



CAAS: Role in Chinese Agricultural Development and International Cooperation

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I. Food and Agriculture in China and Role of Science

Agriculture is the foundation of national development and S&T is the origin of agricultural modernization

- **Food is the most important necessity for people, meanwhile food security is the top priority.**

Agriculture is the foundation of the national economy, and ensuring food security is the primary task of agricultural development.

- **Agricultural S&T innovation is the internal requirement and driving force of agricultural modernization.**

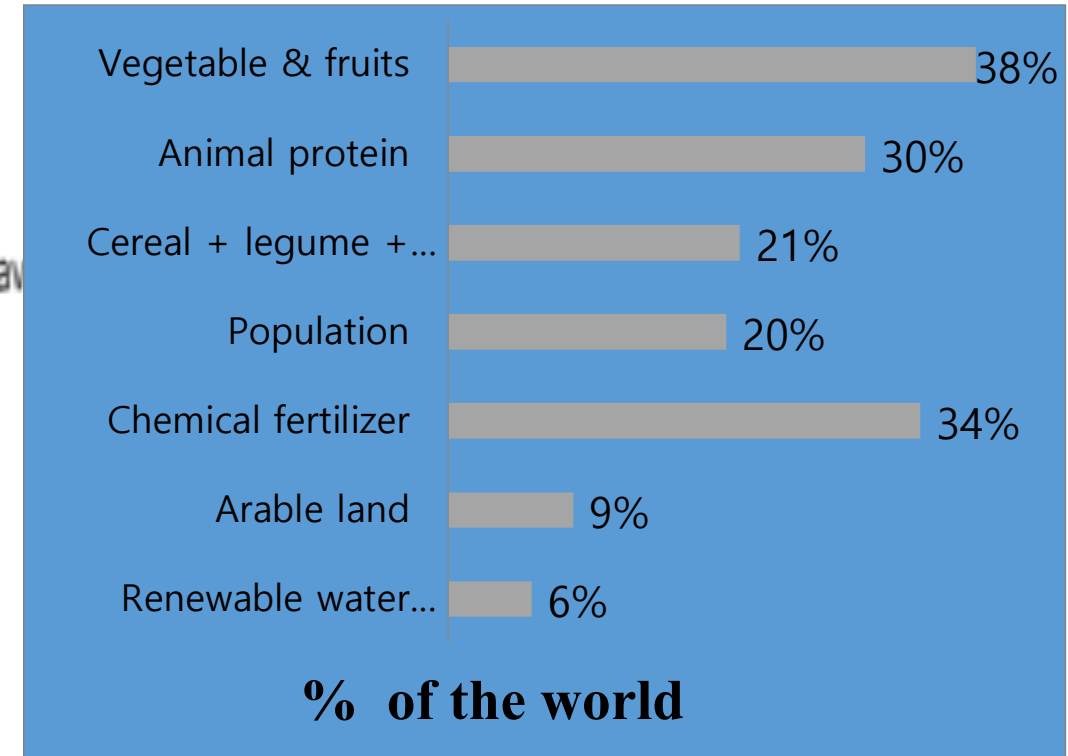
Innovation is the inevitable choice to achieve long-term stable and sustainable development of agriculture. In 2017, Document No.1 of the Chinese central government pointed out that *"strengthening innovation driven by science and technology to promote a high-level development of modern agriculture"*.



I. Food and Agriculture in China and Role of Science

China's Agriculture at a Glance

- 9% of the world's arable land feeding 20% of the world population
- Total GDP in 2016: RMB 74.36 trillion Yuan; Agriculture 6.37 trillion Yuan
- Total population: 1.383 billion vs. 133 million hectare arable land (ranked 4th in total and average)
- Among the lands, 59.4% mountains and plateaus, 9.9% hill, 18.8% basin and 12.0% plain;
- Average arable land per capita: 1.36 mu (0.09 ha)
 - Among all 2,856 counties, 664 counties has 0.05 ha. Per capita, touching the FAO's early warning line
- Engel's coefficient in 2016: Urban: 29.3%; Rural: 32.2%



I. Food and Agriculture in China and Role of Science

Stable increase in overall agricultural production capacity

- Grain production in China achieved 14 consecutive years' increase. In 2017: total Grain Production reached 618million tons.
- Meanwhile, the agricultural products such as cotton, oil, sugar, fruit, vegetable, tea, meat, egg, milk and aquatic product all showed a steady development trend.

