Agricultural Mechanization in Cambodia: Challenges and Opportunities

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I. Background

- Location: SEA and bordered with Vietnam, Laos and Thailand
- Total area: 181,035 km²
- Total population: 14 millions (51.8% are women)
- Population by Urban - Rural residence
  - Urban = 3 millions
  - Rural = 11 millions
II. Agriculture in Cambodia

Contribution of Cambodian Agriculture in GDP in 2012

Source: Ministry of Planning, March 2013
II. Agriculture in Cambodia - 2

Composition of agricultural sub sector in 2012

- Crops: 54.8%
- Fisheries: 25.4%
- Livestock: 14.1%
- Forestry: 5.7%

Source: Ministry of Agriculture, Forestry and Fisheries, April 2013
II. Agriculture in Cambodia - 3

Crop production statistics in 2012

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Cultivated area (ha)</th>
<th>Production (tone)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Rice production</td>
<td>3,007,545</td>
<td>9,290,940</td>
</tr>
<tr>
<td>II</td>
<td>Industrial crops</td>
<td>180,926</td>
<td>1,760,335</td>
</tr>
<tr>
<td></td>
<td>2.1 Sugarcane</td>
<td>48,586</td>
<td>1,573,771</td>
</tr>
<tr>
<td></td>
<td>2.2 Soybean</td>
<td>71,337</td>
<td>120,165</td>
</tr>
<tr>
<td></td>
<td>2.3 Sesame</td>
<td>36,722</td>
<td>26,764</td>
</tr>
<tr>
<td></td>
<td>2.4 Peanut</td>
<td>18,048</td>
<td>30,376</td>
</tr>
<tr>
<td></td>
<td>2.5 Tabaco</td>
<td>5,947</td>
<td>8,987</td>
</tr>
<tr>
<td></td>
<td>2.6 Jute</td>
<td>286</td>
<td>271</td>
</tr>
<tr>
<td>III</td>
<td>Secondary crops</td>
<td>731,957</td>
<td>9,099,472</td>
</tr>
<tr>
<td></td>
<td>3.1 Cassava</td>
<td>361,851</td>
<td>7,613,697</td>
</tr>
<tr>
<td></td>
<td>3.2 Maize</td>
<td>216,330</td>
<td>950,909</td>
</tr>
<tr>
<td></td>
<td>3.3 Vegetables</td>
<td>76,495</td>
<td>411,435</td>
</tr>
<tr>
<td></td>
<td>3.4 Sweet potato</td>
<td>10,428</td>
<td>48,754</td>
</tr>
<tr>
<td></td>
<td>3.5 Mung bean</td>
<td>66,850</td>
<td>74,677</td>
</tr>
</tbody>
</table>

Source: Ministry of Agriculture, Forestry and Fisheries, April 2013
II. Agriculture in Cambodia

Cultivated area (%) in 2012

- **Rice production**: 77%
- **Secondary crops**: 19%
- **Industrial crops**: 4%
The paddy production in Cambodia from 2003 to 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>4.71</td>
</tr>
<tr>
<td>2005</td>
<td>5.98</td>
</tr>
<tr>
<td>2007</td>
<td>6.72</td>
</tr>
<tr>
<td>2009</td>
<td>7.58</td>
</tr>
<tr>
<td>2011</td>
<td>8.78</td>
</tr>
<tr>
<td>2012</td>
<td>9.29</td>
</tr>
</tbody>
</table>
II. Agriculture in Cambodia

The vegetable production in Cambodia from 2003 to 2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0.47</td>
</tr>
<tr>
<td>2005</td>
<td>0.48</td>
</tr>
<tr>
<td>2007</td>
<td>0.49</td>
</tr>
<tr>
<td>2009</td>
<td>0.54</td>
</tr>
<tr>
<td>2011</td>
<td>0.62</td>
</tr>
</tbody>
</table>
II. Agriculture in Cambodia - 7

The fruit production in Cambodia from 2003 to 2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0.58</td>
</tr>
<tr>
<td>2005</td>
<td>0.65</td>
</tr>
<tr>
<td>2007</td>
<td>0.73</td>
</tr>
<tr>
<td>2009</td>
<td>0.76</td>
</tr>
<tr>
<td>2011</td>
<td>0.70</td>
</tr>
</tbody>
</table>
III. The plowing areas by farm machinery from 2003 to 2012

![Bar graph showing plowing areas (ha) from 2003 to 2012.]

*Note: The total of plowing area is approximately 3 million hectares/year*
IV. Statistical data on farm machinery and equipment from 2003 to 2012

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tractor</td>
<td>3,310</td>
<td>3,857</td>
<td>4,166</td>
<td>4,247</td>
<td>4,475</td>
<td>4,611</td>
<td>5,495</td>
<td>6,200</td>
<td>6,786</td>
<td>8,961</td>
</tr>
<tr>
<td>2</td>
<td>Power tiller</td>
<td>13,693</td>
<td>20,279</td>
<td>26,504</td>
<td>29,706</td>
<td>34,639</td>
<td>38,912</td>
<td>53,220</td>
<td>66,548</td>
<td>77,421</td>
<td>128,806</td>
</tr>
<tr>
<td>3</td>
<td>Harvester</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>325</td>
<td>395</td>
<td>430</td>
<td>836</td>
<td>947</td>
<td>1,548</td>
<td>4,820</td>
</tr>
<tr>
<td>4</td>
<td>Thresher</td>
<td>4,967</td>
<td>6,220</td>
<td>7,338</td>
<td>7,795</td>
<td>8,036</td>
<td>8,237</td>
<td>13,798</td>
<td>14,390</td>
<td>15,210</td>
<td>16,146</td>
</tr>
<tr>
<td>5</td>
<td>Mill</td>
<td>32,945</td>
<td>36,531</td>
<td>38,606</td>
<td>38,618</td>
<td>38,680</td>
<td>39,429</td>
<td>47,620</td>
<td>48,217</td>
<td>48,753</td>
<td>54,328</td>
</tr>
<tr>
<td>6</td>
<td>Engine pump</td>
<td>99,875</td>
<td>106,569</td>
<td>120,968</td>
<td>127,610</td>
<td>131,702</td>
<td>136,061</td>
<td>164,974</td>
<td>166,633</td>
<td>183,502</td>
<td>231,942</td>
</tr>
</tbody>
</table>

