DEVELOPMENT OF SUSTAINABLE AGRICULTURAL MECHANIZATION IN INDONESIA

MINISTRY OF AGRICULTURE REPUBLIC OF INDONESIA
JAKARTA - 2013
VISIONS AND FOUR TARGETS
MINISTRY OF AGRICULTURE
REPUBLIC OF INDONESIA

VISIONS MINISTRY OF AGRICULTURE RI:
- LEADING AGRO-INDUSTRY, BASED LOCAL, AND SUSTAINABLE
- FOOD INDEPENDENCE
- ADDED VALUE, COMPETITIVENESS AND EXPORT
- FARMERS WELFARE IMPROVEMENT

Self-sufficiency and Self-sufficiency Sustainable
Food Diversification
Increasing Added Value, Competitiveness, Downstream industries, Marketing and Export
Farmers welfare
Implementation of National Medium-Term Development Plan (RPJM) 2010-2014:

"Intended to consolidate the restructuring of Indonesia in all fields by emphasizing efforts to improve the quality of human resources, including the development of science and technology capabilities and strengthening the competitiveness of the economy".

Themes:
- added value, competitiveness, and partnerships

Target Macro:
- ✔ Increased Agricultural GDP
- ✔ Increased agricultural employment
- ✔ increased exchange rate farmers
- ✔ Increased strategic agricultural commodity export
CONCEPT OF
AGRICULTURAL DEVELOPMENT BASED ON
AGRIBUSINESS

“Building systems and agricultural business that have value-added, competitive, democracy, sustainable and decentralized"

“Development of Selective Agricultural Mechanization and Specific Locations"
TRANSFORMATION OF LIMITED REGION TO DEVELOPED REGIONS

Limited Region / Semi Developed Regions

Service

Industry

Agriculture

Developing Regions / Developed regions

Service

Industry

Agriculture
with
AGRICULTURAL
MECHANIZATION

Efficiency
• Shorter time
• Products more uniform
• High productivity, quality and competitiveness

Effective
• Losses reduced
• Working fatigue reduced
• Human exploitation reduced

Cost
• The minimum economic scale fulfilled
• Lower operating costs
• Increase the added value
INDONESIA’S ECONOMIC INDICATORS

- Indonesia's economic growth: 5 – 6% per year
- GDP in 2011 reached USD 7020 trillion with an inflation rate of 3% - 7%
- GDP per capita in 2011 reached IDR 25,000,000 or about US $ 2,800 (US $ 1 = IDR 9,000)
AGRICULTURAL LAND

Area of agricultural land for food crop covered 24.6 million ha of paddy field where 76% is irrigated with an average cropping index (CI) reached 1.8 with cropping patterns: Rice - Rice – ‘Palawija’ (crops planted as 2d crop in dry season). Ownership paddy fields average 0.5 ha / person.

Dry land (moor, gardens, fields and ‘huma’) area of 25.3 million hectares

Land for annual crop area of 50.9 million hectares and plantation area of 16.7 million hectares.
EMPLOYMENT AND GENDER

Â In 2011, Indonesia's population of about 240 million people with a growth rate of 1.12 % per year.

Â The labor force reached 112.8 million people and about 39% of them work in agriculture.

Â Female labor force participation rate : 39.38 % and nearly 40% of them coming from poor farmer. Female labor is almost half of male labor.

Â Most female workforce worked on planting and harvesting.
### Percentage of Farm Household Enterprises by Level of Education and Sex Year 2010

<table>
<thead>
<tr>
<th>Level of Educational Attainment</th>
<th>Livestock</th>
<th>Horticulture</th>
<th>Rice &amp; Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Level Elementary School</td>
<td>96.7</td>
<td>89.2</td>
<td>95.6</td>
</tr>
<tr>
<td>Higher level than Elementary School</td>
<td>3.3</td>
<td>10.8</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics, 2000. Statistics and Gender Indicators
Variability some farm machinery in Indonesia in 2010 (units)

