

DeltAlliance



Spatial Decision Assistance of Watershed Sedimentation (SDAS)

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Rationale



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- Uncontrolled erosion in upstream watersheds reduces soil fertility. Deposition of eroded sediments leads to problems downstream: sedimentation of rivers; reduced drainage capacity, reduced reservoir capacity; impact on environmental quality.
- Sedimentation in Jakarta leads to increased flood risk
- Measures required to address erosion and sedimentation
 - e.g. Perpres 54/2008
- A tool is required to assess the influence of potential measures on erosion and sediment yield.

Content

- SDAS: short overview
- Main results
- SDAS in practice
 - Influence of Perpres 54/2008 on erosion and sediment yield

SDAS: short overview

SDAS as Policy Making Tool

- SDAS (Spatial Decision Assistance of Watershed Sedimentation) is address following issues:
 - What is the total erosion and sediment yield of a given watershed?
 - Which parts of watershed (i.e. sub-watersheds) contribute most to the total of sediment yield?
 - What are the impacts of watershed degradation or rehabilitation on erosion and sediment yield?
 - How can erosion and sediment yield be reduced by upstream spatial planning?

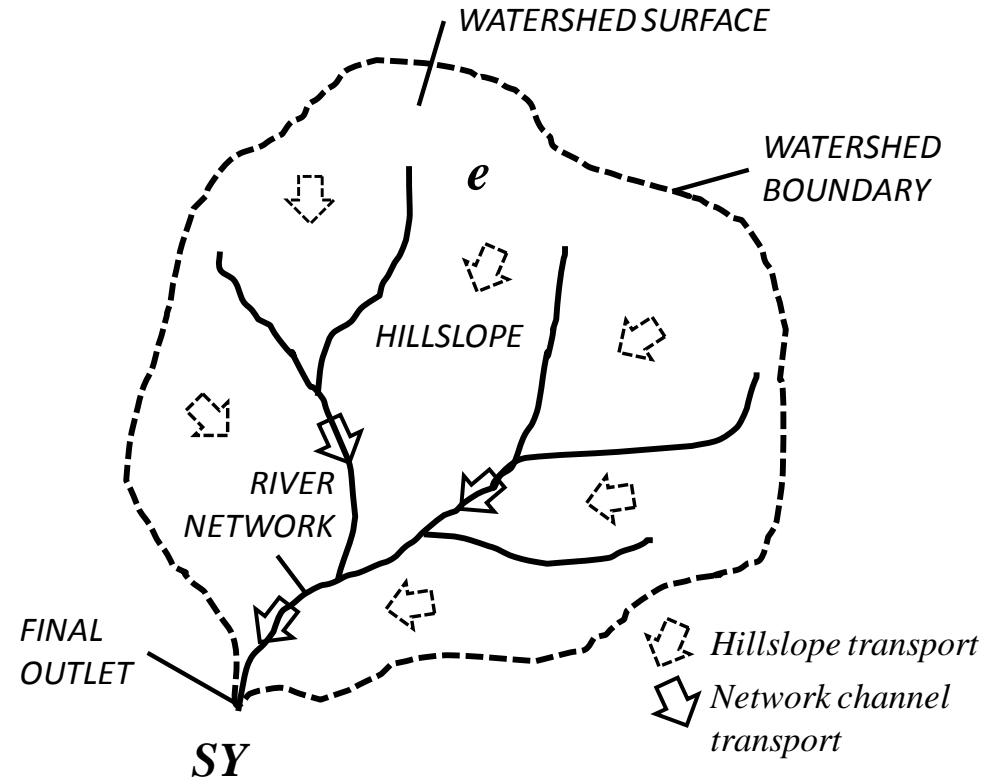
Concept of Calculation in SDAS

- $SY = e \times SDR$

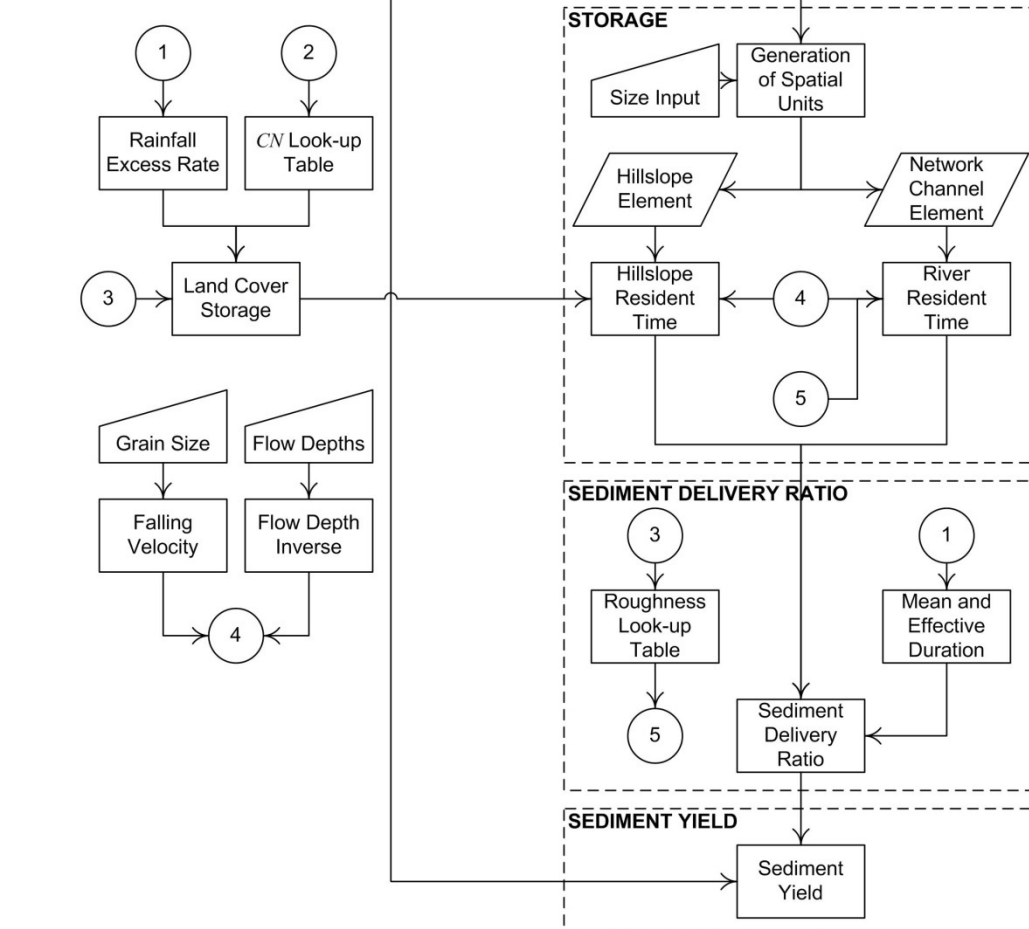
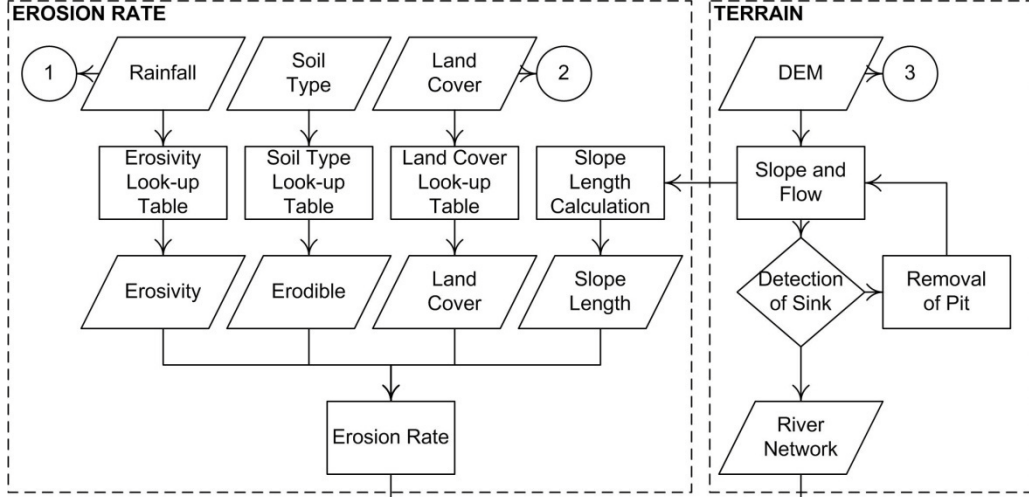
e = rate of erosion

