

# GP-STAR

International Water Management Institute  
(IWMI)

Giriraj Amarnath

[a.giriraj@cgiar.org](mailto:a.giriraj@cgiar.org)

# Where we are based:

:: LOCATIONS OF IWMI OFFICES

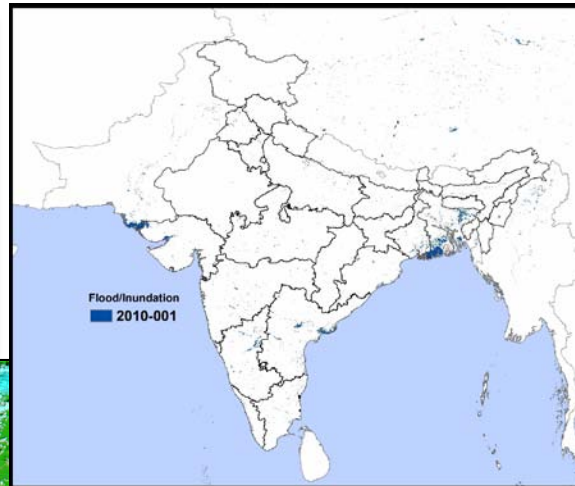


# IWMI's Role in Water-related Disaster Risk Management

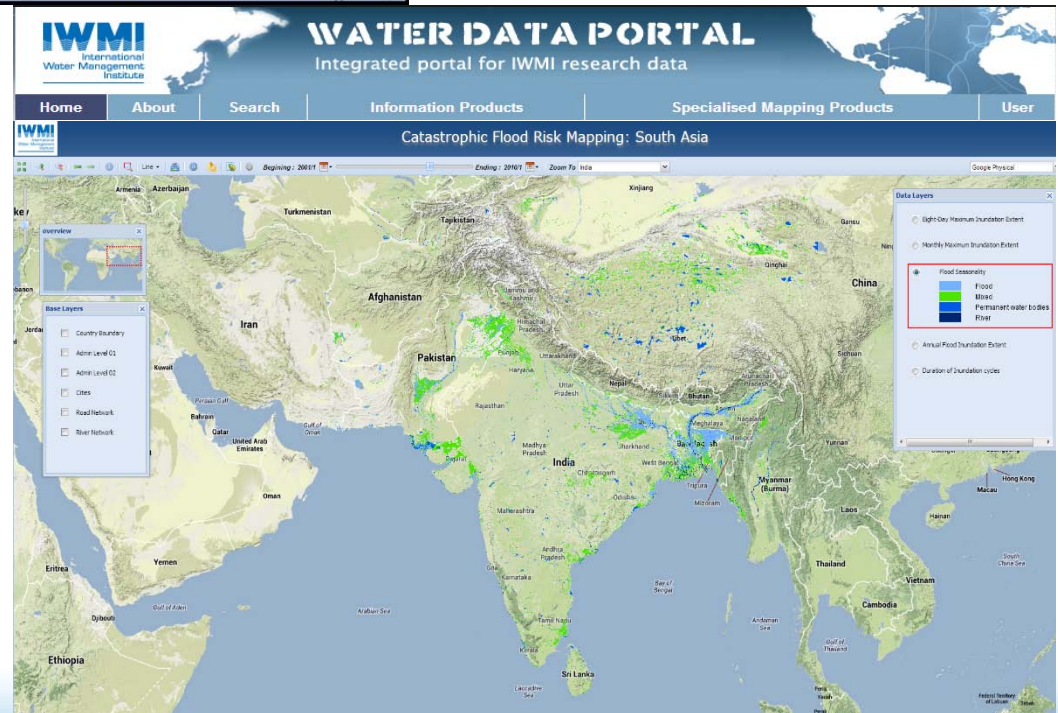
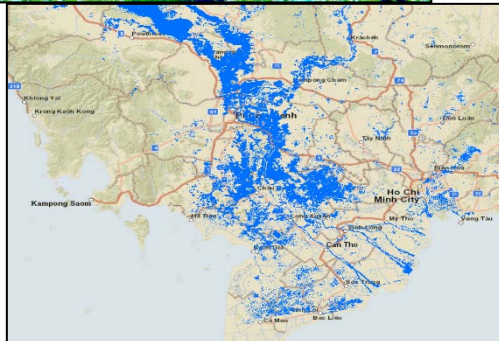
Disaster	Prevention	Preparedness	Response	Recovery
Floods	Mapping flood-prone areas; delineating flood-plains; land-use mapping.	Flood detection; early warning; Rainfall mapping.	Flood mapping; evacuation planning; damage assessment.	Damage assessment; spatial planning.
Drought	Risk modelling; vulnerability analysis; land and water management planning.	Weather forecasting; vegetation monitoring; crop water requirement mapping; early warning.	Monitoring vegetation; damage assessment.	Informing drought mitigation.

Ways remote sensing can help disaster management

# REGIONAL FLOOD RISK MAPPING - SA and SEA

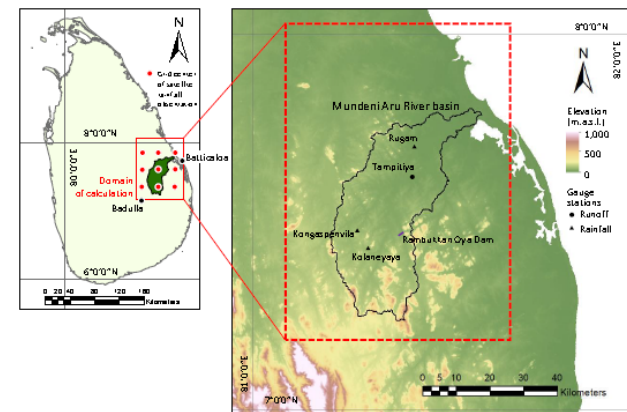
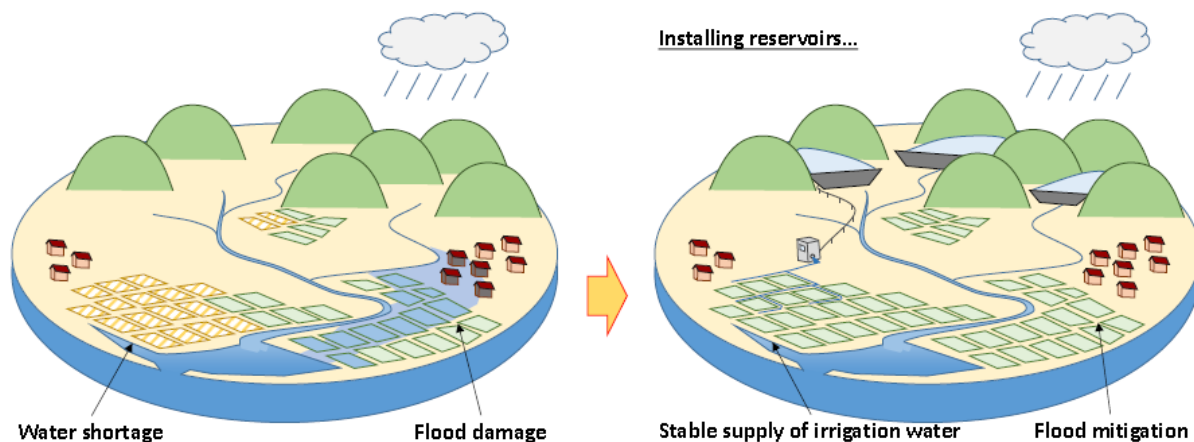


