2019 THIRD QUARTER

ICID news

A WATER SECURE WORLD FREE OF POVERTY AND HUNGER

MESSAGE FROM
THE PRESIDENT

Dear Colleagues,

ICID's World Irrigation Forum 3 (WIF3) at Bali, Indonesia was a huge success! With a flawless technical organization and excellent logistical arrangements for more than 1500 delegates from more than 60 countries, WIF3 surpassed all previous records of ICID events. We are thankful to the NC of Indonesia and ICID Central Office together with all the NCs, Chairs, Co-Chairs, Direct Members of ICID that worked really hard to successfully conclude the WIF3 and its side events by our international partners. We are delighted after receiving numerous positive feedback from the delegates, partners and presenters at WIF3. As many as 6 Ministers accompanied by their respective senior ministry officers from various countries took part in the High Level Advisory Group deliberations and issued a joint statement highlighting the issues and solutions for the water sector globally. The 70th IEC meetings also saw an active participation of our members, partners and diverse stakeholders. I was also honoured to present the World Irrigation and Drainage prize to Prof. Dr. Chandra A Madramootoo from Canada who has worked tirelessly in our sector to solve most pressing problems the irrigation faces globally. I would also like to take this opportunity to congratulate all the winners of the WatSave and Best paper awards together with the World Heritage Irrigation Structures from 7 countries that were recognized during the event. Keynote presentations and technical sessions were rich sources of knowledge sharing and so were ministerial deliberations; the farmers' round-table meeting; young professionals' training sessions; technical tours, exhibitions and cultural performances by local artists. I must say that WIF3 has raised the bar for all our future events.

I am sure the WIF3 delegates and participants must have taken very fond memories of the one-week long Bali events with them and will cherish them for long as I do. We must recognize the hard work of several months by our INACID colleagues in close collaboration with the Central Office to prepare this grand event. Thanks are also due to NCs that participated enthusiastically with large delegations.

Colleagues, it is my pleasure sharing with you another huge event where ICID has recently been actively involved is the 6th India Water Week (IWW 2019) the last week of September in Delhi, India, the land of numbers. Similar to previous IWWs, this year too IWW attracted a large number of foreign as well as Indian delegates. It was organized by the Ministry of Water, Government of India and the Honourable President of India graced the opening ceremony in the presence of several ministers, foreign ambassadors, experts and delegates. Our Secretary General, Er. Ashwin Pandya, made a presentation on water cooperation in the inaugural plenary session and chaired the Strategy Development session of Global Water Partnership. Additionally, ICID also organized several panel discussions, special sessions and was well represented in all the relevant deliberations. The themes covered by ICID professionals included innovations to improve water productivity, water and heritage, learning from international best practices in water management. ICID also invited 40 high-school students for the Water and Heritage session to increase their awareness about water issues and how heritage can teach us about sustainability. I have been informed that the students asked very relevant questions that got our water heritage panel experts thinking. You will find brief write-ups on these activities in ICID News Update.

On invitation from the organizers, I delivered a keynote address in the 5th Annual Conference on 'Future Drainage and Storm Water Networks' at Abu Dhabi in United Arab Emirates late last month and spoke at length about water-energy-food nexus. Following the conference, ICID representatives visited the drainage projects in Abu Dhabi and water treatment facilities in Saudi Arabia, on invitation from our new member National Committee, namely, Saudi Irrigation Organization. The treated water from these facilities is productively used for agricultural irrigation thus improving water use efficiency and connecting urban wastewater with rural agricultural landscape. Both these visits also highlighted the focus on drainage, a somewhat less deliberated topic, though it plays a very crucial role not only in agriculture, but also in flood control management in urban areas.

Happy Reading and Best Wishes!

