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WEEKLY EDITION

Xi Calls for Adding Momentum to Cooperation between China, LAC Countries

President Xi Jinping addressed the third Ministers' Meeting of the Forum of China and the Community of Latin American and Caribbean States (China-CELAC Forum) via video link on December 3, calling for adding momentum to cooperation between China and Latin American and Caribbean (LAC) countries.

Xi said over the last seven years since the establishment of the China-CELAC Forum, the two sides have acted on the forum's founding purpose of strengthening unity and cooperation and advancing South-South cooperation, turned it into a major platform for pursuing mutual benefit, and taken China-LAC relations into a new era featuring equality, mutual benefit, innovation, openness, and benefits for the people.

Xi stressed that the world today has entered a new period of volatility and transformation, saying that both China and LAC countries faced the new task of the times, which was to promote post-COVID recovery and deliver happiness

and well-being to the people.

LAC countries are welcome to take an active part in the Global Development Initiative and work together with China to tide over this difficult time, create more opportunities, and build a global community of development with a shared future, Xi said.

"History teaches us that peaceful development, equity and justice, and win-win cooperation represent the right way forward. China and LAC countries are all developing countries. We are comprehensive cooperative partners of equality, mutual benefit and common development, and our shared aspiration for independence, development and rejuvenation has brought us closer together," Xi said.

He called on the two sides to jointly draw up a blueprint for China-LAC relations, add momentum to China-LAC cooperation, and make new contributions to the well-being of their peoples and to the cause of human progress.

Source: XINHUA



An electric multiple unit train of the China-Laos Railway crosses a major bridge over the Yuanjiang River in southwest China's Yunnan province. (PHOTO: XINHUA)

China-Laos Railway: Cross-border Friendship, Green Development Bridge

By WANG Xiaoxia

The China-Laos Railway, which connects Kunming in China's Yunnan province with Lao capital Vientiane, began operating on December 3. It will provide a major boost to the exchanges and cooperation between the two countries and help drive regional sustainable development.

Chinese president Xi Jinping and Lao president Thongloun Sisoulith jointly witnessed the opening of the China-Laos railway via video link.

Xi said the China-Laos Railway is a landmark project of high-quality Belt and Road cooperation. In recent years, with the goals of high standard, sustainability and improvement of people's livelihood, China has continuously improved the level of Belt and Road cooperation, achieved mutual benefits and win-win results for participating countries, and opened up new space for the development of the world economy.

Thongloun said the railway will greatly promote Laos' national economic and social development, expressing gratitude to China for its support.

Bullet trains running at a speed of

160 km per hour slash the travel time between the two cities to about 10 hours, to convert Laos from a landlocked country to a land-linked hub.

With a length of 1,035 km, the electrified passenger and cargo railway is built with the full application of Chinese management and technical standards.

The area along the China-Laos railway is known as a "geological museum". The complex geological structure brought multiple risks such as high ground stress, high geothermal energy and high seismic intensity, making the construction more difficult than expected.

To deal with geological disasters such as slip collapse, surge of water and large deformation, many innovative technologies were applied during the construction process. For example, builders used innovative excavation method to effectively solve the continuous deformation problem, and guaranteed the safety for tunnel construction.

A total of 167 tunnels and 301 bridges were built after builders overcame many technical difficulties.

Data connection of the whole process of electrification is the key to construction, according to engineer Lai Peng from China Railway Electrification Bureau in Wuhan.

Through the use of a digital management platform and the application of intelligent technology, the electrification of the whole line was completed in only two and a half years, and the precision of wire equipment parameters powering the train was controlled within a millimeter, said Lai.

It is also the world's first railway with green scenery along the entire line. The developers attach equal importance to the protection of natural environment and biodiversity. They reduced the carbon footprint of the design during construction as it took place in an environmentally sensitive area. More than 28.6 million shrubs, 40,000 vines and 63,000 trees have been planted along the line.

Huang Daiwen, a chief engineer at the China Railway No.2 Engineering Corporation, said after construction of every section, revegetation followed.

All the stations along the railway are installed with water saving devices, and more than 80 percent of them are installed with power saving devices, according to China Railway Group.

Understanding China Requires Understanding of CPC

President Xi Jinping said on December 2 that to understand China today, one must learn to understand the Communist Party of China (CPC).

Xi made the remarks when delivering a speech via video at the opening ceremony of the 2021 Understanding China Conference (Guangzhou) in Guangzhou, south China's Guangdong province.

The world is experiencing changes unseen in a century which, compounded by the COVID-19 pandemic, have brought the world into a period of fluidity and transformation, Xi said in the speech.

It is all the more important for us to exchange views, have more interactions and cooperation, and contribute our wisdom and strengths to a joint response to global challenges at such a juncture, he noted. "As I have pointed out, 'To understand China today, one must learn to understand the CPC'," Xi said.

Noting this year marks the 100th anniversary of the founding of the CPC, Xi said that the CPC has rallied and led the Chinese people in making unremitting efforts that have fundamentally changed the future and destiny of the Chinese people and exerted a profound impact on the course of world history over the past century. See page 2

Green Olympics

Beijing 2022 Prioritizes Biodiversity Conservation

Edited by TANG Zhaxiao

Yanqing district, located in northern Beijing, will be host to the Alpine skiing, bobsleigh and luge competitions during the Beijing 2022 Winter Olympic games. The region, where more than 70 percent are mountainous, has faced challenges of protecting biological diversity on the 2,000 meter-high mountain.

Started in 2015, the ecological restoration in the Yanqing competition area was completed at the end of June this year, covering a total of 2.14 million square meters.

To better protect the trees, experts conducted an ecological background survey on this area and worked out a protective transplanting plan for animal and plant protection. In the process of construction, workers took the ecological restoration measures to minimize human interference.

