ICID•CIID

ICID Newsletter

Managing water for sustainable agriculture

Also at http://www.icid.org **2009/4**

Message from the President

Dear Friends,

As I write this message, many of you will be preparing to attend the 60th IEC and 5th Asia Regional Conference in New Delhi, December 6-11. This is indeed an historic occasion, as we celebrate the Diamond Jubilee year of ICID. It is noteworthy that the first ever IEC was held in Delhi in 1950 when ICID was formed. Since that time, at least 6 major ICID meetings have been held in Delhi. Our hosts, the Indian National Committee of ICID (INCID) has gone out of its way to organize a splendid set of technical and work body meetings, and a wide variety of tours to meet all tastes. I congratulate INCID and the members of the organizing committee for their extraordinary efforts in ensure that our time in Delhi will be both productive and pleasant. In addition, I know that the Central Office staff is very eager to welcome all members of the ICID family to the office and to provide you with a tour of the facilities. I urge you to take full advantage of all that is being offered in Delhi. Our hosts will go out of their way to make you feel at home and hospitable.

India is a country with a rich history and an ancient civilization that has always depended on water for food production. It is one of the largest irrigated countries in the world with an harvested irrigated area of approximately 87 million hectares. Much of India's most advanced water resources and irrigation development took place since the 1970s, in response to the green revolution. The new high yielding cultivars of rice, wheat, and maize needed water to boost crop productivity so that India could combat famines and death due to hunger and malnutrition. Consequently, India has many success stories to tell about food security. This is noteworthy as we are currently in the midst of a global food crisis and financial crisis. India's efforts towards food self sufficiency are paying off, as the country is buffered to some extent.

While India has made great strides both economically and in the agrarian sector, irrigation faces numerous challenges. Questions still arise about the efficiency of the irrigation system, finances, drainage, groundwater and climate change. These are some of the topics to be addressed at the conference. Furthermore, there are some 600 million people living in the arid and semi-arid conditions in India, who are struggling to plant a crop with very limited or absolutely no water. One could very well ask what is the future of this very vulnerable population - the poorest of the poor?

There is no doubt in my mind that ICID has a role to play in helping to improve the livelihoods of the world's poorest and most vulnerable, whether they be associated with irrigated or dryland farming. We need to extend our thinking into ways of capturing water and managing soil water to boost crop yields in both ecosystems. We ought to work with the plant scientists and crop geneticists to find the drought tolerant crops for dryland systems.

I was recently in Burkina Faso and had the opportunity to look at some of the large and small scale irrigation systems in very dry regions of the country. The inten-sive hand operated watering systems were the order of the day. I received comments that drip irrigation was too expensive and difficult to manage. The question is how to introduce technology and to provide the technical and institutional support to make the system work and be sustainable in the long term. The challenges are enormous, but we will have to think broader, if our work is to have impact on the poorest of the poor.

I was very pleased to deliver the opening keynote address at the recent US National Committee technical meetings in Salt Lake City, Utah. I congratulate the US Committee for the quality of its technical meetings and the manner in which it engages government, the private sector, academia etc. This is a model for us to emulate.

Finally, I close by wishing everyone a very happy holiday, and the very best of the New Year to you and your loved ones. May your year be filled with happiness, joy, peace and a work program which is dedicated to the goal of improved water management for food security.

Yours truly,

Chandra A. Madramootoo
President

International Commission on Irrigation and Drainage (ICID) was established in 1950 as a scientific, technical and voluntary not-for-profit non-governmental international organization. The Newsletter is published quarterly by ICID Central Office, New Delhi, India.

IN THIS ISSUE

- Water Resources and Irrigation in India 2
- Impacts of Global Financial Turmoil 3
- Modern Drainage Water Management 4
- A Tool for AWD Rice Irrigation 5
- Advertisement - SonTek 6
- Future ICID events 7
- 60th IEC and 5th ARC Program 8

Water Resources and Irrigation Development in India

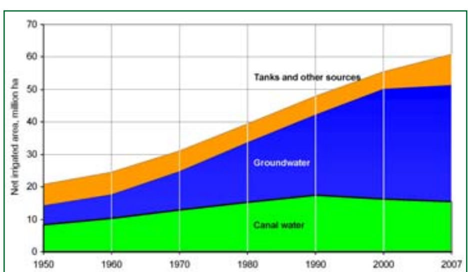
A. K. Bajaj[1]

Water Resources Development

India, on an average receives a total precipitation of about 4000 billion cubic meters (BCM), of which 1869 BCM are estimated as renewable water resources. Within the limitations of physiographic conditions and the technology available, the total utilizable water resources (TUWR) have been assessed at 1123 BCM (690 BCM as surface water and 433 BCM as groundwater). National Perspective Plan envisages further addition of 200 BCM to the TUWR through inter-basin transfer of water. The Ministry of Water Resources (MoWR) has launched a program towards increasing groundwater availability by about 36 BCM through rainwater harvesting and artificial recharge. At present, an estimated 430 BCM of surface water and 234 BCM of groundwater is being withdrawn for different uses. Highly spatial and temporal variation in rainfall confining to the four monsoon months, warranted construction of large, medium and small storages. Currently, there are over 4700 large dams creating storages of about 225 BCM. In order to harness the utilizable surface water resource and prepare for impending global climate change, the country needs to build up adequate storages across the country.

