Brief Introduction of NIAM
Agricultural Mechanization Development in China
The earliest agricultural tools appeared 3000 B.C. The evolution of agriculture tools divided to **primitive agriculture**, **traditional agriculture** and **modern agriculture**.
AM Development in China

**Phase 1**
- 1949s~ middle 1970s
  - Major investor: Government
  - Medium and high power machinery developed rapidly

**Phase 2**
- End 1970s~ early 1990s
  - Major investor: Private Farmers
  - Low power machinery developed rapidly

**Phase 3**
- Middle 1990s ~
  - The laws and policies are perfected gradually
  - AM developed rapidly
From the regional perspective, the development of mechanization is faster in the northern plains, but slower in the southern part, especially in the hilly and mountainous areas of the southwest.
The overall rate of mechanization in typical hilly and mountainous counties is lower than 50%.
AM Development in China

At the end of the 13th Five-Year period of agricultural mechanization, the total power of agricultural machinery reached 1.056 billion kw, an increase of 17% over that at the end of the 12th Five-Year period. The overall level of mechanization in plowing, sowing, and harvesting increased to 71.25%, 7.4 percentage points higher than that at the end of the 12th Five-Year Period.

Overall mechanization rate/%
- Wheat: 97%, 3.50% higher than the end of the "12th Five Year"
- Corn: 90%, 8.60% higher than the end of the "12th Five Year"
- Rice: 84%, 6.20% higher than the end of the "12th Five Year"
AM Development in China

In 2021, the overall level of mechanization in plowing, sowing, and harvesting reached 72.03%, 0.78 percentage points higher than that in 2020.

- Cultivation rate: 86.42%
- Machine seeding rate: 60.22%
- Machine yield rate: 64.66%
NIAM historical Contributions
Nanjing Institute of Agricultural Mechanization, Ministry of Agriculture and Rural Affairs (NIAM) was established in 1957. NIAM is a non-profit national research institute, belongs to The Chinese Academy of Agricultural Sciences (CAAS), Ministry of Agriculture and Rural Affairs.
Developed the first rice trans-planter in the world and also the first automatic sprayer in China.

Automatic sprayer developed in 1934

The world's first rice trans-planter

Tractor pulled share plow in 1955
NIAM has Won a total 14 national scientific and technological achievements awards.

<table>
<thead>
<tr>
<th>序号</th>
<th>成果名称</th>
<th>奖项类型</th>
<th>年度</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>南-4103型沤田绳牵引机组</td>
<td>国家发明奖</td>
<td>1964</td>
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<td>2</td>
<td>东风-2S型机动水稻插秧机</td>
<td>国家发明三等奖</td>
<td>1981</td>
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<tr>
<td>3</td>
<td>农业机械测试数据实时处量和仪器的研究</td>
<td>国家科技进步三等奖</td>
<td>1985</td>
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<td>4</td>
<td>农家微型水力发电装置</td>
<td>国家科技进步二等奖</td>
<td>1985</td>
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<td>5</td>
<td>我国不同地区实行农业机械化方案制定方法的研究</td>
<td>国家科技进步三等奖</td>
<td>1987</td>
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<td>6</td>
<td>旋耕机工作部件及其与拖拉机配套合理性的研究</td>
<td>国家科技进步二等奖</td>
<td>1987</td>
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<td>7</td>
<td>种植业适度规模研究</td>
<td>国家科技进步三等奖</td>
<td>1989</td>
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<td>8</td>
<td>新型背负式机动喷雾机研制开发</td>
<td>国家科技进步二等奖</td>
<td>2001</td>
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<td>9</td>
<td>花生收获机械化关键技术与装备</td>
<td>国家技术发明二等奖</td>
<td>2015</td>
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<tr>
<td>10</td>
<td>1.5万只蛋鸡笼养成套设备与标准鸡舍设计推广</td>
<td>国家科技进步三等奖</td>
<td>1985</td>
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<tr>
<td>11</td>
<td>太湖地区三麦免（少）耕学以适用技术</td>
<td>国家科技进步二等奖</td>
<td>1986</td>
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<tr>
<td>12</td>
<td>国家12个重要领域技术政策的研究</td>
<td>国家科技进步一等奖</td>
<td>1987</td>
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<tr>
<td>13</td>
<td>2000年振兴目标的研究</td>
<td>国家科学进步二等奖</td>
<td>1989</td>
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<tr>
<td>14</td>
<td>杂交水稻机械采授粉制种实用新技术</td>
<td>国家科技进步四等奖</td>
<td>1991</td>
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</table>
There are 14 post experts been selected in the national modern agricultural industrial technology system and 2 in Jiangsu Province system.
NIAM Scientific Research
Scientific Research

Responsibility of NIAM

- Research on theory and policy of agricultural mechanization
- AM technology and equipment research and development
- Technical standard system of AM engineering
- AM technology consulting and information services
- AM quality supervision and inspection, promotion
- Technology transformation and experimental demonstration
- Agricultural, Rural and park planning and engineering design
# Innovation Groups

