

Cooperation Fields and ways on Agricultural Mechanization in Asia-Pacific Region

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I. General Information on Chinese Agricultural Mechanization

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I. Rapid and Comprehensive Development of Chinese Agricultural Mechanization



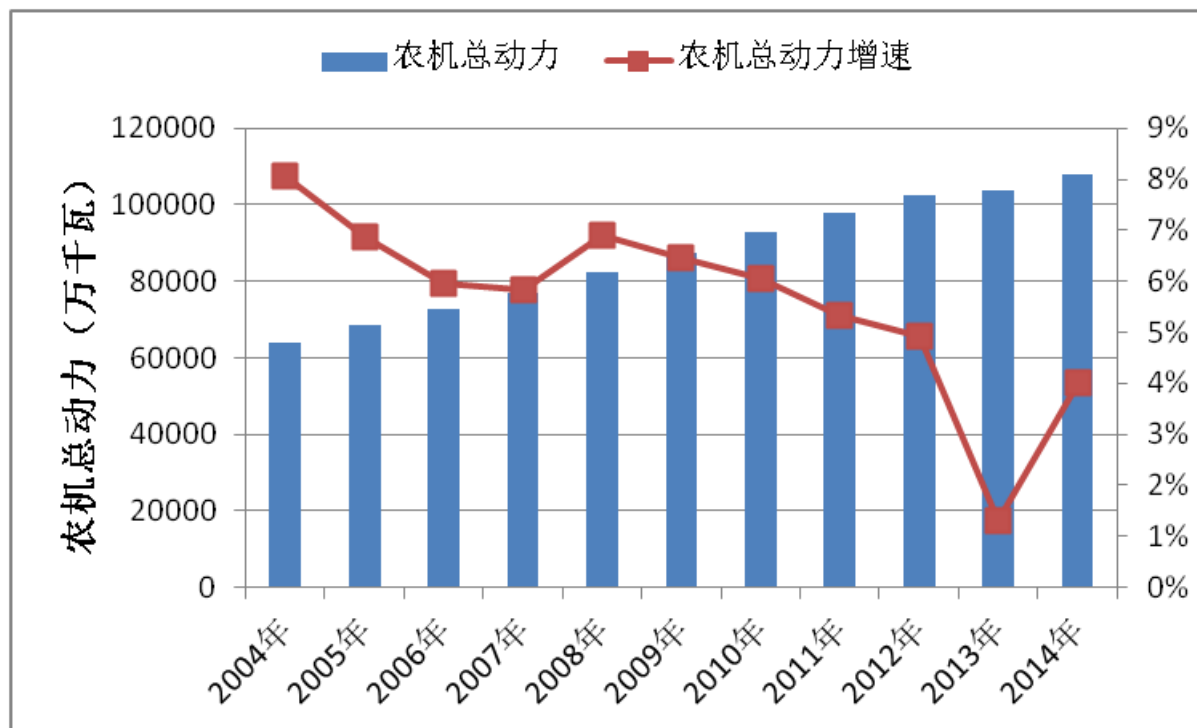
- In the 1950s, China has established supporting system for agricultural machinery **research, manufacturing, identification, popularization, sale and social services**. Chinese agricultural Mechanization has been rapidly developing in recent years.



