

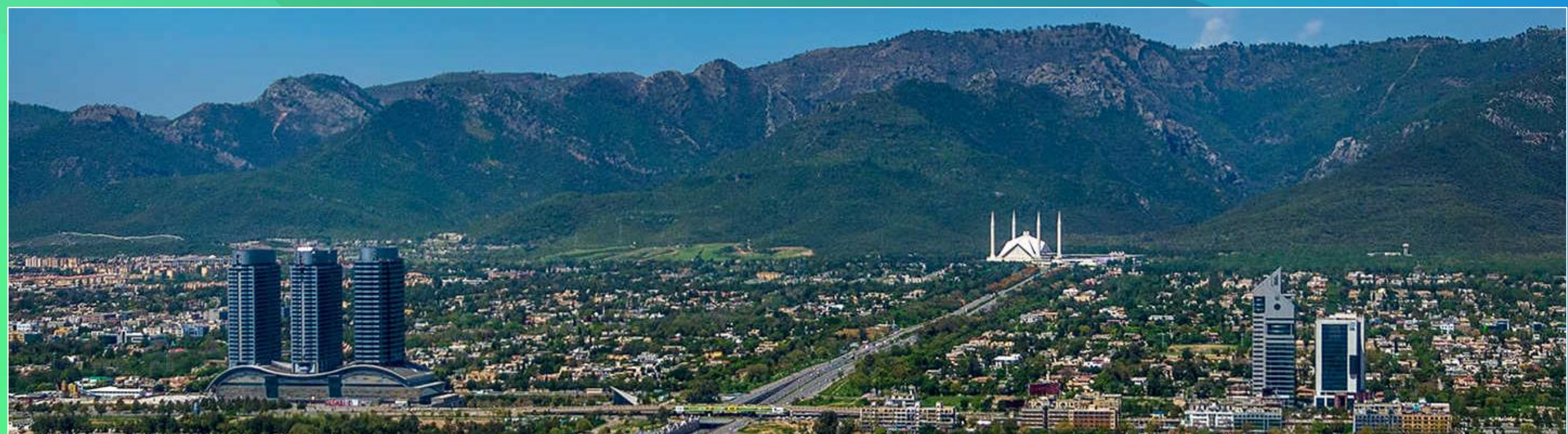


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# Harnessing Space Technology for Disaster Mitigation and Management in Pakistan

Hassan Ali – Pakistan



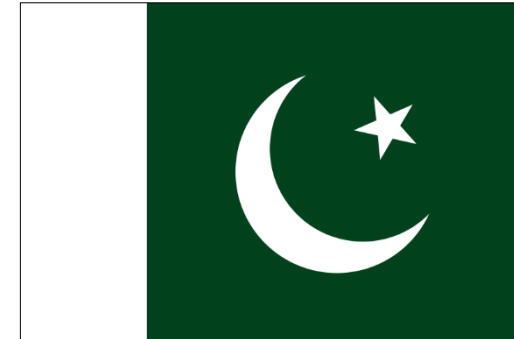
# Presentation Outline



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- Pakistan – At a Glance
- Natural Hazards – Resultant Disasters
- SUPARCO – National Space Agency
- EO Satellites & Coverage
- Platforms & Tools
- Geospatial Datasets
- Challenges & Limitations
- Capacity Building Needs
- Recommendations



# Pakistan – At a Glance



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- Shares Borders with
  - **Afghanistan:** Northwest
  - **India:** East
  - **Iran:** Southwest
  - **China:** North
- 5<sup>th</sup> most populous country – **241.49M**
  - Projected 4<sup>th</sup> most populous by 2030
  - Area **796,096** sq. km.
    - 303 people per sq. km.
  - **204,300** sq. km. Crop Land
- 1,046 km coastline along
  - **Arabian Sea:** South
- **3,180 km** Indus River runs across country
  - 13 other significant rivers
- **6,668** Glaciers



Floods

Earthquakes

Landslides

Droughts

Cyclones

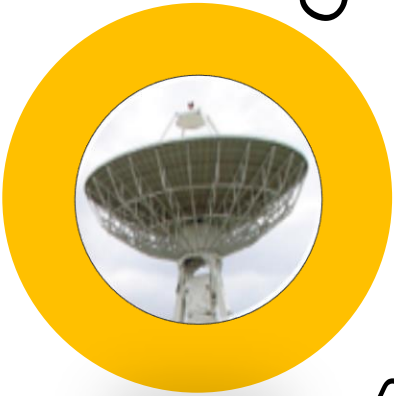
Heatwaves

Snowfall

Fog

- Floods: 2010 & 2022
  - Approx. 3,500 lives
  - Approx. \$25Bn damages
- Earthquake: 2005
  - Approx. 70,000 lives
  - Approx. \$2.3Bn damages
- Landslide due to Monsoon
- Drought: 1999-2002
  - 3,000,000 affected
- Cyclone: 2023
  - Biporjor – 81,000 affected
- Heatwave: 2015
  - 65,000 affected
- Snowfall: 2022
  - 23 lives lost in a night
- Fog: 2023-2024
  - Punjab, Upper Sindh, KP