Felix Reinders
President, ICID

Inside

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FORUM STATEMENT — 3rd World Irrigation Forum (WIF3)

Bart Schultz, Zhanyi Gao, Brian Wahlin, Kaluvai Yella Reddy, Arcieri Marco, Jelle Beekma, IJsbrand H. de Jong, Olcay Ünver, Smith Mark, Mochammad Amron, Adang Saf Ahmad, Gao Zhanyi, Kamran Emami, Naoki Hayashida, Ahmed Bouari, Irene Bondarik, Waseem Nazir, Ashwin Pandya and Sahdev Singh.

Preamble

Recognizing the importance of sustainable agricultural water management and to bring it to the forefront, starting from 2013, the International Commission on Irrigation and Drainage (ICID) has been triennially organizing the World Irrigation Forum (WIF). The Forum aims to bring together the stakeholders under one roof, including policymakers, experts, researchers, non-governmental organizations and farmers, among others. It provides a platform for the world irrigation and drainage community and interested development professionals to find solutions to problems plaguing agricultural water management, in time of depleting freshwater resources as a result of global warming and climate change and the rapidly changing demographics and dietary habits.

The Third World Irrigation Forum (WIF3) on the Main Theme: Development for water, food and nutrition security in a competitive environment, was organized by ICID in cooperation with the host Indonesian National Committee on Irrigation and Drainage (INACID) and the partners Food and Agriculture Organization of the United Nations (FAO), Asian Development Bank (ADB), World Bank, International Water Management Institute (IWMI), UNU-FLORES, and others. Three sub-themes were covered under the Main Theme: Sub-theme 1. Enabling policy environment for water, food and energy; Sub-theme 2. Role of civil society and NGOs with focus on farmers and extension facilities; Sub-theme 3. Improving agricultural water productivity with focus on rural transformation. In addition there was a Meeting of the High Level Working Group (HLAG) consisting of Ministers and Senior Officers from Member and Non-Member countries, Farmers' Roundtable, Youth engagement, 6 Workshops, 15 Supporting Events, Exhibition, Technical Tours, and Social Programmes. These events included: Key-note speeches, Paper and short-communication presentations during the sessions, Technical papers presented as posters, and displays.

In total more than 1500 participants from 60 countries, including ministers and vice ministers from 9 countries and heads, or representatives of 10 International Organizations attended the Forum, Based on this the following statements were formulated and supported by the participants at the concluding session of the Forum.

Main statements

The focus of WIF3 was to address global food security, poverty alleviation and environment protection, through sustaining economically and socially viable irrigation and drainage development and management. We, therefore:

- Recognize that the world is facing rapid population growth and urbanization, changes in land use, climate and diets, increasing droughts and floods, environmental degradation, etc.;
- Reaffirm that sustainable development and management of agricultural water is a priority issue for achieving food security and poverty alleviation;
- Recognize the need to achieve water security. To this end it is vital to course-correct and increase water productivity by improving agricultural water management at all levels, with respect to the specific challenges facing least developed and emerging countries, in meeting the sustainable development goals (SDG) and maintaining rural development.

Therefore, the participants of WIF3 share the view on the following:

- Encourage the adoption of land and water policies that provide an effective environment for sustaining water resources, delivering of appropriate services and improving resilience in agricultural water, and incentives for sustainable agricultural water use;

- Support the implementation of integrated water resources management (IWRM) at the levels of river basin, irrigation and drainage schemes and on farm through (international) cooperation to achieve sustainable water management;
- Contribute to the building of new and maintaining, strengthening and improving existing infrastructure for multiple purposes, including water storage, irrigation and drainage, application of water saving and information technologies, rural water supply, energy production, environmental water use, and disaster prevention, that are economically sound, environmentally sustainable and socially equitable;
- Endeavour to improve water productivity for agriculture by clarifying roles and responsibilities in irrigation and drainage system operation and maintenance, where applicable reforming of irrigation and drainage management institutions, improved agricultural water service provision to farmers, and encouraging engagement of private sector and civil society organisations;
- Intend to support farmers in improving their individual irrigated and rainfed agriculture to increase crop productivity and conserve water with a view to achieve sustainable production of enough food for the rapidly increasing urban population;
- Promote increased and effective use of financial resources, including encouraging international financing institutions, development partners and governments to enhance support for agricultural water management;
- Scientific research, education, development and adoption of innovations in practice: Support increased collection, use and dissemination of data to improve performance of the sector and support of evidence-based policy making.
- Strengthening, training and education for young professionals: Contribute to the creation of an environment in which the younger generation and women are encouraged and capable to engage in agriculture, and to empower young professionals to contribute with new skills to agricultural water management.

