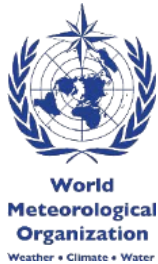


MANAGING DROUGHTS AND FLOODS

VLADIMIR SMAKHTIN

International Water Management Institute, Colombo, Sri Lanka

Interactive Workshop on the development of South Asia Drought Monitoring System
Dhaka, Bangladesh, 20 April 2015



DROUGHTS AND FLOODS - MANIFESTATION OF WATER RESOURCES VARIABILITY



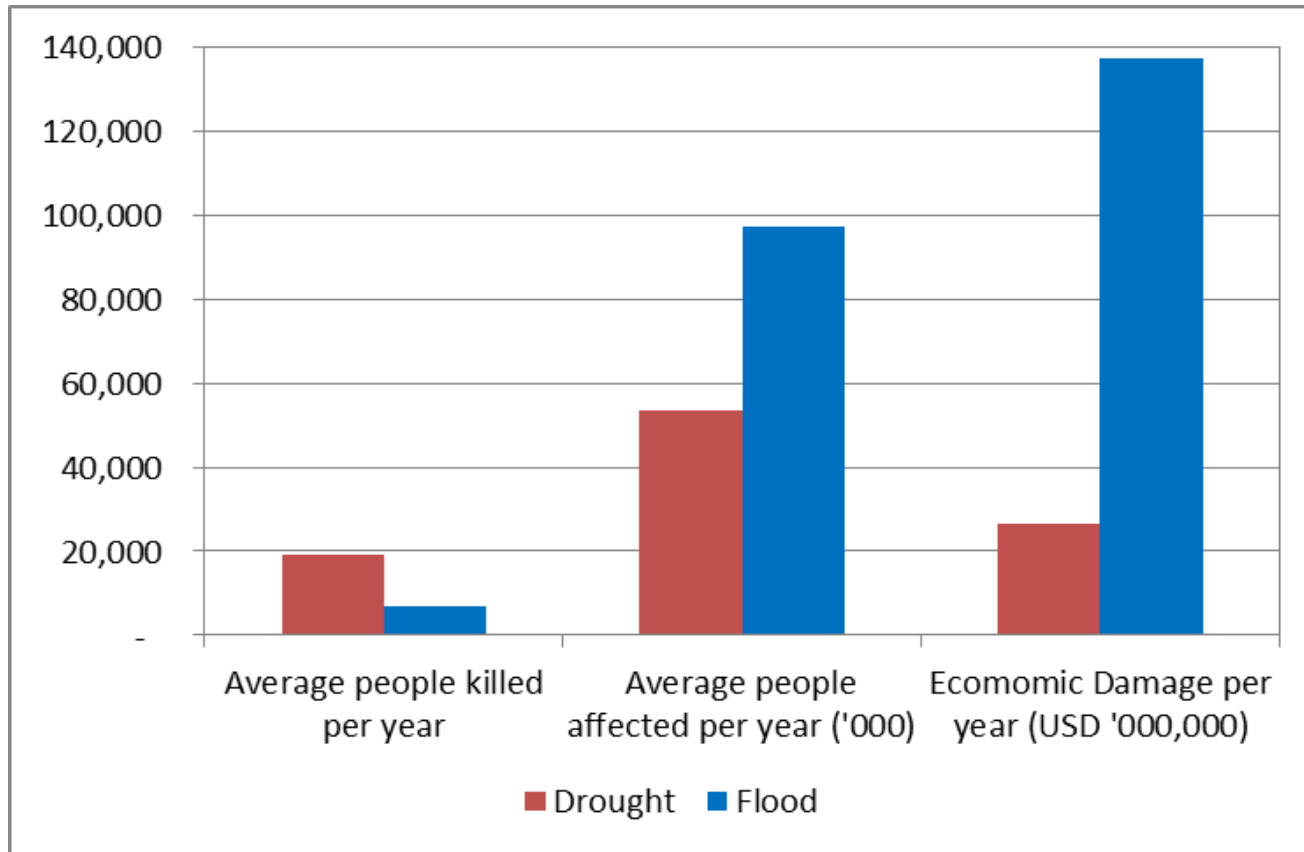
TOO LITTLE...



...TOO MUCH



DROUGHTS AND FLOODS: NUMBERS AND FACTS



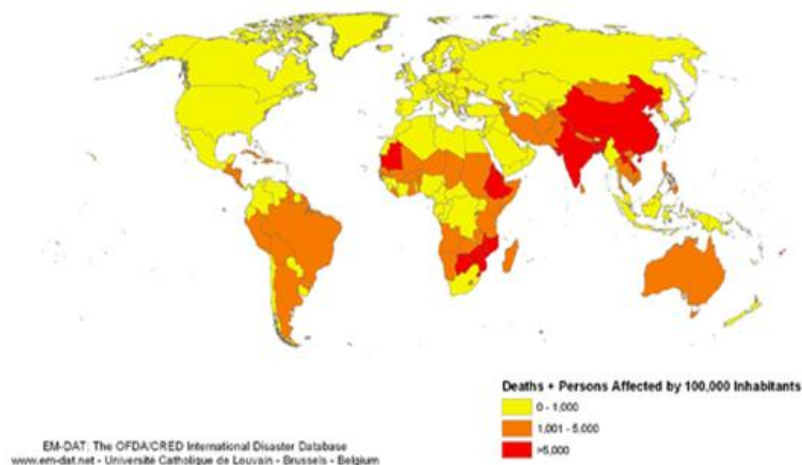
Source -EM-DAT: The OFDA/CRED International Disaster Database, Brussels

