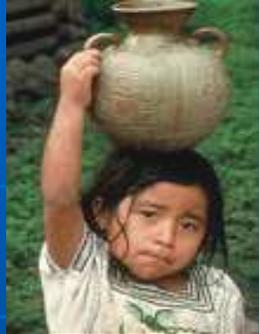


International Center for Integrated Water Resources Management (ICIWaRM)

Hosted by the:
Institute for Water Resources (IWR)



In Partnership with:
A consortium of U.S. Universities led by:
The University of Arizona (SAHRA)



and Professional Organizations led by:
The American Society of Civil Engineers (ASCE-EWRI)

“Water Science Forum 2008”

Eugene Stakhiv
Technical Director ICIWaRM
& US Director, IJC
International Upper Great Lakes Study

Follow-on to Prof. Valdes' Messages

- Many new technologies are on the horizon, (but need vetting, applications, coordination, and translation into BMP's)
- Science needs translation and simplification for use by water practitioners
- Traditional methods for diffusion of knowledge need to be transformed and accelerated
- UNESCO IHP-VII program (2008-2013) sets new science goals; in coordination with their Centers which are the engines of tech transfer
- ICIWaRM is designed to be the US-based UNESCO Center which will focus on integrating the best available science with '*Best Management Practices*' (BMP's) aimed at mid-level Ministry technical staff.

NRC Report (2008): ‘Integrating Multiscale Observations of US Waters’

- Many key hydrologic processes cannot be readily observed (e.g. groundwater recharge, evaporation)
- Satellite imagery is qualitative, poorly verified, and dispersed among agencies and data centers- not readily available – even to other federal agencies
- Spaceborne sensors do not directly observe many environmental variables – indirect estimates
- Costly ground-based systems are required for verific.
- Integration of observations and real-time data requires a cyber-infrastructure that is not currently in use or even designed.
- Data assimilation from process models, remote sensing data and in-situ measurements is still a dream
- CUAHSI HIS is a good beginning, Corps’ CWMS.

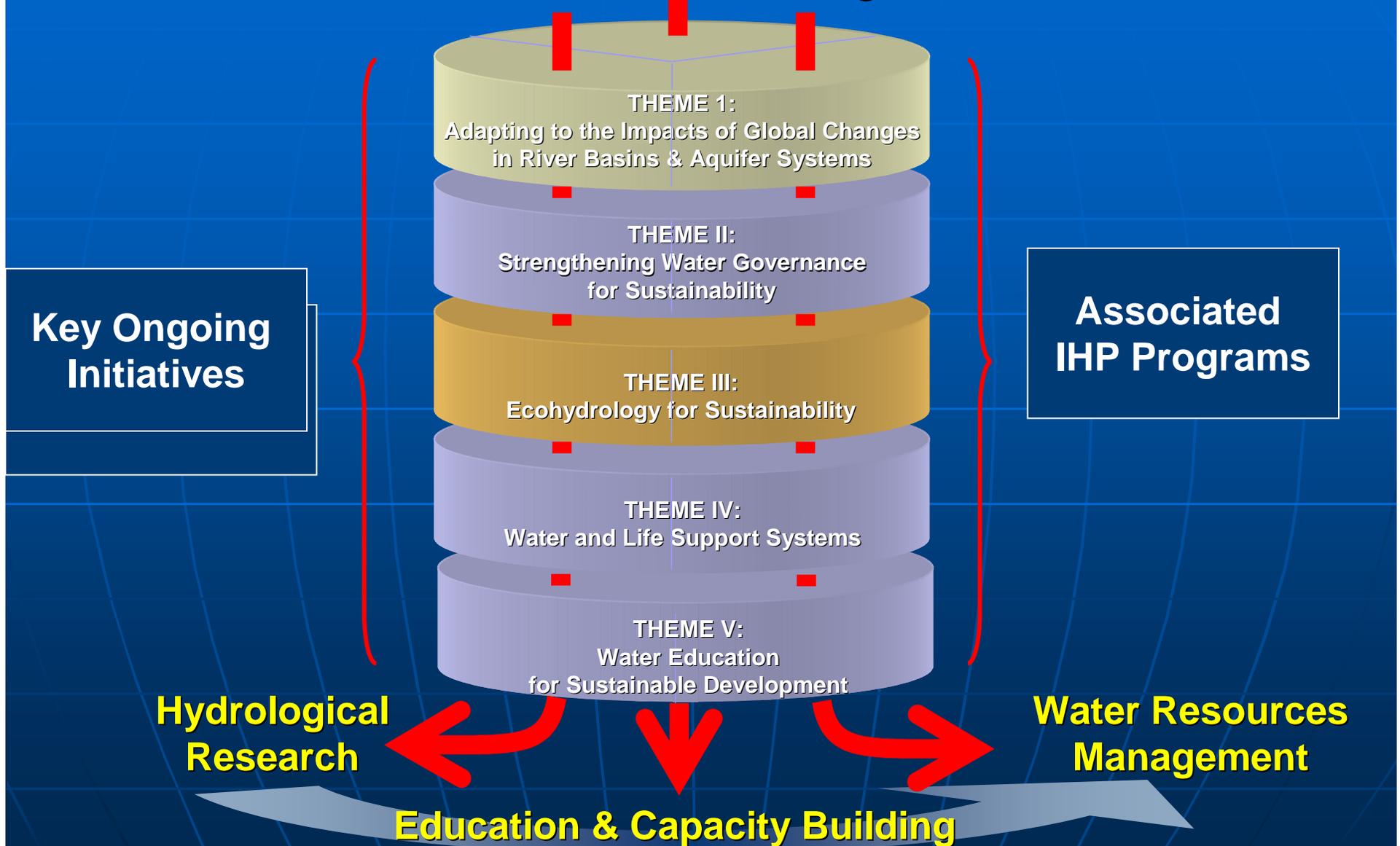
UNESCO Water Family - Strengthening the role of the IHP Centres