SDR = Sediment
Delivery Ratio

- Calculated per grid cell
in raster-based
computer programme



SDAS Interface & Work Flow

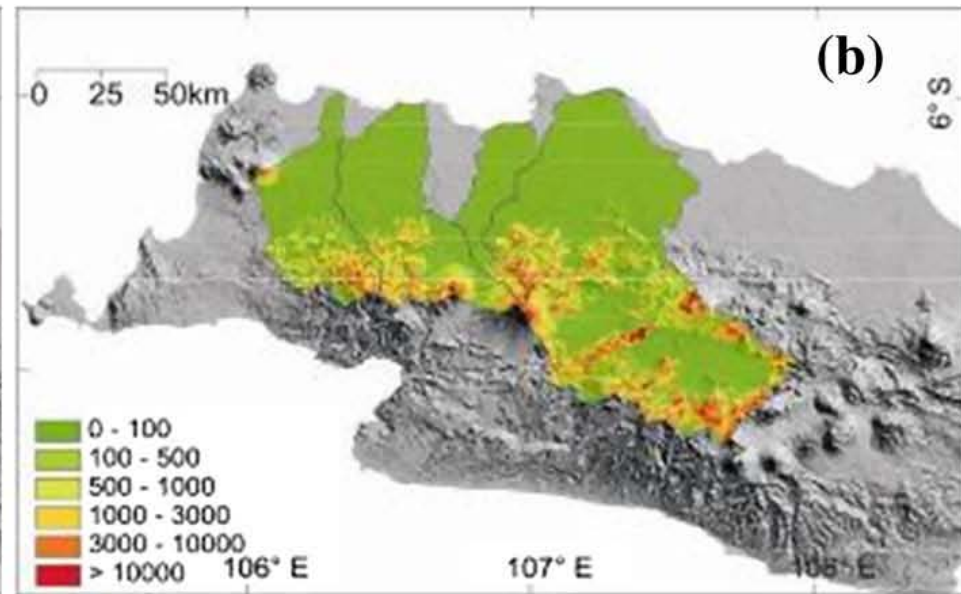
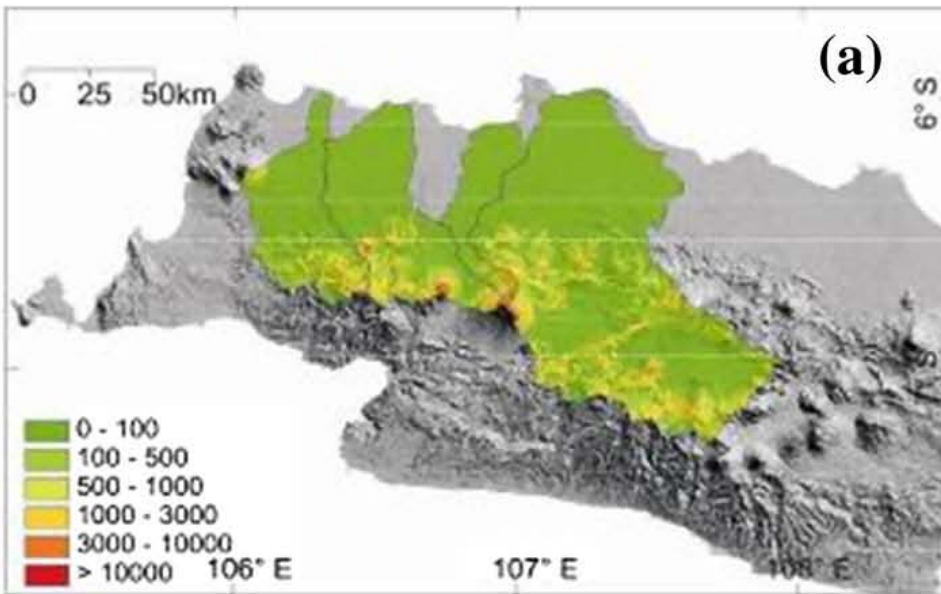


