Agricultural Technology Creates Bumper Harvests

By Staff Reporters

In 2025, China's agricultural sector brimmed with innovative vitality. Breeding innovations continuously broke high-yield records, and smart agriculture accelerated the reconstruction of production models, promoting a deep transformation of agricultural production from "experience-driven" to "technology-driven."

Precise seed breeding

China's breeding technology underwent a revolution in precise design. A number of new varieties with high yield, quality, resistance and efficiency were bred and promoted, safeguarding domestic food security.

The Institute of Genetics and Developmental Biology of the Chinese Academy of Sciences developed GEAIR (Genome Editing combined with AI-based Robotics), the world's first intelligent breeding robot capable of automatic cruise and cross-pollination.

GEAIR, which can identify stamens with 85 percent accuracy, takes only 15 seconds to complete pollination, said Xu Cao, a researcher at the Institute, adding that this technology saves more than 25 percent of the cost in tomato breeding and has shortened the breeding period from five years to one year.

In 2025, Northwest A&F University in Shaanxi, northwest China, saw 12 new wheat varieties it had developed with breakthroughs in lodging resistance receive national approval. The wheat varieties developed by the university have been grown in around 120 million hectares.

A smart agriculture visualization platform in use in a farm in Yongji county, Jilin province. (PHOTO: XINHUA)

"Wei Liangyou 2268," the new insect-resistant and high-yield rice variety, was developed using molecular design breeding technology. It has achieved a yield of 1,174 kilograms per mu in its demonstration plot in Hunan province in central China.

AI management

In 2025, AI has been deeply integrated in agricultural scenarios, and agricultural large models have achieved multiple breakthroughs and large-scale applications, making the transformation of agricultural production precise, unmanned and green.

In a vegetable greenhouse in Changping District, Beijing, a robot using the "Shennong Large Model" is used to check the fruits and vegetables. If it detects a bacterial leaf spot, for instance in the lettuce, it immediately alerts the pest and disease identification agent for diagnosis. It triggers the irrigation agent to adjust the water and fertilizer ratio, reducing labor costs by 30 percent.

The Shennong Large Model is also applied to diagnose livestock and poultry diseases, and has over 100,000 users in Inner Mongolia, Shanxi, and other areas.

Chinese company Weichai Lovol has released the first industrial AI large model in China that focuses on the dual scenario of "intelligent agricultural machinery + smart agriculture." It is used in over 70 smart farms across the country, covering more than 633,000 hectares.

The first version of a comprehensive planting large model, "iMAP," is undergoing application verification in major grain-producing areas such as Inner Mongolia and northeast China. The cumulative pilot area for crops like corn is now 67,000 hectares.

China's grain output in 2025 reached 715 million tonnes, up by 1.2 percent year on year, with agricultural scientific and technological progress contributing over 65 percent of the growth rate.

The coverage of high-quality seeds is over 96 percent, and the application of intelligent agricultural machinery increased by 38 percent year on year.

Tech Commercialization Soars to New Heights

Edited by LU Zijian

Since the start of China's 14th Five-Year Plan period (2021-2025), the country has deepened its reform of the mechanism of applying sci-tech achievements in real-world practices, improved policy support and market services, and achieved steady growth in both the scale and quality of applied scientific and technological outcomes, according to a State Council report submitted to the Standing Committee of the National People's Congress for deliberation on December 22.

From 2020 to 2024, the total transaction value of technology contracts nationwide surged from 2.83 trillion RMB to 6.84 trillion RMB, a growth of 141.7 percent, the report noted.

An institutional framework has been basically established for the application of sci-tech achievements. China has delegated the rights to use, dispose of, and benefit from sci-tech achievements, clarified the reward ratios for contributors, improved the open patent licensing system, and strengthened the legal provisions governing technology contracts, according to the report.

The application of sci-tech achievements from universities and research institutes was also reformed with promising results. By the end of 2024, there were 2,364 technology transfer institutions established by universities and research institutes, an increase of 21 percent compared with 2020. The total transaction value of the contracts related to the transfer and application of sci-tech achievements by universities and research institutes reached 226.91 billion RMB in 2024, growing by 81 percent compared to 2020.

Enterprises also played a crucial role in advancing the application of sci-tech achievements. In 2024, enterprises' R&D investment comprised more than 77 percent of the national total R&D expenditure in China, and their valid invention patents accounted for 73.7 percent of the national total. Enterprises commissioned universities and research institutes to undertake technical development, consulting and service projects, with a total contract value of 201.07 billion RMB, marking a 1.9-fold increase compared to 2020.

