

## 7th Asian G-WADI Meeting cum Workshop



at CSIR-**National Geophysical Research Institute**,  
Hyderabad, India

with the support of **National Institute of Hydrology** & IHP Indian National  
Committee (Ministry of Water Resources, RD-GR, Govt. of India), Roorkee, India

November 26-30, 2017, Hyderabad, India

# ACCELERATED MARCHING OF GWADI IN 2<sup>ND</sup> DECADE:

## Safeguarding Water Resources in Semi-arid regions through Integrated Management

G-WADI, a global network on Water And Development Information for arid lands ([www.gwadi.org](http://www.gwadi.org)) is a and flagship program of UNESCO. Under this program, a number of regional network have been established and Asian G-WADI (<http://asian-gwadi.westgis.ac.cn>) was formed during 2004 with its first secretariat in India at National Institute of Hydrology, Roorkee with initially 3 countries, India, Iran and China. As far as water is concerned, arid and semi-arid countries face the most challenges in managing this resource. Thus such network was created to learn from each other's experiences and adopt best practices through this network for a successful water management. Annexure 1 provides detailed objectives and Annexure 2 its further details on the member countries and pilot basins etc. At present 13 countries have joined the network of Asian GWADI.

Under this program, a few representative areas have been selected for detailed study so that findings could be shared, discussed, improved and implemented in the best possible way. A series of meetings are therefore, held in the member countries to discuss the progress in the study as well as advances in the field of water sciences. The 1<sup>st</sup> meeting of Asian G-WADI was held in Roorkee, India during 2004 and since then 5 subsequent meetings were held in China and Iran where annual or bi-annual progress have been discussed.

We have recently celebrated very well the progress of the network in more than a decade in Beijing, China organized by the CAREERI and CAS, Peoples Republic of China. Now we have to march faster and up-scale most of the knowledge gained in different environments. The Asian GWADI has also grown bigger and have the advantage of inclusion of the study areas from a variety of agro-climatic and geological regions. Thus next and 7<sup>th</sup> meeting is proposed in India with following objectives.

- a. GWADI has established very well with the working knowledge on the applications of Remote Sensing, Rainfall-runoff relations as well as surface water dynamics including Climate Change. However, the knowledge on the groundwater system has been lacking behind although, groundwater works very well as a risk saver if we adopt integrated water resources management. At the same time a large number of uncertainties are associated with groundwater due to inherent variability.
- b. We have overcome this uncertainty to a greater extent by obtaining a 3D continuous picture of the subsurface in the form of Aquifer Mapping using airborne geophysical investigations.
- c. However, rainfall that is source of water has been greatly affected by the Climate Variability and has further added the uncertainties. The impact on groundwater is very well established and observed. Groundwater is most affected due to Climate Change in the form of erratic rainfall, increase in temperature, sea level rise etc.

Now under the changing climate scenarios and with an enhanced knowledge of sub-surface, the estimates of all components of groundwater cycle need to be revisited and bring out an

improved or modified methodologies for the same. This is urgently required as this will greatly affect the planning as well as sustainable management.

This is why a workshop is proposed in the form of next Asian GWADI meeting at the CSIR-National Geophysical Research Institute, Hyderabad, India to learn from the working experience in different agro-climatological regions and bring out a revised document embedded with improved and stochastic estimates under Climate Changed scenarios.

UN-SDG may be successful only if we reduce the uncertainty of the estimates of the groundwater fluxes that have been changed considerably due to Climate variability.

The expected Number of participants is 45 (with 19 from abroad from the member countries, experts and UNESCO officials).

The outcome of this meeting will bring out a document that includes the guidelines to improve and test the methodologies to estimate various fluxes of the groundwater system for an Integrated Water Resources Management and test them in well-studied watersheds to bring out the finalized recommendations by a working group.

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The program of the workshop cum Asian GWADI meeting is proposed as follows.