The combination of in situ and relocation protection has been adopted to protect trees in core competition areas. Workers have tried their best to leave

the trees where they were when they designed the competition courses. If that was not possible, most of them were moved to nearby sites, or transplanted at the foot of mountain in the Winter Olympic Forest Park.

More than 24,000 trees that consisting of about 30 species have been transplanted from 2017, with a survival rate of 90 percent (As shown below).

A set of management and monitoring system has been set up for every transplanted tree. All trees in the entire Yanqing competition zone (except the Olympic Village) are registered and had their profiles marked with a QR code.

Animals are also protected. The activities of mammals and birds are often monitored by 29 infrared cameras set up in the competition area. Workers have built temporary migration paths and artificial bird's nest for local animals and reduced working hours of construction to ensure animals could migrate freely and safely. Many animals returned as construction progressed.



Tree transplantation in Yanqing district, Beijing. (Graphic Design: TANG Zhaxiao; PHOTO: XINHUA)

Editor's Pick

Germplasm Bank: 'Noah's Ark' Guards Wild Species

By TANG Zhaxiao

Germplasm, also known as living genetic resources, are seeds or tissues that are maintained for animal and plant breeding, preservation and other research uses. They may exist in the form of seed collections stored in seed banks or trees growing in nurseries. Germplasm collection plays an important role in the maintenance of biological diversity and food security.

The Germplasm Bank of Wild Species (GBOWS), located in Kunming, southwest China's Yunnan province, has pre-

served more than 10,000 types of wild plant seeds as of 2020, accounting for 36 percent of the country's plant species.

Known as Asia's largest "Noah's Ark" for wild species, it is a comprehensive national database for the collection and preservation of germplasm resources, including seed banks, in vitro plant banks, DNA banks, microbial banks and animal germplasm banks.

After a decade's development, GBOWS has become a leader in the protection of global biodiversity together with the Millennium Seed Bank in the UK and the Svalbard Global Seed Vault

in Norway.

Preventing the loss of biodiversity and germplasm resources

Seeds are the starting point of a plant's life. The protection and utilization of seed resources are particularly significant when biodiversity is threatened.

Since 1900, nearly three species of seed-bearing plants have disappeared each year, which is 500 times faster than they would naturally. The report, *State of the World's Plants and Fungi 2020*, has shown that 40 percent of the world's plants are at risk of extinction.

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WEEKLY REVIEW

Scientists Generate Stable Pig Stem Cells for Gene-editing

Chinese researchers cultivated stem cell lines that can "give birth to" healthy off-spring more than 200 generations, according to a recent study published online in the journal *Cell Research*.

Fendouzhe Completes Deep-ocean Expedition Again

During the 53-day expedition, which started on Oct. 14, the deep-sea manned submersible Fendouzhe (Striver) completed 23 dives, six of which exceeded a depth of 10,000 meters. China has ranked first in the world in the number of 10,000 meter deep dives.

Shenzhou-13 Astronauts to Give Space Lecture

The three Shenzhou-13 crew members aboard China's space station will give a special lecture at 3:40 pm (Beijing Time) today. The astronauts will introduce and display their living and working scenes in the space station and interact with students on the Earth.

China's Grain Output Gets Good Harvest in 2021

The yield of grain reached nearly 683 billion kg this year, up 2 percent year on year, the National Bureau of Statistics said on December 6.

S&T DAILY WECHAT ACCOUNT (EN)



Further Promoting the Commercialization of Sci-tech Achievements

By CHEN Chunyou

Since the 18th CPC National Congress, China has attached great importance to sci-tech innovation, and has introduced measures to promote the commercialization of sci-tech research findings countrywide.

According to Wang Zhigang, Chinese minister of science and technology, the reform of the mechanism for evaluating sci-tech achievements has progressed. The rights for use, disposal, and profit distribution of sci-tech achievements have been delegated to universities and research institutions at a quicker pace.

In order to perfect the innovation ecosystem, a guideline to improve the evaluation mechanism for sci-tech achievements was issued, in which the es-

tablishment of a diversified evaluation system involving the government, social organizations, enterprises, and investment and financing institutions was put forward to motivate researchers, said Wang in the preface of *Guide for the Commercialization of Sci-tech Achievements*.

In the preface, Wang said the sci-tech achievements have offered solid support for economic and social development. For example, the commercial use of 5G technology can be seen in smart manufacturing, healthcare, energy, agriculture, education and finance. In addition, the pollution control technologies in water pollution and air pollution have been upgraded, while R&D of treatments and vaccines for COVID-19 has effectively protected people's lives. The BeiDou Satellite global network has also played a bigger role in transporta-

tion and urban construction.

China will deepen the implementation of innovation-driven development strategy. The integration of basic research, applied research and technological innovation will be promoted to accelerate the development of strategic emerging industries, Wang said in the preface.

Moreover, the service system for commercialization of sci-tech achievements will be further improved, such as advancing the building of a technology exchange market, technology transfer institutes and new R&D institutes, as well as accelerating the building of national platforms for providing and sharing information on sci-tech achievements. The small and medium-sized enterprises will be encouraged to be active players in sci-tech innovation and commercialization of sci-tech achievements.

In addition, the financial institutions, such as banks, insurance and bonds, will be further encouraged to enhance the support of commercialization of sci-tech achievements, and social capital will also be pooled to invest in this action. Wang said that a strict intellectual property rights protection system has been implemented in China. Enterprises, universities and researchers are encouraged to produce high-quality and high-value outcomes, which will help improve the efficiency of commercialization of sci-tech achievements.

Facing the journey ahead, Wang stressed that it is required to speed up the pace of technological and institutional innovation, and provide a steady supply of innovative sci-tech achievements for high-quality economic and social development.



