Asian and Pacific Workshop on Whole-Process Mechanization of Potato Production

Accelerating the promotion of China’s Potato Production Mechanization

Center of Agriculture Machinery Extension of the Ministry of Agriculture

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Contents

Acknowledge the progress of potato production mechanization

Recognize the content of potato production mechanization

Solve the key problems in potato production mechanization
The progress of potato production mechanization

- **Planting area**: 83.6 million acres
- **Yield**: 19.1 million ton
- **Location**: Nationwide
- **Global ranking**: area and yield occupies 1/4, ranking in the first place
Development after 21st century

Market demand + Government promotion
Government leading with various methods

Government & Multi-sectors participating

- Research
- Administrative promotion
- Technique guide
- Demonstration
Research

1, The tenth “five year plan” key program
Research & development on the key facilities in the whole-process mechanization of potato production

2, The eleventh “five year plan” key program
Research & demonstration on the technology of mechanized digging & harvesting

3, National Public Welfare Industry special program
Study on the upgrading of the key technology and facilities in rhizome crop’s mechanization

4, National modern agriculture program on potato industry technology system

5, Provincial & enterprise’s research
Administrative promotion

* The comment of accelerating potato industry’s development from MOA (Oct. 2006)
* Regional layout planning of national advantaged agricultural products (2008—2015)
* National potato production mechanization meeting (2009.9.25, Inner Mongolia)
* MOA promotion of main crop and technology (2011)
Technical guidance

- Industry standard
- Local standard
- Technology standard
Demonstration

- Allowance of purchasing machine
- Allowance of Working
- Allowance of Production
- Demonstration programs (20 national districts)
- Base construction (Wuchuan\ Guyang)
30 factories and more than 100 products are included in the program.
Progress

Level of potato mechanization

综合（%） 机耕（%） 机播（%） 机收（%）

Complex  Farming  Seeding  Harvesting
The mechanization of potato production to achieve positive progress

Yield increased 500 kg/acre

Saved 600 RMB/acre

Efficiency increased 10 times

<table>
<thead>
<tr>
<th>机械化水平</th>
<th>耕种水平 (%)</th>
<th>机耕水平 (%)</th>
<th>机播水平 (%)</th>
<th>机收水平 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>马铃薯밀</td>
<td>34.2</td>
<td>54.71</td>
<td>21.42</td>
<td>19.64</td>
</tr>
</tbody>
</table>
The overall level of potato mechanization is still low.
Imbalanced development among provinces

Potato mechanization level in China’s provinces in 2014 (%)
New progress

Step to middle level

Step to whole process

Step to industrialize

![Bar chart showing progress in various agricultural processes](chart)
whole process mechanization of main restricted

1, The supply of machinery

2, The blend of machine and Agronomic

3, The change in running business

4, The matching of saving, transporting and machining
Chances

Four modernizations
Transfer of rural labor force
Development of agricultural mechanization

Key point: use machine to take the place of labor force
Agricultural production method: From human and animal force to mechanization

Agricultural production rely more on machinery

Farmer’s demand on machinery increase

Mechanization level influence farmer’s willing of production as well as industry’s stable development

Mechanization lead to the revolution of variety breeding, cultivation model, production method and operation method
## 2010-2014 potato production cost and benefit
(National potato production)