- Mapping algorithm based on MODIS data
- 8-days maps of inundation extent
- Annual maps of maximum inundation
- Inter-annual variation of regional flooding extent

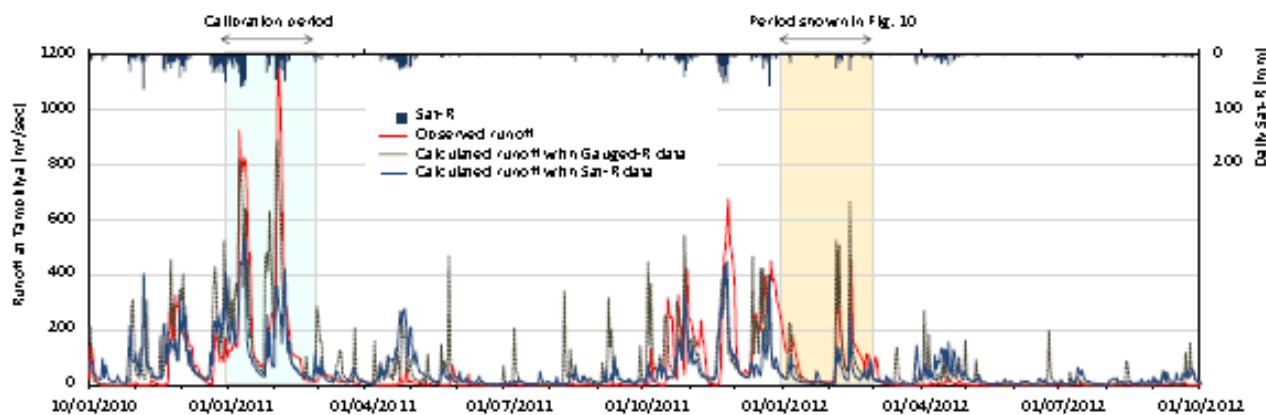




# Concept of Flood Mitigation and Irrigation Improvement

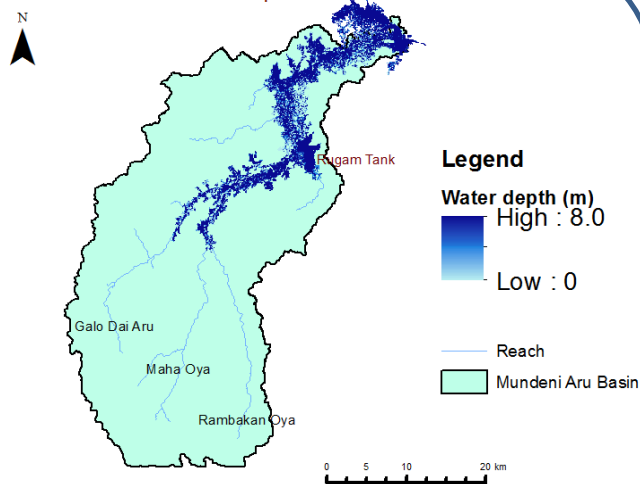


Hydrograph for observed and simulated discharge

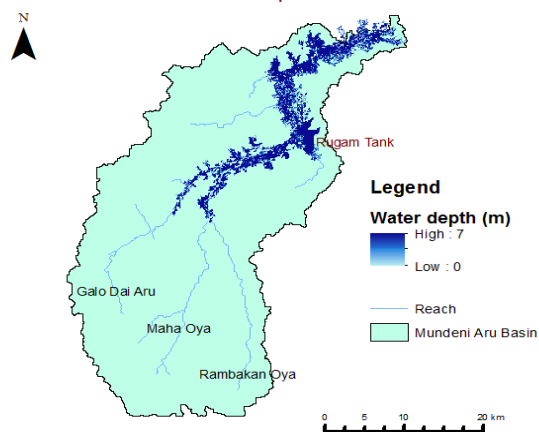


# Flood Early Warning for Protection measures

Flood extent map without counter measures

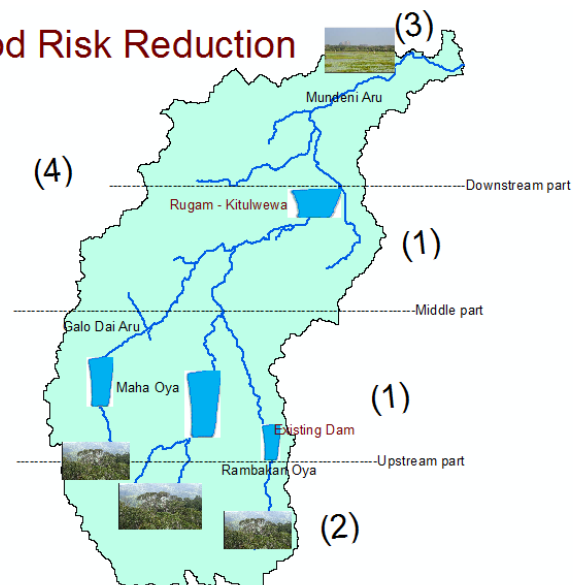


Flood extent map with counter measures



Accepted in IAHS Red Book Series (2015)

