International Risk Expert

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(1) country-wide (natural) risk potential

- Floods – Biggest Risk,

    Likelihood: Most Frequent Impact: Highest

- Earthquake – Major Risk,

    Likelihood: Highly Frequent Impact: High

- Forest Fire – Medium Risk,

    Likelihood: Highly Frequent Impact: Medium

- Tsunami – Minor Risk,

    Likelihood: Less Frequent Impact: High

- Volcanos - Minor Risk,

    Likelihood: Least Frequent Impact: Lowest
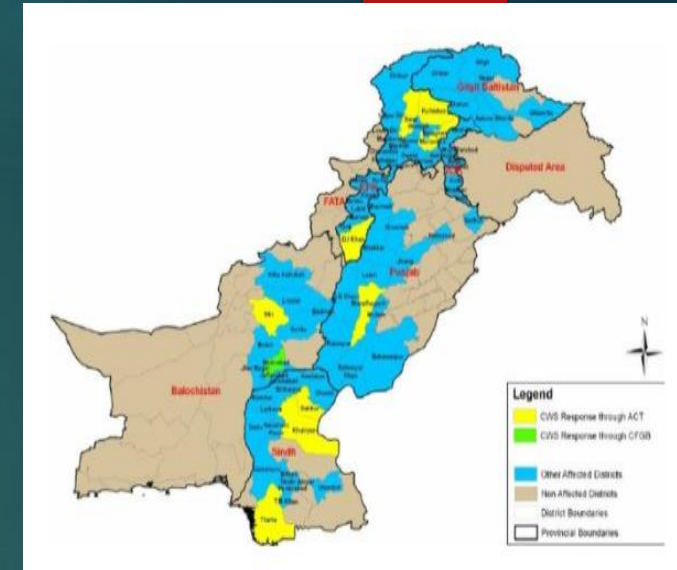
Rafique, Sidra & Khan, M. (2015). Flood disaster management -A review FLOOD DISASTER MANAGEMENT FOR CULTIVATION AND POWER GENERATION – A REVIEW. 10.13140/RG.2.1.4109.9608.

