

INSIGHTS

China's Experience in Ending Poverty Boosts Global Development

Opinion

By GONG Qian

To eradicate poverty in all its forms everywhere is the top priority of the 2030 Agenda for the United Nations Sustainable Development Goals (SDGs). But according to an UN 2022 report, the COVID-19 pandemic wiped out more than four years of progress on poverty eradication.

Such an "unprecedented" reversal is being further exacerbated by multiple and interlinked global crises, prominently referring to the climate crisis, the Russia-Ukraine conflict and food crisis.

In this case, China's success in alleviating poverty is of great importance for the world to promote sustainable development. It provides a new approach for global development and a new paradigm of governance on poverty reduction, and has already made positive impacts around the world, considering successful cooperation between China and some African countries, Xu Xiuli, a professor from China Agricultural University (CAU), told *Science and Technology Daily* recently.

Xu is now presiding over a project by National Social Science Fund of China, called "Research on the Approaches and Mechanism for Effective Experiences Sharing in Poverty Reduction Among China and Countries Involved in the Belt and Road Initiative".

"Inadequate ability in technology application is the core problem responsible for its low agricultural productivity in Africa," said Xu.

Cooperation between CAU and its partners in Tanzania is a typical approach taken by Chinese universities and institutes, which focuses on impart-



Li Xiaoyun, professor from China Agriculture University, talks with local people in Tanzania about planting maize. (PHOTO: Kong Deji)

ing techniques as a way of reducing poverty. CAU has been using Chinese experience, including leveraging technology-led farming methods, to increase agricultural productivity and improve food nutrition in Morogoro, Tanzania.

The two sides launched the "Small Technology, Big Harvest" project in 2011, which was initiated by Li Xiaoyun, a professor from CAU. Working with Sokoine University of Agriculture (SUA) and the Morogoro regional government, the Chinese research team came up with a maize intensive planting technique. This produced a three-fold increase in maize yields. According to data from the research team, as of mid-November 2021, the project had been referred to more than 1,000 local farmers and covered more than 10,000 mu (670 hectares) of land.

In 2021, CAU launched another pi-

lot project to improve soybeans value chain in Morogoro. The project, with 200 demonstration farmers in four villages being engaged, aims at improving the nutrition of local villagers and increasing their income.

Such cooperation benefits all the farmers. For Tanzania, its agriculture technology has been greatly improved. Most importantly, local people have gradually experienced a cognitive change in the past 10 years, said Xu, adding that "They build up the confidence to be self-reliant."

According to Xu, CAU has established an overseas center for talent cultivation, in order to acquire practical experience and do further research on poverty reduction for academicians.

Outside the African continent, China has carried out its first overseas aid project - the East Asia Poverty Reduction Co-

operation Pilot Project with governments from Laos, Cambodia and Myanmar since 2017. China helped six villages to build infrastructure including roads and water supply systems, supported rural industries involving animal husbandry and crop cultivation, improved communities' environment and more.

Xu said that China is taking an approach, namely "Closing-Gap Experience Sharing in Foreign Aid", when offering assistance and experience in fighting against poverty to other countries. First, the shared experience is pragmatic, accessible, and in line with the development stage of the time and place. Second, China would explore cooperation boundaries with other countries by discussing and consulting, and fully respect the established institutional systems of the recipient countries. Third, the both sides are expected to build a good bilateral relationship with mutual equality and benefits and win-win cooperation.

In the past, the majority of developing countries would learn from developed countries how to alleviate poverty. But China's great success in poverty reduction may offer a new option for them, Ma Junle, a post-doctoral from CAU, told *Science and Technology Daily*.

In recent years, Development Assistance Committee members including the European Union, France, Germany, and the U.S. have showed weak motivation and capability to offer aid on global poverty reduction due to the economic downturn. China's poverty reduction experience sharing, serving as a global public good, injects a new impetus for the world, as the country has been investing more in it, said Ma.

All in all, the world will see how China shoulders its responsibility to tackle this common challenge facing humanity.

