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WATER PEOPLE HEALTH
Coping with the Floods

Setting the Context - Pakistan Drainage Issues

Muhammad Umer Karim

National Water Policy on Overall Flood Management - Slide 1/2

- 20.1.1 The Flood Protection Plans (National as well as Local) shall be updated on a periodic basis using integrated and innovative approaches, removing technical shortcomings and learning lessons from the past major flood events;
- 20.1.2 Flood zoning shall be established and appropriate land use would be enforced by avoiding growth of such developments in flood hazard areas that would make the flood protection facilitiesvulnerable to failure. Where feasible, land use shall be adjusted to ensure compatibility with the frequency and duration of flooding;
- 20.1.3 Flood Plain Mapping and Zoning shall be carried out along River Indus and its tributaries (Kabul, Swat, Jhelum, Chenab, Ravi & Sutlej) and a River Act shall be prepared for restricting/ prohibiting permanent settlements in high and medium flood risk areas;
- 20.1.4 Reservoir Operational Rules shall be reviewed and optimized to ensure efficient and prudent decisions to control floods provided, however, that the safety of the dam, embankments, spillways, dam abutments, foundations and all other hydraulic structures is to be placed at no risk under any condition;

National Water Policy on Overall Flood Management - Slide 2/2

- 20.1.5 Effective use shall be made of non-structural measures like flood forecasting and early warning systems to minimize flood losses through better forecasts and warning, through additional forecasting facilities, e.g. radars, and other monitoring equipment and flood forecasting computer software incorporating rainfall-runoff and hydrodynamic models;
- 20.1.6 The construction of additional flood protection facilities and improvement of existing infrastructure shall continue where needed, concurrently with development of other measures specified here. Greater emphasis shall be laid on proper maintenance of the existing infrastructure and strengthening of vulnerable reaches of flood protection embankments;
- 20.1.7 The design and maintenance standards of existing barrages and flood protection structures shall be reviewed and changes made where necessary to bring them to the level of functional capability, reliability and and safety;

National Water Policy on Urban Flood Management

- 20.2.1 Drainage system of major cities shall be rehabilitated/ upgraded keeping in view the damages/ inconveniences caused to increased population and due to likely increase in short duration intense rainfall events attributed to climate change
- 20.2.2 Delineation of flood plains will be carried out and legislation would be recommended to impose a ban on all types of construction in those plains except that aimed at flood management.
- 20.2.3 Capacity of WASAs and other municipal level organizations will be built to deal with planning, execution and management of schemes aimed at prevention of urban flooding.
- 20.2.4 In the cities prone to urban flooding, dedicated warning systems will be installed to make accurate forecasts in the wake of extreme events induced by climate change.
- 20.2.5 Steps will be taken to promote bio engineering measures against urban flooding along with structural and non-structural measures

Sindh Water Policy on Floods

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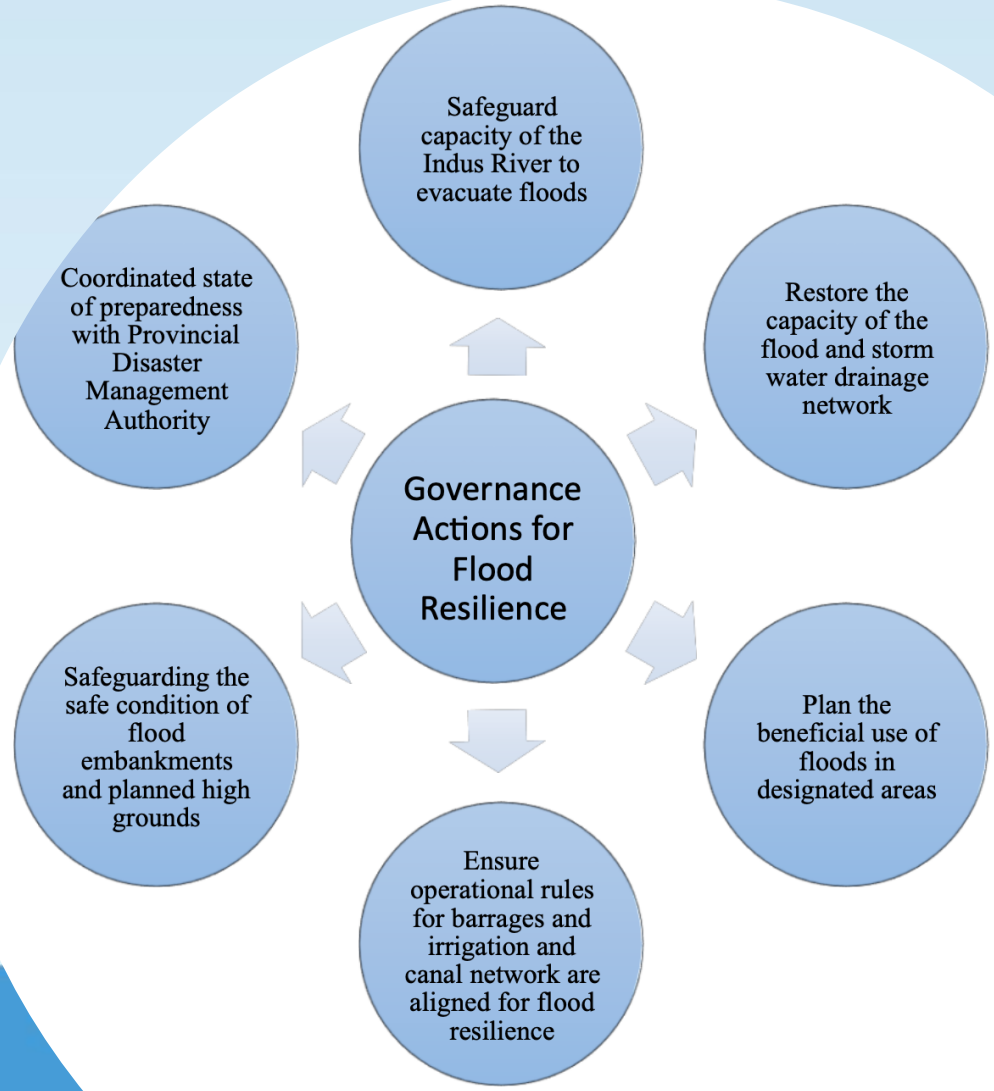
- We must Safeguard the capacity of the Indus River to evacuate floods. This capacity is now heavily compromised due to conversion of the flood plains in permanent farmland, including the construction of roads and settlements. This has replaced the official system of temporary occupation of the flood plain. It needs to be worked through area by area how this can be partly reversed creating more space for the rivers, for instance by creating inundable roads.