Main results

Erosion per cell (tons/km²/year) in 1901 and 2005

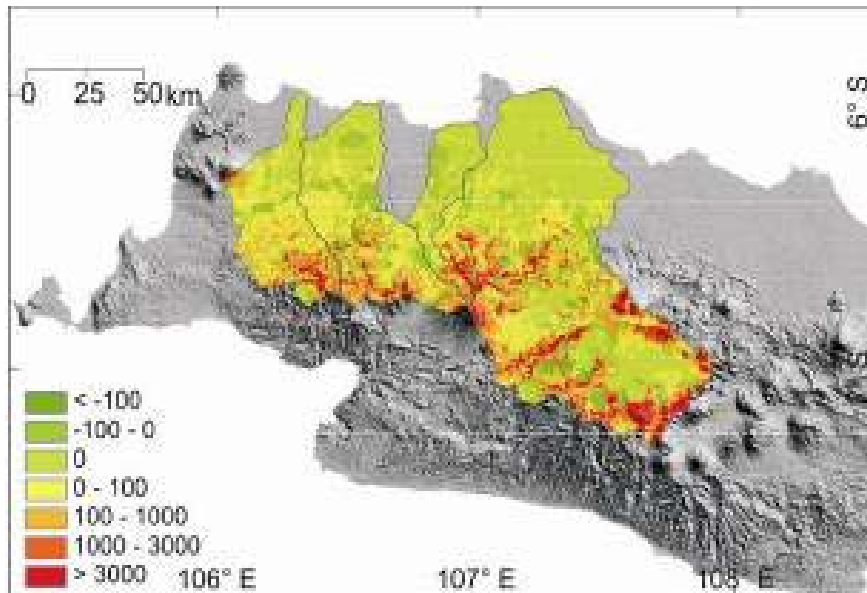
1901

2005

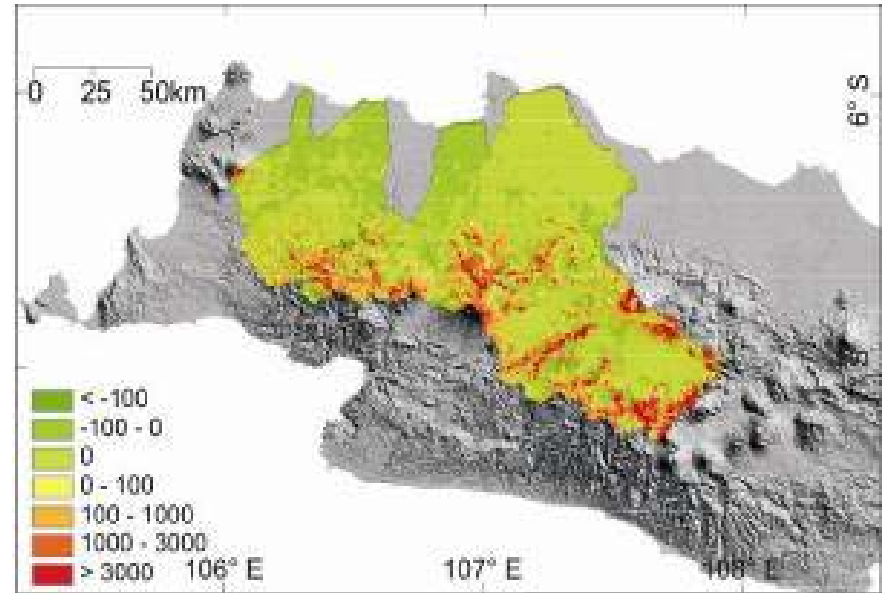


Detection of long term change

Change of sediment yield
1901-2005
(tons/m²/year)