Visitors take a close look at the lunar samples at an exhibition highlighting China's sci-tech development during the 13th Five-Year Plan period. (PHOTO: VCG)

The Era of White-collar Farmer Coming

By LI Linxu

Imagine if planting crops was no different from working in an office. Well, thanks to the advancement of science and technology, the era of the white-collar farmer has indeed arrived.

From seed sowing, pesticide spraying to crop harvesting, all of these jobs can now be done by machines or drones, freeing farmers from their traditional labor-intensive work. Now, at the click of a mouse, farm work is done remotely from an air-conditioned control room, just like a white-collar office worker.

With the help of improved seeds, sowing machines, spraying drones, and cotton pickers, the cotton yield in a demonstration test field in Yuli County,

reached a record high of 9,306 kg per hectare.

Yuli County, a major production base of premium cotton in Xinjiang, is home to more than 66,000 hectares of cotton fields. The agricultural mechanization rate of the county has reached 96 percent, according to a local official.

The record cotton yield showcases the power of science and technology in agriculture. In recent years, a series of new technologies, new varieties, and new equipment have been used in major crop production bases, making significant achievements in agricultural modernization.

During the 13th Five-Year Plan period, the total research funds of China's agricultural institutes has reached to 61

billion RMB, up 51.23 percentage points from the 12th Five-Year plan period, according to a report released last month.

Driven by greater investment in agricultural science and technology, a batch of major accomplishments have been achieved, especially in the field of wheat and rice genetics and breeding.

In 2017, the number of new varieties of plants applied by China jumped to No. 1, and the number of patents applied by scientists in the field of agriculture in China continued to rank first in the world.

By 2020, the contribution rate of scientific and technological progress to China's agriculture has increased to 60 percent, according to the report, which summarized the scientific and techno-

logical achievements in China's agriculture and countryside.

Science and technology has become a most important driving force for the economic growth in agriculture and countryside, said Zhang Taolin, vice minister of the Ministry of Agriculture and Rural Affairs, calling for further pushing forward self-reliance and self-strengthening in agricultural science and technology.

By 2035, the agricultural mechanization rate is expected to reach 75 percent, according to the *Outline of the 14th Five-Year Plan for National Economic and Social Development and Vision 2035 of the PRC*. By then, there should be more white-collar farmers in the countryside.

China's Big Data Industry to Exceed 3 Trn RMB by 2025

By Staff Reporters

The scale of China's big data industry is estimated to surpass three trillion RMB by 2025, with a compound growth rate of about 25 percent, according to a development plan for the big data industry during the 14th Five-Year Plan period (2021-2025) released by the Ministry of Industry and Information Technology (MIIT) on November 30.

The plan also proposes to primarily establish an evaluation system for data element value, make the foundation of the big data industry more solid, create a stable and efficient industrial chain, and promote the positive development of the industrial ecology.

In order to achieve the goals, China will accelerate the cultivation of the data element market and transform the advantages unique to big data into important driving forces for the high-quality development of the industry.

The arrangement of telecommunications infrastructure is to be accelerated, including setting up an integrated national big data center and a big data center for industrial Internet. Technological

innovation and standardization will be strengthened as well.

Regarding building a stable and efficient industrial chain, the plan puts forward a value enhancement action of big data in raw materials, equipment manufacturing, consumer goods and electronic information.

There will be another action of big data development and application in nine fields, including telecommunications, finance and medical treatment.

To build a good industrial ecology, China plans to encourage the development of concerned enterprises, optimize the public service through big data and promote the clustering development of the big data industry.

Data security is also emphasized in the plan. The country aims to enhance its ability in data security management, reinforce the management of cross-border data security and set up a monitoring system for data security.

MIIT also simultaneously released a development plan for the software and information technology services sector, and one on integrating China's industrial sector with information technologies.

No County Left Behind on the Path to Common Prosperity

By ZHONG Jianli

As Zhejiang province aims for "significant progress" in building itself into a pilot zone for common prosperity by 2025, it is making efforts to bridge the gap between rural and urban areas. Recently, the province issued a plan to sup-

port its 26 mountainous counties in achieving leap-forward and high-quality development through science and technology.

The plan's goal is that by 2025, the annual growth rate of R&D expenditure in the 26 counties will be two percentage points higher than the provincial av-

erage. The number of high-tech enterprises is expected to increase by more than 12 percent each year.

Comparative advantages of mountainous area

Longyou County, is a typical mountainous area located in Zhejiang,

The county is known for its abundant bamboo resources. In the past, most of the bamboo processing plants were family workshops, which used antiquated machines and caused environmental pollution.

After a green recycling bamboo industrial park was established, the county has now developed an eco-friendly industrial cluster with integrated bamboo production, processing, sales, research and innovative service.

Promoting digital development

Suichang County uses leading enterprises as the "locomotive" to promote innovation. Focusing on the development of the digital economy, the county aims to build the "Digital Green Valley."

Since 2020, a group of leading companies such as Alibaba Cloud and NetEase, have established partnerships with Suichang. China's first county-level NetEase joint innovation center and the first county-level Alibaba Cloud innovation center have been set up and are op-

erational.

The "Digital Green Valley" project has brought about the digital transformation of the county's economy. In the first half of 2021, a number of Suichang's economic indicators, including its 18.9 percent of GDP growth rate, ranked first among the 26 counties of the province.

Industrial innovation service complexes

Building industrial innovation service complexes is a major measure for Zhejiang to deepen supply-side structural reform, promote high-quality economic development, and enhance industrial competitiveness.

Thanks to the province's support, Jinyun County has built 12 provincial or higher level innovation platforms, to provide all-around services for entrepreneurial incubation, innovation research and development, public services, and industry cultivation.

A total of nearly 150 million RMB has been invested in building the innovation service complex for the sawing machine and related machinery industry. In the complex, seven professional laboratories are operational, and technology transfer centers from seven universities have also begun functioning.



