

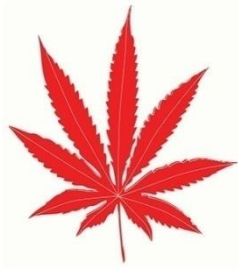


Conference Abstract

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### Conference Abstract

#### Irrigation Advisory Services for Farmers of Pakistan Science in Service of Mankind

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Seasoned Water Manager. Mr. Bhatti is enrolled in the Ph.D. program for Environmental Sciences. Published several papers in various scientific journals.

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#### Speakers Profile

Ahmad Zeeshan Bhatti is a seasoned Water Manager with more than 13 years of experience in fast-paced research for development world. He possesses water project design and implementation skills and has track record of achieving exceptional results in irrigation water management and research dissemination. Mr. Bhatti is enrolled in the Ph.D. program for Environmental Sciences from the University of Prince Edward Island; he holds a M.Phil. in Water Resource Management from the University of Engineering & Technology, Lahore, Pakistan; and a B.Sc. in Agricultural Engineering from the University of Agriculture, Faisalabad, Pakistan. He has published several papers in various scientific journals.

#### Abstract

The Holy Qur'an highly stresses upon the need to serve humanity in all possible ways. Describing the characteristic and superiority of a Muslim, the Holy Qur'an says:

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“You are the best people ever raised for the good of mankind because you have been raised to serve others; you enjoin what is good and forbid evil and believe in Allah” (3:111) Similarly, the Holy Prophet Muhammad (PBUH) repeatedly stressed upon doing good to the humanity irrespective of the race, religion and color. He promoted kindness, gratitude and doing good to develop a harmonious and peaceful society. As per the golden footprints of his master the Promised Messiah (PBUH) has had a great compassion for mankind. He said,  
“Sympathy for all mankind is a moral obligation and a duty; a religion is no religion which does not inculcate sympathy, nor does that man deserve to be called a man who does not have sympathy in him (message of peace).”The obligation of scientists and engineers greatly increases in this fast commercializing world, where research is mostly done for the sake of research, earning IF instead of making an impact on the society and mankind. There are always means and ways by which scientific research can actually benefit mankind. Irrigation Advisory Services (IAS) launched by Pakistan Council of Research in Water Resources (PCRWR) is a similar endeavor, which is now improving livelihood of a common farmer in Pakistan. More than 90% of the agriculture value added of Pakistan comes from irrigated agriculture. However, farmers are facing acute water shortage during the last couple of decades. The present irrigation water deficit of about 15% is expected to increase to 30% by 2025. A major portion of irrigation water losses (40%) takes place in fields because of over-irrigation due to an outdated mindset of farmers that more water would produce more yields. This takes toll in terms of groundwater mining as farmers over-irrigate in pursuit of increasing production. Irrigation scheduling is the art of applying right quantities of water at the right time. However, knowledge of crop water requirement (CWR) is necessary. A simplified approach to estimating crop water requirements (ETc) is linking it with reference evapotranspiration (ETo) by a crop coefficient (Kc). PCRWR has determined Kc of all the major crops through lysimetric studies, which is the most reliable method. On the other hand, remote sensing techniques have made it possible to estimate real time ETo of the recent past. Numerical weather prediction (NWP) based weather forecasting can also forecast ETo and rainfall for the short-term future. These two techniques were recently developed for PCRWR, in collaboration with University of Washington, Seattle, USA to estimate weekly crop water requirements of different crops. PCRWR launched the Irrigation Advisory Services for farmers of different agro-climatic zones through cell phones. Initial SMS operations started with 700 farmers in 2016. Given the success, the service was expanded to 10,000 farmers in 2017 and to 20,000 in 2018. The message contained how much water has been (or will be) used by its crop (inches) during the last (next) week, excluding effective rainfall in order to replenish the same through irrigation like, “Dear farmer friend, this is to inform you that between 21 and 28 July in your area (Bahawalnagar), the crops used this much water (cotton 1.6 inch, sugarcane 1.7 inch). Next week, 0.5 inch rain is predicted in some parts of your region. Therefore please irrigate your crops accordingly. For further assistance please call 03459213698. Thanks”. An impact assessment survey was conducted to determine the efficacy of the system. It was found, that more than 80% of farmers were receiving messages on weekly basis and half of them were making use of it in terms of optimizing their irrigation schedules to minimize waste, maximize efficiency and crop production. In 90% cases the PCRWR rainfall forecast proved right and farmers did skip irrigation particularly in the groundwater irrigated areas, where irrigation costs too high.

Water saving estimation ranged from 15 to 20%, a couple of individualistic success stories are: Muhammad Ashraf, Hayatabad, Sargodha, recorded his feedback on 11 May 2017 as, "I had grown wheat on my 12 acres land this season and continuously received irrigation advisory messages from PCRWR, so keeping in view the advised water consumption and rainfall forecast, I only applied 3 irrigations, whereas my neighboring farmers applied 6 to 7 irrigations. I have recently harvested my crop and got 48 maunds/acre [4,742 kg/ha] yields, whereas my neighbors could get 42 maunds/acre [4,149 kg/ha]. I am thankful to PCRWR for their advice, which not only let me get better yields but the irrigation cost was substantially reduced." Haji Nazeer Ahmad Qazi, Makhdoom, District Sargodha recorded feedback on 28th March, 2017 as, "I had grown wheat on 10 acres. I received a PCRWR message that 0.5 inch rainfall is expected in the upcoming week. Keeping in view of the expected rainfall and last week water consumption I skipped my last irrigation for wheat and used the same for leguminous crop. The rainfall forecast proved right, which not only saved me irrigation but protected wheat from lodging as his nearby farmers suffered". Articles on the success stories of the initiative have been published in EoS magazine of the American Geophysical Union, Voice of America Magazines on 21st and 26th June, 2017, respectively (<https://eos.org/project-updates/growing-more-with-less-using-cell-phones-and-satellite-data>, <https://www.voanews.com/a/pakistan-farmers-get-tips-via-text/3917603.html>) and later by NASA. The PCRWR's IAS is an embodiment of the fact that science can and meant for benefiting a common man as per the teachings of the Holy Qur'an.



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