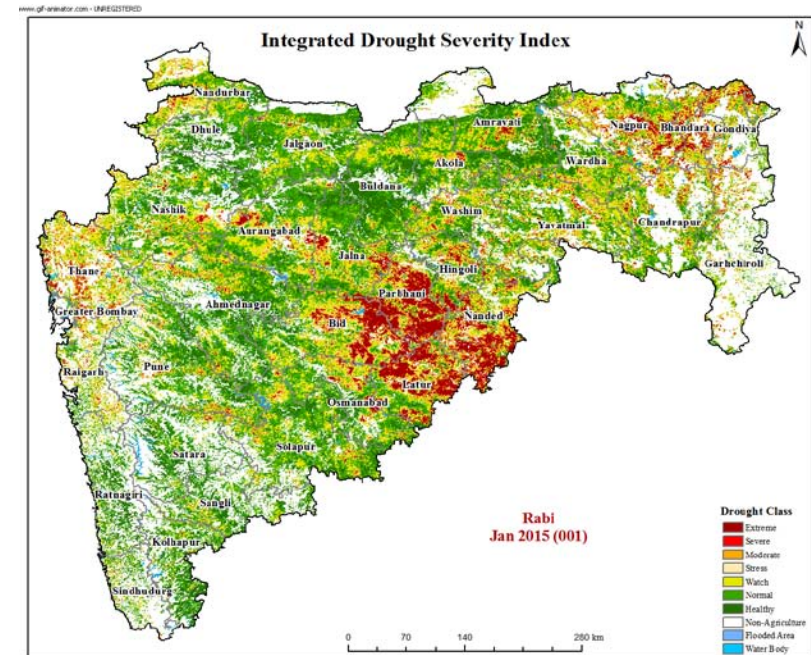
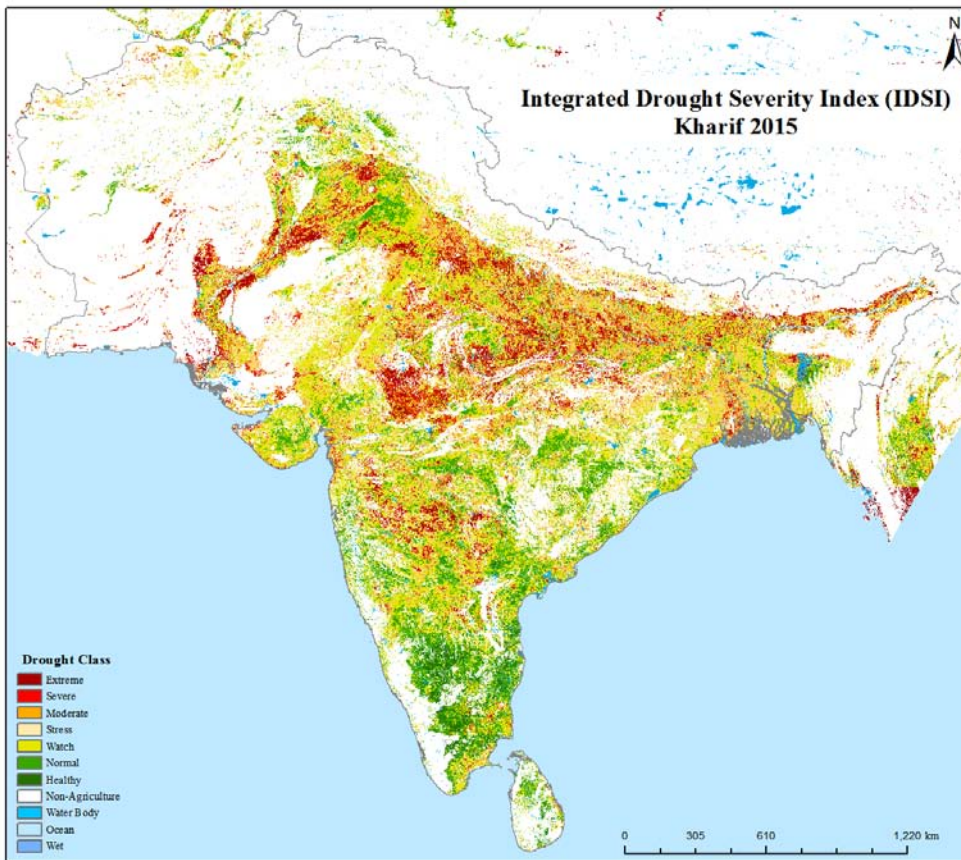
## Flood Risk Reduction



Integrated flood risk management that reduces flood risk while increasing its positive impact is needed

- Socio-economic aspects
  - Building multi-objective reservoir that reduces flood impact during wet season and used stored water for irrigation purpose during dry season
  - Proper Dam operation and application of basin scale forecasting system
- Ecosystem Management aspect
  - Re-establishing wetlands in the downstream of the basin area
  - Re-forestation in the upstream areas

# SOUTH ASIA DROUGHT MONITOR SYSTEM (SA-DMS)

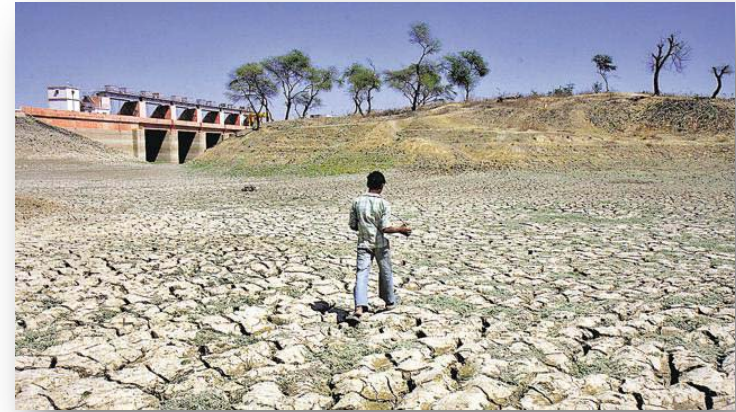
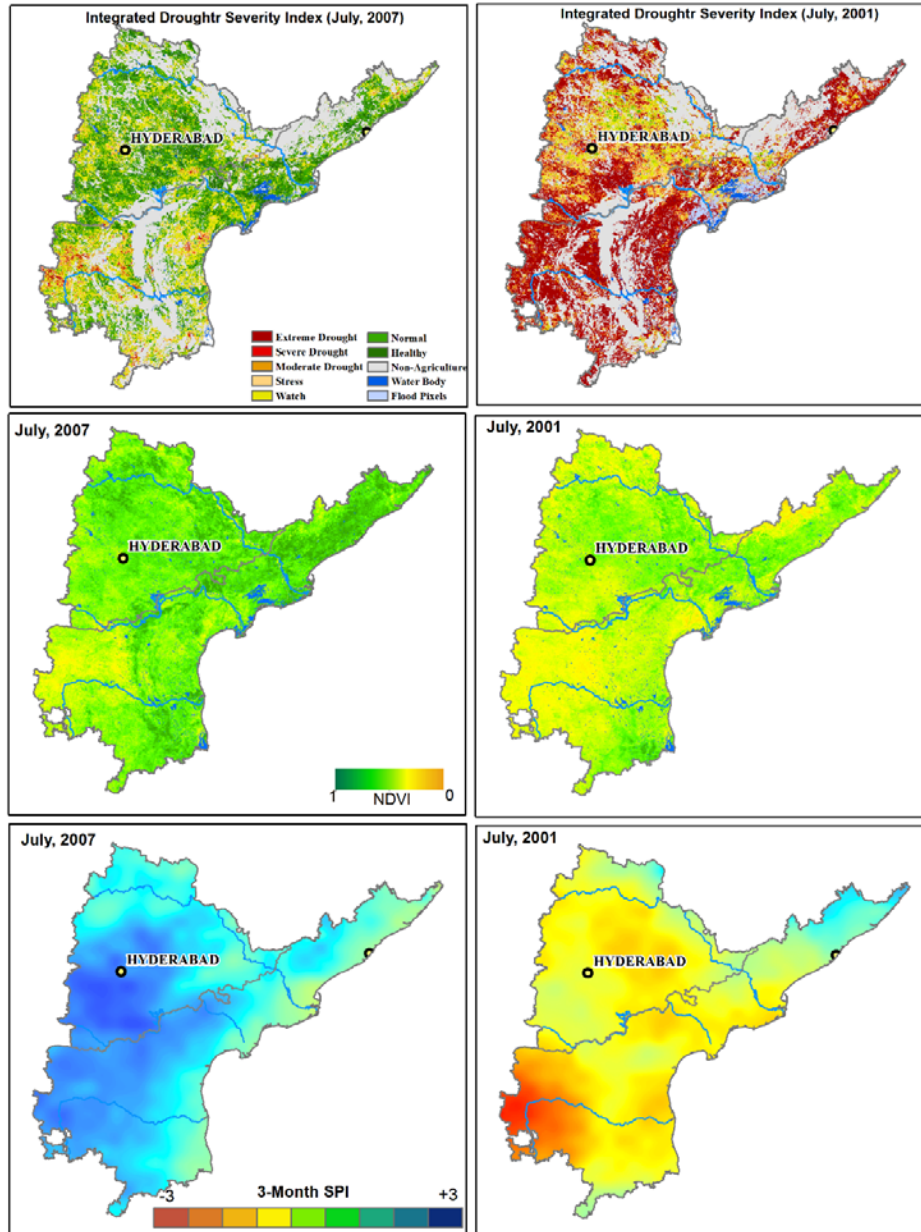