The Jiangxi Weir, an irrigation project honored as World Heritage Irrigation Structures (WHIS), is located at Longyou County, Zhejiang Province. (PHOTO: CFP)

Germplasm Bank: 'Noah's Ark' Guards Wild Species

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The alarming extinction rate of plants and other wildlife are crying out for conservation.

"There are many ways to protect plant diversity, but the seed bank has many unmatched advantages compared with in situ conservation and other methods," said Prof. Li Dezhu, director of the Germplasm Bank of Wild Species.

Building a germplasm bank

Initiated in 2004, GBOWS is a major national scientific and technological infrastructure built by the Kunming Institute of Botany, affiliated to the Chinese Academy of Sciences.

It is not easy to build such a germplasm bank. The procedure must follow the "3E" standard, namely Endangered, Endemic and Economic, and involve more than 70 steps.

In order to ensure genetic diversity, researchers must collect the same plant from different growing locations. Generally, 10,000 seeds of each plant are collected and stored, with a minimum of 2,500 seeds.

When collecting seeds, scientific researchers need to record the collection time, location, altitude, soil type, surrounding environment in detail, and use the leaf, flower, fruit and other information as the basis for future ecological restoration.

At room temperature, ordinary seeds can be stored for one to two years

at most. With storage methods using low temperatures and drying, the seeds can survive for decades or even thousands of years here.

Seed of hope to protect future biodiversity

Though the basic scientific and technological work of collecting and preserving species is a laborious process, it is very worthwhile and meaningful to save plants and animals before they disappear.

"The germplasm bank is home and the Noah's Ark for plant seeds. As long as it is safe and sound, the rare wild germplasm resources will be protected from extinction," said Li Dezhu, adding the goal is to conserve 19,000 species and 190,000 accessions.

GBOWS belongs to one of the important facilities for global biodiversity conservation. It exchanges seeds with other seed banks in the world on a regular basis, which is very necessary for global germplasm resources security.

The sharing service of wild biological germplasm resources is also an important direction for GBOWS. In recent years, GBOWS has cooperated on 161 scientific and technological projects and distributed 13179 plant seeds to 124 institutions.

Seeds are life and hope. We can better protect the future of humankind through protecting germplasm resources, said Li.

Understanding China Requires Understanding of CPC

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Not long ago, the sixth plenary session of the 19th CPC Central Committee was successfully concluded with the adoption of the resolution on the major achievements and historical experience of the party over the past century, he said, adding that going forward, the CPC will draw strength from history, forge

ahead for a better future, stay true to its founding mission, and rally and lead the Chinese people on a new journey toward building a modern socialist country.

The Party will always put the people first, commit to its fundamental purpose of wholeheartedly serving the people, follow a people-centered philosophy of development, promote well-rounded hu-

man development and common prosperity for all, and better meet the Chinese people's aspiration for a better life, Xi said, adding that the CPC will unswervingly follow the path of peaceful development and opening-up to the world, work for a community with a shared future for mankind, and promote humanity's common values of peace, development, fair-

ness, justice, democracy and freedom.

"The CPC will always be a builder of world peace, a contributor to global development and a defender of the international order, and strive to make new and greater contributions to the progress of human civilization and to world peace and development," Xi said.

Source: XINHUA

Comment

Pandemic Can't Stop China's GDP Increasing

By YU Haoyuan

The global pandemic has lasted for two years and every country has imposed sweeping control policies to deal with it. As for China, the government has stuck to a zero tolerance policy (ZTP), while some countries prefer to have a more open approach. Throughout the pandemic, China's GDP has continued to grow, while other economies are struggling.

China is the only major economy to report economic growth in 2020, according to the World Bank. Moreover, many organizations, such as the International Monetary Fund, predicted that in 2021, China's expected GDP would rise by 8 percent.

As many media outlets have also reported, with multiple measures related to investment, foreign trade and consumption, China's GDP will continue its rising trend in 2021.

Firstly, China's economic recovery is mainly based on ZTP.

South China Morning Post said that "China's zero-tolerance stance on the COVID-19 pandemic has helped it recover strongly from the public health crisis."

Meanwhile, the BBC believed that the strict COVID-19 containment measures and emergency relief for businesses helped China's economy recover. The ZTP has made a huge difference between China and the rest of the world. "China's economy has seen a strong rebound, while the rest of the world struggles with anemic demand, millions of job losses, and businesses shutting down," the BBC reported.

According to Investors' Corner, the BNP Paribas Asset Management official blog, ZTP has contained the COVID-19

spread effectively and led to robust export growth since mid-2020. This has allowed China's production to quickly return to normal and able to supply the rest of the world when others' production stagnates.

Critics say that the ZTP will raise costs and diminish benefits in the future. However, the policy is a method that has contained the pandemic successfully. If it hadn't been for the policy, many countries' economies would have crashed harder after the Omicron variant was discovered.

CNBC also reported that based on a study by Peking University mathematicians, "China could face more than 630,000 COVID-19 infections a day if it dropped its zero tolerance policies by lifting travel curbs."

Secondly, the consumption growth that maintained its trend has benefited China's economy.

A recent China National Bureau of Statistics report shows that the country's retail has maintained its economic growth. As a great example of boosting public consumption, this year's Singles Day festival sales have also set a new record. The latest data released by JD.com and Alibaba show that public consumption during the festival is still maintaining momentum. Two platforms have racked up 889 billion RMB (139 billion USD) in total in 2021, which broke the online sales record they reached last year.

