

Guru Champions Collaboration on Wheat Research

Dialogue

By BI Weizi & LONG Yun

After a 37-year career, German native Hans-Joachim Braun retired from the International Maize and Wheat Improvement Center (CIMMYT) in 2020. As the director of the Global Wheat Program and the CGIAR Research Program on Wheat, Braun's legacy will continue to impact all aspects of the wheat research world.

Despite his plans for a relaxing retirement, Braun hopes to continue supporting wheat research, whether through his involvement with CIMMYT or through long-standing relationships with national partners. He aims to raise awareness about population growth, which he considers as the "problem of all problems." During his long research history, he has noticed the tremendous changes in agriculture and technology that China has gone through in the past few decades. He recently spoke to *Science and Technology Daily (S&T Daily)* about these changes and how cooperation with China in wheat research is vital for global food security.

S&T Daily: What are the biggest changes you've noticed in China?

Hans-Joachim Braun: China has made tremendous progress in infrastructure — construction, transportation, IT, communication, investments in science and universities, and R&D. In many of these areas, such as biotechnology and IT, China nowadays is a global leader. I have visited more than 100 countries, but I don't know of any other where changes have happened so fast.

Q: Could you highlight some of the most impressive achievements of the collaboration between China and CIMMYT over the past decades?

A: China and CIMMYT have developed a close, intensive and productive cooperation in wheat and maize improvement. We have cooperated in breeding, agronomy and training. In 2014, Chinese economists evaluated the impact of the collaboration on wheat improvement and found that around 50



Hans-Joachim Braun. (COURTESY PHOTO)

percent of the Chinese spring wheat varieties derived from crosses with CIMMYT lines and varieties selected from these crosses, had on average, a six percent higher yield than crosses using only Chinese lines.

CIMMYT lines are also an excellent source of disease resistance. An intensive cooperation developed in training and many Chinese scientists visited CIMMYT's Headquarters in Mexico and worked with CIMMYT's wheat and maize scientists. This helped develop close and fruitful collaboration.

CIMMYT also employed several Chinese scientists. Evidence of the collaboration's benefits includes the fact that around eight CIMMYT scientists, including myself, have received China's friendship award. A highlight was when CIMMYT hired Dr. He Zhonghu and based him in Beijing. Over the last 35 years, he coordinated cooperation between Chinese institutions and CIMMYT and became one of the most recognized wheat scientists in China and internationally. Having CIMMYT scientists based in China, for example [in] Henan University, was also a success. Thanks to four decades of cooperation, CIMMYT now works with many Chinese institutions and universities, and I am convinced that this collaboration produces significant results in wheat science, ultimately benefiting wheat and

maize farmers.

Q: What do you think of the significance of international cooperation in the field of agricultural development and food security?

A: International cooperation is paramount for agricultural development and food security. For wheat, in particular, where research investments on a global scale are much smaller than in hybrid and genetically modified crops such as maize and soybeans, so germplasm exchange is essential. In wheat, the research community is still open, sharing wheat lines and new technologies, such as those in the molecular area. This allows even weaker programs, such as those in Africa, to benefit, and strong programs to make faster progress. No country will be able to come up with all the inventions alone.

Q: With climate change, geopolitical conflicts and supply chain disruptions, the food security issue is of global importance. What do you think the international community should do to ensure global food security? What is China's role in this?

A: It is paramount that free germplasm exchange continues. Wheat researchers share their research results and best lines, as no program is big enough to do all the research alone. Breeding today is a complex and expensive undertaking, requiring breeders,

pathologists, physiologists, quality experts, geneticists, statisticians, biometricians, molecular experts, and in the future more and more experts in AI. Smaller countries and breeding programs simply can't afford to operate such programs and depend on organizations like CIMMYT. China has a very strong wheat improvement program in all these areas and shares its findings.

Q: What's the biggest challenge in wheat production and how should it be dealt with?

A: With climate change, yield stability is becoming the most important trait for many farmers, alongside raising yield potential. In many countries, lawmakers want to see a reduction in plant protectives, so varieties with better and more durable disease resistance are required. Water shortages, either from rain or irrigation, are becoming a major global issue and wheat varieties with better tolerance to heat and drought are needed. Wheat is a very water-efficient crop, but it still requires roughly 1,000 liters of water to produce 1 kg of wheat grain. Even with the most sophisticated irrigation systems, such as drip irrigation, it still requires around 400 liters of water to produce 1 kg of wheat grain. Wheat is a major staple and importantly helps to increase zinc and iron needed for a healthier diet. Increasing CO₂ has some benefits for yield but has a negative effect on quality. Therefore, meeting the quality demands of millers, bakers and eventually consumers will become more and more challenging.