Average annual characteristics over 1980-2008

DROUGHTS AND FLOODS: NUMBERS AND FACTS

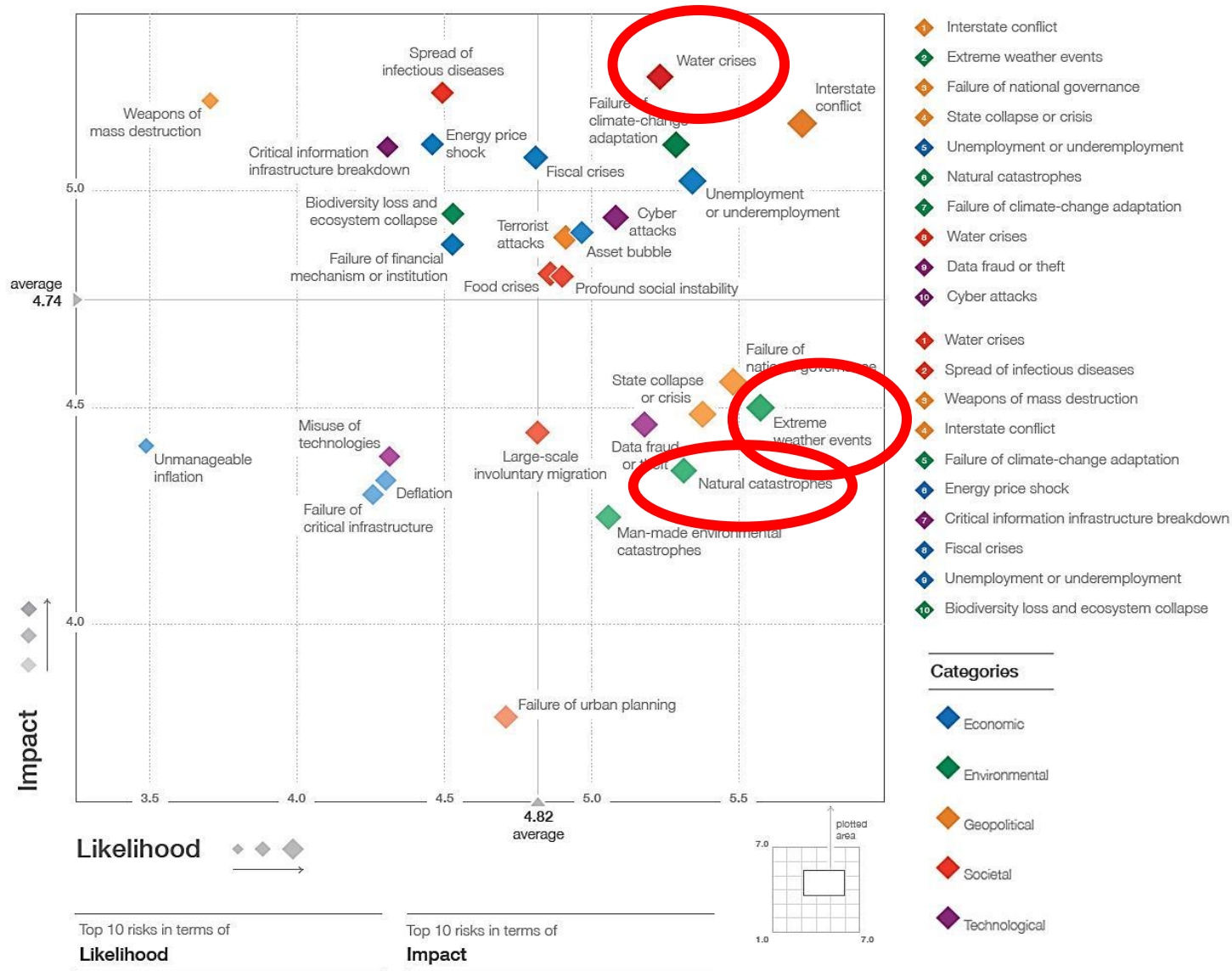
- 95% of all affected people by floods and droughts are in Asia
- Floods and droughts account for about 90% of all people affected by all natural disasters
- Frequency and intensity of these events increases with changing climate
- Annual damages may rise to over 400 bill USD globally by 2030

Deaths and People Affected – by 100,000 inhabitants (1974-2005)