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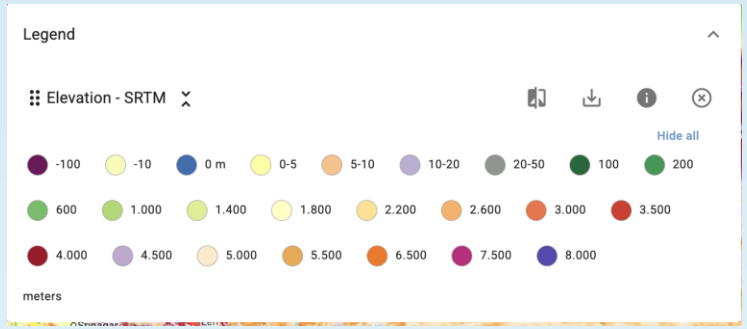
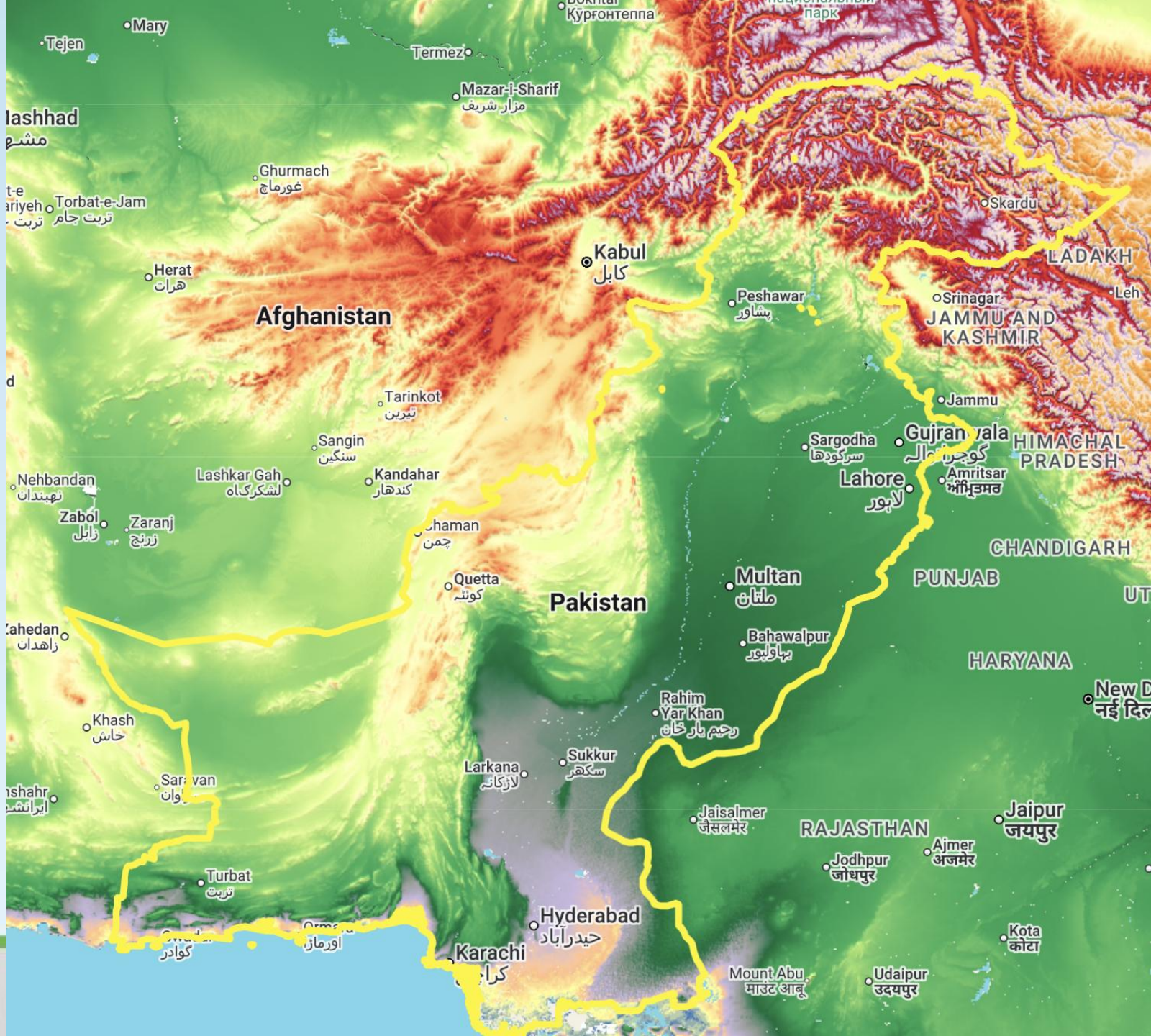
Natural Ground Elevations