General Statement

Water productivity must be increased, while endeavouring for innovation. Without innovation, there can be no food security for mankind. Improvements in the productivity of water for food production and processing constitute one of the most important pathways to eradicate extreme poverty. The experience of many developed and emerging countries demonstrates that a well-developed agriculture sector can support prosperous rural areas and high living standards. However, in order to achieve this goal, we have to conceive and strive for an unprecedentedly known process of rural transformation: young people would have to stay in rural systems-based communities and live on agriculture. It is only because of their freshness, curiosity and openness of mind that innovation can be brought successfully at disposal of rural populations. Today there is a huge amount of information and communication technology (ICT) available in agriculture. However, proper conditions to fully displace the power of all these innovations require the presence of young actors. Moreover, it is their active role that can optimize the value of water through integrated farming and smart, market driven agriculture, enhancing the value chain of irrigation water to promote social and economic community transformation (i.e. multifunctional use of irrigation water). Of course, in order to do so, though, they need to find attractive conditions of life, to stay in and live on agriculture. This is what every National Government would have to be committed on. New resources for their training, effective transfer of knowledge from research to the field, innovative financial schemes for their economic sustainability, simple procedures for easy access to credit, effective solidarity funds to restore them in case of extreme climatic events, are all part of the same strategy a Government needs to be conceiving and developing, if introduction of innovation and, thus, increased productivity of water resources in agriculture are really to be taken into account.

Other Events

The **High-Level Working Group (HLAG)** Meeting brought the policy planners and high-level national representatives together to share their thoughts and ideas towards improvements in policies, initiatives and implementation experiences at national level concerning irrigation and water management under various constraints. The interactions at the highest political and official level have the potential of exchanging the concerns and networking to bring together partnerships for implementation of the common goals of bringing forth a prosperous rural society. In the meeting, following issues were discussed:

- importance of efficient irrigation and water management as foundation stone for poverty alleviation
- platforms for the multi-stakeholders to share and learn by engaging in issues of interest at the global level
- multidisciplinary discussions towards sustainable water management solutions in agriculture through:
  - exchange of latest irrigation and drainage policies, practices,
  - innovations and technologies,
  - exploring and formulating concrete inter-disciplinary proposals,
  - development of liaison/ collaboration among various national and international institutions,
  - organizations and private sector working for agricultural water management, and
  - advocacy for political commitments.

The **Farmers Round Table Meeting** on Strengthening farmers groups in competitive environment for global food security discussed the following items:

1 the usage of organic fertilizer in horticulture can give great impacts to the farmers in terms of production, environment control, and market;

2 good water management is crucial for optimizing agricultural production, consequently promoting farmers' incomes through, among others, participatory operation and maintenance by the farmers;

3 marketing of agricultural products also plays an important role in achieving better incomes for farmers;

4 rotational scheduling of irrigation water at secondary level, as well as at farm level can be effective;

5 use of ICT systems to improve water productivity;

6 role of government, NGOs, universities, and market actors needs to be encouraged to have a better understanding to strengthen farmers

Based on these discussions, the following recommendations were formulated:

- subsidy for agricultural input needs to be encouraged by various methods, based on the locations;
- facilitating ICT development to support farmers on production and marketing and introducing irrigation
- local wisdom to have better environmental impacts

Two **Young Professionals Training workshops** were held. Following recommendations were made:

- climate projections by agencies need to be coordinated to reduce uncertainties,

- adaptive measures/technologies need to be made widely available through social media,
- valuation of water is context specific and needs to consider social, cultural and economic factors,
- capacity building of youth and simultaneously of leaders on water technologies

Workshops (6 workshops; 57 papers accepted)

Historical water sustainability is based on the pillars technical and political synergy, learning while doing, technical and financial empowered operation and maintenance, adaptability, social and structural resilience, appropriate laws and regulation, empowered, fair and transparent community-based management systems.