Source -EM-DAT: The OFDA/CRED International Disaster Database, Brussels

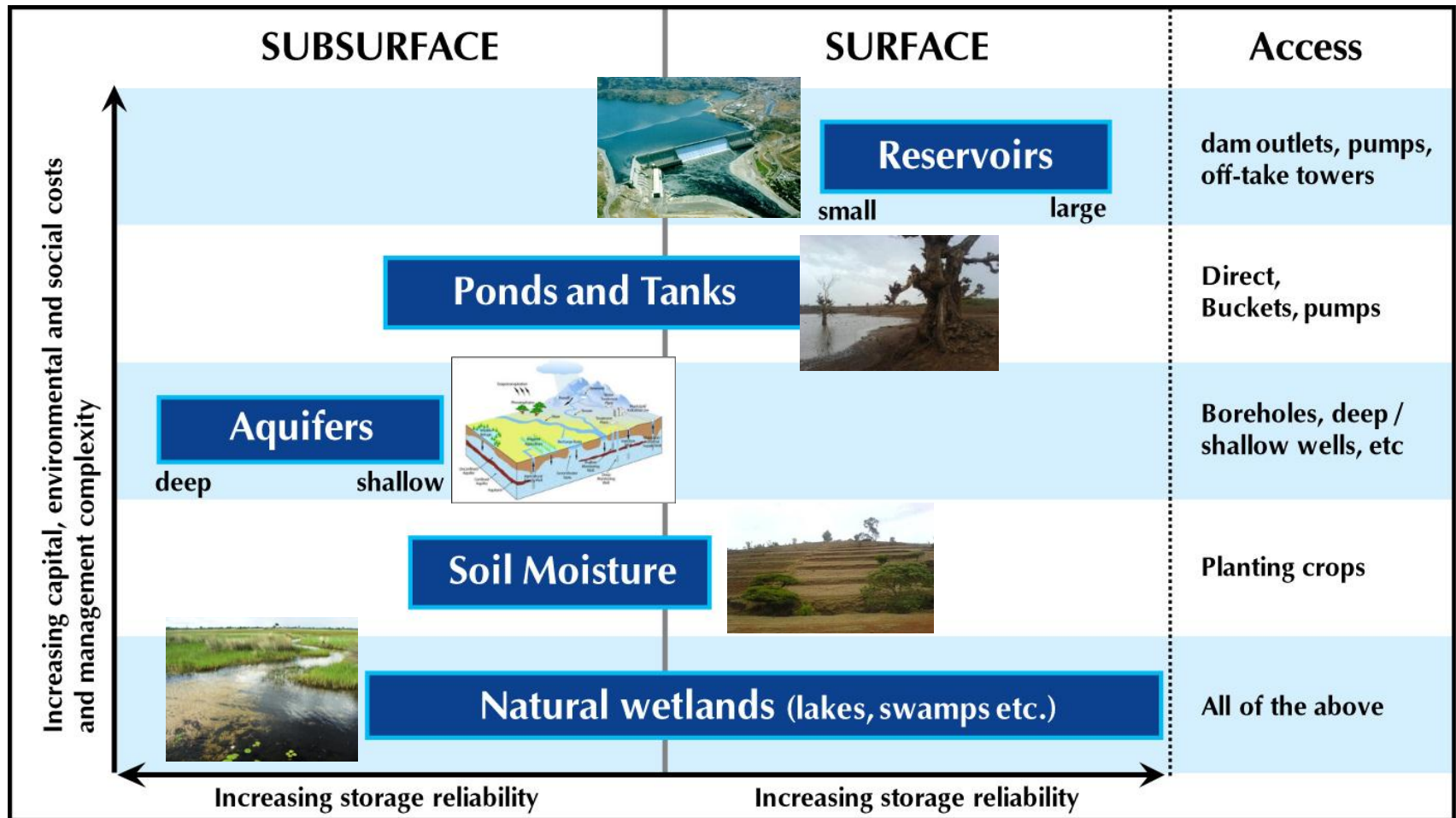
WORLD ECONOMIC FORUM, GLOBAL RISKS 2015



POSSIBLE INTERVENTIONS

- Rethinking Water Storage
- Conjunctive Drought and Flood Management with a more focus on natural infrastructure
- Understanding and quantification of flood and drought risks and hotspots
- Monitoring and forecasting