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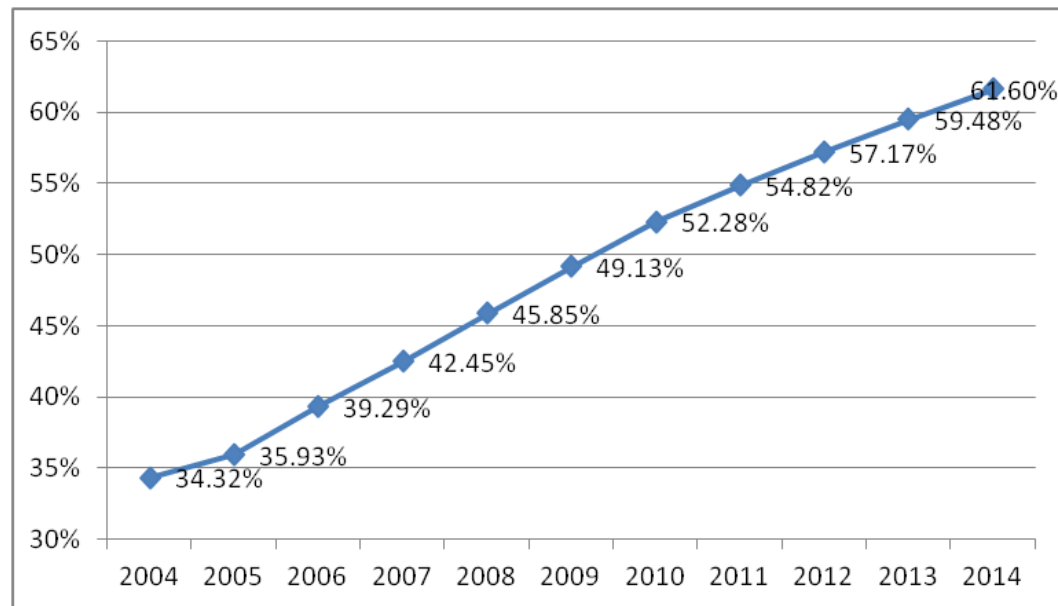
- In 2016, the total power of agricultural machinery reached 11.44 billion kilowatts, about 8.47 kilowatts per hectare.



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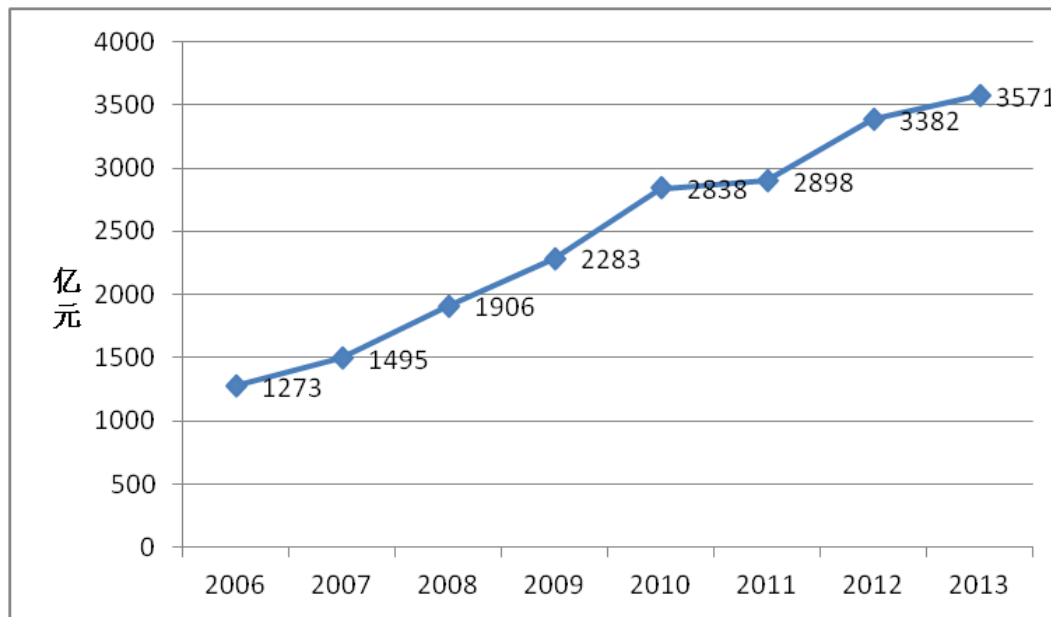
- The comprehensive mechanization percentage of **rice, corn and wheat** were 76.48%,81.44% and 93.71% , which indicates the rapid development of mechanization on food crops .