Q: What experience do you think China can offer to the world in the field of agricultural technology?

A: China has a very strong national wheat improvement program. China could make available its germplasm, its technologies developed in the molecular area, genomic selection, statistics, bioinformatics, and AI. China should play a very important role in training scientists from the developing world. China could also invest in building up research capacity of National Research Systems in Sub-Saharan Africa. China is such an important player in the global breeding scene, and there are so many areas it could contribute.

My China Story

Bridging Cultures, Building Dreams

By LONG Yun & BI Weizi

In southwestern Shandong's Jining city, a story epitomizes how vision and collaboration bridge countries and cultures. Chong Chern Han, a young Malaysian entrepreneur, found a path to personal growth and spearheaded the establishment of a high-end intelligent recreational vehicle (RV) manufacturing project in 2014, enhancing the global competitiveness of the local industrial ecosystem in Shandong.

The first chapter of this story began in 2008, during the Olympic era in China, a period marked by rapid development. Drawn by the pace of change and encouraged by his wife Yu Hong, Chong made the life-altering decision to leave Malaysia, head to China and immerse himself in the burgeoning opportunities in the country, particularly in Shandong.

A witness to rapid development

According to Chong, China's business approach contrasts with many western countries that are closing their doors to international collaboration. Instead, China is increasing its openness, benefiting both the country and the global community. "This openness has facilitated access to affordable technology products, such as laptops, which are more accessible in terms of price and quality, thanks to China's manufacturing capabilities," he said.

Chong highlights several factors influencing his decision to settle and start a business in China. He mentions the abundance of resources like steel and timber, ideal for manufacturing RVs, and the professionalism of local technicians, which has led to the full localization of his team. Furthermore, the supportive and inclusive policies from local and state governments aimed at embracing overseas talent play a crucial role. These policies include assistance for starting businesses, making it easier for foreign entrepreneurs to establish themselves in China.

Regarding infrastructure, Chong marvels at what he calls "China speed," referencing the rapid construction of buildings and infrastructure projects. For example, in spite of challenges, a circular highway project around Jining was completed within 15 months, six months

ahead of the usual two-year time, significantly reducing travel time across the city. In another example, the construction of a sky bridge linked two areas, reducing travel time by twenty minutes. Such developments not only improve personal convenience but also enhance business logistics, making operations more efficient.

In addition, the widespread adoption of new energy vehicles and renewable energy further demonstrates China's commitment to sustainable development. This focus on innovation extends beyond environmental initiatives, as China is also leveraging cutting-edge technologies to enhance everyday life. Technologies like exoskeletons, which were showcased on Mount Tai during the Spring Festival, promise to improve life quality by aiding mobility for the elderly or those with physical limitations.

Being a cultural messenger

"Malacca, my hometown, was visited by Zheng He, a Chinese explorer, five times around six centuries ago, an era that marked the prosperity of the ancient Silk Road. Today, I have the privilege of relocating from Malaysia to China and participating in the Belt and Road Initiative. This opportunity not only fuels my personal growth but also allows me to act as a bridge for cultural and economic collaboration between our regions. It has instilled in me a profound sense of duty to share China's story," Chong noted.

For Chong, authenticity is key to his narrative. He avoids presenting a polished or exaggerated version of life in China. "I simply share my genuine experiences in China with everyone, and these moments have nothing to do with whether I am a foreigner or Chinese," he said.

His efforts go beyond his own business. He actively supports governments, local communities, and friends, helping them expand globally while attracting foreign enterprises to China. He believes that societal prosperity benefits his family and, ultimately, himself.

To those skeptical of China's development, Chong offers a clear message: "Do not let misconceptions cloud your perception of China. Otherwise, you may miss out on its beauty, warmth, and the invaluable opportunities it offers."

Mawangdui Maps: Antique Maps of China

Traditional Eastern Wisdom

By BI Weizi

In 1973, three silk maps — a topographic map, a military map, and a prefecture map — were discovered in Tomb 3 in the Early Western Han tomb complex in Mawangdui, dated 168 BC. They are recognized as one of the earliest known Chinese maps at the time of their discovery.