2015 field observations in Jalna,  
Maharashtra

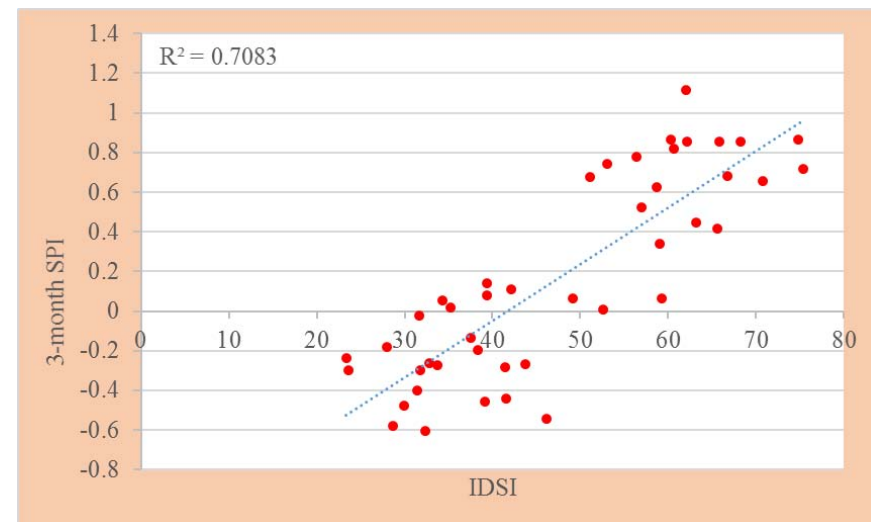
- First of its kind to establish for entire South Asia using multisource remote sensing observations;
- Historical drought risk mapping and assessment covering SA countries (2000 – Current);
- IDSI allows better understanding on drought frequency, duration over the 15years;
- Products are useful tools in drought mitigation studies and in decision-making process;



# Drought Monitor Indices for Andhra Pradesh and Telangana - *drought year (2001) and normal year (2007)*

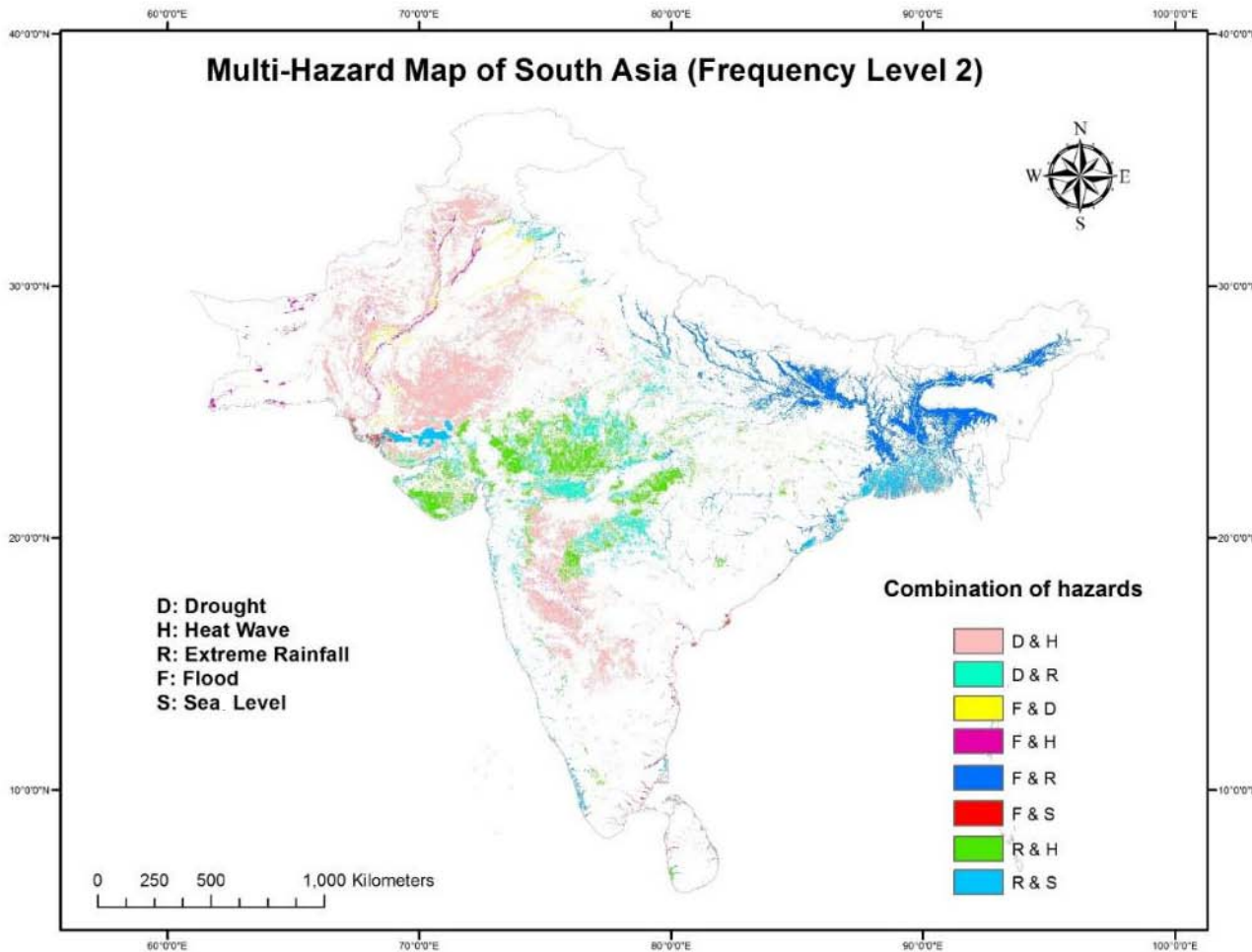


*High correlation observed between 3-month SPI, IWMI's IDSI and rice crop production*