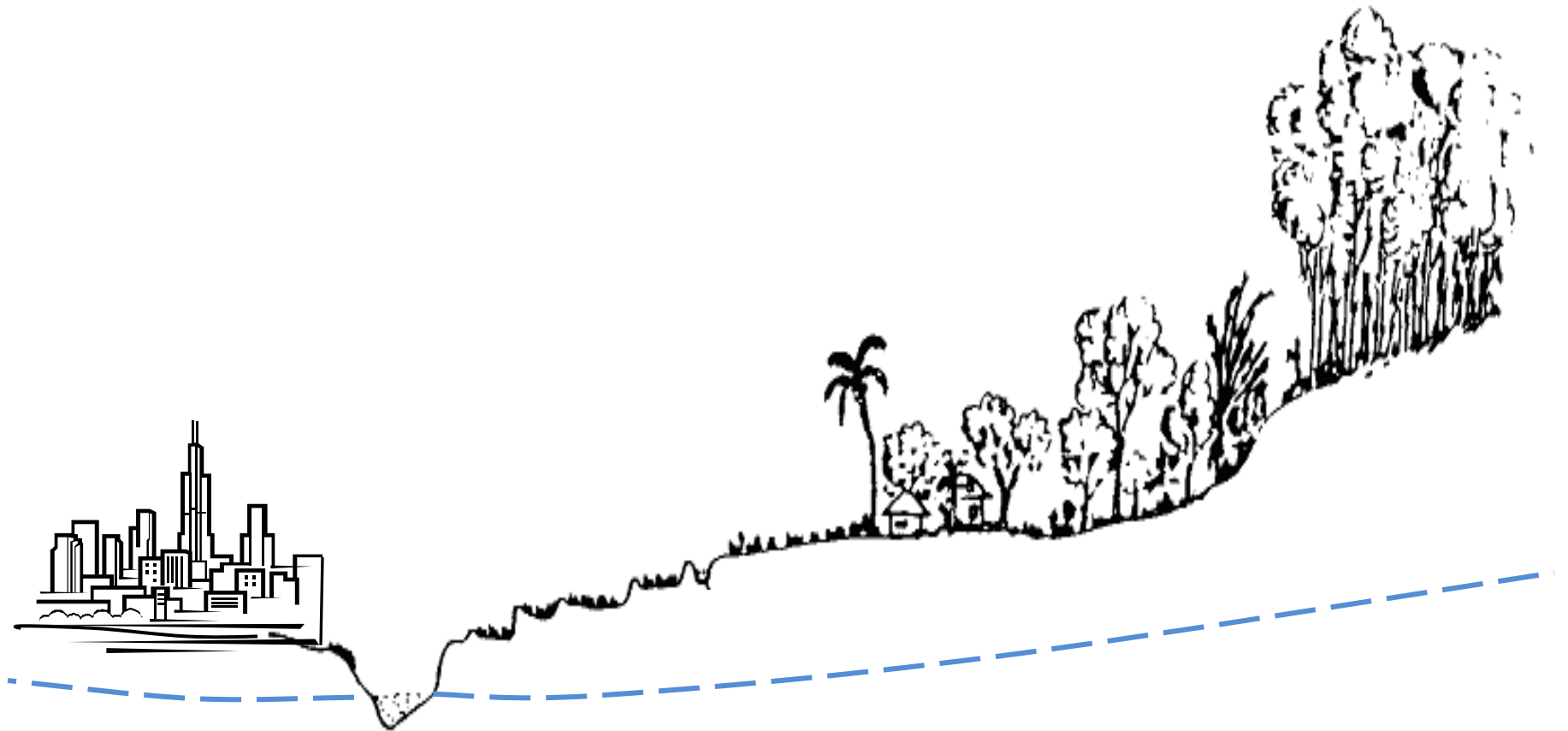
WATER STORAGE CONTINUUM



Source: McCartney and Smakhtin 2010

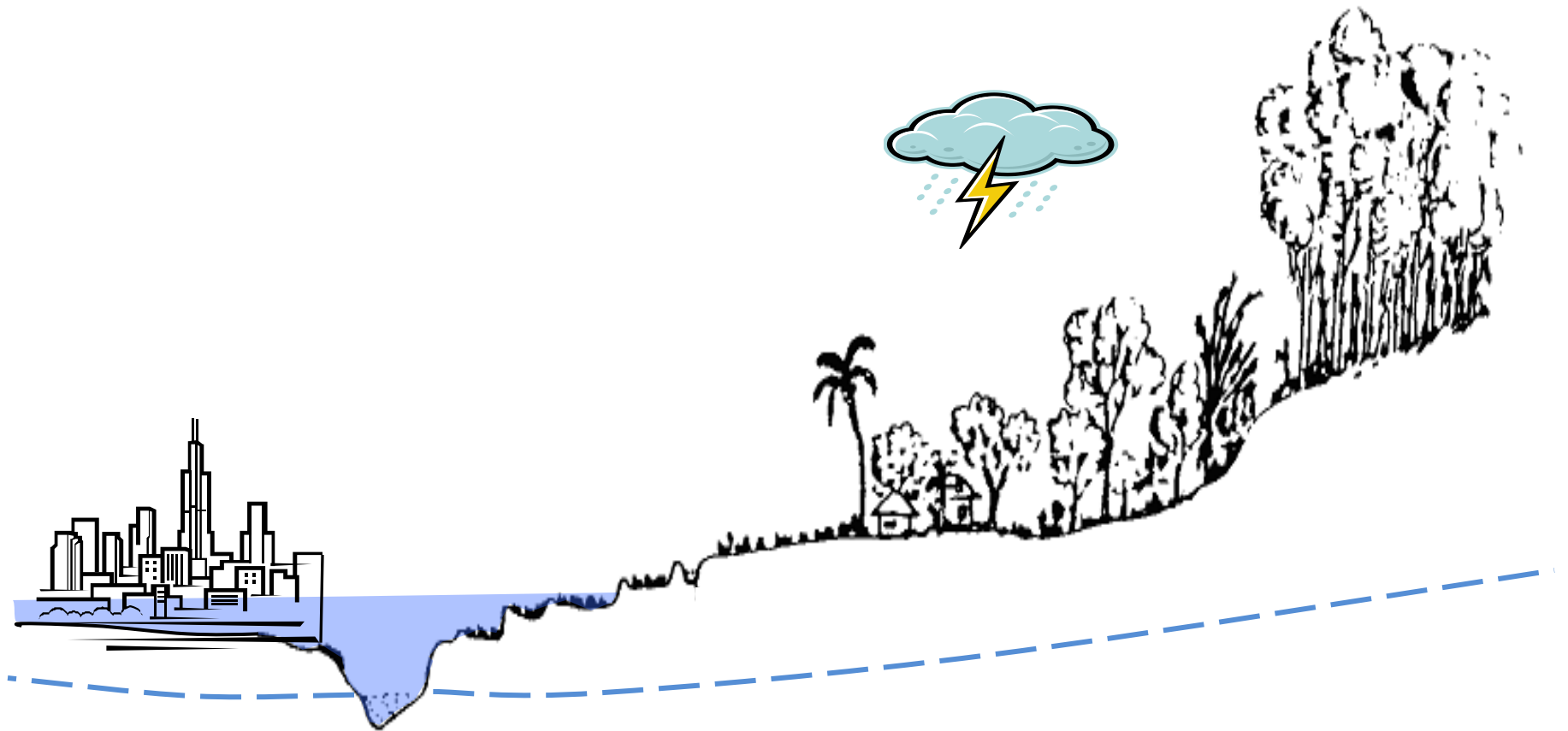
CONJUNCTIVE FLOOD AND DROUGHT MANAGEMENT

Dry Season