According to Asian Times, China's Q3 showed GDP growth despite a real estate drop, which is due to the resilience on the part of the country's consumers. Eviews Econometric Software computed that "the GDP consumption data is consistent with retail sales reports," which means the public consumption level is the



China has always run a mass nucleic acid test in a short time to follow zero tolerance policy. Medical workers take swab samples from residents for nucleic acid testing at a sampling site in Xiangfang district of Harbin city, Heilongjiang province. (PHOTO: XINHUA)

same as the period before the pandemic.

Thirdly, China's foreign trade keeps growing and foreign investors are optimistic about China's future development.

Foreign trade is one of the most accurate economic indicators. The total value of China's trade in goods in the first three quarters was 4.37 trillion USD, increasing 22.7 percent over the same period last year. Exports rose 22.7 percent to 2.4 trillion USD, and imports totaled 1.97 trillion USD with a growth rate of 22.6 percent. Compared with the same period in 2019, China's imports and exports increased by 23.4 percent — exports by 24.5 percent and imports by 22 percent. All of these numbers exceeded market expectations.

"They [China] are not growing at 10 percent, but they are still growing faster

than everyone else," Nicholas Lardy, a senior fellow at the Peterson Institute, told Marketplace. He indicated that China is rapidly attracting foreign direct investments, and when others' trade shrank last year, China's trade has grown and will maintain growth. "They are increasing their share of global trade quite dramatically," said Lardy.

According to Financial Times, global investor holdings of Chinese stocks and bonds rose by about 120 billion USD in 2021, despite Beijing's recent regulatory crackdown on the private sector. By the end of September 2021, international investors held 7.5 trillion RMB (1.1 trillion USD) worth of yuan-priced stocks and fixed-income securities, an increase of about 760 billion RMB (117 billion USD) from the end of 2020.

Emerging Role of the Circular Economy on Green Development

Edited by QI Liming

According to the International Institute for Sustainable Development (IISD), circular economy solutions will play a critical role in the path to decarbonization. However, to date few nationally determined contributions explicitly identify circular actions. Yet achieving *The Paris Agreement* goals will be impossible without them: the carbon footprint associated with the extraction and processing of resource materials (including fossil fuels and agriculture) accounts for half of global greenhouse gas emissions.

Kevin Moss from the World Resources Institute, Mari Pantsar from the Finnish Innovation Fund, and Scott Vaughan from the China Council for International Cooperation on Environment and Development outline how trade policy can support the transition. In their opinions released on IISD website, one dimension of circular economy actions involves different dimensions of trade and supply chains, namely:

- Introduce government incentives that extract new value from waste material
- A core objective of the circular economy is to reduce waste streams

through the reuse and recycling of materials

- Government policy plays an important role in helping markets and consumers find new values in secondary materials

- Scale up circular business models that maximize value from reusing goods

- Consumers need to use products for longer before buying a replacement

- Use international trade policy as an enabler for a fully circular economy

- Given the growing impact of circular economy actions on domestic and international supply chains, more proactive trade policies are needed

- Bilateral and regional free trade agreements represent the best option to advance circular economy actions

ABI research: circular economy to grow rapidly in the next five years

As Environment+Energy Leader reported on their website, global technology intelligence firm ABI Research recently forecasted that the circular economy will grow rapidly in the next five years. By the end of the decade, the world economy is expected to achieve 10.5 percent circularity.

The circular economy is a vision for the global economy in which waste

is eliminated, resources are reused, and nature is regenerated. By repurposing materials instead of throwing them away, the circular economy can reduce greenhouse gas emissions, waste, and pollution.

Lindsey Vest, Smart Cities & Smart Spaces research analyst at ABI Research, describes the circular economy in the following terms: "The circular economy is an often-misunderstood concept that goes much further than waste management and can become a blueprint for cities. It is a movement away from our take-make-waste economy to one which designs out waste, keeps products and materials in use, and regenerates natural systems."

The pivotal role of technology pushing forward the circular economy

Technology will be key to realize the circular economy vision. Smart-city innovations such as the sharing economy, smart lighting, and green infrastructure are already supporting the shift. One emerging technology that is expected to play a central role is Digital Twin: a virtual model of something tangible, such as a building, bridge, or jet engine, which receives performance data via sensors placed on it.

By providing better information, Digital Twins can help inform businesses and governments about how to design-out waste from their workflows. Michael Jansen, founder and CEO of Digital Twin provider Cityzenith, says that Digital Twin, "...can cut the operating costs of buildings by 35 percent, boost their productivity by 20 percent, and cut their carbon emissions by 50-100 percent" by identifying and managing potential inefficiencies.

Digital Twin technology was recognized as one of five top tech-growth sectors by the World Nano Foundation. MarketsandMarkets predicts the Digital Twin market will grow from 3.1 billion USD today to 48.2 billion USD by 2026.

According to DW, the transition to a circular economy is still in its early stages. Today less than 9 percent of the global economy reflects circular principles, according to the *Circular Economy Gap Report*. Resources are being depleted with increasing intensity, consumption is rising, and little progress has been made in dealing with products at the end of their life cycle.

Research suggests that the benefits of the circular economy on overcoming these challenges could be significant.

Nuclear Heating System on the Way

By Staff Reporters

Heating from fossil fuels accounts for a major share of energy consumption in many developed countries. Currently, with climate change and energy issues being so important to the planet's well-being, it is imperative to develop nuclear energy heating to mitigate these factors.

On November 15, the second phase of China's nuclear energy heating commercial demonstration project, covering an area of 4.5 million square meters, was put into operation in Haiyang city,

Shandong province, the first city in China to heat without using carbon. However, an often asked question is whether nuclear energy heating will pose the risk of nuclear pollution and leakage?

Wu Fang, a leader in Shandong Nuclear Power Company of State Power Investment Corporation, said that the public has nothing to worry about. "Nuclear heating and coal-fired plant heating are the utilization of waste heat from power plants. There is only heat exchange between the producer and the user, and other medium transmissions do not ex-

ist," said Wu.

