

# Holistic Approach to Water Conservation

## Policy

By ZHONG Jianli

In the latest move to build a water-saving society, China's National Development and Reform Commission, Ministry of Water Resources, and other departments recently issued a guideline on accelerating the development of the water-conservation industry.

The guideline sets a target for the industry to reach a trillion RMB value by 2027, nurturing a group of specialized and innovative "little giant" enterprises. The plan envisages establishing a development pattern of the water-conservation industry that is primarily enterprise-driven, market-oriented, innovation-powered, and emphasizes the integration of production, education, research and application.

By 2035, the goal is to cultivate some leading enterprises, with water-saving technologies, processes, equipment manufacturing, and management services that reach advanced global standards. This will foster an all-round adoption of water-saving production and lifestyles.

To advance the upgrade and replacement of water-saving products and equipment, the guideline supports enterprises to intensify R&D, design, and production efforts. This involves constructing a supply system of water-saving products and equipment, ranging from basic raw materials to end-consumer goods, to drive the digital, intelligent and green development of



Water-saving automatic sprinklers are used to irrigate vegetables in a greenhouse in Taibai county, Shaanxi province, northwest China on June 25, 2024. (PHOTO: XINHUA)

water-saving products and equipment manufacturing.

Innovating water-saving management service models involves implementing intelligent water usage control in high water-consuming enterprises, industrial parks, and medium-to-large irrigation districts.

It also emphasizes strengthening digital empowerment by integrating technologies such as the Internet of Things, AI and digital twinning with the water system management techniques, to explore typical "Internet + water-saving management" application scenarios

for precise water control.

Regarding promoting sci-tech innovation in the water-conservation industry, the guideline supports research institutes, universities, leading enterprises and industry associations in conducting basic and applied related research and innovation.

The guideline calls for efforts to enhance the protection and utilization of intellectual property of water-saving technologies. Platforms, such as the national water-saving industry technology innovation alliance, are to be established to drive the conversion and

widespread application of water-saving technologies.

Recommendations also include stimulating investments from foreign and private capital into the water-conservation industry, and encouraging research institutions and high-tech enterprises to engage in international water-related events, and carry out overseas cooperation in water-saving technology consultation, engineering construction and management services, to support the high-quality development of the Belt and Road Initiative.

## Case Study

# Hunan Agricultural University Signs Deal to Boost Peanut Farming in Nigeria

By YU Huiyou, CHEN Yifei, LIANG Yilian

A team from Hunan Agricultural University (HUNAU) in central China and Hong Kong-based Sun Crops Agriculture Ltd. have signed a cooperation agreement to boost peanut cultivation in Nigeria.

The Nigeria Groundnut Revivification Plan agreement, signed on July 10, will see Sun Crops fund the technical service fee to implement modern and efficient peanut cultivation technology in Nigeria's Jigawa state. The three-year project (July 2024 - June 2027) aims to boost the average yield per mu (about 0.067 hectares) in the demonstration planting area by more than 50 percent.

Nigeria, with its abundant sunshine and temperature and vast land area, has great potential for agricultural development. Since the 1960s, Lee's Group, the parent company of Sun Crops, has invested in many African countries, including Nigeria. It has established and improved planting, production, processing, and sales of various agricultural products such as rice, sugarcane, peanuts, sesame, and cotton in Nigeria. However, the peanut project was troubled by declining yield, high rate of sterile grain, poor quality, and low economic returns for farmers.

In December 2023, Lee's Group learned that a team at HUNAU, led by professor Li Lin, had developed a high-quality and high-yield cultivation technology

for peanuts and sought to cooperate with them. In May, the team conducted in-depth research in Nigeria, examining local peanut growth conditions such as light, temperature, soil and mechanized supporting facilities, and proposed the Nigeria Groundnut Revivification Plan.

According to Zheng Xiaofeng, vice president of HUNAU, Hunan plays a leading role in economic and trade cooperation between China and Africa. The university supports the provincial government's strategy to build a highland of China-Africa cooperation. It seeks to accelerate the transformation of sci-tech achievements in universities, carrying forward the spirit of Yuan Longping, the renowned agro-scientist who was also the honorary president of the university.

Wu Jun, dean of HUNAU's College of Agronomy, told *Science and Technology Daily* that the university attaches great importance to the transformation of sci-tech achievements and encourages Li's team to go out to connect with enterprises.

This cooperation leverages enterprise investment and expert wisdom to solve agricultural production issues in Africa, creating a multi-win model.