<table>
<thead>
<tr>
<th>Region</th>
<th>Hand tractor</th>
<th>Water pump</th>
<th>Power Thresher</th>
<th>Dryer</th>
<th>Rice milling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sumatera</td>
<td>9.211</td>
<td>2.848</td>
<td>6.076</td>
<td>2.472</td>
<td>22.289</td>
</tr>
<tr>
<td>Jawa</td>
<td>71.127</td>
<td>80.683</td>
<td>16.566</td>
<td>1.108</td>
<td>60.635</td>
</tr>
<tr>
<td>Bali dan Nusa Tenggara</td>
<td>6.220</td>
<td>2.833</td>
<td>2.404</td>
<td>258</td>
<td>4.566</td>
</tr>
<tr>
<td>Kalimantan</td>
<td>4.067</td>
<td>1.367</td>
<td>5.415</td>
<td>666</td>
<td>7.155</td>
</tr>
<tr>
<td>Sulawesi</td>
<td>18.306</td>
<td>1.894</td>
<td>7.721</td>
<td>1.051</td>
<td>14.123</td>
</tr>
<tr>
<td>Maluku dan Papua</td>
<td>498</td>
<td>684</td>
<td>348</td>
<td>114</td>
<td>263</td>
</tr>
<tr>
<td>Indonesia</td>
<td>109.429</td>
<td>90.310</td>
<td>38.530</td>
<td>5.699</td>
<td>109.031</td>
</tr>
</tbody>
</table>

Sources: Calculated from data agricultural tool and machinery by region province and district in Indonesia (Central Bureau of Statistics, 2002) and reports from the region.

Development of agricultural mechanization in Indonesia is still centered on crops commodity, mainly on commodity rice and focused on tractors, water pumps, mechanical threshers and rice mills.
### USE OF AGRICULTURAL MACHINERY IN 2010

<table>
<thead>
<tr>
<th>NO.</th>
<th>ACTIVITY</th>
<th>TRADITIONAL</th>
<th>MECHANIZATION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tillage</td>
<td>62</td>
<td>38</td>
<td>hand tractors capacity 50 ha / yr / unit</td>
</tr>
<tr>
<td>2.</td>
<td>Planting</td>
<td>100</td>
<td>0</td>
<td>still using traditional (dandur jajar legowoÔ drill)</td>
</tr>
<tr>
<td>3.</td>
<td>Weeding</td>
<td>100</td>
<td>0</td>
<td>still traditional (using hedgehog)</td>
</tr>
<tr>
<td>4.</td>
<td>Pest and Disease control</td>
<td>0</td>
<td>100</td>
<td>using hand sprayer dan power sprayer</td>
</tr>
<tr>
<td>5.</td>
<td>Irrigation</td>
<td>50</td>
<td>50</td>
<td>water pumps capacity 30 ha / yr / unit</td>
</tr>
<tr>
<td>6.</td>
<td>Harvest</td>
<td>100</td>
<td>0</td>
<td>still traditional (using a sickle)</td>
</tr>
<tr>
<td>7.</td>
<td>Threshing</td>
<td>79</td>
<td>21</td>
<td>power threshers Capacity 40 ha / yr / unit</td>
</tr>
<tr>
<td>8.</td>
<td>Drying</td>
<td>85-90</td>
<td>10-15</td>
<td>dryer capacity 60 ha / yr / unit</td>
</tr>
<tr>
<td>9.</td>
<td>Milling</td>
<td>0</td>
<td>100</td>
<td>rice milling capacity is more than 97% in 2002. Now estimated at over 100% (saturation) in some places.</td>
</tr>
</tbody>
</table>
Agricultural machinery industry in Indonesia in 2010

<table>
<thead>
<tr>
<th>No</th>
<th>Industrial Scale</th>
<th>Unit</th>
<th>Production Capacity (Units / year)</th>
<th>Level Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Industrial large-scale</td>
<td>3</td>
<td>955,550</td>
<td>Medium - High</td>
</tr>
<tr>
<td>2</td>
<td>medium-scale industries</td>
<td>30</td>
<td>125,000</td>
<td>Medium</td>
</tr>
<tr>
<td>3</td>
<td>Small scale industries</td>
<td>1063</td>
<td>15,000</td>
<td>Simple</td>
</tr>
</tbody>
</table>

Until 2010, there were 158 Indonesia National Standard (SNI) field of agricultural machinery. As many as 50 agricultural equipment and machinery has been awarded the User Product Certificate of SNI Mark (SPPT-SNI), and as many as 75 agricultural equipment and machinery has been awarded the Certificate of Conformity SNI.
## EKSPORT-IMPORT VALUE OF AGRICULTURAL MACHINERY IN 2005 – 2010