Agriculture in the year 2016:

475 varieties were approved, 119 plant varieties, 60 new pesticides and veterinary drugs, 1002 software copyrights and 3700 patents



I. Food and Agriculture in China and Role of Science

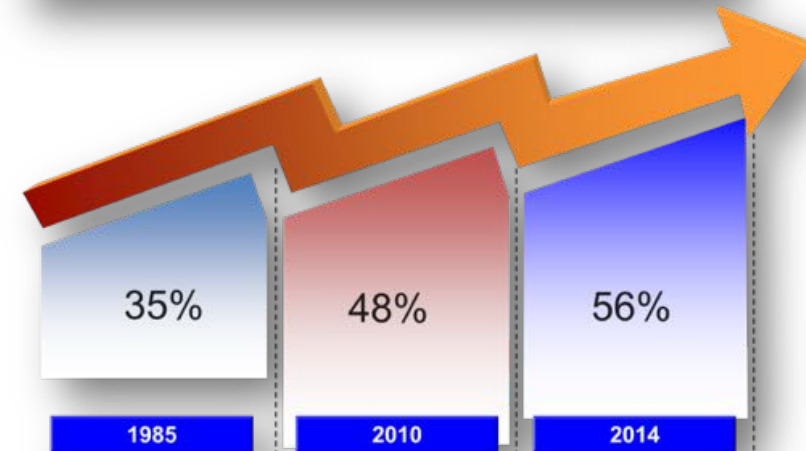
Agricultural S&T is an important pathway to achieve new development of agriculture

S&T progress is the core driving force for agricultural development , which has been always support Chinese modern agricultural development

2017 :

- Contribution ratio of agricultural Sci.-Tech. progress exceeded **57%**
- Improved variety coverage rate of main crops reached **96%**.
- The yield of grain crops increased up to **5.45 ton/ha**, and the contribution rate of improved varieties reached **43%**.
- The comprehensive mechanization level of plowing, sowing and harvesting in the agriculture was as high as **66%**.

Contribution Rate of ARD to Agricultural Production



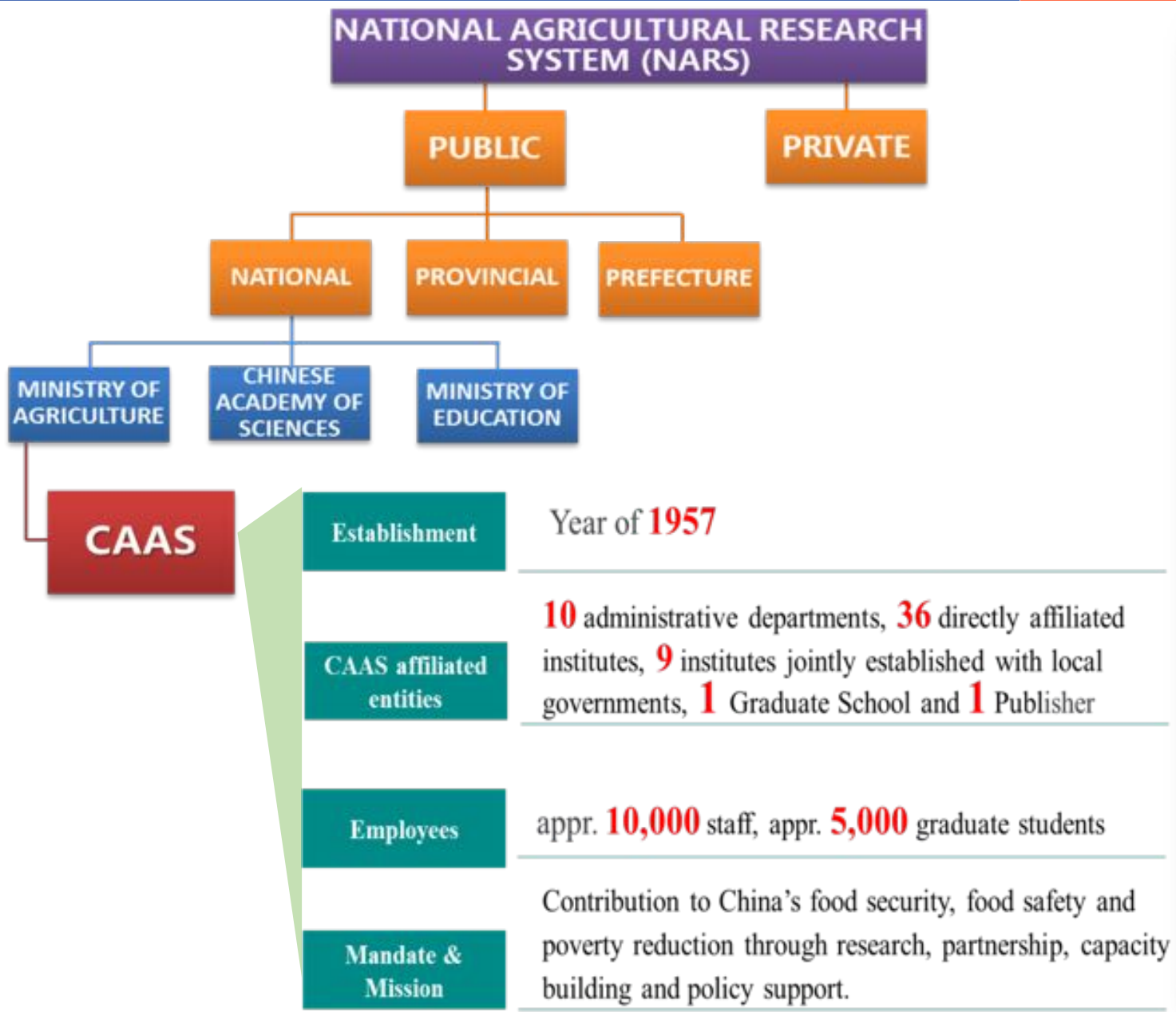
I. Food and Agriculture in China and Role of Science