CONJUNCTIVE FLOOD AND DROUGHT MANAGEMENT

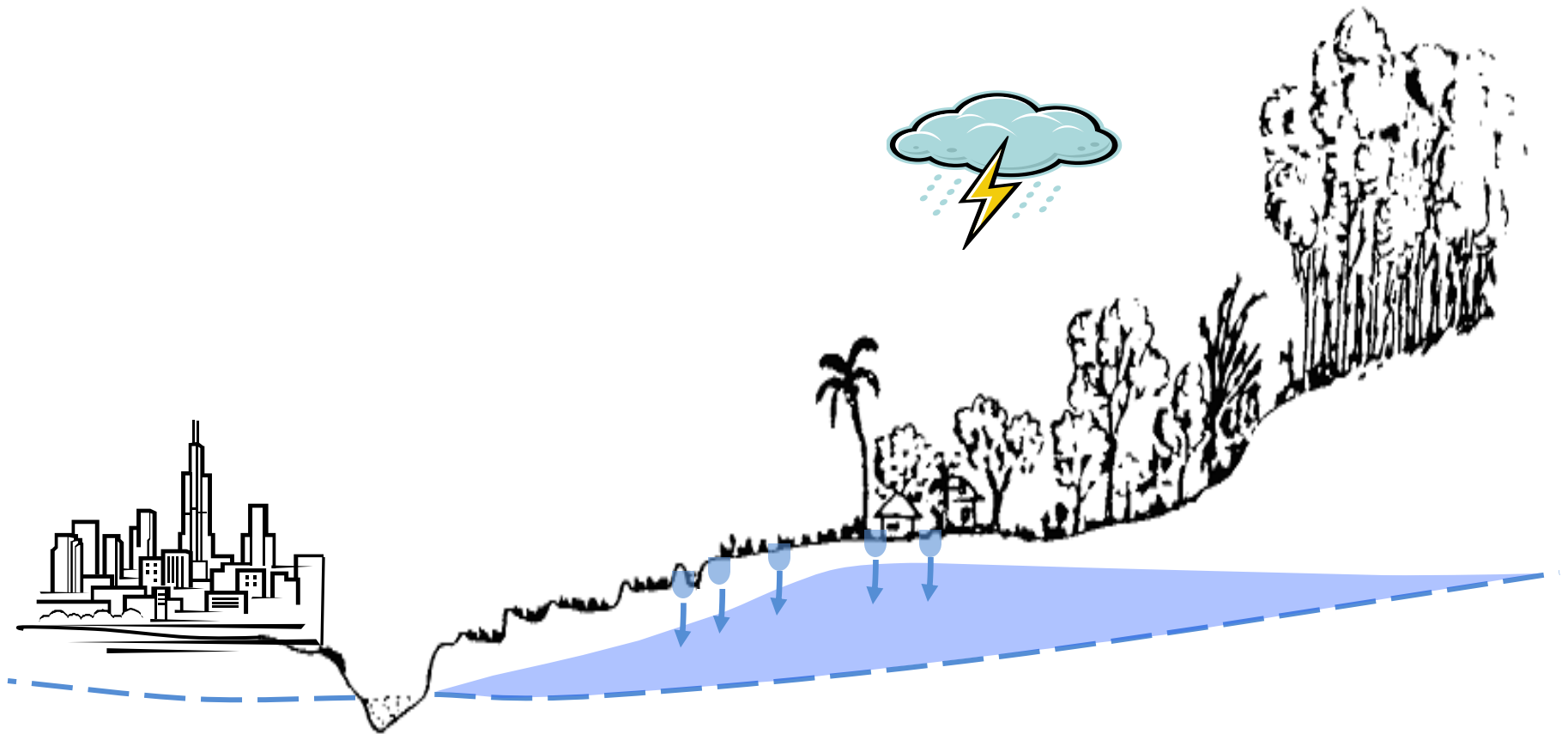
Wet Season



CONJUNCTIVE FLOOD AND DROUGHT MANAGEMENT

Underground Taming of Floods for Irrigation (UTFI);

