

# Rapid Response Mapping on Pakistan Floods

## Overview of ICIMOD Efforts

### Pakistan Flood #1

#### Background

The 2010 Pakistan floods began in July 2010 following heavy monsoon rains in the Khyber Pakhtunkhwa, Sindh, Punjab and Balochistan regions of Pakistan. Present estimates indicate that over two thousand people have died and over a million homes have been destroyed since the flooding began. The United Nations estimates that more than 21 million people are injured or homeless as a result of the flooding, exceeding the combined total of individuals affected by the 2004 Indian Ocean tsunami, the 2005 Kashmir earthquake and the 2010 Haiti earthquake. At one point, approximately one-fifth of Pakistan's total land area was underwater due to the flooding. Total estimated damage of 43 billion USD dollars.

[http://en.wikipedia.org/wiki/2010\\_Pakistan\\_floods](http://en.wikipedia.org/wiki/2010_Pakistan_floods)

#### Historical to Current Disasters

The 10 worst natural disasters in Pakistan in the last 75 years are:

- 1935 Quetta earthquake 60,000 people died
- 1945 Balochistan earthquake 4,000 people died
- 1950 River Ravi floods 2,900 people killed
- 1970 Pakistan cyclone 500,000 lost their lives
- 1974 Hunza earthquake 5,300 people killed



- 2000 Drought: At least 1.2 million people affected over 100 died in Balochistan
- 2005 Kashmir quake: At least 73,000 people were killed and more than 3.3 million made homeless
- 2007 Cyclone Yemyin: At least 380 people were killed and 1.5 million affected
- 2010 Hunza Lake disaster: At least 20 people killed
- 2010 floods: Toll so far: 2,000 deaths; over 13 million affected

#### Satellite Data Availability

Total of 640 satellite data were made available through charters

Availability of satellite data from high to coarse resolution observed to be 19% high,

21 medium and 60% coarse resolution data.

Charters	Satellite	Total	Cloud	Pre-Disaster	Sub-Total	Cloud	Post-Disaster	Sub-Total
Sentinel Asia	JAXA-ALOS	65	3	6	9	7	16	23
	AVINIR	32		4	4		4	4
	PALSAR	25					25	25
	ISRO	2					1	1
	P6-AWIFS	2		1	1			
	FORMOSAT	58						
International Charters	MS	42				35	7	42
	PAN	16				9	7	16
	NASA Landsat ETM+	107				2	13	15
	Landsat TM	15				8	20	28
NASA Rapid Response	ASTER	62		2	2	12	48	60
	EOI	22					2	2
	DIGITAL GLOBE	22					4	8
	QUICKBIRD	12					3	7
	WORLDVIEW	10					3	7
	MODIS Terra / Aqua	386		8	8	86	292	378
<b>Total Satellite Images</b>		<b>640</b>						

#### Appreciation and Feedbacks

Syed Pervaiz Hussain, Pakistan Meteorological Department, Lahore "The daily satellite maps provide us to monitor the flood waves. The valuable satellite base analysis maps are very useful. The FFD management highly appreciated ICIMOD and MENRIS technical support for the flood 2010. In my view your leadership quality and your early decision to use satellite data for the use of flood mitigation"

Imran Iqbal, Member, Space Application and Research, SUPARCO "I don't have words for the invaluable support which has been provided by Mr. Amarnath. We are very grateful for the time he has put in to support us. I am sure SUPARCO is benefitted with your maps by providing valuable inputs to NDMA"

Shirish Ravan, UN-SPIDER "Thanks for your great support. I am sure Imran is finding these maps very useful and probably having shape files with SUPARCO can make a big difference. It is nice to see you are in the mainstream of the community"

Delilah H.A. Al Khudhairi, European Commission, Italy "Interested to use flood affected crop area you are preparing and we would like to include them in our EC maps"

Nate Smith, USAID / OFDA "Thank you for the excellent products. I have passed them on to our operations center"

Ian Thomas, Advisor, Ministry of Forest and Soil Conservation assisting colleagues in ADB - "From my limited knowledge the ICIMOD maps look great. Many thanks for providing flood information and responding so rapidly"

