Paying Attention to Environmental, Social and Economic Sustainability; Indonesian Food and Fuel Case Study

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Paper presented at the “Food, Fuel and Forest”
A Seminar on Climate Change, Agriculture and Trade,
Agricultural commodity prices worldwide rose sharply in 2005-2007
2005-2006 food price index growth: 9%
2006-2007 food price index growth: 23% (FAO, 2008)
Led by Dairy Products, Oil, and Grain (except: Sugar)
Supply Side:
- Weather-related production shortfalls
- Reduction on stock levels (mainly cereal)
  Global stock levels have on average declined by 3.4% per year (FAO, 2008)
- Increasing fuel costs → Raised the production and transportation costs of agricultural commodities

Demand Side:
- Structural change on food demand → income growth and economic development (China and India)
- Increasing demand of crops to produce bio-fuels (e.g. sugar, maize, cassava, oilseeds and palm oil)
- Diversifying diets towards meat and dairy products → Intensifying demand for feed grains
### Table 1 Production in major exporters of basic food commodities

<table>
<thead>
<tr>
<th>Commodities</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals1)</td>
<td>000 tonnes</td>
<td>1,038,325</td>
<td>1,001,221</td>
<td>932,527</td>
</tr>
<tr>
<td>% change</td>
<td>-3.57</td>
<td>-6.86</td>
<td>11.74</td>
<td>11.74</td>
</tr>
<tr>
<td>Oilseeds2)</td>
<td>000 tonnes</td>
<td>281,589</td>
<td>293,097</td>
<td>306,387</td>
</tr>
<tr>
<td>% change</td>
<td>4.09</td>
<td>4.53</td>
<td>-5.75</td>
<td>-5.75</td>
</tr>
<tr>
<td>Meat3)</td>
<td>000 tonnes</td>
<td>196,050</td>
<td>203,317</td>
<td>208,057</td>
</tr>
<tr>
<td>% change</td>
<td>3.71</td>
<td>2.33</td>
<td>0.74</td>
<td>0.74</td>
</tr>
<tr>
<td>Dairy4)</td>
<td>000 tonnes</td>
<td>370,986</td>
<td>378,730</td>
<td>383,840</td>
</tr>
<tr>
<td>% change</td>
<td>2.09</td>
<td>1.35</td>
<td>2.77</td>
<td>2.77</td>
</tr>
<tr>
<td>Sugar5)</td>
<td>000 tonnes</td>
<td>76,882</td>
<td>93,451</td>
<td>103,101</td>
</tr>
<tr>
<td>% change</td>
<td>21.55</td>
<td>10.33</td>
<td>-0.93</td>
<td>-0.93</td>
</tr>
</tbody>
</table>

Basic food commodities output dropped 4-7 percent.

Operations on financial market influence significantly to the rise of agriculture and food price (Derivatives market increase the portfolio diversification and reduce risk exposure).

The soar of agriculture prices can be a moment to concern on agriculture in developing countries, especially in Indonesia by increasing AGRICULTURAL PRODUCTION AND PRODUCTIVITY (causing the environmental disequilibrium).

Source: FAO, 2008
Objectives

Overview agriculture economic related on environmental sustainability and poverty reduction in Indonesia

The impact of the rise of food and fuel price on Indonesian economy and welfare

The economic impact of implementation of environmental sustainability
The agricultural contribution to National GDP is tend to fall (rely on the sector endowment)
The contribution of the forestry sector is the lowest one to the national GDP because of the high lost on forest area and the rise of illegal logging. Food crops (The highest)
The largest crop production is PADDY (tend to increase gradually with annual growth 1.39 percent) and expected to soar slightly since rice price worldwide increases.

Among the 9 major food crops in Indonesia, MAIZE production had the highest growth rate in 2007 (14.4 per cent). Influenced by the rise of bio energy demand in the world.

Figure 3. Production, area and productivity of farm food crops from 2000 to 2007
Sources: CBS - Statistics Indonesia and Directorate General of Food crops, 2008
1975-1985: HIGH INCREASE
RICE YIELD was achieved by a special governmental intensification program including the subsidy on pesticides and fertilizers, the provision of capital and a guaranteed floor price for rice.