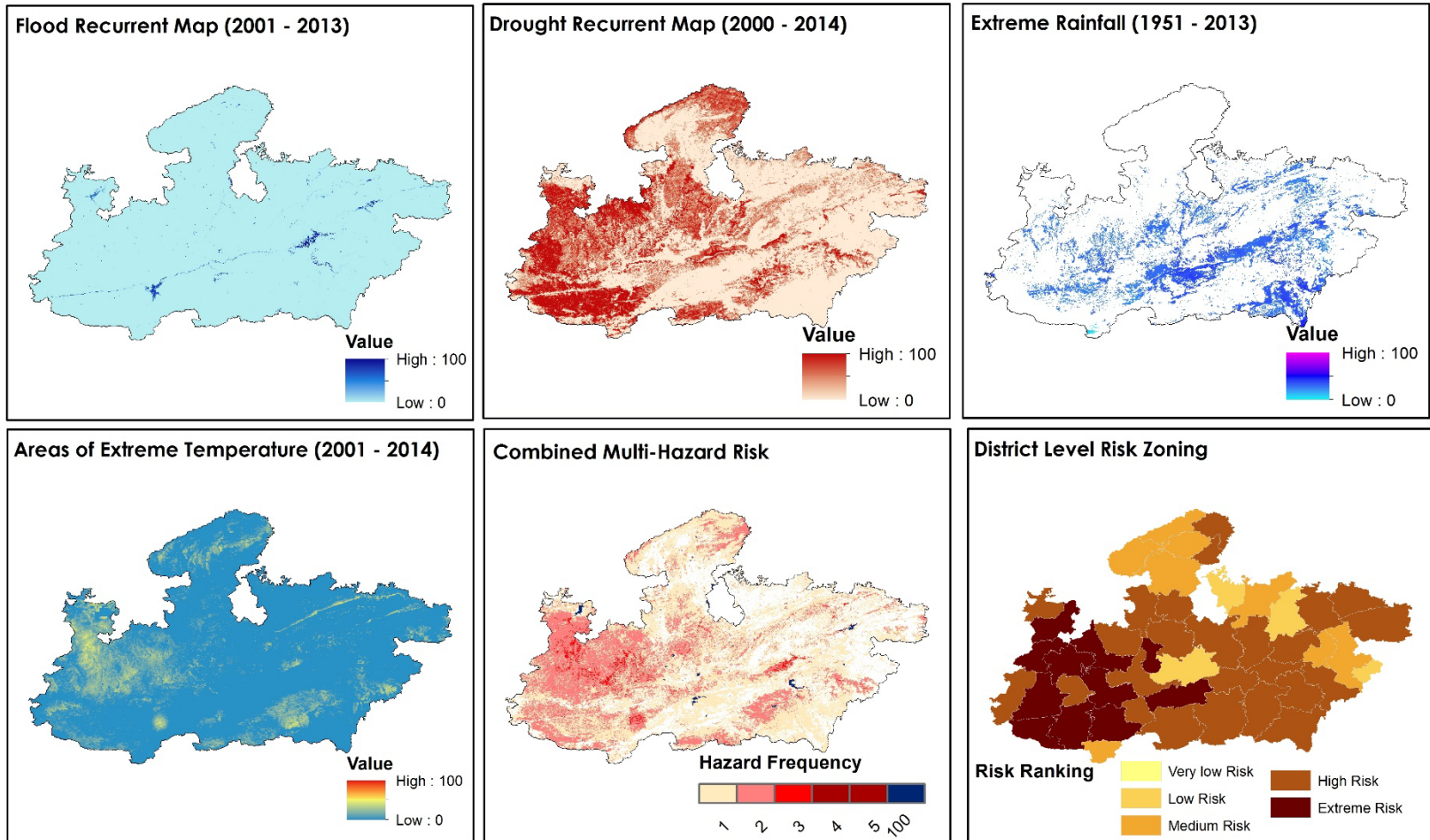


# Urban planner / manager: What type and level of protection is appropriate?



Funding Donor: CCAFS

# MULTIPLE CLIMATE RISKS ASSESSMENT

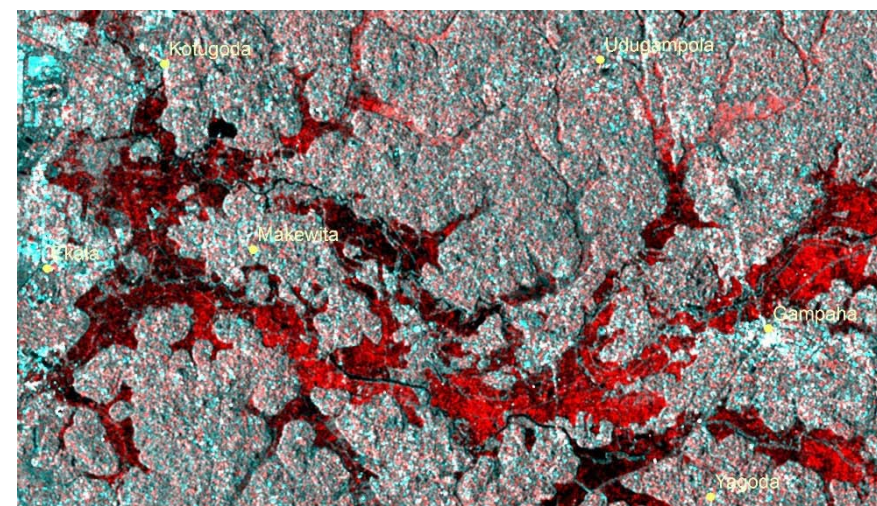


High to Extreme Risk Districts:

*East and West Nimar, Dhar, Barwani, Ratlam, Mandsaur, Shajapur, Bhopal, Hoshangabad*