The country's technology transfer service system has been largely established, and the service system for startups and incubation has been further improved, according to the report. By the end of 2024, there were over 15,000 incubation institutes nationwide, with over 500,000 enterprises and teams under incubation, and almost 6,000 companies cumulatively nurtured have been listed or quoted in capital markets.

In addition, China accelerated the establishment of a sci-tech finance system aligned with scientific and technological innovation, empowering the application of sci-tech achievements. Data shows that the National Fund for Technology Transfer and Commercialization has invested in over 700 technology-based enterprises, driving the establishment of local funds with a total scale exceeding 140 billion RMB.

The report said China plans to accelerate formulating policies and measures to advance the deep integration of sci-tech innovation and industrial innovation, and promote the application of sci-tech achievements.

International Cooperation

China-ASEAN Cooperation Upgraded in 2025

Edited by WANG Xiaoxia

In 2025, against the backdrop of the severe impact of unilateralism and protectionism on the global economic and trade order, China and ASEAN steadily advanced cooperation and development, and jointly promoted a closer China-ASEAN community with a shared future.

China has always supported ASEAN and worked with its member countries to maintain the stability of the region's trading system and the smooth operation of regional industrial and supply chains.

In the first 11 months of 2025, ASEAN was China's largest trading partner. China's imports and exports with ASEAN exceeded 930 billion USD, up 8.5 percent year on year.

Through high-level opening up, China has continuously shared the opportunities of its super-large market with ASEAN countries.

In the first 10 months of 2025, the trade volume of agricultural products and food between the two reached 51.3 billion USD, increasing by 8.9 percent year on year. China's imports of dried and fresh fruit from ASEAN exceeded 10 billion USD, accounting for more than two-thirds of its global imports.

Cross-border connection projects have injected impetus into regional prosperity. For example, the China-Laos railway and Jakarta-Bandung high-speed railway have driven economic development along their routes.

Industrial parks are further promoting the integration of industrial chains. The China-Malaysia Qinzhou Industrial Park and Malaysia-China Kuantan Industrial Park under the model of "Two Countries, Twin Parks" have boosted regional growth.

Flagship projects such as the China-Singapore Suzhou Industrial Park are contributing to the development of regional economy and society.

The China-ASEAN Free Trade Area 3.0 Upgrade Protocol, signed in Kuala Lumpur, Malaysia, on October 28, marks the China-ASEAN free trade area cooperation and regional economic integration moving beyond trade and investment liberalization and facilitation.

The upgrade also covers new, high-potential fields like digital economy, green economy, supply chain interconnectivity, competition and consumer protection, and micro, small, and medium-sized enterprises.

The China-ASEAN Year of People-To-People Exchange 2024-2025 concluded in December. Over the past two years, China and ASEAN have jointly held nearly 200 people-to-people and cultural exchange activities, promoting cultural affinity and mutual understanding.

China has launched the "ASEAN Visa" for the 10 ASEAN countries and ASEAN observer Timor-Leste, on the basis of comprehensive mutual visa exemption with countries such as Singapore, Thailand and Malaysia, as well as the issuance of the "Lancang-Mekong Visa" for Mekong River nations, to facilitate cross-border travel within the region.

From mutual visits to educational cooperation, from a significant increase in the number of two-way tourists to frequent cultural festivals and events, China and ASEAN have been constantly expanding channels for people-to-people exchanges, and the emotional ties between their people have grown stronger.

China Proposes New Air Quality Standards

Policy Express

By SUN Jin & LI He

China is proposing tighter national air quality standards that would lower allowable concentrations for key pollutants including PM2.5, PM10, sulfur dioxide (SO_2) and nitrogen dioxide (NO_2), the Ministry of Ecology and Environment (MEE) said on December 15 as it opened a public consultation on three draft ecological environment standards.

One draft is the ambient air quality standards (for comment) and the other two supporting technical specifications focus on strengthening limits for fine particulate matter (PM2.5) and inhalable particulates (PM10) and on tightening SO_2 and NO_2 thresholds to better protect public health.

From 2015 to 2024, China reduced its annual average PM2.5 concentration by 36 percent and cut the number of heavily polluted days by 68 percent, a major achievement in history. Despite this success, more efforts still need to be made.

Under the draft, secondary limits for PM2.5 would fall from an annual/daily 35/75 μg/m³ to 25/50 μg/m³. PM10 secondary limits would be lowered from 70/150 μg/m³ to 50/100 μg/m³. Limits for SO_2 and NO_2 would also be tightened, reflecting both their direct health impacts and their role in forming secondary PM2.5.