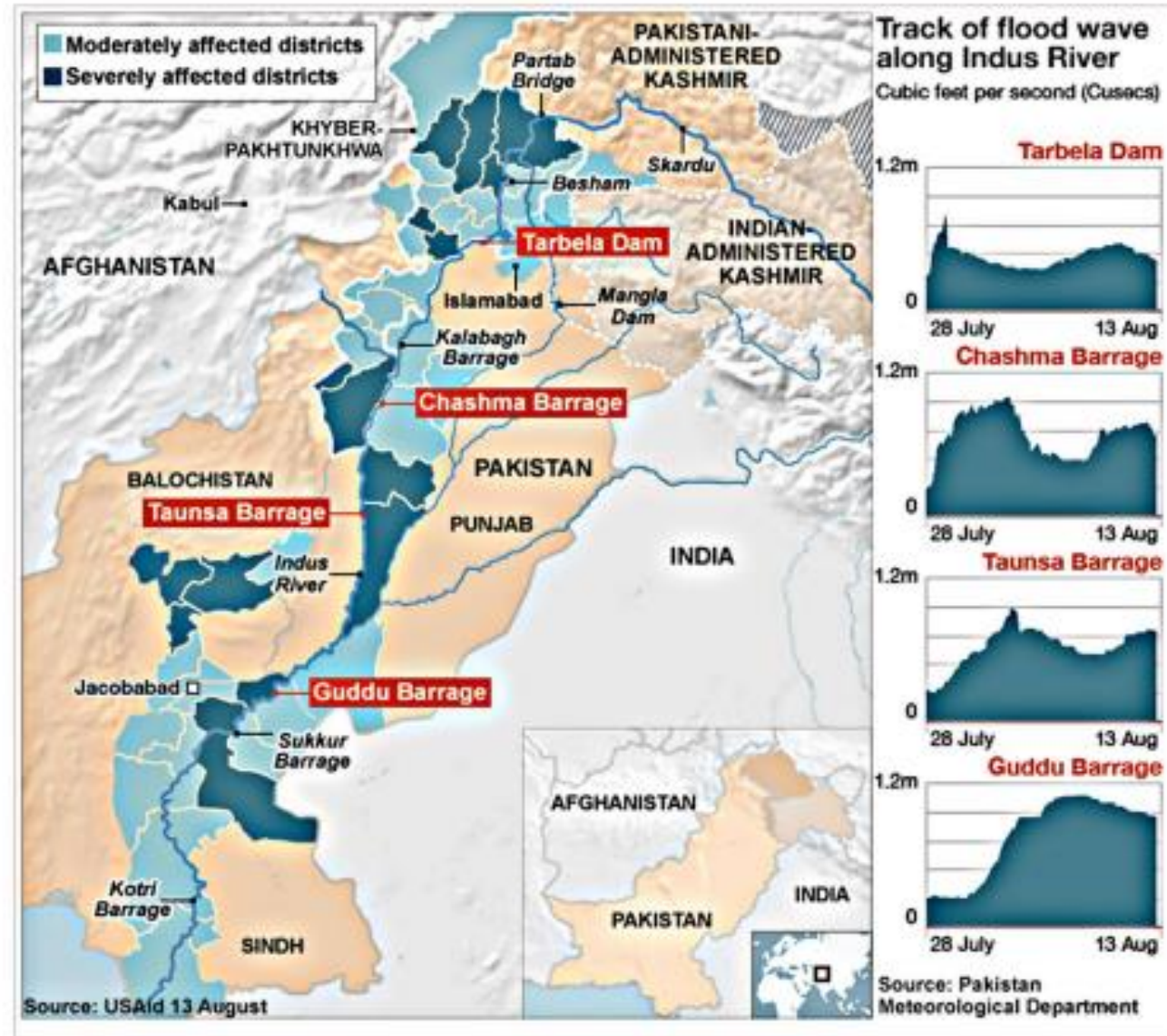https://seismic.pmd.gov.pk/hazard-map.php
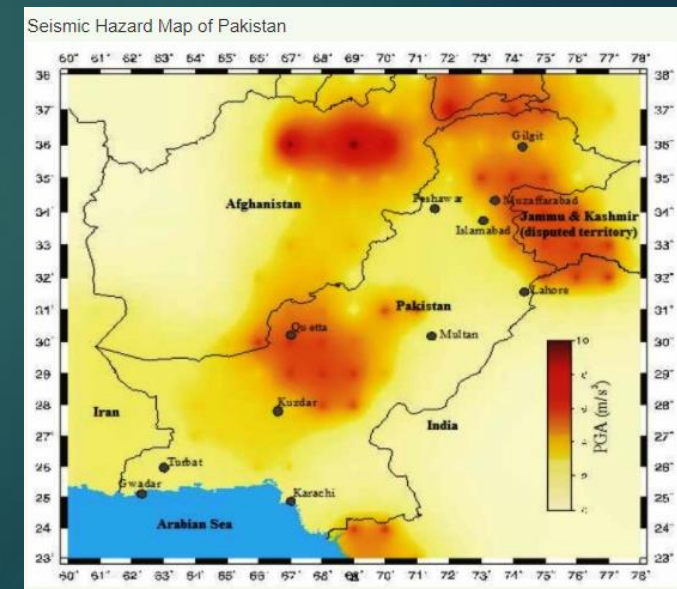
Flood 2010

Causalities: 1,200 to 2,200,
Houses Damaged 1.6 million leaving an estimated 14 million people without homes.
(Source: Britannica)

UN Flood Map

- Moderately affected districts
- Severely affected districts

Track of flood wave along Indus River
Cubic feet per second (Cusecs)

Source: USAid 13 August

Source: Pakistan Meteorological Department

Tools:

▶ HEC RAS

▶ ArcGIS with Geo-HEC RAS Extension
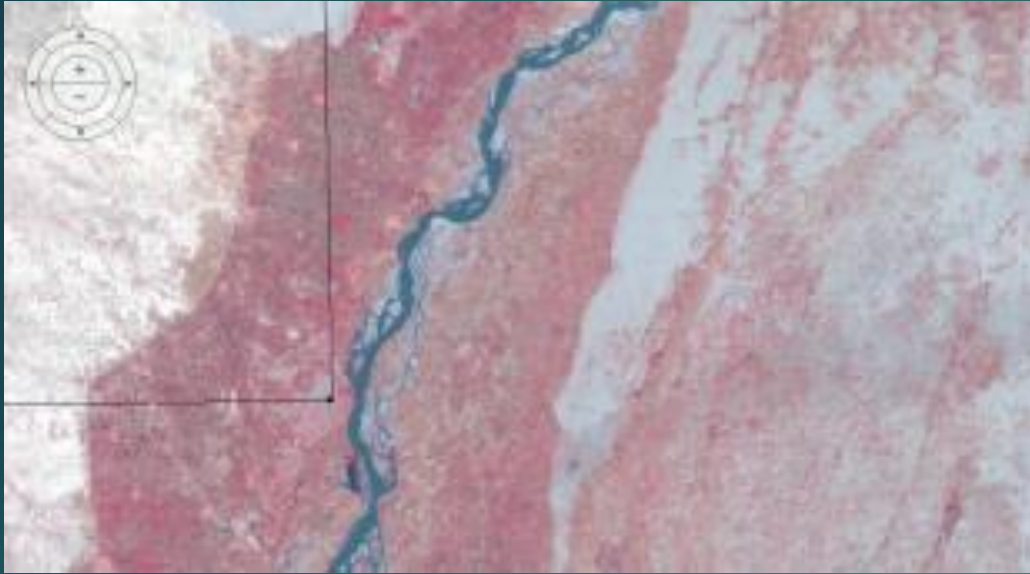
▶ ERDAS IMAGINE

▶ Google Earth Pro

▶ Global Mapper

Data:

▶ Landsat 7 and 8

▶ Pakistan Meteorological Department Inflow and Outflow Data

▶ Boundary Shapefiles from Diva GIS
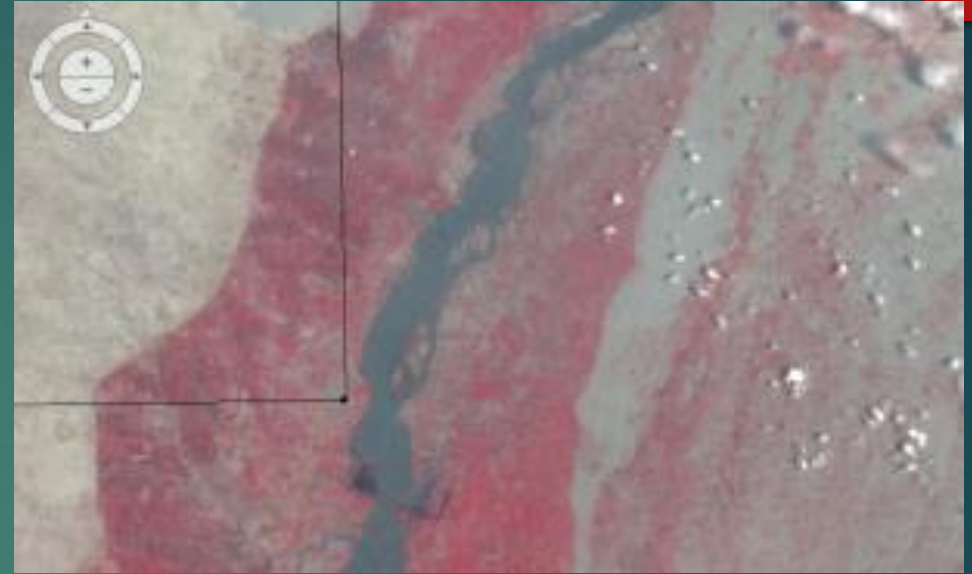
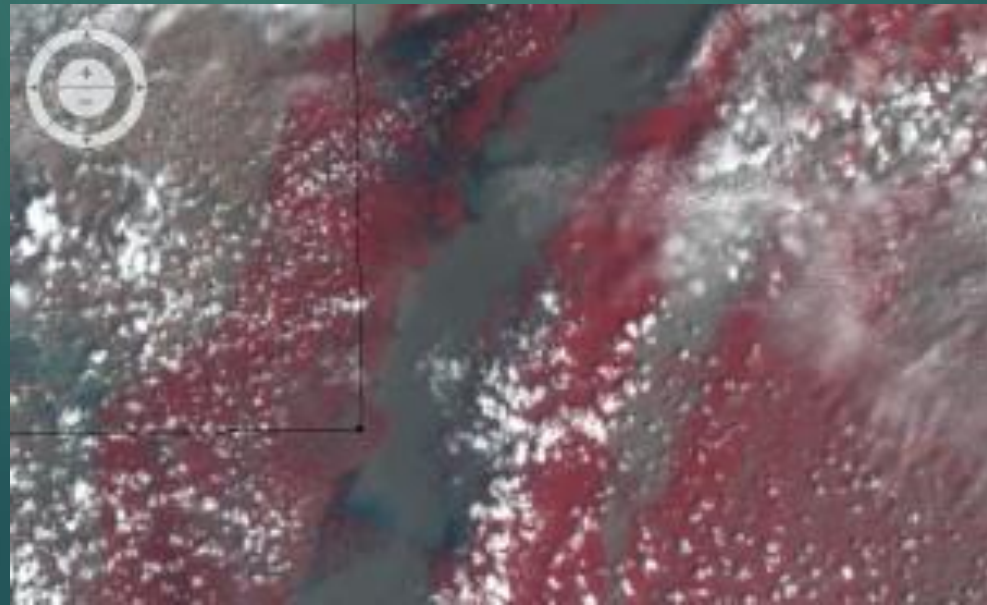▶ Manning roughness coefficients data from Reports