Rapid Development of Farmer Cooperatives and Farm Land Consolidation

- **Farmer Cooperative Law in 2007**
- **In 2016, 2.9million farmer cooperatives established, Memberships cover 40% of moderate scaled farms in China.**
- **Farmer cooperatives provide service in purchase of production input materials (seeds, fertilizers, etc.), storage and sales of products, technical extension for product processing, transportation and market information.**



II. ABOUT CAAS





II. ABOUT CAAS

8 Disciplinary Clusters



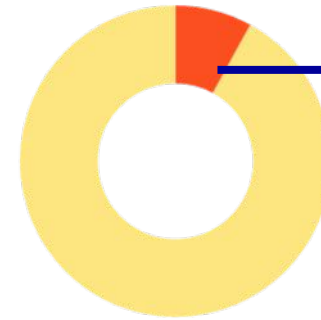
107 Research Areas



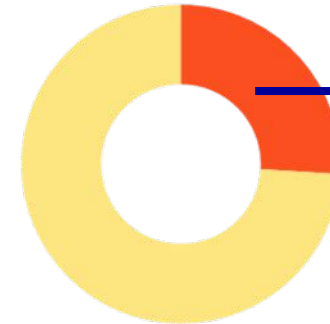
332 Research Directions

An Innovation-driven Science Organization

-  Crop Science
-  Horticulture Science
-  Animal Science
-  Veterinary Medicine
-  Agro-resources and ENV
-  Agro-Mechanization and Engineering
-  Agro-product Quality, Safety and Processing
-  Agro-Information and Economics



8% Total Agricultural Scientists in China



26% National Awards in Agricultural S&T



20 billion RMB _____

II.ABOUT CAAS



PLATFORM

Platform	Number	Platform	Number
National major scientific engineering projects	2	Long-term national bank for crop germ plasm resources (No.2 in the world for number of collections)	1
National key laboratories	6	Mid-term national bank and nursery of crop germ plasm resources	10+12
National and ministerial-level quality inspection centers	38	Platforms of national S&T basic conditions	4
National and ministerial-level field platforms and stations	29	Bank of somatic cell of livestock and poultry genetic resources (No. 1 in the world)	1
National crop, livestock and poultry improvement centers	19	National agricultural libraries (No. 1 in Asia, No. 3 in the world)	1
MOA key laboratories	42	MOA agricultural products quality & safety risk evaluation laboratories	25





II.ABOUT CAAS

Scientific research bases

106 scientific research bases,
with total area of **6467**
hectares, distributing in **27**
provinces nationwide





GRADUATE EDUCATION

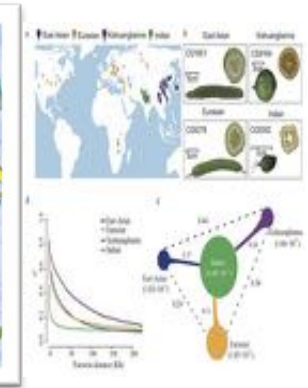
- **Founded in 1979** -- One of the earliest degree conferral institutions for master's degree and doctor's degree in China.
- **Multi-layered & Multi-typed**--- post doctor; students for Ph.D. or master degree, international students, professional degree students.
- **Scale** – **5119** post graduate students, including **1595** PH.D students, **3524** master students.
- **Complete agricultural subjects** --Offer 8 academic categories, 17 primary disciplines.
- **International Students**-- **395** international students , more than **60** countries and regions.



