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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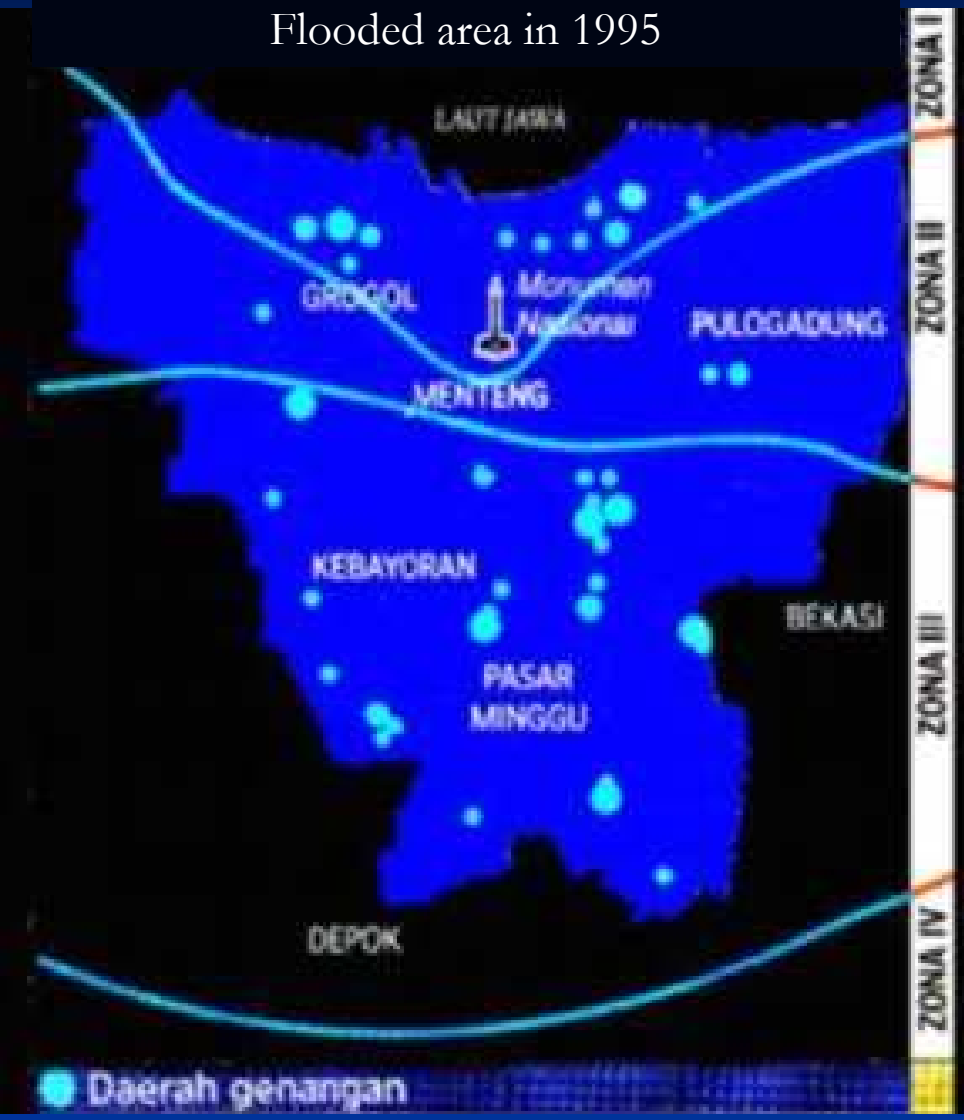
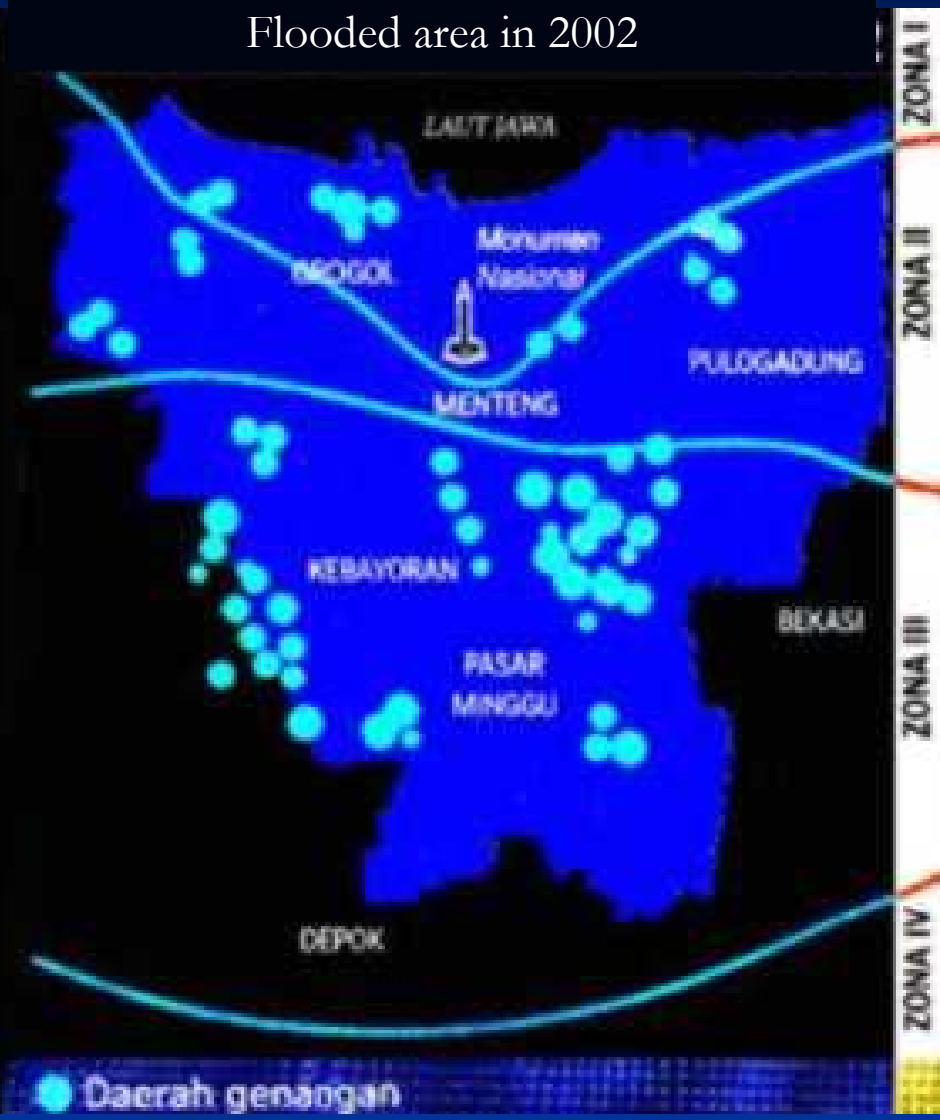
Flooded Area in Jakarta