As he explained, the nuclear heating process is mainly to extract steam from the secondary circuit of the nuclear power unit as a heat source, conduct multi-stage heat exchange through the in-plant first heat exchange station and the external heat exchange station of a heating supply enterprise, and finally transfer the heat to end-users via the municipal heating pipe network.

"Throughout the whole process, there are only two steps, i.e., water heating by steam and water heating by water,"

said Wu. There are multiple circuits for isolation between nuclear power plants and users. Only heat is transferred between circuits, and no water exchange nor radioactive materials enter the user's heating pipelines. The hot water is only circulated in a closed way in the community, isolating from the nuclear power plants layer by layer, thus eliminating any exposure and improving safety.

Yu Bing, deputy director of the National Energy Administration, said that nuclear heating brings a new option to build a clean, efficient and diversified

Zero Tolerance : Better Prepared for COVID-19

Voice of the World

Edited by QI Liming

A newly released report on Nature.com about the new Omicron variant has updated its transmissibility, severity and ability to evade vaccines. Omicron has prompted countries to reimpose travel restrictions, including the UK, the EU and the U.S. It was China, with strict yet valid quarantine requirements, that looked most prepared to deal with the new variant.

Faster spreading

Epidemiologists measure an epidemic's growth using R, the average number of new cases spread by each infection. In late November, South Africa's National Institute for Communicable Disease (NICD) in Johannesburg determined that R was above 2 in Gauteng province, South Africa. That level of growth was last observed in the early days of the COVID-19 pandemic, Richard Lessels, an infectious-disease physician at KwaZulu-Natal University in Durban, South Africa, said at a press briefing.

Gauteng's R value was much lower in September, when Delta was the predominant variant and the number of cases were falling, suggesting that Omicron has the potential to spread much faster and infect vastly more people than Delta, said Tom Wenseleers, an evolutionary biologist at KU-Leuven in Belgium. Based on the rise of COVID-19 cases and sequencing data, Wenseleers estimates that Omicron can infect 3 to 6 times as many people as Delta, over the same time period. "That's a huge advantage for the virus, but not for us," he added.

Lower vaccines' potency against the Omicron variant

The variant's swift rise in South Africa hints that it has some capacity to overcome immunity. Around one-quarter of South Africans are fully vaccinated, and it's likely that a large fraction of the population was infected in earlier waves, said Wenseleers, based on heightened death rates since the start of the pandemic.

In this context, Omicron's rise in South Africa might be due largely to its capacity to infect people who recovered from cases of COVID-19 caused by Delta and other variants, as well as those who've been vaccinated. A December 2 preprint from researchers at the NICD found that reinfections in South Africa have increased, as Omicron has spread. "Unfortunately, this is the perfect environment for immune escape variants to develop," said Christian Althaus, a computational epidemiologist at the Univer-

sity of Bern, Switzerland.

How well the variant spreads elsewhere might depend on factors such as vaccination and prior infection rates, said Aris Katzourakis, an expert in viral evolution at the University of Oxford, UK. "If you throw it into the mix in a highly vaccinated population that has given up on other control measures, it might have the edge there."

"The profile of the mutations strongly suggest that it's going to have an advantage in transmissibility and that it might evade immune protection that you would get," U.S. infectious disease expert Dr. Anthony Fauci told NBC.

Safer and more effective: zero tolerance on COVID-19

According to Bloomberg, China's "COVID-Zero" stand was vindicated as Omicron forces borders around the world to be shut down.

Currently, countries across the world scrambled to impose border and travel curbs after the new Omicron variant emerged. But in China, it was business as usual.

"Omicron is a booster shot for COVID-Zero," said Huang Yanzhong, a senior fellow for global health at the New York-based Council on Foreign Relations. "If Western countries are walking back on their reopening and closing their borders, they'll lose ground for accusing China of sticking to what they say is an unsustainable and incorrect approach."

While the verdict is still out on whether the startling genetic changes found in Omicron justify the preemptive lock down approach, some analysts said China's approach may offer benefits. Kinger Lau, a strategist with the Goldman Sachs Group Inc., said the economic fundamentals and ongoing COVID curbs in the world's second largest economy put it in a better position to face the new variant.

The lower mortality rates were tied to the stringent curbs, including changes in behavior such as mask-wearing and social distancing, that led to reduced air pollution, better hygiene and fewer traffic accidents, according to the study published in *Nature*.

"The results suggest that virus countermeasures not only effectively controlled COVID-19 in China but also brought about unintended and substantial public health benefits," the researchers said.

With more definitive data on Omicron's ability to wreak havoc likely to take weeks, more countries are expected to shut their borders. That shows other governments are also unwilling to take chances, rather than rely on science, said Jin Dong-Yan, a virologist at the University of Hong Kong.



A quarantine sign at Honolulu International Airport. (PHOTO: VCG)

heating system in northern China. At present, it is a mature technology with plenty of domestic enterprises actively participating in it. In addition to the Haiyang project, the nuclear power plants in Qinshan and Hongyanhe are also undergoing renovation.

Wu said that Haiyang residents would have their heating fee for households reduced by one RMB per square meter compared with previous years, and various indicators have met the requirements after the nuclear energy heating promotion: including saving

100,000 tons of raw coal, reducing carbon dioxide emissions by 180,000 tons, 691 tons of dust, 1123 tons of nitrogen oxides, and 1188 tons of sulfur dioxide in every heating season.

In the future, after the Phase II Demonstration Project is put into operation, the thermal efficiency of the nuclear power unit will also increase from 36.69 percent to 39.94 percent, thus achieving a win-win result among local people, local governments, heating companies, nuclear power companies, and ecological and environmental protection aspect.

