FLOOD REDUCTION
FUNCTION OF AGRICULTURE
IN INDONESIA

Fahmuddin Agus, Edi Husen, and Irawan
Soil Research Institute, Jln. Juanda 98, Bogor
16123, Indonesia

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Flooded Area in Jakarta

Flooded area in 1995

Flooded area in 2002

Source: www.kompas.com
Causes of Floods

- Extremely heavy rainfall
- Clogged drainage canals or streams
- Reduction of absorption and water retaining zones that increases the peak flow of streams
- Reduction/reclamation of wetland in the catchment
Land Use changes as one of the influencing factor of hydrological changes
Land use changes in Citarik Watershed, West Java

Year


Area

100%

80%

60%

40%

20%

0%

Industrial area
Housing/urban
Annual upland
Paddy field
Mixed cropping
Forest
Land use changes of the upper and middle Ciliwung Sub-Watershed from 1990 to 1999 as interpreted from aerial photos.

<table>
<thead>
<tr>
<th>Land use</th>
<th>1990</th>
<th>1999</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (ha)</td>
<td>%</td>
<td>Area (ha)</td>
</tr>
<tr>
<td>Forest</td>
<td>5,601</td>
<td>21</td>
<td>5,034</td>
</tr>
<tr>
<td>Plantation (perennials trees)</td>
<td>6,848</td>
<td>25</td>
<td>5,612</td>
</tr>
<tr>
<td>Annual upland crops</td>
<td>2,330</td>
<td>9</td>
<td>6,267</td>
</tr>
<tr>
<td>Paddy field</td>
<td>10,409</td>
<td>39</td>
<td>2,832</td>
</tr>
<tr>
<td>Settlements</td>
<td>1,613</td>
<td>6</td>
<td>7,058</td>
</tr>
<tr>
<td>Lakes</td>
<td>38</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>26,841</td>
<td>100</td>
<td>26,841</td>
</tr>
</tbody>
</table>

Source: Adapted from Apriyanto (2001).
FLOOD REDUCTION FUNCTION AND HYDROLOGICAL RESPONSES
Buffering Potential = PA + PC + IC
Water retention capacity as a function of time (land use changes) in Citarik Sub-watershed.
Average daily maximum flow of Citarum river (Nanjung Station)
Hydrographs of Tegalan (annual-crop based), Rambutan (perennial crop based), and Kalisidi (perennial crop based with annual intercrops) catchments of Indonesia from 15 December 2001 event with 102 mm rainfall. Source: Agus et al. (2002)
CONCLUSIONS

- Different land use systems have different effectiveness in mitigating floods, but all agricultural land uses are a lot more effective than industrial and settlement areas.

- Higher frequency of flood and higher volume of flood water in major cities in the lowland areas of Java are attributed to land use changes in the respective river basin from forest to agriculture and from agriculture to urban and industrial development areas.

- Maintaining the existence of agricultural land can contribute, among others, in reducing flood disaster and thus land use policies should take necessary measures to control the increasing trend of agricultural land conversion.