The Development of Agricultural Engineering & Mechanization in P. R. China

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1. THE NEW STAGE OF AGRICULTURAL DEVELOPMENT

Basic balancing between supply and demand of agro-products
→ Changing development strategy from pursuing quantity of products to taking a general consideration on products quality, efficiency, competition & sustainability

Agriculture running mechanism changes towards marketing system
→ reconstruction of resources allocation, circulation system and price system, etc.

Marketing environment changes towards both domestic and global markets

Policy targets changes to overall planning on urban and rural economical development; construction of modern Agriculture and realize national basic industrialization by 2020.

Agricultural equipment industry and mechanization are entering into an accelerated development period.
2. **RECENT STATUS (2002):**

1). **Agricultural equipment manufacturing: (2002)**

- 2,040 manufacturing enterprises with annual output value over 0.6 mil. US $

- Total output value 14.4 bil. US $ with 678 thousands of employees

- 14 categories and more than 3,000 varieties of products.

- Total farm power: 579 mil. kW; 4.6 kW/ha

- Total units of tractors: 14.46 mil. (only 6.3% over 20 hp);

- 6 units/10² rural households

- Total units of grain combine harvester: 310 thousands.

- Total rural vehicles: Over 18 mil. units;

- 7.8 units/10² rural households
2). Agricultural mechanization:

- **Comprehensive mechanization level (2002):**
  
  Tillage – 47 %; Sowing – 26 %; Harvesting – 18 %

- **Mechanization level by crops (2002):**

<table>
<thead>
<tr>
<th>Sowing (planting)</th>
<th>Harvesting</th>
</tr>
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<tbody>
<tr>
<td>Winter wheat</td>
<td>73 %</td>
</tr>
<tr>
<td>Paddy Rice</td>
<td>6 %</td>
</tr>
<tr>
<td>Corn</td>
<td>47 %</td>
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<td></td>
<td>70 %</td>
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<td>20 %</td>
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<td>1.7 %</td>
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- **Ownership of agricultural machinery:**

  Cumulated investment in farm machinery: **38.7 bil. US $**.
  (investment by farmers: 96.1 %)

  Rural households own farm machinery by average is about 183 US $, which equals to 1/3 of total fixed property owned by rural household for production.
Comprehensive Mechanization Level (%)
3). **Agricultural Mechanization Services Industry:**

- Numbers of rural households owned farm machinery - **29 mil.** (12 % of total rural households)
- Rural Specialized household supplying contract AM services: **3.3 mil**
- Trans-regional services for harvesting: **180 thousand** combine harvesters have harvested 12 mil. ha of wheat and rice in 2002.

4). **Exportation and Importation of Farm equipments:**

5) **Foreign AM companies have established more than 70 sub-companies or joint-ventures in China (John-Deer, New Holland, Kubota, Yammar, Dong Yang ( etc)
Customized Services for Combine Harvesting

Trans-regional service for wheat harvesting in 2001:

150,000 combines
6). Protected Horticulture:
   Total areas: 2.07 mil ha
   Large Greenhouse: 1000 ha
   (over 60% for flower production)
   Greenhouse structure manufacturing enterprises: over 300s

7). Post Harvest Technology and Product Processing

   Processing enterprises for agricultural products & by-products:
   55,000 (1999)
   Employees: 14 million,
   Total production value: 223 billion US $.

8). Challenges:
   ◆ Small scale farming;
   ◆ Lower farmers’ income;
   ◆ Equipment technologies backward;
   ◆ Insufficiency of technical innovation capability
3. ORGANIZATIONAL STRUCTURE OF COUNTRY’S FARM MECHANIZATION MANAGEMENT

1). Management system for agricultural Mechanization:

- Decision departments:
  - Central Government: Department of Agricultural Mechanization, Ministry of Agriculture
  - Provincial level: 31 units

- Application management departments:
  - Prefecture level: 346 units
  - County level: 2,745 units
  - Township level: 34,317 units
2). Research Organization:

- **National:**
  - Chinese Academy of Agricultural Mechanization Sciences (CAAMS)
  - Chinese Academy of Agricultural Engineering (CAAE)
  - Chinese Academy of Agricultural Sciences (CAAS)
  - Chinese Academy of Forestry Sciences (CAFS)
  - China Agricultural University (CAU)
  - China Forestry University (CFU)

- **Local research institutes higher prefecture level:** 122 units

3). **Appraisal and Certification organizations for farm machinery:** 49 units
4). Extension Services for AM (over county level): 2413 units

5). Professional Training (over county level): 2213 units

6). Safety Supervisory Organizations (over county level): 2900

7). High Education of Agricultural Engineering:

8). Professional Societies:
   - Chinese Association of Agricultural Manufacturing Industry (CAAMI)
   - Chinese Society of Agricultural Engineering (CSAE)
   - Chinese Society for Agricultural Machinery (CSAM)
4. FINANCING TO AGRICULTURAL MECHANIZATION (2002):

Total investment of mechanization: 23.795 bil. Yuan

Amount them:
- Central government input: 0.76 %
- Provincial government input: 9.37 %
- Cooperative organization input: 3.79 %
- Farmers’ input: 85.06 %
- Other input: 1.02 %

Percentage of equipment purchase of total investment: 83.86 %

Percentage of Farm machinery ownership (2002):
- Farmers: 86.36 %
- State-owned: 3.7 %
- Cooperative owned: 9.94 %
Subsidy to farm machinery purchase between 1998 - 2002:
Funding from:
Central government: 100 mil. Yuan
Provinces and municipal government: 470 mil. Yuan
Stimulate local services organization and farmers input: 2,000 mil. Yuan

Additional:

➤ Regulative fund for oil fuel price for farm users;
➤ Subsidy for replacing old large and medium tractors;
➤ Special fund for straw incorporation into field;
➤ Preferential bank loan for mechanization, ….
5. FURTHER NEEDS IN FARM MECHANIZATION AND POST-HARVEST TECHNOLOGY

- Vigorously develop Agri. Equipment Manufacturing Industry;
- Cereal crop full process mechanization: wheat, corn, rice;
- Selected mechanization for cash crops: cotton; oil seeds, sugarcane, protected horticulture;
- Water saving irrigation technology & arid farming equipment;
- Mechanization of livestock production: waste treatment; environ.;
- Full process mechanization of forage & silage production;
- Post-harvest and value-added processing mechanization;
- Appropriate and new-tech investigation:
The 10 items of extended mechanization technologies during 2001-2005

1. Transplanting & harvesting for paddy rice
2. Nursery, transplanting & harvesting for corn
3. Arid farming & water-saving technologies
4. Straw incorporation into field and its comprehensive utilization
5. Local cereal drying mechanization technology
6. Mechanization of facility horticulture and livestock farming
7. Harvesting technology for cotton, oil seeds and peanut
8. Mechanization of forage production
9. Mechanization of value-added processing of agro-products
10. Aviation technology for farm use
Welcome to
Olympics of
Agricultural
Engineering in
Golden
Beijing!

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Thank you!