IHP IGC – XVII Resolutions 1 & 7



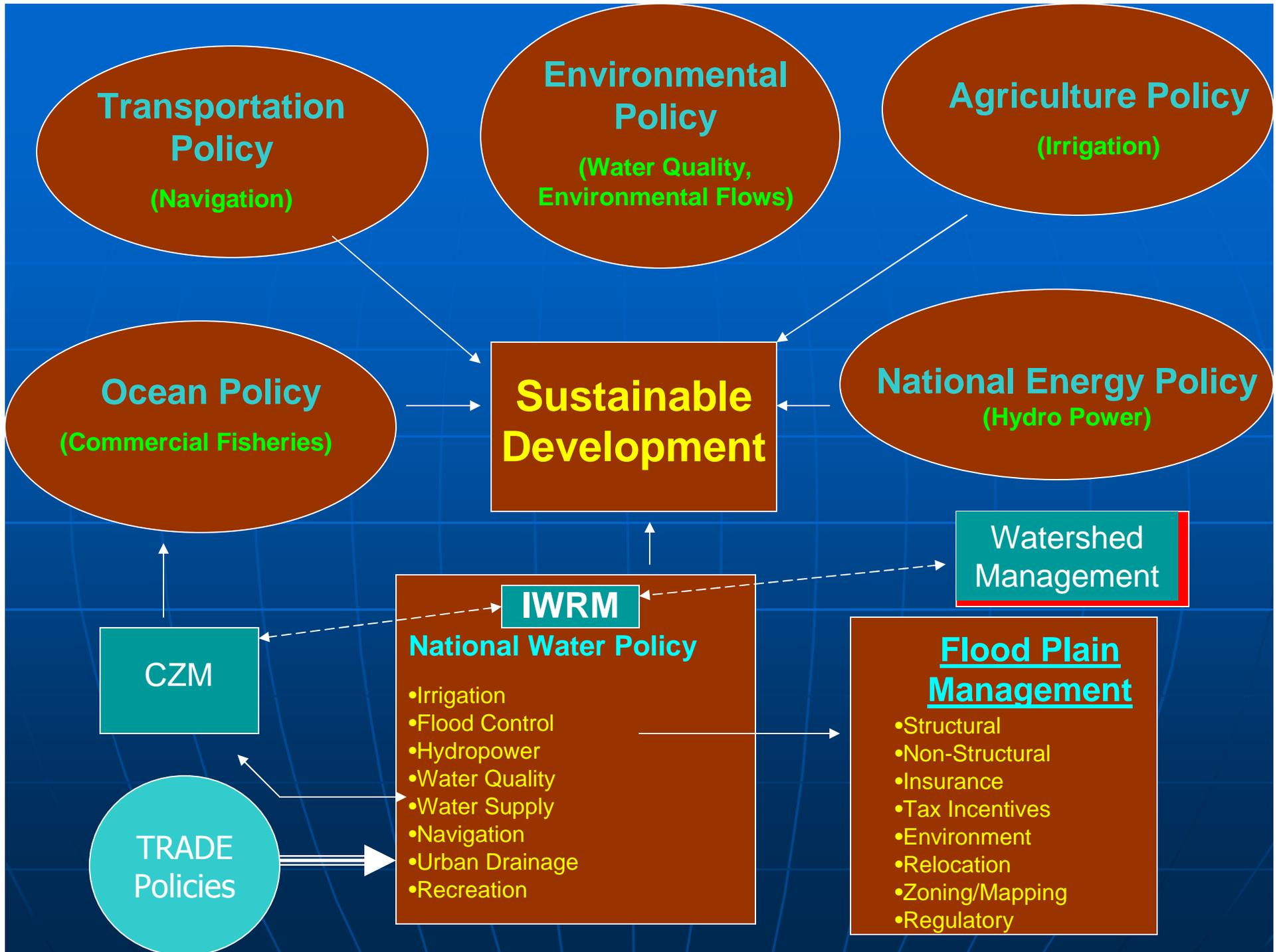
IHP-VII Core Themes & Cross-Cutting and Associated Programs