The discovery of these maps is a milestone in the history of world cartography, as they provide valuable physical materials for the study of ancient China's geographic cognition, surveying and mapping technology, and military strategy.

The topographic map, over 2,000 years old, depicts the topography of southern China during the Western Han Dynasty, with fine lines and symbols, including mountains, rivers, roads, settlements, and other geographical information.

The area of the map covers an area

roughly corresponding to present-day Hunan province, Guangdong province, and parts of Guangxi Zhuang autonomous region, showcasing ancient China's detailed geographical knowledge of the southern region.

Similar to modern contouring techniques, lines and symbols of varying thickness were used to represent the ups and downs of the terrain. Mountains are outlined with curves, rivers with double lines, roads with dotted lines, and settlements with circular or square symbols.

This precise mapping technique shows that the geographers of the Western Han Dynasty had mastered complex map-making methods.

Moreover, these maps also demonstrate the systematic perception of geographical space in ancient China. In addition to natural geographic features, administrative divisions, military fortifications, and transportation routes were drawn in detail, laying a solid foundation for the development of cartography in later generations.



Chong Chern Han. (COURTESY PHOTO)

FAST: Revealing Facts Behind Cosmic Mysteries

Science Outreach

By Staff Reporters

The Five-hundred-meter Aperture Spherical Radio Telescope (FAST), also known as the "China Sky Eye," is the world's largest single-dish radio telescope. Located in a natural depression in Guizhou province, FAST was completed in September 2016 and officially began operations in January 2020. With a diameter of 500 meters, it surpasses the Arecibo Observatory in Puerto Rico, making it the most sensitive ra-

dio telescope in the world.

What is FAST?

FAST is a colossal radio telescope designed to detect radio waves from distant celestial objects. Its massive size allows it to capture faint signals from the far reaches of the universe, providing astronomers with unprecedented insights into the cosmos. The telescope's reflective surface is made up of 4,450 triangular panels, which can be adjusted to focus on different areas of the sky. This flexibility enables FAST to observe a wide range of astronomical phenomena, from pulsars to distant galaxies.

Eye for research

Its primary mission is to detect radio waves emitted by celestial bodies,

enabling groundbreaking scientific research. According to the news released by its operator on November 26, 2024, FAST has identified more than 1,000 new pulsars since its launch in 2016. Pulsar observation is a major task for FAST, which can be used to confirm the existence of gravitational radiation and black holes.

Additionally, FAST contributes to the Search for Extraterrestrial Intelligence effort by scanning the skies for potential signals from alien civilizations, addressing one of humanity's most profound questions: Are we alone in the universe?

Benefits for humanity

Beyond its scientific achievements, FAST has far-reaching benefits

for humanity. The technological innovations driven by its development, such as advancements in data processing, have applications in fields like telecommunications and medical treatment.

FAST also fosters global collaboration by being open to international scientists, promoting a spirit of cooperation essential for tackling complex scientific challenges.

Moreover, it serves as a powerful educational tool, inspiring the next generation of astronomers and engineers. By capturing the public's imagination and deepening our understanding of the cosmos, FAST advances scientific knowledge and enriches society as a whole.

'Ne Zha 2' Redefines Animated Movies

From page 1

Unlocking the digital secrets of ink painting

One of the most groundbreaking achievements in *Ne Zha 2* is the development of the world's first "dynamic ink wash rendering engine." This innovation was driven by a mere 0.8-second scene in which the dragon king Ao Guang's weapon slices through the air, causing ink-like colors to shift between freezing and diffusion. The scene took nine months to complete.

"If particle effects formed the bones of *Ne Zha 2*, then the 'dynamic ink wash rendering engine' injected its soul," said Liu.

Traditional Chinese ink painting, with its delicate brushwork and expressive depth, posed a significant challenge for digital animation. After years

of research, the team succeeded in bringing the dynamic flow of ink onto a digital canvas, allowing for real-time simulation of brushstrokes spreading across rice paper.

This breakthrough imbued characters with a unique artistic vitality — every detail, from skin to clothing and even hair, carries the elegance of ink painting. *Ne Zha's* signature red silk and fire-tipped spear appear more vibrant than ever, infused with an energy that blends tradition and modernity.

Through this fusion of culture and technology, *Ne Zha 2* is redefining Chinese animation. When *Ne Zha's* wind-and-fire wheels glide over ink-painted landscapes, audiences witness not just an evolution in filmmaking, but a civilization revitalizing its cultural heritage through innovation.