LIFE IN CHINA

Real China through a Canadian Professor's Eyes

By LONG Yun

Professor Abdul Ghani Razaqpur, a world-renowned Canadian scholar in engineering, joined Nankai University as a teacher in 2017.

His China journey actually started 34 years ago. Over the past three decades, he has witnessed tremendous changes in China but something that hasn't changed in his eyes is the kindness and hospitality of Chinese people he has met.

Science and Technology Daily recently spoke to Razaqpur to learn more about his life in China and get an insight into his views on the research and application of the eco-friendly and energy-saving buildings and ecological materials.

Why China?

When asked why he chose the city of Tianjin as the destination in China, Razaqpur joked about the comfortable weather there. "You know, I am a Canadian," he quipped, alluding to the climatic similarities between the two.

He said he was impressed by his Chinese co-workers' attitude, research, teaching, and their way of international interaction with other scholars and students.

The support from the university's administration was another reason that persuaded him to stay. He explained that China provides scientists and engineers excellent opportunities and material support.

"It would not be an exaggeration to say this [China] is the center of gravity of the world's economic, technological development strategy," he said.

New Opportunities from China's development

Some of Razaqpur's friends and colleagues had shared their doubts about his decision to go to China. "What would I be afraid of in China? From the Premier to the ordinary people around me, everyone I have met in China have never said a bad word about me or Canada. They are appreciative of interacting with others," he said.

Given that the false information about China permeates through many Western media, Razaqpur proposed that more people-to-people exchanges and communication can help others to see the real version of China's stories. He said people who have lived in China need to be telling the international community that China is more than just politics, adding that some media and organizations fabricated a negative image of China because they can profit from it.

Razaqpur added that anyone interested in peace and prosperity and those wanting to live a good lifestyle, should be interested in China. Its development will give rise to new opportunities for commerce and other countries will benefit from China's prosperity, he said.

"I'm more interested in the people. Because I think people have the right to live in peace and live a comfortable life in every country. So this is the point of everything. When you see a major country like China, it impacts many people, and prosperity becomes crucial to humanity and love," he said.

To make a difference

As an expert in ecological materials and low carbon and zero energy buildings, he believes that countries should



Professor Abdul Ghani Razaqpur. (COURTESY PHOTO)

be using natural energy, such as solar energy, to reduce the energy consumption of buildings. He is advocating energy-saving buildings by using more clean and less energy-intensive materials, which is something he also imparts to his students to follow when they enter the building industry.

Razaqpur is also concerned with how to use different building materials to store energy. He especially took phase change materials (substances which absorb or release large amounts of so-called "latent" heat) as an example to store solar energy, applauding its role in saving energy when releasing heat.

Razaqpur and his team are experimenting in this field, and seeing promising results. He noted that the industry is facing the challenge of an increasing need for construction companies to take

risks to apply new research findings in order to minimize the carbon footprint.

He is, however, optimistic about the cooperation in the sci-tech field between China and Canada, saying science and technology are mutually beneficial for both countries, who share the same thoughts about the benefits of climate change. Sharing experience and knowledge is the way to go, he said.

Through his efforts, the National Research Council of Canada signed a cooperative agreement with Nankai University, the first in the world that the organization has signed with a university.

Professor Abdul Ghani Razaqpur is a recipient of the Chinese Government Friendship Award for his contributions to international cooperation.

Letter to the Editor

Understanding the Story of the CPC

By Pronkina Olga

I am from Russia and currently working at Gansu University of Political Science and Law. I was awarded the title of "Advanced Individual in the First Dunhuang Cultural Expo" and the Dunhuang Award by the People's Government of Gansu Province in 2016 and 2019 respectively. In 2020, I was recognized as a foreign high-end talent by the Ministry of Human Resources and Social Security.

Since coming to China in 2010, I have had a very fulfilling time working, living, growing and learning here, while having witnessed the rapid changes in the city of Lanzhou, the strong rise of Gansu province out of poverty and the rapid development of China's economy and infrastructure. More recently, it was amazing to get a first-hand experience of the remarkable way the Chinese government led an orderly fight against the pandemic as it ravaged the country, and watching the humanitarian act of China providing aid to countries around the world.

I have often heard my Chinese colleagues say that all of this is due to the strong and correct leadership of the Communist Party of China (CPC). Not having paid much attention to the CPC in the previous decade or so, perhaps because of being a foreigner, after experiencing the pandemic in China and the changes that China has made to the world in the post-pandemic era, I have come to understand the efficiency of the CPC.

In May 2021, to celebrate the 100th anniversary of the founding of the CPC, the Foreign Talent Research Center of the Ministry of Science and Technology invited me to participate in a program with other foreign experts, themed "Telling the Story of the Communist Party of China" in Jiangxi province, a sacred place of the Chinese Revolution. The purpose of the program was to enhance foreign experts' understanding of China's policies and national conditions, as well as the history of China's revolution, and the construction of its ecological civilization.

During the 5-day program, we visited the "Red Holy Land" of the CPC, such as Jinggang Mountain, Ruijin and Ganzhou, to learn more about the history of the CPC. We also visited local science and technology parks, demonstration villages for poverty alleviation, ecological civilization construction areas and beautiful villages. It was inspiring to see the

achievements of China's ecological civilization construction.

Through field trips, historical materials and personal experiences, I expressed my heartfelt admiration for the revolutionary martyrs of the CPC and my recognition of its revolutionary spirit. Therefore, we should cherish the present, focus on the future and work hard to build a community with a shared future for mankind.

We foreign experts also gained a deeper understanding of the achievements of China's poverty eradication efforts and the determination of the CPC to always make the happiness of the Chinese people and the rejuvenation of the Chinese nation its original intention and mission. These activities have indeed enhanced my sense of existence and honor as a foreign expert working in China, as well as my sense of urgency to understand the CPC further.