Irrigation Development

Although, some impressive irrigation works like western and eastern Upper Yamuna Canals, Mettur dam on Cauvery River were built during the British period, the real momentum in harnessing of water resources for irrigation was taken up through successive Five-Year Plans commencing from 1951. As a result the irrigated area (gross/ harvested) expanded by almost four times from 22.6 million hectares in 1950 to 87.2 million hectares in 2007. Nevertheless, since 1990, the proportion of canal irrigated area has been steadily decreasing (see Figure). The groundwater irrigation has dramatically



Trend in expansion of irrigated areas by different sources in India

India produces 95 million tonnes of rice from about 43 million hectares

increased through private investment and presently it shares about 60% of the total net irrigated area. The total estimated ultimate irrigation potential (gross) both through surface and ground waters has been estimated at 140 million ha. In 2000, of the 634 BCM of the total water withdrawals for all uses, about 541 BCM (85%) were diverted for irrigation purposes. As per the National Commission on Integrated Water Resources Development (NCIWRD, 1999), even with improvement of the irrigation efficiency from the present 35% to 60%, the total water demand for irrigation by 2025 and by 2050 will be 611 BCM and 807 BCM, respectively.

The command area development program was launched in the 1974 with the objective of bridging the gap between irrigation potential created and its utilization. In 2004, the program was restructured to include the objective of increasing agricultural productivity. Presently, more than 56,000 Water User Associations (WUAs) covering 13 million ha of canal command have been formed following the participatory irrigation management (PIM) approach.

Growing water scarcity and promotion of horticultural/ cash crops by the Government also prompted adoption of water saving irrigation methods. Today, India has over 2 million ha of sprinkler and close to 1 million ha of micro irrigated area. Coupled with improved agronomical practices and access to irrigation water, the food grain production has reached to 230 million tones (about 56% from irrigated agriculture), achieving not only self-sufficiency but also some exportable surplus.

Drainage Provisions

The expansion of the Irrigated area has not been without problems. Due to poor water management, waterlogging and soil salinity has been developed in some canal commands reducing the land and crop productivity. It is estimated that about 3 million ha are waterlogged and 6.45 million ha are salt affected in the country. Although India has the largest irrigated area in the world, the area with adequate drainage provisions is dismal. It is projected that about 13 million ha could be affected by waterlogging and soil salinity by 2025. In some canal commands, modern sub-surface drainage (SSD) technology covering over 50,000 ha has been adopted. Some successful examples of public-private partnership in SSD installation have been reported.

Challenges and the Way Ahead

India faces the daunting task of doubling its food grain production from the present 230 million tones to feed an estimated population of 1.6 billion by 2050. To achieve this, additional crop area will have to be brought under irrigation, besides substantial increase in the present water withdrawals for irrigation. With the rapidly growing water demand from irrigation and other sectors, and likely threat due to impending climate change, the country can no more afford to follow the "business as usual" approach of water resources development and management (WRDM). The country therefore needs to embrace the integrated approach towards WRDM, modern and scientific technology and tools in water management/ saving, institutional reforms, and capacity building of all stakeholders for achieving efficient and sustainable water use. Irrigation being the largest user of water in India, any improvement in its handling from the water source to the field application will facilitate further expansion of the irrigated area. In future, less and less water will have to be used for growing more food. Stagnant crop yields, low overall water use efficiency, inadequate land drainage, over exploitation of groundwater, deteriorating quality of ground and surface waters, use of poor quality waters for irrigation are some of the challenges to the water managers, researchers and policymakers of the country.