Elke Foerster, GTZ GmbH and ICIMOD Board Member "the link to the „Pakistan floods“ look operational and good efforts by ICIMOD and would be good to read ICIMOD's assessment and action"

Inayatullah Chaudhry, ICIMOD Pakistan Office - "Salute to MENRIS team for doing the marvelous job"

#### ICIMOD Products in other Portal / Media

- Portal
- Sentinel Asia [http://dms.ksc.jaxa.jp/sentinel2/thumbnailemb.action?subset\\_name=Emergency+Observation&requestId=ERICIM000010](http://dms.ksc.jaxa.jp/sentinel2/thumbnailemb.action?subset_name=Emergency+Observation&requestId=ERICIM000010)
- European Commission [http://ec.europa.eu/dgs/jrc/index.cfm?id=1410&obj\\_id=11360&dl\\_code=NEWS&lang=en](http://ec.europa.eu/dgs/jrc/index.cfm?id=1410&obj_id=11360&dl_code=NEWS&lang=en)
- UN-OCHR One Response Pakistan <http://pakresponse.info/index.php?id=3>
- United States Geological Survey (USGS) [http://edcftp.cr.usgs.gov/pub/data/disaster/201007\\_Floods\\_Pakistan/docs\\_misc/Flood\\_Maps/ICIMOD/](http://edcftp.cr.usgs.gov/pub/data/disaster/201007_Floods_Pakistan/docs_misc/Flood_Maps/ICIMOD/)
- Dutch International Hydrology Portal <http://www.hydrology.nl/mainnews/1-latest-news/214-mapping-pakistan-floods.html>
- SUPARCO Flood Maps <http://floodmaps.lums.edu.pk/>
- Pakistan GIS [http://pakgis.blogspot.com/2009/05/pakistan-flood-2010-water-extent-from\\_16.html](http://pakgis.blogspot.com/2009/05/pakistan-flood-2010-water-extent-from_16.html)
- Media <http://www.scidev.net/en/news/pakistan-flood-data-wasted-say-critics.html>
- <http://propakistani.pk/2010/09/06/pakistan-flood-data-got-wasted-critics/>
- <http://www.thenews.com.pk/07-09-2010/islamabad/3438.htm>



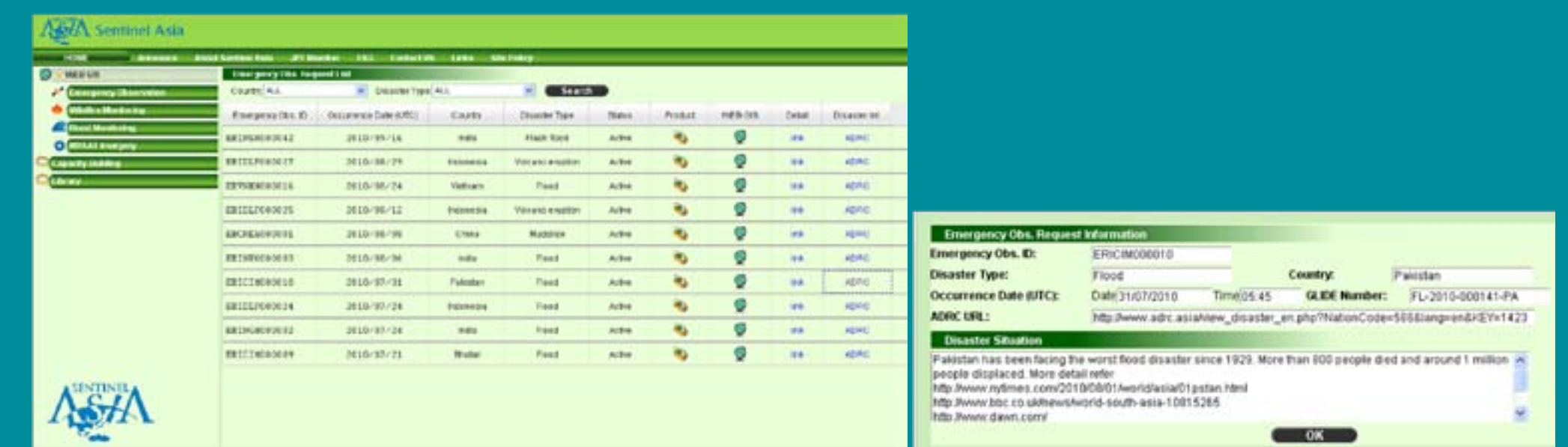
Mountain Environment and Natural Resources' Information System (MENRIS)  
International Centre for Integrated Mountain Development (ICIMOD)