Flooded area in 1995



Flooded area in 2002



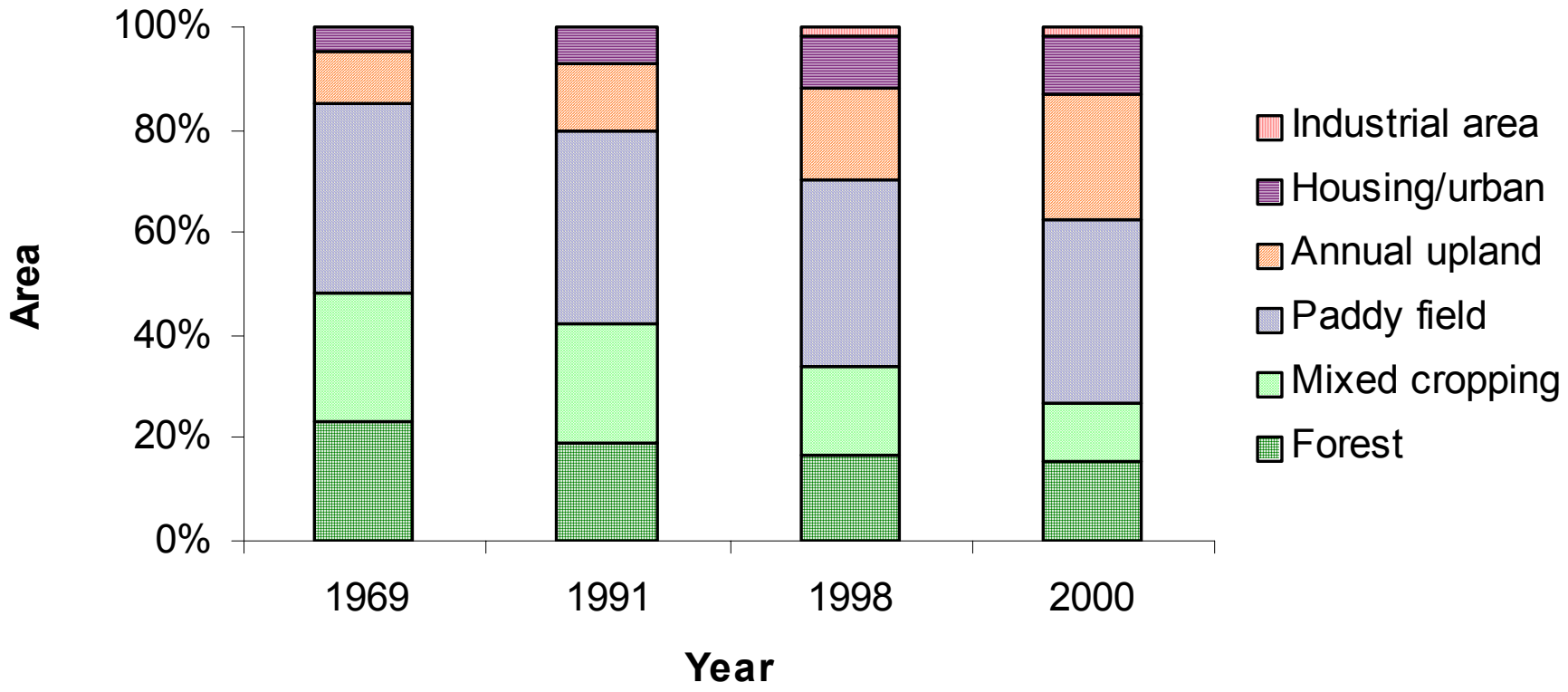
Source: www.kompas.com

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

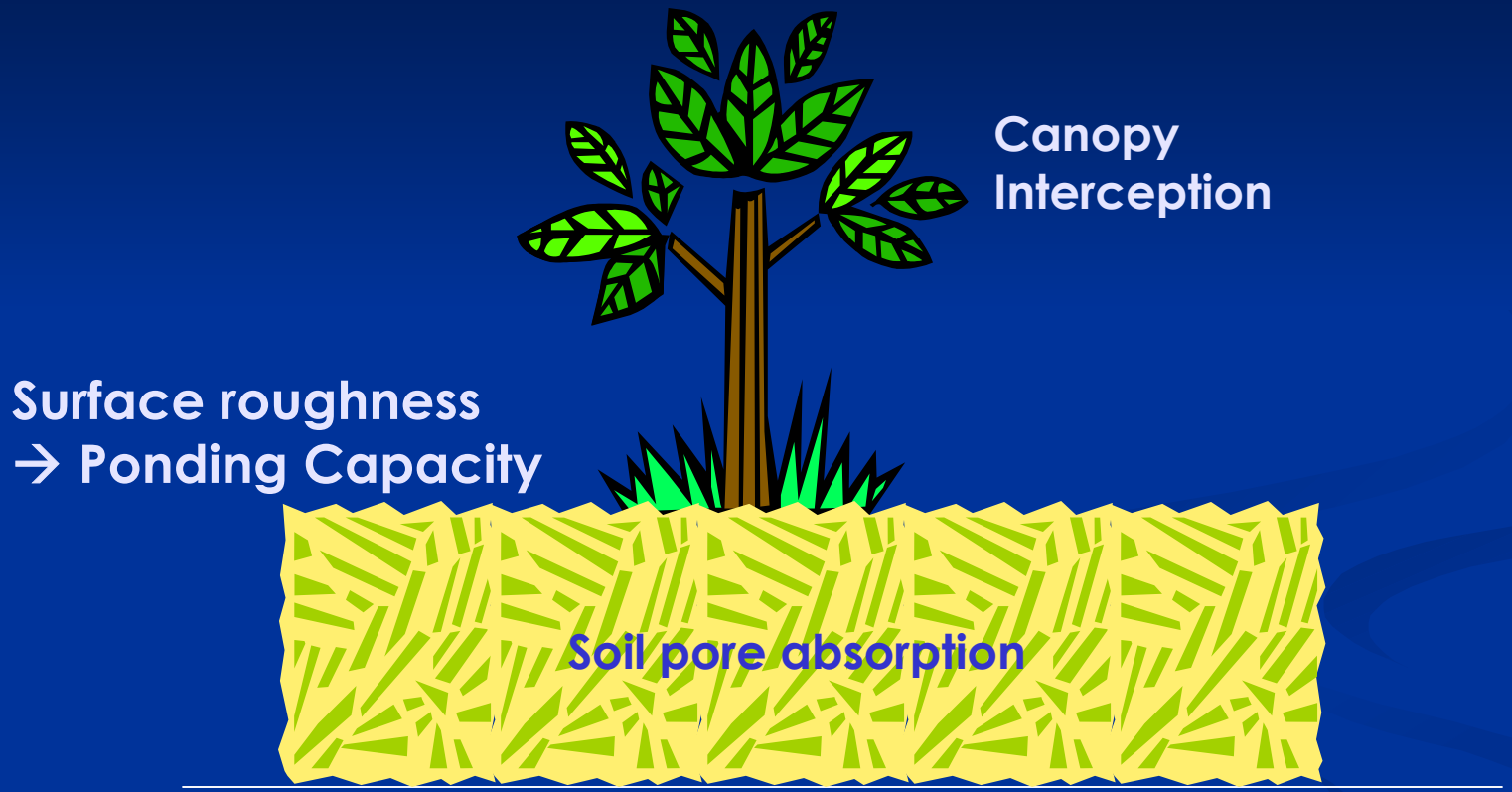