Study Area Map
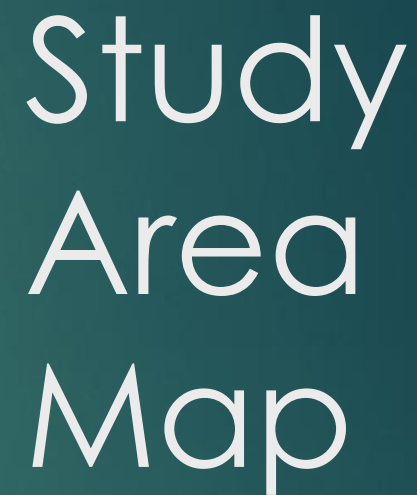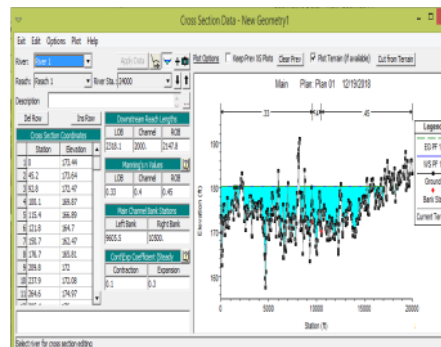
Methodology:
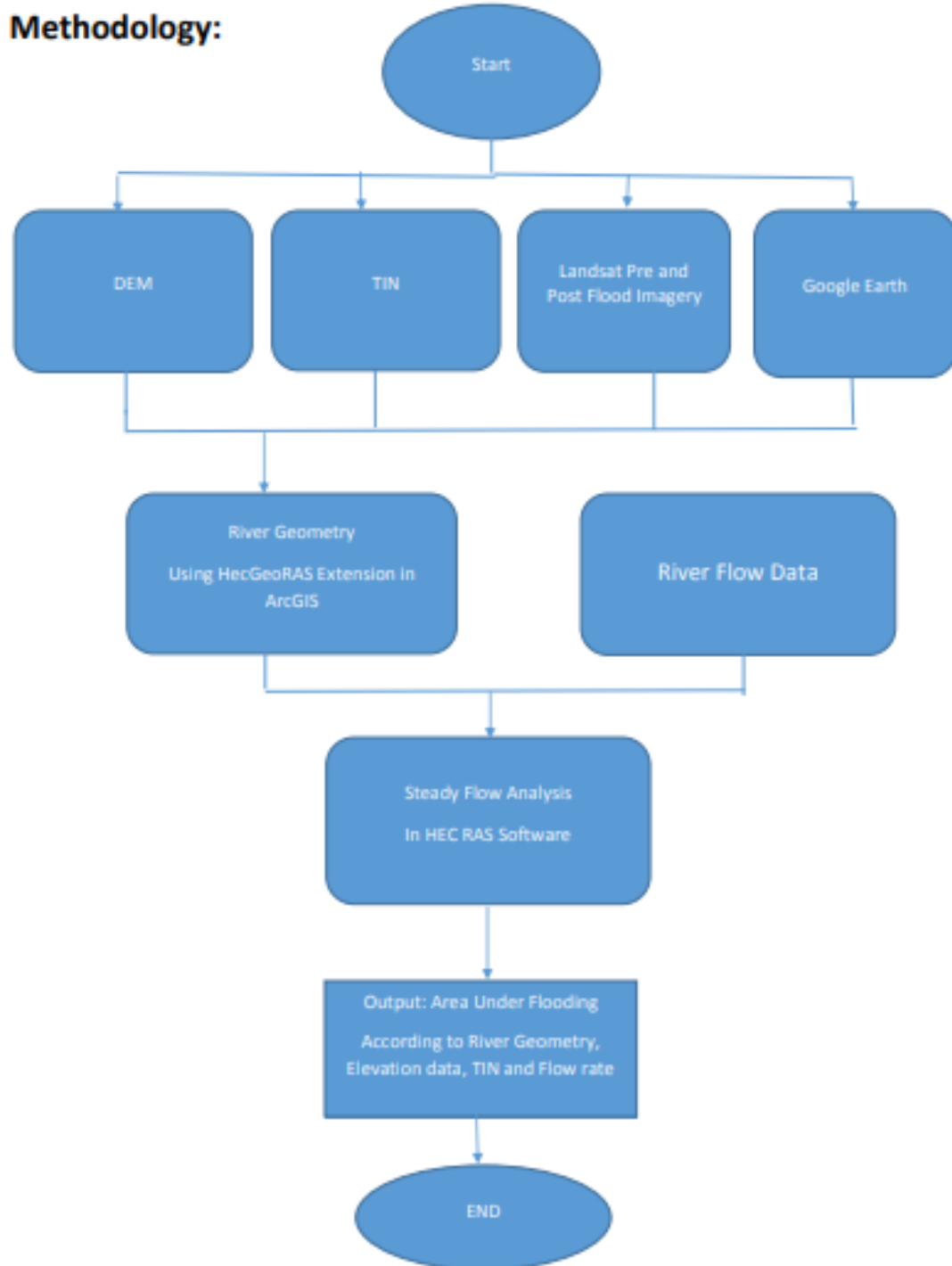
- Landsat Imagery