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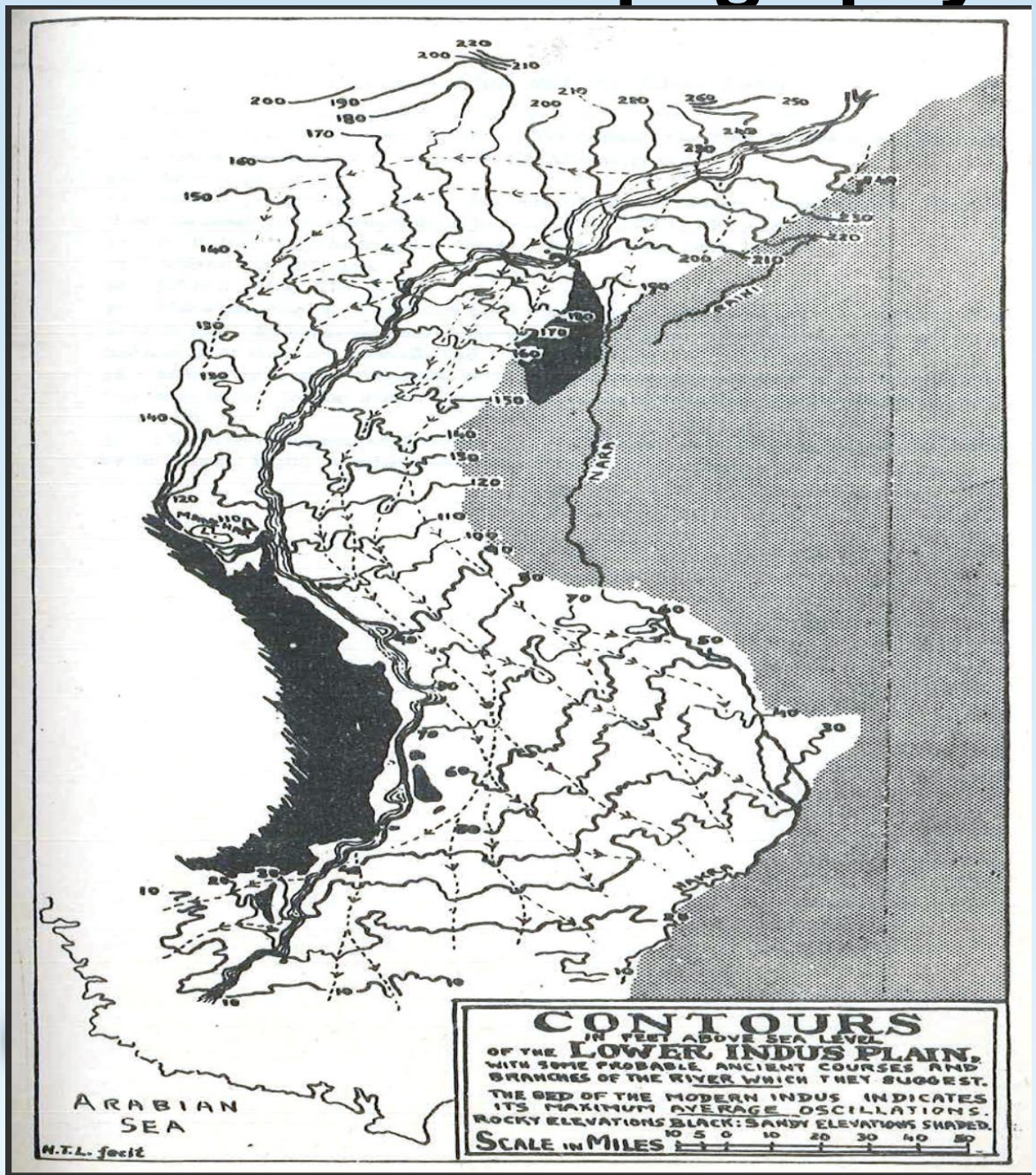
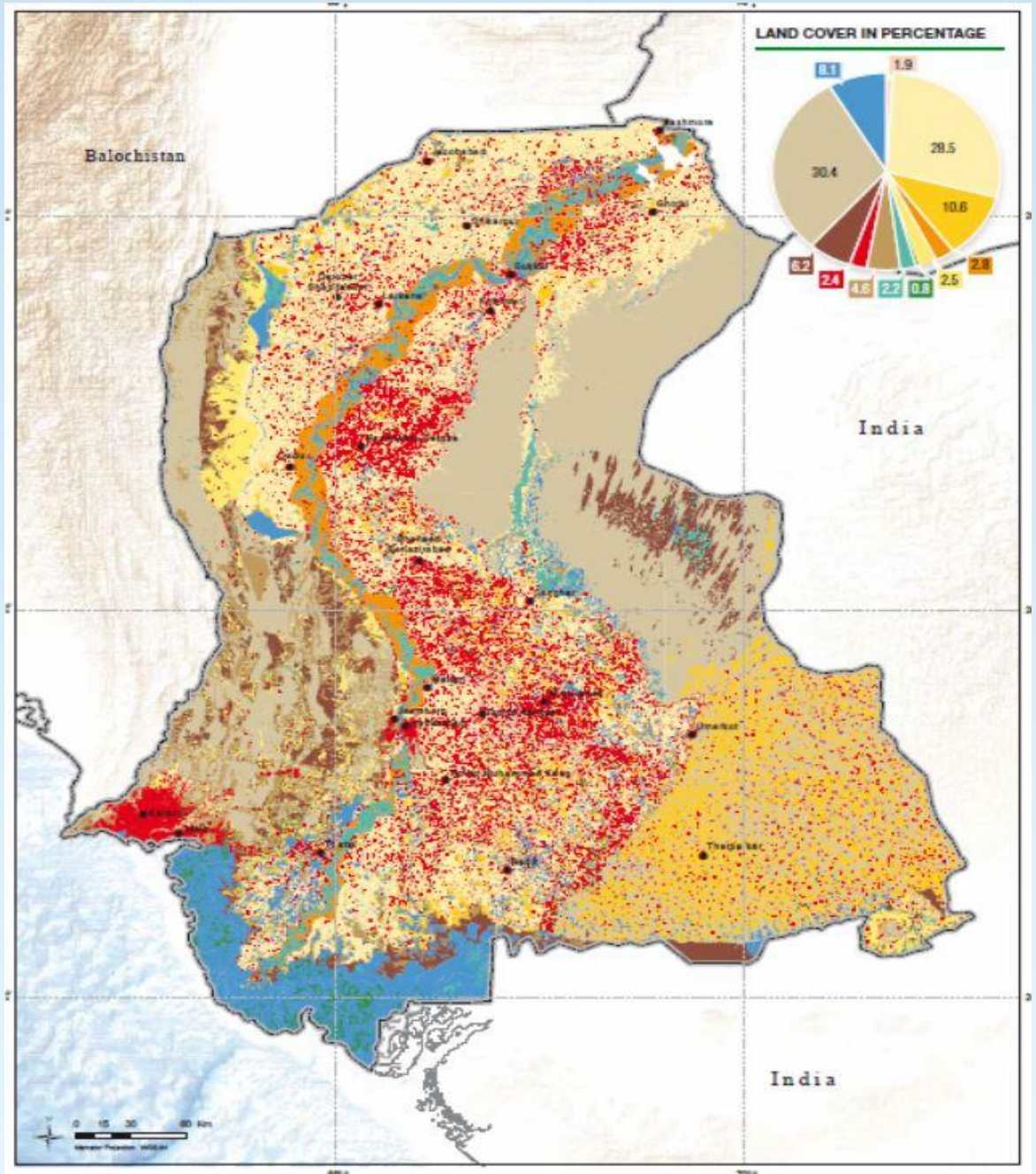
Natural Water Ways