ICIWaRM Host Organization & Mission

- The overall mission of ICIWaRM is

*“The advancement of the science and practice of integrated water resources management (IWRM) to address water security and other water-related challenges by regional and global action, through **new knowledge, innovative technologies, collaborative interdisciplinary scientific research, networking, training and capacity development, within the framework of UNESCO’s International Hydrological Programme (IHP)**”.*



Integrated Water Resources Management

- ***Integrated***: coordinated, internally consistent, comprehensive, collaborative,
- ***Management***: implementation of policies, laws, regulations, **applied science and engineering 'best management practices'** in a coordinated, consistent manner.
- Equity, Efficiency, Environment, Engineering

Key Differences in IWRM Goals: Developing & Developed Nations

Developed

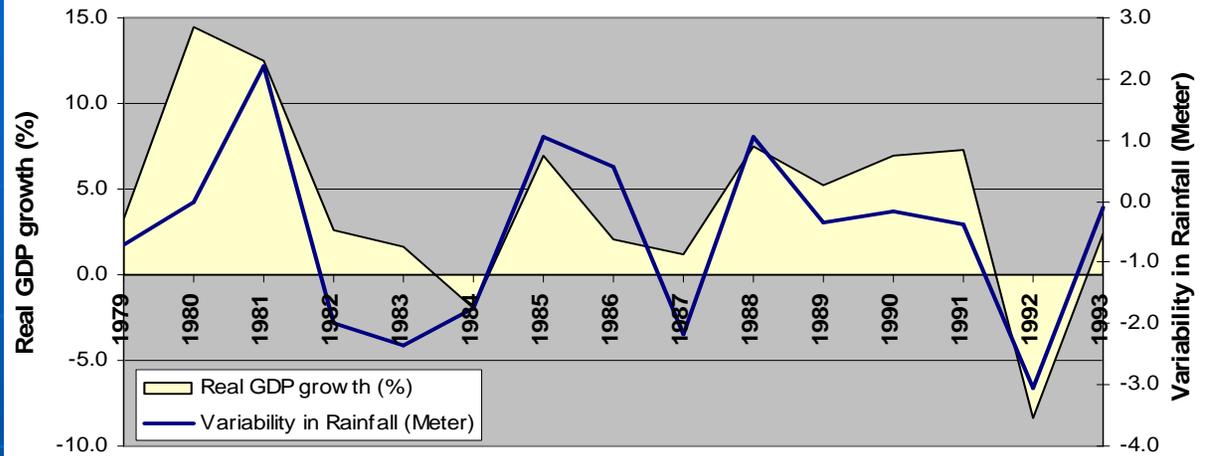
- Comprehensive planning
- Resource use efficiency
- Regulatory/Legal focus
- Flood control, navigation, multipurpose storage
- Private Sector Investment
- Ecorestoration/biodiversity
- Watershed Mgmt/Protection
- Hazard Risk reduction plans
- Recreation & Esthetics
- Transparency/Accountability
- Participatory planning
- Advanced technologies