#### ICIMOD Efforts in Pakistan Floods

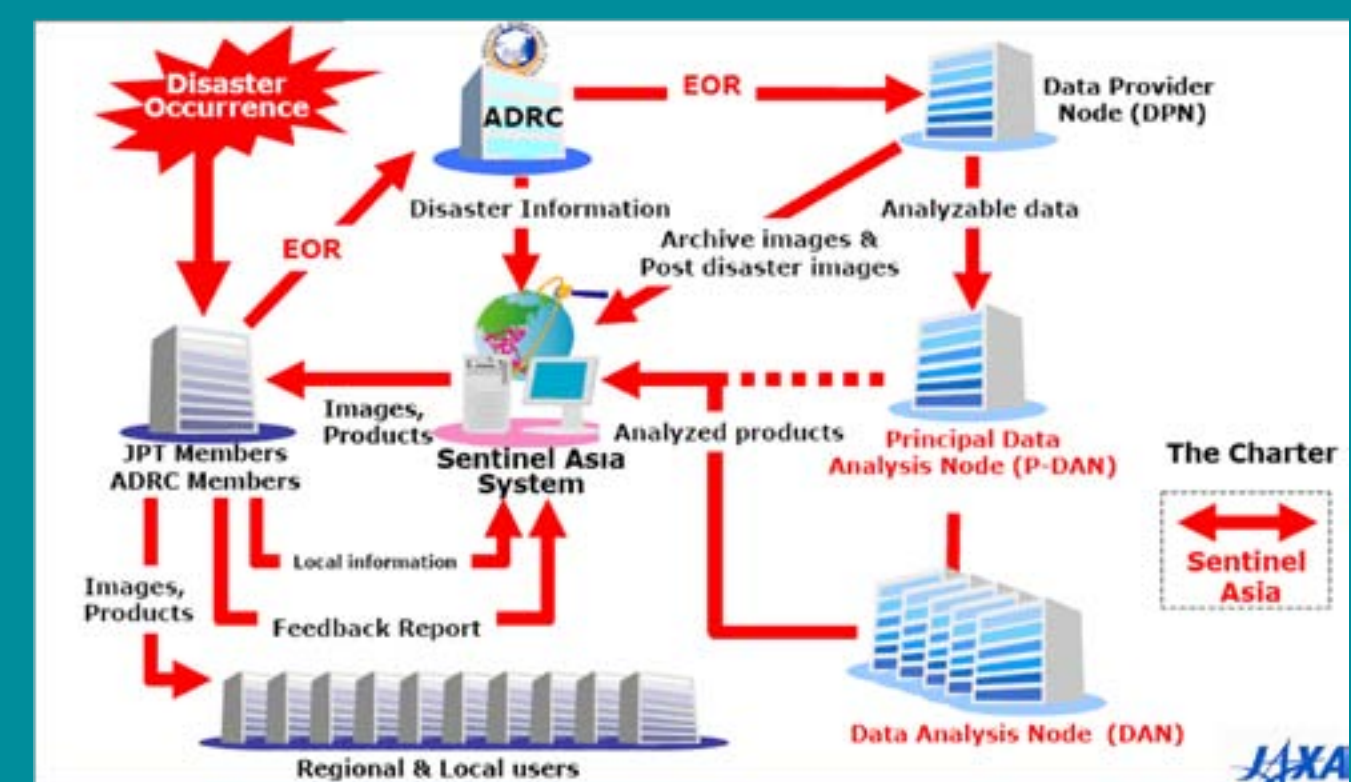
As part of supporting with space-based information for disaster management to the regional member countries (RMC) of ICIMOD space cooperation was established with regional and international charters for its use during disaster response and emergency crisis. On 31st July 2010 ICIMOD requested Emergency Observation Request (EOR) to Sentinel Asia as ICIMOD being the JPT member of APSRAF. With this EOR, Glide Number has been generated and referred as FL-2010-000141-PA.