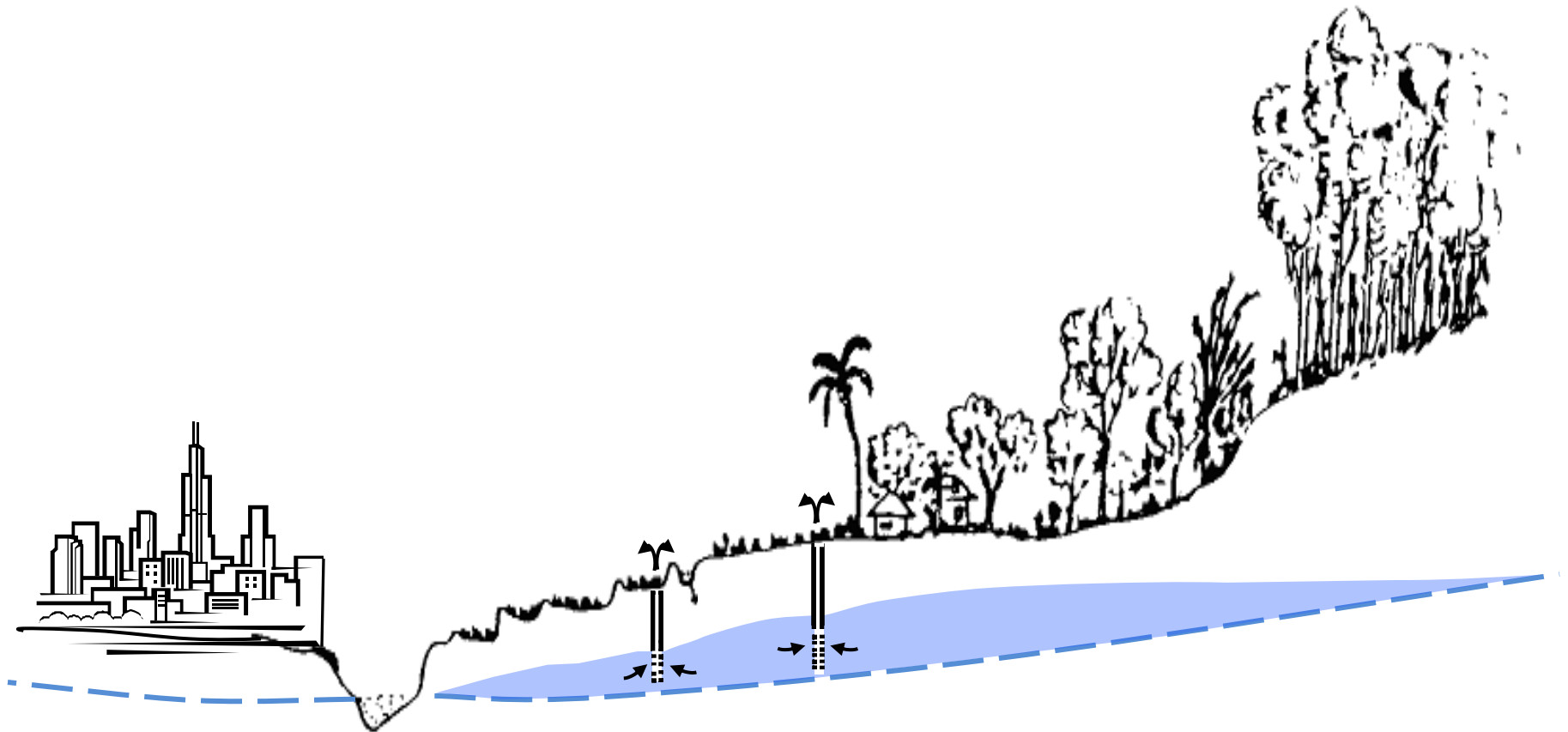
Wet season



CONJUNCTIVE FLOOD AND DROUGHT MANAGEMENT

Underground Taming of Floods for Irrigation (UTF-I);