Land use changes of the upper and middle Ciliwung Sub-Watershed from 1990 to 1999 as interpreted from aerial photos.

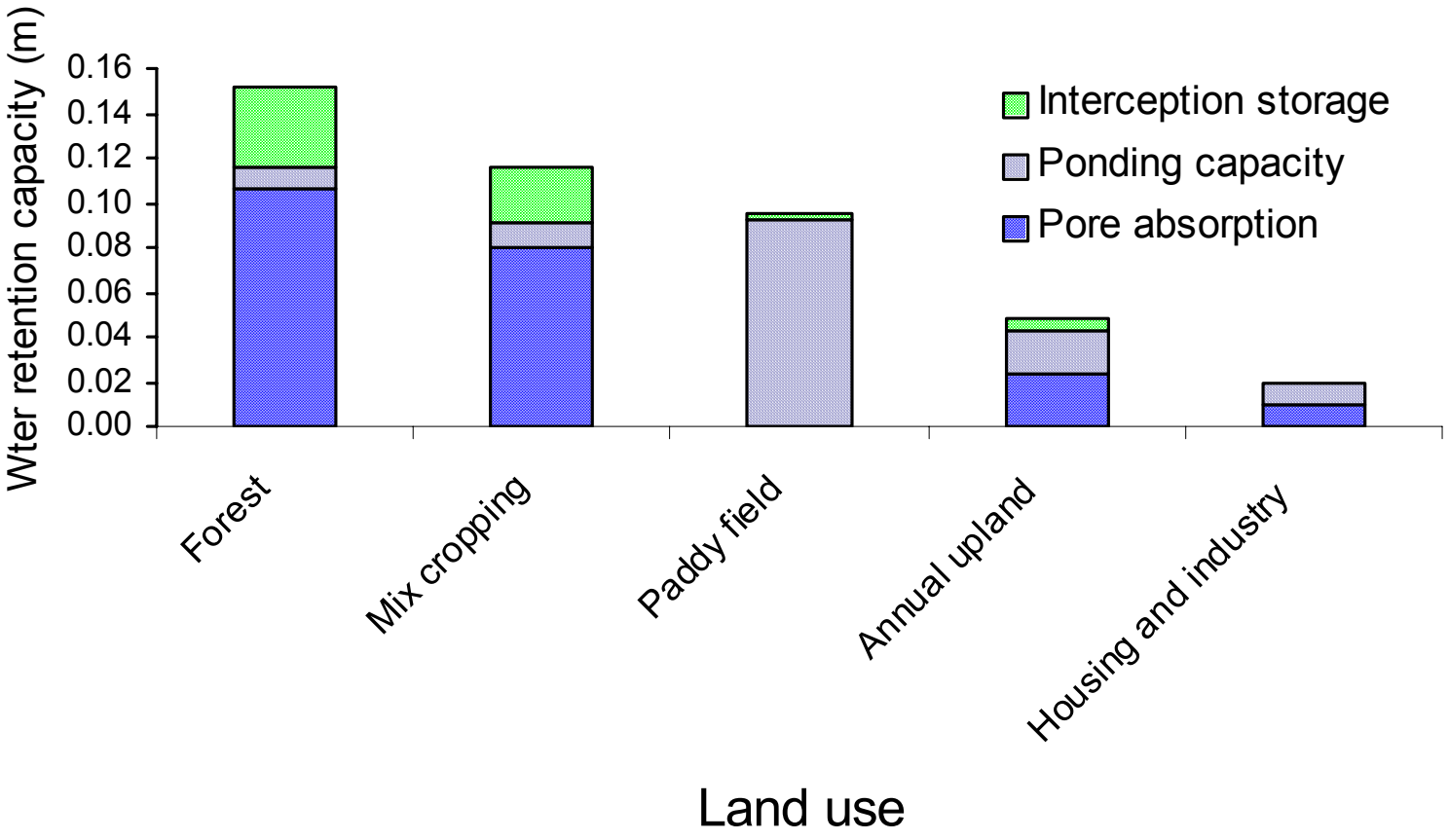
Land use	1990		1999		Change	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Forest	5,601	21	5,034	19	-567	-2
Plantation (perennials trees)	6,848	25	5,612	21	-1,236	-5
Annual upland crops	2,330	9	6,267	23	3,937	15
Paddy field	10,409	39	2,832	11	-7,577	-28
Settlements	1,613	6	7,058	26	5,445	20
Lakes	38	0	36	0	-2	0
Total	26,841	100	26,841	100		

