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Introductions to the International Activities on Water

WG1: GEOSS ASIAN WATER CYCLE INITIATIVE (AWCI)



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UNESCO Regional Science Bureau
for Asia and The Pacific**

Acknowledgement – Contributions by IHP Experts and Networks

Regional Sciences Bureau for Asia and the Pacific - UNESCO Office, Jakarta



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UNESCO IHP-VIII 2014-2021

Axis 1

Mobilizing International cooperation to Improve knowledge and innovation to address water security challenges



1
Water
Related
Disasters and
Hydrological
Changes



2
Groundwater
in a Changing
Environment



3
Addressing
Water
Scarcity and
Quality



4
Water and
Human
Settlements
of the Future



5
Ecohydrology
Engineering
Harmony for
a Sustainable
World



6
Education,
Key to Water
Security

Axis 3

Developing
institutional and
human capacities
for water security
and sustainability

Axis 2

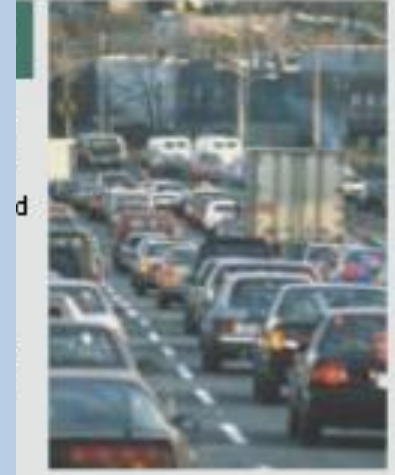
Strengthening the Science-Policy
interface to reach water security
at local, national, regional, and
global levels



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Water Security for Sustainable Development

WATER SECURITY is defined as the capacity of a population to safeguard access to adequate quantities of water of acceptable quality for sustaining human and ecosystem health on a watershed basis, and to ensure efficient protection of life and property against water related hazards -- (floods, landslides, land subsidence,) and droughts.





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Integrated Climate Risk Management

Three Pillars of Drought Risk Management

1. Monitoring and forecasting/early warning
 Foundation of a drought plan
 Indices/ indicators linked to impacts and action triggers
 Feeds into the development/delivery of information and decision-support tools

- Meteorological, Hydrological and Agricultural Droughts
- Real-time Alerts
- Forecasts and projections

2. Vulnerability/ resilience and impact assessment
 Identifies who and what is at risk and why
 Involves monitoring/archiving of impacts to improve drought characterization

- Impact Evaluation
- Drought Vulnerability

3. Mitigation and response planning and measures
 Pre-drought programs and actions to reduce risks (short and long-term)
 Well-defined and negotiated operational response plan for when a drought hits
 Safety net and social programs, research and extension

- Drought Declaration
- Support national policies



Courtesy



The World Bank

UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 2018



UN WATER

Report

The United Nations World Water Development Report 2018

NATURE-BASED SOLUTIONS FOR WATER



***THE WORLD'S WATER: RISING DEMAND,
INCREASING SCARCITY, DEGRADING QUALITY AND
INCREASING RISKS***



UN
environment



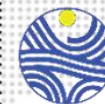
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UNU-INWEP
International Hydrological Programme

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Uncertainty of Climate Projections to the Watershed Level?



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Global Temperature ($^{\circ}$ C)



