



# ***IAHS PUB***

**(Predictions in Ungauged Basins)**

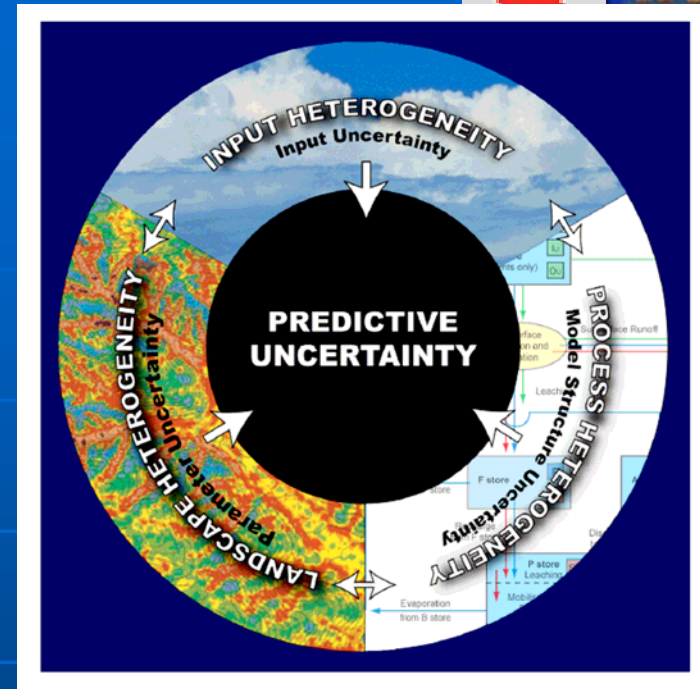
**S. B. Weerakoon**

**University of Peradeniya, Sri Lanka**

# Goal of PUB



Reduction of the predictive uncertainty in hydrological science and practice.



PUB aims to shift the prediction of stream flow, sediment and water quality variables from calibration-based to new, and largely understanding-based methods.

- Improve the existing hydrological models
- Develop new, innovative models and approaches to capture space-time variability of hydrological processes

# Broad Objectives of PUB

- Advance the ability of hydrological predictions, the knowledge and understanding of climatic and landscape controls on hydrologic processes
- Demonstrate the value of data for hydrologic predictions and provide a rational basis for future data acquisitions
- Provide a scientific basis for sustainable river basin management.
- Actively promote capacity building activities in the development of appropriate scientific knowledge and technology.

# PUB and PUB-Sponsored Activities

The PUB Scientific Steering Group (SSG) will

form links with national, regional and international groupings, international programmes, IAHS commissions for the advancement of PUB.

the PUB Working Groups around the world centred on basins, problems, hydroclimatic zone etc.

Main activities will be in three areas:

organization of meetings, workshops and congresses,

regular publication in journals, reports and books, of progress in PUB activities, and

technology transfer through various means (e.g. web-based communication)

# PUB Themes



- Basin inter-comparison and classification
- Conceptualization of process heterogeneity
- Uncertainty analyses and model diagnostics
- Develop and use of new data collection approaches
- New hydrological theory
- New model approaches
- PUB national and multi-national working groups

*Each PUB Theme is led by a troika . Troikas together with a PUB Chair and several additional members form the PUB Scientific Steering Group*

# Theme 7: PUB national and multi-national working groups

## Objective:

Form PUB national/regional/multi-national working groups and PUB technology transfer

## Troika:

Ian Littlewood, Centre for Ecology and Hydrology, UK

Yasuto Tachikawa, Kyoto University, Japan

Chris Spence, Hydrometeorology and Arctic Laboratory, Canada

# Capacity Building Through Global Partnerships

- Link up with existing networks of HELP, FRIEND and CEOP river basins established in developing countries and adopt them as PUB basins,
- Encourage PUB Working Groups to be formed in both developed and developing countries, to include scientists from both developing and developed countries as active partners, in order to encourage training opportunities
- Encourage and foster conferences, workshops and targeted short courses to be run in developing countries,
- Support and sponsor, where possible, the active participation of scientists from developing countries in all PUB activities, as well as in PUB-sponsored conferences and workshops.