III. Role of CAAS in Agricultural Development

Three major roles of CAAS in Chinese agricultural development

- ① Serve as a national team and Center of excellence in national agricultural science and technology innovation
- ② Serve as a national think tank for agricultural related policy formulation
- ③ Serve as flagship for International cooperation to lead Chinese agricultural institutions with international partners



New requirements for Agriculture Science in China

“As the national team on agricultural science and research, CAAS shall face the global frontier of agricultural science and technology, aim at national key requirements, and focus on modern agriculture development. CAAS shall accelerate the endeavor to build itself with world class discipline and as world leading research institution to support China’ s upgrade on the agricultural science and technology.”



President XI Jinping in his congratulation letter to CAAS’s

60th Anniversary

May 26, 2017

New requirements on agricultural science and technology development in China

- Facing the new round of science and technology revolution

 establish a series of *world-class agricultural science centers*

- Focusing on the overall and key obstacles that constrain the development of agriculture

 establish a series of national-level *technology innovation centers*

- Aiming at resolving prominent problems that hurdle development in agricultural ecological regions and economical zones

 establish a series of *regional-level technology innovation centers*

IV. International Cooperation: Current situation

1. CAAS: to be a world-class sci-tech research institution

being a national-level international agricultural S&T center for scientific innovation, international Cooperation, and talents cultivation height



- ❑ Cooperation with: **83** countries and regions, **38** international organizations, **7** MNCs and Gates Foundation with **82** agreements signed
- ❑ **13** representative offices of international organizations
- ❑ **62** joint laboratories / joint research centers with counterparts in the United States, Canada, Japan, etc., and also some international organizations
- ❑ **4** overseas joint laboratories were established in Brazil, Belgium, Australia and Kazakhstan
- ❑ **6** FAO and OIE reference labs.



International partners and platforms

- Sino-Japanese Sustainable Agriculture Center
- Sino-German Agricultural Sci-Tech Innovation Center
- China-UK Center for Sustainable Innovation on Agriculture

- Bill Melinda Gates Foundation Project
- CGIAR Strategic Projects
- UK Newton Fund
- EU Horizon2020
- China-US Flagship Programs
- China-Netherlands Key Programs
- China-Norway Sino- Grain Programs etc



- China-Brazil Joint Laboratories on Agriculture Science
- CAAS-CIMMYT Joint Laboratories on Wheat Quality
- CAAS-CABI Joint Laboratories on Biosecurity

- RDA Beijing Office
- CIP Beijing Office
- ICRAF Beijing Office
- IPNI Project Office

IV. International Cooperation: Current situation

2. CAAS: taking the lead in agricultural cooperation

International



- ❑ Responsible for cooperation with **CGIAR**
- ❑ Host Country Agreement of CIP-China Center for Asia Pacific (**CCCAP**) & CCCAP infrastructure plan
- ❑ Being Co-Chair of **China-EU Task Force on Food, Agriculture and Biotechnology**
- ❑ Being Lead Shepherd of APEC Agricultural Technology Cooperation Working Group (**ATCWG**)

Domestic



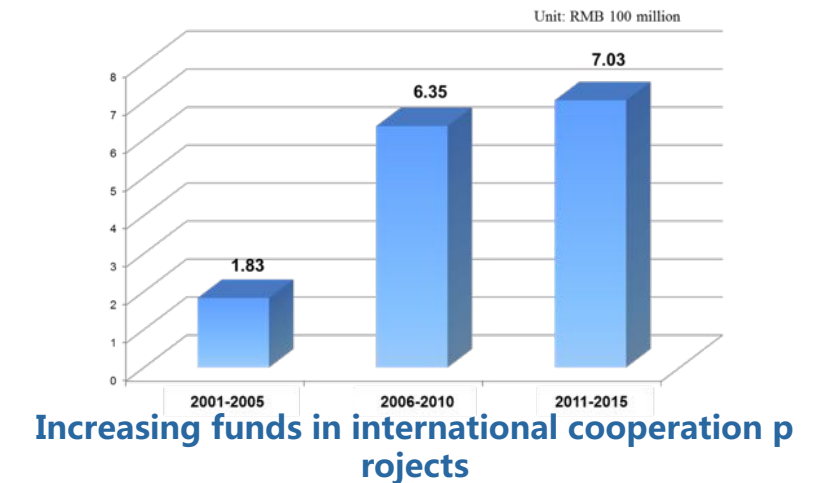
National Network of Agricultural S&T International Cooperation

