



**21<sup>st</sup> ICID Post Congress – Vol. 2**

8<sup>th</sup> International Micro Irrigation Congress  
and

62<sup>nd</sup> IEC meeting of ICID  
19-23 October 2011,  
Tehran, Iran

# Foreword



The International Commission on Irrigation and Drainage (ICID) is a scientific and technical non-governmental international professional organization dedicated inter alia, to improve water and land management to enhance the worldwide supply of water and fibre for all people.

ICID stimulates and promotes the development and application of the art, science and techniques of engineering, agriculture, economics, ecology and social science in managing water and land resources for irrigation, drainage and flood control and river training applications. Its objectives encompass research and development, capacity building and adoption of comprehensive state-of-the-art approaches and techniques for sustainable agriculture in the World. ICID, founded in 1950, enrolled as many as 110 member countries; about 60 of them are active and contribute to the goals of ICID.

The triennial congresses are the major events of ICID, among others. Numerous congress themes and topics have been presented and discussed during the past 20 congresses over a period of 60 years. The main theme of the 21st Congress is "Water Productivity Towards Food Security". Water resource use is a complex issue within the food security debate, and water productivity for food security remains an important issue.

In addition, the Congress Programme addressed an interesting mix of issues that are highly relevant today. I would like to particular draw your special attention to Questions 56 and 57 where 'Water and land productivity challenges' and 'Water management in rainfed agriculture' was addressed. I consider these an extremely important questions as we move to achieve the Millennium Development Goal (MDG) of cutting the number of undernourished people to half by 2015.

During the Congress, papers were presented and discussed for two Questions, a Special Session, a Symposium and numerous Workshops. The Congress proceedings included a printed volume with 'Abstract' and a CD-ROM containing all full length papers of all events.

I hope these proceedings were useful to all delegates during the Congress and many others who may refer to them in future.

Chandra A. Madramootoo  
President, ICID

# Preface



The 21st International Congress on Irrigation and Drainage based on the theme 'Water Productivity Towards Food Security' was organized by ICID at Tehran, Iran during 15-23 October 2011. The magnificent IRIB International Conference Center (IICC) was the venue of the Congress and Pre-Council meetings of ICID.

The 21st ICID Congress was opened by H.E. Mahmoud Ahmadinejad, President, I.R. of Iran. The event was graced by the presence of high profile guests and dignitaries - H.E. Pawan Kumar Bansal, Minister of Water Resources from India; H.E. Khaliatian, Minister of Jihad-e-Agriculture, H.E. Namjoo, Ministry of Energy, I.R. of Iran; H.E. Dr. Shavkat Khamraev, Deputy Minister of Water and Agriculture, Uzbekistan; H.E. Li Guoying, Vice Minister, Ministry of Water Resources, China; H.E. Eng. C.K. Chiza, Deputy Minister of Agriculture, Republic of Tanzania, President Chandra Madramootoo, Presidents Hon. Aly Shady, Prof. Bart Schultz, Peter Lee and serving Vice Presidents and Vice Presidents Hon., and Senior Officers from the FAO, ADB, and WWC.

The event was hosted by the Iranian National Committee (IRNCID) with the leadership of H.E. M.R. Attarzadeh, Deputy Minister of Energy for Water and Wastewater Affairs, and Chairman, IRNCID and Dr. S.A. Assadollahi, Secretary General, supported by several Ministries and National Organizations (Private and Government) from Iran.

More than 200 papers were presented during the Congress. Besides the Congress, meetings of 30 ICID workbodies, workshops and a large technical exhibition were held. The other side events held were FAO side event on Investment in North Africa; Australian Special Session; FAO ICID Special Session, Special Session on 6th World Water Forum, and the Young Professionals meeting. During the Opening Session, three publications (a) Towards Sustainable Development of Tidal Areas: Some Principles and Experiences (Prepared by WG-SDTA); (b) Half a Century with IRNCID; and (c) History of Water in Ancient Iran, prepared by IRNCID were released.

Two questions, central to the theme of the Congress were discussed: Question 56 : Water and Land Productivity Challenges; Question 57 : Water Management in Rainfed Agriculture. Question 56 and Question 57 both covered 5 and 4 sub-topics, respectively. Concurrently with the Congress, a Special Session on 'Modernization of Water Management Schemes' (19 October 2011) and a Symposium on 'Climate Change Impacts on Soil and Water Resources' (18 October 2011) were also held successfully. Another Workshop and three Special Sessions were also organized: viz (i) Workshop on 'Water Use Charging Systems and Available Financing of Irrigation: Case Studies for Cross-Country Comparisons' by TF-FIN (17 October 2011). A full-day FAO-ICID-IRNCID Special Session on 'Modernization of Water Management Schemes' by WG-MIS (20 October 2011); ICID-FAO Special Session on 'Water for Food Security' by TF-WWF6 (18 October 2011); and the Special Session on 'Young Professionals Forum' by WG-YPF (17 October 2011).

ICID has instituted several awards for its members to enhance their interest and participation in the activities of ICID. The 4th Award for Best Performing ICID National Committee (BPNCA) was given to the South African National Committee on Irrigation and Drainage (SANCID) for their outstanding contributions, impressive achievements and excellence in performance. The 3rd Award for 'Best Performing Workbody (BPWA) was given to the ICID Working Group on Sustainable Development of Tidal Areas (WG-SDTA) for their outstanding performance. Further, ICID 'WatSave Innovative Water Manager Award' was presented to Prof. Dr. Subhash M. Taley (India) for his water saving contribution on 'Participatory Rainwater Conservation of Rainfed Agriculture of Vidarbha Region (Maharashtra), India'. ICID 'Technology Award' was presented to Messrs. Pieter S van Hoerden and Charles T Crosby (South Africa) for his water saving contribution to 'SAPWAT 3 : Irrigation Water Planning Tool' and 'Farmer Award' was presented to Mr. Jerry Erstrom (USA) for their water saving contribution on 'The Willow Creek Piping Project'. Plaques were presented to Office-Bearers Prof. Dr. Chandra Madramootoo (Canada), Dr. (Mrs.) Samia El-Guindy (Egypt), Dr. Shinsuke Ota (Japan), Prof. Lucio Ubertini (Italy), and Er. M. Gopalakrishnan, Secretary General, ICID, who were retiring after the 2011 Congress. The 8th N.D. Gulhati Memorial Lecture was delivered by Dr. Charles Michael Burt (USA) on 19 October 2011 following the Opening Ceremony of Tehran Congress and 'Best Paper Award 2011' was awarded to Messrs Yanbo Huang, Guy Fipps, Stephan J. Maas, and Reginald S. Fletcher (USA) to the paper titled 'Airborne Remote Sensing for Detection of Irrigation Canal Leakage' published in Volume 59, No. 5 (December, 2010).

H.E. M.R. Attarzadeh, Deputy Minister of Energy for Water and Wastewater Affairs, and Chairman, IRNCID presided over the Closing Ceremony (23 October 2011) of the Congress. Er. M. Gopalakrishnan, Secretary General, ICID presented the conclusions and recommendations that emerged from the different sessions of the Congress. He also read out Tehran Declaration based on the outcome of the Congress. Dr. Gao Zhanyi, President-elect of the ICID, addressed the Congress and thanked all the ICID National representatives for their support and the delegates for making the Congress a huge success.

ICID profusely thanked Australian National Committee of ICID (IACID); Chinese National Committee on Irrigation and Drainage (CNCID); and Turkish National Committee of ICID (TUCID) for hosting receptions. The Iranian National Committee on Irrigation and Drainage (IRNCID) deserved special thanks for hosting welcome receptions, farewell dinner and cultural show. Last but not the least, all the members of Iranian Organizing Committee and ICID Central Office staff deserve special thanks for their untiring efforts in making the Congress a successful event.

M. Gopalakrishnan  
Secretary General

New Delhi  
February 2012

# Office-Bearers – Pre-Congress

## President (2008-2011)



Prof. Dr. Chandra Madramootoo (Canada)

## Vice Presidents

(2008-2011)



Dr. (Mrs.) Samia El-Guindy (Egypt)



Mr. Shinsuke Ota (Japan)



Prof. Lucio Ubertini (Italy)

(2009-2012)



Dr. Willem F. Vlotman (Australia)



Dr. Laszlo G. Hayde (Hungary)



Mr. A.K. Bajaj (India)

(2010-2013)



Dr. Ragab Ragab (Hungary)



Engr. Husnain Ahmad (Pakistan)



Mr. Chaiwat Prechawit (Thailand)

## Secretary General (2004-2011)



Er. M. Gopalakrishnan

# Newly Elected – Office-Bearers

## President (2011-2014)



Dr. Gao Zhanyi  
(China)

## Vice Presidents (2011-2014)



Prof. Kim, Tai-Cheol  
(Korea)



Dr. Adama Sangare  
(Mali)



Dr. Gerhard Backeberg  
(South Africa)

## Secretary General (2012-2014)



Er. Avinash C. Tyagi

# Contact – coordinates of Office Bearers (Post-Congress 2011)

## President 2011-2014



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## Secretary General 2012-2014



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# Bio-Sketch of Office Bearers

## PRESIDENT



President  
2011-2014

### **Dr. Gao Zhanyi, China (2011-2014)**

Dr. Gao Zhanyi (born in 1962) obtained Ph.D in Hydrology and Water Resources Management from Institute of Water Resources and Hydropower Research (IWHR), China in 2005. At present, he holds the position of Director, National Centre for Efficient Irrigation Technology Research, China. He has served in various capacities in several international and national projects of global nature. Dr. Zhanyi has been contributing immensely to the activities of ICID as member and Chairman of Permanent Committee and several workbodies. He was also the Vice President of ICID for the period 2005-2008. He participated in numerous ICID events and was the key force behind the successful organization of 19th Congress and 56th IEC in 2005.

Dr. Zhanyi was also the recipient of various awards like ICID WatSave Award in 1999. Greet Yu Science and Technology Achievement Award from Ministry of Water Resources, China in 2006, 2007, 2008 and 2009 and Science and Technology Achievement Award from Ministry of Water Resources, State Council, Ningxia Autonomous Region, Hebei Province and Beijing Municipality in 1998, 2003, 2004, 2008.