Dry season



UNDERSTANDING RISKS

flood risks mapped for South Asia

<http://waterdata.iwmi.org/FloodMapping.php>



WATER DATA PORTAL

Integrated portal for IWMI research data

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About

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Information Products

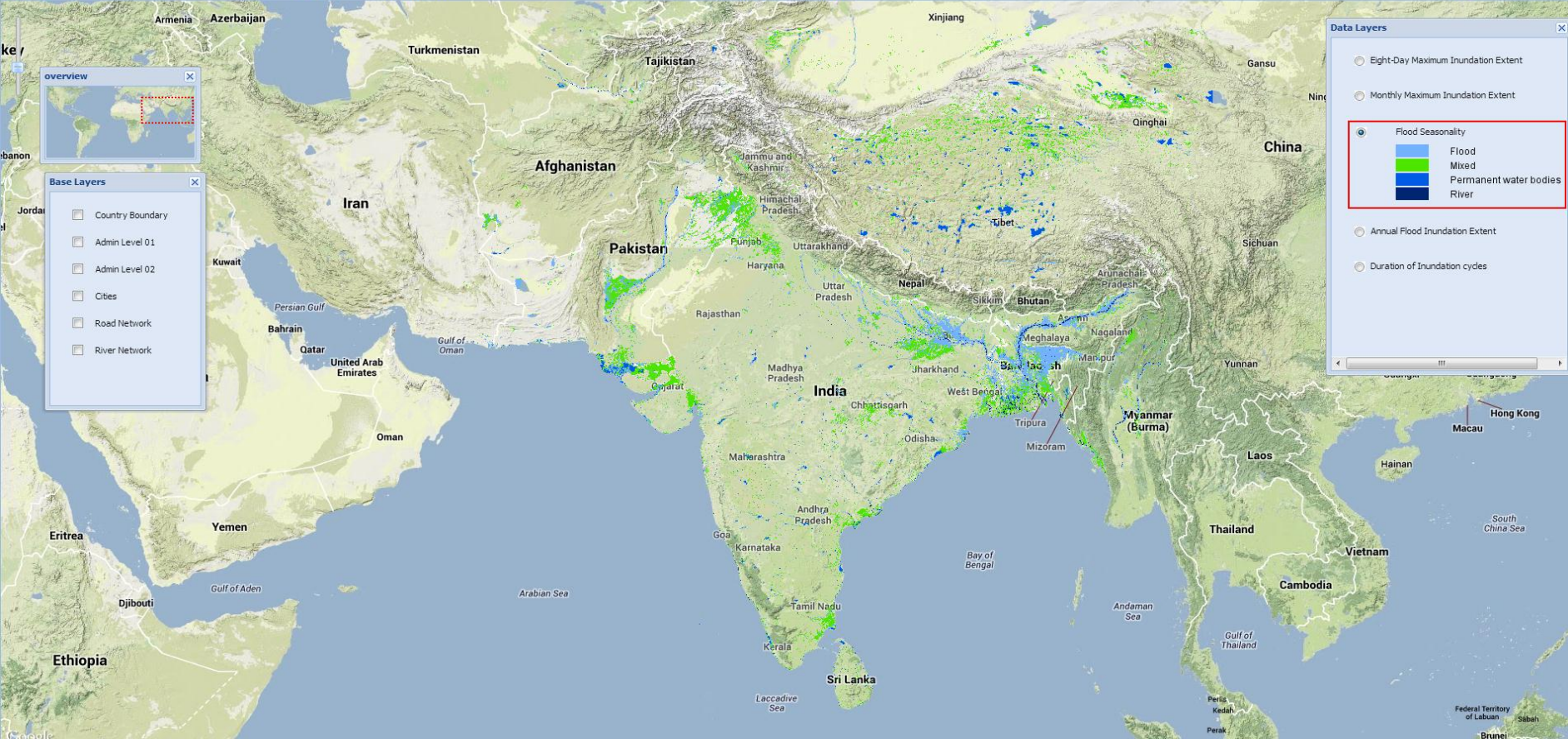
Specialised Mapping Products

User



Catastrophic Flood Risk Mapping: South Asia

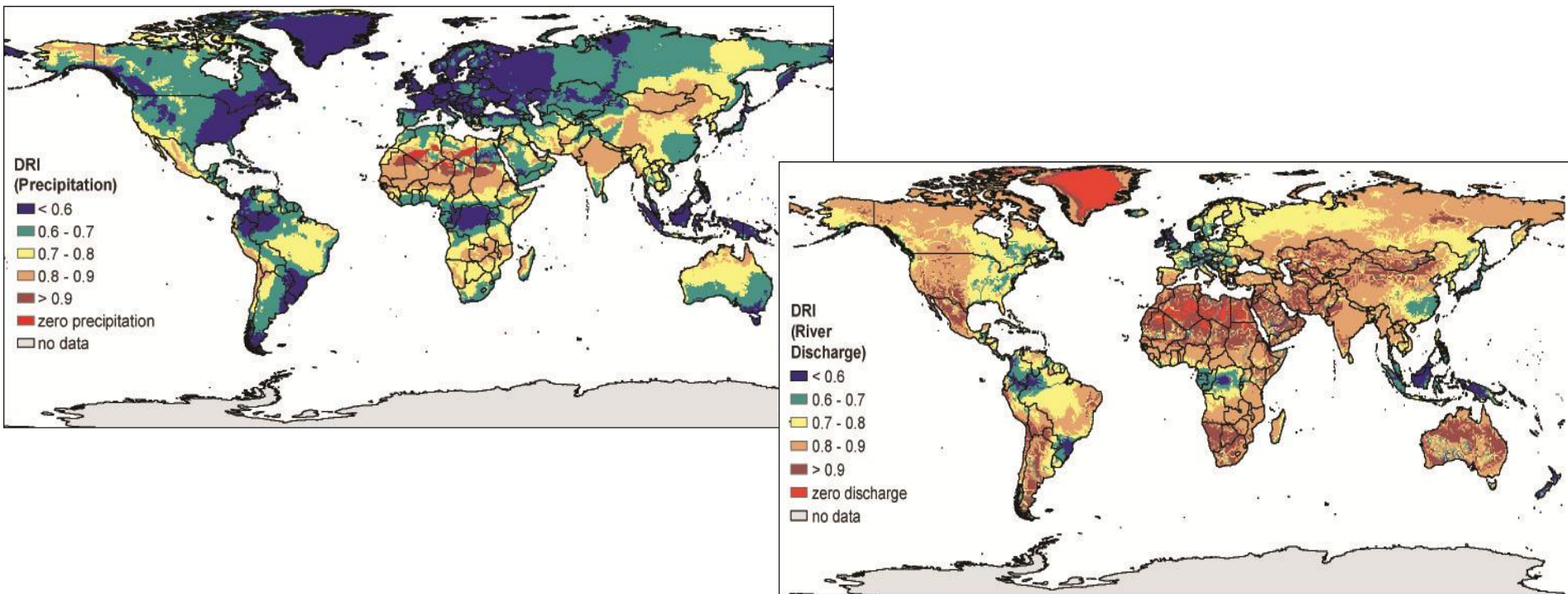
Beginning : 2001/1 Ending : 2010/1 Zoom To India Google Physical



UNDERSTANDING RISKS

drought risks mapped for the globe – around 20 parameters

<http://waterdata.iwmi.org/droughtmap.php>

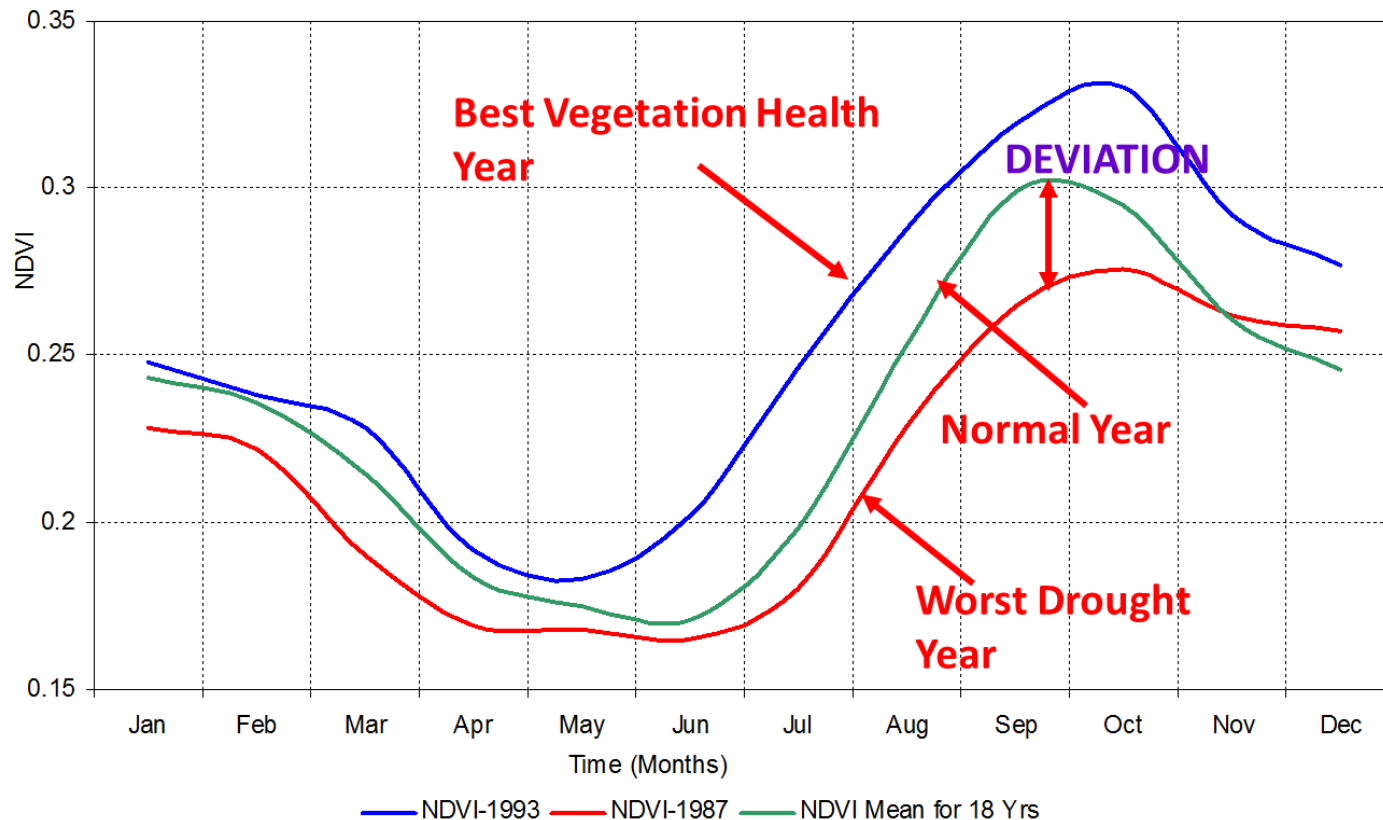


Measures of frequency of drought occurrence, drought intensity, socio-economic vulnerability, ability to cope, etc.