Following the successful China-Africa cooperation on peanut production, the college plans to encourage research in rice, cotton, and other crops and continue to help African countries achieve agricultural modernization and food security, Wu said.

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Significant achievements have been made in manned spaceflight, lunar exploration, BeiDou navigation, high-speed rail, mobile communications, new energy vehicles, deep-sea and deep-earth exploration. There are many other landmark achievements.

But while our science and technology undertakings show significant progress, we must also be aware that compared with the leading sci-tech powers in the world and given our goal of becoming a strong sci-tech power, our technological strength is still not strong enough, our system and mechanism are not yet sound, and the overall efficiency of the national innovation system is not yet high. The resolution highlights problem- and goal-oriented approaches to deepen reform of the science and technology system and points out the direction.

To address the mismatch between talent training and sci-tech innovation supply and demand, and the shortage of top sci-tech talents, the resolution emphasizes integrated reform of the education, science, and technology talent system. To address our relatively weak original innovation capabilities and dependence (on others) for key core technologies, it emphasizes strengthening organized basic research and encourages high-risk, high-value basic research.

To address the low level of organizational coordination and resource distribution, it emphasizes improving management of science and technology plans, adhering to the "Four Orientations," and optimizing the mechanism of major science and technology innovation.

To address the insufficient supply of high-quality science and technology, it emphasizes reforming the mechanism for the transformation of sci-tech achievements, strengthening the leading position of enterprises in sci-tech innovation, and promoting the integration of sci-tech innovation and industrial innovation.

**Promoting new and greater breakthroughs in sci-tech reform and development**

Q: What are we going to see in the field of technological innovation? What kind of key measures can we expect?

Yin: Effective deployment is just the start, and further implementation is crucial. MOST will enhance its political

# Sci-tech Modernization Backbone of Chinese Modernization: Science and Technology Minister Yin Hejun

stance, strengthen its sense of responsibility and mission, and unify thoughts and actions with the CPC Central Committee's decision-making and deployment. The goal is to build China into a strong sci-tech power by 2035, and high-level sci-tech self-reliance and self-strengthening is the mainline. We will focus on "strategy, planning, policy, and service" — strengthening strategic planning, policy measures, scientific research forces, major tasks, resource platforms, and regional innovation. We will promote new and greater breakthroughs in science and technology reform and development.

- We will improve a new type of whole-nation system. Measures will be taken to strengthen the construction of national strategic sci-tech forces, optimize their positioning and layout, promote central-local collaboration in sci-tech innovation, and coordinate the construction of various sci-tech innovation platforms. We will also promote systematic, institutional, and collaborative development of sci-tech innovation forces, innovative elements' configuration, and talent teams.

- We will promote deep integration of sci-tech innovation and industrial innovation. We will focus on key links such as supporting the industrial chain, the leading position of enterprises, transformation of sci-tech achievements, and sci-tech finance. We will establish a policy system compatible with new quality productive forces.

- Integrated reform of education, science and technology talent systems will be coordinated. We will establish a discipline-setting adjustment mechanism and talent training model guided by scientific development and national strategic needs. We will implement more active, open, and effective talent policies, improve the system to ensure that researchers can focus on their work, delegate more autonomy to employing entities, and reduce the burden on talents.

- We will deepen sci-tech openness and cooperation. We will practice

international science and technology cooperation initiatives, broaden government and private exchange and cooperation channels, focus on joint research to address global challenges, participate in and lead the formulation of international science and technology rules, and create a globally competitive open environment for sci-tech innovation.

Only reformers can advance, only innovators can thrive, and only those who reform and innovate will prevail. MOST will implement the plenary session's directives, advance reform through innovation, drive development through innovation, and deeply advance science and technology system reform with persistence and determination. We will address issues as they arise, eliminate obstacles, and accelerate the construction of an efficient, smooth, open, collaborative, and vibrant national innovation system, thus providing stronger sci-tech support for Chinese modernization. We will accelerate building China into a strong sci-tech power, providing stronger sci-tech support for Chinese modernization.

**Promoting the integration of sci-tech and industrial innovation**

Q: The plenum gave instructions for the integration of production, learning, and research, transformation of sci-tech achievements, and innovation ecosystems. How can reform achieve deep integration of sci-tech innovation and industrial innovation? What will MOST focus on?