23.04.2010

25.06.2010
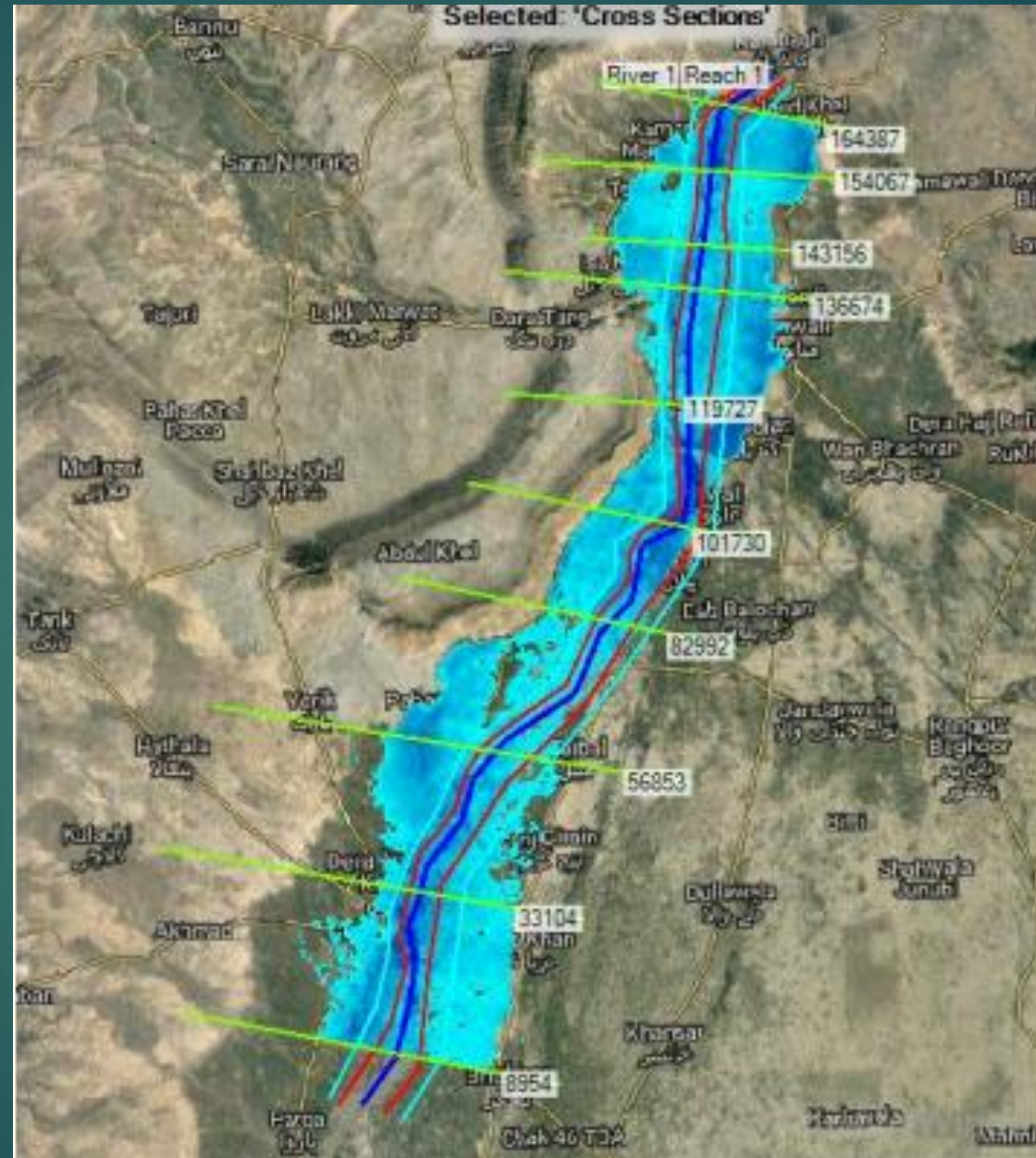
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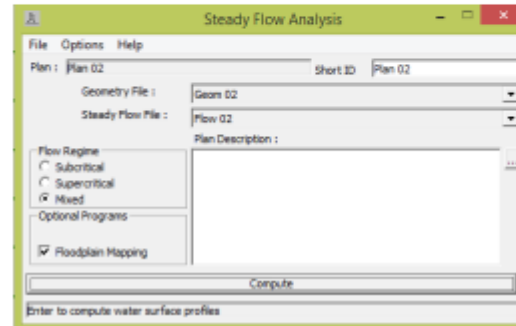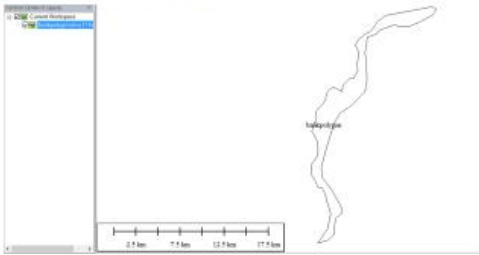
Processing Steps

Results

- Blue area shows inundated area.

Tectonic Map

(2) overview on available data

- **Floods**

Daily Discharge data

Daily Precipitation data

River Geospatial data

Inflows and outflows

Head/Levels data

(Dams, Major Barrages)

Remotely Sensed Data

(Imagery, Atmospheric Products)

- **Earthquake**

Event based

Richter scale measurement

Epicenter

Depth

- **Tsunami**

Event Based

Mean Sea Level

Coastal Cities Elevation

- **Forest Fires**

Yearly Data for canopy cover and carbon emissions

% Area loss due to Forest Fires

- **Volcanos**

Event Based

No known measurements

(3) recommended next steps

- Effective mitigation and response to natural hazards
- Increased focus towards sustainable development.
- Collection of real world data including geospatial information
- Using Machine Learning time series analysis for prediction of disasters and mitigation of potential hazards
- Following Sustainable Development Goals
- Alternatives for Climate Change causing Human Activities

(4) your lessons learned

- Climate Change is one the biggest Hazard of 21st Century for the Globe
- Natural Disasters can be mitigated or vulnerability can be reduced with by proactive planning.
- Digital technology is significantly useful for Disaster Risk Management
- Geo-statistics adds more meaning or (contextual) information for better analysis of Real World Events.
- Increasing amount of data cannot be coped with traditional approaches therefore, big data
- Awareness among masses about challenges can lead to innovative ideas,

Thank You!