Changing rural demographics are creating new challenges in many agricultural water management schemes. The elements that constitute modernization need to be tailored to the specific location and social economic context to address the evolving requirements of farmers and the broader economy, while ensuring sustainable ecosystems that underpin irrigated agriculture.

Future efforts on modernization and revitalization of irrigated agriculture needs to place farmers and rural populations at the centre of the design and implementation of actions to create and sustain effective irrigation services. In order to achieve this empowerment of institutional and organisational requirements in transferring the responsibilities and/or ownerships of irrigation and drainage systems to water users' associations is one of the most important aspects to ensure maintaining the success of participatory irrigation and drainage management, including productivity of micro irrigation systems. Improvement of roles and legislation of irrigation service arrangements and extension facilities in modernization of irrigation management needs to be conducted through sustainably effective institutional and organisational arrangements of the farmers through water users' association and related stakeholders.

Tidal areas are facing the problem how to balance between development and conservation under rapid urbanization. In addition to updated professional techniques and public data, the stakeholders would have to strengthen the communication on knowledge and concepts. In order to reduce risk on loss of lives and damage to property, construction and operation of intelligent flood control systems by integrating rainfall information in river basins, river flows and simulation of potential floods is important. To avoid the problems such as over pumping of groundwater causing land subsidence and sea water intrusion, as well as flooding, it is important that optimal management systems will be constructed and operated.

More reliable information on future climate change impacts with less quantitative and qualitative uncertainties has to be established through innovative and integrated impact assessment, which is to be shared with the stakeholders, including water users.

Information technology, remote sensing, and the internet are increasingly important elements of modernization but are not immediately applicable in all locations. Smart water management with innovated information and communication technology is to be urgently developed and systematically applied, not only for agricultural productivity but also for the adaptation to the changing climate and mitigation of its possible negative impacts.

Supporting Events (15 Events)

There are a lot of factors involved in developing the effectiveness of agriculture systems. Intensification of productivity on existing agricultural lands is needed to avoid massive land conversion and additional ecological disturbances. For example, trends of water productivity in Africa can be improved by about 70%. One simple method is to identify champion farmers in a region and understand their best practices and to find better ways of sharing this information with other regional farmers.

There is a need to provide local or regional benchmarks of water productivity so that farmers can compare their performance and look for help improving their production practices to reach the set goals. Analysis of the social-economic conditions of farmers in a region as well as their water governance structure is needed when evaluating reasons for high or low water productivity.

Reducing water productivity gaps involves the optimization of soil, fertilizer, water and crop production resources. Systematic mapping of agro-ecological zones based on similarities of soil, climate and crop types is required to improve production systems and modelling yield and water productivity gaps. Remote sensing has a large potential to contribute spatial information for field scale estimates of water productivity including the identification of in-season stresses. Mapping of crop types and distribution at finer scales will allow the effective use of remote sensing to estimate evapotranspiration, crop yield and water productivity. A question is how to translate information from complex models of evapotranspiration and yield into useful advice and practical information for farmers?

Adequate operation and maintenance of irrigation and drainage systems are often neglected elements in scheme management, generally leading to a build-deteriorate-rehabilitate vicious cycle. Design build operate contracts and result based lending can focus on this item, while they may provide the possibility for an innovative way to better operate and maintain irrigation and drainage systems based on a performance-based approach. In order to achieve this binding performance criteria will be needed. Result based lending would have to result in a shift of the focus towards greater sustainability of systems by improved operation and maintenance.