## VICE PRESIDENTS



Vice President  
2009-2012

### **Dr. Willem F. Vlotman, Australia (2009-2012)**

Dr. Willem F. Vlotman (born in 1952) obtained B.Sc. Civil Engineering (1975), M.Sc. Agricultural Engineering (1982), Ph.D Irrigation and Agricultural Engineering (1985), and MBA, Agribusiness (2004)

At present he is working as Assistant Director Environmental Hydrology, Basin Plan Division of the Murray-Darling Basin Authority, Canberra, ACT, Australia. Dr. Vlotman is the Theme Leader of 'Systems' of ICID, Chairman Working Group on Drainage (WG-DRG), Secretary, Working Group on Modernization of Irrigation Services (WG-MIS) and Observer, Asian Regional Working Group (ASRWG).

He has more than 34 years of experience in channel hydraulics and hydrology; water simulation models, water management; application of chain management; optimizing crop production; computer programming and modern computer software applications; extensive experience in Institutional Strengthening and Organizational Development of research organizations, Human Resources Unit and Marketing and Public relations Unit.

Dr. Vlotman is also associated with various professional societies which includes IAL; AWA, USCID, ASCE, and Toastmasters International.

Dr. Vlotman authored and co-authored 2 books, over 70 reports and working papers, more than 50 technical papers.



Vice President  
2009-2012

**Dr. Laszlo G. Hayde, Hungary (2009-2012)**

Dr. Laszlo G. Hayde, Hungary (b. in 1958) obtained Doctorate in Fluid Mechanics from Technical University of Budapest (1995), M.Sc. in Civil Engineering with Specialization in Hydraulic Engineering (1982).

Presently, Dr. Hayde is working as Senior Lecturer in Irrigation Engineering, UNESCO-IHE, The Netherlands. Dr. Hayde has been associated with ICID since 1998. He has been Secretary General of HUCID (2000-2004) and was elected as Vice President of HUCID in 2008. Dr. Hayde is Secretary of European Regional Working Group (ERWG), Member of Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST) and Permanent Finance Committee (PFC). He was chief editor of the ICID Publication Danube Valley, History of Irrigation and Flood Control (2004). He was also an Observer on erstwhile ICID Working Group on Capacity Building, Training and Education (WG-CBTE).

Dr. Hayde has more than 27 years experience in consulting, education and research in water and environmental planning and management, hydraulic engineering, fluid mechanics, EU Water Framework Directive, environmentally sound solutions in Hydraulic engineering, environmental impacts and assessment; 19 years experience in education management, organizations of education programmes, curricula development. He is also associated with various professional societies.



Vice President  
2009-2012

**Mr. A.K. Bajaj, India (2009-2012)**

Mr. A.K. Bajaj, India (b. in 1951) obtained B.E. Hons. in Mechanical Engineering and M. Tech in Fluids Engineering and Water Resources subjects.

Mr. Bajaj retired as the Chairman, Central Water Commission (CWC) and Ex-officio Secretary to Government of India, Ministry of Water Resources. He is also a member of Permanent Committee for Technical Activities (PCTA), Permanent Finance Committee (PFC) and ICID Staff Committee (SC).

Mr. Bajaj has more than 35 years of experience in Planning, design and conceptualization of Water resources of the country at macro level, appraisal of major and medium multipurpose water resources projects, undertaking flood management activities on an annual basis and advising the Central Government. He holds membership of various professional societies.



Vice President  
2010-2013

**Dr. Ragab Ragab, UK (2010-13)**

Dr. Ragab (born in 1949) obtained BSc. in Soil and Water Sciences (1970), MSc. in Irrigation (1974), and Ph.D. in Rural Engineering, University of Leuven, Belgium (1982).

At present he is the Chairman of the British National Committee on Irrigation and Drainage (ICID-UK) and working as Head, Water, Soil and Landscapes Group at the Centre for Ecology & Hydrology, CEH, (Natural Environment Research Council, NERC) Wallingford, UK. Dr. Ragab is the Chairman, WG-PQW and WG-CROP and Member WG-DROUGHT. He has more than 40 years of experience in irrigation, drainage, catchment's hydrology, remote sensing application in hydrology, integrated water management, climate change impact on water resources, soil-water-plant- atmosphere relations, rainfall harvesting, use of poor quality water (saline/brackish, treated waste water) for crop production, organic farming and urban hydrology.

Dr. Ragab is also associated with many professional organizations which include: British Society of Soil Science Society (BSSS), American Society of Agronomy (ASA), Soil Science Society of America (SSSA), and European Soil Science Society. Dr. Ragab actively participated in several events of ICID including IECs and Congresses. He also Authored and Co-Authored numerous scientific papers and Editor and Co-Editor of several special issues of International Journals as well as Conference Proceedings.



Vice President  
2010-2013

**Engr. Husnain Ahmad, Pakistan (2010-13)**

Engr. Ahmad obtained his Bachelor and Master Degrees in Civil Engineering from the University of Engineering & Technology (UET), Lahore; a Master Degree in Business Administration from Cardiff Business School, University of Wales; Master Degree in Computer Sciences; and Fellowship of Institute of Professional Financial Managers,

London. He authored more than eight technical publications and was awarded a gold medal for his contributions. Ever since he came into the fold of PEC in 1991, he actively participated in all major events.

He is also associated with various professional societies which include: Member Governing Body of Pakistan Engineering Council, Member Executive Council Institute of Engineers Pakistan, Member, Governing Body Government Engineering Academy, Punjab, Elected Vice President, Britannia Alumni Association of Pakistan (BAAP) and life Member of Old UETians Association. Engr. Ahmad has the honour of also getting elected as President Pakistani Students Society and National Union of Students, UK

Engr. Ahmad is the ever youngest President of Pakistan Engineering Congress in its 94 years of history. Presently, he is Director General in Senate of Pakistan.



Vice President  
2010-2013

**Mr. Chaiwat Prechawit, Thailand (2010-13)**

Mr. Prechawit obtained his Bachelor's Degree in Irrigation Engineering (1965), Master of Science in Agricultural Engineering from Colorado State University (1968), and Bachelor's Degree in Business Administration (1983).

He has forty five years of experience broadly span from design to land classification surveys and operation and maintenance of irrigation projects. Mr. Prechawit was also the project manager of three large irrigation improvement projects in Northeast Thailand financed by the World Bank and KfW of the Federal Republic of Germany. He retired as Chief Inspector General of the Ministry of Agriculture and Cooperatives and actively involved as Honorary Advisor to Royal Irrigation Department, Ministry of Agriculture and Cooperatives. Mr. Prechawit is also associated with various professional societies which include: The Engineering Institute of Thailand and Thai Hydrologist Association etc. He actively participated in several events of ICID including IECs and Congresses.



Vice President  
2011-2014

**Prof. Tai Cheol, Kim, Korea (2011-2014)**

Prof. Tai Cheol, Kim obtained his Ph.D. in Major Irrigation and Drainage from Seoul National University in 1984. He has been contributing to the ICID activities through various workbodies and was also very deeply involved in invigorating the activities of Korean National Committee on Irrigation and Drainage. He also attended various international level workshops / conferences on irrigation management. Over the past 22 years, he has actively participated in several ICID Congresses and events which have helped to achieve the mission of ICID. He is also member of several professional associations like President of PAWEES (International Society of Paddy Water Environment Engineering). He has to his credit many awards, which are - Watsave Technology Awards, 2001, ICID; 2004, Paper award, PAWEES; 1994, Academic Award, 1994, Korean Society of Agricultural Engineers; 1996, Distinguished paper, Korean Science & Technology Association to name a few. Presently, Prof. Kim is Professor in Irrigation, Drainage and Rural Engineering in Chungnam National University, Korea.



Vice President  
2011-2014

**Dr. Adama Sangare, Mali (2011-2014)**

Dr. Adama Sangare (born in 1963) obtained his Masters on Water Management for Agriculture in 1991 from School Inter-States of Engineers of the Rural Equipment (Burkina Fasso) and Federal Polytechnic School of Lausanne. Presently, he is the Président of the Association Malienne des Irrigations et du Drainage (AMID) and Co-Directeur de BETICO. Dr. Sangare also held the position of Chief of brigade for the hydro-agricultural installation (underground drainage) of the perimeter of Bikov (1985-1988); Professor of general hydraulics and hydrogeology with the ECICA (1993-94); Chief of mission study of the collector of Daoudabougou design, calculation, estimate of cost of work (1996). Over the past 26 years he has served in various capacities in his country in World Bank projects as well as other projects funded by other agencies.

Dr. Sangare is also the Chairman of African Regional Working Group since 2009 and is the force behind organizing 3rd African Regional Conference. He very actively participated in several ICID events.



Vice President  
2011-2014

**Dr. Gerhard Robert Backeberg, South Africa (2011-2014)**

Dr. Gerhard Backeberg (born 1954) obtained Ph.D. from University of Pretoria (1994). He has more than 30 years of experience in various capacities, of which Department of Agriculture (1977-1995) and Water Research Commission (1995 to Present). Dr. Backeberg is also associated with many professional societies which include: South African Irrigation Institute, International Association of Agricultural Economists, etc. He has won so many awards like S2A3 Bronze Medal for research excellence award by the South African Association for the Advancement of Science in 1985; Certificate for best M.Sc. dissertation awarded by the Agricultural Economics Association of South Africa (AEASA) in 1984; ICID 2007 Best Paper Award for the article published in Irrigation and Drainage, Vol.55(1); SABI Silver Award 2007 for contribution to irrigation research in South Africa etc. He has authored/co-authored more than 30 papers and articles published in proceedings and journals. Presently, Dr. Backeberg is serving as the Director: Water Utilisation in Agriculture, Water Research Commission, South Africa.

Dr. Backeberg has actively participated in many ICID activities since 1999 and presently he is the Chairman of Task Force on Financing Water for Agriculture (TF-FIN).

## SECRETARY GENERAL



Er. Avinash C. Tyagi  
Secretary General  
2012-2014

### **Er. Avinash C. Tyagi (2012-2014)**

Er. Avinash. C. Tyagi, a 1973 graduate from University of Roorkee, India and a post graduate from Indian Institute of Technology (IIT) Delhi, has 37 years of experience dealing with various facets of water resources management. He has worked in water resources sector for Government of India for 28 years at Central Water Commission (CWC), Inter-state Tungabhadra Board, and Ministry of Water Resources. For the last 9 years, at the World Meteorological Organization, he has developed an intimate knowledge of issues related to water resources management in developing countries around the world.

Er. Tyagi was the Director of the Climate and Water Department of the World Meteorological Organization, a specialized UN Agency, and is responsible for providing support to the countries in the field of water resources management including flood management and adaptations to climate change particularly in the water and agriculture sectors.