#### Methodological Framework

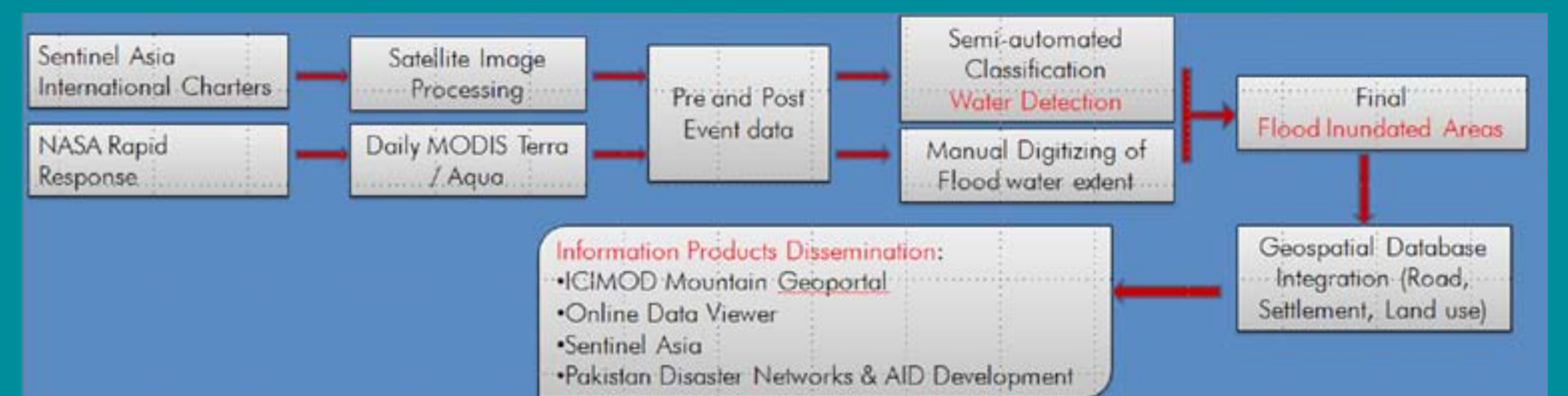
##### Step 1: EOR Request to Sentinel Asia



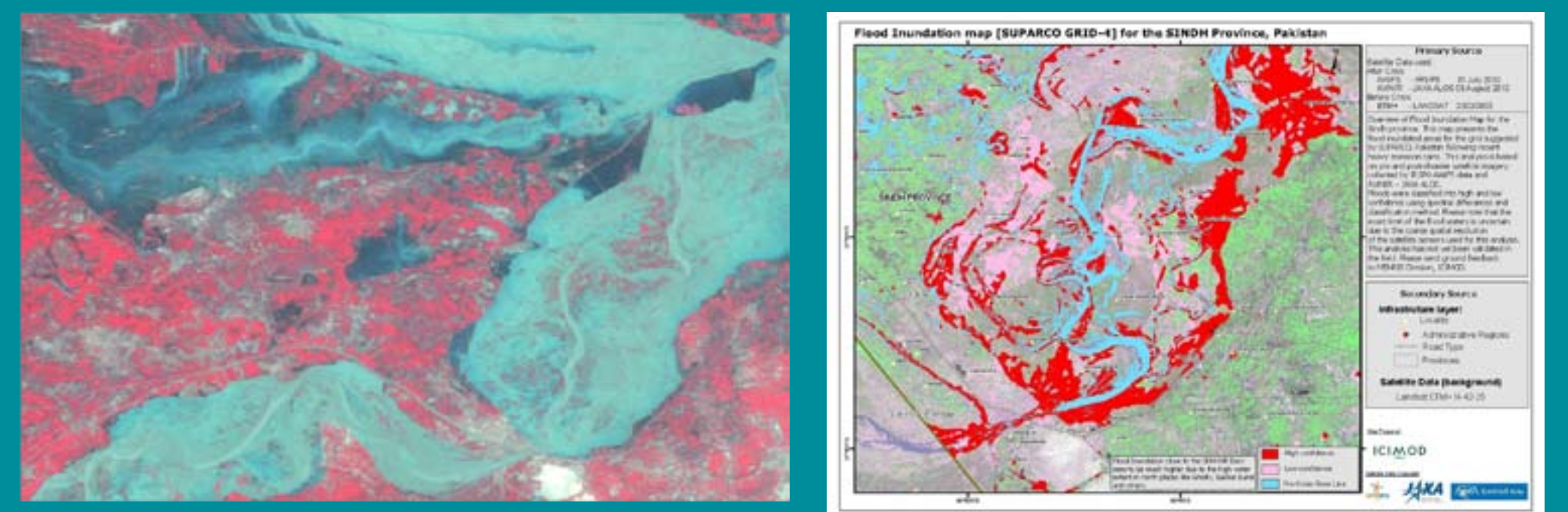
##### Step 2: Sentinel EOR Flow in access to pre and post disasters images