[1] Chairman, Indian National Committee on Irrigation and Drainage (INCID) / Central Water Commission, New Delhi, E-mail: cmanoff@nic.in

Impacts of Global Financial Turmoil on Food Security

The 2nd McGill Conference on Global Food Security was organized by McGill University, Montreal, Canada from 5 to 7 October 2009, and led by ICID President Professor Chandra Madramootoo. The Conference addressed the impacts of the recent global financial crisis on food security especially in the regard to developing countries. Participants from more than 25 countries presented their unique perspectives on the current situation. International aid agencies reviewed ongoing food security problems and the effect of the economic crisis on their ability to respond both in the short and long term. There were over 400 participants including Ministers of Government, Ambassadors, Members of Parliament, policy makers, international scholars, development experts, representatives of international agencies and NGOs, private sector staff, academics and students. Secretary General M. Gopalakrishnan was invited to make a presentation on the Indian sceanrio on food security. Several key ICID dignitaries also participated in the deliberations including Pres Hon Aly Shady and Vice President Hon Professor Dr. Victor Dukhovny. Conference participants debated specific challenges around finance, investment and credit in agriculture, research and capacity building, markets and trade, appropriate biofuel policies, and the future challenges in food production due to changes in climate. The conference brought out some crucial recommendations for long term policy planning and identified priority areas required to increase agricultural production. The following is a summary of the speech made by Prof. Dr. Chandra Madramootoo, President, ICID and the Dean of Faculty of Agricultural and Environmental Sciences, McGill University, Canada.

The problem of high food prices is not only confined to the developed world but people in many developing countries are among the most affected. The analysis showed high fuel prices led to high transportation costs. Other factors contributing to higher food prices are occurrence of floods and droughts, conversion of food producing land to fuel production, dwindling international reserves of cereals and grains and changing dietary pattern particularly in India and China.

The world wide financial crisis has resulted in credit for farmers becoming expensive and difficult to find, potentially causing fewer crops to be planted and exacerbating food shortages.The mixture of trade restrictions and liberalization has an important influence on household food security. It is necessary to understand how markets function and examine interventions that can facilitate trade imperative to improving global food security. The trading in food commodities from the stock markets and the stock markets arrangements also played some role in driving up food prices.

One of the most evident and salient points emerged from the last year's McGill Conference was the fact that the countries both developed and developing could not come back in investment in the agriculture sector over the past 25-30 years. The President of International Fund for Agriculture Development in his keynote address in last year conference remarked the food prices was not a sudden as some may have felt the declining in financial and investment in agriculture and food production over such a long period was a warning sign which we failed to ignore. The strategy in financial and economic crisis has impact on the availability of funds and investments in food production, rural infrastructure, technology transfer, marketing support services, easy access to credit by local agriculture entrepreneurs and small landholders as well as its slow down on the conversion of food crops to the biofuel.

From (L) Secretary General M. Gopalakrishnan, President C. Madramootoo and President Hon Aly Shady at the conference venue

Some Key Messages from President Madramootoo's speech

- The food crisis will not come to an end very soon and has been in the making for the last 30 years.
- Financial downturn exacerbated the food crisis.
- Need to reinvest and inject new capital into agriculture development as manifested by the G8/G20 summits.
- It is imperative to enhance small landholder productivity.
- Implement risk management measures with institutional support and with public-private partnerships to ensure steady flow of capital to the agricultural sector.
- Some $55 billion/yr needed to address the gap in food production in developing countries.
- Research and development and capacity building, agricultural extension and dissemination of information to agricultural producers are the backbone for sustainable agricultural development and food security.
- Gap in crop yields – could be increased 7 fold with the application of existing and new technologies.
- International agencies have reacted by mobilizing resources for food assistance and short term financing. Agencies have introduced a number of innovative mechanisms for quick response to the 2008 food crisis and by coming together to seek long term strategies.
- There is no viable substitute for the liberalization of trade in agriculture.
- Reduce trade barriers; remove protectionism and subsidies.
- If tariffs continue to stay there will be 11% drop in developing country exports and a decline of $ 350 billion in revenue.
- Biofuels if produced wisely and with proper planning, and with judicious selection of feedstock and conversion methods, can be a viable source of additional rural income, without compromising food security.
- Long-term impacts of climate change are not precisely known. Climate variability will continue to affect crop yields and food security, in the arid and semi-arid and monsoon areas, where the poorest of the poor live.
- There is need to introduce in countries, risk management tools, such as weather index based insurance models, better water management and crop selection, drought resistant crops.
- An indicator for measuring food security levels is the nutritional interventions particularly for women and children.
- Aquaculture and fisheries van play a major role in filling the nutritional gaps for protein, using non-land based resources, and at the same time not competing with resources used for the production of food crops.

Modern Drainage Water Management to Reduce Drainage Volumes and Nitrogen Losses

R. Wayne Skaggs and Mohamed A. Youssef*

Introduction

Artificial drainage is necessary to farm some of the world's most productive soils. Drainage ditches or subsurface drain tubes are used to lower water tables, improve trafficability, prevent water-logging, control soil salinity and increase yields. Subsurface drainage reduces surface runoff, sediment losses and the movement of contaminants attached to the sediment, such as pesticides and phosphorus, into surface waters. However, subsurface drainage increases the losses of nitrogen (N) to surface waters, and has been cited as one of the primary sources causing algal blooms and hypoxia in major water bodies. For example, N losses from over 20 million ha of intensively drained cropland in the U.S. Midwest have been cited as a major contributor to excessive N and hypoxic conditions in the northern Gulf of Mexico. The development of methods to reduce N losses from agricultural drainage systems has become an important objective of researchers, engineers and drainage professionals.

