Strategic Approach to the Improvement of Agricultural Productivity towards Food Security in Indonesia
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- Introduction ➔ Important roles of Agriculture & Food Security for Indonesia

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- Challenges for Food Security & Sustainability

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- Improvement of Agricultural Productivity
  - Development Approach & Strategy
  - Development of Agricultural Technology

- Closing Remarks
Agricultural is a prime mover of national & regional economic development

- Contribute to GDP’s growth & export earning
- Provide food, fiber, energy & raw material for industry
- Create job opportunity & income for the people
Food is not everything but without food is nothing

- Stability in the aspect of social, economic, politic and national security
- Quality of the people and sustainability of natural resources
- People’s welfare and employment creation
- Life sustainability of people and the country

- Government of Indonesia must obtain and maintain national food security ➔ Act No. 7/1996
<table>
<thead>
<tr>
<th>Year</th>
<th>Population (million)</th>
<th>Consumption (kg/year/person)</th>
<th>Consumption (000 t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>228.50</td>
<td>137.03</td>
<td>31,312</td>
</tr>
<tr>
<td>2007</td>
<td>231.45</td>
<td>135.67</td>
<td>31,402</td>
</tr>
<tr>
<td>2008</td>
<td>234.44</td>
<td>134.33</td>
<td>31,492</td>
</tr>
<tr>
<td>2009</td>
<td>237.46</td>
<td>133.00</td>
<td>31,582</td>
</tr>
<tr>
<td>2010</td>
<td>240.52</td>
<td>131.68</td>
<td>31,673</td>
</tr>
<tr>
<td>2011</td>
<td>243.63</td>
<td>130.38</td>
<td>31,764</td>
</tr>
<tr>
<td>2012</td>
<td>246.77</td>
<td>129.09</td>
<td>31,855</td>
</tr>
<tr>
<td>2013</td>
<td>249.95</td>
<td>127.81</td>
<td>31,947</td>
</tr>
<tr>
<td>2014</td>
<td>253.18</td>
<td>126.55</td>
<td>32,039</td>
</tr>
<tr>
<td>2015</td>
<td>256.44</td>
<td>125.29</td>
<td>32,131</td>
</tr>
<tr>
<td>2016</td>
<td>259.75</td>
<td>124.05</td>
<td>32,223</td>
</tr>
<tr>
<td>2017</td>
<td>263.10</td>
<td>122.82</td>
<td>32,315</td>
</tr>
<tr>
<td>2018</td>
<td>266.50</td>
<td>121.61</td>
<td>32,408</td>
</tr>
<tr>
<td>2019</td>
<td>269.93</td>
<td>120.40</td>
<td>32,501</td>
</tr>
<tr>
<td>2020</td>
<td>273.42</td>
<td>119.21</td>
<td>32,595</td>
</tr>
</tbody>
</table>
### Condition of food crop's production in Indonesia

<table>
<thead>
<tr>
<th>Commodity</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>52.138</td>
<td>54.089</td>
<td>54.151</td>
<td>54.455</td>
<td>57.157</td>
</tr>
<tr>
<td>Soybean</td>
<td>672</td>
<td>724</td>
<td>808</td>
<td>748</td>
<td>593</td>
</tr>
<tr>
<td>Peanut</td>
<td>786</td>
<td>838</td>
<td>836</td>
<td>838</td>
<td>789</td>
</tr>
<tr>
<td>Mungbean</td>
<td>-</td>
<td>310</td>
<td>321</td>
<td>316</td>
<td>323</td>
</tr>
<tr>
<td>Sweet potatoes</td>
<td>1.991</td>
<td>1.902</td>
<td>1.857</td>
<td>1.854</td>
<td>1.887</td>
</tr>
</tbody>
</table>

Some of agricultural commodities are still imported

Cereals, tuber & fruit crops as alternatives food sources

In 2008, Indonesia is already self sufficient in rice production
Main Problems for Enhancement of Food Security

- Increase of food production especially rice is less than that of requirement due to bio-physical constraints.
- Land degradation, climate variability, pest and diseases enemy, and conversion of agricultural land.
- Availability of food materials in the global market will become limited with high price.
- Increase price of production inputs and energy.
- Limited purchasing power of poor people.
- Limited utilization of alternatives local food crops.
- Competitive utilization of some food crop’s production with bio-energy.
- Lack of infrastructures ➔ irrigation & post harvest.
### Conversion plan of lowland based on Land Utilization Planning of District

