THE NEW ADVANCES OF AGRICULTURAL MECHANIZATION AND EQUIPMENT INDUSTRY IN RECENT YEAR IN P.R.CHINA

presented at
The 3rd Session of the TAC of APCAEM
13-14 December 2004, Hanoi, Vietnam

WANG Maohua

Member of Chinese Academy of Engineering
Professor, China Agricultural University
Qinghua Donglu No.17, Beijing 100083, China

wangmh@cau.edu.cn
1. **NEW ADVANCES OF AGRICULTURE AND RURAL ECONOMY IN 2004**

1). **Crucial challenges to ensure food security and to improve farmers’ income**

**Facts in 1998 – 2003:**

- Sustained reduction of grain production
- Decrease of grain sown areas
- Slow improvement of farmers’ net income

![Graphs showing national output of grain crops, total sown area of grain crops, and increase of farmers income over previous year from 1998 to 2003.](image-url)
2). **Take strategic measures to promote agriculture and rural economy development in 2004**

- Giving top priority to solve agriculture, rural and farmers’ problems in the National Social & Economic Development Program
- Balancing urban and rural economy development
- Speeding up strategic re-adjustment of agriculture and rural economy
- Reducing farmers’ load by reforming rural tax systems and adopting subsidy policies directly to producers

**2004:**
- Reducing farmer’s tax: 36 bil. US $
- Subsidies for grain producers, seeds and farm machinery: 18 bil. US $

**Comparison 2003/2004:**
- Investment to agriculture from Central Government:
  - 2003 / 144.6 bil. US $
  - 2004 / 198.8 bil. US $
  - Increased rate: ↑ 37.5 %
3). Success in 2004:

- A bumper harvest of grain production in 2004:
  
  430 mil. tons / 2003 → 455 ~ 465 mil. tons / 2004

- Farmers’ income turned over from many years’ low:
  
  By the end of Sept. in 2004, the farmers’ cash-income increased 11.4%

- The market demand of agricultural equipment have shifted toward production process mechanization
China is starting a new period featured with industry supports agriculture and urban supports rural development!
2. A STATE LAW ON “PROMOTION OF AGRICULTURAL MECHANIZATION” WAS EFFECTIVE AS OF 1ST NOV, 2004

1). **Background:** The overall agricultural mechanization level is still quite low:

**Mechanization level (2003):**
- Tillage: 47 %
- Sowing: 27 %
- Harvesting: 19 %

**Mechanization level by crops (2003):**

<table>
<thead>
<tr>
<th>Sowing / planting</th>
<th>Winter wheat</th>
<th>Paddy Rice</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>78 %</td>
<td>6.16 %</td>
<td>48.24 %</td>
</tr>
<tr>
<td>Harvesting</td>
<td>75 %</td>
<td>23.6 %</td>
<td>2.03 %</td>
</tr>
</tbody>
</table>
2). The State Law targets at speeding up development of agricultural mechanization and providing an aid to support producers and rural service organizations with advanced and appropriate machinery.

3). The State Law mainly refers to:
   - R & D in development of machinery products;
   - Quality insurance of machinery products;
   - Extension & application;
   - Socialized service;
   - Policy, subsidy and investment support.

4). The State Law requires that all government bodies above county level should add the promotion of agricultural mechanization to the national and social development plans and smooth an increase of financial support to the development.
3. THE TRENDS OF AGRICULTURAL EQUIPMENT AND MECHANIZATION DEVELOPMENT

1). Sustained increases of farm power-use

**Total Farm Power (mil. kW)**

- 1990: 287
- 1994: 336
- 1998: 449
- 2002: 579
- 2003: 605

**Total Units of Tractors (10^6 units)**

- 1990: 7.79
- 1994: 8.87
- 1998: 12.08
- 2002: 14.47
- 2003: 14.94

**Combine Harvesters (10^3 units)**

- 1990: 39.6
- 1994: 63.8
- 1998: 181.8
- 2002: 312.1
- 2003: 362.2

**Rural Vehicles (10^6 units)**

- 1990: 0.23
- 1994: 0.43
- 1998: 0.79
- 2002: 9.53
- 2003: 10.29
2). Great changes in market demand structures for farm power consumption

- Fast increase for mid- and large tractors and implements
  
  36400 units were marketed between Jan. – May, ↑79.8%

- Small tractors demand are continuously in saturation stage:
  