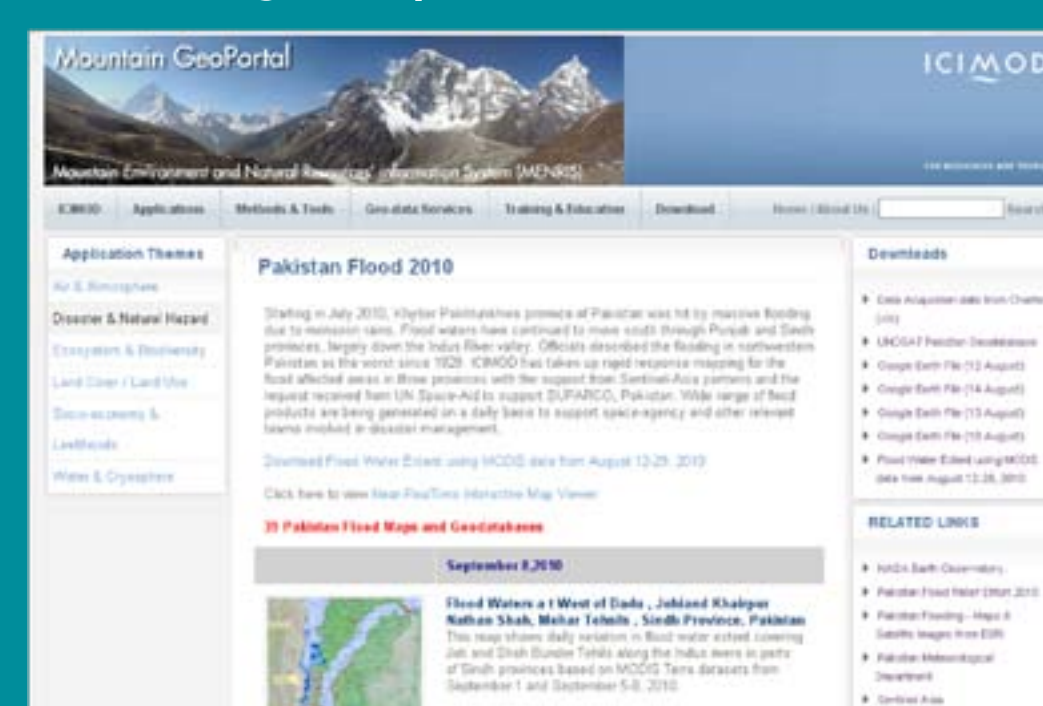
##### Step 3: ICIMOD working flow on rapid mapping, processing and analysis



#### Product Information / Dissemination



#### Flood geospatial info in Mountain Geoportal



#### ICIMOD Product Dissemination

- Pakistan
- Pakistan Space and Upper Atmosphere Research Commission (SUPARCO)
- National Disaster Management Authority (NDMA)
- Pakistan Meteorological Department (PMD)
- World Wide Fund for Nature, Pakistan (WWF)
- International Water Management Institute (IWMI)
- ICIMOD Pakistan Focal Office (ICIMOD)
- International Organizations
- United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)
- European Commission (EC)
- United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHR)
- Asian Development Bank (ADB)
- World Food Programme (WFP)
- U.S. Department of Agriculture (USDA)

#### MODIS Flood Online Data