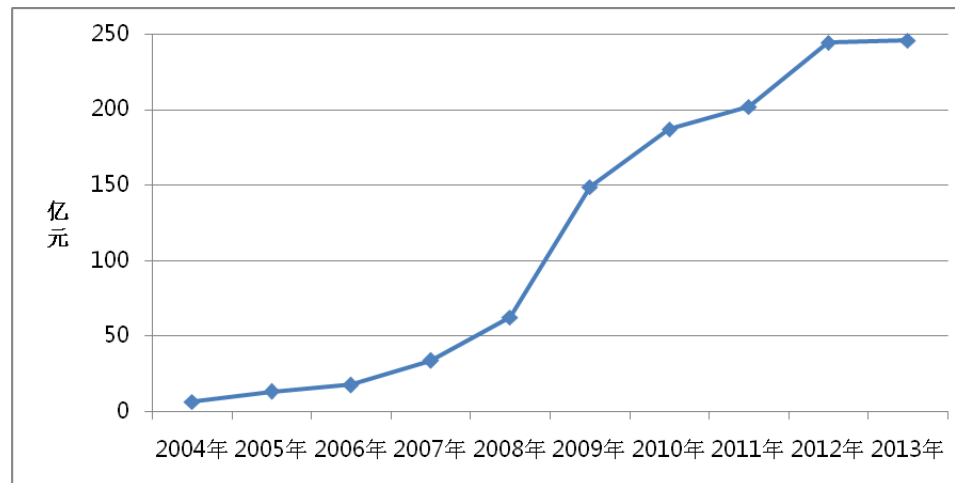
- The mechanization of **potato, cotton, rape, peanut and other economic crops is still in a low level.** Also the demand for mechanization of **animal husbandry and fishing and facility agriculture** is quite urgent. Both of above have become the focus of the current development of Chinese agricultural machinery.



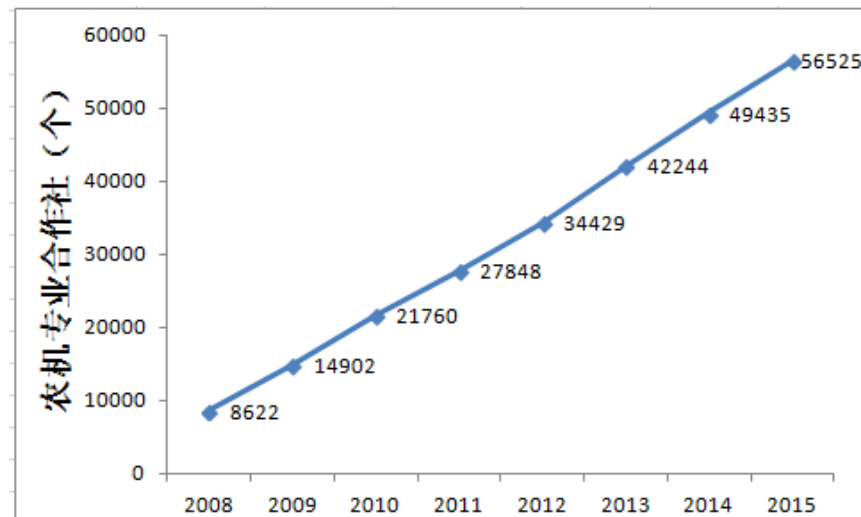
- The agricultural machinery manufacturing system in China is perfect. There are more than 8000 enterprises with an output of more than 4000 billion RMB Yuan.



- The agricultural mechanization has been powerfully guaranteed by **government's supporting policy system**. In the **Law on Promotion of Agricultural Mechanization** in 2004, indicates the central and the provincial governments shall respectively allocate funds to **subsidize the farms and agricultural organizations** for their purchase of machines. The total subsidy has been up to **1600 billion Yuan** until the year 2017.