The fertilizer policy had the most impact on the yields of rice. Although, the re-implementation of subsidies has been inconsistent, due to the government's limited budget.

1985-2000: LOW INCREASE
RICE YIELD was due to decreased government support, involving a reduction in advisory services, reduction in the subsidy on pesticides and fertilizers and uncertainty concerning the floor price of rice. → rice import's increased
FERTILIZER’S POLICY INCONSISTENCY:
April 1998: Subsidy for AS and SP-36 fertilizer was reinstated because of the crisis. Followed by an announcement by the Ministry of Agriculture on 1 December 1998 that the government would no longer be involved in the marketing and subsidies of fertilizers.

March 2001: the marketing of urea for the agricultural sector reverted to government control.

February 2003: the government applied regulations allocating the areas for the distribution of fertilizers to the different companies.

2003-2005: The government has reinstated fertilizer subsidies for urea, SP-36, AS and NPK fertilizers, but only for food crops and smallholder plantations. Plus increased the rice’s purchase floor price.

Dual pricing system leads to inefficiency and a distortion of marketing systems.
The majority of the labor force in Indonesia works in the agricultural sector.

Some of the agricultural labor force migrated to the urban areas and started working for the informal sector.

The manufacturing sector during the period of 2004-2007 increased slightly with the average annual growth was 1.82 per cent.

Meanwhile, the mining sector’s contribution to employment in Indonesia was relative small.

Figure 5. Population 15 Years of Age and Over Who Worked by Main Industry between 2004 and 2007 (thousand persons)
Source: CBS, 2008
Table 2. Poverty line, percentage and number of population below the poverty line

<table>
<thead>
<tr>
<th>Year</th>
<th>Poverty Line (Currency/capita/month)</th>
<th>Population below the Poverty Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>1996/a</td>
<td>42,032</td>
<td>17.6</td>
</tr>
<tr>
<td>1998/b</td>
<td>96,959</td>
<td>12.1</td>
</tr>
<tr>
<td>1999/c</td>
<td>92,409</td>
<td>13.0</td>
</tr>
<tr>
<td>2000/c</td>
<td>91,632</td>
<td>9.5</td>
</tr>
<tr>
<td>2001/c</td>
<td>100,011</td>
<td>9.7</td>
</tr>
<tr>
<td>2002/c</td>
<td>130,499</td>
<td>14.1</td>
</tr>
<tr>
<td>2003/c</td>
<td>138,803</td>
<td>16.2</td>
</tr>
<tr>
<td>2004/c</td>
<td>143,455</td>
<td>15.9</td>
</tr>
<tr>
<td>2005/c</td>
<td>t.d</td>
<td>-</td>
</tr>
<tr>
<td>2006/d</td>
<td>175,324</td>
<td>19.2</td>
</tr>
</tbody>
</table>

Source: CBS, various years

Indonesia still faces the poverty problems. It were still reasonably high and tends to go up in 2006

The recovery of the Indonesian economy (2000’s) is suspected to reduce the number of poor people

The most people that above the poverty line are still vulnerable to become poor
The agricultural land owned by farmers has continued to decrease. Distribution on land could be central to any assessment of income inequality and poverty.

<table>
<thead>
<tr>
<th>Type of Land (ha)</th>
<th>1983 On farm (%)</th>
<th>Average Area (ha)</th>
<th>1993 On farm (%)</th>
<th>Average Area (ha)</th>
<th>2003 On farm (%)</th>
<th>Type of Land (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.5</td>
<td>40.8</td>
<td>0.26</td>
<td>48.5</td>
<td>0.17</td>
<td>55.11</td>
<td>&lt; 0.5</td>
</tr>
<tr>
<td>0.5 – 1.99</td>
<td>44.9</td>
<td>0.94</td>
<td>39.6</td>
<td>0.9</td>
<td>33.29</td>
<td>0.5 – 1.99</td>
</tr>
<tr>
<td>2.0 – 4.99</td>
<td>11.9</td>
<td>2.72</td>
<td>10.6</td>
<td>3.23</td>
<td>6.4</td>
<td>2.0 – 2.99</td>
</tr>
<tr>
<td>≥5</td>
<td>2.4</td>
<td>8.11</td>
<td>1.3</td>
<td>11.9</td>
<td>5.06</td>
<td>=3</td>
</tr>
</tbody>
</table>

The pattern of land ownership will influence the production & productivity of agricultural products (esp. rice).
The Impact of the Rise of Food Production, Fuel Price and Implementation of Environmental Sustainability on Indonesian Economy and Welfare

**THE IMPACT OF THE RISE OF FOOD PRODUCTION**

Warr and Oktaviani (2008): estimates the rate and factor bias of technical change in Indonesian AND the effect of this technical change on income distribution and poverty.