Decision Making and Large Uncertainty in the Different Models

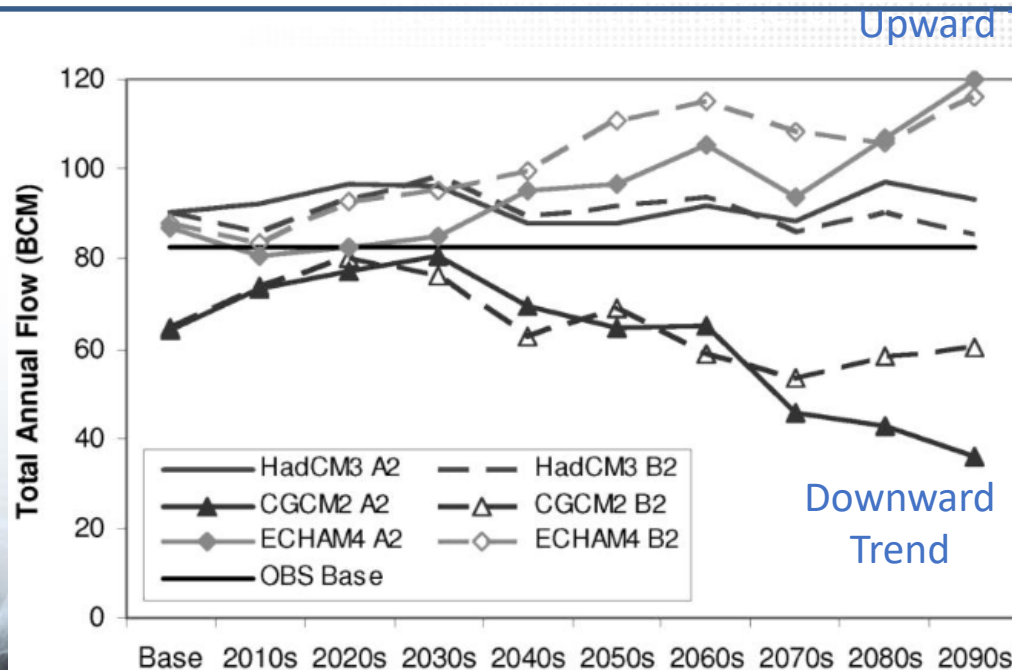


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Example: Six different models projections for the River Nile discharge



How to take decisions?

(Di Baldassare, 2012)

Simulated decadal mean flows at Dongola on the main Nile from six GCM experiments. The values represent averages of 10 realizations of statistically downscaled scenarios for each experiment while the base refers to the baseline period 1992–2001.

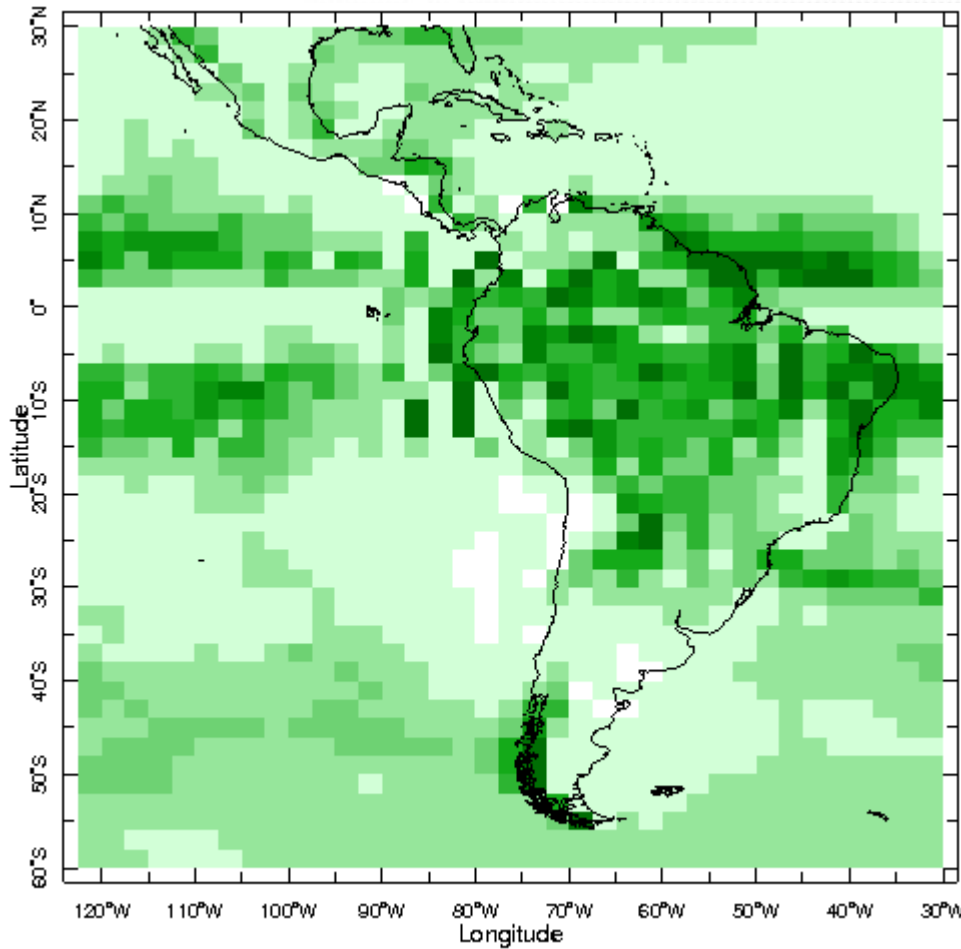
How to utilize the information in the coarse Global Circulation Models to take long-term decisions at the local level?