<table>
<thead>
<tr>
<th>item</th>
<th>单位</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net benefit</td>
<td>元</td>
<td>1058.13</td>
<td>1000.7</td>
<td>1072.37</td>
<td>1315.74</td>
<td>1000.09</td>
</tr>
<tr>
<td>Total benefit</td>
<td>元</td>
<td>2989.16</td>
<td>2218.02</td>
<td>2233.65</td>
<td>2761.37</td>
<td>2430.48</td>
</tr>
<tr>
<td>Average yield</td>
<td>KG</td>
<td>1708.07</td>
<td>1819.27</td>
<td>1670.6</td>
<td>1641.42</td>
<td>1753.44</td>
</tr>
<tr>
<td>Total cost</td>
<td>元</td>
<td>1131.03</td>
<td>1214.27</td>
<td>1161.28</td>
<td>1355.46</td>
<td>1400.39</td>
</tr>
<tr>
<td>Direct cost</td>
<td>元</td>
<td>799.19</td>
<td>869.43</td>
<td>760.08</td>
<td>783.56</td>
<td>839.13</td>
</tr>
<tr>
<td>Planting fee</td>
<td>元</td>
<td>264.93</td>
<td>333.36</td>
<td>313.96</td>
<td>326.23</td>
<td>339.60</td>
</tr>
<tr>
<td>Fertilizer fee</td>
<td>元</td>
<td>160.16</td>
<td>207.02</td>
<td>195.55</td>
<td>160.02</td>
<td>184.8</td>
</tr>
<tr>
<td>Indirect fee</td>
<td>元</td>
<td>41.03</td>
<td>40.33</td>
<td>22.82</td>
<td>43.08</td>
<td>37.55</td>
</tr>
<tr>
<td>Manpower cost</td>
<td>元</td>
<td>290.81</td>
<td>304.51</td>
<td>370.38</td>
<td>528.82</td>
<td>491.98</td>
</tr>
<tr>
<td>Family labor</td>
<td>元</td>
<td>249.14</td>
<td>260.49</td>
<td>339.31</td>
<td>329.61</td>
<td>321.84</td>
</tr>
<tr>
<td>Employ fee</td>
<td>元</td>
<td>41.67</td>
<td>44.02</td>
<td>39.07</td>
<td>199.21</td>
<td>168.70</td>
</tr>
</tbody>
</table>
Variety: 9 main crop and 5 main economic plants
Process: 5 main procedure: Tillage, plant, harvest, protection, dry
Aim: demonstration area
Promoting the mechanization of main crops

- Milestone in the development
- Lead to the change of variety, plant, operation and management
- Lead to the change of research, production, promotion, logistic, application and management. Especially the industry of Agricultural Mechanization
- The key work of 13th five year plan
Comment from MOA about promoting potato industry

2020 aim

- Planting area reach 100 million acre, increase 15 million acre
- Staple food reach 30% of total production
- Consumption as staple food reach 30% total consumption of potato
- Specialization, Regionalization, mechanization, Industrialization, focus on staple food
Recognize the content of potato production mechanization

integration
diversity
pluralism
systematically
continuity
dynamicity
Technology integration

Good Seeds
Good method
Good chance

Better agricultural mechanization technology
Whole process mechanization of potato production

- Tillage
- Mulching and ridge
- Sowing
- Depositing and transportation
- Recycling
- Fertilizing
- Harvesting
- Seedling
- Irrigating
- Recycling
# Area variety

<table>
<thead>
<tr>
<th>Area Type</th>
<th>Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-one harvest area</td>
<td>Hei Longjiang、Jilin、Inner Mongolia、Gansu、Ningxia、Liaoning、Hebei、Shanxi、Qinghai、The north of Shanxi、The north of Xinjiang</td>
</tr>
<tr>
<td>Central-two harvest area</td>
<td>Henan、Shandong、Jiangsu、Zhejiang、Anhui、Jiangxi、Liaoning、Hebei、Shanxi、The earth of Hunan、The earth of Hubei</td>
</tr>
<tr>
<td>South west-mix area of one and two harvests</td>
<td>Chongqing、Sichuan、Guizhou、Yunnan</td>
</tr>
<tr>
<td>South-winter harvest area</td>
<td>Guangdong、Guangxi、Hainan、Fujian</td>
</tr>
</tbody>
</table>
Body variety

Land scale management: Transfer, trusteeship, Shares

自主型  合作型  服务型
autonomy  cooperation  service

Whole process mechanization of production
Sustainability

Economical

safe

green

Land output rate

Labor output rate

Resource utilization ratio
Whole process mechanization:
- Time and space
- Relatively stable
- Radiation
- Evolution
Solution for main crop whole process mechanization

