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# NEWSLETTER

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SPECIAL ISSUES

## New National S&T Development Planning

Chinese Ministry of Science and Technology, in collaboration with other government agencies, including National Development and Reform Commission, Ministry of Finance, Ministry of Education, Chinese Academy of Sciences, Chinese Academy of Engineering,

National Natural Science Foundation, China Association for Science and Technology, and State Administration of Science, Technology and Industry for National Defense, has recently released a national science and technology development plan for the 12<sup>th</sup> Five-year period (2011-2015).

The Plan defines the following main objectives for the 12th Five-year period: enhance China's proprietary innovation capacity, competitiveness, and international influence in the area of science and technology, striving for major technological breakthroughs in the key areas, providing strong support to the change of economic development mode, and establishing a national innovation system featured with clearly defined functions, rational structures, sound interactions, and efficient operations. China will work hard to sit in 18<sup>th</sup> place rather than in the current 21<sup>st</sup> place in the world, in terms of comprehensive innovation capacity. It will also raise the contribution rendered by scientific and technological advancement to 55%, with substantive progresses made in building an innovation country. Meanwhile, the Plan sets up a range of specific goals and targets for enhancing R&D intensity and original innovation capability, combining technology and economy, improving people's life with science and technology, rational distribution of innovation centers, S&T personnel contingent capacity building, institutional innovations among many others.

The Plan also made the deployments for China's S&T development and proprietary innovations in next five years, focusing on the following: 1) accelerate the implementation of major S&T projects at the national level; 2) foster and develop strategic and emerging industries; 3) land major technological breakthroughs in the key areas; 4) deploy basic research and R&D activities in a visionary manner; 5) strengthen the capacity building of S&T innovation centers and platforms; 6) bring out more innovation talents; and 7) raise the openness of S&T activities, and the level of cooperation.

### Improving People's Life with Science and Technology

Chinese Ministry of Science and Technology (MOST) released a document on improving people's life with science and technology at a national meeting held on July 18 discussing social and S&T development issues. MOST officials said efforts will be made to initiate a national action to improve people's life with science and technology, especially in four areas: population and health, ecological environment, public safety, and disaster prevention and mitigation.

WAN Gang, CPPCC Vice Chairman and Minister of Science and Technology, said efforts shall be made to provide guidance for improving people's life with science and technology, along with a raised input and enhanced innovation capacity building for the purpose. Meanwhile, efforts shall be made to strengthen international cooperation, raise people's awareness,

and diffuse S&T findings in the area.

At the meeting, WANG Weizhong, Vice-Minister of Science and Technology, made a comprehensive review of the accomplishments achieved in promoting the social development with science and technology during the 11th Five-year period, and made deployments for the activities to be staged during the 12th Five-year Plan period. WANG said that during the 12th Five-year plan period, major efforts will be made to improve people's life with science and technology, focusing on six areas: 1) strengthen the innovation of science and technology management systems and mechanisms; 2) speed up the implementation of major science and technology projects at the national level; 3) accelerate the implementation of major special projects that are designed to improve people's life with science and technology; 4) stage and implement a national action to improve people's life with science and technology; 5) enhance the capacity building of the sustainable development parks; and 6) strengthen international cooperation in the area.

### Food Yield Boosting

Not long ago, Chinese Ministry of Science and Technology, Ministry of Agriculture, Ministry of Finance, and National Food Authority jointly inked an accord with 13 major grain-producing provinces (regions) in Beijing. The development marks the official start of a new round of nationwide efforts to boost food yield in the new Five-year period.

Chinese Ministry of Science and Technology Science initiated a food yield boosting project in the 11th Five-year period, during which enhanced technology innovation activities have led to the significant boost of food yield under government guidance. Efforts have been made to raise the yield of three major crops, including rice, wheat and corn over three major plain regions (northeast, north, and the lower and middle reaches of the Yangtze River). Meanwhile, efforts have been made to enhance the capacity building of experimental fields, core fields, demonstration fields, and radiation zones. The project made a role model for food yield boosting over extensive areas, providing a strong technical support for materializing food yield increase, and for national food security.

WAN Gang, CPPCC Vice Chairman and Minister of Science and Technology, pointed out that efforts shall be made to integrate the technologies and techniques that are able to raise food yield over extensive areas, strengthening technical services for food production, encouraging and supporting S&T personnel to go to the rural areas, implementing the special action of "million S&T envoys", and establishing new technical service systems in major grain-producing provinces. Meanwhile, efforts shall be made to enhance the capacity building of the bases, platforms, and contingents that make food yield boost possible, staging S&T activities to boost food yield, increasing investments in such activities, and perfecting a long term mechanism that can render technical support to food yield boost.

## Potato Genome Sequenced

26 Chinese and foreign institutions headed by Beijing Genomics Institute published their tuber crop potato genome sequence results in the July 10, 2011 issue of *Nature*. The new study provides a very valuable resource for understanding the genetics of potato and associated molecular breeding.

Researchers employed a homozygous doubled-monoploid potato clone to sequence and assemble 86% of the 844-megabase genome. They predict 39,031 protein-coding genes, and present evidence for at least two genome duplication events indicative of a palaeopolyploid origin. As the first genome sequence of an asterid, the potato genome reveals 2,642 genes specific to this large angiosperm clade. Researchers also sequenced a heterozygous diploid clone, which shows that gene presence/absence variants and other potentially deleterious mutations occur frequently, and are a likely cause of inbreeding depression. Study results indicate that gene family expansion, tissue-specific expression, and recruitment of genes to new pathways contributed to the evolution of tuber development.