<table>
<thead>
<tr>
<th>Region</th>
<th>Lowland area (ha)</th>
<th>Utilization plan of lowland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Non-irrigated</td>
</tr>
<tr>
<td>Sumatera</td>
<td>2,036,690</td>
<td>414,780</td>
</tr>
<tr>
<td>Java and Bali</td>
<td>3,933,370</td>
<td>442,120</td>
</tr>
<tr>
<td>Kalimantan</td>
<td>1,253,130</td>
<td>375,200</td>
</tr>
<tr>
<td>Sulawesi</td>
<td>982,410</td>
<td>124,270</td>
</tr>
<tr>
<td>NT &amp; Maluku</td>
<td>566,100</td>
<td>67,050</td>
</tr>
<tr>
<td>Papua</td>
<td>131,520</td>
<td>65,060</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,903,220</strong></td>
<td><strong>1,488,480</strong></td>
</tr>
</tbody>
</table>

In Indonesia, conversion of agricultural land 1-1.5% ~ 100,000 ha/year
Challenges for Food Security and Sustainability

- Land gradation & high input price ➔ development of low external input technology
- Water scarcity ➔ development of on-farm water reservoir & water management saving technology
- Abundant local food crops ➔ development of post harvest & simple food technology
- Available sub-optimal land resources ➔ development of suitable land reclamation & management technology
- Abundant of agricultural wastes ➔ development of processing technology for organic fertilizers & bio-energy
Development Prospect of Swamplands

Swamplands

Wrong reclamation and management

Right and careful reclamation and management

Degraded land

Productive land
Planted Crops & Cropping System on Swamplands

Food crops: rice, corn, soybean, mungbean, peanut, cassava, sweet potato

Horticultural crops: vegetable and fruit crops

Estate crops: Coconut, palm oil, rubber, coffee, cacao, pepper, ginger

Cropping systems: monoculture, inter-cropping, mix-cropping
- Shift in planting season
- Increase flood & drought of agricultural land
  - Degradation of land & water resources,
  - Damage & reduce the capacity of infrastructure
  - Reduce cropping area & production
  - Trigger of pest outbreaks
  - Decrease crop’s productivity, quality & efficiency
  - Cause forest and crops fire
### Impact of Climate Characteristic on Drought Area & Production Lost of Rice

<table>
<thead>
<tr>
<th>Year</th>
<th>Area of drought (ha)</th>
<th>Climate characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drought</td>
<td>Lost</td>
</tr>
<tr>
<td>1991</td>
<td>868,0</td>
<td>192,3</td>
</tr>
<tr>
<td>1993</td>
<td>67,0</td>
<td>20,4</td>
</tr>
<tr>
<td>1994</td>
<td>544,4</td>
<td>161,1</td>
</tr>
<tr>
<td>1997</td>
<td>504,0</td>
<td>88,5</td>
</tr>
</tbody>
</table>
Challenges of Climate Change for Agricultural Technology & Food Security

- Development of high yielding & low methane emitting crop varieties
- Development of soil & water management with low methane emission
- Development of crop varieties tolerant to drought
- Development of crop varieties tolerant to submergence
- Development of crop varieties tolerant to salinity
- Development of water harvesting technology
- Development of efficient water management technology
- Regional, ecosystem, integrated development approach of agriculture based on local resources capacity & sustainability
- Improve agricultural land conditions by promoting organic fertilization from agricultural wastes
- Optimum utilization of cultivated lands using appropriate land, water & crop management techniques
- Gradually develop & improve agricultural infrastructures especially for rice based-farming system areas
- Expansion of agricultural areas with very selective utilization & high consideration of agricultural, natural resources, ecological sustainability
- Agricultural development should be directed to integrated farming system
Improvement of Agricultural Productivity

Development of Agricultural Technology

- Response to the problems and user community needs
- Support utilization of local specific resources optimally
- Low external inputs sustainable agricultural technology
- More efficient use of production inputs, water and energy
- Improve agricultural land conditions and sustain natural resources with minimum agricultural wastes
Rice Seedling Machine

Capacity: 100 tray/hour
Water Pump

On-farm Water Reservoir

Fertigation Unit
Harvesting Machines

Mesin Sabit (Mower)

Modifikasi: (Hasil kerjasama BBP Mektan dengan PT Shang Yang Seri)
Rice Husk Furnace

Corn Cob Furnace
Chopping Machines

Rice straw chopper
Capacity: 1 ton/hour

Corn cob chopper
Capacity: 1 ton/hour

Cassava chopper
Machines for Processing Jatropha curcas

Capacity 200-300 kg/day, diesel 8.5 hp
Rendement 27%.
Processing Units for Bio-diesel, Bio-ethanol, Bio-gas
As a prime mover of national and regional economic development, agriculture plays important and strategic role for Indonesia, therefore, Indonesian Government gives high priority in National Development Program.

Strong commitment and good coordination among related stakeholders with better development approach, strategy, and technology are needed for improving production and maintaining natural resources.
Terima kasih
Thank You