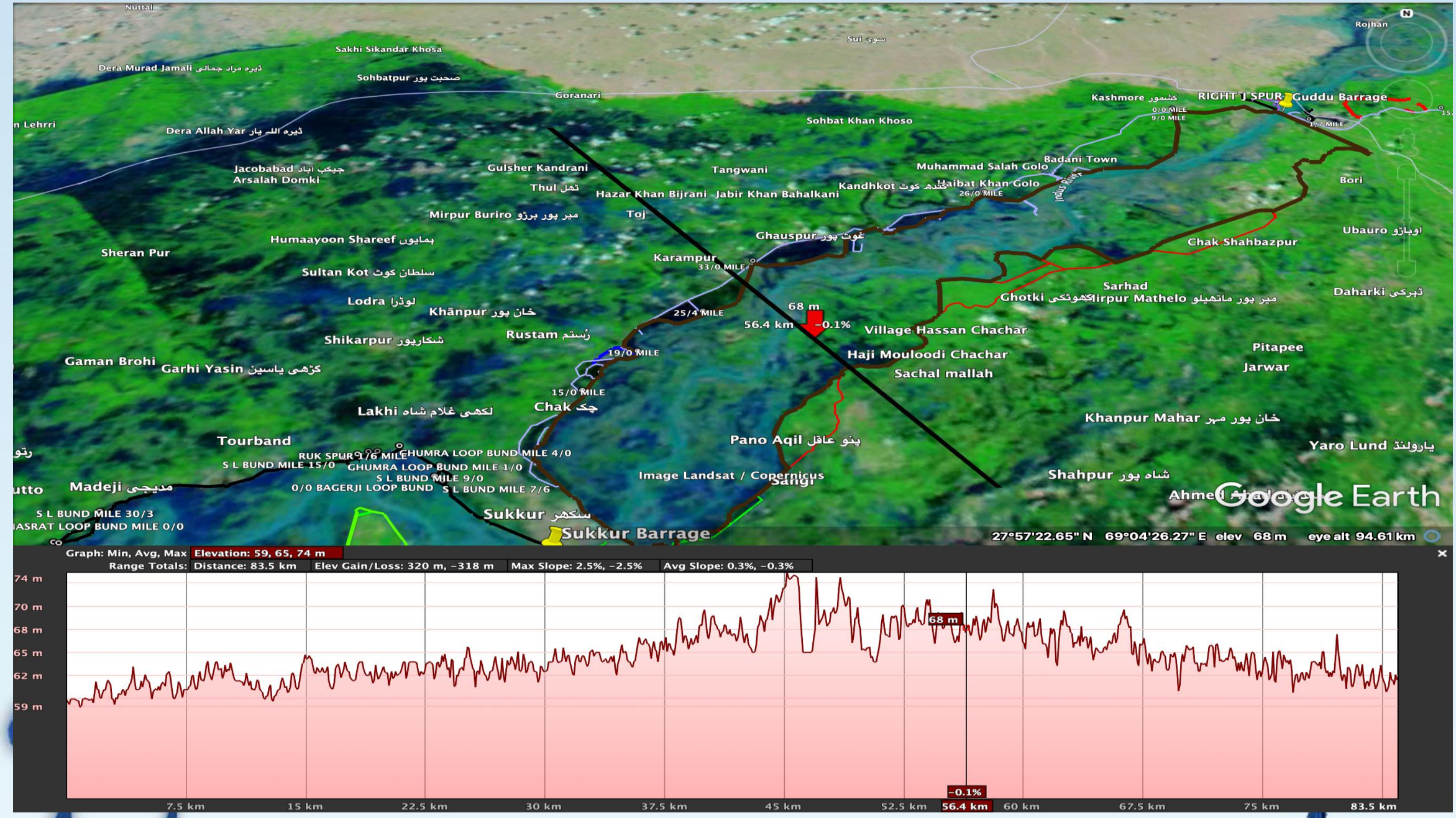
WWF Hydro SHEDS
Free Flowing Rivers
Network v1