Hypothesis: Income distribution emphasizes the factor biases of the technical change as a determinant of the distributional consequences of the productivity growth (Ferguson, 1975 in Warr and Oktaviani, 2008).

**SIMULATIONS:**
1. Labor augmenting change increases by 10%
2. Capital augmenting technical change goes up by 10%
3. Land augmenting technical change rises by 10%
4. Increase Productivity labour by 1.97%, capital by 1.24% and land by 0.25%
The result of this research reveals that the increases in primary factor productivity raise national income and aggregate consumption. But their effects on factor prices – the functional distribution of income – are not uniform.

Labour-augmenting technical change (Simulation 1) → Supply of unskilled labour increased → average real wage of unskilled labour decreased → return to capital and land rise considerably → Poverty incidence declines in both rural and urban areas.

Capital – Augmenting Technical Change (Simulation 2) → real consumption for every socio-economic category → Reduces poverty incidence.
Land-augmenting (Simulation 3) is the most reducing poverty simulation. All socio-economic groups gain except the richest urban households.

Technical change at the econometrically estimated rates (Simulation 4)
Raising real consumption for every one of the 1,000 socio-economic sub-categories and reduces poverty incidence at the rate of 0.18 per cent per year. Declining both, rural poverty at 0.16 % per year and urban poverty incidence at 0.13 per cent per year.
Households will lose their income. The welfare of households will be reduced because the increasing prices of several commodities.

The household number that can maintain its utility decline faster for rural 1, 2, and 3 than that of other types of households. The population under the poverty line is increase from 8.9% to 12.9 %
The economic impact of implementation of environmental sustainability

Based on Resosudarmo (2002) using CGE Model

The model focuses on the relationships among urban production activities, urban air quality, and health problems in urban areas. The use of oil-based fuels in production activities contributes to air pollution in urban areas.
**Results:**

**First**, the introduction of the unleaded gasoline policy, with or without catalytic converters, will effectively reduce the ambient concentration of lead in urban air to approximately zero, thus more than fulfilling the WHO air quality standard.

**Second**, the most effective single policy is the shift to unleaded gasoline with catalytic converters.

Gasoline and HSDO pricing policy (THE 2\textsuperscript{nd} EFFECTIVE POLICY)
The impact on air pollution health costs is quite different.
Urban air quality in 2020 will be approximately three times worse than in 2000, while the number of air pollution health problems in 2020 will be more than six times higher than in 2000.

The impact of each pollution abatement policy on household income for each socio-economic group is small.
Conclusion and Policy Implication

An increase of food and fuel price in the international market will create the economic, social and environmental problem in most countries, including Indonesia.

The most poverty-reducing form of technical change is land-augmenting technical change. However, the more intensive land use will create land degradation.

The impact of the reduction of fuel subsidy in 2005 it is estimated that return to land declines very sharply (8.44 percent) compared to 2004 (3.91 percent) (Beneficial for Agricultural Sector price).
Conclusion and Policy Implication (2)

All households experience constantly declining incomes. Indonesian households living under the poverty line also increase considering compensate the effects of reduced fuel subsidy (education and health funding; direct transfer; indirect market access).

CRITICAL ISSUE: EFFECTIVENESS AND EFFICIENCY

Reducing oil subsidy can also reduce the fuel consumption. The use of oil-based fuels in production activities contributes to air pollution, increase medical care cost, and reduce labor productivity.
Conclusion and Policy Implication (3)

Suggestion: producing only unleaded gasoline, requiring cars to have catalytic converters installed, phasing out two-stroke engines from urban areas, and imposing vehicle emission standards, as soon as possible.

Gasoline and HSDO prices should be allowed to increase gradually but in significant steps, and public education activities should be stepped up to promote more efficient fuel consumption.
THANK YOU