- ❑ Initiated "National Network of Agricultural S&T International Cooperation " and hold workshops annually
- ❑ China-Africa 10+10 initiative

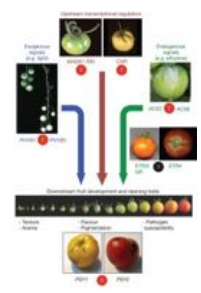
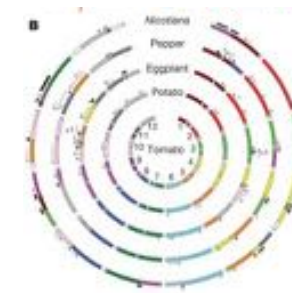
IV. International Cooperation: Current situation

3. CAAS: organize to implement major cooperation projects and expand cooperation research fields

- ◆ **2,343** international cooperation projects with over **1.521** billion RMB budget since 2010
- ◆ Coordinate domestic organizations to cooperate with 13 representative offices of international organizations to conduct over **250** projects throughout **20** provinces
- ◆ Participate in over **50** projects of EU framework programme, with over **55** million RMB funds
- ◆ Implement the "**Green Super Rice**" project funded by the Gates Foundation to promote super rice in 15 target countries in Asia and Africa
- ◆ Participate in the **genomic sequencing** of wheat, cotton, oilseed rape, cucumber as a key player
- ◆ Promote cooperation for China-UK Newton Fund, CISRO Flagship Program, China-Canada Research and Innovation Action Plan



"Green Super Rice is a gift to the world via China's agricultural innovation"



IV. International Cooperation: Current situation

4. CAAS: host several international events and play a key role worldwide

- Successfully hosted and organized many **high-level international academic conference**, such as “*Global Land Science Conference*” , “*International Crop Science Conference*” and so on.
- Initiate “Global Forum of Leaders for Agricultural Science and Technology (**GLAST**)” , which is co-organized with FAO and CGIAR, and was successfully held for **5 times**.
- Host over 200 **scientist summits** and **academic seminars**, such as the “China-CGIAR Cooperation High-level Seminar” and “China-EU Bio-economy Technology Seminar” , which demonstrates CAAS is a good example of international agricultural cooperation and exchange.



IV. International Cooperation: Current situation

5. CAAS: “Go Global” to enhance openness for the outside world

“Going Global” : Many technologies have been transferred to the other countries, including hybrid rice, animal epidemic disease control technology and vaccine production, facility horticulture, agricultural machinery and bio-gas tech.

- ✓ successful plant experiments of **hybrid rice** in **Vietnam, Laos** and **the Philippines**
- ✓ Successful use of **EIA vaccine** in **Cuba**
- ✓ Successful use of **avian flu vaccine** in **Vietnam** and **Egypt**
- ✓ Assist **Vietnam** in building **seed processing** machinery production factory
- ✓ 21 international **bio-gas technique training classes**, training 587 peoples from 89 countries
- ✓ Assist Angola in agricultural development planning, participate in the preparation of China **Agricultural Technology Demonstration Center** in Mozambique and Liberia
- ✓ Hold **practical agricultural techniques training courses** in about 20 African countries with training over 200 peoples



IV. International Cooperation: Current situation

6. CAAS: strengthen the cultivation of talents with international perspective

Study abroad

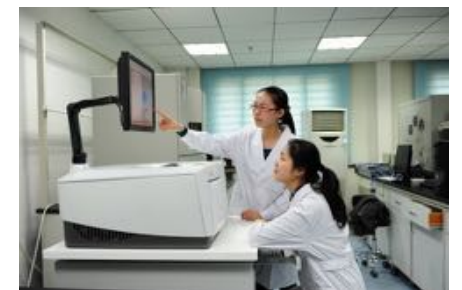
- Assigned **more than 260** young and mid-aged scientists to study abroad
- Send over **80** young scientists to have short study visits in CGIAR centers

Foreign students

- Cooperate with Wageningen University and University of Liège in doctoral education program: **19** and **17** doctoral students has been accepted separately
- There are **245** foreign students in the graduate school of CAAS, out of which, **216** are doctoral students, from **47** countries of Asia, Africa and South America, covering **36** disciplines and **29** research institutes

