Green Revolution in India and Its Significance in Economic Development: Implications for sub-Saharan Africa

IPD, Fourth Task Force on Africa
Pretoria, July 10, 2009

Koichi FUJITA
Center for Southeast Asian Studies
Kyoto University, Japan
Objectives of the paper

• To analyze the historical role of the Green Revolution in South Asia (especially in India) in its overall economic development process

• To show the logic why Green Revolution is essential before starting sustainable economic development with industrialization

• To consider the possibilities of Green Revolution in the context of contemporary sub-Saharan Africa
Accelerated economic growth in India after the 1990s

Impact of liberalization policies?
→ Role of the agricultural development in the 1980s
Food production, net export, and population in India

Severe droughts

1st Green Rev. = Lost decade

Neglect of agriculture

2nd Green Rev.
Wheat as a minor crop to a dominant crop

Graph showing the production of rice, wheat, coarse grains, and maize in Eastern and Southern, and Northern and Western regions from 1950/51 to 2006/07.
Wheat Revolution in India
Nationwide agricultural development in the 1980s

Table 1 Growth Rate of Crop Production in India

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>4.53</td>
<td>2.12</td>
<td>1.73</td>
<td>4.08</td>
<td>1.60</td>
</tr>
<tr>
<td>Wheat</td>
<td>5.79</td>
<td>7.73</td>
<td>4.15</td>
<td>4.29</td>
<td>3.64</td>
</tr>
<tr>
<td>Coarse grains</td>
<td>3.76</td>
<td>1.67</td>
<td>0.55</td>
<td>0.71</td>
<td>-0.99</td>
</tr>
<tr>
<td>Maize</td>
<td>7.84</td>
<td>3.90</td>
<td>0.64</td>
<td>3.20</td>
<td>1.30</td>
</tr>
<tr>
<td>Total</td>
<td>4.45</td>
<td>3.10</td>
<td>2.07</td>
<td>3.38</td>
<td>1.81</td>
</tr>
<tr>
<td>Pulses</td>
<td>3.80</td>
<td>-0.47</td>
<td>-1.18</td>
<td>2.45</td>
<td>-0.07</td>
</tr>
<tr>
<td>Total Foodgrains</td>
<td>4.35</td>
<td>2.63</td>
<td>1.76</td>
<td>3.31</td>
<td>1.66</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>3.05</td>
<td>2.41</td>
<td>1.34</td>
<td>6.01</td>
<td>4.16</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>5.62</td>
<td>2.54</td>
<td>2.27</td>
<td>4.38</td>
<td>3.72</td>
</tr>
<tr>
<td>Cotton</td>
<td>4.54</td>
<td>2.03</td>
<td>2.69</td>
<td>3.23</td>
<td>4.51</td>
</tr>
<tr>
<td>Jute/Mesta</td>
<td>5.60</td>
<td>0.32</td>
<td>2.13</td>
<td>1.28</td>
<td>2.18</td>
</tr>
</tbody>
</table>

Note. The data are three year moving averages.

Rice Revolution in eastern and southern India and oilseeds and cotton revolutions in hitherto coarse grain producing areas.
Rice Revolution in the 1980s

- Sown area
- Yield (100kg/ha)
- Irrigated Ratio (%)

**Sown area**

- **↑ Tube-wells**
- **↓ high growth**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sown area (million ha)</th>
<th>Yield (100kg/ha)</th>
<th>Irrigated Ratio(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950/51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960/61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970/71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980/81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990/91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000/01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003/04</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Minor irrigation development in India

Canal (Gov.)
Tube-well
Other well
Tank
Others
Canal (Private)

(1000 ha)


(Year)
Great divergence between South Asia and sub-Saharan Africa in the 1980s

Per capita calorie intake in developing countries

Rising real wages
Reduction of rural poverty

South Asia
sub-Saharan Africa
Essence of Indian (and Bangladesh) experience

- In the 1980s rice Revolution in eastern (including Bangladesh) and southern India and yellow Revolution (oilseeds) in central India was taken place, which raised rural income and alleviate poverty to a certain extent.

- The engine of rice Revolution was the introduction of tube-well irrigation in hitherto rain-fed rice growing areas.

- Tube-well irrigation induced a widespread emergence and development of ‘groundwater market’, which was basically an efficient rural institution.
Logic of Green Revolution’s role in economic development

- Nationwide agricultural growth with productivity growth
  ↓
- Uplifting income of majority of population (rural population) ‘to a certain level’
  ↓
- Thus creating a large ‘market’ for non-agricultural products and services
  ↓
- Development of non-agricultural sector in a sustainable manner
Implications for sub-Saharan Africa I

• The key is how to raise income of majority of population to a certain extent

• Is a Green Revolution possible in sub-Saharan Africa?

• Disadvantages:
  1) Diversity of staple food (wheat and rice is relatively minor crop for farmers)
  2) Almost totally rain-fed
  3) Difference in food preference between rural and urban areas
  4) Labor scarcity (still) in rural areas
  5) Small market size for industrialization (small poor countries)
Implications for sub-Saharan Africa II

- The most prospective is a rice Green Revolution

- Possibility of NERICA (New Rice for Africa)

- May not be a widespread Green Revolution in rural Africa, but at least contribute to a substantial decrease of rice imports

- Importance of investment for agriculture in addition to investment in agriculture
Thank you for your attention!