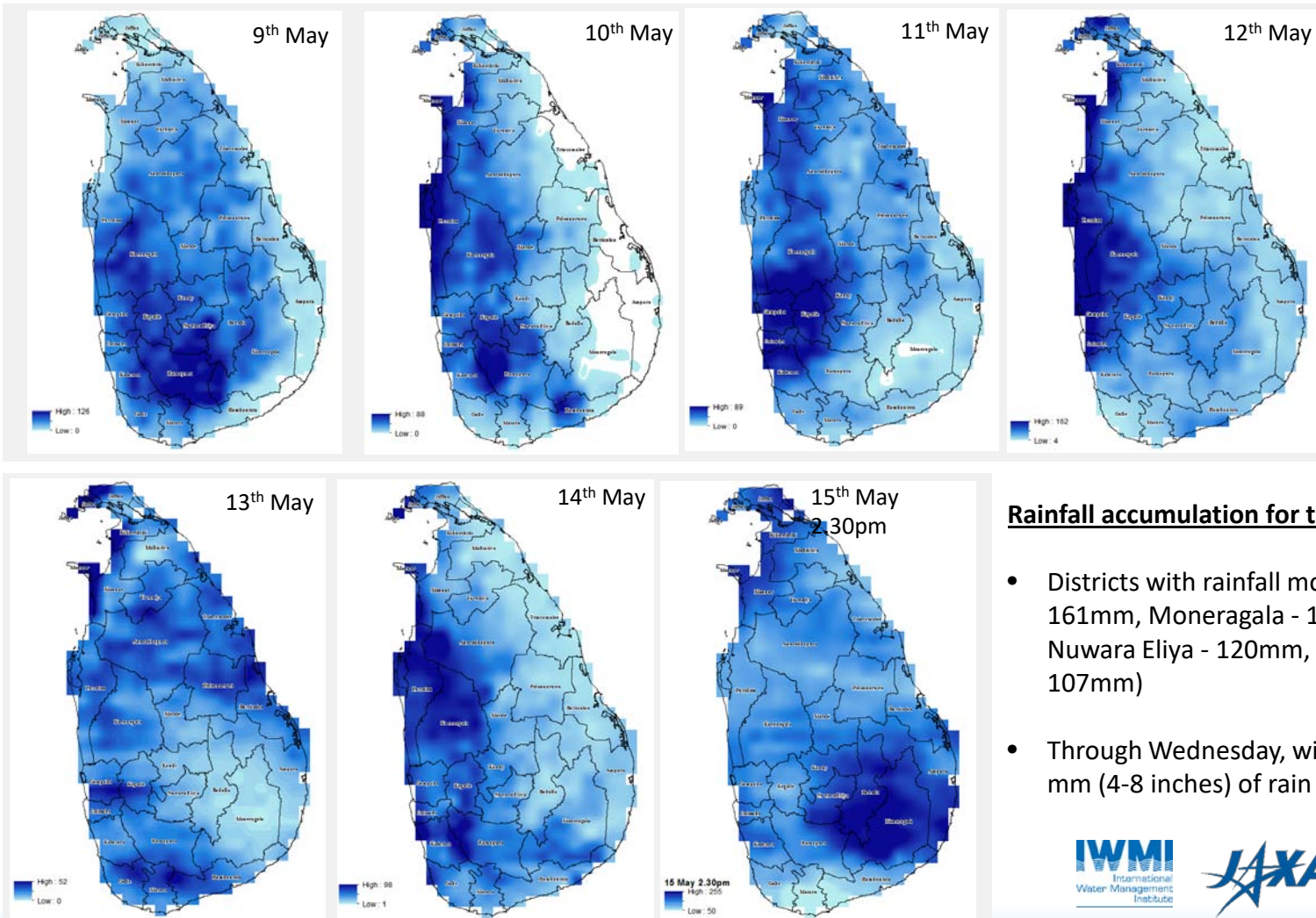


# NEAR REAL-TIME FLOOD EMERGENCY RESPONSE MAPPING FOR SRI LANKA





# GPM Satellite Measures Extreme Rainfall in Sri Lanka

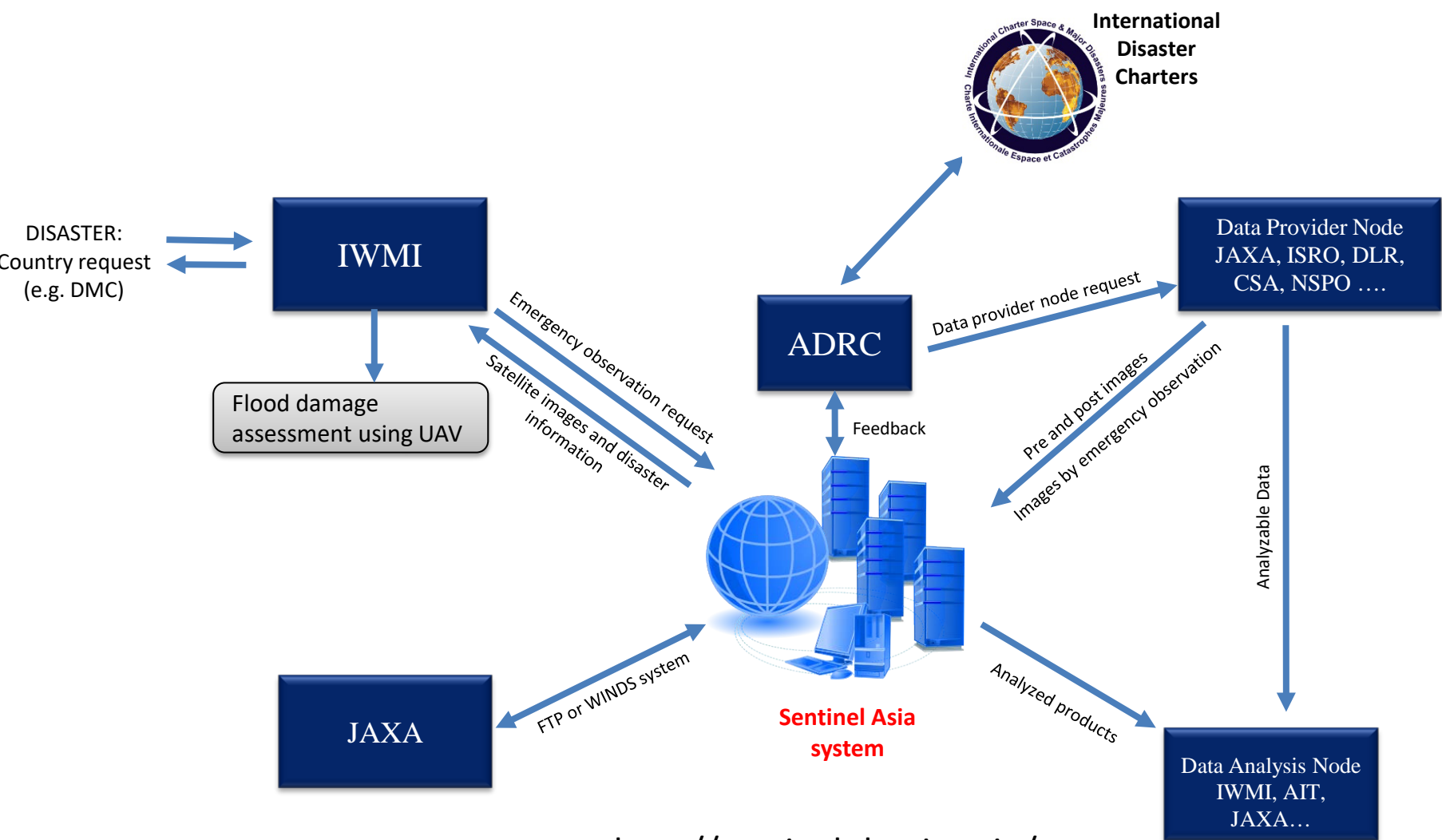


**Accumulated Daily  
Rainfall Estimates using  
Global Precipitation  
Measurements (GPM)**

## Rainfall accumulation for the past 36 hrs.

- Districts with rainfall more than 150mm (Ampara - 161mm, Moneragala - 188mm, Badulla -160mm, Nuwara Eliya - 120mm, Kandy - 104mm, Colombo - 107mm)
- Through Wednesday, widespread rainfall of 100-200 mm (4-8 inches) of rain will fall across the region.