# Technology Transfer

<p>2007</p>	<p>IUGG General Assembly</p> <p>1 regional workshop/short course</p> <p>Survey of Progress Towards PUB from the planning phase (2004-2006)</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>IAHS Symposia/Workshops on Worth of Data, Knowledge and Understanding on Uncertainty Reduction</p> <p><u>Technology Transfer on Predictive uncertainty</u></p> <p>Interim Report on PUB: HSJ Journal special issue/Redbook based on the planning phase (2004-2006)</p> <p>Expand the coverage of PUB</p>
<p>2008</p>	<p>Stakeholder Conference on PUB</p> <p>1 regional workshop/short course</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>Conference on Uncertainty and Value of Data (ICSU, NSF, ARC, NERC, EU)</p> <p><u>Technology Transfer on Predictive uncertainty</u></p> <p>Expand the coverage of PUB</p>
	<p>IAHS General Assembly</p>	<p>Workshops/Symposia on Hydrological Functioning of Basins in Different Hydroclimatic Regions</p>



# Technology Transfer

2009	<p>1 regional workshop/short course</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>Technology Transfer on Predictive uncertainty</p> <p>Expand the coverage of PUB</p>
2010	<p>Major International Conference on PUB in a Developing Country + Short Courses</p> <p>1 regional workshop/short course</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>Taking stock from the maturation phase (2007-2009)</p> <p>Midterm report on the maturation phase in the form of a HSJ special issue/redbook</p> <hr/> <p>Technology Transfer on Predictive uncertainty</p> <hr/> <p>Expand the coverage of PUB</p>
2011	<p>IUGG General Assembly</p> <p>1 regional workshop/short course</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>IAHS Workshops/Symposia on Predictions in Ungauged Basins</p> <hr/> <p>Technology Transfer on Predictive uncertainty</p> <hr/> <p>Expand the coverage of PUB</p>
2012	<p>Major International Conference on PUB in a Developing Country + Short Courses</p> <p>1 regional workshop/short course</p> <p>Ad hoc meetings/conferences: AGU, EGS etc.</p>	<p>Technology Transfer and Looking Ahead</p> <hr/> <p>Recommendations for implementation including discussions and impacts for the future</p> <p>Publication of a “final” report in the form of a book</p> <p>Expand the coverage of PUB</p>

# PUB Website



<http://www.pub.iwmi.org>


Predictions in Ungauged Basins - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites


Address <http://pub.iwmi.org/UI/Content/Default.aspx?PGID=0> Go Links

Google Search 0 blocked Check AutoLink AutoFill Options




## PUB: PREDICTIONS IN UNGAUGED BASINS

SECRETARIAT AT THE INTERNATIONAL WATER MANAGEMENT INSTITUTE



PUB Home | IAHS | IWMI | Joining PUB

ABOUT PUB	<p>Predictions in Ungauged Basins (PUB) is an IAHS initiative for the decade of 2003-2012, aimed at uncertainty reduction in hydrological practice. It is a bottom-up movement which engage hydrologists works-wide. This site is maintained by the PUB Secretariat located at the International Water Management Institute in Colombo, Sri Lanka.</p> 
THEMES	
WORKING GROUPS	
SECRETARIAT	
EVENTS	
DOCUMENTS	
LINKS	
NEWSLETTERS	
PUB LOGO	
CONTACTS	

### NEWS

- World Water Week - Capacity and Partnership Building, Reviewing Implementation in Stockholm, August, ... [Read More](#)
- Session on PUB in the Asia Oceania Geosciences Society Meeting in Singapore, July ... [Read More](#)
- China-PUB hosts Int. Symp. on Flood Forecast and Water Resources Assessment in Beijing, ... [Read More](#)
- Slope Inter-Comparison Experiment (SLICE) Working Group has released the Poster. ... [Read More](#)
- Session on Developing New Hydrological Models in Vermont, USA from July 9-12, 2006: ... [Read More](#)
- USA PUB Workshop will be held from October 16-19, 2006 at Oregon State ... [Read More](#)
- HydroSHEDS data from the global hydrological database of World Wildlife Fund are available ... [Read More](#)
- PUB Newsletter Issue 1.1 was released and dispatched to the PUB MailingList. ... [Read More](#)
- IAHS PUB Secretariat is in operation at the International Water Management Institute (IWMI), ... [Read More](#)