In the U.S., the Agricultural Drainage Management Systems (ADMS) Task Force (http://extension.osu.edu/~usdasdru/ADMS/ADMSindex.htm) was organized in 2002 with the objective of developing and implementing methods to reduce nutrient losses to surface waters from drained lands. The current focus of the Task Force is to reduce N losses from drained lands to the Mississippi River and Gulf of Mexico.

Drainage Water Management

Research has shown that drainage volumes and nitrogen losses through the drains can be substantially reduced by a practice called Controlled Drainage (CD). This practice, which is also referred to as the more general term, Drainage Water Management (DWM), involves the use of a weir or an overflow device to reduce drainage rates by raising the water level in the drainage outlet (Figures 1 and 2). DWM may also include subirrigation, where water is pumped into the drains or the drainage outlet to supply irrigation water via the water table during dry periods. CD reduces the hydraulic gradient to the drain, subsurface drainage rates and annual subsurface drainage volumes. Since drainage requirements for crop production vary with season, CD can be used to reduce drainage rates during periods when intensive drainage is not necessary, such as the winter months. Based on research conducted in the 1970s and 1980s CD was accepted as a best management practice (BMP) in the state of North Carolina for reducing N and phosphorus (P) loads to surface waters and is cost shared to support its implementation. More recent research by a number of investigators has shown that the practice is effective for a wide range of soils and climatological conditions, and it is now being promoted and applied in the U.S. Controlled drainage has reduced drainage volumes ranging from 17% to 85% compared to conventional or uncontrolled drainage, in all cases studied. In some cases the reduction of N losses to surface and groundwater is nearly equal on a percentage basis to the reduction in drainage volume. In others it is clear that the route of N loss has been changed, but the magnitude of reduction, if any, is uncertain. CD conserves water and increases yields, but the magnitude of the yield response may not be a sufficient incentive to promote its application at full potential.

Figure 1. A flash-board riser structure used to implement Controlled Drainage during periods when drainage intensities may be reduced.

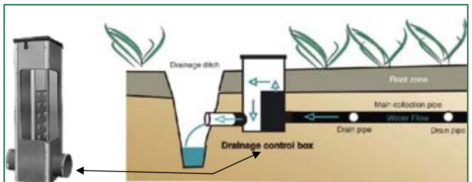


Figure 2. A control structure used with buried drain lines.

Use of DRAINMOD-NII

The magnitude of N losses in drainage water, and the effect of CD on those losses, depends on soil factors, drainage system design, crop species, rotation and yields, fertilization amounts and timing, weather variables and cultural practices. Field experiments have shown the effect of CD on both N losses and crop yields for some combinations of these factors, but only for a few of the many possibilities. Further, the effectiveness of CD varies from year to year because of differences in weather. The best alternative for quantifying the effect of CD on N losses in drainage water spatially and temporally is the application of simulation models. The DRAINMOD-NII model was developed to describe N dynamics in poorly drained soils. The model has been tested against field measurements and found to reliably predict N losses in drainage water for a range of soils and locations across the U.S. and Europe.

As an example application, DRAINMOD-NII was used to evaluate the annual and long term average effects of CD on N losses in drainage water for fields in the Lower Coastal Plain of North Carolina. CD reduced the 35-year average annual predicted N losses in drainage water by 37% (from 42 to 26 kg/ha/yr) for continuous corn and by 34% for a corn-wheat-soybean rotation. Both predicted N loads in drainage water and the reduction of those loads in response to CD varied widely from year to year. Predicted annual N loads for conventional drainage on continuous corn varied from 12.3 to 87.3 kg/ha (Figure 3). CD reduced the predicted annual N loads in drainage water by 18 to 58% over the 35 year period.

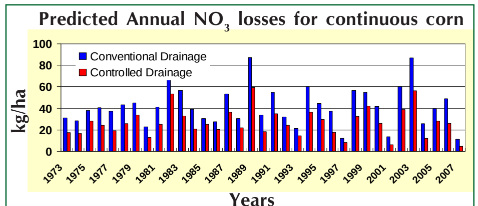


Figure 3. Predicted annual NO_3-N losses for continuous corn under conventional drainage and controlled drainage on a Portsmouth sl soil at Plymouth, NC.