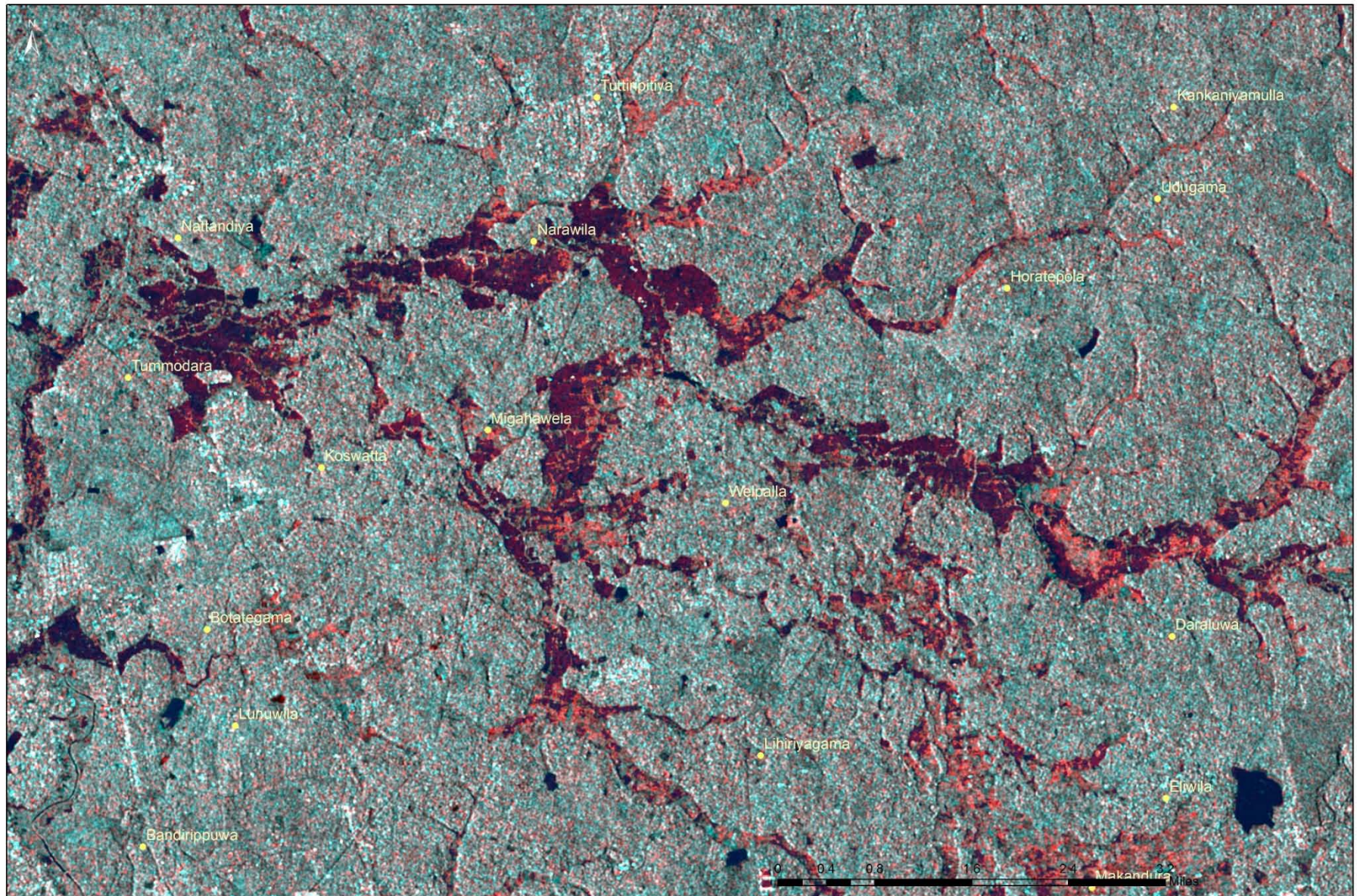
# Charter activation



<http://sentinel.tksc.jaxa.jp/>



# Flood Situation maps in Sri Lanka





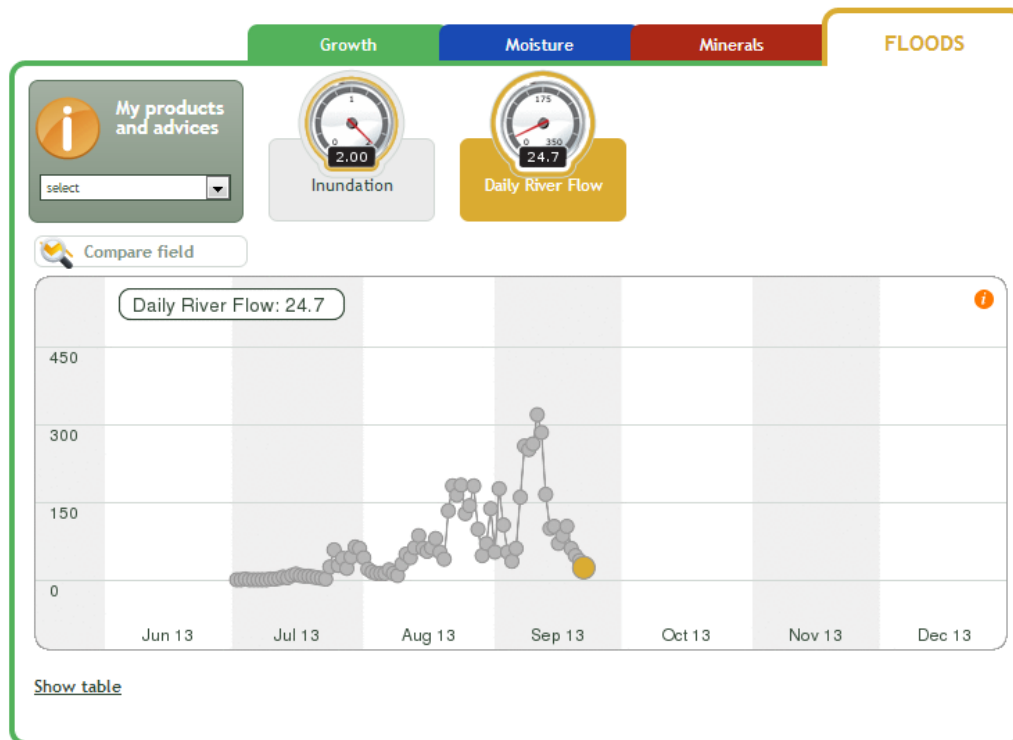
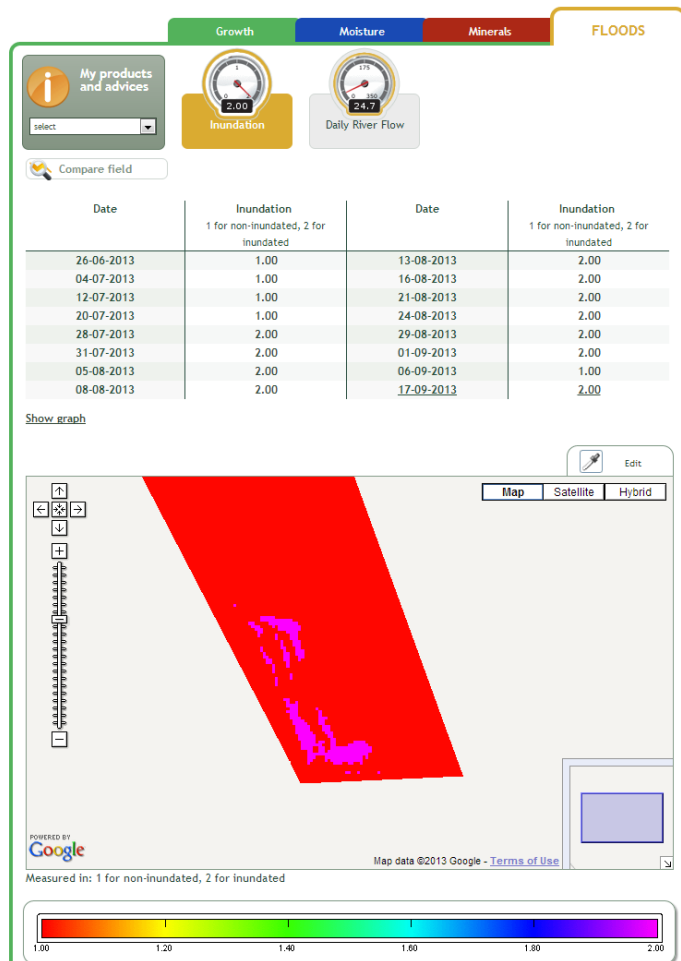
# Assessing flood damages using Drone

## Mapping flood severity using Unmanned Air Vehicle or Drone in Hanwella town along the Kelani Ganga River

- Drone with 4 cm spatial resolution deployed at 70 m above ground level at 3.30 pm to map flood damages along the Kelani Ganga river near Hanwella.
- Most damages noticed in the household than the crop damages
- Several roads has been disconnected restricted the movement of population as well as rescue operations