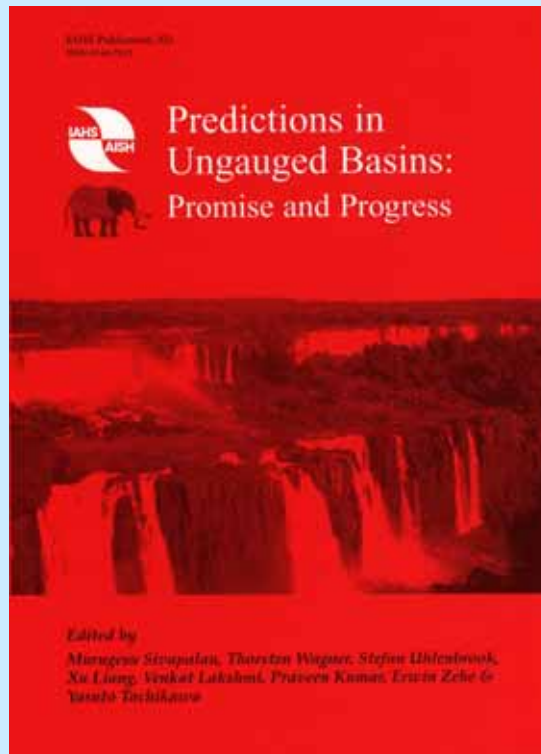
© 2006 Predictions in Ungauged Basins (PUB) Product by Genesis Software

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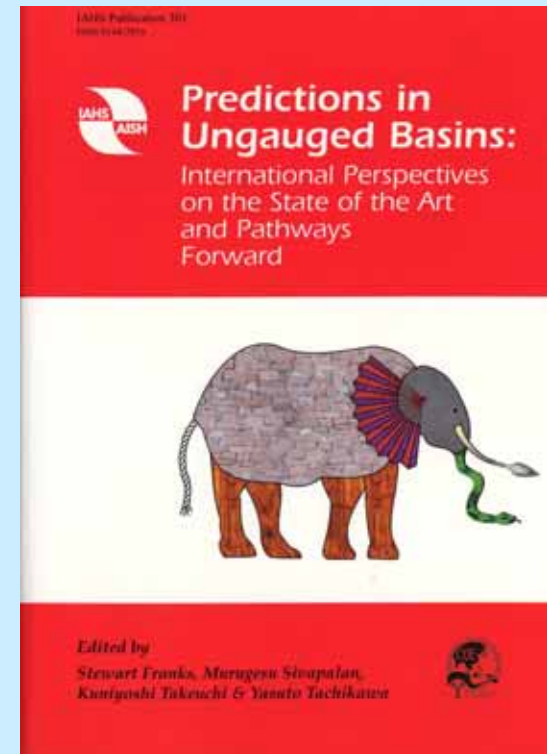
# Thank You

# Publications

**Predictions in Ungauged basins: promises and progress.**  
**IAHS Publ. 303 (May 2006).**  
**520 pp.**



**Predictions in Ungauged Basins: international perspectives on the state of the art and pathways forward.** IAHS Publ.301  
**(December 2005), 348 pp.**



# PUB Newsletters



## PREDICTIONS IN UNGAUGED BASINS

Issue 1.1  
March 2006

# Newsletter



## PREDICTIONS IN UNGAUGED BASINS

Issue 1.2  
June 2006

# Newsletter



PUB is an  
The PUB



## PREDICTIONS IN UNGAUGED BASINS

Issue 1.3  
September 2006

# Newsletter



PUB is an IAHS initiative aimed at uncertainty reduction in hydrological practice  
The PUB

