Sustainable Agricultural Machinery in Thailand

Presentation by

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   DEPARTMENT OF AGRICULTURE

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General Information on Agriculture and Mechanization

- Thailand is a newly industrialized country.
- Its economy is heavily export-dependent.
- Exports accounting for more than two thirds of its GDP.
- In 2012, Thailand had a GDP of THB11.375 trillion (US$366 billion).
- Per-capita GDP was $5,390.
- Thailand's agricultural sector produces 8.4 percent of the GDP.
- The Thai economy grew by 6.5 percent, inflation rate of 3.02 %
- In 2013, GDP 2.7 %
- In 2014, GDP 2.9 %
**Major crops:**

Rice, maize, sugarcane, soybean, cassava, rubber, horticulture crops, oil palm

<table>
<thead>
<tr>
<th>Crops</th>
<th>Planting area mil. ha</th>
<th>Production mil. tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>9.5</td>
<td>20</td>
</tr>
<tr>
<td>Maize</td>
<td>1.2</td>
<td>4.1</td>
</tr>
<tr>
<td>Cassava</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>
Thailand has developed its own range of agricultural machinery and agricultural equipment to suit the special needs and pockets of its mainly agrarian population.

Rice production is the foremost user of this equipment. Planting machinery, Rice threshers, tractors and walking ploughs and nowadays machines that help with the cultivation, caring and harvesting.
Farm Machinery Range of THAILAND
Farm Machinery Range of THAILAND

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CLIMATE CHANGE effect to AGRICULTURE

Thailand’s Rainfall

2011

2015

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Modern Technology for Sustainable Agricultural Systems

- The world population is projected to reach 9 billion by 2050.
- Therefore, managing agricultural production systems on a sustainable basis is one of the most critical challenges for the future of humanity.
- Technological advancements must be used to provide farmers with tools and resources to make farming more sustainable.
- Concepts of modern technologies in agricultural systems have given an important role for the improvement of agricultural productions e.g. crop yield, livestock production, aquaculture production, and sustainable agriculture, in order to maintain food security.
Thailand Efforts in Extension of Farm Mechanization

Burning Problem
Thailand Efforts in Extension of Farm Mechanization

Farm Machinery Demonstration plot of Non-burning Field
Wet & Dry-water control system
Thailand Efforts in Extension of Farm Mechanization

Farm Machinery Demonstration plot of Soil Preparation
Thailand Efforts in Extension of Farm Mechanization

Sub-Soiling Extension

Farm Machinery Demonstration plot of Soil Preparation
Thailand Efforts in Extension of Farm Mechanization

<table>
<thead>
<tr>
<th>Cost</th>
<th>Production</th>
<th>Net Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase 13%</td>
<td>Increase 16%</td>
<td>Increase 19%</td>
</tr>
</tbody>
</table>

28.86 tons/ha to 33.63 tons/ha
Farm Machinery Service Center (LAND PREPARATION)

PRINCIPLE

▸ to develop soil preparation quality for plantation by setup qualitative farm machinery service center including; subsoiler, ploughing and harrowing for field crops solving hardpan problem

▸ farm machinery service center operates and manages by a group of members
Farm Machinery Service Center:

ADVANTAGE

▸ to reduce investment cost of small scale farmers

▸ to make more opportunity for small scale farmers to use the high capacity machines

▸ to develop new generation farmer as professional farmer

▸ to efficiently use machineries by full time using
GOOD PLOUGHING
Farm Machinery Service Center:
Management Methodology

- Separate incomes into 2 parts
  - Part 1: Not less than 30% of income to keep it for buy new machines or changing old machines
  - Part 2: Not over 70% of income use to be all of the operation and maintenance costs
Thailand Efforts in Extension of Farm Mechanization

Soil Erosion Problem
Thailand Efforts in Extension of Farm Mechanization

Soil Erosion Problems
Thailand Efforts in Extension of Farm Mechanization
Thailand Efforts in Extension of Farm Mechanization

Planting along contouring lines against Soil Erosion
Thailand Efforts in Extension of Farm Mechanization

Planting along contouring lines against Soil Erosion
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Planting along contouring lines against Soil Erosion
Thailand Efforts in Extension of Farm Mechanization

Training Course in Irrigation System
Thailand Efforts in Extension of Farm Mechanization

Training Course in Irrigation System

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Thailand Efforts in Extension of Farm Mechanization

On the crisis of flooding in 2011: the program on repaired and maintenance for agricultural engines damaged by flood
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Mechanics development in rural area

Roles

Levels

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Thailand Efforts in Extension of Farm Mechanization