Developing

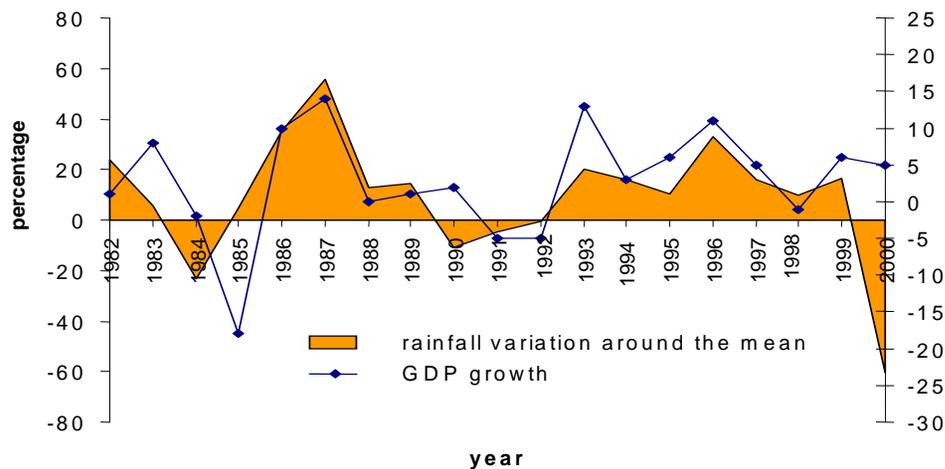
- Poverty reduction
- Access to clean water
- Women's roles promoted
- Irrigation/drainage
- Water Supply/Sanitation
- Public sector investment
- Waterborne diseases
- Rural Development
- Humanitarian disaster relief
- Water User associations for operation and maintenance
- "Appropriate" technologies



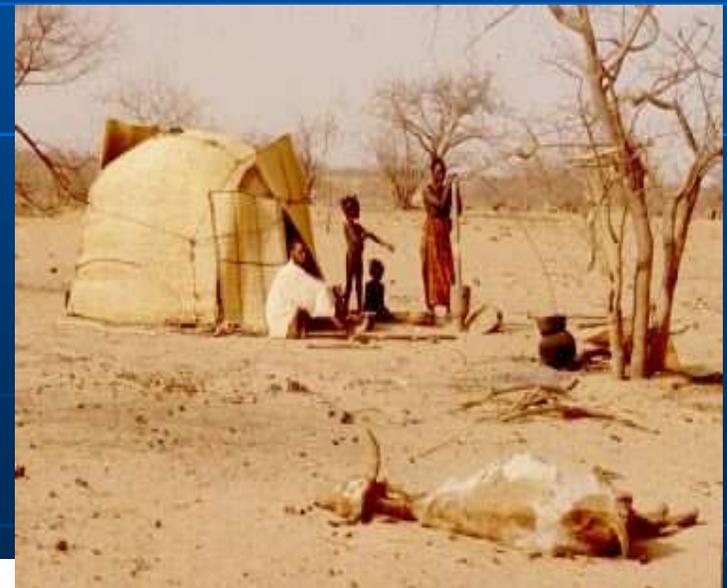
Economy-wide impacts



Rainfall & GDP growth: Zimbabwe 1978-1993



Rainfall & GDP growth: Ethiopia 1982-2000



ICIWaRM - Program Goals



Undertake **capacity-development** focusing on training for implementing IWRM at both watershed and national levels, particularly in Latin America, Africa & Asia, working closely in collaboration among UNESCO centers towards joint problem-solving.

IWRM Practice

BMP's

Contribute to the development & **advocacy of IWRM principles and best management practices**, focusing on institutional, engineering, planning and evaluation issues.

**ICIWaRM:
International
Center for Integrated
Water Resources
Management**

Capacity Development
Water Education

Foster research, tech development and **technology transfer** of models and methods that enhance IWRM .