❍

* W.N. Reynolds District University, North Carolina State University, Raleigh, NC27695-7625, Prof. R. Wayne Skaggs may be contacted at <wayne_skaggs@ncsu.edu>

A Simple Tool to Effectively Implement Water Saving Alternate Wetting and Drying Irrigation for Rice

T.P. Tuong, B.A.M. Bouman, R. Lampayan*

Introduction

The present and future food security of Asia rests with our ability to increase food production with reduced amount of water diverted to agriculture. Rice is an obvious target since it alone accounts for about 50% of all diverted freshwater for irrigation in Asia. Rice needs 2–3 times more water to produce the same amount of grains as other cereals.

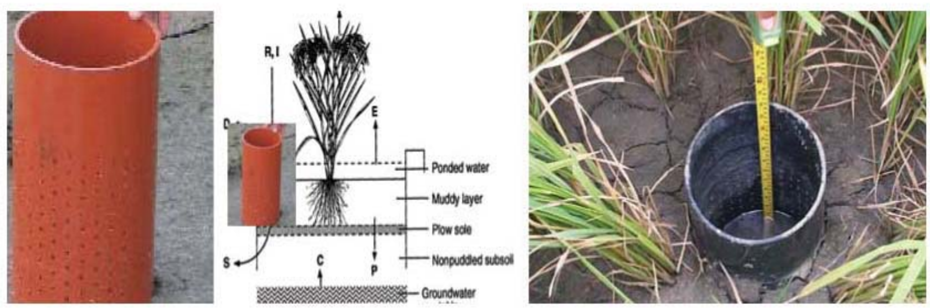
Traditionally, rice is grown in continuously flooded fields. In which case almost half of the applied water is lost as percolation and seepage. To save water, farmers primarily have to reduce these outflows while maintaining evapotranspiration requirement to secure good rice yield. One mature technology for doing this is alternate wetting and drying (AWD) irrigation. AWD does not require rice fields to be continuously flooded. Farmers re-flood their fields only after a certain number of days have passed following the disappearance of ponded water. With the optimal management, this technology reduces the amount of water required by a quarter and, more importantly, it does not reduce yields. We call this *safe* AWD.

The AWD concept, previously called intermittent irrigation, has been studied for more than a decade. Scientists, however, did not come up with recommendations accepted by farmers to implement *safe* AWD. Some scientists gave recommendations in terms of the number of days of non-flooded soil in between irrigations. This period varied widely – from 1 day to more than 10 days – depending on soil type, climate, and the phase of the rice crop. Other scientists recommended that irrigation be given when soil water tension in the rootzone reached a threshold value of 10 kPa. This is less dependent on soil and climate and can be applied at different sites. However, the terms "soil water tension" and "kPa" were completely alien to farmers. Furthermore, farmers did not have suitable equipment to know when the threshold was reached. As a consequence, AWD was not adopted widely by farmers.

Water Tube

What farmers need is simple messages and a simple tool to help them make decisions on when to irrigate. Scientists at International Rice Research Institute (IRRI), through multi-location and multi-season experiments, found that when field water level recedes to 15 cm below the soil surface, soil water tension in the rootzone is always <10 kPa, ensuring good yield. Thus, instead of using threshold soil water tension, the threshold for *safe* AWD is simply "field water level 15 cm below the soil surface."

A practical way to implement *safe* AWD is to monitor the depth of ponded water using a field water tube (see Figure). This tube can be made of plastic pipe or bamboo 30–35-cm-long and 15 cm or more in diameter to allow farmers to see and monitor the surface of water inside the tube. Holes (about 0.5 cm in diameter and 2 cm apart) were perforated on all sides of the tube.



A simple water tube installed in the rootzone allows farmer to see water level beneath the soil surface.

After transplanting, farmers would keep the field submerged for about 2 weeks (or 3 weeks for direct seeding) to suppress weed growth. The tube is then inserted into the soil but you leave 10 cm above the soil surface, with soil inside the tube removed down to the bottom of the tube. Water will flow through the holes into the tube, so that the water level inside the tube is the same as outside. After irrigation, the field water level will gradually subside. When the water level observed in the tube drops to 15 cm below the soil surface, irrigation should be applied to re-flood the field up to 5 cm. This cycle is repeated throughout the season, except from a week before until a week after flowering, when the field should be kept flooded to prevent sterility from occurring. After that, the water level can be allowed to drop again to 15 cm below the surface before re-irrigation.

Technology Adoption

This technology has been widely validated by various national institutes and organizations in farmers' fields in the Philippines, Bangladesh, and Vietnam. Everywhere, farmers reported a reduction in water use of 15–30%. This translates into a reduction in pumping cost and fuel consumption, and higher income. The Bangladesh Rice Research Institute reported that AWD increased farmers' income by US$67–97 per hectare. In Vietnam, the technology also resulted in a 15% yield increase, thanks to a reduction in lodging, which often occurs in direct-seeded rice. In the Philippines, PhilRice and the National Irrigation Administration have successfully used AWD to improve equity and reduce upstream–downstream conflicts in canal irrigation systems.