Mechanics development in rural area

Amount

Principle
Farm Machinery Usage by Ratio

<table>
<thead>
<tr>
<th>TRACTOR</th>
<th>HOUSEHOLD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>owned</td>
<td>607,340</td>
<td>10.7</td>
</tr>
<tr>
<td>contractor services</td>
<td>2,830,282</td>
<td>49.9</td>
</tr>
<tr>
<td>labor &amp; others</td>
<td>2,226,095</td>
<td>39.2</td>
</tr>
</tbody>
</table>

TRACTOR IN USAGE

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## Farm Machinery Usage by Ratio

### Planter in Usage

<table>
<thead>
<tr>
<th></th>
<th>PI ANTFR</th>
<th>HOUSEHOLD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>owned</td>
<td>128,676</td>
<td>2.27</td>
<td></td>
</tr>
<tr>
<td>contractor services</td>
<td>1,413,034</td>
<td>24.91</td>
<td></td>
</tr>
<tr>
<td>labor &amp; others</td>
<td>4,121,098</td>
<td>72.64</td>
<td></td>
</tr>
</tbody>
</table>
### Farm Machinery Usage by Ratio

<table>
<thead>
<tr>
<th>HARVESTER</th>
<th>HOUSEHOLD</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>owned</td>
<td>52,652</td>
<td>0.93</td>
</tr>
<tr>
<td>contractor services</td>
<td>2,353,886</td>
<td>41.49</td>
</tr>
<tr>
<td>labor&amp;others</td>
<td>3,255,912</td>
<td>57.39</td>
</tr>
</tbody>
</table>

**HARVESTER IN USAGE**

เครื่องเก็บเกี่ยวที่ใช้เครื่องมือเป็น ของตนเอง 0.93%

ใช้เครื่องมืออื่นหรือ แรงงานลดลง 57.39%

เครื่องเก็บเกี่ยว 41.49%
**AGRICULTURE REFORM STRUCTURE**

<table>
<thead>
<tr>
<th><strong>Market requirement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value creation</td>
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</tbody>
</table>

**down stream**
- **SMALL FARMER**
  - Machines pool
  - Contractor services
  - Cash crop production

**middle stream**
- **MEDIUM FARMER**
  - Machines utilization
  - Smart farmer
- **LARGE FARMER**
  - Modern Farm
  - Farm pool
  - Precision Farming
  - Benchmarking

**up stream**
- **PROCESSING**
  - Efficiency increasing/Cost reduction
  - High Technology
  - Various & Innovation products to reach market requirement
  - Global Standardisation

- **MARKET**
  - New market
  - Brand creation
  - New S-curve industries
  - Social Business

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MODERN FARMING CONCEPT

- using technology advancement to develop a better and more precise farming
- control variables such as soil and water for an increase in productivity
- improve the quality of products to meet the benchmark, making products more safe, hence qualify to be exported and traceability
- more environmental friendly
# Modern Farming Development Plan

<table>
<thead>
<tr>
<th>Major Commodity</th>
<th>Minor Com.</th>
</tr>
</thead>
<tbody>
<tr>
<td>crops (rice, sugarcane, tapioca, rubber)</td>
<td>fishery (shrimp, snapper, tilapia)</td>
</tr>
<tr>
<td>small animals (chickens, pigs)</td>
<td>cash crops</td>
</tr>
<tr>
<td>large animals (cows, dairy)</td>
<td></td>
</tr>
</tbody>
</table>

**Short term plans (6 months):**
- Improving cooperatives models;
- Farmer grouping to do Modern Farm;
- To produce cash crops

**Medium and Long term plans (> 1 year):**
- Research, development and innovation in agriculture;
- To adopt IT to be Application for agriculture and farmer registration

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PRECISION FARMING BASED ON INFORMATION TECHNOLOGY

Precision Guidance

Land Levelling Guidance

Precision Planting

Precision Cultivation

Yield Mapping Guidance

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Individual farming plots Plotting Program preparing for Precision Farming
Name: ดวงกมล พลยุทธ
ID: 1451500003586
Crop: ข้าว 6
Area: 6 ไร่
Individual plots on the earth background map
New Thailand 4.0 Policy Aims to Turn Country Into a ‘Smart’ One

Thailand 4.0
Thriving in the 21st Century through
Security, Prosperity & Sustainability
Thailand 4.0 comes after three prior economic models

- Thailand 1.0 focused on agricultural development
- Thailand 2.0 focused on upgrading low income households reach middle-income
- Thailand 3.0 emphasized on the growth of the industrial industry
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Thailand 4.0 will change the country’s traditional farming to smart farming, traditional SMEs to smart enterprises, and traditional services to high-value services.

- The aim is to create creativity and innovation through the application of technology.

- As The Nation, the challenge of this model is getting the country to come out of its middle income trap.

- The government wishes to see farmers become entrepreneurs and SMEs to branch out of being tied to government assistance and to become startups that grow beyond their potential growth areas.
technologies perspective
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New design for smarter tropical greenhouse

New farm and orchard management

New approaches for Rice and field crops production
Thank you.

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