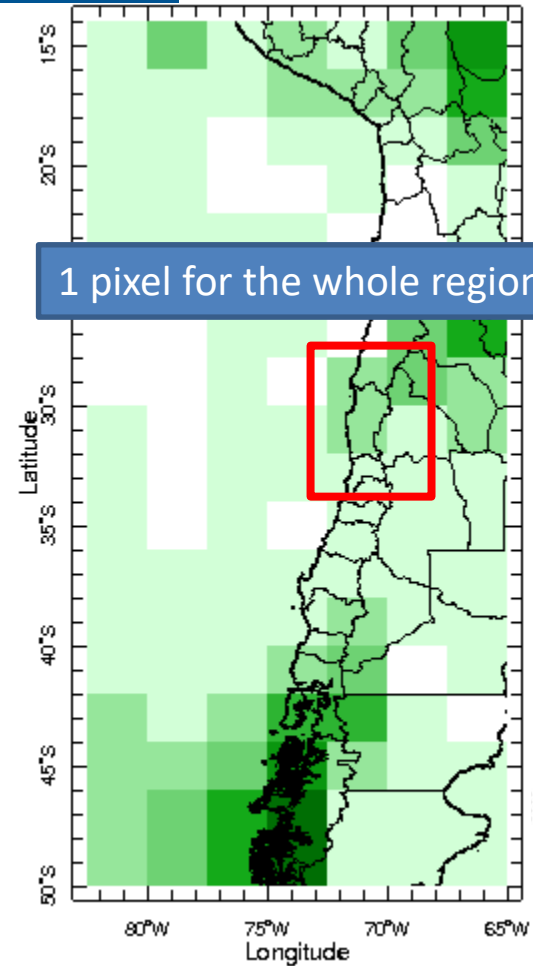
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Jan 2006



Jan 2006

Climate Risk Informed Decision Analysis (CRIDA)



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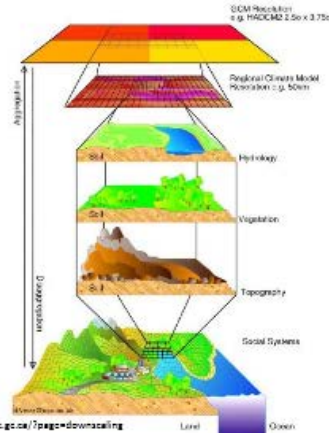


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A bottom-up approach to utilize the information in the GCMs

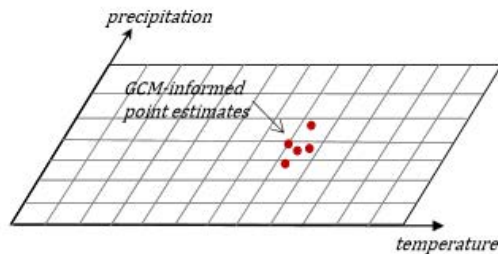
Traditional Approach

1. Downscale a few climate model projections



2. Generate a few water supply series

3. Determine whether system performance is acceptable for these series.

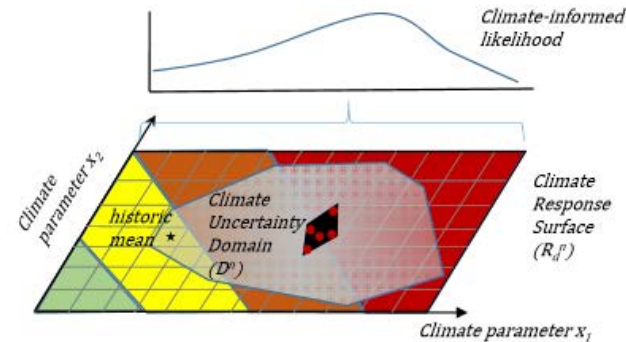


Expected Net Benefits (ENB)