Water Accounting Plus is a promising framework that allows users to assess the potential impacts of different water management strategies on agricultural and environmental services. It has potential for scaling up by irrigation and drainage system managers and farmers, as well as by development agencies for taking considered investment decisions, monitoring and evaluation. Economic water productivity has a potential role to improve performance and enhance resilience of irrigation systems when variability of water supply and scarcity is more a norm than an exception. Simple science based on-farm irrigation scheduling with local information platforms has shown encouraging results and potential for its promotion to help improve water productivity.

Irrigation delivery and agricultural extension services have a promising role in increasing cropping intensity and crop diversification. Improved information on the irrigation and drainage systems by using ICT tools in developing sustainable water management solutions for tackling water scarcity challenges is a way forward.

Innovative groundwater recharge and demand management approaches offer promising contributions towards building resilience and adaptation to climate change. Some of the demonstrated innovative approaches, like application of solar systems, can provide access to smallholder farmers for irrigation, while minimizing potential environmental costs.

APEC Climate Center Integrated Modeling Solution (AIMS)

Jaepil Cho*

There is an emphasis on the importance of adaptation against to climate change and related natural disasters. As a result, various climate information with different timescale can be used for science-based climate change adaptation policy. From the aspects of Global Framework for Climate Services (GFCS), various time-scaled climate information is produced by producer group. However, application of weather and climate information in different application sectors has been done separately in the fields of agriculture and water resources. Furthermore, utilization of climate information including seasonal forecast and climate change projections are insufficient. Therefore, establishment of both institutional and technical platforms is necessary as a UIP (User Interface Platform) focusing on multi-model ensemble (MME) based climate service, seamless climate service, and climate service based on multidisciplinary approach.

APCC Integrated Modeling Solution (AIMS) was developed as a platform focusing on user-centered downscaling of various time-scaled climate information, application of downscaled data into impact assessment modeling in various sectors, and finally producing information can be used in decision making procedures. Platform means connecting various climate information producers including APCC, downscaling experts, and users of various nations and sectors through AIMS to maximize application of climate information and provide user-centered climate services. User-centered climate services means use of climate information based on the understanding of GCMs and downscaling techniques that appropriately reproduce the main climate characteristics highly related to the users objectives, instead of blindly using climate data provided by climate information producers. Figure 1 shows the concept of multidisciplinary approach for climate services including not only horizontal linkage at the scientist level but also vertical linkage for supporting decision or policy making (left) and corresponding AIMS components (right).

Currently, user-centered downscaling module for climate change scenario is included in AIMS, making it easy

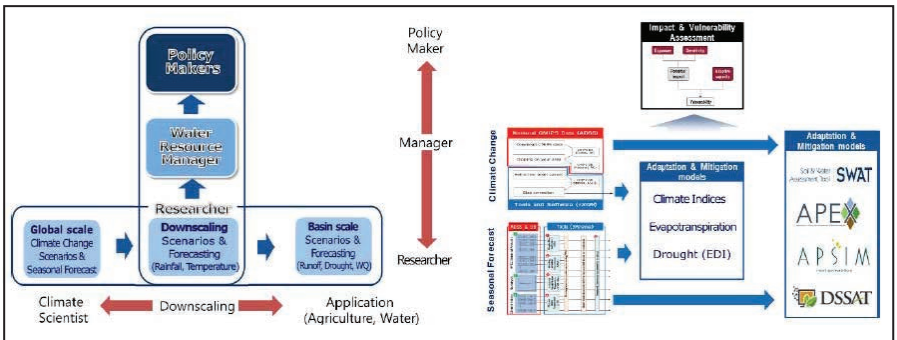

Figure 1. Concept of multidisciplinary approach for climate services including horizontal and vertical linkage (left) and corresponding AIMS components (right)