IWMI

### IN THIS ISSUE

MESSAGE FROM

PUB OFFICE AT  
WATER MANA

PROMISE, BACK  
FUTURE PERS

NEWS FROM P

FORTHCOMING

PUBLICATIONS

MESSAGE FROM

### Welcome

On behalf of the  
welcome you to  
made great strides  
The PUB Science  
2003 issue of the  
veritable manifest  
sciences—one that  
reliance on calibrated  
understanding an

### IN THIS ISSUE:

FROM THE PUB SECRETARIAT

PUB IN THE CONTEXT OF

NEW PUB WORKING GROUPS

- IMPROVED PROCESSES FOR  
PARAMETERIZATION OF  
COLD REGIONS
- LOW STREAM FLOW  
DROUGHT

SHORT COMMUNICATIONS

- REGIONALIZING LOCAL  
NOVEL METHODOLOGIES  
ERROR-COVARIANCE

FORTHCOMING PUB-RELATED

PUBLICATIONS

### IN THIS ISSUE:

UK CONTRIBUTIONS TO

PUB SESSION AT THE 3rd  
INTERNATIONAL ENVIRONMENTAL  
MODELING AND SOFTWARE

PUB SESSION AT THE 3rd  
OF ASIA-OCEANIA SOCIETY  
GEOSCIENCES

PUB SESSION IN NEPAL

A NEW PUB-AFFILIATED

LAUNCH OF HYDROLOGICAL

PUBLICATIONS

FORTHCOMING PUB-RELATED

UK CONTRIBUTION  
DECADE



## PREDICTIONS IN UNGAUGED BASINS

Issue 1.4  
December 2006

# Newsletter



PUB is an IAHS initiative aimed at uncertainty reduction in hydrological practice  
The PUB Newsletter is published by the PUB Secretariat sponsored by IWMI

IWMI  
International  
Water Management  
Institute

### IN THIS ISSUE:

FROM THE PUB SECRETARIAT

PUB AND INTERNATIONAL CENTRE FOR  
WATER HAZARD AND RISK MANAGEMENT,  
JAPAN

INTERNATIONAL IAHS-PUB SYMPOSIUM ON  
FLOOD FORECASTING AND WATER

In 2007, we would like to make our dissemination products more dynamic, more interesting and less formal. Is it necessary? Is it possible? Is it worth our effort? If all the answers are 'yes', then how do we do it? We need your ideas, dear PUBers. We would certainly like to hear more about the on-going activities in each working group – at least once a year (better two!). 'News in brief' style could be an alternative to a longer essay, when time is short. We would encourage advertising vacant positions and funding calls through the available PUB media. However, most importantly,

# Working Groups



- are the main engines for PUB activities and achievements. PUB Themes serve as the organizational basis for WGs. **New WGs are welcome.**

## List of Working Groups:

**WG1 - Top-Down Modelling Working Group**

**WG2 - MOPEX Working Group**

**WG3 - Orographic Precipitation, Surface & Ground Water Interactions and their Impact on Water Resources**

**WG4 - Japan Working Groups (7 Nos.)**

**WG5 - Design Flows for Ungauged Basins**

**WG6 - China Working Groups (7 Nos.)**

**WG7 - Uncertainty Estimation for Hydrological Modelling**

# List of Working Groups Contd...



- WG8 - Remote Sensing and Data Assimilation (RSDA)
- WG9 - Mediterranean Working Group
- WG10 - Drought and Flood Risk: Hydrology and Sediment Transport in Mountain catchments
- WG11 - Andean Catchment Flow Estimation
- WG12 - Slope Inter-Comparison Experiment (SLICE)
- WG13 - The United Kingdom Working Group (UKWG)
- WG14 - The Waternet of Southern Africa
- WG15 - CNC- PUB : Canadian National Working Group
- WG 16 - IP3 in Cold Regions
- WG 17 - Low Stream Flows and Hydrologic Drought

*New WGs are welcome*

# PUB



- An IAHS initiative for decade 2003-2012

## Motivation:

need for better predictive tools in hydrology for sustainable WR management as natural hydrological and ecological regimes have been disrupted.