- Suitable area
- Technology route
- Technology scale
- Facilitation
- Operating standard process
- Operating institution
- Protection arrangement
一、适宜区域
 马铃薯分布广泛，适宜在气候温和、土壤肥沃、灌溉条件好的地区种植。

二、时间线和采摘技术

<table>
<thead>
<tr>
<th>时期</th>
<th>时间</th>
<th>5.1-5.5</th>
<th>5.6-6.20</th>
<th>5.20-10.10</th>
<th>10.1-10.15</th>
</tr>
</thead>
<tbody>
<tr>
<td>种植</td>
<td>稳定地</td>
<td>插种</td>
<td>中耕培土</td>
<td>滴灌浸保</td>
<td>收获</td>
</tr>
<tr>
<td>路线</td>
<td>旋耕机整地</td>
<td>株沟施肥、起垄施肥、施用底钾肥</td>
<td>起垄，播种，覆土</td>
<td>滴灌，浸作物</td>
<td>收获</td>
</tr>
</tbody>
</table>

三、操作规程

<table>
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<tr>
<th>路线</th>
<th>整地</th>
<th>插种</th>
<th>中耕培土</th>
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<tr>
<td>操作</td>
<td>一次性</td>
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<tr>
<th>机器种类</th>
<th>型号及图片</th>
<th>主要参数</th>
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<tbody>
<tr>
<td>1104拖拉机</td>
<td>WZ1104</td>
<td>90马力以上，110马力，1.5千米/小时，0.5kg柴油/亩地</td>
</tr>
<tr>
<td>播种机</td>
<td>2CM-4/4A</td>
<td>块距（mm）：800-900（可调）；播种深度（mm）：80-150；施肥容量：90L</td>
</tr>
<tr>
<td>中耕培土机</td>
<td>3MZ-360</td>
<td>块距（mm）：900；作业幅度（mm）：3600；作业速度（km/h）：4-6</td>
</tr>
<tr>
<td>收获机</td>
<td>4U-170A</td>
<td>工作幅宽（mm）：3600；工作行数：4行；滚筒转速：2000r/min；20-30亩/小时</td>
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四、配套机具

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马铃薯的生产适宜机械化，青岛洪珠农业机械有限公司主推马铃薯全程机械化。
Solve the key problems

Supply-side reform

Policy support

Institutional Innovation
Supply side reform

demand of agricultural mechanization VS shortage of new technology supply
Need technology progress
Supply side reform

Increase quality and efficiency of agricultural supply

- Technology innovation
- Production innovation
- Service innovation
- Operation innovation
- Human resource innovation
Allowance on purchasing machinery: lower scale, lower amount, increase open-up.

Mainly subsidize main crop’s key process, no limitation on urgent needs.

Construction on demonstration area.
- Integrated subsidies, finance, insurance and facilities of agricultural business entities to a single policy system
- Performance appraisal on the whole process agricultural mechanization
- Technology innovation and subsidies
Institutional innovation

- Multi-background expert group
- Enterprise as the main body to innovate
- Demand leading research and assessment

- Multi-background expert group
- PPP, government purchase and other cooperation
- Negotiation on key problems
◆ Enterprise leading, research and industry cooperate, integrate resources.

◆ Demand leading research and assessment, make promotion staff has more power in project establishing, executing and assessing.
Actively construct the collaborative development mechanism of public welfare and business promotion. Implement policy support according to law, support and encourage schools, scientific research institutions, production enterprises, cooperatives, social groups to carry out technical popularization; explore the services of public welfare in a variety of forms, strengthen planning guidance, project driven, work plan, business guide, promote the national promotion agencies and multiple main bodies to form a joint force.
Establish and improve the Department consultation, discipline coordination system, oriented by problem, construct a inter-discipline communication, coordination and cooperation mechanism among agricultural and agronomic departments. Focus on the overall solutions, promote scientific research, teaching, marketing and producing. Make consensus and division of labor.

Lead by government, promotion agency, enterprise and industrial organization.
Thank you