1989 Satellite  
Ground Station



2004 SPOT5  
System Upgrade



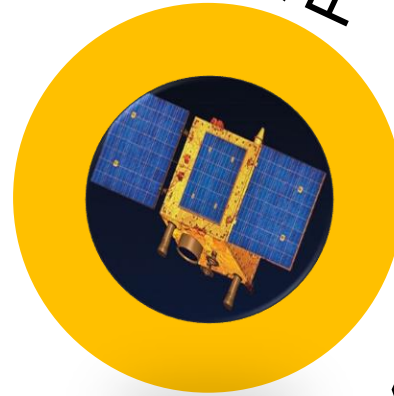
2011  
PAKSAT1R



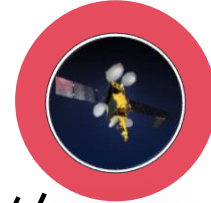
2017 SPOT6/7  
System Upgrade



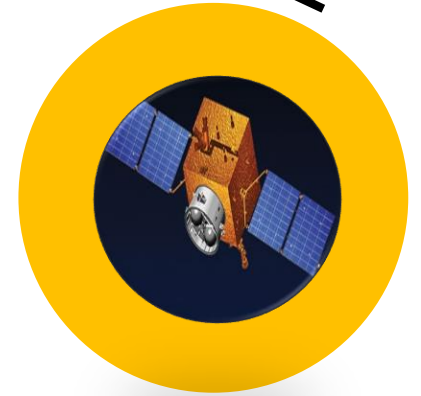
2018 PRSS-1 &  
PAKTES-1



2024 PAKSAT-  
MM1



Next PRSS-2



# EO Satellites & Coverage



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- **Regional coverage since Aug, 1989**
  - SPOT 6/7, Pleiades 1A/1B, TerraSAR
  - 1.5m, 0.5m, 0.3m
  - Optical & Synthetic Aperture Radar(SAR)