- Water supplies are no longer secure
- Risks of floods & droughts are increasing
- Destruction of riparian ecosystems continues

- **Reference:**

**“PUB Science and Implementation Plan”** by M. Sivapalan et al. and  
**PUB Presentation** by Sivapalan



# Present practices in hydrological predictions

Predictive tools are data-driven (most widely) from gauged data and applications are based on the premise that

- past is a reasonable guide to future
- data from one basin is a useful guide to the response at another basin (hydrologically similar basin).





# Difficulties with Predictions in Ungauged Basins

- spatial heterogeneity of climatic and landscape properties
- changes in climate - annual and decadal fluctuations in climatic inputs
- changes in land use
- decline of gauging networks

# Technology Transfer

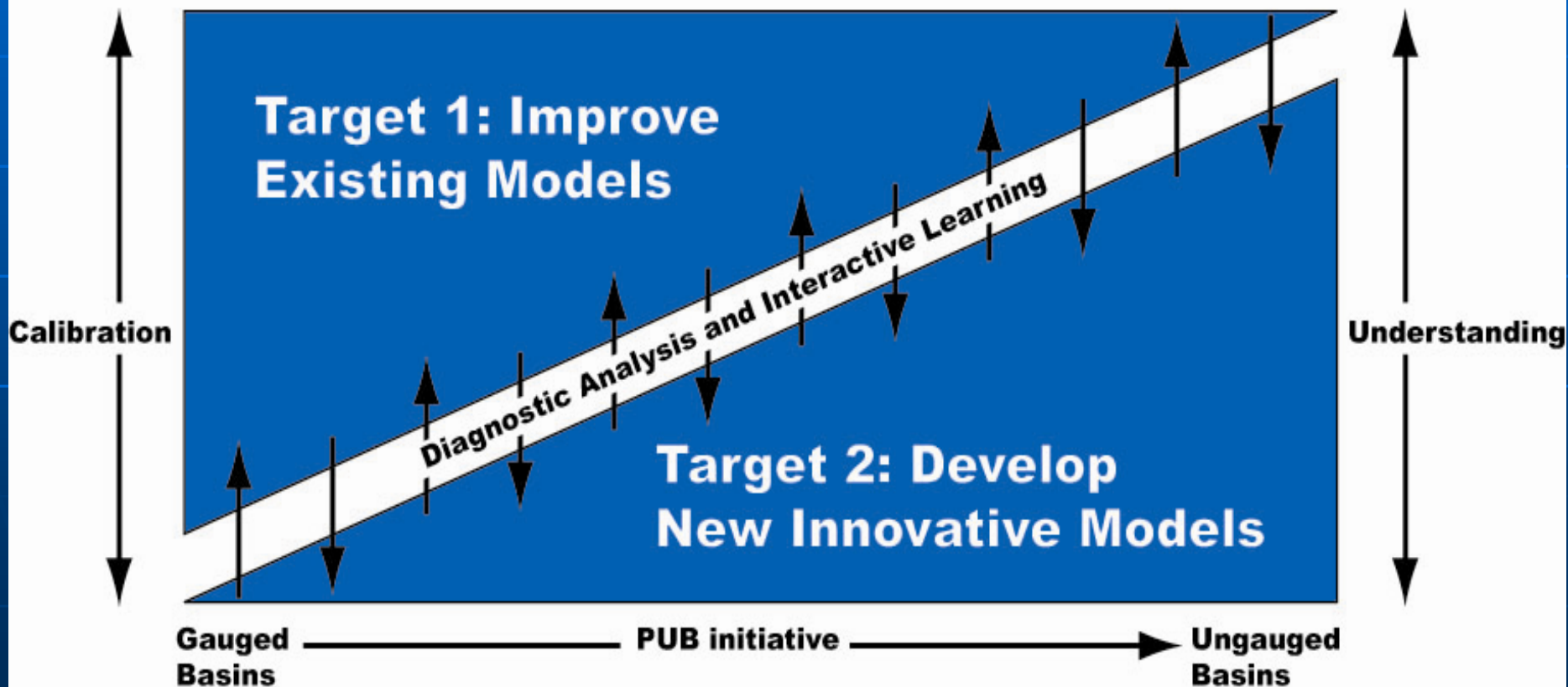


**PUB Website:** <http://www.pub.iwmi.org>

- News and Views
- List of Working Groups
  - links to the WG web sites
- Links to related activities
- Meetings - Past and Future
- Discussion page
- PUB Newsletters
- Ongoing Call for Proposals to set up PUB Working Groups (pro forma) and Projects