Research Box

ITIF: China Overtaking U.S. in Innovation Capacity

Edited by TANG Zhexiao

China has surpassed the U.S. in total innovation output and is getting close on a proportional basis, said a report released by the Information Technology and Innovation Foundation (ITIF), a Washington-based think tank focused on science and technology policy, on January 23.

According to the report, China's innovation and advanced-industry output in 2020 was 139 percent of the equivalent output in the U.S. up from 78 percent in 2010.

"Overall, China made notable progress relative to the United States," said the report's general results, adding that the country is surpassing the U.S. in gross output of innovation indicators such as the number of science and engineering articles published, the number of doctoral degrees awarded and advanced-industry output.

On a proportional basis, which is one of two indicators ITIF created to quantify overall progress, China is now roughly 75 percent as advanced in innovation and advanced-industry production as the U.S. "If this relative growth continues apace, China will surpass the United States by 2035," said the report.

In terms of gross-output indicators, China's gross innovation capabilities, measured by R&D expenditures, venture capital investments, advanced-industry output and patent output, are now almost 40 percent greater than those of the U.S.

In the Western world, there exists a common misconception that China is incapable of "true" innovation, especially at the frontier. But the reality shows that China can innovate.

Data from a comparative analysis performed by ITIF, shows China is "gaining ground or extending its lead over the United States" from 2010 to 2020.

ITIF policy analyst Ian Clay said that the U.S. should not be complacent, given China's recent gains in areas such as space exploration, genomics, artificial intelligence, and quantum computing.

China is already a world leader in the implementation of cutting-edge technologies, according to the report.

A helpful example is that of science and engineering articles, which measures the extent to which a nation contributes to the building of knowledge in these innovation-related subjects.

Though falling behind in undergraduate and doctoral degrees per capita in the natural sciences, mathematics and statistics, China has published over 742,000 articles over the last decade, compared with the U.S.' 600,000, growing 10.7 percent annually from 2015 to 2020.

Another example is industrial robots. As one of the fastest-growing markets, China has been the world's largest industrial robot market for nine consecutive years since 2013. In 2021, sales volume of industrial robots in China reached 271,000, increasing about 50 percent, according to the China Robot Industry Alliance.

Hi! Tech

3D-printing Hydrogel Electronic Devices Bring Many Possibilities

By Staff Reporters

Scientists at China's Westlake University have developed a highly conductive 3D printing ink that can build circuits in hydrogel to create devices that can be used to monitor heart rate and stimulate nerves.

Radio-frequency identification (RFID) chips, being used in credit cards

and as pet microchips, could also be added to the jelly-like hydrogel to store information like medical records, according to the researchers.

The tissue-like softness and high water content of hydrogel electronics render them highly promising for biomedical applications. The approach should, therefore, open up new design possibilities for soft, customizable, 3D

hydrogel electronics for diagnostic and treatment devices.

Hydrogel is a network of hydrophilic polymers that holds a large amount of water and is similar to biological tissue. To make electronic devices out of hydrogels, they need to contain stretchy, conductive, and other functional materials.

In the study, the researchers created hydrogel electronics using hydrogel

as a supporting matrix and ink with silver, the most conductive metal. The end result can be stretched, twisted, or compressed and will return to its original shape.

Researchers said that highly conductive printing ink can be used to create circuits in the jelly-like hydrogel, which can then be used for devices to monitor heart rate and stimulate nerves.

Wandering Earth II: A Glimpse of Where Tech Going

Edited by TANG Zhexiao

With the box office hitting 3.4 billion RMB (about 502 million USD) by February 7, a Chinese homemade sci-fi blockbuster *The Wandering Earth II* sparked huge audience interest and triggered widespread discussion about the science and technology used in the movie.

The movie includes many scenes featuring hi-tech, including planetary engines, quantum computer and space elevators, giving us a glimpse of future technological development through sci-fi on the big screen.

To avoid a solar disaster, people in the movie try to build thousands of fusion-powered planetary engines to propel Earth out of its orbit.