Contours & Topography of Sindh

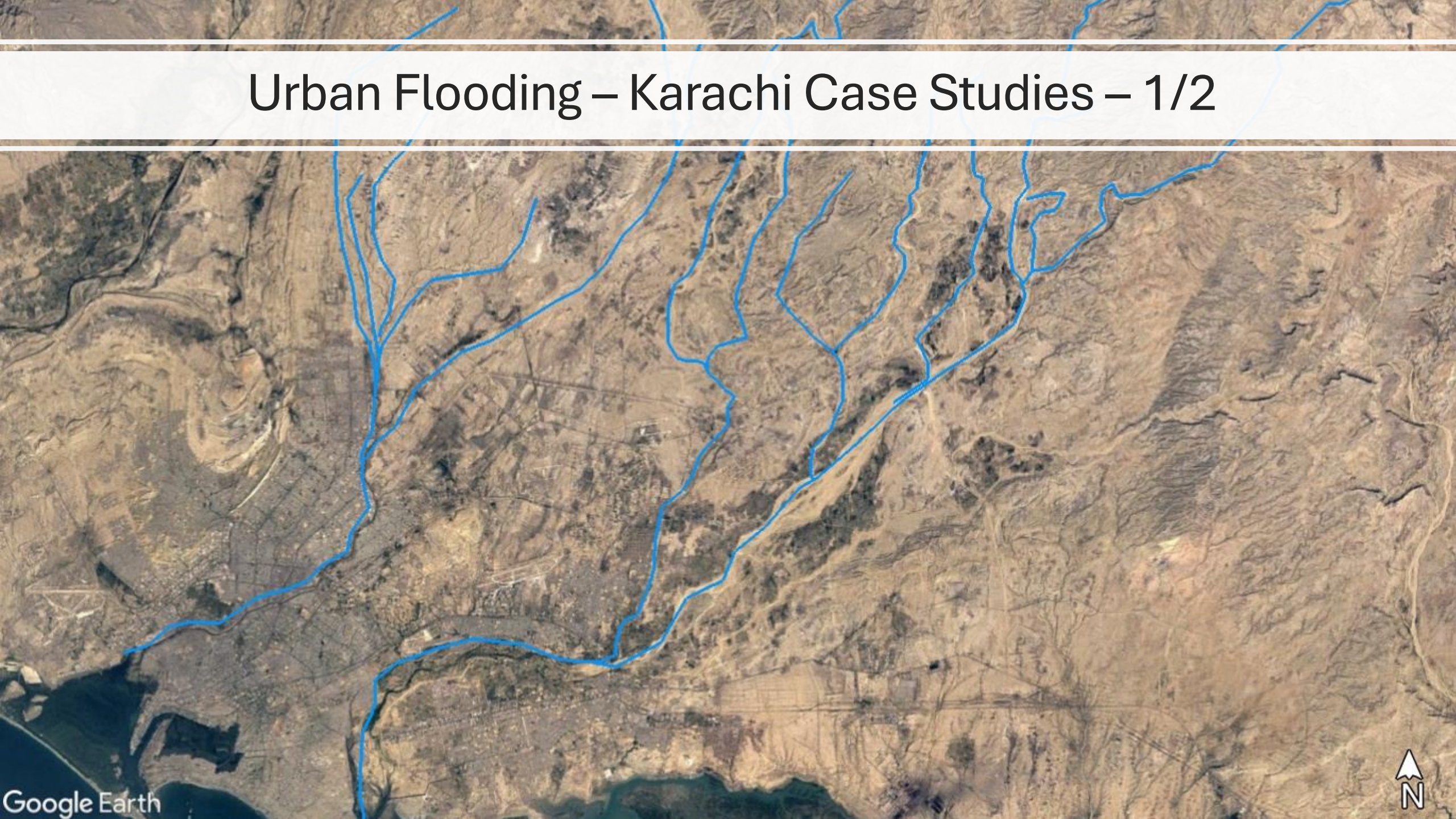




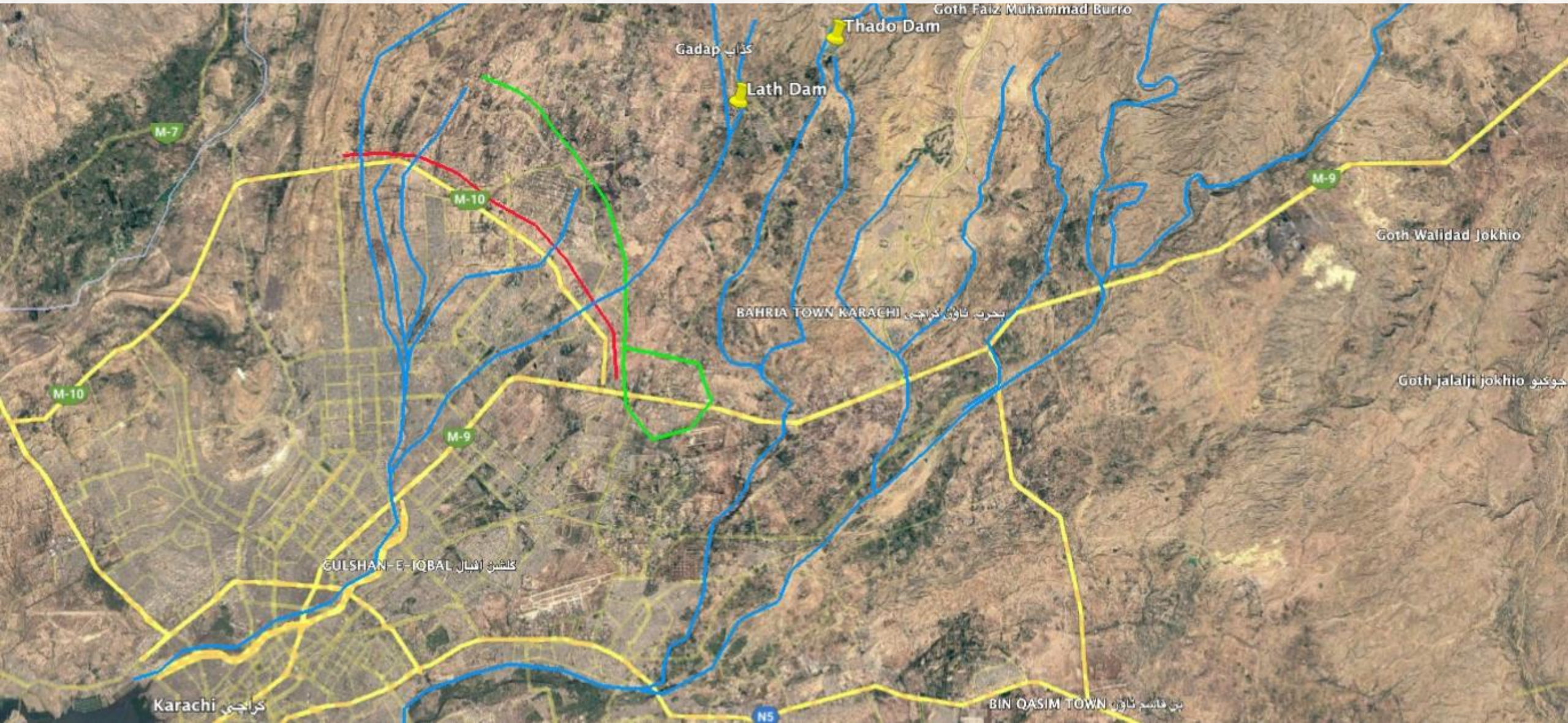
Sindh Land Surface Elevation – River Cross Section