# Targets

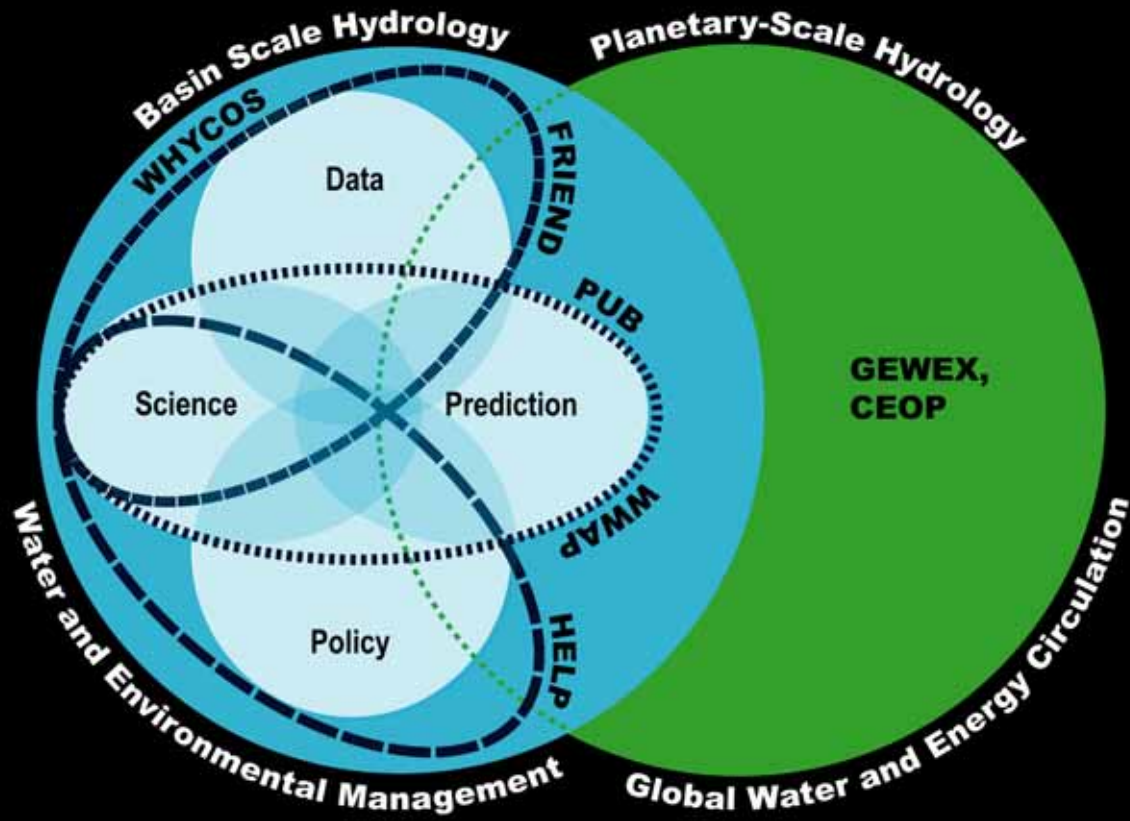
## Towards Paradigm Change - From Calibration to Understanding





# Place of PUB Amongst International Programmes on Water

## Place of PUB Amongst International Programmes on Water



**PUB is to provide the advanced predictive hydrological engines necessary to drive these related programmes**



# PUB Organization

**PUB SSG:**

**Jeff McDonnell, (PUB Chair), Oregon State University,  
USA + 23 other eminent researchers (Theme troikas+2)**

**<http://www.pub.iwmi.org>**

**PUB International Secretariat**

**International Water Management Institute (IWMI),  
127, Sunil Mawatha, Pelawatte, Battaramulla,  
Sri Lanka.**

***PUB Secretariat in 2006-7 is managed by  
Saman Weerakoon and  
Vladimir Smakhtin (Principal Hydrologist, IWMI)***

# Forthcoming PUB Events

- PUB Session at the Fourth AOGS Meeting (Asia Oceania Geosciences Society Meeting), July 30 - August 4, 2007 at Bangkok
- PUB Session at the MODSIM07 Conference, December 10-13 , 2007 in Christchurch, New Zealand
- PUB Session at the Canadian Water Resources Association AGM, June 25-28, 2007 in Saskatoon, Saskatchewan
- PUB Session at the Canadian Geophysical Union AGM, May 28 - June 1, 2007 in Newfoundland
- PUB Session at the European Geosciences Union General Assembly, 15 – 20 April, 2007 in Vienna, Austria
- + +

# Capacity Building Through Global Partnerships

One of the greatest benefits of PUB is the increased level of knowledge and capability that will be generated out of the sustained research that will be done globally on hydrologic predictions. PUB has the ambition to make these advances spread as uniformly as possible throughout the world.

PUB will actively encourage PUB Working Groups to be formed in both developed and developing countries, in all continents; Encourage all PUB Working Groups to include scientists from both developing and developed countries as active partners, in order to encourage training opportunities

Actively encourage and foster conferences, workshops and

# Water and Environmental Management at Basin Scale

- UNESCO International Hydrological Programme (IHP)
- Hydrology for the Environment, Life and Policy (IHP-HELP)
- Flow Regimes from Experimental and Network Data (IHP-FRIEND)
- WMO World Hydrological Observing System (WHYCOS)
- World Water Assessment Programme (WWAP)



# Water and Energy Circulation at the Planetary Scale

- Global Energy Water Experiment (GEWEX)
- Coordinated Enhanced Observing Period (CEOP)

# About PUB

- The IAHS Decade on Predictions in Ungauged Basins (PUB) is an initiative of the **International Association of Hydrological Sciences (IAHS)** aimed at formulating and implementing appropriate science programs to engage and energize the scientific community, in a coordinated manner, towards achieving major advances in the capacity to make reliable predictions in ungauged basins.
- Now two years into the effort, PUB participants have defined a set of community science questions in the hydrological sciences with broad consensus and community buy-in.
- Hydrologists worldwide have come to recognize the multi-disciplinary nature of their discipline and the need to establish efforts that will enable scientists from various sub-disciplines to integrate their work. This will surely lead to novel opportunities for scientific progress that would be unachievable with individual scientists working alone. In this context, the PUB initiative will undoubtedly lead to new predictive approaches based on a combination of current and new theories, and of existing and potentially new data sets, that are unimaginable at the present time. This international initiative to foster and enable multi-disciplinary approaches to hydrology must be matched by national initiatives with similar objectives in individual countries or regions.
- PUB is literally a grassroots-level movement, enabling open participation to everyone who is interested, and with a minimum of bureaucracy

# Future PUB

In particular, over the next 10 years PUB will lead to:

- Development of a framework for, and implementation of, routine estimation of predictive uncertainty in all future hydrological predictions.
- A new suite of models and methodologies that can be used with confidence for predictions in ungauged basins in different hydro-climatic zones.
- A network of scientists and groups around the world, especially in developing countries, with the necessary scientific expertise and experience to solve emerging hydrological problems.
- An array of measurement networks in selected basins around the world and associated databases of hydrological measurements to serve as a reference pool for new emerging questions.

# PUB Technical Sessions in Asia



*PUB Special Session, Nanjing*

*PUB Special Session, Singapore*



*PUB Special Session, Nepal*

*A PUB Symposium by China  
International Symposium on Flood Forecasting and Water Resources Assessment for IAHS-PUB  
PUB in September 2006  
September 28-30, 2006, Beijing, China*



*Also the National PUB Sessions are held*