Talent Introducing

- Being praised by the State Administration of Foreign Expert Affairs for advances in bringing in foreign brains. 9 institutes are given the name of "*Demonstration Base for Intelligence Introducing*" .
- **Elite Youth Program**: to introduce young academic leaders and innovative talents who is younger than 40 years old with international perspective and adaptability to the future



V. New Trend of Global Agricultural Development: Challenges and Opportunities

1. New global development trend impacting agricultural and food production

Global food safety remains severe

Sustainable agricultural development faces greater pressure

International agricultural product trade competition intensifies

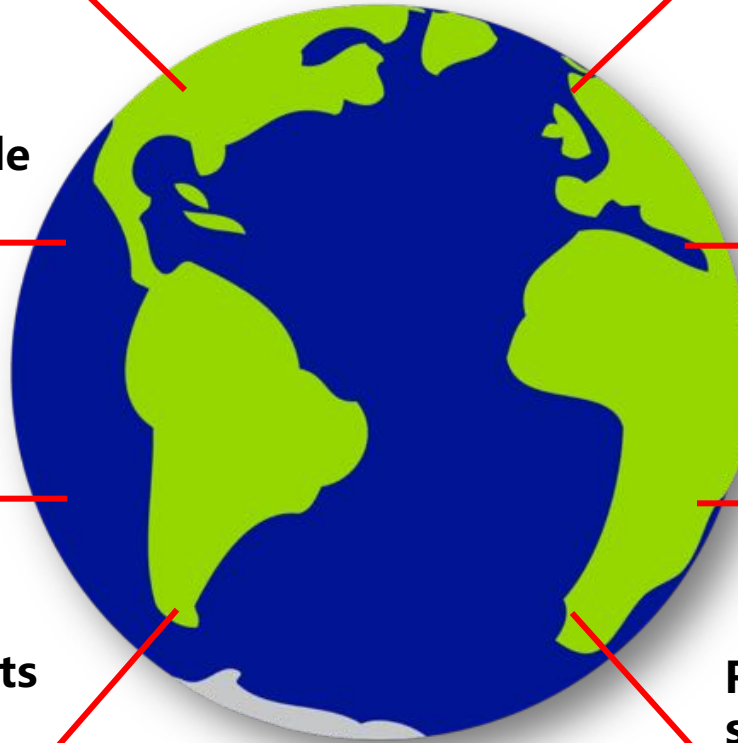
Agricultural industry transformation accelerates

Modern biological technology surges

Agriculture information technology changes quickly

Agricultural product quality attracts more and more attention

Resource-conserving agricultural science & tech receives attention



V. New Trend of Global Agricultural Development: Challenges and Opportunities

2. Agricultural development requirements in China

Situation

- More **difficulties** to guarantee continuous food yield increase
- More **constraints** in agricultural resource environment
- Greater impact from **imported agricultural products** on the domestic market
- New challenges brought by **accelerated urbanization**

Requirements

- Transform production approaches and structure to revitalize the rural development, **control the consumption of water for agricultural use, decrease the use of fertilizer and pesticide and deal with pollution from livestock and poultry, plastic mulch recycling and straw burning issues and promote green yield-increase and efficiency-gains crop production**
- A modern integrated agricultural production system **that the primary, secondary and tertiary industries integrate with each other**
- **Coordinate agricultural production with multi-functional and multi-layer agricultural technology**

VI. Agricultural Science & Technology International Cooperation: Development Strategy

1. International cooperation should play a bigger role promoting science led agricultural development

With new trends in agricultural development at home and abroad, technology and innovation have become an important pathway to address challenges, and effective international cooperation is the key to promote agricultural innovation.

Although CAAS has achieved great results in international cooperation, it still faces an arduous and long-term task to build itself into a world leading scientific research institute:

- ❑ *Unbalanced development among institutes and disciplines*
- ❑ *Institute Operating mechanism needs to be improved for building a top-notch scientific research institution*
- ❑ *The agricultural talents capacity building is still need to be strengthened*
- ❑ *Operating of joint international labs is not effective enough*

Facing these problems, CAAS will:

- *Adhere to the basic principles of cooperation, development and win-win*
- *Improve the cooperation mechanism for agricultural technology global strategic partnership*
- *Strengthen connection with international scientific research programs, initiate international major agricultural science & technology cooperation action plans*
- *Accelerate cooperation in agriculture with countries along the "Belt and Road"*
- *Bring in advanced agricultural technologies and "Go Global" in agricultural product safe supply, green production and ecological safety*
- *Capability building in multiple ways to cultivate talents with international perspective*