Er. Tyagi has been involved in the investigations, planning and design of irrigation and flood management projects, development of the National Water Policy (2002), and operation and management of one of the major inter-state multi-purpose projects. He was closely associated with the formulation of the Andhra Pradesh Participatory Irrigation Management Act 1997, and was instrumental in initiating Benchmarking of Irrigation Systems in India.

Worked at the World Meteorological Organizations, for nine years he has developed professional network, working closely with various UN agencies; with International Institutions such as World Bank, African Development Bank, European Commission, and African Union; regional institutions such as Nile Basin Authority, Niger Basin Authority, Lake Chad Basin Authority, Zambezi River Commission; non-governmental organizations such as GWP, WWC, IAHS, IAHR etc and has proactively collaborated with the various international programs on water and climate change issues. He is presently the coordinator of UN-Water Thematic Priority Area on Water and Climate Change.

At WMO, he was spearheaded a major initiative on climate change with a vision to establish a Global Framework for Climate Services to support various development sectors, including the water and agriculture sector in climate risk management; established an international program on flood management developing the concept of Integrated Flood Management; and is presently developing another international program on Integrated Drought Management in close collaboration with various international partners.

Er. Tyagi has been associated with activities of ICID in the past as an observer in its Working Groups on flood management and climate change and strived for closer relationship between ICID and WMO.

# The Iranian Organizing Committee



Mr. S. A. Assadollahi  
Secretary General, IRNCID



Mr. A. R. Salamat  
Secretary, Congress and Executive Secretary, IRNCID



Mr. M. Ehsani  
Secretary, Congress and Hon. Secretary, IRNCID

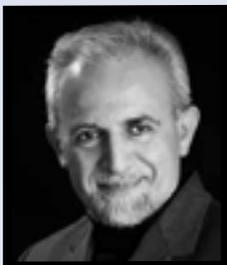


Mr. R. Davtalab  
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# International Review Committee

Question 56	Water and Land Productivity Challenges
 <p data-bbox="191 637 521 732"><b>General Reporter</b> <b>Dr. Saeed Nairizi (Iran)</b> <b>Vice President Hon. ICID</b></p>	<p data-bbox="589 319 1481 510">Dr. Saeed Nairizi (b. 1946) has a Ph.D. (1978) in Civil Engineering from Southampton University, UK. He is currently CEO of Toossab Consulting Engineers, one of the major water consultants in the region. Specialized in Irrigation Engineering and Water Resources Management with 35 years of experiences of working in Water Engineering Services in Iran and other countries as Turkmenistan, Tajikistan, Afghanistan, Syria, Sudan and Oman.</p> <p data-bbox="589 546 1481 669">Dr. Nairizi has been a senior member of IRNCID executive committee for last 20 years (since 1991). He has organized and contributed in many IRNCID activities including several conferences, workshops and Asian Regional ICID conference in 2004.</p> <p data-bbox="589 705 1481 963">Dr. Nairizi's commitments to ICID since 1993 have been: Member of Micro and Mechanizes Irrigation Systems (WG-ON-FARM, 1994-2002); Secretary of (WG-PQW, 1995-2003); Member of Editorial Board of ICID Journal (1999-2009); Chairman of WG-DROUGHT (2000-2008); ONFARM Theme Leader (2002-2011) ;and Chairman, PFC (2008-2011). His latest assignment is to be the General Reporter of Q.56 in 21st Congress in Tehran. Dr. Nairizi organized 3 workshops for ICID: Montpellier and Tehran (2003) and Moscow (2004).</p> <p data-bbox="589 1000 1481 1122">All these workshops were related to WG-DROUGHT activities. This Working Group provided a book titled "A Guideline on Irrigated Agriculture under Drought and Water scarcity" (which is under ICID publication process) under his Coordination and Editorship.</p> <p data-bbox="589 1158 1481 1349">Dr. Nairizi has been the author of many papers and books in Farsi dealing with science and innovation in the water related issues. Dr. Nairizi is a sports fan and activist. He is an active member of Iranian Weightlifting Federation (IWF). He is holding First Degree International Weightlifting Referee Certificate, and currently participating in World Weightlifting Championship and Asian Game as a referee. Contact: E-mail: &lt;s.nairizi@toossab.com&gt;</p>

**Question 57****Water Management in Rainfed Agriculture**

**General Reporter  
Dr. Theib Oweis (Syria)**

Dr. Theib Y. Oweis holds a Ph.D. in Agricultural and Irrigation Engineering and an M.Sc. in Irrigation Science from Utah State University, Logan, Utah, USA, in 1980 and 1983, respectively.

Since 1991, he is working for the International Center for Agricultural Research in the Dry Areas (ICARDA). Currently, he is Director of Integrated Water and Land Management Program. Earlier held positions as Manager of Water Resources Conservation and Management and Principal Scientist in integrated water resources and irrigation management. Special areas of expertise include irrigation systems and scheduling, water use efficiency, water productivity, supplemental irrigation and water harvesting. Particular interest is in capacity development for optimal management of water under conditions of scarcity and climate change. As a university professor, research manager and team leader he has extensive experience in initiating, mobilizing fund, planning, implementing and reporting research projects centrally and in collaboration with over 30 countries of the dry areas.

From 1983 to 1991 he worked for the University of Jordan, Amman Jordan as an Assistant Professor of irrigation and drainage. Also founded, partnered and acted as technical director of the private engineering firm Dar Ar Rai Irrigation and Water Consultants, Amman, Jordan.

Earlier from 1973 to 1977, worked for Dar Al Handash Consultants (Shair and Partners), Beirut Lebanon. Responsibilities included irrigation and water resources, planning, design and implementation of spade irrigation, water supply and irrigation networks, farm irrigation systems, and technical and economical feasibility water projects.

Published 57 ISI refereed journal publications, 88 proceeding papers, 20 research reports, 41 books and book chapters and 30 other types of publications in the areas of irrigation management, water productivity, water harvesting, supplemental irrigation, remote sensing and GIS application, use of saline water in agriculture, water use efficiency and deficit irrigation. Contact: E-mail < t.oweis@cgiar.org >

**Special Session****Modernization of Water Management Schemes**

**General Reporter  
Dr. Karim Shiati (Iran), Vice  
President Hon. ICID**

Dr. Karim Shiati obtained B.SC. in Irrigation Engineering (1973, Iran); M.SC. in Water Resources Engineering (1977, New Zealand) and Ph.D. in Water Resources/Environment (1991, The Netherlands).

Dr. Shiati is involved in ICID activities since 1993, as the Vice President of ICID (2006-2009) and at the present is the Chairman of Asian Regional Working Group ARWG (since 2006) and member of ICID work bodies, namely WG – PQW (since 1997), WG-Climate (since 2006) and member of UN-Water Task Force on Water and Climate Change, TFWCC (since 2009).

At present he is member of Managing Board and Head of Water Resources Department of YEKOM Consulting Engineers (since 1978). His key qualifications are in the areas of Water Resources Development, Irrigation & Drainage networks, Water Quality and EIA of water related projects. He is currently member of High Council of Iranian National Committee on Irrigation and Drainage (IRNCID). Contact: E-mail: < karim.shiati@yekom.com >

**Symposium****Climate Change Impacts on Soil and Water Resources**

**Prof. Dr. Chandra A. Madramootoo (Canada),  
Chairman President, ICID**

Prof. Dr. Chandra A. Madramootoo (Canada) obtained Ph.D (1985) in Agricultural Engineering from McGill University, Canada. He is Dean of the Faculty of Agricultural and Environmental Sciences, Associate Vice Principal of McGill University, a member of the senior academic leadership team of McGill University, and a James McGill Professor in the Department of Bioresource Engineering. He was the Founding Director of the Brace Centre for Water Resources Management. Dr. Madramootoo is a member of the Governing Board of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India.

Dr. Madramootoo has worked as a member of the Canadian National Committee of Irrigation and Drainage (CANCID) during the past 20 years and served in numerous workbodies of ICID. He currently serves as the President of ICID and was Vice President of ICID 2002-2003 and also holding the position of President, CANCID. He participated in numerous IECs and Congresses and was the key force behind the successful organization of the 18th ICID Congress and 53rd IEC at Montreal in 2002. Prof. Madramootoo is also the member of various professional societies. He has to his credit 15 awards from different organizations and published papers in more than 300 books, Journals, Conferences etc. He has been recognized nationally and internationally with several awards: elected a Fellow of the Canadian Society of Bioengineering (CSBE), elected a Fellow of the American Society of Agricultural and Biological Engineers (ASABE), and inducted into the International Water Academy. Contact: E-mail: <[chandra.madramootoo@mcgill.ca](mailto:chandra.madramootoo@mcgill.ca)>

# International Panel Experts



**Dr. Yohei Sato  
(Japan)**

Dr. Yohei Sato (b.1942) graduated from the University of Tokyo in 1967, and received his Ph D in Agriculture from the University of Tokyo in 1972. He is currently a Professor Emeritus of the University of Tokyo and also the Representative of the NGO "Forum for Less- favored Areas". He is the representative of the ICID National Committee of Japan.

He began his career as an Assistant Professor of the University of Tokyo in 1972. Later he moved to the Faculty of Agriculture at Utsunomiya University in 1979 and served as an associate professor. And he moved to the Institute of Socio-Economic Planning at the University of Tsukuba in 1980 and served as associate professor and professor. In 1995, he moved back to the Graduate school of Agricultural and Life Sciences at the University of Tokyo and served as a professor until his retirement in 2003. After his retirement, he moved to Tokyo Agricultural University, and one year later he took the presidency of the National Institute of Agro-Environmental Sciences until the end of March, 2011. He has conducted researches in the field of land consolidation, and rural land use planning. He has published more than 150 papers and 32 books. Particularly, he has made remarkable achievements on rural land use planning.

He won Young Scientist Award in 1972, CIGR Recognition of Outstanding Contributions in 2000, JSIDRE Award in 2004, CIGR Merit Award in 2006, and PAWEES International Award in 2007. Moreover, they have made him an Honorary Professor of Wuhan Technical University of Surveying and Mapping in 1998, a Guest Professor of Beijing Normal University in 2003.