This technology has now reached 60,000–70,000 farmers in the Philippines, and tens of thousands in Bangladesh and Vietnam. Realizing its profound impact on farmers, the Bangladeshi Secretary of Agriculture approved AWD for nationwide dissemination; it is becoming a national program of the Department of Agricultural Extension. The Philippines' Department of Agriculture is working toward an Administrative Order authorizing AWD to be practiced in all irrigation systems nationwide.

Acknowledgment: IRRI carried out the work on AWD through projects funded by the Swiss Agency for Development and Cooperation, Asian Development Bank, and Japanese Ministry of Foreign Affairs.

❍

* International Rice Research Institute, Los Banos, Laguna, Philippines. Dr. To Phuc Tuong may be contacted at <t.tuong@cgiar.org>

SonTek
YSI incorporated

[SOUND PRINCIPLE NO. 27]

Extreme Weather events require Extreme Monitoring Solutions

www.sontek.com

Sound Principles. Good Advice.

Issue 5

INSIGHT ON ULTRA-LOW SEDIMENT FLOW PROVIDED BY ARGONAUT-ADV®

LOUISIANA, USA.
Louisiana's coastal wetlands provide vital wildlife habitat and a strong buffer against storms. But they are threatened by subsidence and cut off from the historic floods that built the Mississippi River Delta. Using SonTek Argonaut–ADVs®, a Louisiana State University team captured continuous streams of data on shallow, slow-moving currents (down to 1 mm/s) that are notoriously difficult to measure. Their findings are teaching stakeholders how releases of sediment-rich pulses of water through a diversion structure near New Orleans may be managed to help rebuild marshes while minimizing impacts on local fisheries.
> www.sontek.com/news/UltraLowFlow.pdf

ACOUSTIC DOPPLER TECHNOLOGY ENABLES FAST ASSESSMENT OF POST-QUAKE HYDRAULIC CONDITIONS

SICHUAN PROVINCE, China.
A 7.9 magnitude earthquake in China left millions homeless and susceptible to thirst and water-borne disease as it ravaged the country's hydrology monitoring stations. SonTek/YSI immediately responded with assistance and hydroacoustic equipment — allowing hydrologists to gauge the speed and strength of water flow, as well as monitor drinking water distribution. The advanced RiverSurveyor® provided fast assessment of flood conditions and did in minutes what had taken hours for a field crew with conventional instruments.
> www.sontek.com/news/ChinaQuake.pdf

For FREE technical notes, access to web-based training and product information, visit www.sontek.com.
Questions? E-mail: inquiry@sontek.com. Or call: +1.858.546.8327.

A SMART WAY TO HANDLE FLOODS

KUALA LUMPUR, Malaysia.
Devastating floods are common in crowded Kuala Lumpur, necessitating the massive Stormwater Management and Road Tunnel (SMART) project. Because accurate and timely information on discharge and velocity are vital for success, 16 SonTek Argonaut-SL and Argonaut-SW current meters were required. Says Bruce Sproule, Greenspan Technology's International Manager, "SonTek equipment...was the easiest and most accurate to incorporate into this project. The support is good and the equipment reliable."
> www.sontek.com/news/SmartTunnel.pdf

The most common and widespread of the world's natural hazards is the flood. According to UNESCO, these disasters strike about 150 times, impact 500 million lives, and create at least $60 billion in damages – each year. Providing fast and reliable flow data under unpredictable conditions is serious business at SonTek. And making a difference anywhere in the world means our instruments have to be accurate, reliable, and capable under extreme conditions.

Future ICID Events

61st IEC Meeting and 6th Asian Regional Conference, 10-16 October 2010 Yogyakarta, Indonesia

The theme of the conference is "Improvement of irrigation and drainage efficiency through participatory irrigation development and management under the small land holding conditions". The five sub-themes are (i) Irrigation under the escalating water scarcity and the issue of agricultural land conversion and agricultural land fragmentation; (ii) Challenges for irrigation agriculture under the small land holders in the approaching decades; (iii) Improvement of irrigation and drainage efficiency through participatory irrigation development and management under the small land holding conditions; (iv) Multifunctional roles of irrigation water and the role of sustainable balance of ecosystem under the small holder; and (v) Synergizing of the small and the large holder irrigation under the rapid development of rural and urban infrastructures.