Source – Eriyagama et al. (2011)

MONITORING AND FORECASTING

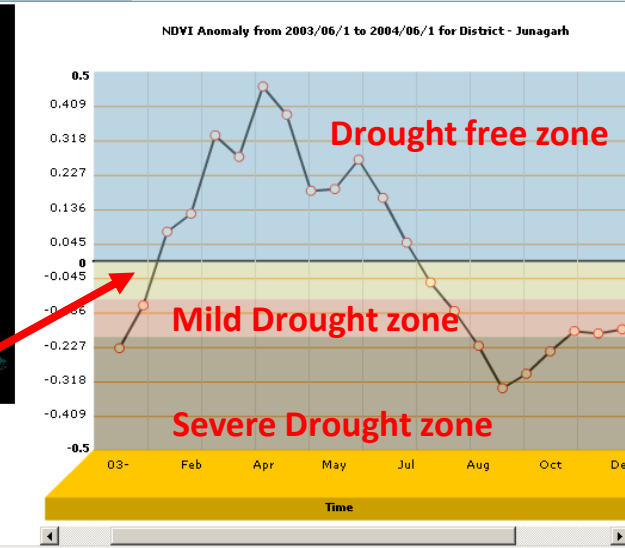
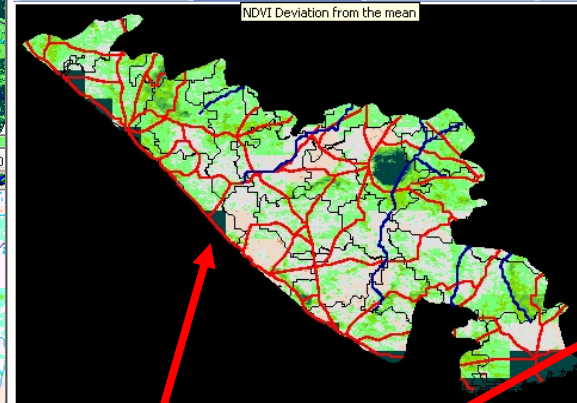
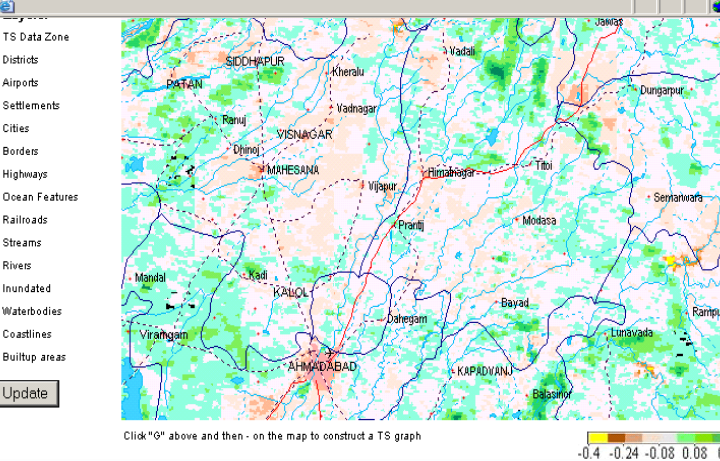
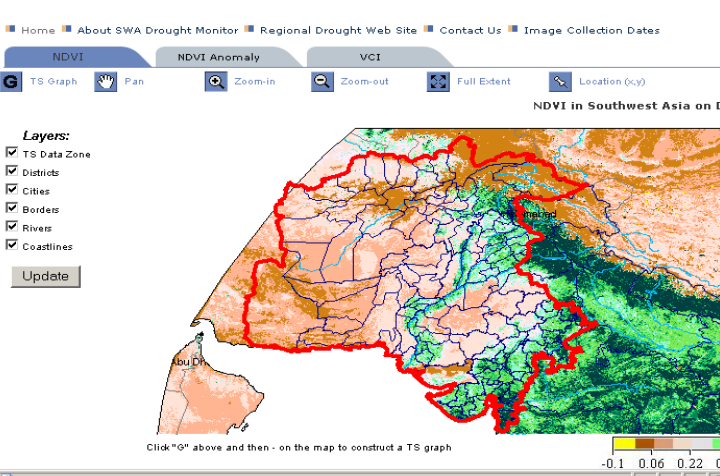
- Drought severity -by deviation of a drought parameter from normal condition
 - Simple or composite parameters /indices
 - Normal condition – from historical data



ONLINE DROUGHT MONITORING SYSTEM – South West Asia

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

MODIS data - 0.5 by 0.5 km, every 8 days, from 2000 onwards



NDVI deviation map for a District

Time Series graph



A water-secure world

www.iwmi.org

SOUTH ASIA DROUGHT MONITORING SYSTEM (DMS):

- Builds on existing expertise in drought monitoring in Asia
- Will feature near-real time, weekly high-spatial resolution information on drought severity online
- Will integrate remote sensing and ground data for better drought characterisation (vegetation indices, rainfall, soil, etc),
- Aims to supports regionally coordinated drought mitigation efforts that can be further tailored to analysis at the national level
- Needs to deliver timely and targeted messages to main economics sectors and communities that trigger certain anti-drought action(s) by decision makers
- Needs to be continuously maintained and hence needs a business model.

THANK YOU !