VI. Agricultural Science & Technology International Cooperation: Development Strategy

Action 1- ASTIP: an important way to build CAAS as a world leading agricultural science research institution in the years ahead

Plan 2013-2025, in 3 phases

Mission Meet industries' major demand for S&T, leap forward to the high-end of the world's agricultural S&T

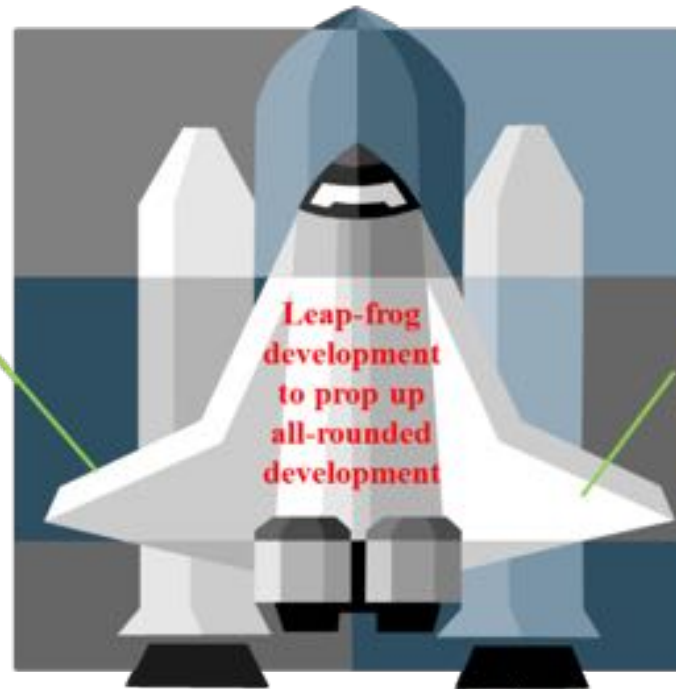
Top-notch modern academy and institutes

Build a top-notch agricultural science research institute

**8 disciplinary cluster, 107 subjects
332 teams**

Innovation tasks

**10 world-class scientific research centers
30 national scientific research centers**



Elite Youth Program to recruit outstanding talents

Capacity building

**International renowned teams: 30
Domestic leading teams: 100
Industrial featured teams: 30**

Optimize scientific research operation and management

Mechanism innovation

Build a multi-layer coordinated innovation system

VI. Agricultural Science & Technology International Cooperation: Development Strategy

Action 2-Center for International Agriculture Research (CIAR)



中国农业科学院

海外农业研究中心

Center for International Agricultural Research, CAAS

CIAR was founded in January 2016, with 16 research institutes, CIAR is a state-level international center for scientific research, a thinking tank, providing information and agricultural talents training, which serves "Belt and Road Initiative" .

1、International Agricultural Scientific Research collaboration

3、International Agricultural Information Service (Big Data decision support system)

2、Agricultural Technology "Global" with other partners

4、Develop international agricultural talents

5、Take lead in cooperation issues nationwide



VI. Agricultural Science & Technology International Cooperation: Development Strategy

Action 3-Establish the Western Research Center and South West Innovation Center of CAAS

Build a bridgehead for cooperation with Central Asia to promote “Belt and Road” agricultural cooperation

- Establish Western Research Center and South West Innovation Center of CAAS to **develop dry land agricultural technology cooperation** with the **western China and Central Asia and ASEAN countries**, thus turning this region into a agricultural science & technology achievement demonstration site of the “Silk Road Economic Belt” .
- S&T innovation to **support modern agricultural development in western regions** in order to build a national comprehensive agricultural R&D and service base and a cooperation window opening for Central Asia.
- Promote the regional agricultural S&T innovation alliance with characteristics of the western region and develop the **“China-Central Asia Agricultural Science & Technology Cooperation and Communication Center”**



VI. Agricultural Science & Technology International Cooperation: Development Strategy

2. Cooperating with countries along the “Belt and Road” in agricultural S&T is and will be the core works of CAAS



The “Belt and Road” initiative advocates principles of **“peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit”** and aims at promoting common development and prosperity, trust and exchanges in countries along the Belt and Road, in order to build an new open economic system.