for users around the world to use the interface. Looking at the climate change downscaling components, AIMS first provides the clipped daily climate change scenario data for the target countries selected by the user containing 29 Global Climate Models (GCMs). Users need to prepare and upload the observed data of the target area for statistical analysis. Currently, three downscaling are provided by AIMS including: 1) SQM (Simple Quantile Mapping) based on quantile mapping bias correction, 2) SDQDM (Spatial Disaggregation and Quantile Delta Mapping) designed to minimize the signal disturbance for extreme ranges, and 3) BCSA (Bias Correction and Stochastic Analogue) for considering spatial correlation between observatories. The selection of the downscaling method is performed by evaluating the reproducibility of the major indices selected by the user among the 27 commonly used Climate Extreme Indices. Finally, downscaled data can be used to perform drought analysis for future periods using EDI (Effective Drought Index). The latest version of AIMS can be downloaded from the AIMS web page (http://aims.apcc21.org). Figure 2 shows the individual components of AIMS.

AIMS is a client program that can be installed on personal computers to produce station-based downscaled climate change scenario data. APCC is now adding downscaling modules for both individual GCM and multi-model ensemble (MME) based seasonal forecast information collected and produced by APCC. AIMS server is also being developed for interacting with the AIMS client for the purpose of sharing research information and downscaled data with users of various countries and sectors. We will also develop modules for linking with the popular models of the application sectors through collaboration with world leading organizations. AIMS is expected to be helpful for the increase of adaptation capacity against climate change in developing countries through the voluntary participation of producer and user groups within in the institutional and technical platform suggested.

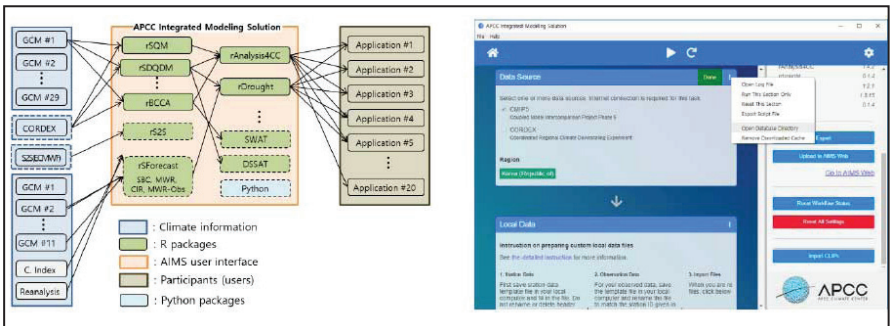

Figure 2. Individual components of AIMS, solid line represents the developed ones while the dashed line represents under development (left) and AIMS user interface (right)

* Research Fellow, APEC Climate Center, Republic of Korea

Water Saving in Agriculture

Improving water efficiency is the imminent challenge faced in agriculture today. There is a need to innovate and change existing water policies, management practices, and water-saving techniques. A holistic approach involving all the stakeholders like farmers, corporates, government, and civil society organizations are required to improve water productivity. Recognizing this need, ICID constituted WatSave Annual Award(s) in 1997 to identify and promote exceptional water conservation/saving practices in agriculture. These nominations are received from ICID's National Committees through invites sent at the beginning of every calendar year. The award consists of an honorarium of US$ 2000 and a citation plaque.

WatSave Award has been categorised in the following four categories:

1. **Technology Award:** To recognize the best technological applications or projects developed; which has been successful in saving water and/or recovering wastewaters/low quality waters.
2. **Young Professionals Award:** Awarded to Young professionals (below 40 years) for their original contribution in research and innovative water-saving techniques leading towards sustainability.
3. **Innovative Water Management Award:** Identifies non-technological interventions, innovative land, and water management practices and policy interventions helping in increasing water availability for different uses. It aims to promote new policies/approaches for water-saving leading to the -effective and beneficial use of water.
4. **Farmer Award:** Awarded to farmer(s) who have successfully developed or implemented water-efficient farming techniques in the farms, as well as the community.