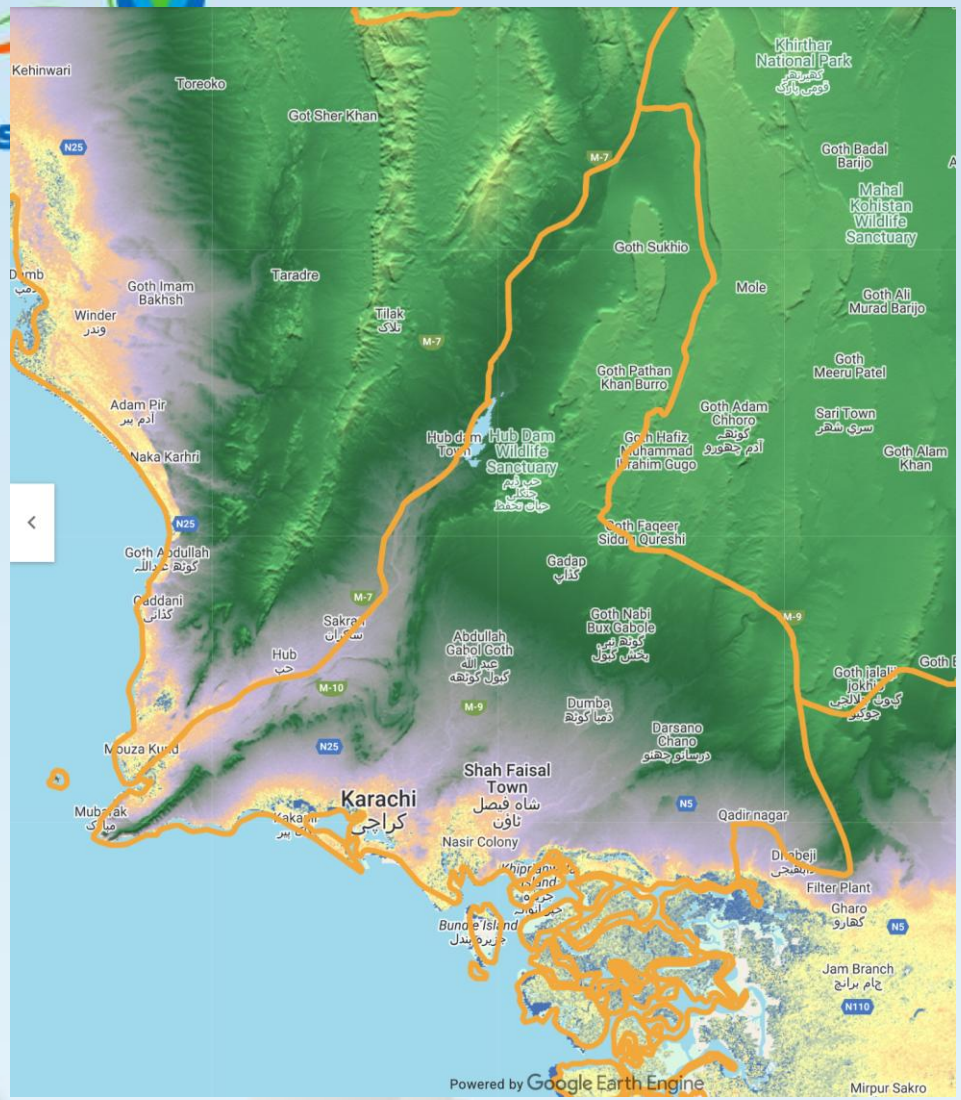
Urban Flooding – Karachi Case Studies – 1/2