Water Science

Technology Transfer

ICIWaRM Core Organizations and Partners



★ USA Institute for Water Resources (IWR)

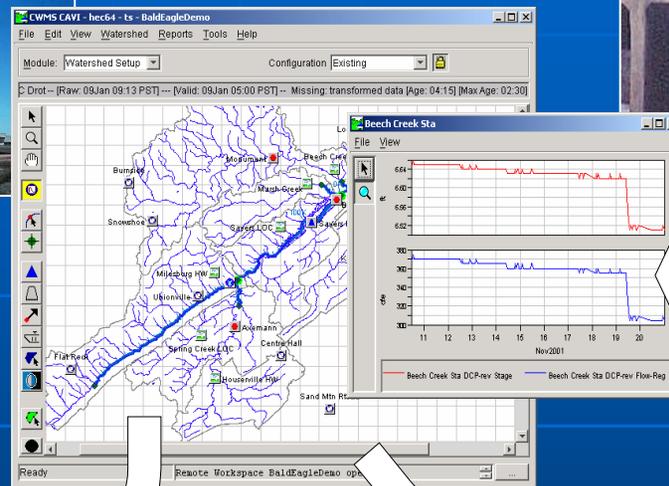
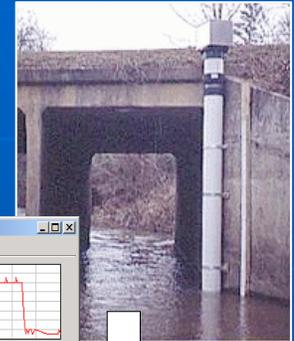
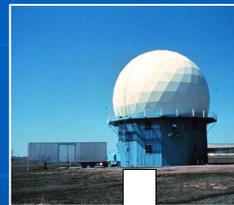
□ Water Science / Academic Sector

▲ Professional Practice / NGO Sector

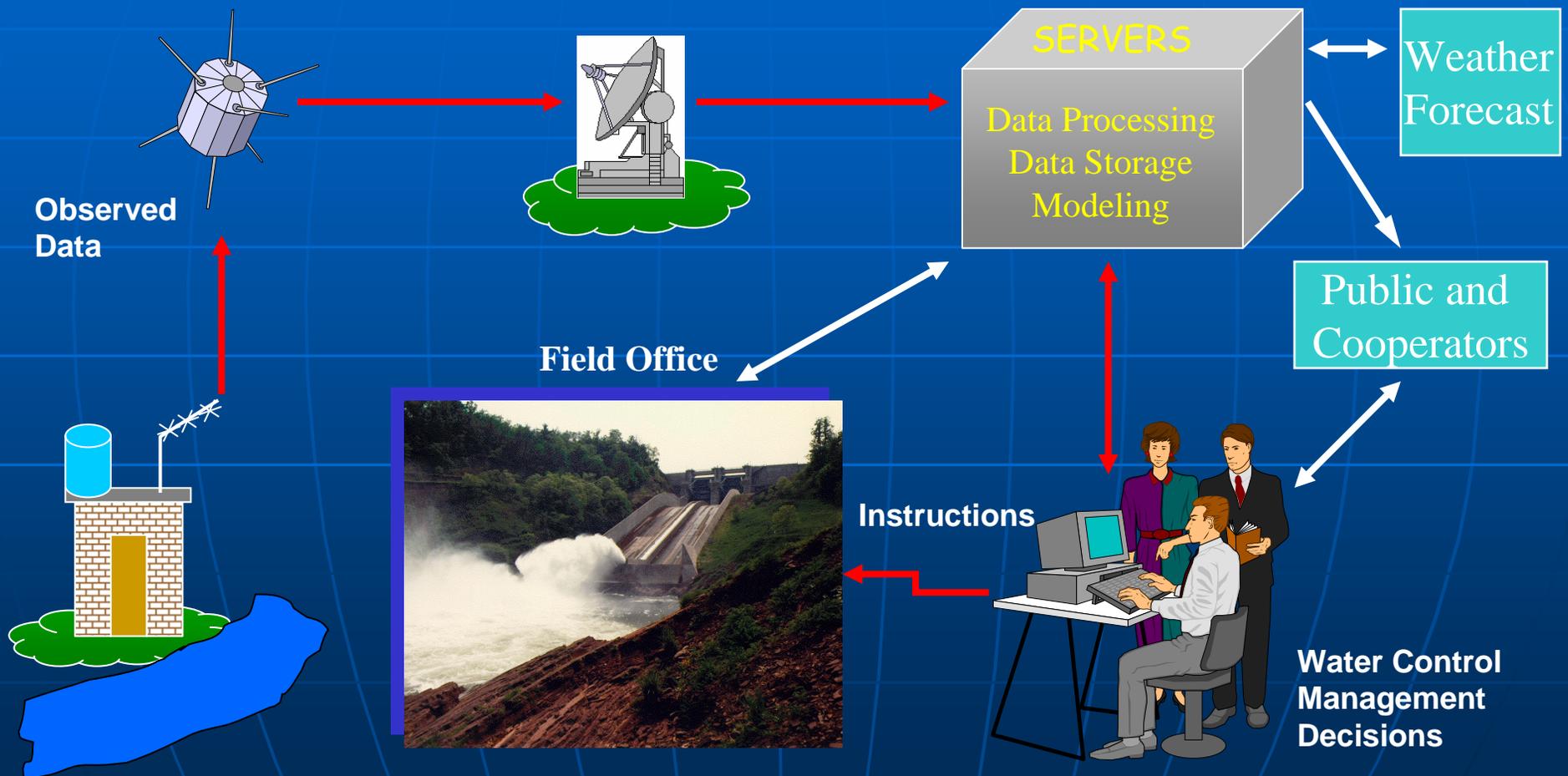
■ Participating Universities - IWRM Masters Degree Program