He has also made several outstanding contributions not only to domestic societies such as the Rural Planning Association and JSIDRE as a President but also to international societies such as CIGR as a Chairperson, an Executive Board member and an Honorary Vice President, PAWEES as a President and an Editor-in-Chief of the international journal of "Paddy and Water Environment". Contact: E-mail: < sato-yoh@mail2.accsnet.ne.jp>, <yoheis@t-t-t.jp>



**Dr. Ragab Ragab  
(UK)**

Vice President of ICID as well as the Chairman of the British National Committee on Irrigation and Drainage, ICID.UK, Dr. Ragab Ragab currently heads the Department of Water, Soils and Landscapes at Centre for Ecology and Hydrology, UK. His fields of interests cover, irrigation, drainage, catchment's hydrology, remote sensing application in hydrology, integrated water management, climate change impact on water resources, soil-water-plant- atmosphere relations, rainfall harvesting, use of poor quality water for crop production, organic farming and urban hydrology. Leader of several projects in the UK and overseas. Expert Reviewer for the Intergovernmental Panel for Climate Change, IPCC, International adviser to "Brazil National Institute for Salinity Research", Fortaleza, Brazil, Adjunct Professor at Alexandria University, Egypt and Lecturer at Oxford University, UK. Supervisor for international students at different Universities and external examiner to various Universities in and outside the UK. Recipient of several international Awards, examples are: "Who is Who in the World" Publication board Award", "Who's Who" in Science and Engineering, The Barons 500. Leaders for the New Century, Barons Who's Who, Egypt State Recognition and Merit Award for Scientific Achievement, ICID Award of Excellence: In recognition of the exceptional contributions to the ICID and the world food security.

Ex. Member of the Editorial Board of J. Agricultural Water Management, Reviewer for more than 15 International Journals. Chairman of the Working Group on the Sustainable use of natural resources for crop production, ICID, Chairman of the Working Group on the use of poor quality water for irrigation, ICID, member of the British Society of Soil Science Society-BSSS, member of the American Society of Agronomy - ASA and member of Soil Science Society of America – SSSA and member of the European Soil Science Society. In addition to the UK, has extensive field experience and carried out several projects in North Africa, Europe, the Middle East and the Mediterranean region. Author and Co-Author of numerous scientific papers and Editor and Co-Editor of several special issues of International Journals as well as Conference Proceedings. Contact: E-mail: <rag@ceh.ac.uk>



**Dr. Bharat R. Sharma**  
**(IWMI, India)**

Dr. Bharat R Sharma has over 25 years experience in conducting and managing natural resources management research especially for surface and ground water resources, on-farm water management, rainwater management and development of water resources in hilly areas. His key contributions include improving on-farm water management in large irrigation commands, improving the assessment and management of groundwater in the Indo-Gangetic and Yellow river basins, impact of large inter-basin water transfers on regional groundwater resources, assessment of water resources and water productivity in the Indo-Gangetic basin and potential interventions for its improvement, impact of climate change on water resources and development of a national plan for unlocking the potential of rainfed agriculture in India and its possible adaptation in East African countries.

Since 1997, Dr. Sharma was Asst. Director General (Integrated Water Management), at the Indian Council of Agricultural Research (ICAR) and was responsible for management of research in the area of integrated management of water resources at the national level. Dr. Sharma has been member of the Indian National Committee on Irrigation and Drainage, ICID Working Group on Irrigated Agriculture under Drought and Water Scarcity Conditions (WG-DROUGHT), Member, CII National Committee on Water Management (WaterCom), Chairman- Farm Irrigation & Drainage Committee (Gol), Research Advisory and Management Committees of the three research institutes and Board of Management of two universities. He has more than 170 research and policy publications/ books and several awards to his credit.

Dr. Bharat R Sharma is presently working as Principal Researcher and Head of the International Water Management Institute at its New Delhi-India office. He has been leader and associate for a number of international projects including: Integrated Rainwater Management Strategies for Blue Nile Basin, Smart ICT-Africa, National River Linking Project (India), Groundwater Governance in Asia, and Water and Food Security in South Asia. Contact: E-mail: <B.Sharma@CGIAR.ORG>



**Dr. James E. Ayars**  
**(USA)**

Dr. James E. Ayars is a Research Agricultural Engineer working at the USDA-ARS, Water Management Research Laboratory in Parlier, CA. He has 33 years of research experience related to managing irrigation and drainage systems in arid areas. Research activities include: (1) field studies of irrigation and drainage water management to reduce subsurface drain flow; (2) reuse of saline drainage water for supplemental irrigation; (3) water management studies of irrigation districts; (4) studies of the effects of irrigation management on drainage water quality, (5) integrated management of irrigation and drainage

systems in arid areas, and (6) managing subsurface drip irrigation systems. Recent work included the determination of water requirements for vegetable crops grown on the west side of the San Joaquin Valley. His current research is evaluating water management strategies for reducing water application to wine, table, and raisin grapes. He is also determining the water and nitrogen requirements for pomegranates. He was the Secretary for the US Committee on Irrigation and Drainage and has served as the Vice Chairman of the Drainage Committee of ICID. Dr. Ayars has presented papers at several ICID meetings and served as an Expert Reviewer on several questions related to drainage and water quality. His degrees are from Cornell University (B of Agr Eng) and Colorado State University (MS, Ph.D). He has over 200 publications in both popular and refereed journals. Contact: E-mail: <James.Ayars@ARS.USDA.GOV>



**Dr. N. Hatcho  
(Japan)**

Dr. Nobumasa Hatcho is a Professor in the Department of Environmental Management at the Faculty of Agriculture in Kinki University, Japan. He began his career as an irrigation engineer in the Ministry of Agriculture, Japan, and then went on to work as a technical officer in water management with FAO AGL. His expertise also extends to water/environment management and rural development. Prof. Hatcho served as Chairman and a member of the Board, IWMI 2002-2008, and was Chairman of the Working Group on History (2002-2009), ICID and works with numerous development agencies in Japan, including JICA, and NGO, and is a member of PAWE, JSIDRE, INWEPF and others. Contact: E-mail: < hatcho\_n@yahoo.co.jp>



**Dr. Suhas Wani  
(India)**

Dr. Suhas P. Wani is Project Coordinator, Integrated Watershed Management (Asia) and Principal Scientist (Watersheds), Research Program on Resilient Dryland Systems at International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, India. His area of specialization are integrated watershed management, wasteland development, biodiesel plantation, integrated nutrient management and carbon sequestration for the conservation of natural resources and their sustainable use for improving livelihoods in the semiarid tropics.

Dr. Wani is a University Gold Medalist and serving as an expert to make a presentation and address the members of the Parliament Forum on Water Conservation and Management; as a member of Working Group on Minor Irrigation and Watershed Management for the Twelfth Five-Year Plan; as a member of Expert Committee for technical evaluation for "National Initiative on Climate Resilient Agriculture (NICRA), launched by ICAR; member of the Programme Advisory Committee for Natural Resource Management and Climate Change in MS Swaminathan Research Foundation, Chennai, India and Honorary Trustee of S.M. Sehgal Foundation (SMSF) and the Institute of Rural Research and Development (IRRAD) and organizing committee member.

He has received National Groundwater Augmentation Award at National level from Ministry of Water Resources; Doreen Mashler Award; Best Team Award, Best ICAR Award and Outstanding scientific article award. Organizing Committee Member of International Conference on Plant Nutrition 2010 and for International and national workshops/conferences.

He is operating multidisciplinary projects and is associated with the organization of national and international scientific meetings, workshops and field days at ICRISAT and has published 380 research papers, books and conference papers in international and national scientific journals. Contact: E-mail: <s.wani@cgiar.org>



**Dr. Maurits Willem Ertsen**  
(The Netherlands)

Dr. Maurits Willem Ertsen has M.Sc. (1993) from Wageningen Agricultural University and Ph.D. (2005) from Delft University of Technology. His key qualifications are in the areas of History of water science and technology; irrigation engineering; rural water management; water systems design and management; river basin management; education and training; training of tutors and project teams; computer supported learning. He is currently a Senior Lecturer (since 2002) at Water Resources Management Group, Department of Civil Engineering and Geosciences, Delft University of Technology. His past experience includes - Ph.D. research, Water Resources Management Group (1999-2005) at Delft UT; Coordinator of Civil Engineering Project Education (1999-2002) at Delft UT; Researcher at the Education and Didactics Group (1997-1999) at Delft UT; Researcher at the Irrigation Group (1995-1997) at Wageningen University; and Coordinator of the Research Group on Underdevelopment (1994-1995) at Wageningen.

He has been member of numerous professional bodies - International Commission on Irrigation and Drainage: Chair of the Working Group on Modernisation of Irrigation Services (since 2008); Secretary of the Dutch Association of Water History (since 2008); International Commission on Irrigation and drainage: Member of the Young Professionals Forum (2000-2008); Treasurer and member of the executive council of the International Water History Association (since 2003); Member of the Society for the History of Technology; and Member of Envirotech, special interest group in history of the environment. Contact: E-mail: <m.w.ertsen@tudelft.nl>



**Dr. Masayoshi SATOH**  
(Japan)

Dr. Masayoshi SATOH (b.1948) is currently Professor at Irrigation and Water Management Engineering, Graduate school of Life and Environmental Sciences, University of Tsukuba, Japan (Since 1997). Areas of his research interest are - Hydrology in irrigated fields; Return flow and water reuse; Irrigation requirement and management; and Integrated water resources management. His past positions include - Assistant Professor, Dept. of Agricultural Engineering, Faculty of Agriculture, Gifu University, Japan (1972- 1977); Lecturer, Dept. of Agricultural Engineering, Faculty of Agriculture, Iwate University, Japan (1977 - 1980); Associate Professor, Dept. of Agricultural Engineering, Faculty of Agriculture, Iwate University, Japan (1980 - 1982); and Associate professor, Institute of Agricultural and Forest Engineering, University of Tsukuba, Japan (1982 - 1997). Dr. Satoh is member of numerous Academic Societies - The Japanese Society of Irrigation, Drainage and Reclamation Engineering (Vice President); The Association of Rural Planning, Japan; The Japan Society of Hydrology and Water Resources; Japanese Association for Water

Resources and Environment; and WG on Modernization of Irrigation Service, ICID. Contact: E-mail: <massa@sakura.cc.tsukuba.ac.jp>

# Congress Organization and Programme



## **Introduction to Congress Arrangements**

The opening ceremony of the 21st ICID Congress was held on 19 October 2011 at Tehran, Iran. Two questions which were central to the theme of the Congress were Question 56 Water and Land Productivity Challenges; and Question 57 Water Management in Rainfed Agriculture. Question 56 and Question 57 had five and four sub topics each, respectively. In conjunction with the Congress, a Special Session on "Modernization of Water Management Schemes" and a Symposium on "Climate Change Impacts on Soil and Water Resources" were also held. Further, a large number of workshops and special sessions were organized on topics of considerable interest to the irrigation and drainage community worldwide and were attended in large numbers by participants. The Congress was covered by the Iran media, including local newspapers.

