URBANRVM

Reducing Local Flood Risk in Jakarta Through Spatial Runoff Management Using Run-Off Volumetric Model

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INTRODUCTION

UrbanRVM (Urban Runoff Volumetric Model) is a tool developed to help urban planners define and allocate infiltration areas in cities, particularly in Indonesia. **UrbanRVM** can process topographic data such as **DEM (Digital Elevation Model)** along with other data including **land use, rainfall, and runoff coefficients** for each land-use type. The model produces several outputs such as **surface runoff direction, runoff stop points, surface water volume, infiltrated water volume, and ponded water volume.**

| Runoff Calculation Method (Rational Method)

Rational Equation: Q = CIA

Where, Q = peak discharge, CFS

C = Runoff Coefficient (Rational Method)

I = Rainfall Intensity, mm/hour

A = Drainage Area

Runoff Coefficients for Land Use Types

Land Use/Type of Surface	Range of "C" Values*
Downtown business	0.70 to 0.95
Heavy Industrial	0.60 to 0.90
Multi-residential units, attached	0.60 to 0.75
Light industrial	0.50 to 0.80
Neighborhood businesses	0.50 to 0.70
Cultivated lands with loamy soils	0.40 to 0.45
Suburban residential	0.25 to 0.40
Playgrounds	0.20 to 0.35
General unimproved lands	0.10 to 0.40
Parks and cemeteries	0.10 to 0.25
Woodlands with sandy soils	0.10 to 0.15

*C is a unitless coefficient.

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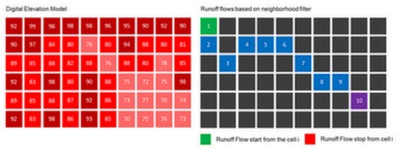
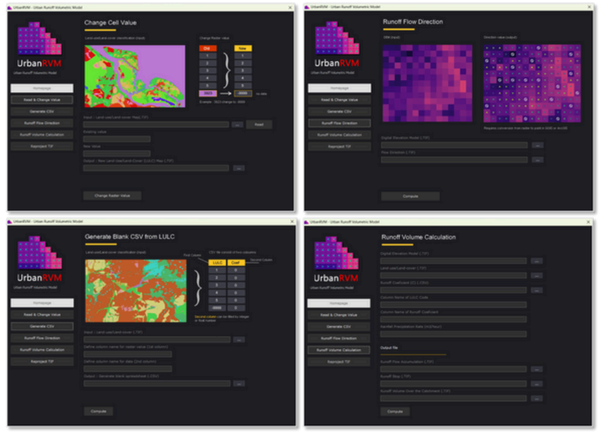
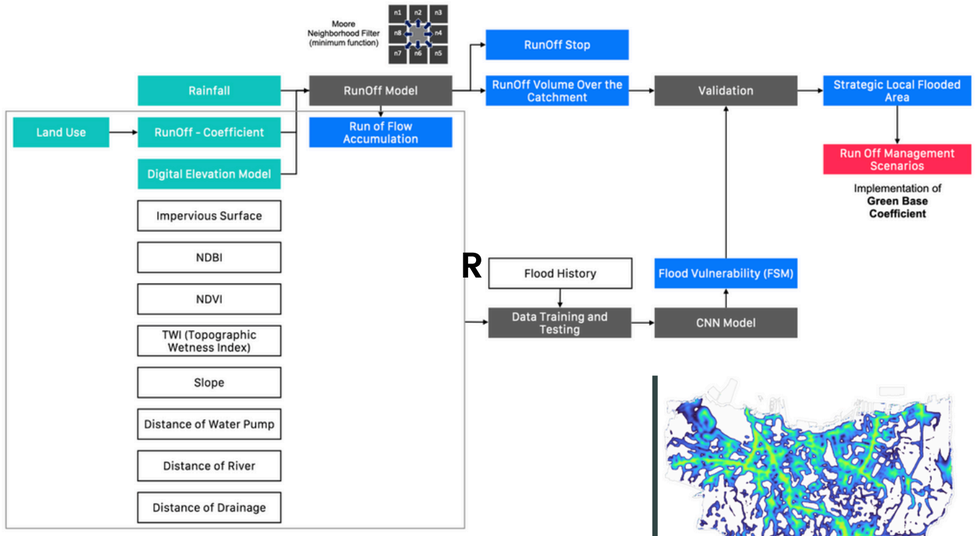
Conventional methods ignore the spatial flow of water (from higher to lower areas). UrbanRVM addresses this by providing more accurate and spatially representative calculations.