<table>
<thead>
<tr>
<th>No.</th>
<th>Export/ Import</th>
<th>Agricultural Machinery Type</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2005</td>
</tr>
<tr>
<td>1</td>
<td>Eksport</td>
<td>Pre-harvest Machine</td>
<td>66 000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td></td>
<td>48 992 061</td>
</tr>
<tr>
<td>2</td>
<td>Eksport</td>
<td>Post Harvest Machine</td>
<td>20 000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td></td>
<td>454 027</td>
</tr>
<tr>
<td>3</td>
<td>Eksport</td>
<td>Agricultural Product Processing Machinery</td>
<td>734 000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td></td>
<td>25 974 989</td>
</tr>
<tr>
<td>4</td>
<td>Eksport</td>
<td>implement and its equipment</td>
<td>546 000</td>
</tr>
<tr>
<td></td>
<td>Import</td>
<td></td>
<td>24 416 535</td>
</tr>
</tbody>
</table>
STRATEGY DEVELOPMENT OF SELECTIVELY AGRICULTURAL MECHANIZATION AND SPECIFIC LOCATION

1. DEVELOPED REGIONS
   The region is possible to implement agricultural machinery because of the technical, economic and social aspects are feasible.
   The purchasing power of farmers to purchase agricultural machinery is adequate

2. DEVELOPING REGIONS
   This regions are feasible in technical aspect, economic as well as social aspects, but weak in terms of capital, so need low interest credit and easy. This area requires technical guidance and business management of agricultural machinery intensively

3. SEMI-DEVELOPED REGIONS
   This regions are feasible in technical and social aspects but not economically feasible, so need a grant or subsidy from the Government and need a technical guidance and agricultural machinery business management intensively

4. LIMITED REGIONS
   The region is constrained because of the technical, economic and social development is not feasible to implement agricultural machinery.
Agricultural machinery supply chain consisting of the provision and delivery systems

1. Agricultural machinery supply system
   - Employment contract (consignment)
   - Cooperation credit / capital from the supplier / manufacturer
   - Grants through the revolving fund
   - Loans from regional banks or financial institutions

2. Distribution system of agricultural machinery
   - Direct sales
   - Lease – purchase
   - Business management units
   - Field operations of the company / manufacturer
PHASES OF SELECTIVELY AGRICULTURAL MECHANIZATION DEVELOPMENT AND SPECIFIC LOCATION

1. Appraisal
2. Target group
3. Procurement of agricultural machinery
4. Increased human resource capacity
5. Environment
6. Investment
7. Demonstration of agricultural machinery
8. Testing and certification of agricultural machinery
9. Distribution
10. Quality control of agricultural machinery in circulation
ORGANIZATIONS AND INSTITUTIONS

1. Government Institutions (Regional Technical Services Units in agricultural machinery testing and workshop as well as the Research and Development Agency).

2. Private institutions *(supporting system)*
   - Groups of farmers, Combination of farmer groups (Gapoktan) and Agricultural cooperatives
   - Service Effort of Agriculture Machine (UPJA)
   - Association of agricultural machinery entrepreneurs and dealership
   - Credit and financial institutions or banks
   - Insurance
   - Workshop for the treatment and maintenance of agricultural machinery
   - NGOs and Universities
ISSUES IN AGRICULTURAL MECHANIZATION DEVELOPMENT IN INDONESIA

- The availability and use of appropriate agricultural machinery is still limited.
- Inadequate business UPJA scale.
- Weak support of workshop activities and lack of spare parts.
- Institutional agricultural machinery has not been steady.
- Management of agricultural machinery has not been optimal, both technical and business management.
- Purchasing power and capital are limited due to the exchange value of agricultural products declined steadily.
- System of standardization, certification, and testing agricultural machinery is still weak.
- Participation of farmers / private sector in the utilization and development of agricultural machinery is still low.
Factors Inhibiting The Development of Agricultural Mechanization in Indonesia

- **Capital**
  Generally, farmers have small land (0.5 hectares / person) and capital less so that they can not afford to buy agricultural machinery that cost relatively expensive.

- **Soil Conditions**
  Topography of agricultural land in Indonesia mostly undulating and mountainous so it’s difficult to operate farm machinery.

- **Labor**
  Due to the availability of abundant labor, so the use of agricultural machinery will cause a lot of unemployment.

- **Experts**
  Experts or competent persons in the development of agricultural machinery (mechanization of agriculture) are still inadequate.
CONCLUSIONS AND RECOMMENDATIONS

Å Agricultural mechanization development has a strategic position in the agricultural development that agribusiness oriented in transforming of traditional agriculture to modern agriculture.
Å Agricultural mechanization development has contributed significantly in improving efficiency, productivity, quality, value added and competitiveness as well as environmentally friendly.
Å Agricultural mechanization development is inseparable from the role of institutional support in adopting, learn, develop and manipulate agricultural machinery in accordance with the social and economic conditions of the region / area.
Å Agricultural development with the concept of agri-business, competitive, sustainable, democracy and decentralized is a modern agricultural development that take advantage of local resources and technological innovation of agricultural machinery ongoing / sustainable is a must.