## **Participation**

In all, there were 684 participants; delegates from host country were 441, whereas delegates from other countries were 243 from 36 member countries. The participants from non-member countries were 6.

## **Topics and Reports**

Reports / Papers were received and discussed on two Questions 56 and 57, Special Session, Symposium and the History Seminar. The abstracts of all reports / papers together with its French translation have been already published and made available during the Congress. The CD-ROM in the fold includes all full length reports / papers.

## **Exhibition**

An international exhibition was also organized by the host national committee. Numerous Iranian and international exhibitors participated.

## **Workshops and Special Sessions**

Workshop and three Special Sessions were organized in conjunction with the Congress: (1) Workshop on 'Water Use Charging Systems and Available Financing of Irrigation: Case Studies for Cross-Country Comparisons' by TF-FIN; (2) A full-day FAO-ICID-IRNCID Special Session on 'Modernization of Water Management Schemes' by WG-MIS; ICID-FAO Special Session on 'Water for Food Security' by TF-WWF6; and the Special Session on 'Young Professionals Forum' by WG-YPF.

## **Presentations of Plaques**

At the concluding session, plaques were presented to the Office-Bearers who were to retire after the 2011 Congress in Tehran, Iran. They were:

- President Chandra Madramootoo (Canada)
- Vice President Dr. (Mrs.) Samia El-Guindy (Egypt)
- Vice President Dr. Shinsuke Ota (Japan)
- Prof. Lucio Ubertini (Italy)
- Er. M. Gopalakrishnan, Secretary General, ICID

## **Social function**

During IEC and the Congress, the following social functions were arranged for the participation and accompanying persons:

- 'Chinese Night ' hosted by Chinese National Committee on 19 October 2011
- 'Turkish Night' hosted by Turkish National Committee on 20 October 2011
- 'Australia Reception' hosted by Australian National Committee on 21 October 2011
- 'Farewell Dinner & Cultural Show' by IRNCID on 22 October 2011

**Congress Program**  
**21st International Congress on Irrigation and Drainage**  
**8th International Micro Irrigation Congress**  
**15-23 October, 2011, Tehran, Iran**

**Saturday, 15 October 2011: Arrival and Registration**

<b>09:00 – 17:00</b>	Registration
<b>15:00 – 17:00</b>	Staff Committee Meeting (SC)
<b>17:00 – 18:00</b>	Management Team for ICID Journal (MT-JOUR)
<b>18:00 – 20:00</b>	Management Board Meeting (MB)

**Sunday, 16 October 2011**

<b>09.00 - 17:00</b>	Registration
<b>09:00 – 12:30</b>	History of Irrigation, Drainage and Flood Control (WG-HIST)/ Seminar Environment (WG-ENV)
	Drainage (WG-DRG)
	Young Irrigation Professionals Forum (WG-YPF)
	Task Force on Water for Bio-Energy and Food (TF-BIO-ENERGY)
	Task Force on Sedimentation of Reservoirs (TF-SEDIMENTATION)
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 - 17:00</b>	Technology and Research Uptake and Exchange (WG-TRUE)
	Water Management in Water Stressed Regions (WG-DROUGHT)
	Committee on Congresses/Conference (C-CONGR)
	Asian Regional Working Group (ASRWG)
	Irrigation and Drainage in the States under Socio-Economic Transformation (WG-IDSST)
	Permanent Finance Committee (PFC)
<b>15:15 - 15:45</b>	Tea / Coffee Break

**Monday, 17 October 2011**

<b>08:00 - 09:00</b>	Meeting of National Committees with Officer Bearers
<b>09:00 - 17:00</b>	Registration
	Start of National Committees' Display
<b>09:00 - 12:30</b>	Intensification on Technology and Research in Irrigation and Drainage (Intensification-TRID)
	Sustainable Development of Tidal Areas (WG-SDTA) and Workshop – Session I
	Role of Irrigation on Poverty Alleviation and Livelihoods (WG-POVERTY)/ MDG
	European Regional Working Group (ERWG)
	African Regional Working Group (AFRWG)/Special Work Team on Lake Chad Basin (ST-LCB)
	Task Force on Financing Water for Agriculture (TF-FIN) and Workshop – Session I
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	ICID Journal Editorial Board (EB-JOUR)
	Sustainable Development of Tidal Areas (WG-SDTA) and Workshop – Session II
	Global Climate Change and Agricultural Water Management (WG-CLIMATE)
	On-Farm Irrigation Systems (WG-ON-FARM)
	American Regional Working Group (AMRWG)
	Task Force on Financing Water for Agriculture (TF-FIN) and Workshop – Session II
<b>15:15 - 15:45</b>	Tea / Coffee Break
<b>15:00 – 18:00</b>	Special Session for Young Professionals Forum
<b>17:00 – 18:00</b>	Meeting of National Committees with Vice Presidents

<b>Tuesday, 18 October 2011</b>	
<b>09.00 - 17:00</b>	Registration
	National Committees' Display (Day 2)
<b>09.0 - 12:30</b>	Symposium – Climate Change Impacts on Soil and Water Resources
	PC on Strategy and Organization (PCSO) – Session I
	Comprehensive Approaches to Flood Management (WG-CAFM)
	Modernization of Irrigation Services (WG-MIS)
	Poor Quality Water for Irrigation (WG-PQW)
	Task Force (TF) to Guide ICID Inputs to 6th Forum (WWF-6)
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	PC on Strategy and Organization (PCSO) – Session-II
	Committee on Public Relations and Publications (C-PR&P)
	Water Saving for Agriculture (WG-WATS)
	Water and Crops (WG-CROP)
	TF-WWF Special Session on Water for Food Security with FAO
<b>15:15 - 15:45</b>	Tea / Coffee Break
<b>19:00 – 21:00</b>	Welcome Reception
<b>Wednesday, 19 October 2011</b>	
<b>09.00 - 17:00</b>	Registration
	Closing of National Committees' Display (Day 3)
<b>09.00 – 12.30</b>	Opening Ceremony
	Opening Remarks and welcoming addresses by the dignitaries, President of ICID and Chairman of IRNCID
	N.D. Gulhati Memorial Lecture for International Cooperation in Irrigation and Drainage
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	Question 56 – Water and Land Productivity Challenges
	Q.56 General Reporter presentation (Plenary session)
	Q. 56.1 - Water and Land Productivity: Concepts, Indices and Targets (Session – I)
	Q. 56.2 - Innovations, Technologies and Best Practices for Sustaining and/or Increasing Water and Land Productivity (Session – I)
	Q. 56.3 - Productivity of Poor Quality Waters for Irrigation Uses (Session-I)
	Q. 56.5 - Irrigation and Drainage Management Improvements (Session-I)
	Question 57 – Water Management in Rainfed Agriculture
	Q.57 General Reporter presentation (Plenary session)
	Q.57.1 - Drainage and Flood Management in Rainfed Farming
	Q.57.2 - Water Harvesting and Conservation
	Q.57.3 - Supplementary Irrigation
	Q.57.4 - Rainfed Farm Management
<b>13:30 – 17:00</b>	Special Session: Modernization of Water Management Schemes
	- General Report for Special Session
	- Paper Presentation and Open Discussions
<b>19.00 – 21.00</b>	Chinese Night

<b>Thursday, 20 October 2011</b>	
<b>09:00- 17:00</b>	- Poster presentation – 21st Congress - International Exhibition (Day 1)
<b>09:00 – 12:30</b>	Question 56 – Water and Land Productivity Challenges Q. 56.1 -Water and Land Productivity: Concepts, Indices and Targets (Session - II) Q. 56.2 - Innovations, Technologies and Best Practices for Sustaining and/or Increasing Water and Land Productivity (Session - II) Q.56.4 - Improving Crop Water Productivity under Stressed Environment (Session-I) Q.56.5 - Irrigation and Drainage Management Improvements (Session-II) Question 57 – Water Management in Rainfed Agriculture Q.57.1 - Drainage and Flood Management in Rainfed Farming Q.57.2 - Water Harvesting and Conservation Q.57.3 - Supplementary Irrigation Q.57.4 - Rainfed Farm Management
<b>09:00 – 12:30</b>	FAO-ICID-IRNCID Special Session on 'Modernization of Water Management Schemes' – (Session-I)
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	Question 56 – Water and Land Productivity Challenges Question 56 – Water and Land Productivity Challenges
<b>13:30 – 17:00</b>	FAO-ICID-IRNCID Special Session on 'Modernization of Water Management Schemes' – (Session-II)
<b>19:00 – 21:00</b>	Turkish Night
<b>Friday 21, October 2011</b>	
<b>09:00- 17:00</b>	- Poster presentation, 8th IMIC International Exhibition (Day 2)
<b>09:00 - 17:00</b>	FAO Side event on Investment in North Africa FAO-ICID Special Session
<b>09:00 – 17:00</b>	8th International Micro Irrigation Congress (8IMIC)
<b>09:00 – 10:00</b>	Keynote Speech by President Chandra Madramootoo (plenary session)
<b>10:00 – 17:00</b>	8IMIC - Session I and - Session II
<b>09:00 – 12:30</b>	Permanent Committee for Technical Activities (PCTA) – Session I Session on Australian experiences: Modernization and Water Management Schemes
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	Permanent Committee for Technical Activities (PCTA) – Session II
<b>15:15 - 15:45</b>	Tea / Coffee Break
<b>17:00 – 19:00</b>	Meeting of Office Bearers Committee (OBC)
<b>19:00 – 21:00</b>	Australian Reception
<b>Saturday, 22 October 2011</b>	
<b>09:00 - 17:00</b>	Closing of International Exhibition (Day 3)
<b>09:00 - 12:30</b>	International Executive Council (IEC) meeting – Session I
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 – 17:00</b>	International Executive Council (IEC) meeting – Session II
<b>15:15 - 15:45</b>	Tea / Coffee Break
<b>18.30 – 22:00</b>	Farewell dinner and cultural show

<b>Sunday, 23 October 2011</b>	
<b>09:00 – 12:30</b>	Q.56 Plenary Session (Concluding)
	Q.57 Plenary Session (Concluding)
	8th International Micro Irrigation Congress (Concluding)
<b>11:00 - 11:30</b>	Tea / Coffee Break
<b>12:30 - 13:30</b>	Lunch Break
<b>13:30 - 17:00</b>	Closing Ceremony
	Ministerial Speeches
	WWC President Speech
	Presentation of Tehran Declaration
	Address by President, ICID
	Address by President-elect, ICID
	Address by Chairman of National Organizing Committee
<b>Monday 24, October 2011</b>	
	Start of technical / post-conference tours (IRNCID)



# Opening Ceremony

## 19 October 2011

### **Welcome address by Mr. Alireza Salamat Executive Secretary, IRNCID**

Excellences, Honourable Ministers,  
Distinguished Guests,

On behalf of the Iranian National Committee on Irrigation and Drainage, I have the pleasure to warmly welcome you to the 21st ICID Congress on Irrigation and Drainage, 8th International Congress on Micro Irrigation and the 62nd International Executive Council, held during this beautiful season of autumn in Tehran Metropolitan as the Capital of the Islamic Republic of Iran.