| Neighbourhood Concept using UrbanRVM

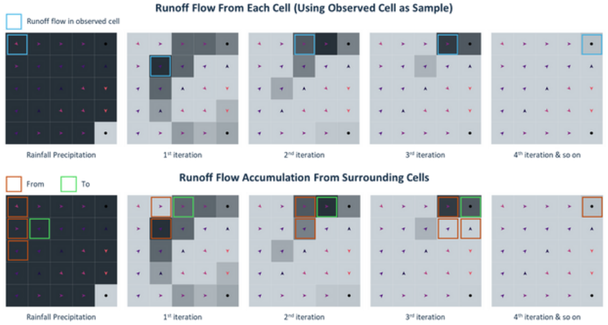




RESEARCH FRAMEWORK

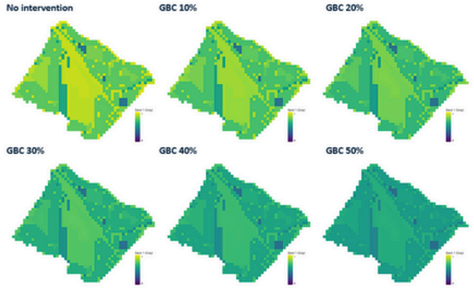


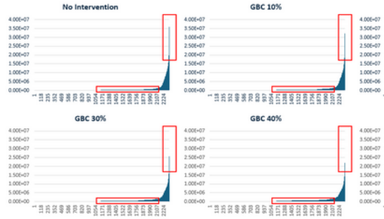
RUNOFF ACCUMULATION CALCULATION

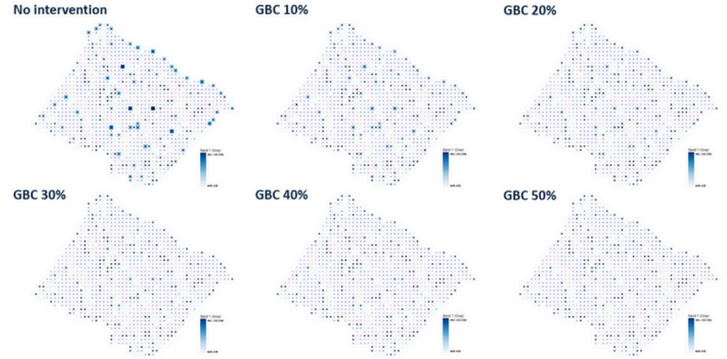


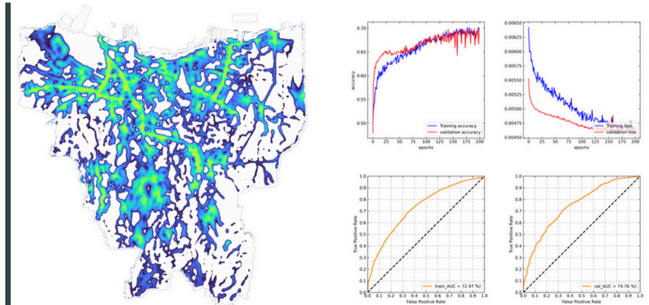
RESULT

| Scenario Management – Implementation of Green Base Coefficient (GBC/KDH)









RESULT - FLOOD VULNERABILITY MODEL

CONCLUSION

Most hydrological models assume flooding results from river or drainage overflow, but rainfall occurs across all areas with varying slopes, land cover, and rainfall intensity. The proposed method offers a more comprehensive approach by managing surface runoff through strategies like GBC, infiltration wells, and urban green spaces, ensuring each land use contributes to flood prevention and mitigation.

RESULT - FLOOD SIMULATION