stage 1

floods impact on spatial configuration

normal conditions
street network
r3000 / r800

flood model (100-year return): segment deletion and penalty levels

street network under flood conditions
r3000 / r800

stage 2

urban systems and services exposure

land use

health

education

slums

shelters

stage 3

global-scale resilience strategies

population density → nachr3000m (core 20%) normal condition → nachr3000m flood condition → critical infrastructure → priority emergency corridors; structural resilience strategies in transport infrastructure

Dem (copernicus) → waterways network → high risk zones → designated zones for water-sensitive urban design (WSD)

waterways network → high risk streets network → waterway and street network during extreme events

stage 4

local-scale resilience strategies

population density → nachr3000m flood condition → nachr800m flood condition → 10 clusters (k-means) → assessment of shelter placement; identification of safe-accessibility priority zones

waterway and street network during extreme events → deployment of emergency boats → assessment of boat deployment efficiency under flood conditions