At first, allow me to deeply thank the International Commission on Irrigation and Drainage for their utmost efforts for holding this great event in Tehran.

I would also like to take this opportunity to sincerely thank the authorities in the Ministry of Energy and Ministry of Jihad e Agriculture, I.R. Iran for their effective support towards holding the Congresses and ICID annual event.

Sincere thanks to our friends in the IRIB International Conference Centre, as the venue of the ICID 2011 International Congress. This Conference Centre is Tehran World Class meeting and convention facility with over 20,000 square meters, located on the best northern part of Tehran.

Ladies and Gentlemen,

The Iranian National Committee on Irrigation and Drainage (IRNCID) as the organizer of the International Congress on Irrigation and Drainage and ICID annual event in 2011, joined ICID as an active member in 1967.

At present, it holds 7 active technical working groups and 9 regional committees with over 2000 main and affiliated members from all over the country.

Being one of the most well-known scientific institutes in Iran, IRNCID has hosted ICID annual meeting in 1977 and the Asian Regional Conference in 2007. The representatives of IRNCID have been ICID vice presidents during 4 periods.

Coming to its activities, IRNCID has so far published 82 Newsletters and 147 books in addition to holding 65 training events in relevant fields to its mandate.

As an outstanding achievement, the Iranian National Committee has prepared a DVD entitled as "Half a Century with IRNCID" including all its publications, newsletters, various declarations, and over 3000 photos from its different events.

Dear participants,

Gathering professionals in water resources from around the world, the ICID Congress is a reputable, scientific, triennial event held in one of its member countries to deliberate on global issues of thematic, generic and relevant interests related to irrigation, drainage and flood control.

Recalling the past, it was during the annual meeting of ICID held in Sacramento, USA, in 2007, when I.R. Iran, through voting, was elected to host the 21st ICID Congress on Irrigation and Drainage in Tehran during 2011.

Besides the congress, a special session, a symposium and a seminar, as well as, several workshops is planned to be held. Simultaneous with such scientific events, the 62nd IEC and annual meetings of ICID including the working group sessions will absolutely add the extension of such an International Congress.

Distinguished guests,

The Multi-Purpose International Congress in Tehran, 2011 is considerably important from various view-points as follows:

The Multi-Purpose International Congress in Tehran, 2011 is considerably important from various view-points as follows:

- Holding two simultaneous Congress and the annual IEC Meeting. Only once was Iran the venue of IEC Meeting in Tehran.
- Attendance of some hundred international experts and professionals on water engineering and irrigation in Tehran 2011 is a wonderful opportunity for getting acquainted with technical, professional and scientific capabilities.
- Since the formation of the Ministries of Energy, and Jihad-e-Agriculture, such great, extensive, and scientific events on water resources, irrigation and drainage have been exceptional.
- The topics of both International Congresses, Special Session, Symposium and Seminar are the focal issues on water and agricultural sector in Iran and other countries. Therefore, concentration on papers and the results of the international expertise shall certainly fulfil the scientific requirements of ICID member countries.
- Formal inauguration of the International Training and Technology Centre on Irrigation and Drainage (ITTCID) simultaneous with Tehran Congress in 2011, will multiple the importance of such events.
- The Mission of ICID presidency shall terminate in October 2011. Thus, IRNCID is also one of the candidates of this post.

Dear Guests,

By taking into account the vast number of correspondences made with over 30000 foreign professionals and experts for receiving papers; the congress secretariat has received over 460 extended abstracts from around 60 Countries.

The abstracts have been reviewed by the scientific committee and as a final result over 250 papers have been accepted to be presented orally and as poster presentations.

IRNCID has also provided the opportunity for National organizations and companies to demonstrate their activities and achievements during the Congress days.

As arranged Tehran Congress will proceed by two technical tours and two post-conference tours to Mazandaran in the North, Khuzestan in the South, Esfahan and Shiraz province in the Central part of Iran.

Fulfilling the usual services provided during ICID events, IRNCID organizing committee has provided the accompanying persons with additional specific tours most of the days to visit recreational, cultural and tourism attractive sites in Tehran Metropolitan.

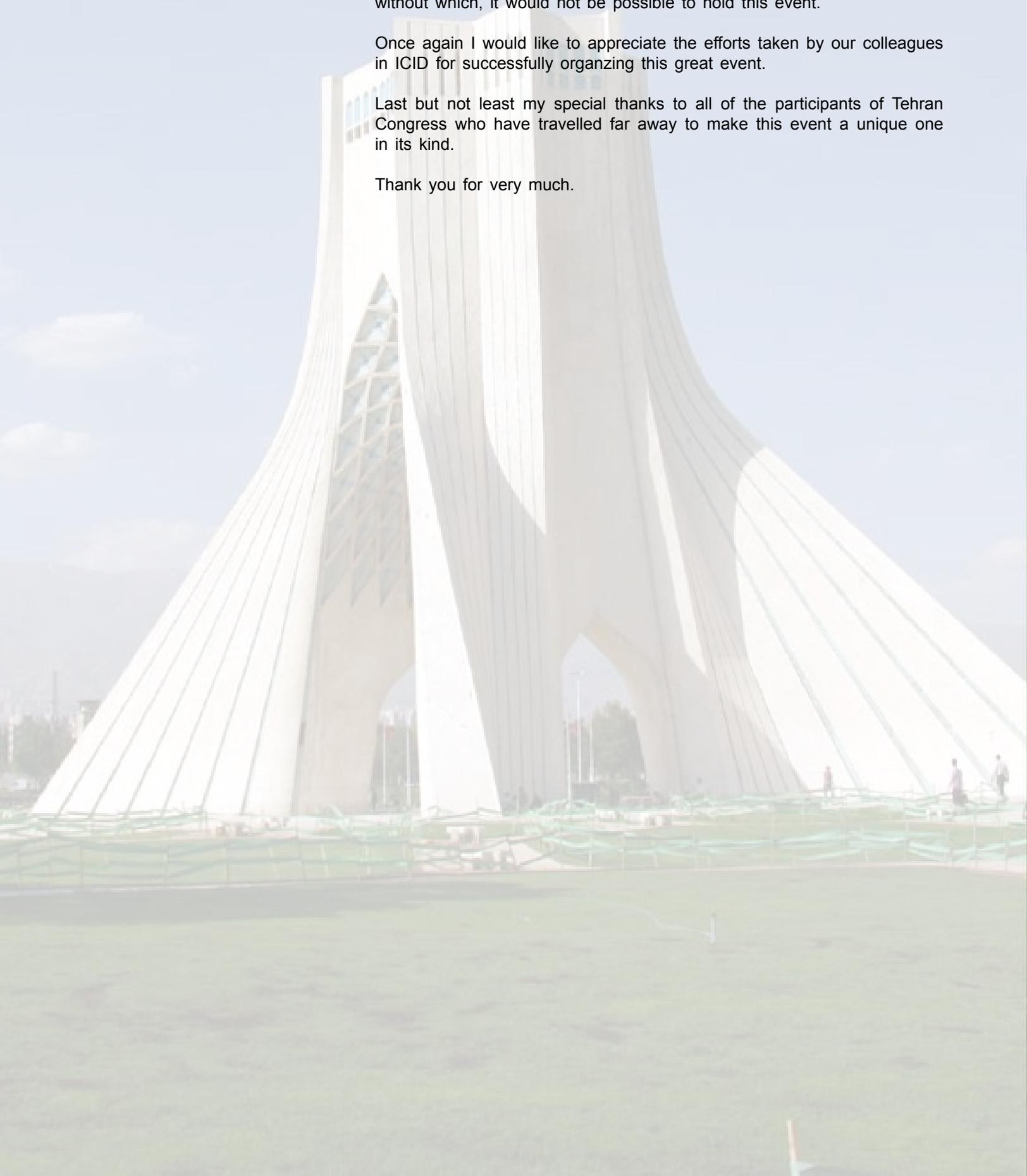
Ladies and Gentlemen,

I would like to thank H.E. Mr. Majid Namjoo as the Minister of Energy and H.E. Mr. Khalilian, Minister of Jihad-e Agriculture for their effective support without which, it would not be possible to hold this event.

Once again I would like to appreciate the efforts taken by our colleagues in ICID for successfully organizing this great event.

Last but not least my special thanks to all of the participants of Tehran Congress who have travelled far away to make this event a unique one in its kind.

Thank you for very much.





## Welcome address by Prof. Chandra A. Madramootoo, President, ICID

### Challenges of Food and Water Security

President Prof. Chandra Madramootoo in his opening remarks at the 62nd Council meeting highlighted the current key drivers as - the continuing food crisis and volatile food prices, climate variability - floods and droughts, competition from other water users, population growth, Lack of water storage capacity, growing demands for energy and alternative fuels, changing dietary patterns, weak institutional capacity, lack of investments in agriculture and water, weakened applied research and technology transfer capabilities, and environmental and water quality degradation. The following are excerpts from his speech.

"The challenge of doubling the food production over the next 25 years to meet the food requirements of world's rising population has to be met with the reduction in cropped area in many countries and the rising demand for water from industrial and domestic sectors at the expenses of agriculture" said President Madramootoo. In the Province of Alberta, Canada, for example, the competition for water from other sectors of the economy has been growing significantly. Adopting the package of improved technology in water application, seeds, fertilizers, and farm machinery, farmers in Alberta could dramatically decrease the irrigation water application from about 900 mm per annum in mid 1950s to only 380 mm today. At the same time barely yields have actually increased over the same period from about 2.5 tonnes per hectare in mid 1950s to about 6.5 tonnes per hectare today. Farmers of Southern Alberta have come to realize that they can remain comparative in an international market and sell their produce across the world. "We therefore need to continue investment in irrigation infrastructure rehabilitation and maintenance and also in research and development, technology transfer, and in capacity development/ building," said the President.

