The 10th Session of the Technical Committee of CSAM & Regional Workshop on Establishing a Regional Database of Agricultural Mechanization in Asia and the Pacific  
17-18 November 2014, Siem reap, Cambodia

The Importance and Procedures on Establishing a Regional Database of Agricultural Mechanization

Minli Yang, Ph.D.  
Professor and Executive Deputy Director  
China Research Center for Agricultural Mechanization Development  
China Agricultural University  
qyang@cau.edu.cn
The Importance and Procedure on Establishing a Regional DataBase of Agricultural Mechanization

- Preface
- CRCAMD Introduction
- Data sources and cases
- Significance on establishing a regional database
- Procedures on establishing a regional database
Agricultural mechanization (AM) is the base of agricultural modernization and important symbol.

AM is closely related to industrialization, urbanization and agricultural labor transfer.

China is a large farming country, it's the primary task to ensure food safety for Chinese government.

Now structural shortage of agricultural labor force is becoming more and more prominent. There were over 270 million agricultural labor force transferred to the city by 2013.

Cultivated land and water resource constraints continue to intensify.
• Preface

- How to ensure China's food security?
- Who is farming?
- How to farming?
- It is the top priority to actively promote AM development.
- How to promote AM development?
- It is very necessary to research AM strategy, formulate AM development plan and supporting policy.
- Generally, the method should be adopted to combine qualitative analysis with quantitative analysis in above researches.
- So, we must to have statistics and make some typical investigations.
CRCAMD Function

- To realize the technical and economic analysis of technological application and systematic effect
- To study and solve major problems of AM development directions and policy issues
- To provide consulting services for the country's decision-making departments
CRCAMD Introduction

Research Fields

- Rural Development and AM
- Mechanization Production Patterns and Equipment System Integration for Main Crops
- Regional Planning for AM
- Agricultural Machinery Cooperatives
- Information Engineering of AM
• CRCAMD Introduction

Research Contains

- Modes and ways of AM development
- Development strategy, Laws, Policies, Planning, mechanism and system of AM
- Main crops mechanization production
- AM development level evaluation methods and standards
- Relationships researches, such as
  - relationships on AM and industrialization, urbanization, informatization, labor migration, scale of operation, energy, ecology, sustainable development, etc
- The relationship between AM level and grain yield

Grain yield increased for ten consecutive years

Grain Yield of China (10,000 tons)

2003: 43070
2004: 46947
2005: 48402
2006: 49804
2007: 50160
2008: 52871
2009: 53082
2010: 54648
2011: 57121
2012: 58958
2013: 60194

- 602 million tons predicted for 2020

Crop production mechanization level improved

% 2004: 34.32
2005: 35.93
2006: 39.29
2007: 42.47
2008: 45.85
2009: 49.36
2010: 52.28
2011: 54.82
2012: 57.17
2013: 59.48

- 70% predicted for 2020
• The relationship between AM level and grain yield

How to change AM technology to meet growing food demands

Some of the farmland production is still very weak

For example: rice
• The relationship on AM and urbanization, labor migration

• Crop production mechanization level improved
• the proportion of employment in primary industry
• urbanization rate increased
• The trend of crop production mechanization level
AM evaluation index systems and standards

The Evaluation for the Level of Agricultural Mechanization Part 1: Crop Cultivation-----Agricultural Standards

launched by MOA, China in June 2007

<table>
<thead>
<tr>
<th>表 1 评价指标</th>
</tr>
</thead>
<tbody>
<tr>
<td>一级指标</td>
</tr>
<tr>
<td>指标名称</td>
</tr>
<tr>
<td>耕种收综合机械化水平/(%)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>农业机械化综合保障能力/(%)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>农业机械化综合效益/(%)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
• CRCAMD Introduction

AM evaluation index systems and standards

- The evaluation index system for animal husbandry mechanization
- The evaluation index system for fishery industry mechanization
- The evaluation index system for agricultural products pretreating mechanization
- The evaluation index system for facility agriculture mechanization
- The evaluation index system for fruit, tea and mulberry mechanization

launched by MOA, China in January 2013
AM development plans and policies

- To assess *The Twelfth Five-year Plan for National Agricultural Mechanization Development of the People's Republic of China (2011-2015)*

- To formulate *The Thirteenth Five-year Plan for National Agricultural Mechanization Development of the People's Republic of China (2016-2020)*

- To improve *Agricultural Machinery Purchase Subsidy Policies*

- To study and formulate *Agricultural Machinery Operation Subsidy Policies*

All of the above work are based on the data analysis.

The data comes from statistical data and survey data.
• Data sources and cases
• Data sources and cases

China Agricultural Mechanization Statistical Yearbook
launched by Department of AM Management, MOA, China

China Agricultural Mechanization Yearbook
launched by Nanning AM Institute, MOA, China
Data sources and cases

China Agricultural Mechanization Statistical Yearbook launched by Department of AM Management, MOA, China

- The annual statistical analysis on the national AM development.
- The annual national AM development indicators
- The annual regional AM development indicators (31 provinces)
**Data sources and cases**

We have the main statistics of China's AM since 1949

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Power of Agricultural Machinery (10,000 kW)</th>
<th>Number of Tractor (10,000 units)</th>
<th>Number of Combine Harvester (10,000 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>8.1</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td>1955</td>
<td>52.9</td>
<td>0.48</td>
<td>0.09</td>
</tr>
<tr>
<td>1960</td>
<td>591.2</td>
<td>4.55</td>
<td>0.59</td>
</tr>
<tr>
<td>1965</td>
<td>1098.8</td>
<td>7.66</td>
<td>0.67</td>
</tr>
<tr>
<td>1970</td>
<td>2165.3</td>
<td>20.38</td>
<td>0.80</td>
</tr>
<tr>
<td>1975</td>
<td>7478.6</td>
<td>94.31</td>
<td>1.26</td>
</tr>
<tr>
<td>1980</td>
<td>14745.7</td>
<td>261.89</td>
<td>2.70</td>
</tr>
<tr>
<td>1985</td>
<td>20912.5</td>
<td>467.64</td>
<td>3.46</td>
</tr>
<tr>
<td>1990</td>
<td>28707.7</td>
<td>779.45</td>
<td>3.87</td>
</tr>
<tr>
<td>1995</td>
<td>36118.1</td>
<td>931.82</td>
<td>7.34</td>
</tr>
<tr>
<td>2000</td>
<td>52573.6</td>
<td>1361.82</td>
<td>26.26</td>
</tr>
<tr>
<td>2005</td>
<td>68549.4</td>
<td>1679.37</td>
<td>47.70</td>
</tr>
<tr>
<td>2010</td>
<td>92780.5</td>
<td>2177.96</td>
<td>99.21</td>
</tr>
<tr>
<td>2013</td>
<td>103906.8</td>
<td>2279.00</td>
<td>142.10</td>
</tr>
</tbody>
</table>

Source: China Agricultural Mechanization Statistical Yearbook
• Data sources and cases

Fig. 1 Trend of total power of agricultural machinery from 1949 to 2013

Fig. 2 Trend of the number of tractor from 1949 to 2013

Fig. 3 Trend of the number of combine harvester from 1949 to 2013

Fig. 4 Trend of the number of rice transplant from 2000 to 2013
Data sources and cases

The total number of tractor tends to saturation.
The number of small tractor began to decline steadily.
The number of large-medium sized tractor continues to rise.

Fig 5 Trend of numbers of the total tractor, large-medium sized tractor and small sized tractor from 2000 to 2013
It's very important and necessary to establish a regional database for promote regional AM harmonious development.

It'll contribute to

- establish a platform for regional AM exchange and cooperation
- formulate regional AM development strategy, plan and policy
- adjust the regional industrial structure
- promote agricultural machinery trade and technology cooperation
First, to reach a consensus among member countries

Second, to study and put forward a regional database platform framework by the expert group organized by CSAM, the framework should include:

- target
- functions
- scope
- indicator types (focus on AM)
- key indicators (main and basic)
- indicators standardization
Third, to discuss fully and improve the framework

Forth, to get the recognition and support of member countries' governments

Last, to establish the regional database of AM (module design, programming, data collection, etc)
Cooperation, Friendship, Development

Thank You

qyang@cau.edu.cn