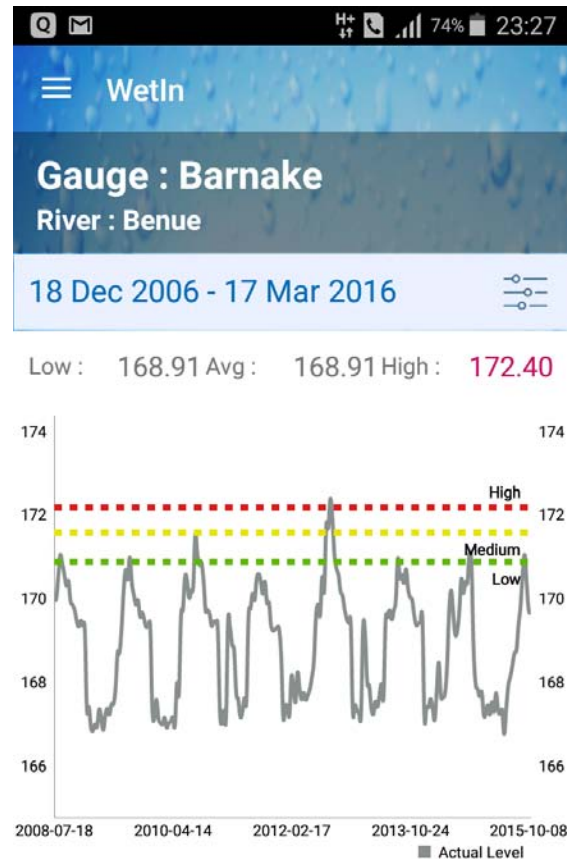
# Operational Flood Management Information – Eastern Sudan





# WetIn mobile app based flood early warning

“WetIn allows users to monitor rivers and streams in the Niger-Benue river system in Nigeria using satellite altimetry”



- WetIn will be limited to the android operating system devices, for the time being.
- To provide an alternative to traditional monitoring using radar altimetry and improve model-predicted discharge in the downstream
- This mobile app aims to give added support to authorities and citizens during this rainy season in Nigeria



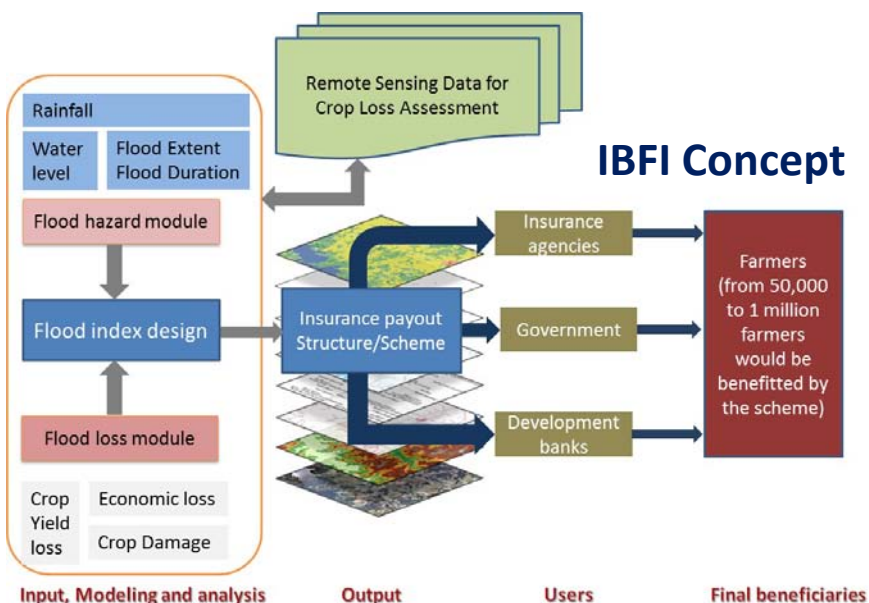
# INDEX-BASED FLOOD INSURANCE IN INDIA TO ENHANCE AGRICULTURE RESILIENCE AND FLOOD PROOFING LIVELIHOODS



RESEARCH PROGRAM ON  
Climate Change,  
Agriculture and  
Food Security



<http://ibfi.iwmi.org/>



- Setting up pilot-scale trials to demonstrate that positive verifiable impacts emerge from IBFI in terms of agriculture resilience and improving productivity, and household incomes, locally and at the broader scale
- Developing tools and strategies that support IBFI development and upscaling, integrated with existing and future flood control measures.

Project Period: 2015 - 2018

Pilot Districts : Muzaffarpur, Darbhanga,  
Samastipur



Partners: International Food Policy Research Institute (IFPRI), Indian Institute of Technology (IIT)-Gandhinagar, Indian Institute of Water Management (IIWM-ICAR)\*; Agriculture Insurance Corporation of India, MoA; Bajaj Allianz, Insurer, Swiss Reinsurance



A water-secure world

[www.iwmi.org](http://www.iwmi.org)

# Partners and engagement



RESEARCH  
PROGRAM ON  
Water, Land and  
Ecosystems



RESEARCH PROGRAM ON  
Climate Change,  
Agriculture and  
Food Security



...and many, many more.



# Please provide input to the following question:

- What is the mission of GP-STAR in your view?
  - To support countries to effectively utilize space technology in DRR within the overall framework of Sendai Framework for better preparedness and minimize loss of life and impacts.
- Assisting countries, regions and communities in the implementation of GP-STAR;
- Better alliance/balance with space and disaster agencies and far reaching impacts at community level to reduce poverty and improving livelihood;

# Please provide input to the following question:

- What activities, projects, programmes can you affiliate/contribute to GP-STAR
  - IWMI's thematic programme on **Water-related Disaster Risk Management (WDRM)** can effectively contribute to the GP-STAR alliance. Areas of contribution:
    - Flood Risk Assessment, Disaster Response, Disaster Preparedness;
    - Turning flood into opportunity for agriculture and reducing risk;
    - Operational mechanism of rapid response mapping and focus on **product customization and user demand**;
    - South Asia Drought Monitor and upcoming Southern Africa Drought Monitor;
    - Multi hazard Risk Assessment at regional scale (Floods, Drought, Heatwaves, extreme precipitation, sea level rise);
    - **Risk transfer solutions** through index insurance product to enhance agriculture resilience and flood proofing livelihoods;
    - Capacity building on the use of satellite technology in managing floods and drought;
  - IWMI has build regional/global partnership namely Sentinel Asia, UNSPIDER RSO, GEO, WMO-IDMP and these activities can be promoted within GP-STAR;



# Please provide input to the following question:

- What outcomes (procedures, products, information, knowledge, know-how) can you contribute
  - IWMI's value-added products including risk management solutions can be scaled up to other region;
  - Data and information access as IWMI follows principles of open data policy;
  - Collecting and disseminate knowledge on GP-STAR;
  - Advocating for GP-STAR;
  - Growing and reinforcing a network of partners for cooperation on GP-STAR
  - Demonstrate best practices and full cycle of DRM and DRR;
  - Strengthening partnerships to increase technical, institutional, and financial contributions to GP-STAR;

# Please provide input to the following question:

- What role and working field in GP-STAR do you foresee for your organisation
  - Scientific input to the partnership
  - Contribute experience to support risk management solutions;
  - Provide international experience;
  - IWMI could support in ToR, Advisory support / working group



Please mark (x) your contribution/interest according to  
below matrix,

**see: Input\_partners\_GP-STAR\_Expert\_meeting.xls**

SCOPE-PURPOSE	TARGETS- INDICATORS	PRIORITIES FOR ACTION	COUNTRY / REGION	Earthquake	Tsunami	Mass movement	Volcanic eruption	Storm	Flood	Extreme temperatur es	Drought	Fire	locust swarms	Non-Earth Objects	Space weather			
The present framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or manmade hazards as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors	a	1																
	b	4																
	c																	
	d																	
	e																	
	f																	
	g																	

COMMENTS: