km and will be built in three phases.

The 2-km line of the first phase will be used to collect basic data for operations, so it is crucial for the developers to push their research and development work to a new stage, according to Yang Xufeng, chief engineer of the Datong high-speed flying train project unit of China Railway Sixth Bureau.

He added that after about two years' research in the first phase, the line will eventually be extended to 60 km to test the vactrain's technologies for commercial use.

"While China's researchers have made breakthroughs in technologies relating to the vactrain, a reliable infrastructure system allowing the trains to run and test its performances is of equal importance," Yang said. "When we were commissioned to build the test line project, we were fully aware that this is the most challenging mission in the history of our company. But the following two years have proved that we have the competence to tackle all the challenges."

Installing the vacuum tube,



Construction workers of China Railway Sixth Bureau Group use heavy machines to install a pipeline for the vactrain test line in Datong. DU XIU / FOR CHINA DAILY

which is done by putting together pipelines each with a diameter of 6 meters and a length of 21 meters, for instance, requires great accuracy, according to Yang.

"The high accuracy is a must for an air-free vacuum tube system that allows the safe operation of maglev trains," Yang said. "As a whole, the size differences of the pipelines should be controlled at less than 2 millimeters."

He added that there are also strict requirements for the accuracy of the flatness of rails, in welding and others. "We are glad to say that all our works have passed the appraisal

by authoritative experts."

Industry insiders said vactrains can reach a speed of more than 1,000 km per hour, much faster than the conventional bullet train that travels at under 400 km/h.

They added that as the system uses the latest technologies such as superconducting magnetic levitation and vacuum tubing, it is expected to cultivate a powerful and wide-covering industry chain in Shanxi province, pushing forward its advanced manufacturing and high-tech industries to a new level.

Leng Xue contributed to this story.

Local's efforts power county's regrowth

By YUAN SHENGGAO

On Youyu's land of nearly 2,000 square kilometers, green is now the dominant color.

This makes a sharp contrast to what it was seven decades ago, when this county in the northwest of Shanxi province was overwhelmed by the color brown, thanks to the sustained efforts made by local residents and officials.

Over the past 70 years, the county's vegetation coverage has increased from less than 0.3 percent to 57 percent at present. In addition, the county has launched a massive soil erosion control campaign over the decades, freeing more than 133,000 hectares of land from soil erosion.

Many local residents, especially seniors, said they still feel it is incredible thinking about how much Youyu has changed.

Zhao Shouzhong, who had worked as a forestry technician for about 40 years with Youyu's Nanshan Forestry Park, said that the county had been easy prey of soil erosion and sandstorms when he was a child.

"When we were little, we had to light up the house even though it was daytime, because the county was always clouded with sandstorms," Zhao said.

To change the adverse living environment, the authorities of Youyu began a massive greening campaign to battle sandstorms and improve the ecological system of the county in the early 1950s. Since then, government officials, together with forestry technicians and residents, have spared no effort to plant trees.

In 2020, the government of Youyu announced that it was among the first in Shanxi to fulfill its land-greening target — covering almost all the once bare hills and mountains with vegetation.

Since then, the county has

renewed its efforts for greening with a focus on implementing a comprehensive program to protect the mountains, watercourses, forests, wetlands, farmlands and grasslands, and integrating ecological environment improvements with socioeconomic development, according to local officials.

The new efforts have ensured that environmental improvements can benefit as many people as possible.

Sea buckthorn is a local native plant widely used in greening and farmers recently found that this commonplace shrub can generate big revenue.

The planting area of sea buckthorn in Youyu now stands at nearly 20,000 hectares. Farmers harvest the sweet-and-sour fruits in late summer and sell them to local processing enterprises, which turn them into healthy beverages that are now popular throughout the country. Total revenue generated from the industry chain is about 200 million yuan (\$27.94 million) a year.

The greener Youyu has also attracted an increasing number of tourists in recent years, who toured the county to see its increasingly attractive scenery and to hear the stories behind its miraculous transformation.

Zhang Yanfang, a manager of a tourism company that operates an outdoor camping site at a forest park in Hongqikou village, said the camping site is now especially popular among self-driving tourists.

"We are welcoming more families and individual tourists, who are here to enjoy nature's beauty, while experiencing a variety of outdoor activities like camping, barbecue and bonfire parties," Zhang said.

Yuan Zhaohui contributed to this story.



Youyu county now has a vegetation coverage of 57 percent, compared with less than 0.3 percent seven decades ago. XIN TAI / FOR CHINA DAILY

Plan highlights moves to attract tech talents

By HAO NAN
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North China's Shanxi province will implement an action plan to substantially increase its number of scientific and technological researchers and management personnel.

The initiative aims to mitigate the shortage of related human resources, and optimize the structure of the local talent pool, local officials said.

According to the plan, by the end of the 14th Five-Year Plan (2021-25), the number of research and development personnel per 10,000 employees will witness a rapid rise, with an average annual growth rate of more than 20 percent.

In addition to nurturing local talents, Shanxi has also been making efforts for years to attract talented individuals from overseas. Qu Zhican, who graduated from Johns Hopkins University with a PhD degree, is one of them.

In 2018, Qu returned to her hometown with startup capital and biological technologies with independent intellectual property rights, and founded Shanxi Nano-



Qu Zhican (right) and her colleague conduct an experiment at the lab of Shanxi Nanolattix Biotechnology. DENG YINGMIN / FOR CHINA DAILY

lattix Biotechnology. The company is committed to the innovative development of anti-cancer medicines, and scientific research and technological achievement transfer in the big health industry.

At the eighth "Makers in China" SME Innovation and Entrepreneurship Competition, Shanxi has 10 projects included in a list of top 500 projects nationwide, which was announced on Nov 16, and Nanolattix's biomedicine project made the

list as the only one of its kind in the province.

Located at the Shanxi Transformation and Comprehensive Reform Demonstration Zone, Qu said the company has gained strong support from the zone in terms of policy, funding and human resources.

Also, the zone's international cooperation and investment promotion center, together with other government agencies, has helped the company explore markets and deal

with various difficulties during the COVID-19 pandemic, which has effectively boosted its sustainable development, she added.

When it comes to cultivating high-quality scientists, researchers and technologists, Shanxi will focus on strategic emerging industries and "future industries" such as artificial intelligence and quantum computing, by setting up special funds dedicated to fostering innovation and entrepreneurial talents in these fields.

To increase the number of high-tech companies, especially small and medium-sized enterprises, is another highlight. By 2050, Shanxi is expected to be home to 10,000 State-level sci-tech SMEs and 5,000 national-level high-tech companies. It also plans to promote 100 high-tech enterprises to become globally renowned and nationally influential high-tech leaders.

Moreover, local R&D personnel will be encouraged to participate in global academic exchanges and cooperation, and be supported to undertake State-level international cooperation projects.

Shen Jia contributed to this story.