Urban Flooding – Karachi Case Studies – 2/2



Karachi Elevation & Contour Lines



Karachi Drainage Issue – Case Study – Slide 1/3

- Storm Water Drain converted into Domestic Sewage – Filled with Sludge

Karachi Drainage Issue – Case Study – Slide 2/3

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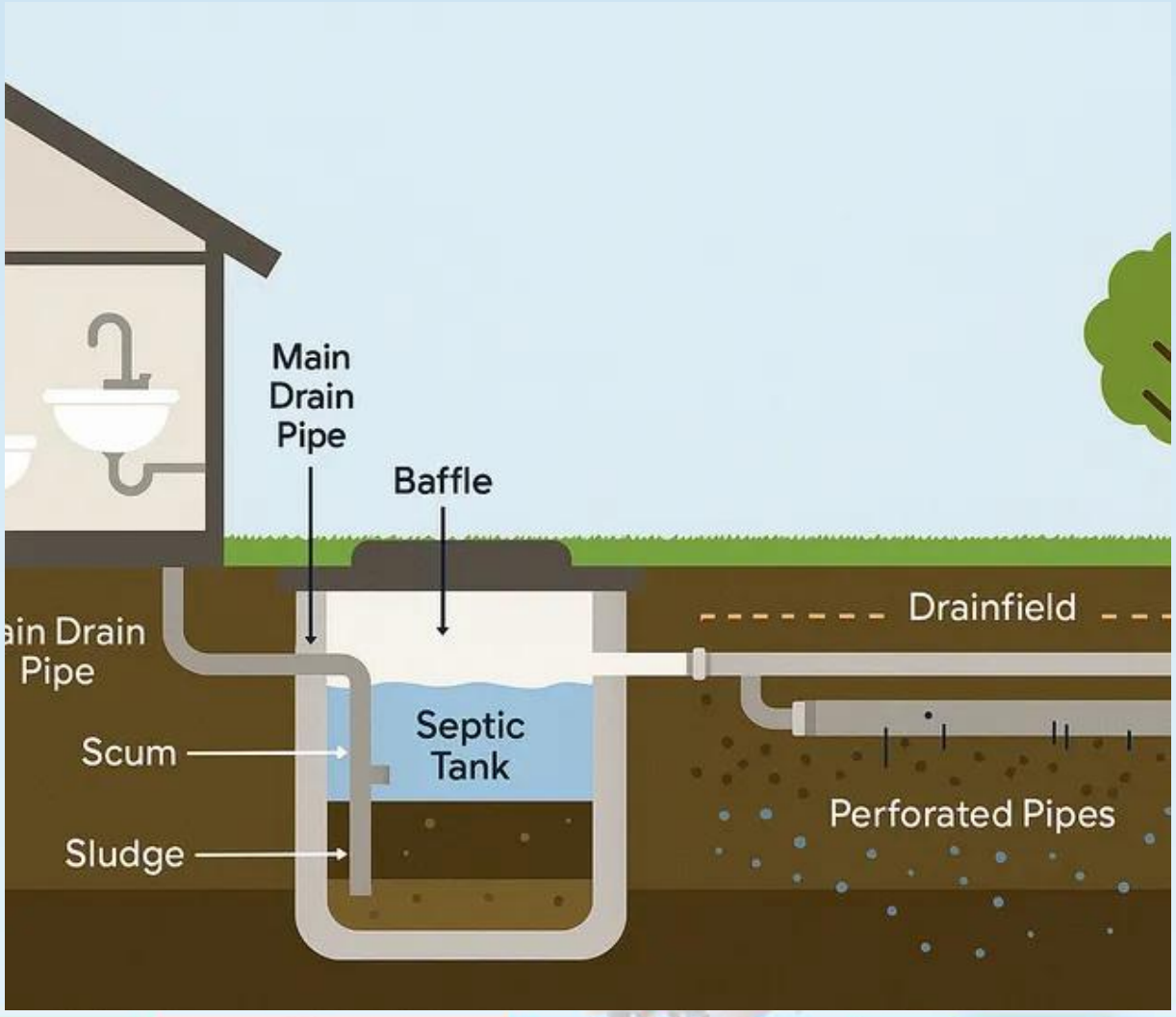
A septic tank prevents drains from choking by separating solid sludge from liquid wastewater, preventing the solids from entering and clogging the drain field pipes. The tank relies on physical separation and bacterial decomposition to perform this primary treatment.



Karachi Drainage Issue – Case Study – Slide 3/3

Where is sediment coming from??????

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Case Study of Bangkok - Rain Flood Drainage

