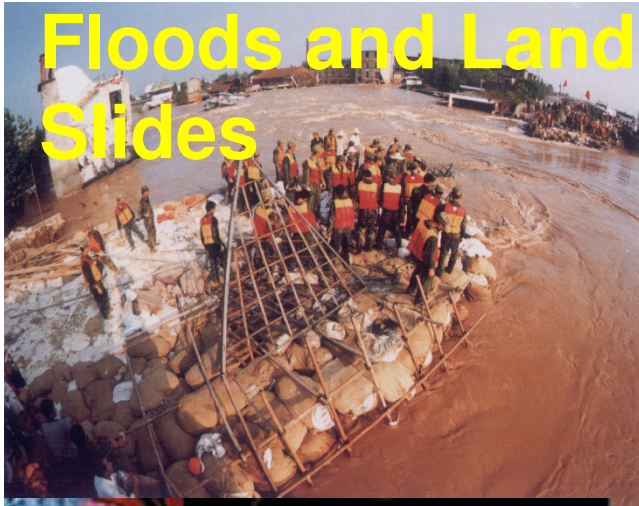


Floods and Land Slides



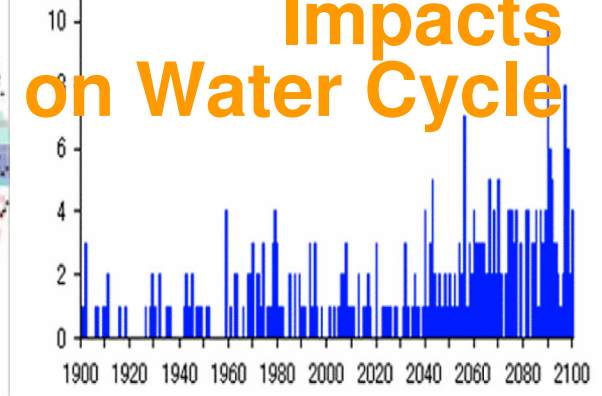
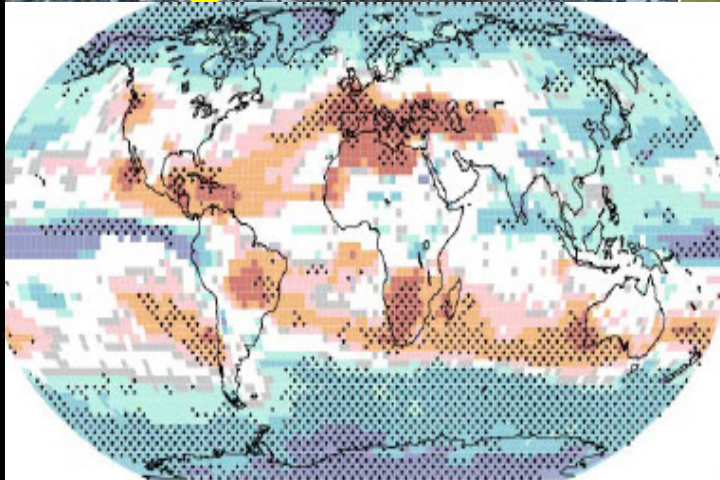
Water Pollution and Ecosystem Degradation