	Time	Activities	Remarks	Responsibility
<b>Sunday Nov. 26, 2017</b>		Arrival of the participants	All outstation participants will be accommodated in the CSIR-NGRI Guesthouse, Uppal Road, Hyderabad-500007, India Ph: +91 40 27022580	
<b>Monday, November 27, 2017</b>	10.00	Inaugural Function Guests: Director, UNESCO New Delhi, Office Director, National Water Mission, New Delhi Dr. Anil Mishra, UNSCO, Paris		
	11.15	Remarks from the representative of the Global GWADI/ UNESCO		Dr. Anil Mishra UNESCO, Paris
	11.45	Report from the Secretariat, Asian GWADI		Prof. Xin Li CAREERI, China
	12.00	Special Talk: How GRACE & GARCE FOLLOW ON Missions are useful in Arid and Semi-Arid Regions!		Dr. VM Tiwari Director, CSIR-NGRI
	13.00	Lunch		
	14.00	Country Reports (Each 15 Minutes)		Country representatives
	16.00	Tea Break		
	16.30	Special Findings from the Asian GWADI pilot basins (20 Minutes each)		China India Iran
	17.30	Close of the day		
	20.30	Dinner		
<b>Tuesday, November 28, 2017</b>	10.00	Aquifer Mapping: Application of Advanced Geophysics with HR 3D geophysical investigations		Dr. S. Ahmed
	10.45	Special Talk: How Groundwater Fluxes are influenced by the Climate and Global Changes		Dr. A. Selles
	11.30	Special Talk: Translation of Geophysical parameters to Hydrogeological ones		Dr. S. Chandra
	12.00	Visit to the IFCGR		Dr. Sonkamble
	13.00	Lunch		
	14.00	Panel Discussion for Adopting and improving the techniques to estimates groundwater fluxes with certainties under uncertainties		Moderated by: Dr. SK Jain Director, NIH
	17.00	Presentation of the Experimental Hydrological Park for the field visit		Dr. S. Sonkamble
	17.30	Close of the day		
19.30	Dinner			
<b>Wednesday, November 29, 2017: Field visit to Experimental Hydrological Park, Chhotuppal</b>				
<b>Thursday, November 30, 2017</b>	10.00	Concluding Session with presentations based on the Round Table Discussions and Field Visit to prepare a hand book under ASIAN GWADI		Moderated by Dr. S. Ahmed, CSIR-NGRI
	11.00	Asian GWADI Secretariat meeting		Co-Chaired by Dr. R. Jayakumar & Dr. N. Sadeghi, UNESCO
	12.30	Lunch & Close of the Meeting		
		Departure of the Participants		



## Asian G-WADI

### Goals & Objectives

#### The Need for G-WADI

Globally, arid and semi-arid areas face the greatest pressures to deliver and manage freshwater resources. It has been estimated that some 80 countries, constituting 40% of the world's population, were suffering from serious water shortages by the mid-1990s and that in less than 25 years two-thirds of the world's people will be living in water-stressed countries, most of these in North Africa, the Middle East, and West Asia.



Challenges facing water managers in these areas include population growth, agricultural expansion, salinity increases, and agricultural/urban pollution. Goals include resource availability, equity in water management, and strategies to support peace and security.



Accurately assessing the water balance in semi-arid areas generally is more difficult than in water-rich countries. Rainfall is less predictable and of highly variable intensity and extent. Floods are difficult to quantify and estimation of recharge to aquifers is particularly difficult. Few surface water diversions are accurately gauged, and few wells are metered. Moreover, much of the water being withdrawn from deep aquifers is non-renewable and is being extracted beyond safe-yield levels.



#### G-WADI Objectives

G-WADI's strategic objective is to strengthen the global capacity to manage water resources in arid and semi-arid areas. Its primary aim is to build an effective global community through integration of selected existing materials from networks, centers, organizations, and individuals who become members of G-WADI. The network promotes international and regional cooperation in arid and semi-arid areas.