- The **agricultural service system** constituted by large agricultural machinery, cooperatives, professional-service companies developed rapidly, which effectively solve the contradiction between “Small farms” and “Huge machines”.
- The number of agricultural cooperatives has been incredibly increasing. The number of 2015 is about 6.5 times than that of 2008.



- The **Innovation System** is composed by college, institution and enterprises.
- The **Extension System** have four levels, and they are national level, province level, city level, county level.



II. Brief Introduction of NRIAM



- NRIAM is a non-profit national research institute, specialized in **modern agricultural equipment technique innovation, agricultural product quality inspection, education and training and agricultural engineering planning.**
- Affiliated to Chinese Academy of Agricultural Sciences(CAAS)
- Developed the **first rice trans-planter** in the world and also the **first automatic sprayer** in China.



NRIAM has the staff of 267, among whom are 234 professional researchers. Including 20 researchers, 63 associate researchers and 111 researchers with graduate degrees.



➤ 5 Key Disciplines 12 Research Teams



1. Tillage and soil preparation machinery

- ◆ Tillage machinery
- ◆ Transplanting and sowing machinery



2. Harvesting Machinery

- ◆ Harvesters of underground fruits and tuberous crops
- ◆ Harvesters of crop grain
- ◆ Harvesters of fruits, Vegetables and tea
- ◆ Harvesters of crop stalks



3. Agro-Ecology and Environmental Equipment

- ◆ Crop protection equipment
- ◆ Biomass conversion and utilization equipment



4. Agricultural products processing equipment

- ◆ Agro-products grading and storing equipment
- ◆ Drying and Processing Machinery for Special Farm products



5. Agricultural mechanization and intelligent control

- ◆ System optimization and evaluation of agricultural mechanization technologies
- ◆ Intelligent Control of Agricultural machinery

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➤ **Tillage and soil preparation machinery**

- (1) Key technology of energy saving in tillage and soil preparation machinery
- (2) Key technology and equipment of Orchard
- (3) Efficient compound seedling technology
- (4) Green ecological planting technology
- (5) Highly-efficient mechanized transplant technology of seedling





大型智能化气力式水稻直播机



小麦正位施肥播种机



水稻大苗移栽技术及装备



无人插秧机



➤ **Harvesting Machinery**

- (1) Peanut, Sweet Potato, Garlic harvest technology and equipment
- (2) Rice, Wheat, Rape, and Soybean harvest technology and equipment
- (3) Fruit, Vegetable and Tea harvest technology and equipment
- (4) Cotton, and Hemp crop harvest technology and equipment





花生联合收割机



谷子联合收割机



有机肥深施肥



刷辊式采棉机



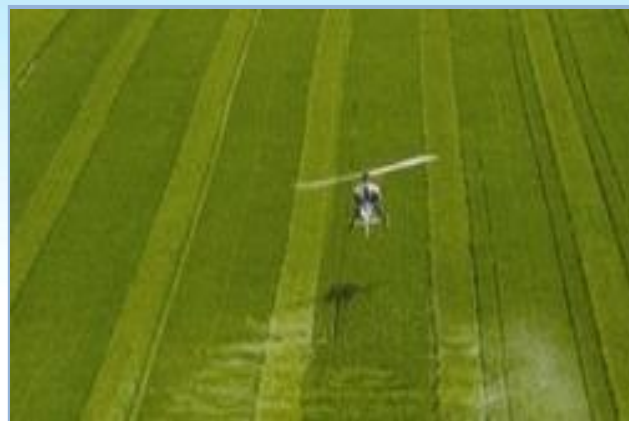
➤ **Agro-Ecology and Environmental Equipment**

- (1) Key components for precision application of pesticides
- (2) Aerial application technology and equipment for precision agriculture
- (3) Stalk storage and comprehensive using technology and equipment
- (4) Technology of producing and spraying organic fertilizer equipment
- (5) Dry anaerobic fermentation equipment technology





喷杆喷雾机



自动导航无人机低空施药装置



秸秆粉碎



沼气干发酵库



➤ **Agricultural products processing equipment**

- (1) Seeds shelling technology and equipment
- (2) Drying technology for main grain and oil crops
- (3) Multi- resource Energy technology for fruit, vegetables and fungi





花生种子加工线



花生荚果分级机



低露点组合式高效干燥技术与装备



冻融-热泵联合干燥技术与装备



➤ Supporting policy and intelligent control

- (1) Intelligent operation of agricultural machinery components.
- (2) Digital design technology of mechanized.
- (3) Agricultural mechanization supporting policy .