## Novel Antibiotics

Not long ago, CAS Kunming Institute of Zoology won a national patent grant for the animal antimicrobial venom peptides and derivatives it has screened out. Project leader LI Wenhui told reporters that animal antimicrobial peptides that directly destroy the cell walls and membranes of bacteria are able to keep bacteria from becoming drug resistant, which makes them a promising anti-infection drug candidate. Researchers screened out venom peptides from the antimicrobial peptides collected from some 500 animals, based on the previous laboratory studies. Venom peptides have shown strong antibacterial activity to more than 500 clinical drug-resistant strains, while enjoying extremely low mammalian toxicity and hemolytic activity, better than the similar drug candidates that are clinically tested (III) in the United States, enjoying a promising clinical application prospect.

## Genome Wide Tumor Study

*Nature-Genetics* has recently published a study made by Chinese scientists on esophageal and lung cancers. The study, led by Prof. LIN Dongxin of Chinese Academy of Medical

Sciences Cancer Institute, made a comparison of some 10,000 esophageal cancer patients in the northern, central, southern and eastern parts of China, and found that genetic mutations of five chromosomal segments have contributed to the occurrence of esophagus cancer. Meanwhile, a team, led by Prof. SHEN Hongbing of Nanjing Medical University, found that six genetic variants of 4 chromosomal segments, including three disease-causing loci reported for the first time, are associated with the occurrence of lung cancers.

## NEWS BRIEFS

### New Relay Satellite Launched

At 23:41, July 11, 2011, China blasted off a Tianlian-1-02 satellite aboard a CZIIIC launch vehicle, from the Xi'chang Satellite Launch Center. 26 minutes after lifting off, the Xi'an ground control received the data showing that the satellite was separated from the carrier rocket, and entered a geosynchronous transfer orbit.





The new satellite is the second of its kind developed by China Academy of Space Technology under China Aerospace Science and Technology Corporation to relay geosynchronous orbit data. It will work with a sister satellite launched in 2008, providing data relay and control services for Shenzhou spacecraft, space lab, and space station to be launched in the future. In the second half of 2011, the new satellite will be employed to provide relay service for China's first docking missions.

### Large Scientific Facilities Phase II

Chinese National Natural Science Foundation and Chinese Academy of Sciences jointly inked an accord on July 12, 2011 in Beijing to start the Phase-II operation of a joint fund set

up for large scientific facilities that will last from 2012 to 2014.

During Phase-II operations, the Fund will boost its amount to RMB 60 million a year, with an added item for the steady-state device and an expanded scope for large facilities. Under the agreement, the joint fund will finance the cutting edge research activities in the areas of material science, information, life sciences, environment, resources, and diagnostic techniques.

### National Supercomputing Center in Changsha

Tianhe-1, a 100-teraflops supercomputer stationed at Changsha National Supercomputing Center, the second of its kind in the country, was recently put into operation, providing supercomputing services to the public. According to a plan, the 100-teraflops supercomputer will be upgraded to the 300-teraflops level in the coming October. The Hunan Meteorological Bureau and Hunan Provincial Department of Land Resources, the first users of the supercomputer, are currently working on their meteorological and geographic platforms using the supercomputer. Researchers also developed high-end applications for advanced machinery and equipment design.

### China's Service Robots in Top Five

The Blue Eagle team of China Science and Technology University won the first-place award for 2D simulation and the second-place award for the service robot at the 15<sup>th</sup> RoboCup held July 5-12, 2011 in Istanbul. Before this, China had never been ranked in the top 5. Some 2,800 delegations from 43 countries and regions participated in the game, making the event the largest in its 15 years of history.

Blue Eagle, the first Chinese team that participated in the RoboCup in 2000, has been grown into a leader in the field. Over the past year, Blue Eagle's 2D team developed a "coordinated omni-directional" technology, and made it part of the new 2D simulation system, which secured the team's first-place award.

Blue Eagle has won five world titles and nine world runner-ups since 2005. The team also published its findings in top international journals or at international conferences, and was a holder of a special CAS President award and a newcomer award conferred by the Ministry of Education. Researchers said the technical results stemmed from the study will find their applications in more and more areas.

### China's First Sea Island List

According to the Chinese Ministry of Land and Resources, China Sea Islands (Reefs) List,

the first of its kind released since the promulgation of the PRC Law of Islands Protection, has recently passed the review. The List has covered the island and reef names collected by aircraft or satellite based surveys over China's 11 coastal provinces, autonomous regions, and municipalities. The List finalized the geographical attributes, names, codes, and number of China's islands and reefs, and updated their location, size, shoreline length and other basic data. A Chinese Sea Islands Map was also prepared for the purpose.

## Straw Recycling Raises Yield

A straw recycling project, jointly undertaken by Northeast Agricultural University, Heilongjiang Academy of Agricultural Sciences, and Chinese Academy of Sciences Northeast Institute of Geography, has developed a range of straw recycling techniques desirable for growing rice, corn, and soybean over the Three-River Plains in the northeast part of the country in a more efficient manner. In addition to the straw reclaiming and recycling techniques, researchers also developed no-till planters and subsoilers, and established the technical modes desirable for growing the crops over the Three-River Plains, which not only raised unit yields, but also brought down the costs, with noticeable environmental benefits. Thanks to the optimized farming practice, farmers who employed the techniques have enjoyed a reduced fuel consumption by 1-2 liters per mu (1mu=0.0667hectare), or 30 in RMB term.

The project team established 1,500mu of experimental plots at 852 Farm and in the demonstration zones, where soybean and corn were optimally fertilized under a reduced tillage plan, which increased unit yields by 7%, reduced energy consumption by 20%, and raised the comprehensive benefit by at least 10%. Rice straw recycling, together with an optimized fertilization and disease prevention plan, has also raised unit yields by 7% to 10%, and the comprehensive benefit by at least 10%, enjoying a combined economic benefit worth RMB 100 million.

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