Groundwater irrigation has many benefits in terms of its availability on demand and not been constrained by institutional systems and supply variability. In countries like India and China, tube well irrigation has expanded rapidly, while canal irrigation remained very modest. Groundwater irrigated areas in India is about 39 million ha, in China 19 million ha, and in the USA it is 17 million ha and the area is increasing. Pres. Madramootoo said that we must be concerned in protecting our aquifers to avoid depletion of groundwater resources. ICID needs to pay attention to this subject and that there is a need to develop a better framework of groundwater management and its protection.

Powerpoint presentation (to link)



## **N.D. Gulhati Memorial Lecture by Dr. Charles Michael Burt (USA)**

Triennially, N.D. Gulhati Memorial International Lecture is delivered by an eminent professional at the time of Congresses.

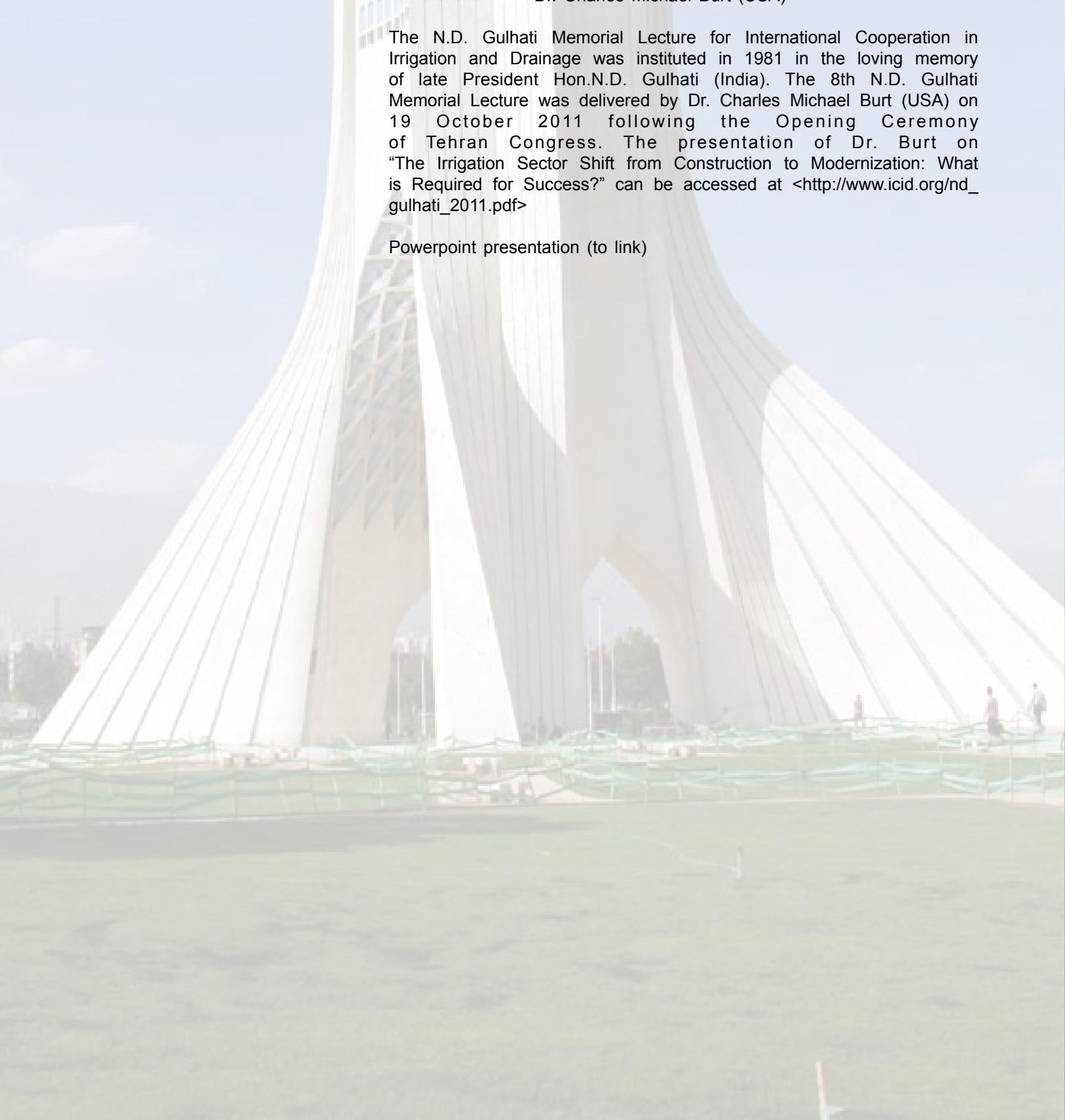
8th N.D. Gulhati Memorial Lecture for International Cooperation In Irrigation and Drainage

The Irrigation Sector Shift from Construction to Modernization: What is required for Success?

Dr. Charles Michael Burt (USA)

The N.D. Gulhati Memorial Lecture for International Cooperation in Irrigation and Drainage was instituted in 1981 in the loving memory of late President Hon.N.D. Gulhati (India). The 8th N.D. Gulhati Memorial Lecture was delivered by Dr. Charles Michael Burt (USA) on 19 October 2011 following the Opening Ceremony of Tehran Congress. The presentation of Dr. Burt on "The Irrigation Sector Shift from Construction to Modernization: What is Required for Success?" can be accessed at <[http://www.icid.org/nd\\_gulhati\\_2011.pdf](http://www.icid.org/nd_gulhati_2011.pdf)>

Powerpoint presentation (to link)



# Proceedings of Technical Sessions



## Plenary Report Question 56 (excerpts)

### Question 56: Water and Land Productivity Challenges

*Prepared and presented by  
VPH Dr. Saeed Nairizi (Iran), General Reporter*

- Irrigation efficiencies should be studied and recommended for planning and decision making based on basin water balance rather than measurement at the farm level.
- Irrigation water productivity (IWP) is a promising tool to evaluate the effectiveness of water allocated to agriculture from economic and environmental consideration, particularly within the water stressed region. The definition of IWP should be framed based upon the different objectives, and scales.
- Evaporation from the field is an actual water loss within the irrigation schemes, which is not recoverable. So attempts should be directed to the technology and management of irrigation planning and operation to minimize such water losses.
- The concept of crop water requirement needs to be reconsidered with the aim to focus on the actual water consumed by crops. Irrigation technology should be deployed to minimize the real water losses.
- In order to achieve high water productivity, other important factors like proper agro-technology, improving the soil condition, better seeds, appropriate fertilizer application, and above all the better farm management should be given due attention.

## Plenary Report Question 57 (excerpts)

### Question 57: Water Management in Rainfed Agriculture

*Prepared by  
Dr. Theibe Oweis (ICARDA, Syria), General Reporter and  
presented by  
Dr. N. Heydari (Iran)*

- Policies need to be developed to encourage the use of water efficient and productive practices such as supplemental irrigation, water harvesting and other rainfed farming inputs and tools. Supplemental irrigation for early sowing and for alleviating soil moisture stress during dry spells in the crops growing seasons is very effective in improving rainfed agriculture. Deficit supplemental irrigation can maximize water productivity especially in water scarce areas.
- Water harvesting through both micro catchments (soil water storage) and macro-catchments (surface and ground water storage) are instrumental for climate change adaptation in reducing runoff, erosion and floods in addition to increasing water availability to farmers and crops.
- Improved crop varieties and other cultural practices should be supportive to improved yields and water productivity.
- Institutions should be developed in rainfed areas and existing ones should be strengthened and empowered. Especially the role of women and youth need to be given special attention.
- Increased support to research to fill knowledge gaps on water management and associated aspects, especially on the impacts of climate change on rainfed agriculture and its adaptation. Besides the research, capacity building is important to disseminate and apply improved practices and technologies.
- Access to markets was identified as the most important and work on developing markets in remote areas and improving access to markets in rainfed areas need utmost attention.

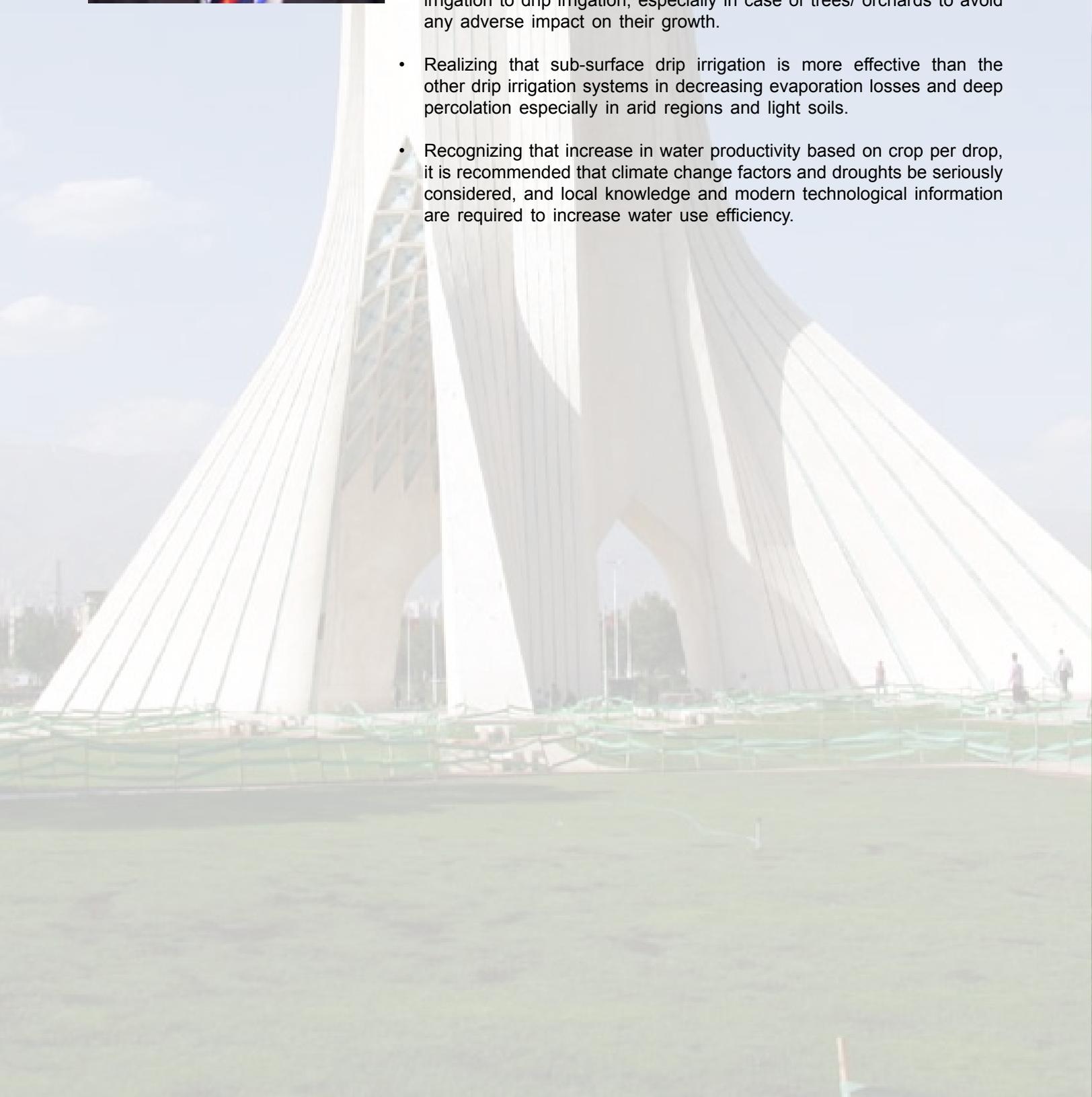


## 8th International Micro Irrigation Congress (excerpts)

### 8th International Micro Irrigation Congress

*Prepared and presented by  
VPH Felix Reinders (South Africa), Chairman WG-On-Farm*