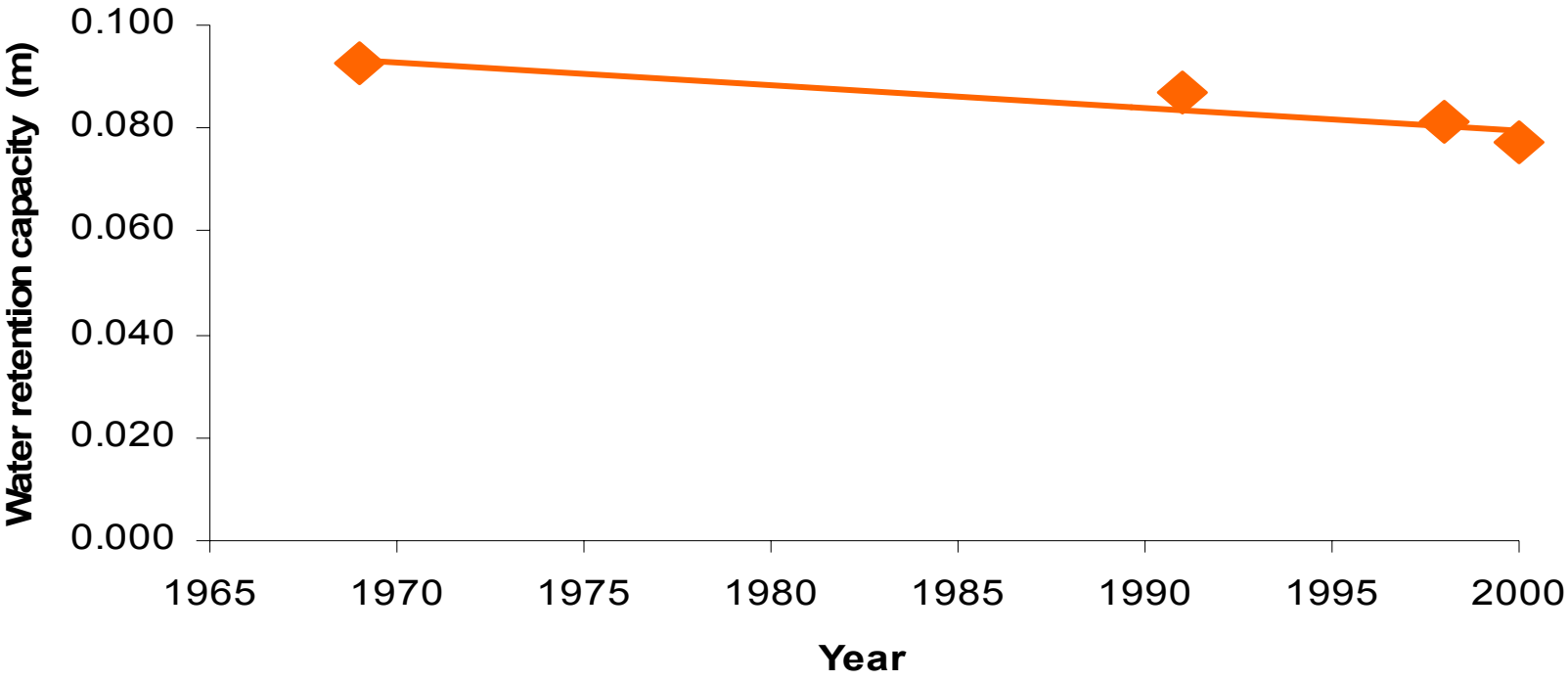
Source: Adapted from Apriyanto (2001).