Yin: High-quality development and new quality productive forces require advancing the integration of sci-tech and industrial innovation. At the national science and technology conference, General Secretary Xi clarified the foundation, key aspects, and pathways for integrating technological and industrial innovation, providing clear guidance for our work. MOST will focus on three aspects:

- Establishing the leading role of enterprises in sci-tech from a systematic level. Enterprises are the main subjects of innovation and the main force of innovation and creation. Building a strong

sci-tech power requires a large number of innovative enterprises to lead industrial development. We must establish mechanisms to cultivate and expand leading technology enterprises, cultivate leading and fast-growing technology companies, and explore mechanisms for elevating enterprise projects to national projects. We must support enterprises to form innovation consortia with universities and research institutes, and promote integrated innovation across the industrial chain.

Meanwhile, we will encourage and support small and medium-sized technology enterprises to increase R&D investment, and raise the proportion of R&D expense deductions. We will consolidate and develop the public sector and encourage, support and guide the development of the non-public sector, treating private and state-owned enterprises equally and allowing those capable of undertaking significant national sci-tech research tasks. This will fully leverage the role of enterprises as the "question setters," "problem solvers," and "evaluators".

- Deepening reform of the mechanism for the commercialization of research achievements. Promoting the transformation and application of sci-tech achievements has always been a focus and difficulty of sci-tech reform. MOST has been continuously working in this area and exploring effective practices. We will improve the national technology transfer system, formulate policy documents to promote the transformation of sci-tech achievements in the new era, and deepen the reform of the ownership of official sci-tech achievements. Through property right incentives, we will stimulate the enthusiasm of scientific researchers to transform achievements.

Relying on our industrial base and super-large-scale market advantages, we will coordinate and promote the demonstration and application of major scientific research achievements, strengthen and expand national demonstration zones for the transformation of sci-tech

achievements, and supply more high-level sci-tech for high-quality development.

- Optimizing the innovation ecosystem. Given our limited national financial resources, implementing major national scientific projects, building national strategic sci-tech forces and enhancing innovation capabilities depends on establishing a diversified investment mechanism. We must build a sci-tech financial system compatible with technological innovation and accelerate a sci-tech financial service system focused on venture capital for technology start-ups. We will guide capital to invest start-up technology-based small and medium-sized enterprises for the long term, and provide financial support for hard technology research, thereby channeling financial resources into the fertile ground of innovation. We will improve the national innovation policy system and accelerate an innovation ecosystem more compatible with new quality productive forces.

**Advancing reform of science and technology plan management**

Q: The plenary session proposed to improve the management of science and technology plans. How will MOST do this to produce more R&D results? How will you ensure high-quality sci-tech supply for high-quality development?

Yin: National science and technology plans are important carriers for the government to organize sci-tech innovation activities. They are also focal points for the reform of the science and technology system, which is an acute concern of the sci-tech community.

In the early stages, in response to problems such as duplication and distribution of sci-tech resources, MOST promoted reform of national science and technology plan management, achieving positive results. Going forward, MOST will conscientiously follow the requirements of the third plenum and advance the reform of science and technology plan management, focusing on three aspects:

- Strengthening the coordination and layout of science and technology resources. Following the deployment of

the CSTC, MOST, in conjunction with the Ministry of Finance and other departments, has established a mechanism for coordinated arrangement and use of central science and technology funds based on the principle of "determining tasks according to needs and funds according to tasks." We will continue to strengthen the overall planning and layout of sci-tech innovation across the entire chain and all fields, strengthening organized basic research, and coordinating and strengthening key core technology research, solidifying the foundation of sci-tech innovation.

- Stimulating the innovative and creative vitality of researchers. In recent years, MOST has introduced many policy measures to give greater autonomy to research institutions and researchers, and the researchers' burden has been reduced. Next, on one hand we will continue to delegate power and enable researchers, giving them greater decision-making power over technical routes, funding allocation, and resource scheduling, expanding the scope of the "package system," and providing better institutional guarantees for researchers to focus on their studies.

On the other hand, we will deepen the implementation of new methods such as "the open competition mechanism to select the best candidates," "horse racing system," and "lead firm governance system," reducing assessment frequency, strengthening periodic assessments, and improving project implementation performance.

- Improving the responsibility system. Following the reform requirements, all national science and technology plan projects have been transferred from MOST to relevant departments. The ministry will focus on the front-end arrangement, mid-term inspection, and back-end check and acceptance.

In the next step, we will follow goal- and application-oriented approaches, consolidating the management responsibilities of competent departments, professional institutions, and undertaking units, ensuring that competent departments effectively take responsibility, strictly control project progress and risks, and ensure timely completion of tasks.