WatSave Winners 2019

Technology Award: "Water and salt regulation scheme under mulched drip irrigation for cotton in arid regions" by TIAN Fuqiang, China

Secondary salinization induced by improper irrigation is recognized as a crucial threat to agriculture all over the world, especially in arid and semi-arid areas. Secondary salinization is typically caused by flood irrigation; i.e., too much irrigation water induces a rise in the water table and the subsequent intense phreatic evaporation leads to upward movement of salt contained in the groundwater which accumulates in the surface soil. Utilizing micro-irrigation techniques also leads to increases in salinization, but in this case secondary salinization is caused by insufficient leaching due to inadequate watering. In fact, increases in salinization resulting from drip irrigation techniques have occurred in many dry areas including Israel, Egypt, the United States, Lebanon, China, etc.

Mulched drip irrigation (MDI), a recently-introduced micro-irrigation approach incorporating surface drip irrigation methods combined with film-mulching techniques, has the advantages of both saving water and labor and increasing crop yields.

Description: In 2007, the nominee and his research team established an experimental research station in an MDI cotton field in Bayangol Prefecture of Xinjiang Uygur Autonomous Region. A numerical model of soil water and salt movement under MDI conditions were developed. Guided by both experimental data and numerical simulations, soil water and salt distribution patterns at multiple spatiotemporal scales were ascertained, and an optimal irrigation schedule for the cotton growth season coupled with a comprehensive soil water and salt regulatory scheme for MDI was developed. This innovative technology has been extensively applied to a 20,000-ha region of cotton fields, resulting in the saving of 500 MCM of water.

Figure 1. Experimental Station in Xinier town, Xinjiang Vygur Autonomous Region

How the innovation saves water?

1. During the growth period: Based on the optimizing irrigation system, water saving can be realized by improving the utilization efficiency of irrigation water.
2. During the non-growth period: Based on the proposed flush irrigation scheme, yearly flush irrigation can be replaced by a multi-year flush irrigation scheme, and the flush irrigation quota can also be reduced compared to traditional methods. In this way, the water amount used for salt-leaching is reduced.
3. Additional water savings can be realized by the reducing the amount of salt leaching water through the application of chemical ameliorants.

Compared to traditional irrigation methods, about 25% less water is required with the proposed water and salt regulation scheme. Also, the cotton yield can be increased by 17% with stable soil salinity.

Young Professional Award: "Applications of constant flow rate control valve in water saving" by Mohammad Bijankhan, Ali Mahdavi Mazdeh, Hadi Ramezani Etedali, Fatemeh Tayebi, and Narges Mehr, Iran

Mechanical Choked Orifice Plate (MCOP), is a discharge control valve. MCOP includes a float-spring blockage system inserted into an ordinary orifice that maintains a quasi-constant flow by being insensitive to both upstream and downstream pressure fluctuations. The innovation is to introduce the application of MCOP -

1. for regulating a single pump with constant rotational speed in tape irrigation systems,
2. for fairly distributing water in low head pressurized networks, and
3. to regulate the pump operating point at its highest efficiency even if the total head-loss changes.

This practical advice results in saving energy and preventing water losses. In tape irrigation system, MCOP prevents tape failures as well as water losses due to high pressures.

Finally, MCOP application is successfully verified in this work to distribute water in low pressurized irrigation pipes.

Figure 2. MCOP valve connected to two tape lines

How the innovation saves water?

With a single pump with constant rotational speed in pressurized irrigation systems, a pump is selected to provide the required pressure for the irrigation system in critical situations, i.e., for an irrigation subunit with the highest head loss and elevation values. Therefore, pump efficiency is affected when it is used to irrigate other irrigation subunits whose friction factors, local head-loss values, and ground elevations are different. In such cases, MCOP can adjust the operating point of the pumping system without requiring electricity.