CAUSES OF FLOOD

MAJOR CAUSES

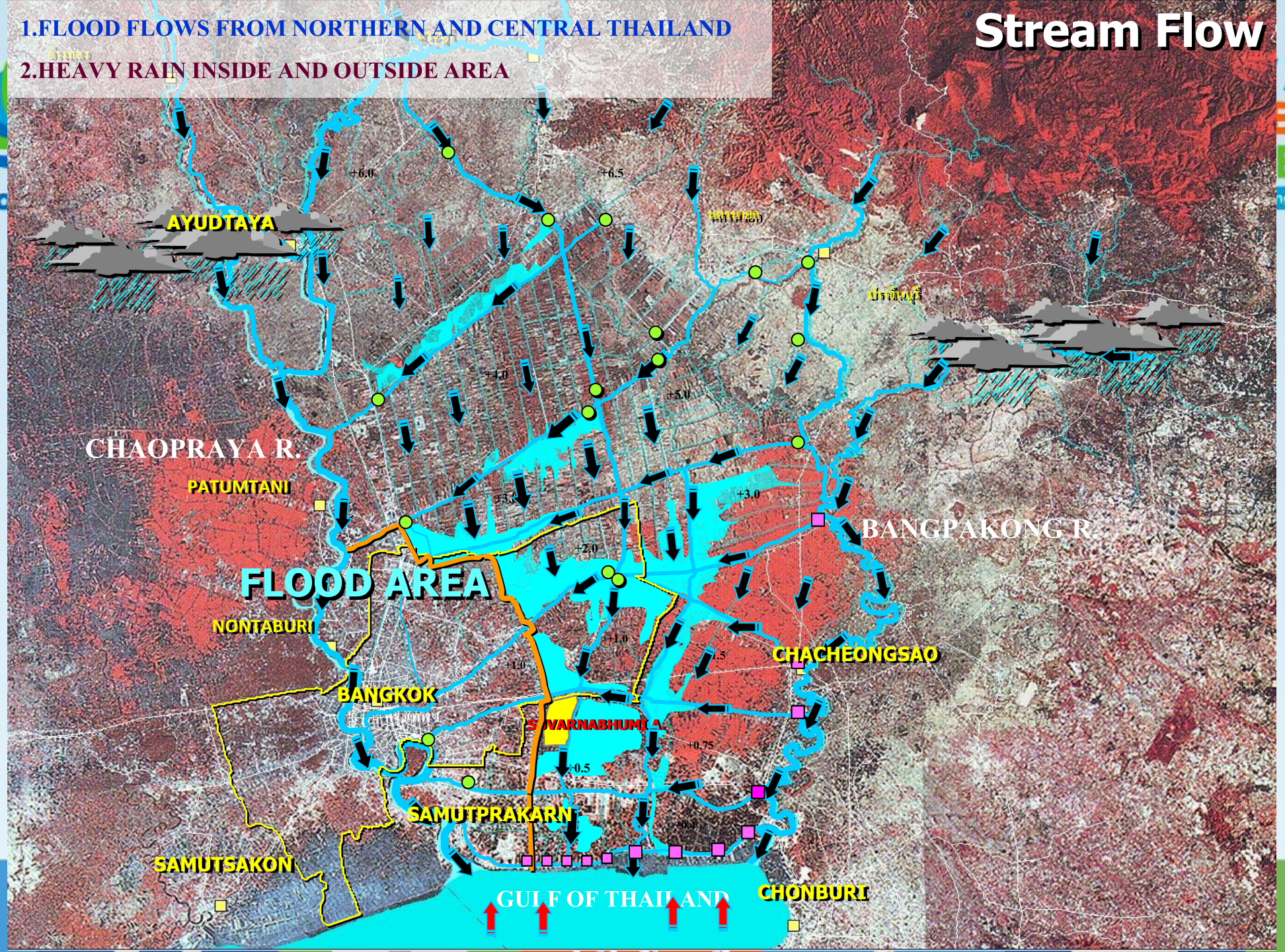
1.DISCHARGE FLOWS FROM NORTHERN AND CENTRAL THAILAND

2.HEAVY RAIN INSIDE AND OUTSIDE AREA

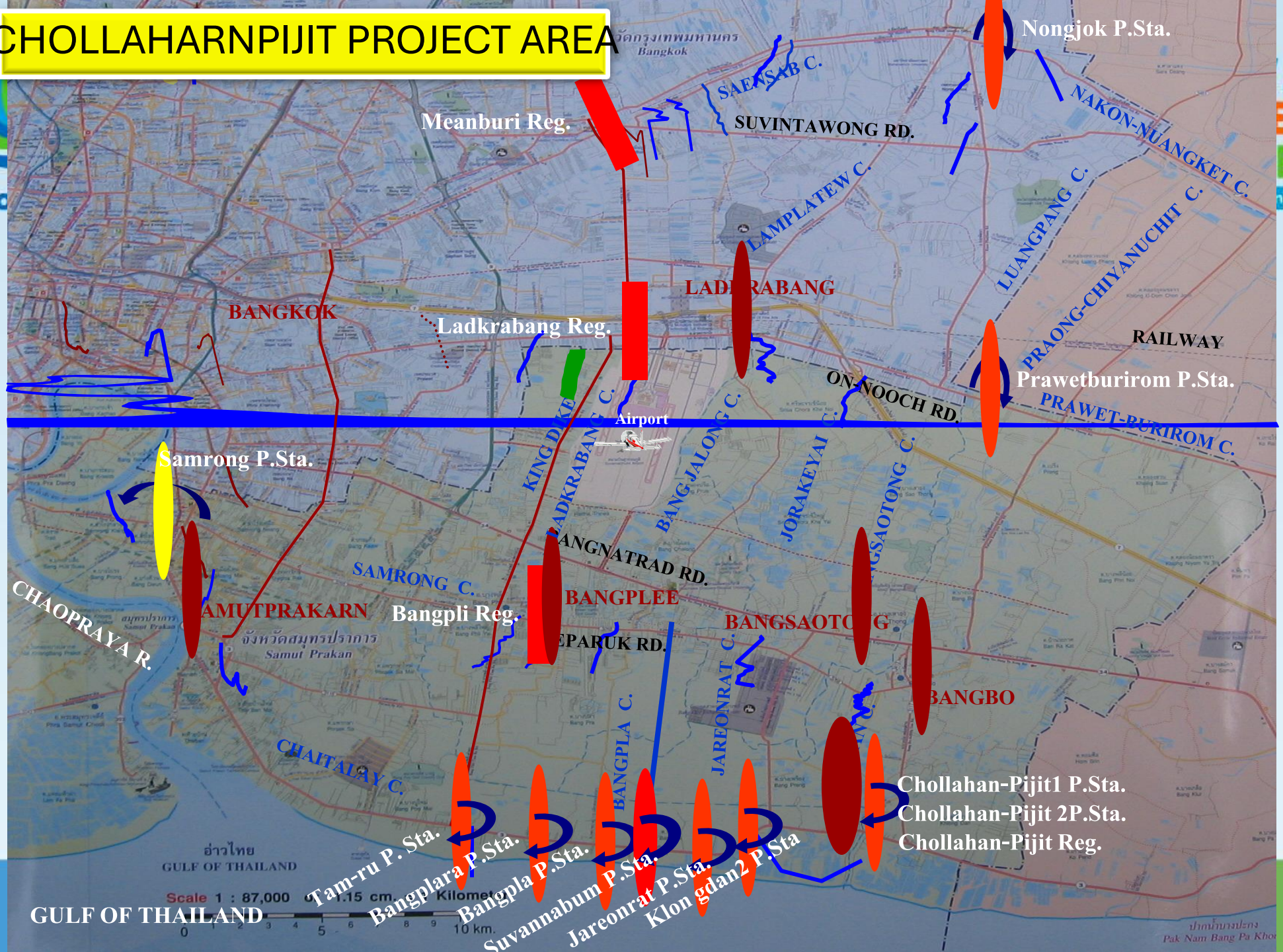
1.FLOOD FLOWS FROM NORTHERN AND CENTRAL THAILAND

2.HEAVY RAIN INSIDE AND OUTSIDE AREA

Stream Flow



CHOLLAHARNPIJIT PROJECT AREA



Project Feature / Flume

Project Feature / Canal and Regulators

Suvannapum Pumping Station

Total 4 pumps

Discharge Volume

8.640 mill m^3 day^{-1}