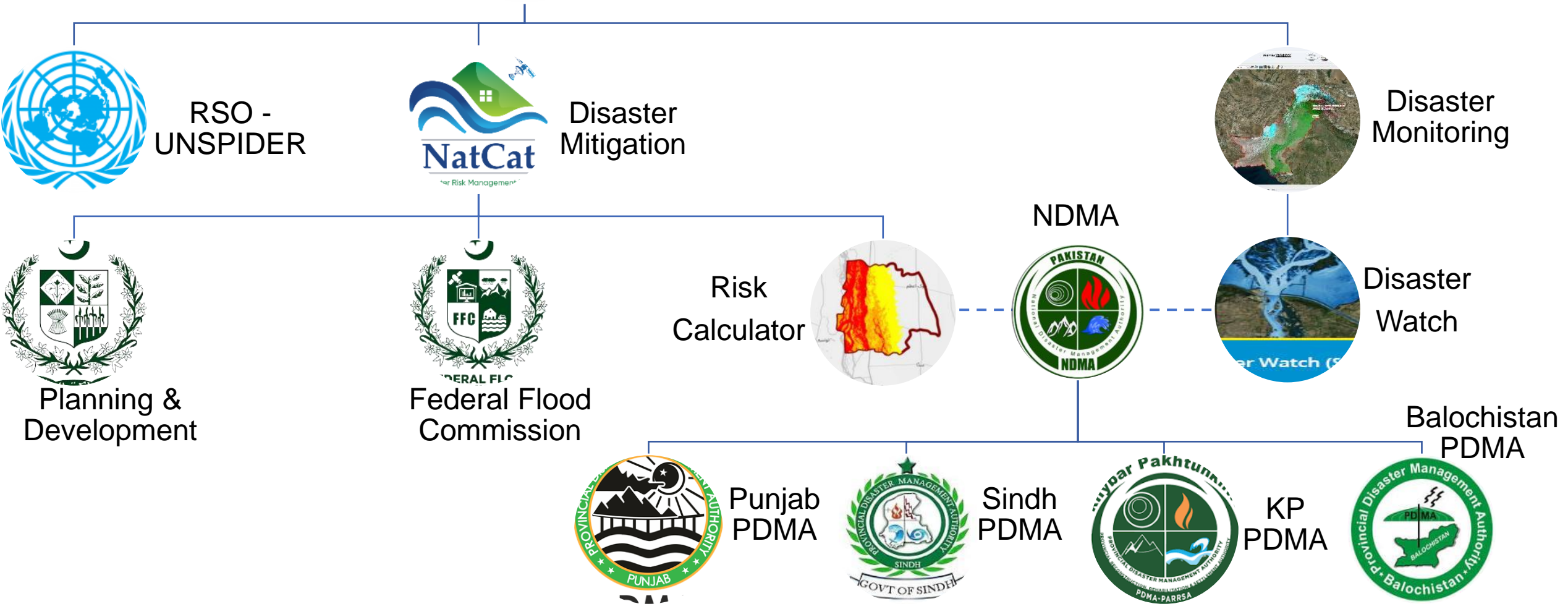


- **Global coverage since July, 2018**
  - PRSS-1, PakTES-1A
  - 0.98m, 2.3m
  - Optical

# SACRED



## Space Application Centre For Response In Emergency And Disasters



# Geospatial Datasets



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- Federal, provincial and local authorities need access to data, before, during and after disasters