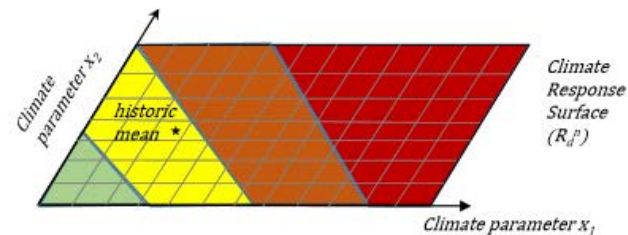
Decision Scaling

$$Risk\ to\ ENB = \sum_{s=1}^{\Omega} Impact \times Probability$$

3. Determine climate risks to project performance



2. Map climate domain onto vulnerability domain



1. Determine the vulnerability domain

Providing tools to identify Climate Risks

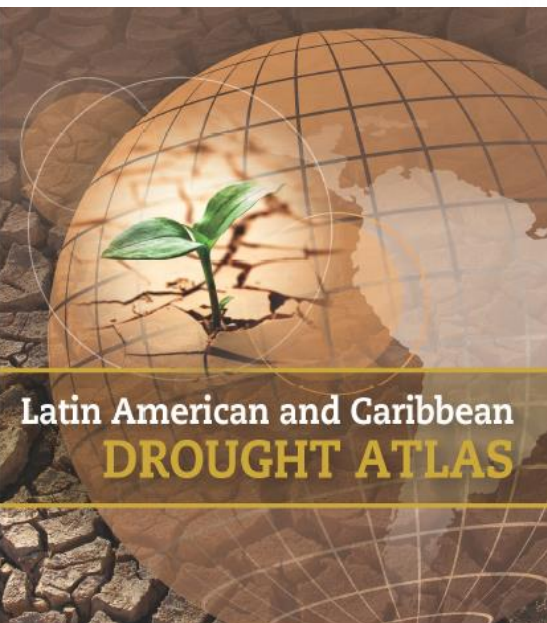


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The Latin American and Caribbean Drought Atlas



Identifying the frequency of drought events:

- How rare is the current drought?
- How large a drought should we plan for?
- How rare is the drought of record?

A long-term regional activity, spanning the 2008-2015 period:

- 12494 precipitation stations analyzed
- From 21 countries in the region
- More than 10 regional workshops were organized
- Funding provided through multiple sources



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la Ciencia y la Cultura



Programa Hidrológico Internacional



CAZALAC

Centro del Agua para Zonas
Áridas y Semiaridas de
América Latina y El Caribe



Comisión
Europea

Flemish government



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The national and regional drought observatories



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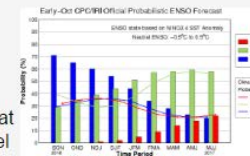
Increasing climate change preparedness:

- Greater understanding and knowledge regarding water-related vulnerabilities
- Enabling early-warning of water-related disasters across sectors
- Greater understanding of the linkages between various sectors

Chilean Agroclimatic Observatory

El Niño, La Niña and the Southern Oscillation

This Map Room includes maps and analyses useful for monitoring ENSO, understanding the impacts and learning about key scientific advancements that have led to our current level of knowledge.



Alerts

Maps for monitoring current agroclimatic alerts affecting the agricultural and other sectors.



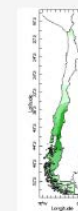
Forecasts

En este maproom se visualiza los pronosticos a corto y mediano plazo de modelos internacionales y pronosticos con mayor detalle local



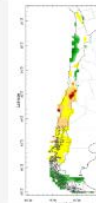
Historical Drought Frequencies

Historical drought frequency analysis for Chile.



Drought Monitor

Maps for monitoring current drought conditions through a set of relevant drought indicators.



Vulnerability Atlas

In this maproom, the Vulnerability Atlas to (agricultural) droughts is presented for Chile and for each commune individually.



