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Changes and Challenges Facing Irrigated Agriculture in Asia

President Gao Zhanyi speaking at the 1st Asian Irrigation Forum in Manila

The 1st Asian Irrigation Forum (AIF) was organized by Asian Development Bank (ADB) from 11 to 13 April 2012 at ADB Headquarter, Manila. The objective of the AIF was to address the challenge of irrigated agriculture against a backdrop of growing demand for limited water resources for agriculture, industry and human consumption. The Forum assessed constraints and opportunities for improved irrigation methods, review best practices and explore opportunities for partnerships to ensure equity, increased efficiency and full transparency in water use for irrigation on national, sub-regional and regional basis. The Forum was attended by leading irrigation and drainage policy makers, practitioners, R&D professionals, leaders of government and private sector irrigation and drainage service providers, representatives of farmer organizations and agri-business to lead discussions on key irrigation and drainage issues for the coming 20 years.

President Gao Zhanyi was invited to speak on 'How irrigation is responding to the challenges of volatility, vulnerability and changes in agriculture'. Prof. Gao Zhanyi highlighted the key changes and challenges facing irrigated agriculture production and measures to revitalize irrigation and drainage in Asia to achieve food security and poverty alleviation. The following is a summary of his speech.

Worldwide, irrigated agriculture accounts for about 70% (2,850 km^3 per year) of the freshwater withdrawals and is perceived as the main factor behind increasing the global water scarcity. According to the various analyses, in future the total water used for irrigation will not be increased significantly and the development of irrigation has to be based on the existing water withdrawals with marginal increase.

In the past, low cost recovery, inadequate management and insufficient investment

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IN THIS ISSUE

ADB's Water Financing Program

About 70% of the world's irrigated area is in Asia. With a global population of 7 billion, Asian irrigation is now at a crossroads. Increasing populations, changing diets, growing cities, and expanding energy and industrial production each demands a greater share of available water resources. With increasing concerns about water scarcity and food security, agriculture as the largest user of water must find ways to increase the productivity of irrigation to produce the food, fiber and fuel needed by the growing population. Improving the productivity of irrigated agriculture is expected to be the foundation for securing affordable food for the population of Asia-Pacific.

ADB's Water Financing Program aims to assist Asian countries in providing more productive and efficient irrigation and drainage services to over 40 million farmers by 2020. ADB has financed more than 200 irrigation projects, with investments totaling US$6.6 billion, and has some US$1.1 billion of irrigation projects pipelined.

Source: www.adb.org

were some of the key constraints for the sustainable development of irrigation systems, worldwide. However, with the rapid increase in population and pace of urbanization, the demand for agricultural products has increased and so also the price. Thus this is an opportune time to enhance irrigation development in Asian countries by adopting comprehensive measures as follows:

Increase investment

For many developing and least developed countries financing irrigation development suffers from two distinctive problems: (a) inadequate funding for rehabilitation of existing irrigation schemes, leading to poor facilities and management; and (b) non-availability of the investment for construction of new irrigation schemes. The problems of aged and incompleted irrigation infrastructures exist in many developing and the least developed countries. These problems lead to poor performance and low water use efficiency and water productivity in many irrigation schemes. There is an urgent need to increase investment both for rehabilitation of the aging infrastructure as well as new schemes.

Improve management

Due to financial and institutional problems many irrigation schemes are managed sub-optimally, which lead to poor water supply service, low productivity and less collection of water charges.

There is huge potential to improve irrigation management to achieve better performance and productivity of irrigation schemes.

Strengthen capacity development

Adoption of modern irrigation technology, tools and services is still weak in many Asian countries. With the expansion of irrigation, management of irrigation system is becoming more and more complex, especially in case of large and medium irrigation schemes involving many smallholder farmers. This demands enhanced technical capacity to operate and maintain the irrigation systems.

Support smallholder farmers

Small land holdings are one of the major constraints for adoption of advance irrigation technologies and in improvement of water and land productivity. The households with small land holding have difficulty to generate enough revenue to maintain sustainable production, and also in obtaining financial support and better irrigation service. Water User Association (WUA) system is an effective way to help the small land holding households to overcome the above problems. In some countries, however, increasing urbanization might lead to larger land holdings. If this trend continues for next 30 years, the farmers might need support to manage irrigation in their larger farmland.

Implement land consolidation

The purpose of land reconsolidation is to improve land and irrigation systems in an integrated manner. Land consolidation can help resolve conflicts between village administrative and hydraulic boundaries of an irrigation system. It also facilitates better land leveling and consolidation of fragmented land parcels. After consolidation land can be redistributed to farmers as per their entitlements. The land consolidation could significantly improve the irrigation water management and thus increasing the productivity and profitability of irrigated land. It has been adopted by several Asian countries.

Reform institutions and governance

Experience has shown that the government on its own cannot maintain the productivity and profitability of the irrigation systems, sustainably without an active involvement of stakeholders, especially farmers. So also, farmers themselves cannot manage large and medium irrigation systems without the support and guidance from the government, and technical assistance from specialized management professionals. The role to be played by the government, management professionals, and WUAs should be well considered and implemented based on the socio-economic conditions of the concerned country.

Although the targets for irrigation development to achieve food security have been posed at global level, the practical irrigation development can only be planned and implemented at national level. In many developing countries the governments have played an important role in development of irrigation sector. It is certain that in most Asian countries, without the government support and leadership the irrigation expansion could not have been achieved at such a pace.

Epilogue

As agriculture sector is still the major contributor of GDP in many developing and all least developed countries, irrigation is of significant importance to achieve food security, social and economic development and social stability. Therefore, the government should continue to play its role in irrigation development in future too. Recently, countries such as China and India have increased investment in irrigation sector. There are many successful experiences in adoption of water saving measures, rehabilitation and modernization of irrigation systems. It will be useful to exchange and share these experiences among Asian countries.

Driven by the increasing demand for food and bio-fuel, the prices of cereals and other agricultural products have risen to new high levels. It is likely that this trend might continue for foreseeable future. In addition, climate change is expected to impose huge impacts on agricultural production. Therefore, more robust irrigation and drainage systems are needed to increase the resilience of our agricultural production systems. International organizations can play an important role by organizing training programs to enhance capacity development, compiling and sharing international experiences, financing pilot projects and boosting financing for the rehabilitation and modernization of irrigation schemes and scaling-up of water saving technologies and measures.

Managing Limited Water Resources for Agriculture in Morocco

Morocco is a water-stressed country with water availability less than 590 m³/year/ capita. Present irrigated area is about 1.5 million ha and irrigation accounts for more than 80% of the total freshwater withdrawal. The Moroccan government therefore has been promoting the National Irrigation Water Saving Programme (PNEEI) since 2009. Dr. Redouane Choukr-Allah, Professor and Head of the Salinity and Plant Nutrition Laboratory, Institut Agronomique et Vétérinaire Hassan II, Agadir, Morocco explains how the new generation green house and low cost wastewater treatment technologies can be deployed for water efficient crop production at lower cost, locally.

Under the Green Morocco Plan (PMV), 0.5 million hectares will be converted to localized irrigation system, at the rate of 50,000 ha per year. In Agadir region of Morocco, these technologies have led to saving of 25% to 35% of irrigation water over the conventional methods. Under the PNEE, Innovative green house and wastewater treatment technologies are promoted for water saving in Morocco.

New generation of greenhouses in arid and hyper arid areas

Greenhouse horticulture in Morocco occupies around 25,000 ha and generates more than 1 million permanent jobs in the greater area of Agadir. It is able to export food crops mainly to Europe and contribute to significant source of revenue. The new generation greenhouse reduces the total water consumption of crops by 60% compared to standard greenhouse (Fig. 1). This can be achieved either by condensing the water evaporated by plants or by specific evaporation pad, fed with saline water or treated wastewater or by a combination of both water sources.

Figure 1. Closed greenhouse prototype of the Greenhouse Watergy project in Almeria, Spain

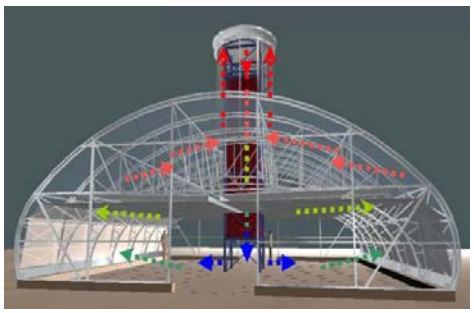

Figure 2. Passive air circulation in the Watergy driven by rising hot air and falling cooled air

The Watergy system consists of a closed greenhouse connected with a cooling tower. An air-water heat exchanger contained in a cooling duct inside the tower provides the climate control of the greenhouse. Air exchange is powered by the heat and pressure difference between the upper and lower side of the tower (Fig. 2). The high water recycling rate of a closed system could be applied in hyper arid areas possibly as self sufficient systems combined with rainwater harvesting from the greenhouse roof in areas with less than 200 mm annual rainfall.

Low cost technologies for treating wastewater

Use of treated domestic wastewater for crop production is becoming one of the strategies to address the food and water insecurity facing many countries in the Southern Mediterranean Region. In coming years, in most of these countries, valuable fresh water might have to be preserved solely for drinking, for very high value industrial purposes, and for high value fresh vegetable crops consumed raw. Where feasible, most crops in arid countries might have to be grown increasingly, and eventually solely, with treated wastewater.

In the last three decades, the annual volume of wastewater generated in Morocco has almost tripled. It has increased from 48 million m³ in 1960 to 700 million m³ in 2010. It is expected that this volume may reach about 900 million m³ in 2020. So far there is a limited planned reuse of reclaimed water in Morocco, given that only 25% of the collected wastewater undergoes any treatment. The actual treated wastewater volume is 177 million m³ per year.

The wastewater treatment technologies that are easily replicated, that allow further upgrading with subsequent development, and that can be operated and maintained by the local community are often considered the most appropriate and cost-effective. Stabilization pond treatment differs from conventional aerobic treatment in that no aeration is applied. The absence of oxygen leads to controlled anaerobic conversions of organic pollutants to carbon dioxide and methane, the latter can be used as energy source. The main advantages of anaerobic treatment are the very high loading rates that can be applied and the very low operating costs.

Stabilization Ponds (Fig. 3) treatment is often very cost-effective in reducing discharge levies combined with the production of reusable energy in the form of biogas. Pay-back period of in anaerobic treatment technologies can be as low as two years. Anaerobic treatment of domestic wastewater can also be very interesting and cost-effective in countries where the priority in discharge control is the removal of organic pollutants.

Figure 3. Stabilization Ponds System

Figure 4. Sand Filter System

Sand filtration (Fig. 4) is one of the oldest known wastewater treatment technologies. If properly designed, constructed, operated, and maintained, it produces a very high quality effluent. Sand filters are beds of granular material, or sand, drained from underneath so that pretreated wastewater can be treated, collected, and distributed to the land application system. Dr. Redouane Choukr-Allah can be contacted at <redouane53@yahoo.fr>

Contribute to Food Security by Optimal Use of Water

Theme 2.2 Contribute to food security by optimal use of water was one of the twelve key priorities of the 6th World Water Forum (WWF6) held at Marseille from 12 to 17 March 2012. In all, nine targets were identified under the theme which were debated during the forum. The theme was jointly coordinated by FAO and ICID involving more than 28 international organizations and many experts world over. Dr. Pasquele Stedito of FAO was the Coordinator while Pres. Hon. Bart Schultz was the Co-coordinator of the theme and entire activities. After two years of preparations and many presentations covering a significant number of relevant issues by wide range of speakers and intense discussions in eleven sessions during the forum, many proposals for solutions and commitments were emerged and are summarized as follows:

Target 2.1 Increasing rainfed agriculture productivity

Implement conservation systems for land and water in order to (i) increase investment in water management, (ii) secure land and water rights and (iii) improve diversification of rainfed crops. According to economic sustainability of rainfed crops, implement soil conservation systems adapted to climate and implement research and development methods on large scale, including the environmental costs. Development of rainfed crops must be managed in a sustainable way considering all the value chain. Investment and management costs must be shared between private and public sectors. Enhancing rainfed crops system must commensurate with local organisations, local practices for land tenure and landscapes.

From left: President Gao Zhayni, Dr. Alexander Muller, Deputy Director General, FAO (not in the picture), H.E. Chen Lei, Minister of Water Resources, PR of China, H.E. Agatham Ag Alassane, Minister of Agriculture, Mali, and Mr. Guillaume Benoit, Ministry of Agriculture, France at the Opening Session of the Theme 2.2

Target 2.2 Increasing productivity of irrigated agriculture

There is a need to gather precise and localized data related to weather, soil conditions and cultivation practices in order to provide guidance for producers and policy makers about steps to increase productivity of irrigated agriculture. Accurate scientific data should be made available to smallholders as well as medium and large producers. It should be ensured that within coming two decades agriculture/ irrigation technology will be thoroughly utilized by even the smallest of land holders. An encouraging consensus is developed among a widely varying group of stakeholder representatives about the utility of the global yield gap atlas in all sectors to increase productivity. The solutions that were presented demonstrated that efforts to improve productivity per unit of water need to take place at various scales, from the farm level all the way through national and basin level.

Target 2.3 Lowering cost of water management

The term "Affordable" should be linked to effectiveness in costs and sustainability in production not to the lower costs. Irrigation water or the services to provide water need to have a fair price which varies per country. In general, water should have a price that creates awareness among users owing to the fact that it cannot be provided for free due to scarcity and the costs associated to its withdrawal.

Preference should be given to local/ native technologies like spate irrigation management. Investments can also be in terms of capacity building of people and training to use new technologies. The participatory process in irrigation water management systems should be linked to a package of policy reforms. Well organized farmers can negotiate in a strong and effective manner with the government. The aim should be to increase crop productivity with respect to inputs like land area, water volume, seed, fertilizer, pesticide, labor, etc. However challenge remains as how to achieve the lower cost of management and affordable price for food in view of the current trend of rising prices of energy and fuel.

Target 2.4 Using non-conventional water for agriculture and aquaculture

Non-conventional water use is accepted and widely used in many countries across the world. Perceptions of stakeholders range from "ignorance is bliss" to a transparent approach where "knowledge is power". In the former, the approach is to provide treated wastewater without complete disclosure as to its origins. In the latter the approach is to reveal all the details, in terms of its origin and how it is treated. Using the term "recycled water" rather than "treated waste water" may imply that it is acceptable and safe for human use. It is necessary to promote the fact that the treated wastewater is a desirable and valuable resource as it contains nutrients and other inputs for crop production that would have to be purchased from commercial sources. Furthermore, the environmental benefits of treating and using wastewater are attractive.

Target 2.5 Increasing capacity of water storage systems

As per the estimates (2007) worldwide there is an additional need for 1504 billion cubic meter (BCM) storages without irrigation rehabilitation and improvements, and about 766 BCM with irrigation rehabilitation and improvements. So there is a need to validate the storage requirements by country.

While planning for storages, incorporate spatial dimensions so that the benefits are

spread to all stakeholders and beneficiaries. Consider and stress the wide range of benefits including rights to food, safe drinking water, employment, and flood control. There is a strong need to promote the environmental and other multiple benefits of storage, especially in view of the climate change impacts on water resources availability.

There is now much wide recognition and acceptance of the need for all typologies of storage (from large dams to small farm ponds) for crop production and food security. Thus there is no longer a differentiation between small and large storage. In many places rainfed and dry land agriculture has shifted to supplemental irrigated agriculture using a variety of rain and runoff harvesting techniques.

Target 2.6 Regional visions and local agricultural plans

While formulating food security plans, focus should be on developing and adopting action plans at the sub-regional level rather than visions at the macro-regional level .Commitment for developing vision and action plan should be primarily the responsibility of the governments at the highest level. Where applicable, river basin authorities are the appropriate level to develop action plans .Regions /countries which developed already their vision for water use, need to revisit those visions to incorporate food security aspect. Qatar for example, is developing a master plan for water and food security through desalinized water by using solar energy and keeping its groundwater as strategic reserve. Farmers in India are influencing the government policies and decisions about the priorities of water uses for different sectors.

Target 2.7 Groundwater for agriculture

There is an urgent need to delimit aquifer systems at user level and have credible water accounting. Participatory monitoring of groundwater is seen as key soft instrument versus hard (economic) instrument in managing groundwater sustainably. User engagement is critical but how to organize groundwater user associations is a challenge. It was proposed to develop by 2018 national strategic action programmes for key 'hotspot' aquifers exploited by intensive agricultural use (% aquifer depletion, % pollution), including a local definition of maximum admissible drawdown (MAD) and local definition of maximum admissible pollution levels (MAP) for agricultural uses.

Groundwater information is complex/ theoretical and therefore it has to be clear and easily accessible to users. Educating farmers about groundwater enhances their understanding and avoid misconceptions. Groundwater institutions are weak, and there is a need for stronger institutions for groundwater management at national level.

From left: Dr. Pasquale Steduto, FAO, Dr. Kevin Parris, OECD, Mr. Jacques Plantey, AFEID, Dr. Gao Zhanyi, ICID, and Prof. Dr. Bart Schultz, ICID

Target 2.8 Reducing post-harvest losses and food waste for multiple gains

High volumes of food waste in rich countries contribute to higher prices on food commodities with multiple implications. Linkage of post-harvest losses and foodwaste to water waste and sustainable diets was recognized. Strengthen focus on low income countries' issues; post-harvest losses due to lack of storage facilities, processing, transportation, and in marketing. No single global solution, i.e. no one size fits all. Encourage exchange best practices and prioritization of issues among different stakeholders. The urban triple challenge - supply chain, diet, and waste of food should be kept in view. Issues of agriculture subsidies and economics of food waste need to be addressed. Labelling of foods – expiry date and best before is not based on food safety or health issues, but for commercial gains. Encourage disclosure on waste by retailers and food industry in annual sustainability reports

Target 2.9 Improve access to water and water management for smallholder farmers

Develop a roadmap on how to build successful "socially constructed processes" to support clever smallholder's access / use of water for agriculture (including livestock, fishery). Work on tailored and flexible approaches that can be adapted to very diverse local levels. Invest in a clever way in agriculture water management. Protect the access rights to land and water. Strengthen support in particular to womenfarmers' organizations. Inform agricultural policies on needs/benefits of small AWM.

Offer range of options adaptable to situations of small holders. Recognize the need to work at different levels, integrate the range of actors interested, users, managers, planners and stimulate their interaction – local, basin, groundwater systems, regional and up to the national level and beyond. Integrate AWM solutions - technical, social, institutional and financial for small holders. Adoption, change of practice, innovation takes time and require support. Social construction is essential with facilitation/help to get organized, work together, and overcome differences.

ICID commitments

It is the ICID's mission to support sustainable water management for increasing global food production. ICID will continue its work in line with the actions and milestones as described in the various action plans. More specifically – ICID will intensify the monitoring of progress made, hold a special session in any of our future conferences to present and discuss the progress made in the countries of our National Committees, publish about the results in our media, renew our Task Force to be well prepared for 7th World Water Forum (WWF7). ICID look very much forward to continue cooperation with FAO and the other partners. The French and Korean National Committees have signed a MoU during the forum for cooperation until WWF7.

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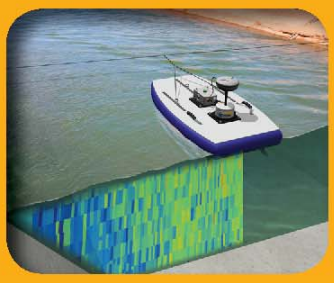

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Capacity Development in Safe Use of Wastewater in Agriculture

The 2nd Regional workshop on 'Safe Use of Wastewater in Agriculture' in the framework of a joint project of the UN-Water members and partners was held at New Delhi in May 2012. The workshop was attended by about 30 participants from 10 ICID member countries from South and West Asia and 9 Faculty from UNU-INWEH, FAO, UNEP, WHO, IWMI, ICID and UNW-DPC. The following is a summary report of the workshop.

Background

Most countries in the world are moving towards the reuse of wastewater for irrigation and other uses. As per the WHO about 20 million hectares of crops around the world are irrigated with wastewater. The wastewater is becoming an important resource, especially in the dry, water-scarce regions of the world, most of which are in developing and underdeveloped countries.

Besides many benefits of wastewater use in agriculture, it can also have adverse impacts on health and environment depending on the treatment level, type of irrigation and local conditions. Untreated wastewater contains a variety of pathogens, many of which are capable of survival in the environment, on crops or in the soil, and pose health risks to farmers and their families, consumers, and nearby communities. In several developing countries raw sewage is still used for agricultural irrigation despite of the health risks.

Cost effective and appropriate wastewater treatment suited for its end use is a fundamental action. But in most developing countries wastewater treatment is not economically feasible in the short term and interim solutions may be needed to protect farmers and public health. In these countries the focus should be on prioritizing affordable and easily adoptable risk management strategies

Launch of Capacity Development Project

Keeping the above scenario in view, the Food and Agriculture Organization of the United Nations (FAO) together with the UN-Water Decade Programme on Capacity Development (UNW-DPC), the United Nations University Institute on Water, Environment and Health (UNU-INWEH) and International Commission on Irrigation & Drainage (ICID) and others have joined forces to promote the safe use of wastewater in agriculture in developing countries and countries in transition. As a result, a 'Capacity Development Project on Safe Wastewater Use in Agriculture' has been launched. The objective of the project is to help in the identification and prioritization of the knowledge and skills to minimize environmental and health risks in urban and peri-urban areas by properly managing wastewater, the greatest source of water for agriculture irrigation, and fertilizer for crop production. A kick-off workshop for the project was organized in Bonn, Germany in November 2011. This will be followed by a series of 5 Regional Workshops and an 'International Wrap-up Workshop' in May 2013. The 1st Regional Workshop was held in Marrakech, Morocco in February 2012 (see ICID News, 2012/1).

Workshop Participants

2nd Regional Workshop

The 2nd Regional Workshop as part of the Capacity Development Project was organized in New Delhi, India from 16-18 May 2012. The objective of the workshop was to help in the identification and prioritization of the knowledge and skills to minimize environmental and health risks in urban and peri-urban areas by properly managing wastewater.

Dr. J.S. Samra, CEO, National Rainfed Area Authority, Planning Commission of the Government of India gave an overview of wastewater use in agriculture in India. In his opening speech, Dr. Samra stressed the need for safe disposal and use of wastewater in rural areas too. The expert faculty consisted of Er. Avinash C. Tyagi (ICID), Dr. Jens Liebe and Ms. Miranda Pieron (UNW-DPC), Dr. Manzoor Qadir (UNU-INWEH), Dr. Anjan Datta (UNEP), Dr. Priyanie Amerasinghe (IWMI), Dr. Payden (WHO), Dr. Satya Priya (FAO), Dr. Bharat Sharma (IWMI), and Dr. Ravinder Kaur (Water Technology Centre, IARI, New Delhi).

The participants from Bangladesh, India, Iraq, Jordan, Myanmar, Nepal, Pakistan, Sri Lanka, Syria, and Turkey engaged in the sectors like irrigation, agriculture, water and sanitation, urban development, environment and health attended the workshop. The experts made presentations on policy and strategic issues, health risks, environmental effects, and socio-cultural acceptance, and capacity needs and national strategies.

The country reports were presented by the representatives of each country briefly describing wastewater production and treatment, use/disposal, research/practice on different aspects of wastewater, policies and institutional set-up etc. A visit to wastewater treatment plant of Delhi Jal (Water) Board was also organized.

As an outcome of the workshop, the participating countries have agreed to (1) Start a multi-stakeholders' platform on 'Safe use of wastewater in Agriculture' in their country, (2) Revise and complete the country report, and (3) Develop awareness building material for farmers and consumers in their respective countries.

An important output from the various regional workshops would be a 'Capacity development action plan' that should describe how the training material and learning methods should be disseminated at country level in the relevant organizations. Further information on the capacity development project, related documents including the country reports, can be found at http://www.ais.unwater.org/ais/course/view.php?id=6

63rd International Executive Council (IEC) & 7th Asian Regional/ Irrigation Australia Conference
23-28 June 2012, Adelaide, Australia, Program at a Glance

Time (Hours)	23 June (Sat)	24 June (Sun)	25 June (Mon)	26 June (Tue)	27 June (Wed)	28 June (Thu)	29 June (Fri)
08.30-10.30		WG-DRG (Room 2) WG-ENV (Rooms 8-9) WG-TRUE (Room 10) C-PR&P (Room 11) AFRWG (Room 5)	WG-CAFM (Room 2) WG-YPF (Rooms 8-9) TF-FIN (Room 10) WG-CROP (Room 11) WG-IDSST (Room 5)	Opening of Asian Regional/ Irrigation Australia Conference (Hall E)	PCTA (Room 10)	IEC (Riverbank Rooms 1,2,3)	Post conference tours
11.00-12.30	SC	Seminar (WG-HIST) (Room 2) WG-SDTA (Rooms 8-9) ASRWG (Room 10) TF-WWF6 (Room 11) WG-CLIMATE (Room 5)	Ws (WG-CAFM) (Room 2) ERWG (Rooms 8-9) Ws (WG-PQW/ENV) (Room 10) PFC (Room 11) EB-JOUR (Room 5)	Ws (TF-FIN) (Room 2) Ws(TF-BIO-ENERGY) (Rooms 8-9) TF-SEDIMENTATION (Room 10) TF-VE (Room 11) PCSO (Room 5)	PCTA (Room 10)	IEC (Riverbank Rooms 1,2,3)	
13.30-15.00	MT JOUR	Seminar (WG-HIST) (Room 2) WG-SDTA (Rooms 8-9) ASRWG (Room 10) TF-WWF6 (Room 11) WG-CLIMATE (Room 5)	Ws (WG-CAFM) (Room 2) ERWG (Rooms 8-9) Ws (WG-PQW/ENV) (Room 10) PFC (Room 11)	Ws (TF-FIN) (Room 2) TF-BIO-ENERGY (Rooms 8-9) MDG (Room 10) PCSO (Room 5)	PCTA (Room 10)	IEC (Riverbank Rooms 1,2,3)	
15.30-17.30	MB	WG-HIST (Room 2) WG-DROUGHT (Rooms 8-9) WG-WATS (Room 10) C-CONGR (Room 11) WG-ON-FARM (Room 5)	WG-MIS (Room 2) AMRWG (Rooms 8-9) Ws (WG-PQW/ENV) (Room 10) WG-PQW (Room 11) WG-POVERTY (Room 5)	Ws (TF-FIN) (Room 2) WG-TRID (Rooms 8-9) Ws (WG-WATS) (Room 10) PCSO (Room 5)	OBC (Room10)	IEC (Riverbank Rooms 1,2,3)	
17.30-18.30				Trade Show / Exhibition	Trade Show / Exhibition	Trade Show / Exhibition	
18.15-19.15		NCs & VPs	NCs & OBC				
19.00-22.00		ICID Day at 18.45 hours (by invitation)		Korean reception (by invitation)	Turkish reception (by invitation)	Intl. Farewell Dinner (Hall F)	

Tea break: 10.30-11.00 & 15.00-15.30 Hours; Lunch break: 12.30-13.30 Hours

Asian Regional / Irrigation Australia Conference

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