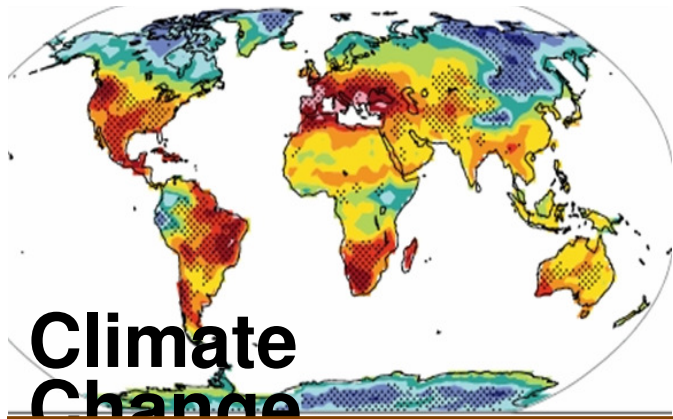


Drought and Water Scarcity

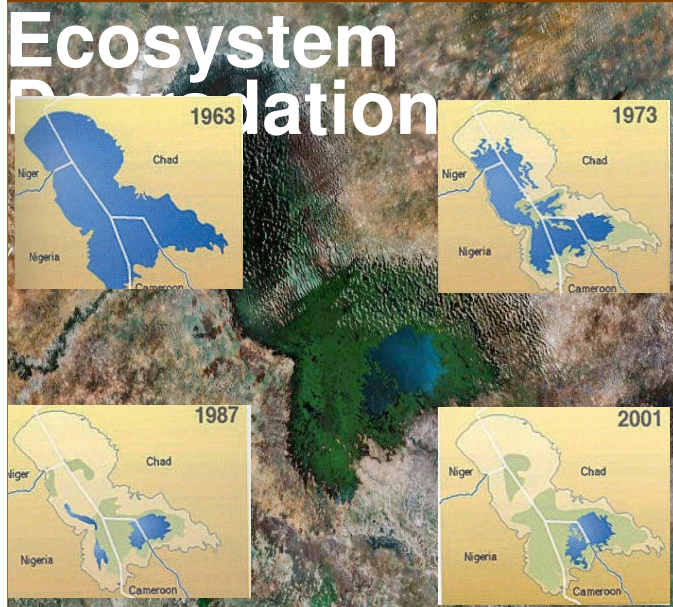


Climate Change Impacts on Water Cycle

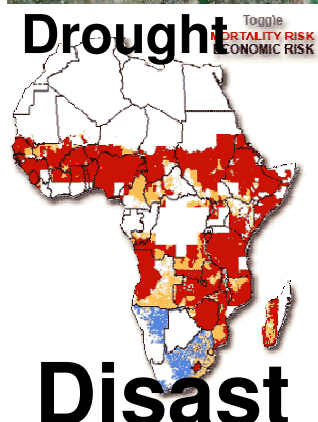




Climate Change

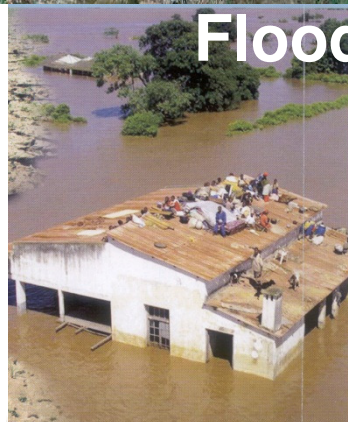


Ecosystem Population



Drought

Disast



Flood



Access to Water

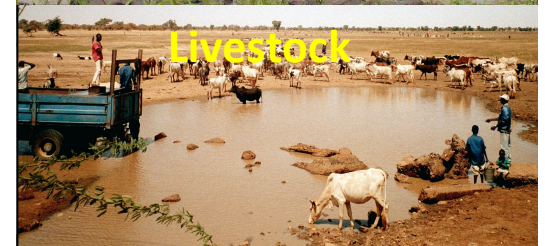


Health

- On track to meet the MDG drinking water target: only 26 of the 53 countries
- Water related diseases: more than 80% → deaths for children under 5
- Deficient agricultural water management: e.g. only 10% of irrigable lands are actually irrigated in WA.
- Hydropower development < 7% of the potential
- 5-25% of GDP due to droughts and floods in affected countries
- Climate impacts are greatest in poor countries.



Food



Agriculture

Livestock



Energy

Pakistan Flood Information in 2010

Pakistan PALSAR Flood - Windows Internet Explorer
 http://monsoon.t.u-tokyo.ac.jp/AWCI/doc/Pakistan/index.htm

Monitoring Flooding in Pakistan Using ALOS PALSAR Data Provided by JAXA

Brief Summary of Pakistan Flooding Monitoring (CEOP-Vol.20_No.3_07_p08.pdf) [0.4MB]

PALSAR Images:

	PALSAR_Flood + Road (Please click left mouse then high resolution image appear in new window. Please click right mouse button there and select "save image as" to save high resolution image.)	GDEM + PALSAR_Flood + Road (Please click left mouse then high resolution image appear in new window. Please click right mouse button there and select "save image as" to save high resolution image.)	On the Google Earth (Please click "open" when you asked on your computer). Or please download "kmz" file on your computer then double click it. You can see the flood area on the google earth.)
2010/08/05 (Thu.)			 20100805_pakistanflood_palsar_wb1_ge.kmz
2010/08/19 (Thu.)			 20100819_pakistanflood_palsar_fhd_ge.kmz
2010/08/22 (Sun.)			 20100822_pakistanflood_palsar_wb1_ge2.kmz
2010/08/27 (Fri.)			 20100827_pakistanflood_palsar_wb1_ge.kmz
2010/08/29 (Sat.)			 20100829_pakistanflood_palsar_wb1_ge.kmz
2010/09/13 (Mon.)			 20100913_pakistanflood_palsar_wb1_ge.kmz