"Given current air quality and emissions-reduction measures, making 25 μg/m³ the annual target for PM2.5 can deliver larger health benefits and steer continued improvement," said He Kebin, an academician of the Chinese Academy of Engineering and dean of Tsinghua University's Institute for Carbon Neutrality.

The draft sets a two-stage implementation timetable. From 2026 to 2030, authorities would enforce transitional particulate limits — with PM2.5 annual/daily secondary limits at 30/60 μg/m³. From 2031, the fully revised limits for particulates, SO_2 and NO_2 would be applied nationwide.

Experts acknowledge near-term economic pressure. "Tighter standards will increase short-term spending on pollution abatement across sectors," said Zhang Shiqiu, a Peking University environmental sciences professor. He stressed, however, that stricter standards will drive industrial and energy-structure upgrades and that implementation costs are likely to be far outweighed by health benefits, supporting sustainable development in the long term.

The Palace Museum in Beijing, capital of China. (PHOTO: VCG)

Shenzhen: Undisputed Innovation Capital

Case Study

By Staff Reporters

China's first large-scale, dedicated optical quantum computer manufacturing plant was recently established in Shenzhen, Guangdong province, marking the country's giant leap from research to mass production of such high-tech equipment.

Shenzhen, as one of China's four Special Economic Zones, has been committed to the deep integration of sci-tech innovation with industrial innovation over the past five years, improving commercial development patterns and industrial systems, and its products are being shared globally.

Innovation drives enterprises

Headquartered in Shenzhen, China General Nuclear Power Corporation (CGN) has developed China's third-generation nuclear reactor technology, centered on Hualong One reactors with independent intellectual property rights. Meanwhile, CGN has played a leading role in the nuclear energy industry chain, driving over 5,400 upstream and downstream enterprises to achieve the independent production of more than 400 key types of equipment.

Statistics show that in Shenzhen, over 90 percent of research institutions, personnel, funds and invention patents come from enterprises. In 2024, Shenzhen's R&D expenditure exceeded 245 billion RMB, among which enterprises invested nearly 230 billion RMB, accounting for over 93 percent.

In this tech-fertile region with active innovation ecosystems, tech giants like Huawei and Tencent have firmly established their roots, while unicorns such as DJI and UBTECH are on the rise. In 2024, the number of national high-tech enterprises in Shenzhen exceeded 25,000, averaging 12 per square kilometer.

Upgrading industrial system

The biomanufacturing industry is booming in Shenzhen, becoming a typical representative of new quality productive forces and a new engine for economic development. At present, Shenzhen has established a complete industrial system for biomanufacturing, with nearly 400 related enterprises.

The upgrading of traditional industries in Shenzhen is accelerating. In the Skyworth Technology Industrial Park, 5G technology is reshaping the production process: 5G + 8K cameras monitor the operation of workshops in real time, maintenance personnel automatically obtain equipment parameters through AR glasses, and AGV carts independently plan their paths.

There is an impressive modern production line in Skyworth's smart factory, which can produce 75-inch TVs in the morning and switch to producing 100-inch ones in the afternoon. Wu Wei, the chief engineer at Skyworth, said that after upgrading the production line, the production efficiency has doubled.

Shenzhen is accelerating the development of industrial clusters and high-end industries. The Shenzhen Institutes of Advanced Technology, under the Chinese Academy of Sciences, has taken the lead in establishing platforms and setting up the national bio-manufacturing industry innovation center with enterprises. It has also gathered a multidisciplinary team of over 1,400 specialists to facilitate industrial innovation and upgrading.

Going global

Local start-up Bambu Lab has transformed 3D printers from professional equipment into consumer products through technological innovation. Xu Han, head of the 3D model community of the enterprise, said, "We have built the largest 3D model community in the world. The number of 3D models has exceeded one million, and we have ranked first in global desktop 3D printing equipment sales for three consecutive years."

The global influence of technological innovation is not only seen in enterprises but also in clusters. To date, about 14 percent of the world's smartphones, 12.5 percent of new energy vehicles and 70 percent of consumer drones are produced in Shenzhen.

In the first three quarters of 2025, the total value of imports and exports of high-tech products in Shenzhen exceeded 1,800 billion RMB, accounting for 56 percent of the city's total trade volume, with a year-on-year growth of 11 percent. Of this figure, exports reached 923 billion RMB, increasing by nearly 10 percent, according to the Shenzhen Municipal Bureau of Commerce.