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**Graph:**
- **Y-axis:** 0 to 250,000
- **X-axis:** 2003 to 2012
- **Legend:**
  - Blue: Thresher
  - Orange: Power Tillers
  - Red: Engine Pumps
V. The challenges of Ag Mechanization in Cambodia

- National policy on agricultural mechanization is not yet prepared;
- Structure of the Provincial Office of agricultural engineering is still weak;
- Inadequate skilled workforce at both national and provincial level;
- Credit scheme for buying farm machinery and equipment is not existent;
- Most of workshops for repairing and maintenance of farm machinery and equipment are not available at the rural areas;
- Annual budget allocated for the implementation of agricultural mechanization activities fails the nationwide coverage;
- Less activities on Research and Development on agricultural machinery and equipment and it exists mainly at the national level;
- External support and cooperation with development partners is still missing; and
- Gap in cooperation with private sector dealing with farm machinery.
VI. The positive points of Ag Mechanization in Cambodia

- The number of farm machinery and equipment is increasing rapidly in the last few years;
- Strategy on agricultural mechanization is in place as a milestone;
- Clear structure and mandate;
- Support from the Ministry of Agriculture, Forestry and Fisheries;
- Good cooperation with other line departments under the Ministry of Agriculture, Forestry and Fisheries;
- Academic institutions providing services in agricultural mechanization from short-term certificate courses to graduated degrees; and
- Annual budget allocation from the Government to implement its activities increasingly.
VII. Orientation of Agricultural Mechanization Development in Cambodia - 1

- Shifting labor force from agriculture to other sectors
- Shifting from the Subsistence Agriculture to Commercial Agriculture
- Rice exportation policy

Main Objectives

- Increase in Labor productivity
- Increase in Land productivity
- Decrease in Costs of production
VII. Orientation of Agricultural Mechanization Development in Cambodia - 2

Mechanization in both pre and post harvest technology will increase rice production in Cambodia.
VIII. Agricultural Mechanization Development Strategic planning in Cambodia

**Goal:**
We are committed toward contributing to **poverty reduction**, ensuring **food security** and **adapting to climate change**.

**4 main objectives are considered and addressed:**
1. Enabling access to Mechanization;
2. Develop broad-based skills and strengthen capacity in agricultural mechanization;
3. Commercialization of agriculture through mechanized farming; and
4. Improving policy, legal and regulatory environment for agricultural mechanization.
IX. The Development of an organizational chart of Dept of Agricultural Engineering in Cambodia

- Department’s leaders
  - Office of Adm, Planning, Accounting and Int. Cooperation
  - Office of Pre Harvest Tech.
  - Office of on farm irrigation
  - Office of Engineering & ALR
  - Office of Training & Community Development
  - Office of Post Harvest Tech.

- Provincial Office of Agricultural Engineering
  - Kbal Po Ag. Eng. Center
  - Toul Samrong Ag. Eng. Center

6 offices at central level
2 offices at Takeo and Battambang provinces
Local made farm machinery & equipment
Farmer congress on farm machinery & equipment
Research & Development on farm machinery & equipment
Field demonstration on farm machinery & equipment used
Display of farm machinery & equipment at the annual agricultural conference
Cooperation with Int institution and private sector
Different applications on rice harvesting introduced at farmer field day
Farmer workshop at the rice field between combine harvester’s owner, operator, rice field owner and other farmers on rice losses and waste after harvesting by combine harvester.
X. Prospective activities for 2014 - 1

- Strengthen the organization of the Provincial Offices of Agricultural Engineering;
- Conduct in-depth data collection on the use of agricultural machinery and equipment;
- Prepare regulations and guidelines for the improvement of agricultural machinery;
- Conduct Research and Develop on most suitable implements equipped with hand tractors and tractors;
- Continue providing training on repair and maintenance of farm machinery and equipment to end-users/farmers;
- Make technical documents available in both Cambodian and English;
- Organize events, at national and provincial levels, where end-users/farmers, distributors and artisans/manufacturers can meet together to share experiences and updated information.
X. Prospective activities for 2014 - 2

- Organize workshops to update and upgrade farmers and artisans/mechanics who are enthusiastic about the creation/innovation and modification of farm machinery and equipment;
- Coordinate and cooperate with development partners, NGOs, and private sector to make the agricultural mechanization sector kept pace with the Govt’s strategy on the promotion of rice export;
- Organize farm machinery expo in cooperation with private sector and development partners at national and provincial levels.
XI. Conclusion

- Agricultural machinery and equipment is increasing rapidly in the last few years in Cambodia;

- Agricultural mechanization in both pre and post harvest technology (plowing, harrowing and harvesting) plays a major roles in agricultural production in Cambodia;

- However, technical skilled workforce is limited and not competence enough to respond the needs at both national and provincial level;

- Most of workshops for repairing and maintenance of farm machinery and equipment are not available at the rural areas;

- Less activities on Research and Development of agricultural machinery and equipment and it exists mainly at the national level; and

- The involving of all support institutions from Governments, international organizations and private sectors are important in applying the agricultural mechanization in Cambodia effectively.
Thank you for your attention