FLOOD REDUCTION FUNCTION AND HYDROLOGICAL RESPONSES

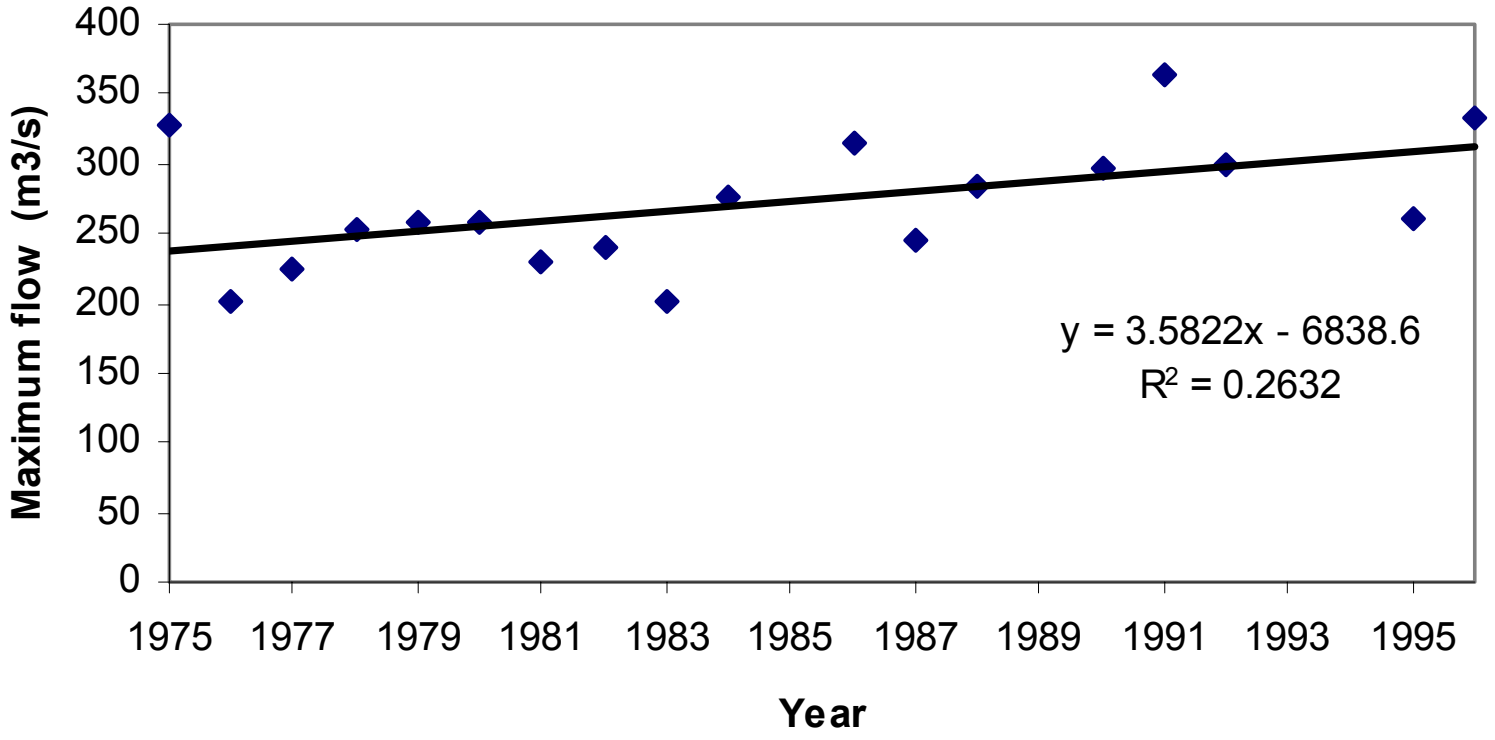


Buffering Potential = PA + PC + IC

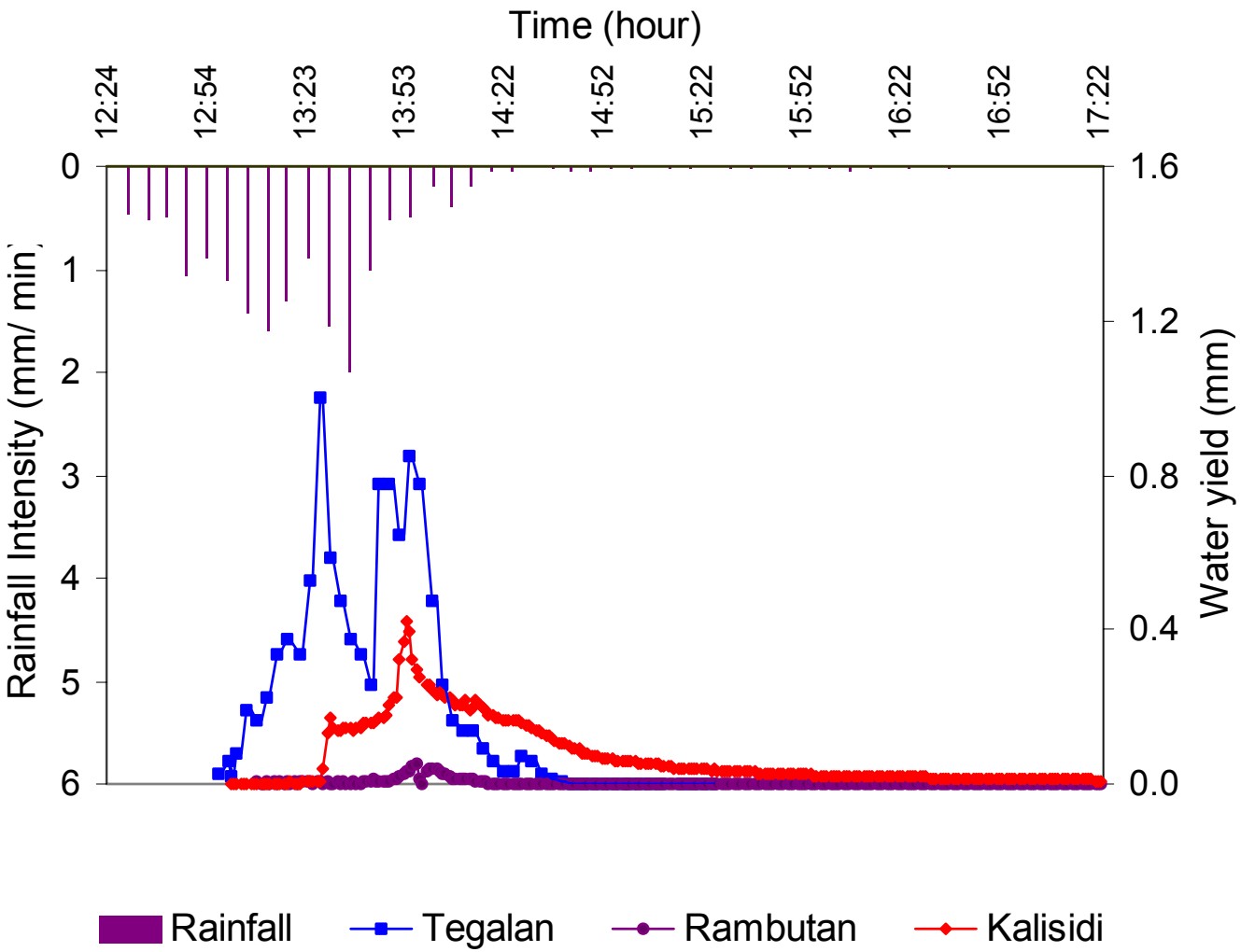

Wter retention capacity (m)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Interception storage
Ponding capacity
Pore absorption
Forest
Mix cropping
Paddy field
Annual upland
Housing and industry
Land use



Water retention capacity as a function of time (land use changes) in Citarik Sub-watershed.



Average daily maximum flow of Citarum river (Nanjung Station)
Source: Widiati (1998)



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.