Specific objectives include:

- improved understanding of the special characteristics of hydrological systems
- capacity building of individuals and institutions in water management
- dissemination of understanding of water in arid zones to the scientific community and general public
- sharing data and exchanging experience to support research and sound water management
- raising awareness of advanced technologies for data provision, data assimilation, and system analysis
- promoting integrated basin management and the use of appropriate decision-support tools.

## Asian G-WADI

Asian G-WADI was established in March 2005 based on consensus and collective understanding of representatives from Afghanistan, China, India, Iran, Kyrgyzstan, Mongolia, Pakistan, Tajikistan and Uzbekistan to confront the urgent need for increased regional cooperation for sustainable development of arid and semi-arid zones. Major actions conceived:

**Data:** Asian G-WADI would house data and develop guidelines for data collection, using it in the region of Asia (Central, East, and South Asia). It will also identify representative basins for evaluation of data/methods and be responsible for dissemination of water related information.

**Modelling:** Asian G-WADI would develop facilities, such as Asian G-WADI website, linking all the associated groups. This will enable all G-WADI community members to receive feedback as well as provide a bibliography for arid and semi arid area. Asian G-WADI would also keep an inventory of models used in arid and semi arid regions of Asia, identify global data sources for modelling (spatial-temporal series), and facilitate training workshops.

**Research Needs:** Asian G-WADI had identified specific research needs for arid and semi-arid regions of Asia that would be highlighted as areas of special emphasis and would provide assistance to conduct studies and research in concepts such as:

- Spatial-Temporal Rainfall analysis
- Evaporation and Evapotranspiration estimation
- Rainwater harvesting and artificial recharge
- Canal transmission loss
- Ecohydrology
- Groundwater Management

**Capacity Building:** Asian G-WADI working through an integrated approach, involving governing bodies, active NGOs, educators, and scientist would be active in capacity building and networking.

### Asian G-WADI Pilot Research Basins:

G-WADI's primary aim of building an effective global community through international cooperation, also applies to Asian G-WADI, with specific emphasis on Asian water issues. Promoting international and regional



cooperation in arid and semi-arid areas, the network also facilitates the creation of conditions for integrated basin management.

Focusing on this aim, the Asian G-WADI has formulated guidelines for proposing one or more basins as G-WADI pilot basins in a country, which can contribute to the knowledge base for the region. The present framework will also provide an effective tool to monitor and follow-up activities. An evaluation, a standard peer review process by the Asian G-WADI Steering

Committee members, of proposed G-WADI pilot basins would then be followed. The objective of a peer-review process is to encourage those committed to the cause of G-WADI program in their country and willing to share information, knowledge, and experience globally.

The outcomes of the Asian G-WADI pilot basin case studies would be included in the UN World Water Development Report.

## Asian G-WADI

### Members countries & Pilot basins

Regional initiative started between UNESCO Tehran, New Delhi and National Institute of Hydrology (NIH), India. Global meeting for Arid zone modeling was held during March 2005, where the regional network was formally launched. Currently, 13 countries are involved in this process coordinated by CAREERI.

#### Member countries

Asian G-WADI includes the following members:

- Afghanistan
- China
- India
- Iran
- Kazakhstan
- Kyrgyzstan
- Mongolia
- Pakistan
- Thailand
- Tajikistan
- Turkmenistan
- Uzbekistan
- Vietnam



Member country flags

#### Pilot basins

[Guidelines for preparing proposals for Asian G-WADI pilot basin\(s\).](#)

- Heihe River Basin (HRB), China, P.R. ([Proposal](#))
- Jaisamand Lake Catchment (Gomti River Basin), India
- Granite watershed in Krishna-Godavari basin, India
- Kashafrud Basin/Mashhad, Iran
- Taleghan-Hashtgerd Basin, Iran
- Chu river basin, Kyrgyz Republic
- Vakhsh River Basin (VRB), Tajikistan