GEOSS/AWCI Website:
<http://monsoon.t.u-tokyo.ac.jp/AWCI/doc/Pakistan/index.htm>

GEWEX

Monitoring Flooding in Pakistan Using ALOS & GSMaP Data Provided by JAXA

Takeo Tadono¹, Masanobu Shimada¹, Kentaro Aida², Katsunori Tamagawa¹, Toshio Koike¹, Kazuhiko Fukami³ and Takahiro Kawakami³
¹Earth Observation Research Center, JAXA; ²Department of Civil Engineering, The University of Tokyo; ³International Centre for Water Hazard and Risk Management under the auspices of UNESCO (ICHARM)

Serious damage has occurred in Pakistan recently due to floods and mudslides caused by heavy rain, which occurred continuously since July 29, 2010. The flood damage has spread from north to south in Pakistan. The Japan Aerospace Exploration Agency (JAXA) has made observations using the Advanced Land Observing Satellite (ALOS, 'Daichi') to monitor the state of the damage.

Figure 1 shows images of Hyderabad, 1,200 km south-southwest from Islamabad, which were taken after the disaster on August 23, 2010 (left) and before the disaster on March 23, 2010 (right). It is obvious that the flooded area along the Indus river basin has greatly expanded.

Figure 2 shows the inundation area image obtained from data acquired with the Phased Array type L-band Synthetic Aperture Radar (PALSAR) onboard ALOS on August 19, 2010. The data was acquired using the ScanSAR observing mode (WB1); therefore it covered an approximately 350 km wide strip at 100 m spatial resolution. The blue color on the topographical map derived from the ASTER Global Digital Elevation Model (ASTER GDEM) shows the inundation area, which was identified by analyzing the backscattering coefficients observed before and after the flood.

Figure 3: Comparison of preliminary IFAS-PDHM simulations using the corrected GSMaP data with the observed in-situ river discharge data at Nowshera, Kabul River from July 25, 0:00 to August 6, 0:00 GMT

A preliminary runoff analysis was done at the Nowshera hydrological station of the Kabul River, which is one of the major tributaries of the Indus River, using the Integrated Flood Analysis System (IFAS) - Public Work Research Institute (PWRI) Distributed-parameter Hydrologic Model (PDHM), grid-size 4 km and the Global Satellite Mapping of Precipitation (GSMaP) as shown in Figure 3. The GSMaP data corrected by the ICHARM's correction method based solely on rainfall-area moment information, without regarding ground-based rainfall data, was used as the input to the IFAS-PDHM. According to the estimation of this preliminary simulation, the flash-flood runoff peak at the Nowshera point (watershed area approximately 92,000 km²) appeared to be over 16,000 m³/s near the time of 0:00 (GMT) on July 31, but in reality, most of the high-flow discharge must have been inundating the floodplains (valley plains) along the Kabul River.

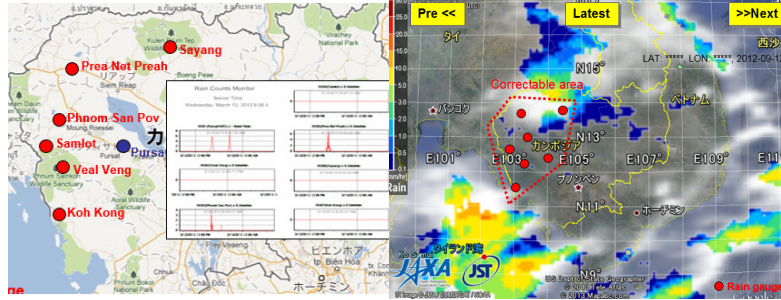
August 2010

Takeo Tadono et al., "Monitoring Flooding in Pakistan Using ALOS & GSMaP Provided by JAXA" GEWEX Newsletter, Special CEOP Issue, Vol. 20, No. 3, p. 8, August 2010.