I was born in the Soviet Union in 1986, which was shaped by the great communist revolutionary teacher Lenin and was once a powerful and prosperous "Red Empire," where the great banner of communism once flew. I often wonder why the Communist Party of the Soviet Union failed to lead the Soviet people to a brighter future, and instead ended up with "disintegration." I think the answer to this question can be found in how the CPC led the Chinese people through 100 years of hard work and struggle and gradually embarked on the road to great rejuvenation.

Pronkina Olga is a Russian teacher at Gansu University of Political Science and Law.

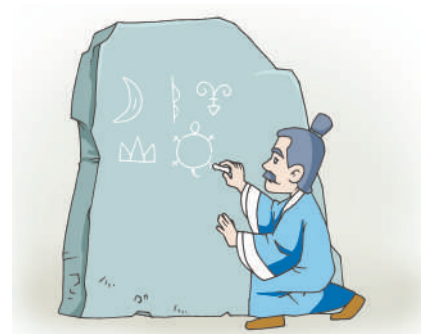


Dr. Pronkina Olga. (COURTESY PHOTO)

Traditional Eastern Wisdom

Cang Jie: Inventor of Chinese Characters

By BI Weizi



Cangjie: Inventor of Chinese Characters (PHOTO: VCG)

According to *Han Feizi*, one of the most important philosophical classics in ancient China, Cang Jie was an official historian of the Yellow Emperor and the inventor of Chinese characters, which are invaluable in recording Chinese civilization.

Before inventing characters, ancient people knotted ropes to remember things, known as the "rope knot tying" method. A big knot represented a big thing, and a small knot represented a small thing. Later symbols were carved on bamboo to record information. With the progress of civilization, things were

becoming more and more complicated, and these methods were far from adequate to meet people's needs. This resulted in an urgent demand for characters to be developed.

Cang Jie, under the order of the Yellow Emperor, was determined to create a specific style of writing. It was said he got inspiration from the hoofprints of animals. He was told by a hunter that different hoofprints represented different animals. Cang believed that if he could capture the particularity of every single thing on earth in a single painting, writing would become possible.

From that day on, Cang Jie observed everything very carefully, including the distribution of stars in the sky, the appearance of mountains and rivers on the ground, the traces of birds, animals, insects and fish, and the shapes of grasses and trees. He then drew different symbols and determined the meaning of each symbol. This is how the original characters were invented and Cang Jie is likely to be forever known as the representative figure who summarized and organized writing and contributed to the formation of Chinese characters.

paign to fight against COVID-19 and cooperating with epidemic control measures.

In addition, Zhong said data showed that China is the country with the lowest COVID-19 infection rate—8.9 out of 100,000—and the lowest mortality rate—0.4 out of 100,000—in the world.

He said rumors and false information spread even faster than the virus, leading to an "information pandemic" and exerting a negative influence on society. He called on the Chinese media to be responsible for dispelling any misinformation about COVID-19.

Zhong Nanshan: Media Should Dispel Misinformation about COVID-19

By Staff Reporters

According to Zhong Nanshan, a top medical expert, the country had fully vaccinated 1.08 billion people as of November 24, accounting for 76.8 percent of the total population, which laid a solid foundation for achieving herd immunity by the end of this year.

The Chinese government has been putting people and their lives first and adopted a series of concrete measures, including prevention and control mechanisms at grassroots level. Online media is also playing a positive role in raising people's awareness of effective epidemic control and prevention, Zhong said on November 25, at the opening ceremony

of the China Internet Media Forum in Guangzhou, that China pays attention to human rights, especially the right to life and the right to health in the fight against global public health threats.

As a result of the effective anti-epidemic measures and the positive influence from the media, most Chinese are voluntarily involved in the active cam-

Ancient Water Systems Still Flowing

By Staff Reporters

Three more ancient Chinese irrigation sites have been recognized as World Heritage Irrigation Structures (WHIS).

Granted by the International Commission on Irrigation and Drainage (ICID) on November 26, the inclusions of the Li Canal-Gaoyou Irrigation District, the Liao River Irrigation District, and the Sagya Water Storage and Irrigation System have brought the total number of Chinese irrigation projects on the WHIS list to 26.

The Sagya water storage and irrigation system in Shigatse City in southwest China's Xizang Autonomous Region has an average elevation above 4,000 meters. It is the highest of the sites on the global list.

Liu Xueying, the technical application support team leader of the Sagya Water Storage and Irrigation System, said the Water Storage and Irrigation System in Xizang Autonomous Region is conservatively estimated to have more than 400 reservoirs still in use. It has benefited more than 300,000 people, accounting for about 10 percent of the total population of the Xizang Autonomous Region. Today, the irrigation sys-

tem still uses the ancient engineering structure and management methods. In addition, its technological, historical and cultural values are still driving the economic and social development of Shigatse city and Xizang.

According to Liu, the irrigation system, built at high-altitude and in a very cold region, recorded a remarkable chapter in the history of water conservancy engineering. It adapted measures to local conditions and developed the corresponding management system. Zhu Haidong, an expert in water conservancy, explained that the reservoir is exposed to sunlight, so that the temperature of the pool water collected from the melting ice water is significantly increased, thus making it possible for the highland barley to thrive in the cold environment.

The reservoirs still in use play an important role in developing Shigatse city into the "Highland Barley Area of the World." Highland barley has been the most important crop and the staple food ingredient in Xizang for thousands of years.

Due to the unique natural climatic conditions, irrigation has become essential for developing China's agriculture.

Service Info

Wuyishan National Park

Wuyishan National Park in Fujian province is officially included in the first batch of China's national parks, which was announced on Oct 12. Aerial photo shows a view of Wuyishan National Park, southeast China's Fujian Province. (PHOTO: XINHUA)