  766.7 thousands units were manufactured, ↓15.1%

- Preserved tractors in total: 18.5 mil. units (by 30 Jun. 2004)

- Output of wheeled tractors (Jan.-Jun. 2004)
  
  Tractors ≥ 25 hp. 48 thousand units, ↑103.86%

  Tractors < 25 hp 867.9 thousand units, ↓26.2%
3) **Increased export and import of farm machinery:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Export (in bil US$)</th>
<th>Import (in bil US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>1.521</td>
<td>1.955</td>
</tr>
<tr>
<td>2003</td>
<td>2.131</td>
<td>4.219</td>
</tr>
</tbody>
</table>

4) **Expansion of mechanization service areas:**

- Field production → *pre- & post harvest treatment & processing*
- Grain crops → *economic crops*
- Grain crop production → *horticulture, livestock, forestry, etc.*

5) **Rapid development of mechanization services**

- Trans-regional harvesting and other services:
  - 1994 – over 60,000 combines
  - 2004 – over 350,000 combines, harvested wheat 17 mil. ha
Customized Services for Combine Harvesting

Trans-regional transportation of combine harvesters

Trans-regional service for wheat harvesting in 2004:

350,000 combines
17 mil. ha
4. ENHANCED INTERNATIONAL EXCHANGE AND
COOPERATION

More than 70 AM sub-companies or joint-venture
enterprises were established in China:

John-Deere, New Holland, Yammar,
Kubota, Tong Yang, San Jiu,
Jinzi, Valtra, Claas, etc)

Products from these Famous manufacturer
started to be accepted by Chinese customers
<table>
<thead>
<tr>
<th>型号</th>
<th>6603型</th>
<th>6403型</th>
<th>804型</th>
<th>724型</th>
<th>654型</th>
<th>600型</th>
</tr>
</thead>
<tbody>
<tr>
<td>发动机形式</td>
<td>立式、水冷、六缸</td>
<td>立式、水冷、四缸</td>
<td>立式、水冷、四缸</td>
<td>立式、水冷、四缸</td>
<td>立式、水冷、四缸</td>
<td>立式、水冷、四缸</td>
</tr>
<tr>
<td>缸径×行程(mm)</td>
<td>106×127</td>
<td>105×135</td>
<td>105×125</td>
<td>105×125</td>
<td>105×125</td>
<td>105×125</td>
</tr>
</tbody>
</table>
5. EVENTS ON AGRICULTURAL ENGINEERING AND MACHINERY IN 2004 IN CHINA:

- Annual large – scale Agricultural Machinery Fairs
- 2004 CIGR Agricultural Engineering Olympics Conference (11-14, Oct., 2004, Beijing)
- International Forum of Agricultural Equipment and Mechanization in Less Developed Regions (Oct. 15, 2004, Beijing)
- Session on agricultural engineering, food security & safety, WEC 2004 (12-16, Nov. Shanghai)
6. **CHALLENGES**

- Lower farmers’ income and weak purchasing capability;

- Equipment manufacturing industry needs adjustments to meet market demands;

- Insufficient technical innovation capability in R & D
7. THE PRIORITIES FOR PROMOTION OF AGRICULTURAL MECHANIZATION & EQUIPMENT DEVELOPMENT

- Mechanization of cereal production

  Rice (43%):

  Advanced transplanting; drying; processing

  Wheat(25%) / Maize(30%):

  Conservation tillage; precise sowing; sub-soil deep loosening; straw incorporation; water saving irrigation; maize harvester

- Other crop mechanization:

  Rape seed harvesting; cotton picking; sugarcane harvesting, tuber crop planting & harvesting

- Mechanization to meet the requirement of agro-industry structure adjustment:

  Facility horticulture, forage production; vegetables; gardens, etc.
9. VISION FOR THE FUTURE

- China’s agriculture is entering into a new stage for industrialization and modernization. Agricultural equipment industry and R & D will have favored development environment;

- Sustainable agriculture, food quality and safety require a series of engineering technological inputs and services:

  Soil & water management, renewable energy and bio-materials’ utilization, mechatronics, precisely manage agriculture process, advanced processing technology and equipment, modern agro-industry management, etc.

- The modern IT advances provide a prospectus possibility for technological innovation to transform traditional into modern agriculture and to serve full food chain & product traceability

- Investigation of new approaches to enhance intl. & regional technical transfer, technical & business cooperation will bring a great benefit to regional agricultural development.
Thank You!