SPACE BASED SUPPORT TO NDMA/PDMAS DURING FLOOD 2022

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Space Application Centre for Response in Emergency and Disasters (SACRED)

- The Centre provides space-based information to national/provincial disaster management agencies to rapidly assess the extent of natural disasters and damages to human lives, property and infrastructure.
- The Centre also provides assistance to regional countries in case of natural disasters.
Support to National / Provincial Departments

- Ministry of Planning Development and Special Initiatives
- Ministry of Water
- National Disaster Management Authority
- Chief Secy, Govt of Balochistan
- Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan Provincial Disaster Management Authorities
- Chairman Senate Standing Committee on Climate Change
Satellites can provide information at Regional, National and Local level

MODIS - 250m

Landsat – 30m

PRSS-1 – 0.98m
Space based support to NDMA/PDMAs

- Regular monitoring of Rivers, Trans-boundary dams, Glaciers
- Torrents / Flash floods – Balochistan, DG Khan, DI Khan, Rajanpur
- House / settlements damage assessment
- Road / bridges damage assessment on major highways
- Crops damage assessment
- Dams breach assessment / identification in Balochistan
SUPPORT TO NATIONAL / PROVINCIAL DEPARTMENTS DURING FLOOD 2022
Monsoon Rains – GSMaPs

First Spell (01 July till 07 Aug 2022)

Second Spell (08 Aug till 29 Aug 2022)
Inundation Situation - Flood 2022 vs Flood 2010

2010

2022
Rapid Flood inundation Mapping
Flooding in Kabul and Swat Rivers at Nowshera
Flooding in Kabul and Swat Rivers at Nowshera
Regular monitoring of Rivers – Chenab and Ravi

River Ravi – 02 Aug 2022

River Chenab – 30 July 2022
Flood/Rain Inundation - Sindh & Balochistan
Flash Flooding in Dera Ghazi Khan and Ranjanpur, Punjab
Flash Flooding in Dera Ghazi Khan, Punjab
Houses/Settlements Damage Assessment
Rapid Damage Assessment – DG Khan
Rapid Damage Assessment – Jhal Magsi
Infrastructure Damage Assessment
Flooding in Swat Rivers at Mohmand Dam Site

Post Event: 30 Aug 2022
Flooding in Swat Rivers at Munda Headwork
Flooding in River Swat – Bridge Damages

Pre - 01 Jun 2022

Collapsed Bridge on N-35

Post - 28 Aug 2022

Hub River Bridge on N-25, Lasbela
Flooding in River Swat – Road Damages
Small Dam Breaches in Balochistan

Sherjan Khadda Dam – Loralai, Balochistan

Dam Breach – Qilla Abdullah, Balochistan
Crops Damage Assessment
Cotton Crop Damage Assessment - Sindh
Balochistan Forest Fire 2022 - Toi Ghar and Shergali Forest

SPOT 1.5m satellite imagery acquired on 19, 20 and 22 May 2022

<table>
<thead>
<tr>
<th>Area</th>
<th>Sqkm</th>
<th>Hectares (ha)</th>
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<tbody>
<tr>
<td>Fire-1 Toi Ghar</td>
<td>27.56</td>
<td>2756</td>
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<tr>
<td>Fire-2 Shergali</td>
<td>14.05</td>
<td>1405</td>
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<tr>
<td>Total</td>
<td>44.61</td>
<td>4461</td>
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Balochistan Forest Fire 2022 – Affected Landcover

<table>
<thead>
<tr>
<th>Affected Area</th>
<th>Landcover/Landuse (Hectare)</th>
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<tbody>
<tr>
<td></td>
<td>Forest</td>
</tr>
<tr>
<td>Sherani District, Balochistan</td>
<td>908.17</td>
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<tr>
<td>DI Khan District, Khyber Pakhtunkhwa</td>
<td>203.33</td>
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<td>Total</td>
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**Affected Landcover**
- Green: Forest
- Orange: Range Lands - Natural Shrubs and Herbs
- Light Brown: Bare Areas with Sparse Natural Vegetation
Near Real Time Support via DisasterWatch
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Global Agenda’s - Shifting of focus from Reactive to Proactive Approach

- Sendai Framework for Disaster Risk Reduction 2015-2030 Priorities for action
  
  1. Understanding disaster risk;
  
  2. Strengthening disaster risk governance to manage disaster risk;
  
  3. Investing in disaster risk reduction for resilience;
  
  4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.

- Climate Change Agreement (COP21) – Article 8

- Sustainable Development Goals (SDGs) 2015-30 – SDGs 6, 13, and 15

**SDG13:** TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

- National Disaster Management Plan (NDMP) Implementation Roadmap 2015-30
National Catastrophic Model (NatCat) for NDRMF

Scope of Work

• Development of Database and Web Application
• Hydro-meteorological Hazard Assessment (Flood, Drought, Cyclone)
• Geo-physical Hazard Assessment (Seismic)
• Exposure of Landcover, Crops and Infrastructure to Hydro-meteorological and Geo-physical Hazards
• Loss and Risk Assessment Model for Hydro-meteorological and Geo-physical Hazards
• Integrated Risk Assessment

Project Significance

• The risk modeling work will provide quantitative information on the expected levels of loss for hazard events of varying types, intensities, and return periods
• It will provide the basis for a national DRF strategy for Pakistan and pilot disaster risk financing products
NatCat Model Overall Approach

Hazard → Exposure

Loss/Risk ← Vulnerability

Fragility Functions

(Average Annual Loss)

(Intensity of Ground Motions)
• NatCat Model will provide baseline data for exposure, vulnerability and loss assessment at Tehsil level against 4 x natural disasters namely earthquake, flood, drought and cyclone

• NatCat Model Risk Calculator will help in identification of potential vulnerable population and infrastructure against future events

• Insurance industry will be able to assess losses for estimation of premium via NatCat Model Risk Calculator

• NatCat Model will help in assessment of reconstruction / rehabilitation cost
NatCat Risk Calculator - Demo Version

Hazard Module

Exposure Module

Loss Module
Conclusion

“Disaster Management is the shared responsibility”