

## U.S. Army Corps of Engineers Institute for Water Resources

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### iRAIN: New Mobile App Supports Water Management Around the World

MARRAKECH, MOROCCO. The public roll-out of the new mobile App iRAIN took place during the United Nations 22<sup>nd</sup> Conference of the Parties (COP22's) Water Day earlier this month in Marrakech, Morocco.

Robert Pietrowsky, Director of the U.S. Army Corps of Engineer's Institute for Water Resources (IWR) and International Center for Integrated Water Resources Management (ICIWaRM), represented the U.S. government in its collaboration on the App with the University California at Irvine's Center for Hydrometeorology and Remote Sensing (CHRS) and UNESCO's International Hydrological Programme (IHP).

iRAIN is a revolutionary App developed by Dr. Phu Nguyen at CHRS that provides for the first time, mobile access to near real-time rainfall estimates to everyone, at any time, and anywhere in the world. It represents an invitation for people everywhere to observe the impacts of the climate on the water cycle while facilitating their involvement in collecting local data for global precipitation monitoring.



*Dr. Phu Nguyen (l), Assistant Adjunct Professor, University California at Irvine, CHRS, and IWR & ICIWaRM Director, Bob Pietrowsky (r) at COP22, Marrakech, Morocco*



It allows users to visualize real-time global satellite precipitation observations, track extreme precipitation events worldwide, and report local rainfall information using crowd-sourcing functionality of the App to supplement the data. A useful feature of iRain is that real-time rainfall observation data can be easily shared through social networks such as Facebook and Twitter. Currently, iRain is [available for iOS](#). A version for Android devices is under development.

Furthermore, the crowd-sourced data will feed into existing tools that use remote sensing technologies and artificial intelligence to estimate rainfall globally from satellite imagery in near real-time (the [G-WADI PERSIANN-CCS GeoServer](#)). Within the framework of The Global Network on Water Resources Management in Arid and Semi-Arid Zones (G-WADI), IHP collaborated with the Center for Hydrometeorology and Remote Sensing (CHRS) of the University of California, Irvine, on the development of tools to provide access to global satellite estimates of precipitation at high spatial and temporal resolutions.

These tools are used to inform emergency planning and management of hydrological risks, such as floods, droughts, and extreme weather events. For example, the Namibia Drought Hydrological Services (NHS) prepares a daily bulletin with up-to-date information on flood and drought conditions for local communities using the PERSIANN-CSS tools.

In fact, the building blocks of iRain rest on satellite precipitation estimates generated by the PERSIANN algorithm, which has been under development for over two decades. The real-time global high-resolution (~4 km) satellite precipitation products from PERSIANN-CCS will be accessible using the App.

New technologies are key driver of the recent success of citizen science activities, and applications such as this one engage non-scientists in the collection of local data, that can later be used by national and local authorities to prepare adaptation measures and better manage their water resources under climate change. This effort is an important component of UNESCO-IHP's strategy to promote collaboration among scientists, stakeholders and governments in order to prepare adaptation measures based on evidence-informed decision-making. Collaboration among all stakeholders is crucial to addressing global challenges and achieving common goals with a stronger focus on scientific and social values.



In the end, the roll-out of the iRain Mobile App during the COP22's Water Days was very informative and served as the first step in paving the way towards further public education and involvement. Dr. Anil Mishra served as the moderator for the release, which included remarks by Dr. Blanca Jimenez-Cisneros, UNESCO's Director of the Division of Water Sciences and head of the IHP Secretariat, and IWR - ICIWARM Director Bob Pietrowsky. There was also a tutorial and hands-on demonstration by CHRS's Dr. Phu Nguyen. The one-page tutorial to facilitate use of the App is available via this [link](#).

#### **Learn More**

For more information, visit [IWR](#)

iRain [Tutorial](#) (pdf)

[PERSIANN-CCS](#)

ICIWaRM [Homepage](#)

[UNESCO-IHP](#)

UNESCO [Pavilion during COP22](#)

#### **More on the iRain Mobile App:**

iRAIN was developed by Dr. Phu Nguyen, Assistant Adjunct Professor at the University California at Irvine's Center for Hydrometeorology and Remote Sensing (CHRS), under the guidance of the CHRS Director, Dr. Soroosh Sorooshian, PhD, NAE, and with financial support from a broad range of partners (see below), including USACE IWR-ICIWaRM.

USACE-IWR-ICIWaRM's support of iRAIN was led by Dr. Will Logan, ICIWaRM Deputy Director, and Dr. Anil Mishra, IHP Senior Water Manager, and was conducted under UNESCO IHP's **Global Network on Water and Development Information for Arid Lands (G-WADI)** program, for which ICIWaRM acts as the Secretariat on behalf of IHP. G-WADI's purpose is to strengthen the global capacity to manage the water resources of arid and semi-arid areas around the globe through a network of international and regional cooperation. The

network promotes regional and international cooperation in arid and semi-arid areas, and aims to build an effective global community through the integration of selected material from networks, centers, organizations, and individuals. G-WADI's objectives include:

- Improved understanding of the special characteristics of hydrological systems and water management needs in arid areas
- Capacity building of individuals and institutions
- Broad dissemination of information on water in arid zones to the user community and public
- Exchange of experience
- Promoting integrated basin management and the development and use of appropriate decision support tools

G-WADI Homepage <https://iciwarm.sites.usa.gov/g-wadi-secretariat/>

### **iRAIN Mobile App – Acknowledgements:**

*CHRS Director: Dr. Soroosh Sorooshian, Ph.D. NAE  
USACE IWR – ICIWaRM's G-WADI Secretariat led  
by Dr. Will Logan*

*UNESCO IHP G-WADI Programme led by Dr. Anil  
Mishra*

iRain is the product developed by **Dr. Phu Nguyen, Assistant Adjunct Professor**, UCI's CHRS and his **team**, which includes a dedicated group of mostly undergraduate students including David Furman, Phat Huynh, Thanh N. Palacios, Hoang Tran, and April Huie.

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*ICIWaRM of the US Army Corps of Engineers Institute for Water Resources provided a major part of support for Mr. Dan Braithwaite, CHRS Programmer Analyst;*

*U.S. Army Research Office supported refinements of the PERSIANN algorithm;*

*Cooperation with UNESCO G-WADI has been critical to the dissemination of data worldwide;*

*NOAA funding thru the Climate Data Record (CDR) Program resulted in the PERSIANN-CDR dataset.*

### **The following CHRS members (former & current) are greatly appreciated:**

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*The U.S. Army Corps of Engineers (USACE) [Institute for Water Resources \(IWR\)](https://www.usace.army.mil/) was formed to provide forward-looking analysis and research in developing planning methodologies to aid the Civil Works program. IWR is a field operating activity under the supervision of the Director for Civil Works, USACE.*