Nuclear fusion is a reaction during which two atomic nuclei fuse to form a larger one along with a huge release of energy, which happens in the sun and other stars. It makes sense in principle to use energy generated by nuclear fusion to propel Earth, according to Wang Teng, a researcher at Hefei Institutes of Physical Science, Chinese Academy of Sciences.

As one of the most cutting-edge scientific projects in the world, nuclear fusion research has developed from experimental devices to experimental and engineering reactors.

For the International Thermonuclear Experimental Reactor (ITER), the world's largest fusion experiment, which aims to create energy through a fusion process similar to that of the Sun, a new timetable is to be worked out by the end of 2023, according to Pietro Barabaschi, ITER's director-general.

"[While] it may be too early for fusion energy to propel planetary travel, there is great hope for using it to turn on a light," said Wang.

The quantum computer 550W, with super computing power and self-awareness, also features in the movie.

Quantum supremacy is currently possible, which refers to the ability of a programmable quantum device being able to solve the problem that for all practical purposes, a conventional computer can't.

Reaching the second stage goal of quantum simulator is the main research task of the current academic communi-



Experimental Advanced Superconducting Tokamak (EAST) in Hefei Institutes of Physical Science, east China's Anhui province. (PHOTO: XINHUA)

ty, according to quantum physicist Pan Jianwei. It will take at least 10 to 15 years before the application shown in this sci-fi film is possible, he said.

The inclusion of space elevators also impressed audiences. The key to make space elevators is to find a super-strong but light material. The elevator

able's performance under the harsh conditions in space also needs deep consideration.

Though it might be long some time before space elevators become a reality, researchers said they would continue to develop new materials as well as make breakthroughs in material performance.

Digital Technology Revolutionizes Agriculture

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In addition, a weather monitoring station is also installed in the greenhouse to monitor light, humidity and temperature in real time, creating a better environment for strawberries to grow.

There is also a digital project which can monitor farms in Anhui province where the strawberries can be planted based on market demand.

Smarter storage and circulation

How to better store and sell agricultural products is a key issue to farmers once the harvest is done. The traditional circulation of the products is highly dependent on manpower, while modern agriculture, equipped with digital technologies, can cope with the situation much more easily.

In Guizhou province, there are warehouse enterprises that have introduced automated storage, selection, grading and packing of agricultural products, through a digitalized management system and quality control system.

Taking apples as an example, the selection equipment could measure the diameter, shape, surface and damaged part of each apple, and a special device could even measure an apple's degree of

sweetness and sourness or whether it has mildew.

Big data plays an important role as well. Ncpgz.com, Guizhou's big data platform for agricultural products, covers over 3,700 vegetable production bases within the province, realizing the capture and smart analysis of sales and price data generated when the vegetables are sold to major wholesale markets for agricultural products all over the country.

In particular, through big data analysis, warehouses built close to the origin of agricultural products can quickly adapt their delivery to the dynamic need of the market.

Blockchain technologies like distributed data storage, point-to-point data transmission and encryption algorithms are also used in the operation of such warehouses, which is crucial to the storage, extraction and analysis of data in the entire supply chain of agricultural products.

Relying solely on labor is no longer how agriculture works today, and the flourishing of science and technology, especially digital technologies, is leading to a more productive and efficient modern agriculture system in China.

Sci-tech Innovation Boosts Green Development

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China's green industries continue to grow, while the technologies in the fields of energy and water conservation equipment, pollution control, and environmental monitoring meets the highest international standards. In 2021, the output value of China's energy conservation and environmental protection industries exceeded eight trillion RMB, said the white paper.

The renewable energy industry is growing rapidly, and the country leads the world in terms of the manufacture of clean energy generation facilities for

wind and photovoltaic power, producing more than 70 percent of the global total of polysilicon, wafers, cells and modules. The white paper stressed that China's green development is benefiting both China and the world at large.

According to the white paper, China is also an active participant in international cooperation on clean energy under the frameworks of UN, BRI, G20, China-ASEAN partnership, ASEAN Plus Three, East Asia Summit, Forum on China-Africa Cooperation, BRICS, Shanghai Cooperation Organization, and APEC.