The national and regional drought observatories



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- Place current droughts into context
- Unlocking national datasets for monitoring different aspects of drought and climate risks
- Drought early warning for pro-active drought management and policy

The screenshot displays three interconnected web panels for drought monitoring:

- Observed discharge (Chile):** Shows a map of Chile with discharge points. Description: "Information on the discharges observed in Chilean rivers by the Chilean Water Authority (DGA) are reported here." It includes a menu for selecting variables like Percentage, Measured, or Anomaly, and regions.
- Standardized Precipitation Index (Peru):** Shows a map of Peru for Dec 2015. Description: "This map can be used to identify the intensity of drought or excess of rainfall for each month. It shows the Standardized Precipitation Index." It includes a menu for selecting variables like Standardized Precipitation Index and regions.
- Niveles de Embalses Observados (Peru):** Shows a map of Peru with dam levels. Description: "Este mapa muestra los niveles de embalses observados en las cuencas principales del Peru." It includes a menu for selecting variables like Mediciones or Anomalia, and regions.

Additional data visualizations include:

- Estación ANA Poechos:** A bar chart showing monthly dam levels from July 2013 to July 2014. Data points: Jul 2013 (~350), Oct 2013 (~250), Jan 2014 (~100), Apr 2014 (~300), Jul 2014 (~350).
- Observations for Cuenca Caplina:** A bar chart showing the Standardized Precipitation Index (SPI) for the current month. Values: SPI1: -0.4939993, SPI12: 0.7238469, SPI3: -0.4608686, SPI6: -0.471522, SPI9: -0.3532815.

Navigation and settings include: Maproom, Hydrological Drought, Region (Chile/Peru), Analysis (Percentage), Language (english/español), and various menu options like Description, More information, Dataset Documentation, Contact Us, and Instructions.

drought or humid condition at different time scales. You can select the time scale in the menu>analysis.

The African and Lac flood and drought Monitors



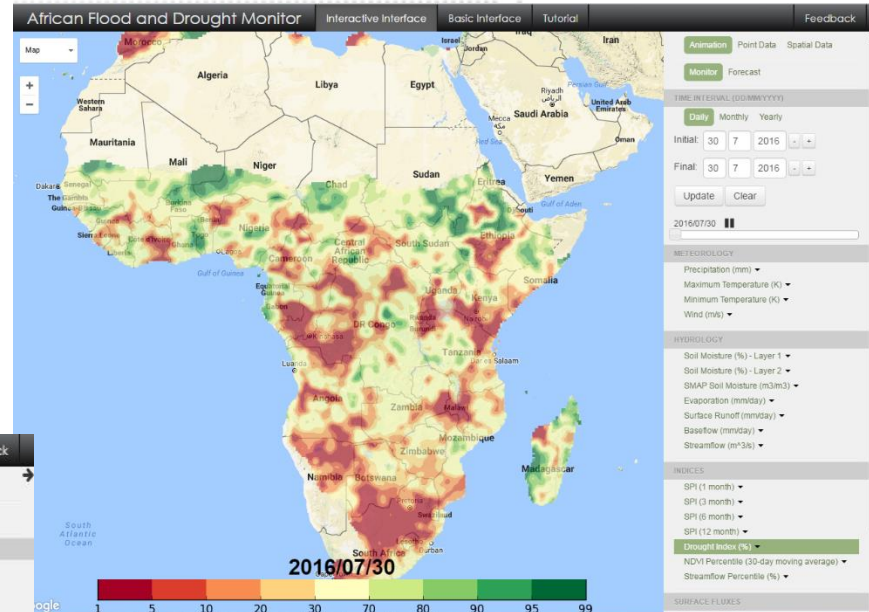
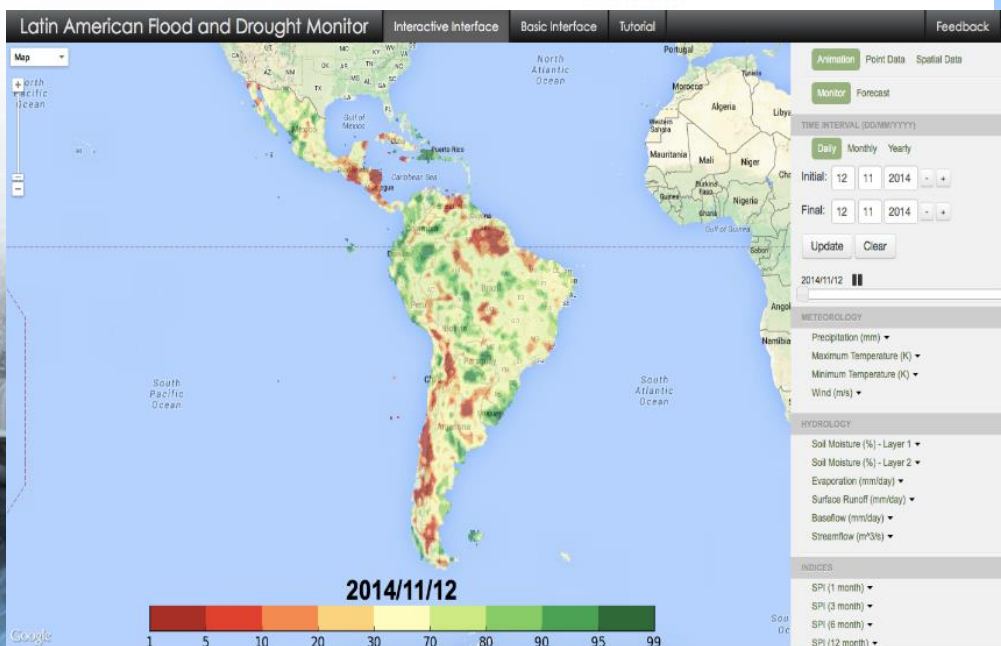
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African and LAC Droughts monitors:

Strengthen the capacity of African and LAC countries for near real-time monitoring and seasonal forecasting to raise awareness of the impact of floods and droughts on vulnerable and disadvantaged groups.



User Interface:
<http://stream.princeton.edu>

Launch of App for Mobile Devices during COP22



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Water and Climate Day - COP22
Launching of the iRain Mobile App



1 Visualize real time global satellite precipitation observations

2 View rainfall movement as an animation

3 Share real-time rainfall data

4 Download the App here:

App store Google play

5 Report rainfall at their location and view reports of others





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IDI Drought Approach



Agricultural Water Productivity

Precipitation

Economic Value of Water

Air Temperature

Livelihood-Dependent Agriculture

Population

Irrigation Development

Agricultural Development

Percent of Water Reuse

Per Capita Urban Water Use



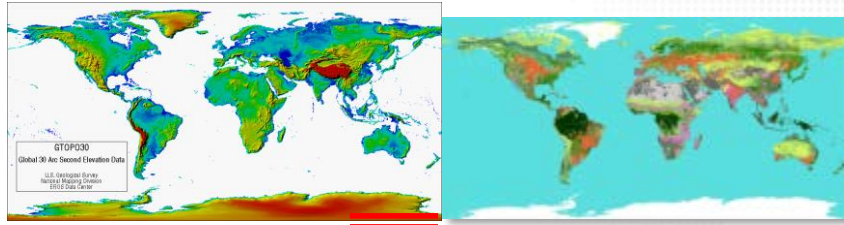
Remote Sensing Applications in Pakistan

Flood forecasting system using satellite data



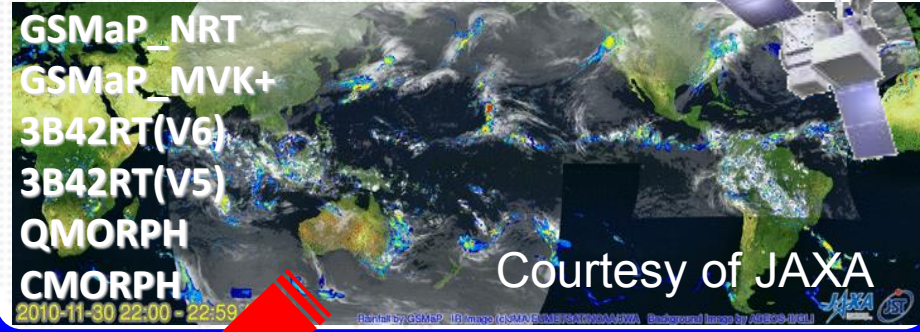
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Global Geological data for modeling Elevation data, Land use data, etc.