Pakistan Bureau of Statistics

- Population
- Housing
- Agriculture



SUPARCO

- Imagery
- DEM
- DSM
- LCCS
- Hazards



Pakistan Meteorological Department

- Temperature
- Precipitation
- Water flow

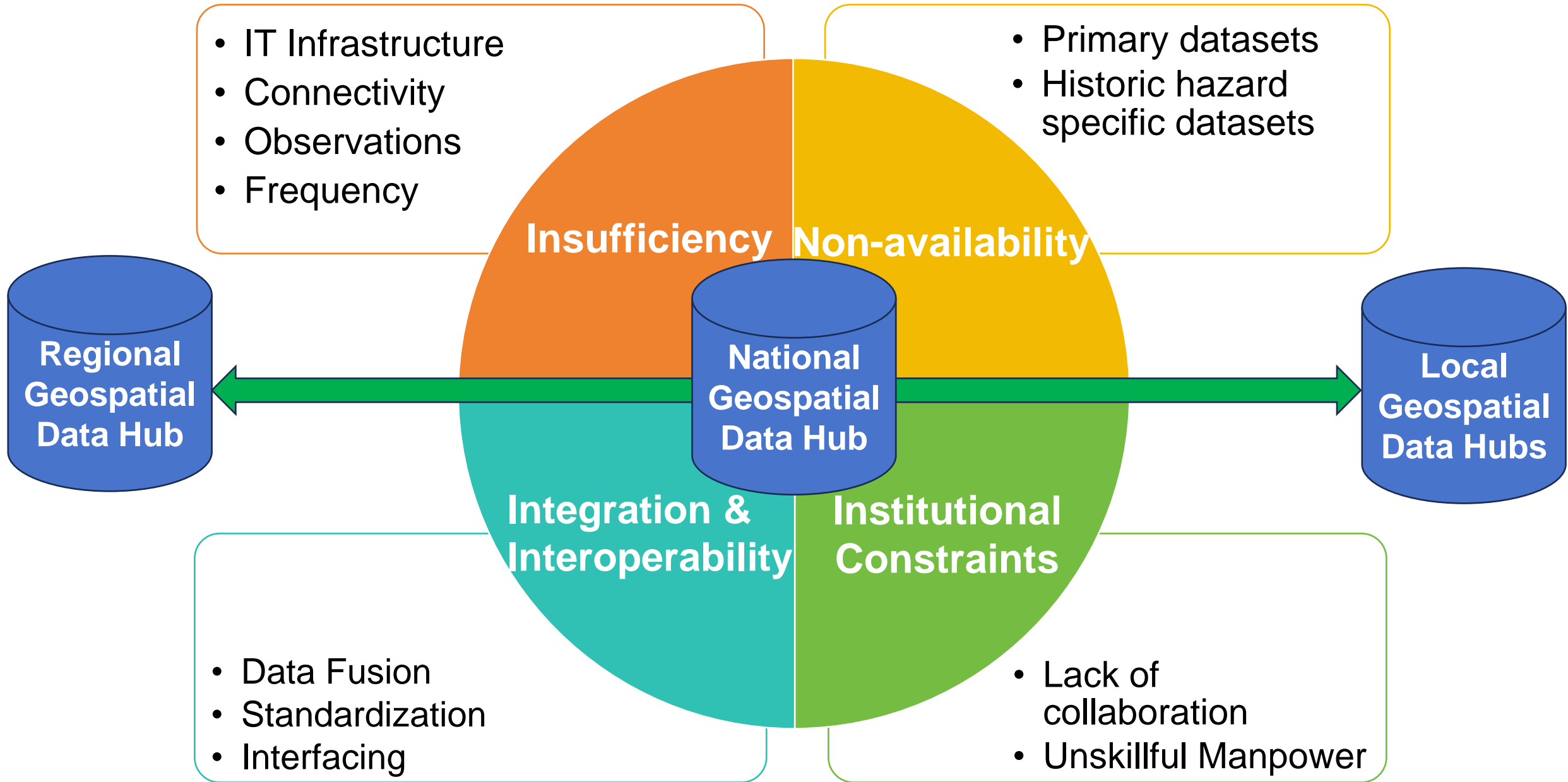


National Highways Authority

- Motorways
- Highways



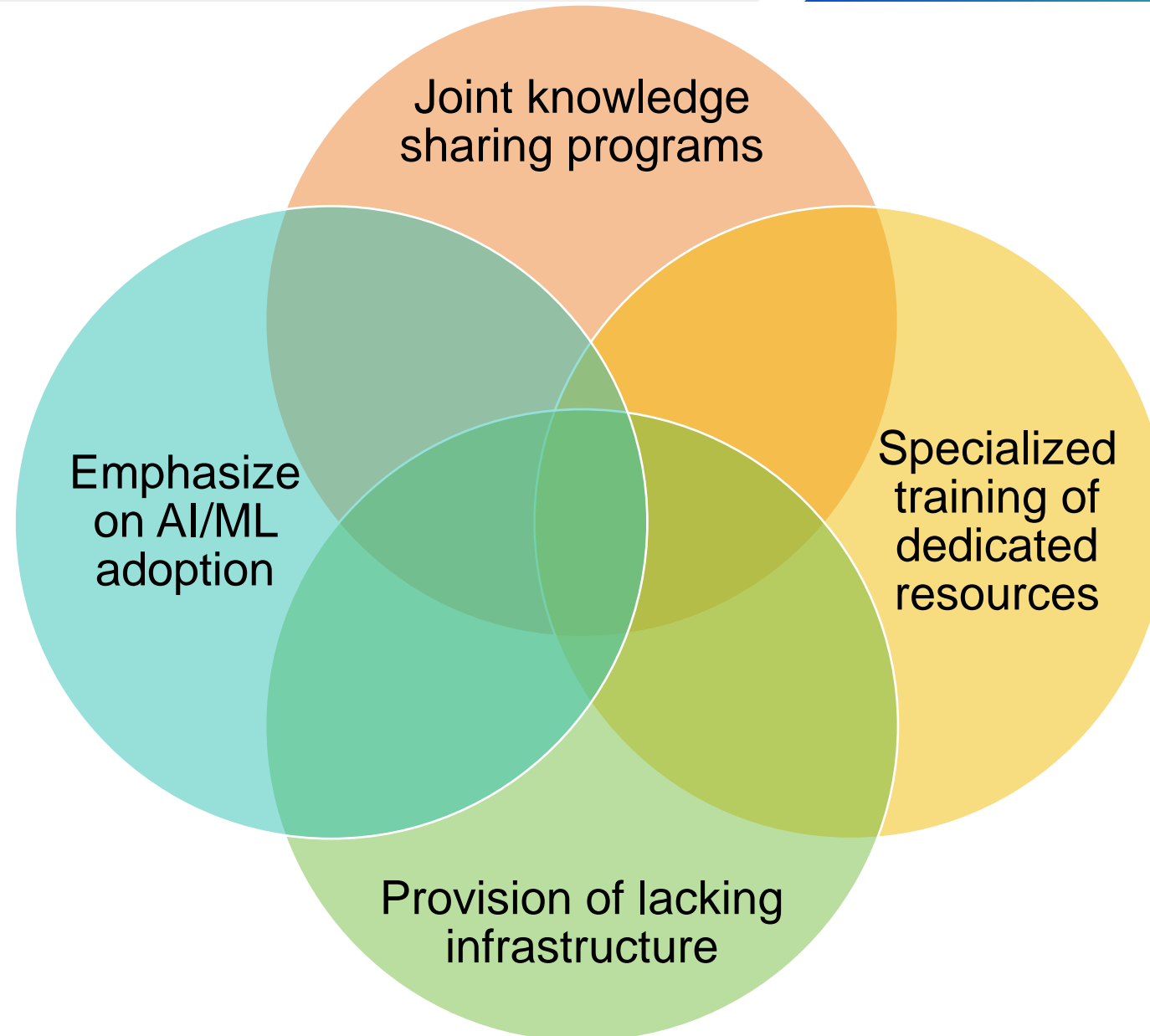
# Challenges & Limitations



# Capacity Building Needs



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## Collaboration

Endorsed forum for collaboration of allied departments

## Open Data

Formulation of policies to make non-sensitive geospatial data open

## Cloud based Technologies

To manage and store large datasets ensuring scalability and accessibility

## Leverage Artificial Intelligence

Integration of AI/ML algorithm to analyze geospatial data for anticipation of disasters





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**THANK YOU**