NIAM built 12 innovation groups, divided into five fields

<table>
<thead>
<tr>
<th>Field of disciplines</th>
<th>Research direction</th>
<th>Lead</th>
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<tbody>
<tr>
<td><strong>Farming Machinery</strong></td>
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<td></td>
<td>Planting Machinery Group</td>
<td>Zhang Wenyi</td>
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<td><strong>Harvest Machinery</strong></td>
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<td></td>
<td>Green Farming and Root Crop Harvesting Technical Equipment Group</td>
<td>Wu Feng</td>
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<td></td>
<td>Crop Production Technology and equipment Group</td>
<td>Zhang Min</td>
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<td></td>
<td>Tea Fruit and Vegetable Harvesting Technical equipment Group</td>
<td>Song Zhiyu</td>
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<td></td>
<td>Cotton and hemp harvesting technical equipment Group</td>
<td>Zhang bin</td>
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<tr>
<td><strong>Agricultural Product Processing Machinery</strong></td>
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<td></td>
<td>Main grain and crop processing equipment group</td>
<td>Xie Huanxiong</td>
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<tr>
<td></td>
<td>Fruit and vegetable products and processing equipment Group</td>
<td>Song Weidong</td>
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<tr>
<td><strong>Agricultural Ecological Environmental Protection Maintain cooperation</strong></td>
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<td></td>
<td>Plant protection machinery Group</td>
<td>Xue Xinyu</td>
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<td></td>
<td>Agricultural production waste resource utilization equipment Group</td>
<td>Chen Yongsheng</td>
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<tr>
<td><strong>Agricultural Mechanization And Intelligent Control</strong></td>
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<td></td>
<td>Agricultural mechanization development and system optimization group</td>
<td>Cao Guangqiao</td>
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<td></td>
<td>Main crops intelligent agricultural machinery equipment group</td>
<td>Jin Chenqian</td>
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<tr>
<td></td>
<td>Western cold and arid regions mechanized group</td>
<td>Gong Yan</td>
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Research Achievements
Representative Achievements

Rape blanket seedling combined transplanter transplanting frequency is 280 times/min · row, at the world's leading level.
Representative Achievements

Rapeseed segmentation - combined low loss harvesting equipment

low loss, high efficiency and high quality harvesting for rapeseed. Simultaneously, the technologies and equipment can also achieve the harvest of rice, wheat, and other highland barley crops.
Cotton intelligent topping machine

Using the self-developed control system, the application of laser ranging, image analysis and recognition technology, to achieve top real-time recognition and detection of cotton, combined with high-speed position control technology, to achieve speed adaptive precision topping.
Intelligent plant protection UAV integrates a number of core technologies such as high-precision autonomous navigation, ultra-low altitude enhanced stability imitation flight, active obstacle avoidance, variable spraying, etc., which can achieve efficient, green, safe and accurate application of pesticide.
Orchard inspection robot
The fruit quantity can be dynamically identified and counted, and the fruit yield can be evaluated.
The operation efficiency is more than 10 times of the humanpower.
Smart farm solutions for large-scale fields
Aiming at the whole-link agricultural machinery and equipment for farm works, we innovated the whole-path planning method of machine-road coordination and multi-machine cooperation.
Representative Achievements

High ground clearance remote control multifunctional management machine for tea plantation

High ground clearance remote control multifunctional management machine for tea plantation
Multi-functional field management robot
It is suitable for the collection of phenotypic information, plant protection, fertilization, ploughing and weeding of various dryland crops.
International Cooperation and Training
**Academic Communications**

**International cooperation platforms**

➢ “The Sino-USA Laboratory of Pesticide Application Technology Cooperation”

➢ “The Sino-USA Laboratory of Peanut Production Engineering Technology”

From 2016 to 2022, NIAM held about 20 international academic conventions.
Academic Communications

NIAM is the host institution of various academic journals, including:

➢ “The Journal of Chinese Agricultural Mechanization”
➢ “Agricultural Development and Equipment”
➢ “Journal of Intelligent Agricultural Mechanization (in Chinese and English)”
Degrees and Training

We have 6 licensed doctoral degree tutors and 60 licensed master degree supervisors. Recently, we have 26 doctoral and 59 master students are enrolled in NIAM, after they graduated they will get the diploma from CAAS.
Degrees and Training

NIAM holds the China Agricultural Mechanization Education and Training Center for domestic as well as international training in agricultural engineering, with an average annual 2000 persons have been trained.
We are also keep cooperation with international organization for example, CSAM, FAO etc. to hold agricultural mechanization training workshop.
Future Development
Future Development

Institute Development

➢ Promote Intelligent machine technology action of CAAS
➢ Promote the research and development for hilly & mountain agricultural equipment
➢ Promote build the Smart Agriculture and Equipment Science Center of CAAS
➢ Promote deepen international cooperation
Future Development

International Cooperation

➢ Technical Exchange
➢ Build Research Platform
➢ Hold Technique Training and Workshop
➢ Demonstration and Extension of Existing Technology and Equipment
In future, NIAM will continue to serve as the innovation center for agricultural engineering theory, technology and equipment. It will also connect universities, institutes, and manufacturers all over the world, forging a mutually beneficial and win-win mechanism of international collaboration and actively contributing to national food security and global elimination of poverty and hunger.
谢谢
Thank you