Ground rainfall and Satellite-based rainfall

GSMaP_NRT
GSMaP_MVK+
3B42RT(V6)
3B42RT(V5)
QMORPH
CMORPH



Courtesy of JAXA

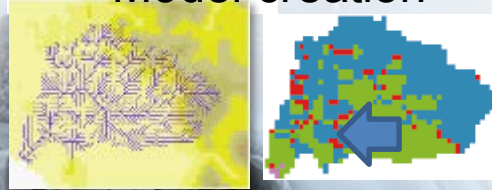
input

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IFAS

Integrated Flood Analysis System

Model creation

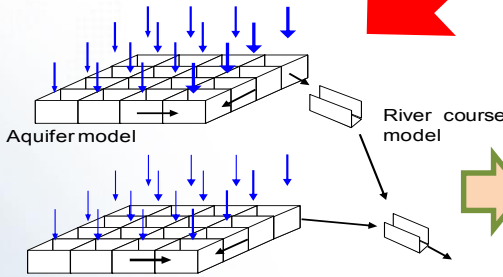


Run-off analysis

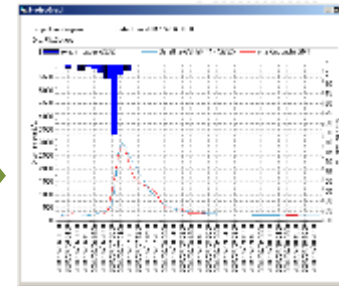
Surface model

Aquifer model

River course model



River discharge, Water level, Rainfall distribution



Calculation

Flow/water level

Flood forecasting/warning



Reduce/Prevent flood damage

Promoting safe evacuation

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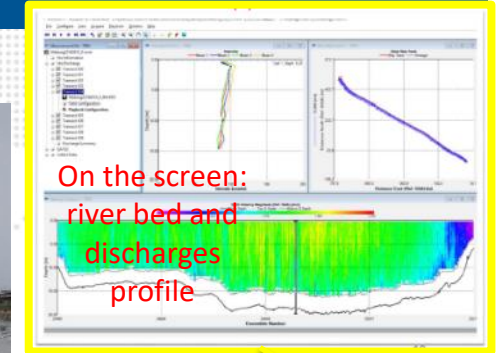
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ADCP, Auto Weather Stations and Community Trainings

Community training programme for flood
and drought management, SAWCRI,
Chakwal



Training provided to
PCRWR, four Provincial
Irrigation Department,
WAPDA and PMD (21
trainees)



River Transect
measurements
on Jhelum river
5-6 August 2017



Young engineers of PMD developed this in house
developed Automated Weather Station (AWS)
(more than 35% cheaper than international standard price)



RiverRay



RiverPro

Ryukan

IHP contributes to SDGs and 2030 Agenda



Building resilience to climate change risk and vulnerability

31 participants from 10 countries (45% women)



Regional Workshop on
**BUILDING RESILIENCE TO CLIMATE
CHANGE RISK AND VULNERABILITY
TO MEET WATER SECURITY CHALLENGES**



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Further update on activities Shahbaz Khan UNESCO

Shahbaz Khan Sustainable and Empower Asia Pacific for Sustainable Development Goals

Update Info 1 Activity log 20+ ...

Timeline About Friends 3,416 Photos Archive More

408 items for you to review

Intro
Add a temporary bio

- Director, Regional Science Bureau for Asia and the Pacific at UNESCO
- Former Research Director at CSIRO
- Studied Biologically Inspired Modelling Systems at Charles Sturt University
- Studied Geographic Information Systems (GIS) at Charles Sturt University - CSU
- Studied Civil engineering at UET Lahore
- Studied at Engineers Australia
- Studied Applied Environmental Economics at Imperial College London
- Studied International environmental law at Macquarie University

Compose Post Photo/Video Live video Life Event

What's on your mind?

Photo/Video Feeling/Activity ...

Posts List view Grid view

Shahbaz Khan shared a memory.
8 August at 09:37 · 🌐

1 Year Ago
See your memories >

Shahbaz Khan is with Ahmed Kamal in Islamabad, Pakistan.
8 August 2017 · 🌐

With three key water managers and personal friends Chief Engineering Advisor/Chief