Countries along the “Belt and Road” , especially underdeveloped countries, face **problems** of insufficient agricultural investment, single industrial structure, aged equipment and slow technology progress. China strengthening agricultural cooperation with these countries will promote complementary agricultural product trade, investment cooperation and technical cooperation, which will bring greater development space and improve the agricultural development capability and agricultural product competitiveness of the whole region.



VI. Agricultural Science & Technology International Cooperation: Development Strategy

2. Cooperating with countries along the “Belt and Road” in agricultural S&T is and will be the core works of CAAS

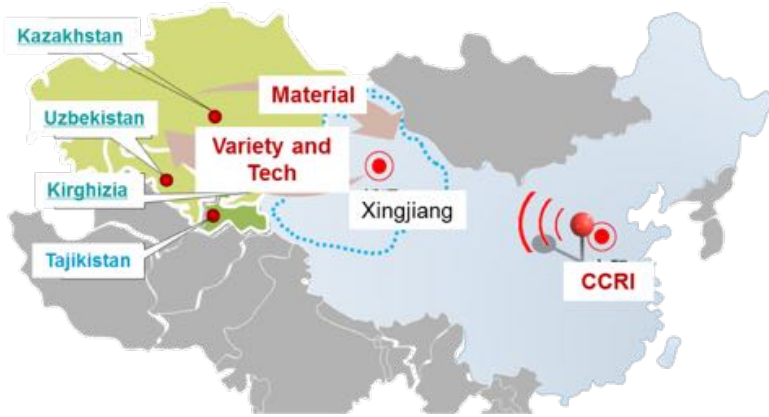
Positively echo “*Belt and Road*”, actively promote agricultural S&T cooperation with related countries, transfer practical technique and assist partners to improve agricultural technique according to local needs. Up to date, over 60 techs and products developed by CAAS “Go Global” .



- **Vaccine:** export avian flu vaccine and diagnostic reagent to Bangladesh and Egypt
- **Veterinary medicine:** co-build a joint Lab on Chinese Traditional Veterinarian Medical with the Chiang Mai University
- **Crops:** Over 30 new varieties have been approved or registered in target countries; over 50 varieties are under regional testing
- **Oilseed:** Develop drought-resistant high-yield double-low hybrid brassica in Pakistan
- **Cotton:** promote cotton related techs in Kirghizia, Kazakhstan and Pakistan
- **Bio-gas:** 52 training courses for North Korea, the Philippines, Columbia and so on
- **IPM:** Build trichogramma pilot producing factories in Laos and Burma

VI. Agricultural Science & Technology International Cooperation: Development Strategy

2. Cooperating with countries along the “Belt and Road” in agricultural S&T is and will be the core works of CAAS



➤ **Cooperate with Central Asian countries in cotton technology:**

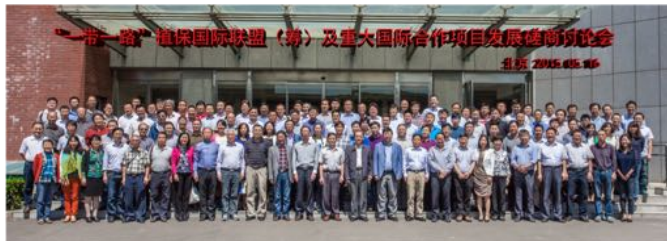
- “Zhongmiansuo No. 44” has become the major cultivated variety in Kirghizia with an extension area of 150,000 mu;
- the per unit yield has doubled from 150kg/mu to 300kg/mu with no extra investment.

➤ **Natural enemy insect production and application technology transfer to Asia and Africa:**

- 15 trichogramma and entomopathogenic nematodes product production bases and factories in Uganda, Laos and Burma;
- annual production can be used for pest control in areas over 500,000mu,

➤ **“Belt and Road” Plant Conservation Alliance:**

- co-build new international cooperation mechanism of plant disease and pest prevention and control



VII. Conclusion

Partnership will be a strong pillar for science innovation and rural development

- ❑ CAAS will **continue to implement the innovation-driven development mindset**, leverage science & technology innovation in agricultural development and build itself into a world's top-notch modern academy and institutes of scientific research and expand cooperation with countries along the “Road and Belt” route.
- ❑ Under the guidance and support of the government, CAAS will contribute to the economic prosperity and regional economic cooperation of countries along the “Road and Belt” , strengthening exchanges of different civilizations and promoting the peaceful development of the world.
- ❑ Agricultural development is vital to people’ s livelihood. CAAS will put forward mutual benefit and mutual learning with countries along the “Road and Belt” , carry out sustainable agricultural development strategy through technology with aim to achieve “people-to people bond”



Thank you