➤ Cultivation of graduate students

- NRIAM has right to confer Master's Degree and Doctoral Degree, with 3 doctoral tutor and 30 master student supervisor;
- Combines training with Nanjing Agricultural University (NAU) and Anhui Agricultural University (AAU) of the postgraduate, has 50 graduates in institute at present.



➤ Domestic talent training

- NRIAM has National Agricultural Mechanization Training Center;
- Conducts trainings class for senior management personnel, technical personnel and cooperatives and farms.
- Organizing 10 training courses annually (more than 300 trainees).



➤ International technical training

- From 2011 to 2013, “Aquatic products or livestock and poultry breeding technology training” in Vietnam, Thailand and other ASEAN countries;
- In 2014, “Rice production mechanization technology training” successfully organized toward ASEAN and African countries;
- In 2015, NRIAM has conducted a training oriented to SCO countries, named “Policies supporting agricultural mechanization and technology management workshop”.



III. Fields and Ways of Cooperation in the future



- **Agriculture is the basic industry of national economy. It's always an important part of international exchanges and cooperation.**
- **Agricultural mechanization is indispensable on the way of developing modern agriculture with broad prospects for cooperation.**
- **Chinese agricultural machinery has strong common points with other Asia-Pacific nations. More communication on technique and experience sharing would effectively promote common progress.**



➤ Challenges

- **Technologies improvement** is needed for local application due to different operating conditions including soil, crop varieties and agronomy etc.
- We need to **choose the right machines**, make improvement for local application, do experiment and demonstration , train the operators and technicians.
- **Technologies demonstration** is needed in major producing areas for better application.
- **Socialized services and Technical training** are needed.



➤ Key Cooperation Fields

- Food crop mechanization production equipment technology, Facility agriculture equipment technology, Livestock and poultry breeding facilities and equipment technology, etc. (**Raising labor productivity**)
- Conservation tillage technology, Plant protection engineering equipment technology, Water saving irrigation equipment technology, Technology of comprehensive utilization of crop straw, etc. (**Improving efficiency of resources using**)



➤ Key Cooperation Fields

- Rural biogas engineering technology, Drying technology of agro-product area, etc. (**Improving the ecological environment of rural areas**)
- Research on the strategy of agricultural mechanization, development plan, development patterns and supportive policy, etc. (**Improve efficiency of agricultural mechanization**)



➤ Cooperation ways

- **Cooperation in Science and technology projects** : Research together on agricultural equipment technical adaptability , building joint laboratory;
- **Human resource development**, including collaboration for visiting scholars, internships, tailored trainings, study tours, etc.
- **Build demonstration farm of mechanized agriculture**: Improve the dissemination and sharing of information, technologies and research literature;
- **Carry out the strategic study of agricultural mechanization.**



➤NRIAM has established **the research center of International Agricultural Machinery**, belongs to Chinese Academy of Agricultural Sciences(CAAS). We are willing to strengthen cooperation with Asia-Pacific nations in aims of contributing more to the normalization of communication.



➤ Working plan in 2017

- (1) Jointly organize the Regional Workshop with CSAM today.
- (2) Plan of Conducting a training course on “Sustainable Agricultural Mechanization of Asia-Pacific area” for training about 20 personnel in October.
- (3) Research on the strategy of agricultural mechanization for 3-5 Asia-Pacific nations.
- (4).....



Thanks for your attention.