Management Award: "Trangie-Nevertire Renewal an Irrigation Infrastructure Modernization Success story" by James Winter and Tony Quigley, Australia

This modernization /renewal project involved the transfer/sale of water to the Australian Government in return for funding to totally modernize the irrigation infrastructure of the Trangie-Nevertire Co-operative Ltd both off-farm and on-farm. Channel conveyance losses have reduced from in excess of 50% to 7%. On-farm productivity improved from greater availably of water and installation of "state of the art" farm irrigation systems. Trangie-Nevertire Co-operative Ltd (TNCL) is a member owned irrigation scheme that pumps out of the Macquarie River in central west NSW that had reached its use-by date in the middle of the Millennium Drought. The combined pressure of high conveyance losses, a series of low or zero water allocation years, the threat of losing water and members to government buy-backs and ever-increasing costs led to the general realization among members that it had to modernize to survive.

The Modernization Project had 5 major elements:

1. Reduction in the earthen channel system from 240 km down to 138 km and retiring 17 members permanently from irrigation.
2. Rebuilding the remaining 138 kms of channel system, lining 108 kms with Firestone EPDM rubber membrane, and installing a complete Rubicon water gate system, all enclosed within electric animal exclusion fencing.
3. Installing a 230 km Stock & Domestic pipeline from the river to all continuing and retiring members' farms to replace the previous reliance on the channel system.
4. Modernizing the remaining members' on-farm irrigation infrastructure, with 24 linear move or center pivot irrigators installed, as well as upgraded field layouts, tailwater return systems and storages.
5. Decommissioning the irrigation infrastructure on those retiring members' farms and reconfiguring them back to a dryland basis including the provision of piped stock and domestic water reticulation.

Figure 3 Lined channel section with Rubicon control gates

How the innovation saves water?

1. The lining of 138 kms of rebuilt main channel with EPDM rubber led to a massive reduction in seepage losses, especially where the channel traversed porous soil types and paleo channels closer to the Macquarie River.
2. The combination of the technologies has reduced the channel conveyance losses from a historical average of 25% (range 20% to in excess of 50%) to now 7%. Substantial volumes of rainfall are captured and held in the lined channel sections most winters, often providing the initial pool fills prior to the pumping season commencing. This has all lead to the farming members now having more water available to them at the farm gate now than pre-project.

Farmer Award: "Water Conservation by use of Sprinkler & Drip Technologies in Paddy Crop" by Mr. Karan Jeet Singh Chatta, India

Installation of community based solar/grid powered micro irrigation infrastructure in existing canal commands: Under the pilot project prepared by Command Area Development Authority, Government of India, the nominee Mr. Karan Jeet Chatta, mobilized fellow farmers and convinced them to participate in this solar power based micro irrigation infrastructure. He also provided his personal land free of cost to the Government to build the structure. Community based water storage tank, pumping unit (Grid/solar powered), filtration unit, HDPE pipe network, hydrant/outlet assemblies, valves, etc. has been constructed by the department.

Figure 4. Community Water Storage Tank using solar power operations

The main objectives of the project were to improve water use efficiency and increase crop productivity: (i) Supply management - By increasing the available supply by reduction in conveyance losses; and (ii) Demand Management - By increasing the field application efficiency with the use of water efficient Sprinkler & Drip Irrigation technology

How the innovation saves water?

The experience of pilot project has been quite encouraging

1. Substantial increase in irrigated area has been observed and with the use of drip/ sprinkler systems by farmers.
2. The tail-end farmers have also started getting irrigation water with this system.
3. Fertilizers and crop-protection chemicals can be applied directly through the micro irrigation system more efficiently.
4. Since the scheduling of water supply is only during day time, the stress of irrigating the fields during night is avoided. It will also reduce the use of tube-wells and help in controlling overexploitation of groundwater, besides savings of electricity.

For more details, please visit: https://www.icid.org/awards_ws.html

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International Commission on Irrigation and Drainage (ICID) established in 1950 as a scientific, technical and voluntary not-for-profit professional international organization.

The ICID News is published quarterly by ICID Central Office, New Delhi, India.

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