Water-Climate-Agriculture Workbench in Cambodia



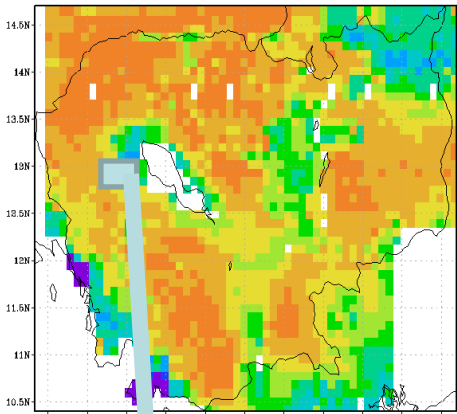
Stakeholder Meeting



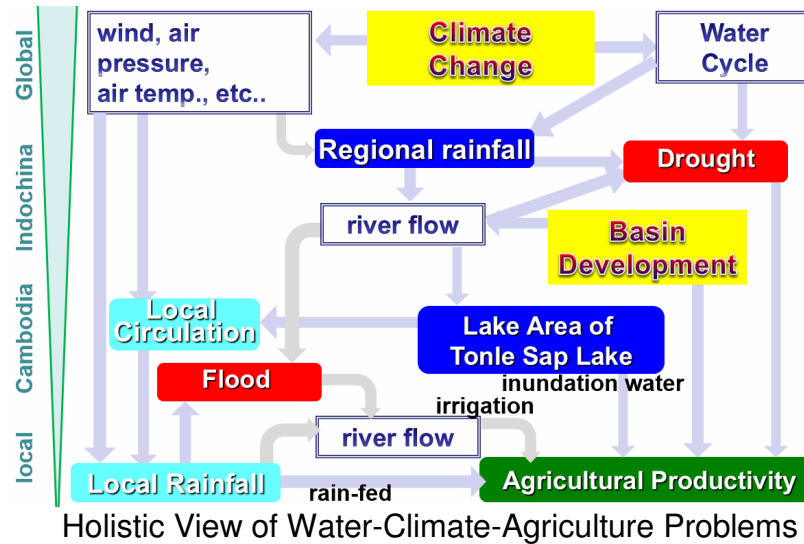
Real-time Rain Gauge → Satellite Data Correction
→ Wide Data Dissemination



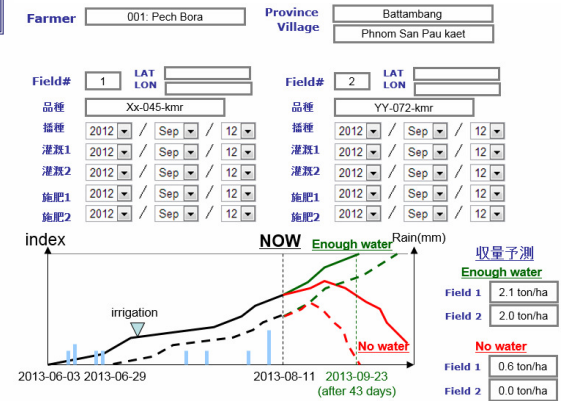
Farmers' Needs & Experiences



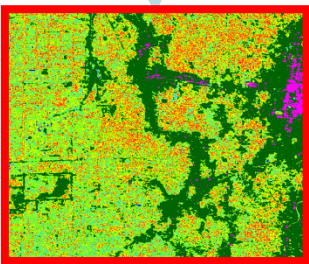
Nation-wide Daily Soil Moisture from Satellite



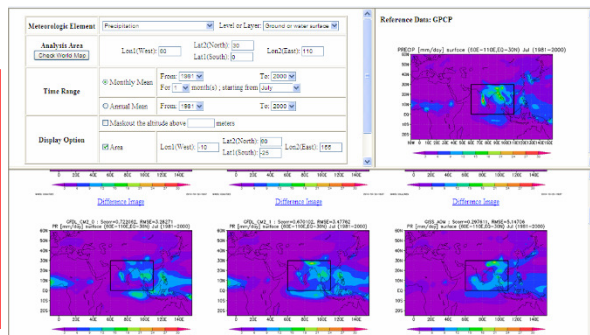
Holistic View of Water-Climate-Agriculture Problems



Water Cycle-Rice Production Coupled Model



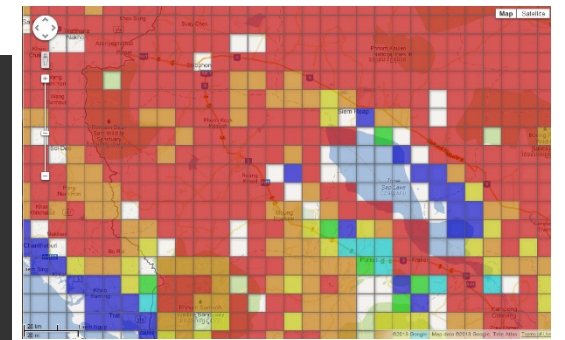
Local Information



Climate Change Analysis Tools



OJT for Local Practitioners



Rice Production Monitoring