Change of sediment yield
1995-2005
(tons/m²/year)



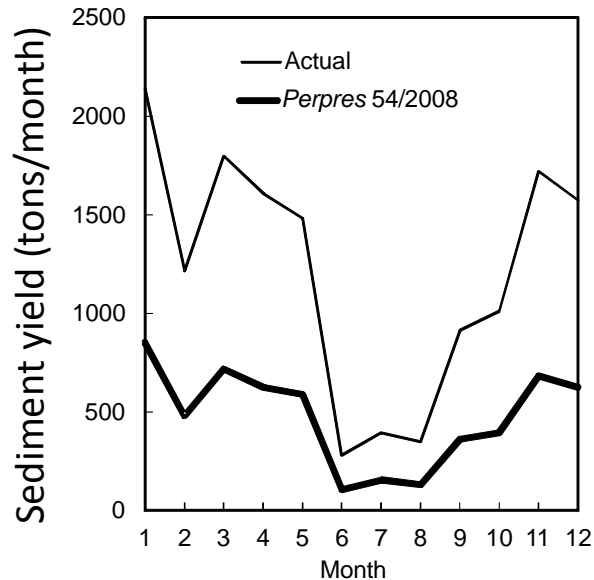
SDAS in practice

Effectiveness of Perpres 54/2008

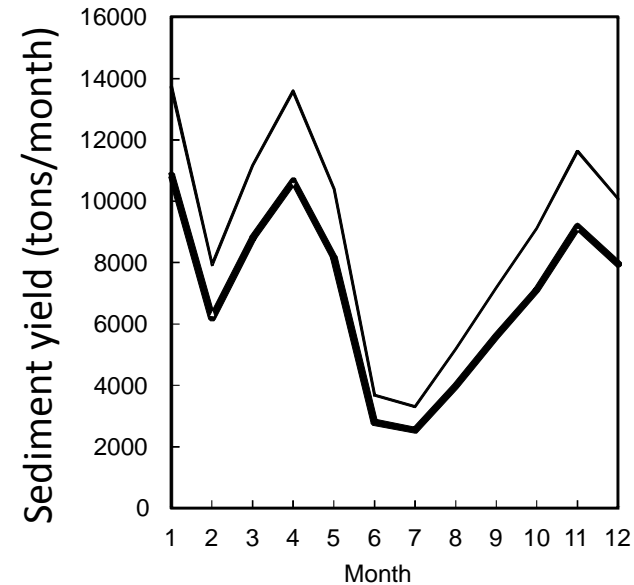
- Presidential regulation number 54 year 2008 (Peraturan Presiden Nomor 54 Tahun 2008)
- Describes land cover planning in the Jabodetabek region
- Perpres 54/2008 is intended to compensate for anthropogenic pressures caused by changes in land cover.
- Ideally, implementation should lead to increased soil water infiltration capacity, reduced erodibility of soils, and reduced river flood peaks.
- Here, examine influence of full implementation on erosion and sediment yield.

Sediment yield in the Ciliwung and Cisadane basins with and without full implementation of Perpres 54/2008

Ciliwung



Cisadane



Average annual reduction in sediment yield with implementation of Perpres 54/2008

Ciliwung: -61%

Cisadane: - 22%

Conclusions

- SDAS, erosion and sediment yield model, developed and available for use
- Strong increases in sediment yield over last 25 years
- Main driver of these increases: land use change
- Model shows usefulness for assessing potential effectiveness of adaptation measures
 - e.g. potential reduction of sediment yield through implementation of Perpres 54/2008; this would also contribute to reduced flood risk

Terima kasih

Questions?

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