Corps Water Management System (CWMS) Modernization Plan

- Improved Real-Time Decision Support for Water Management
- 700+ Multipurpose Reservoirs and Flow Control Structures, Thousands of Miles of Levees
- Expanded Corporate Web-Based Information
- Standardized Corporate Hardware/Software Class IV AIS



CWMS Software Integrates the Processing from Data to Water Management Decisions



El Dorado Irrigation District (EID) 'Drought Dashboard'

Daily dashboard gathers information, calculates drought index, tells decision makers what stage of drought they're in, what the chances of drought in the next two months,

Gage is intuitive, like gas gauge, but sophisticated; it displays a normalized index of days supply

Drought curtailment rules were developed with decision makers and stakeholders, assessing likely frequency of curtailments, false positives and true negatives (drought happens, index doesn't trigger curtailment). PowerPoint documentation of rules are embedded in the Excel model. Anyone with Excel can use the model.

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5/23/2008 [Help](#)
SRI plan, EID is not
y remaining index (SRI)
plies, there is a minimal
the next two months.

only using 2010 demands.

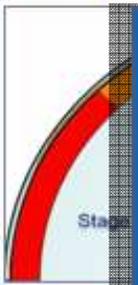
[More details](#)

supply remaining as a function of current storage, worst-case

Some information is entered by hand, some is fetched automatically by Excel from internet pages

Data
5 degrees Celcius for
DWR Sacramento Valley
ed on the May 1 50%

Today's Drought Status in EID



Drought Stage

SRI:

ENSO

-1.4

Warm (positive value) and cool (negative) the Oceanic Niño Index (ONI), based on

Current Water Year Type (1-5):

[click to link to DWR website](#)

4

exceedence forecast.

Enter Current Reservoir Storage (acre-feet): *(click on underlined Lake name to link to online data source and update data manually)*

Sly Park	36,569	Sly Park is 89% full.
Echo Lake	287	Echo Lakes are 15% full.
Lake Aloha	0	Lake Aloha is 0% full.
Silver Lake	3,340	Silver Lake is 39% full.
Caples Lake	11,238	Caples flashboards are not in place; Caples is 50% full.



ICIWaRM Points of Contact

- ICIWaRM Homepage <http://www.ICIWaRM.us>

- IWR's Homepage <http://www.iwr.usace.army.mil/>

- Key ICIwARM POC's:
 - Bob Pietrowsky, Director
 - Eugene Stakhiv, Technical Director
 - Jim Shuttleworth & Juan Valdez, Univ AZ, Lead, Water Science – Academia Node
 - Kyle Schilling, ASCE-EWRI, Lead, Professional Practice Node

Finis-Thanks

(Questions?)