The objectives of the conference address specifically to circumstances of the Asian Countries - which are (a) to contribute to a better knowledge of the scope and phenomena of water and land resources development and management toward achieving a sustainable development; (b) to extend further concept for engineering and management measures to overcome anticipated problems, considering constrains and limitations as well as other affiliated factors related to the theme/sub-themes and topics. The deadline for submission of abstract of papers is **28 February 2010.**

For more information, please contact - Secretary General, INACID, Ministry of Public Works, Directorate General of Water Resources, Main Building, 3rd Flood, Jalan Pattimura No. 20, Kebayoran Baru, Jakarta Selatan, Indonesia; Tel: +62 21 723-0317, 723-0318; Fax: +62 21 5705798, E-mail: secretariat@icid2010.org; Website: www.icid2010.org

24th European Regional Conference, 16-20 May 2011, Groningen, The Netherlands.

The title of the Conference is "Integrated water management for multiple land use in flat coastal areas"

The main topics to be discussed are: (i) Multiple land-use, (ii) Fresh water management and salt intrusion, (iii) Flood risk management, and (iv) Institutional arrangements and history. A technical tour will be organized, hosted by the German National ICID Committee (GECID), in the Eems/Dollard region in Lower Saxony, Germany.

For details, please contact: Mr. Pol Hakstege (Secretary of NETHCID), Ministry of Transport, Public Works and Water Management, Rijkswaterstaat Centre for Infrastructure, P.O. Box 20.000, 3502 LA Utrecht; The Netherlands, Email: pol.hakstege@rws.nl or Mr. Bert Toussaint (Chairman of organizing committee), Ministry of Transport, Public Works and Water Management, Rijkswaterstaat Centre for Corporate Services, P.O. Box 2232, 3500 GE Utrecht, The Netherlands, Email: bert.toussaint@rws.nl, Website: www.nethcid.nl Email: nethcid2011@rws.nl

21st International Congress on Irrigation and Drainage, 62nd IEC Meeting, and 8th International Micro irrigation Congress, 15-23 October 2011, Tehran, Iran

The theme of the 21st Congress is "Water productivity towards food security". The Congress will discuss on Question 56 "Water and land productivity challenges" and Question 57 "Water management in rainfed agriculture", besides Symposium on "Climate change impacts on soil and water resources", Special Session on "Modernization of water management schemes", and Seminar on ''Possibilities of Traditional Methods in Modern Water Management Systems''. Parallel to these, 8th International Micro irrigation Congress (IMIC) will also be held. The Conference website (http://www.icid2011.org) is active and the 2nd announcement providing brief for each of the Sub-questions and Sub-themes of the Int'l Micro-irrigation Congress, schedule of paper submission etc. has recently been posted for download. For details, please contact: IRNCID Secretariat, No. 1, Shahrsaz Alley, Kargozar St., Zafar St., Tehran, Iran, Postal Code: 19198-34453. Tel: (+9821) 2225 7348 – 22250162, Fax: (+9821) 2227 2285, E-mail: irncid@gmail.com, icid2011@gmail.com, Website: http://www.icid2011.org

3rd African Regional Conference, 2011, Mali

For details, please contact: Dr. Adama Sangare, Secretary General, Association Malienne des Irrigations et du Drainage (AMID), Au Modibo Keita, Im Sulla and Fils, BP 1840, BAMAKO, Mali. Tel: (223)222 75 21, Mobile No: (223) 674 08 94, Fax: (223) 223 48 82, E-mail: a.sangare@betico.net; betico@betico.net

Editor: Dr. S A Kulkarni, Executive Secretary, DTP: K.D. Tanwar, **ICID Central Office, New Delhi, India**
E-mail : icid@icid.org, Website : http://www.icid.org

Welcome to 60th IEC Meeting and 5th Asian Regional Conference

6-11 December 2009, New Delhi, India

The host Indian National Committee on Irrigation and Drainage (INCID) is fully prepared to welcome international and national delegates to 60th International Executive Council (IEC) meetings and 5th Asian Regional Conference (ARC) being held at New Delhi. Participants from 43 countries will present more than 180 technical papers through the 20 technical sessions of the Conference. There will be 8 Special Sessions including that of farmers' meeting. All the meetings/ conferences will be held at 'Vigyan Bhawan' except those on Saturday 5 December. There will be daily shuttle bus service for the delegates staying at the listed hotels for commuting to the conference venue. For any assistance, please contact the Conference organizers - Mr. Sunil Sharma (+91 9811299136), Mr. A.C. Gupta (+91 9871995996); INCID Secretariat Mr. Yogesh Paithanker (+91 9868184759); or ICID Central Office: Tel: +91 11-26116857; +91 11-26115679. The final schedule of the pre-Council workbody and 60th IEC meetings, 5th ARC, and Special Sessions is shown below:

Program at a Glance

Day/Date	Saturday 5 December 2009	Sunday 6 December 2009		Monday 7 December 2009		Tuesday 8 December 2009		Wednesday 9 December 2009		Thursday 10 December 2009		Friday 11 December 2009		Saturday 12 December 2009
Time (Hours)	ARRIVALS AND REGISTRATION	09.30-13.15	14.15-18.00	09.30-13.15	14.15-18.00	09.30-13.15	14.15-18.00	09.30-13.15	14.15-18.00	09.30-13.15	14.15-18.00	09.30-13.15	14.15-18.00	DEPARTURE TO POST CONFERENCE TECHNICAL VISITS AND TOURS
		Registration		Registration Start of NCs Display		Registration NCs Display		Registration EXHIBITION		EXHIBITION		EXHIBITION		
								5th Asian Regional Conference						
Theme `Knowledge'		WG-HIST (Hall 2 Main Bldg)	WG-TRUE (Room No. 316)	C-PR & P (Hall 2 Main Bldg)	WG-CD (Room No. 316)	EB-JOUR (Room No. 316)		Exhibition Inauguration (09:00 – 09:30 hrs) Technical Sessions 09:30 – 18:00 hrs) (Hall 5 & 6 Main Bldg)		Opening Ceremony (Main Hall – Main Bldg) (09:30 – 10:00 hrs) Technical Sessions 10:30 – 13:15 hrs) (Hall 5 & 6 Main Bldg.)		Technical Sessions 09:30 – 17:00 hrs) (Hall 5 & 6 Main Bldg.) Closing Ceremony (Main Hall – Main Bldg.) (17:00 – 18:00 hrs)		
Theme `Basin'		WG-ENV (Hall B Annexe)	WG-DROUGHT (Hall 3 Main Bldg)	WG-CLIMATE (Hall 3 Main Bldg)	WG-CAFM (Hall 2 Main Bldg)	WG-SDTA & WS (Hall 2 Main Bldg)		PCTA 09:30 – 13:00 hrs 14:00 – 17:30 hrs (Hall 3 – Main Bldg)		IEC (Session I: 10:30 – 13:15 hrs) (Session II: 14:15 – 18:00 hrs) (Hall A Annexe)				
Theme `System'		WG-POVERTY (Hall A Annexe)		WG-YPF (Hall A Annexe)	WG-MIS (Hall B Annexe)	WG-WATS (Hall B Annexe)	WG-DRG (Hall B Annexe)							
Theme `On-Farm'				C-CONGR (Hall B Annexe)	WG-CROP (Hall D Annexe)	WG-ON-FARM (Hall D Annexe)	WG-PQW (Hall D Annexe)							
RWGs		ASRWG (Hall C Annexe)	AFRWG (Hall C Annexe)	ERWG (Hall C Annexe)	AMRWG & WS (Hall C Annexe)	PCSPOA (Hall C Annexe)								
Task Forces		TF-WWF5 (Hall 3 Main Bldg)		TF-LDCs - AF (Hall 4 Main Bldg)	TF – Finance (Room No. 308)	ST-ARAL (Hall A Annexe)								
Permanent Finance Committee/ Side Meetings	SC 16.00-18..00 hrs (CO, ICID) MB 18.00-20.00 hrs (CO, ICID)	ST-LCB (Room No. 316, Main Bldg)	Mtg. NCs with President 17.00-18.00 hrs, (Hall 4, Main Bldg)	CG-IPTRID (Room No. 308)	PFC (Hall 3 Main Bldg) MT-JOUR 18:00 – 19:00 hrs	Mtg. NCs – VPs 17:00 – 17:30 hrs (Hall 4 Main Bldg)	Mtg. OBC 17:30 – 19:00 hrs (Room No. 316)	Farmer's Session on Participatory Irrigation Management by Indianpim						
Special Sessions						Drainage (Hall 3 Main Bldg)	Micro irrigation (Hall 3 Main Bldg)	ICID-IWMI-INCID Trends in Asian Irrig. (Hall 2 Main Bldg)	MRC Initiative (Hall 3 Main Bldg)	Aral Sea basin Initiative (Hall 2 Main Bldg)	Ground-water (Hall 2 Main Bldg)	Water Governance (Hall 2 Main Bldg)		
Receptions		Welcome Reception (19.00-22.00 hrs)		Free Evening		Reception by INACID, Indonesia (19.00-22.00 hrs)		Welcome Reception (19:00–22:00 hrs)		Reception by IRNCID, Iran (19:00–22:00 hrs)		Farewell Dinner (19:00–22:00 hrs)		

Tea Breaks: Morning Session (11.00 - 11.30 hrs); Afternoon Session (15.45 - 16.15 hrs)

5th Asian Regional Conference | PCSPOA Workbodies | Task Forces | Side Meetings | PCTA Workbodies | Special Sessions