Land Demand and Land Potential of Central Java in 2030: a Forecast to Promote More Balanced Development Policy

By
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OUTLINE

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  – Land demand: number of population growth and land use coefficient calculation
  – Land potential: probability of transferability calculation
  – Land demand vs. Land potential
• Course to balanced development: a brief policy review
• Conclusion
Introduction

• Land allocation issues: land demand vs. land supply
  As our planet does not grow, but it should be developed over time.

• There are problems in many developing countries including Indonesia – Central Java:
  – Disparity
  – Primate cities
  – Food security
  – Environmental balances

• The paper aims to assess the land demand and the land potential of Central Java based on trend in 1994-2006 to forecast the situation of 2030, for further propose policy review to promote balanced development.
Land Demand: Number of Population Growth (in district level)

Two scenarios applied

– **Status Quo Scenario**
  
growth rate (r) based on 1990 and 2000 population censuses with geometric formula.

– **Low Projection Scenario**
  
as Central Java population growth rate has been declining in the lowest rate compared to other provinces.
Land Demand: Number of Population Growth

Population Projection for Central Java, 2030: Status Quo and Low Projection Scenario

Source: CBS and calculation result
Land Demand:
Land Coefficient Formula

\[
\mu = \frac{(L2 - L1)}{(Pop2 - Pop1)}
\]

Where:

- \(L2\) = Built-up area 2006
- \(Pop2\) = Population 2006
- \(L1\) = Built-up area 1994
- \(Pop1\) = Population 1994

<table>
<thead>
<tr>
<th>Year</th>
<th>Change in built-up area</th>
<th>Change in population</th>
<th>Land use coefficient (Provincial average, m² per person)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-2006</td>
<td>1836.52</td>
<td>2.701.907</td>
<td>640,569</td>
</tr>
</tbody>
</table>

Land use coefficient in Central Java, 1994-2006
Land Demand in 2030
Status Quo and Low Projection Scenario

SQ: Status Quo scenario  LP: Low Projection scenario
Shrink district assumed as 0 (zero) growth population
Land Potential: Probability of Transferability Calculation

• Based on trend of land conversion that had been happening between 1994 and 2006.
• The variables include:
  slope
  land use type
  distance from built-up in 1994
  distance from main road
• All variables were analyzed using ArcGIS 9.3. Most of the calculation are raster based within each 300mx300m cell sized (grid)
## Land Potential: Probability of Transferability Calculation

<table>
<thead>
<tr>
<th>Slope Area (Km²)</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 40 %</td>
<td>0</td>
</tr>
<tr>
<td>0 - 8 %</td>
<td>0,37</td>
</tr>
<tr>
<td>15 - 25 %</td>
<td>1587,46</td>
</tr>
<tr>
<td>25 - 40 %</td>
<td>76,71</td>
</tr>
<tr>
<td>8 - 15 %</td>
<td>13,00</td>
</tr>
<tr>
<td>Water body</td>
<td>1,92</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Land use 1994</th>
<th>Land use 2006</th>
<th>Area (Km²)</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry Land</td>
<td>535,64</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Farming</td>
<td>Built-up</td>
<td>65,16</td>
<td>4</td>
</tr>
<tr>
<td>Forest</td>
<td>Built-up</td>
<td>4,67</td>
<td>0</td>
</tr>
<tr>
<td>Plantation</td>
<td>Protected</td>
<td>1206,95</td>
<td>66</td>
</tr>
<tr>
<td>Protected</td>
<td>Paddy Field</td>
<td>23,18</td>
<td>1</td>
</tr>
<tr>
<td>Water Body</td>
<td>Built-up</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance from built-up 1994 (Km)</th>
<th>Polygons</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>1781</td>
<td>54</td>
</tr>
<tr>
<td>1,01-2</td>
<td>772</td>
<td>23</td>
</tr>
<tr>
<td>2,01-5</td>
<td>529</td>
<td>16</td>
</tr>
<tr>
<td>5,01-12</td>
<td>144</td>
<td>4</td>
</tr>
<tr>
<td>12,01-19,1</td>
<td>87</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

As it was indicated that all land use change are likely taking place in the radius of 1 km from the main road, therefore, there is not any detail result for distance from main road but only delineating the scope area of final analyses result into one km maximum distance from main road.
Value of Potential of Transferability
(based on data 1994 and 2006)
Potential of Transferability
(per District based on data 1994 and 2006)
Potential of Transferability
(per District based on data 1994 and 2006)

Total Land Demand and Land Potential, 2030

<table>
<thead>
<tr>
<th>(Km²)</th>
<th>LAND DEMAND</th>
<th>LAND POTENTIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>District land coefficient</td>
<td>Provincial average land coefficient</td>
</tr>
<tr>
<td>Status Quo</td>
<td>5560.165</td>
<td>6357.795</td>
</tr>
<tr>
<td>Low projection</td>
<td>1482.811</td>
<td>2051.178</td>
</tr>
<tr>
<td></td>
<td></td>
<td>136.242,01-310.068=3392,46</td>
</tr>
</tbody>
</table>

Legend

- 40.368 - 91.872
- 91.872,01 - 136.242
- 136.242,01 - 310.068
Land Demand and Land Potential of Transferability in District Level in Central Java, 2030
Land Demand and Land Potential of Transferability in District Level in Central Java, 2030
Brief Overview Regarding Analyses Result

- In general, the land demand is likely less than land supply

**BUT**

If the pattern would be similar with the trend between 1994-2006, it will lead to a serious problem in food security

- There is still a lot of discrepancy between available land supply and estimated land demand.

- A ‘fundamental’ change of policy framework is required to address the problems.
Course to Balanced Development:
a Brief Policy Review (#1)

Dilemma of two headed snake: growth vs. equity

- **Inner zone (Developed region)**
  - Favorable site for big manufacturing (mostly foreign based) industries due to better infrastructure support and closer to any required urban facilities.
  - Attract significant number of laborers and other potential resources from outer regions.

- **Outer zone (Underdeveloped region)**
  - Mostly dominated by agricultural activities.

- **Core (the most developed region)**
  - Perform as a growth centre

- **Spread effect of the growth centre** that is unfortunately unbalanced with the backwash effect.
- **Spread effect** which gets lesser in the outer zone.
- **Backwash effect** (core as well inner zone take so many potential resources from outer zone)
- **Endogenous potential in the outer zone** that should be developed to have a more balanced development

Rapid growth cannot always be a good sign of development

UNBALANCED → DISPARITY
Course to Balanced Development:
a Brief Policy Review (#2)

Recognition of critical situation regarding Food Security

- Indonesian rice consumption is 133 kg per capita, the highest worldwide (to compare: Thailand is 80 kg per capita, and Japan is 40 kg per capita)
- Java is still dominating rice production in Indonesia by contributing ± 60 per cent of national production in 2000.
- 66 per cent of land conversion (± 1212,1km$^2$) in Central Java has been utilized arable land (Protected paddy field). Similar phenomenon for other provinces in Java Island.

- Urgently need to ‘re-allocate’ urbanization by enforcing development outside Java.
- Breakthrough regarding land use and agricultural integrated policy
Conclusion

• Land allocation is critical for development in Central Java, a lot of homework to be done.

• Potential solutions would be begin with determining ‘new’ policy criteria and increasing commitment from any related stakeholders to improve institutional capability.
Terimakasih... Thank You... Vielen Dank