- Recognizing the priority of training farmers to adopt pressurized and micro irrigation systems in countries with low literacy level of the farmers.
- There is an urgent need for extending and applying the results of the agricultural promoter's researches to improve designs and to increase micro irrigation systems efficiency.
- Farmers should be educated while shifting from conventional surface irrigation to drip irrigation, especially in case of trees/ orchards to avoid any adverse impact on their growth.
- Realizing that sub-surface drip irrigation is more effective than the other drip irrigation systems in decreasing evaporation losses and deep percolation especially in arid regions and light soils.
- Recognizing that increase in water productivity based on crop per drop, it is recommended that climate change factors and droughts be seriously considered, and local knowledge and modern technological information are required to increase water use efficiency.





## Special Session Report

### Special Session: Modernization of Water Management Schemes

*Prepared by  
Vice President Hon. Karim Shiati (Iran), General Reporter*

Irrigation modernization is defined as: "A process of technical and managerial upgrading of irrigation schemes with the objective to improve resource utilization (labour, water, economics & environments) and water delivery services to farms; or the transition from Supply - oriented to Service - oriented irrigation water delivery" (FAO).

The "as usual" irrigation practice cannot sustain the important and critical role of irrigation in food security and economic growth in the world. The wide gap between actual and desirable performance / practice of irrigation threatens the sustainability of irrigated agriculture. The need therefore is for a critical evaluation of the existing irrigation services and applying modernization options for their improvement.

Irrigation institutions need to link their central task of providing irrigation services to agricultural production and to integrate their water demands and uses with other users in the basin. The concerned agency would like to know how the delivery system and the on-farm irrigation system are to be managed.

To enhance and update knowledge on modernization of agricultural water and irrigation schemes the findings on the following related subtopics could enable us to achieve our targets:

(i) Policy & legal implications; (ii) Institutional and financial arrangements; (iii) Modernization of infrastructures; (iv) M & E and Performance; (v) Automation of irrigation systems; (v) Developing Data base and use of GIS & RS for O & M of the Irrigation systems; (vi) New concepts to upgrade irrigation services; (vii) Capacity Building and finally; and (viii) Environmental issues.

The following is the outcome of presentations made in Special Session:

- Dr. Monem (Iran) and others from Iran have shown the construction and evaluation of an automatic pivot weir control system for water level regulation as a check structure in irrigation schemes. In this research, physical model of automatic pivot weir based on PID control logic was constructed in hydraulic flume at hydraulic laboratory. The finding shows that the maximum error was 10% and water deviation were controlled in less than 3 minutes and suggested that the control system could be applied in irrigation canals.
- Mr. Taminato (Japan) present the output of a 5 year project named "Establishment of Participatory Water Management in Golestan Province in Iran". The whole activities refer to implications of institutional modalities and activities including: setting up a project promotion committee, selecting pilot site, setting up water User Groups (WUG), focused activities in the pilot site and finally develop plan based on the Participatory Water Management, Operation, Maintenance and Management (OMM). Although the main target of this research, which is efficient utilization of water has not been quantified.
- A very interesting paper has been submitted by Dr. Muhammad Arshad from Pakistan that shows the importance of Performance Assessment for improving irrigation management. The performance indicators were relative water supply, water use efficiency and conveyance efficiency. The results indicate that after the improvement of irrigation system, the increase in rice and wheat area was 34.71 and 13.22 per cent, respectively.

It is recommended that GIS capability is the most appropriate source to provide the better understanding of soil variability. Thus, the integration of RS and GIS tools to regularly compute performance indices could provide irrigation managers with the means for managing efficiency the irrigation system.

- Interesting case study presented by Marylou Smith from USA showed how water might be shared between agriculture and urban users to sustain a healthy environment.

They show how engineers are working with social scientists in the Western United States to determine how to use technological advances such as basin wide computation of consumptive use/return flow ratios to accomplish water sharing strategies, which can gain acceptance among municipalities, agriculture producers and environmental interests.

Lesson learned could assist others around the world faced with similar issues.

- Dr. J. Mohan Reddy (Uzbekistan/USA) compares three different criteria evolved to design level-basin irrigation systems: the volume-balance design criterion, the limiting length design criterion, and the completion-of-advance criterion. If completion-of-advance design criterion is used, the difference between actual and design efficiencies (application efficiency and water requirement efficiency) kept to a minimum. In addition, the actual performance of a level-basin irrigation system designed using the completion-of-advance criterion would be much closer to the design performance even when the inflow flow rate into level-basins fluctuates.
- Mr. Patil and Dr. Belsare (India) project Maharashtra State in India as one of the most industrialized and urbanized State. However, the water sector in Maharashtra is faced with critical challenges. To overcome the poor scenario and improve the performance of irrigation projects, path breaking reforms were initiated.

The reforms in irrigation sector have received general acceptance. Its successful implementation has resulted in improvement in performance of irrigation projects. The reforms have also improved financial performance of irrigation project, with O & M expenses being recovered through water charges. With all-round reforms in water resources management and its successful implementation, Maharashtra State has emerged as one of the best performing states in India

- Dr. Chien-Pang and others from Chinese Taipei presented a case study on conjunctive use of surface water and ground water in Chuoshui Alluvial Fan in Taiwan.

The finding is that the conjunctive use of surface water and ground water is the best solution for increasing ground water recharge and sustainable use of water resources. Following establishing of conjunctive use of surface and ground water policy, ground water use of irrigation in Chuoshui Alluvial region will be sustainable in the future.

- Mr. Jian Yu (China) and others presented the results of a case study on Application of Geosynthetic Clay Liner (GCL) in canal lining in Hetao irrigation area in China. They showed successful use of GCL in reducing the seepage loss in main, sub-main and lateral canals where Hydraulic Conductivity changes from  $6 \times 10^{-9}$  -  $2 \times 10^{-12}$  in the first year to  $101 \times 10^{-6}$  -  $106 \times 10^{-8}$  cms<sup>-1</sup> in the third year.

Comparing with canal lining with concrete blocks, the application of GCLs could significantly reduce the cost of canal lining by 50%. Therefore, there exists a great potential to use GCLs as canal lining material in North and Northwest China.

# Report on Strategy Theme on “Basin” – Dr. Sami Bouarfa (France)

## “Groundwater Resource Management”

Of the 300 million ha of irrigated land in the world, some 113 million ha presently depend on groundwater accounting some 25% of the total irrigation water withdrawals. The overall groundwater extraction has gone up from 100 million km<sup>3</sup> in 1950 to about 1000 km<sup>3</sup> in 2000. Of which 70-75% extraction goes for agriculture. It is estimated that groundwater-based systems generate \$210–230 billion of revenue and are economically and socially more efficient than surface water systems. The low costs of installing and operating tubewells along with the resulting groundwater revolution have been the main reasons for this rapid growth. Groundwater irrigation covers the major irrigated area in France; half of the irrigated areas in South-Asia and is crucial in North-Africa. But, unlike surface water, groundwater is not easily measurable and manageable. In most cases it is used by a large number of independent users, including farmers, who have direct access to water. The same goes for diffuse pollutions. The complexity of aquifers functioning on large time and space scales hampers collective action as well as the perception of the impacts on the environment.

Despite these challenges, ICID so far has not focused enough on issues related to groundwater. The Conference hosted by AFEID is therefore of significance. The Beauce region is an important region for grain production in France. Here farmers have tested an innovative volumetric management system to manage the groundwater. A return from experience by stakeholders and users of the Beauce groundwater was presented and discussed. President Madramootoo in his keynote address spoke on global trends in the usage of the groundwater reserves and resulting pressures from overexploitation. Dr Margat, a world-renowned hydrogeologist presented key data on the usage of the groundwater for irrigation, noting its rapid development during the past 50 years and the difficulties in managing a collective resource for which thousands of individuals have liberal access. Pr Ghislain de Marsily, an eminent hydrologist and member of the French Academy of Science, presented a case study on aquifer management in the French region of Marais-Poitevin which calls into question the necessity for extensive knowledge of water resources for its management. Dr. Marcel Kuper, on behalf of Dr. T Shah, senior fellow at IWMI described how communities in India have responded to aquifer development and overexploitation, noting two distinct responses based on the abundance and accessibility of water resources. Pr B Barraqué, political scientist and economist with the French Centre International de Recherches sur l'Environnement et le Développement, described the evolution of water management in Europe, as the status of groundwater resources move from a thing that is privately owned to a common resource under Public Trust.

### Key Issues

Irrigation withdrawals are causing the imbalance of groundwater in the Mediterranean region. The groundwater quality has deteriorated due to very high nitrate concentrations (sometimes higher than 400 mg/l).

While conjunctive use of groundwater in irrigated schemes is desirable, it can also be the source of new inequities between those who can invest in a borehole and other farmers. It would therefore be important to know if a collective appropriation of groundwater and its management is appropriate through allowance policy, collective drillings.

There are a few cases of successful groundwater management implementation and also a few cases of uncontrolled “tragedies of the commons.”

The Water Framework Directive 2000/ 60/CE (WFD) requires Member States to protect, enhance and restore waters with the ultimate objective of achieving “good status” for both surface and groundwater bodies. While “good quantitative status” is clearly defined in the WFD, this is not the case for the complex “good chemical status.” So the lessons learned in the last 10 years were presented.

Economic approaches of groundwater management discussed were (i) dynamics of, economic activities and groundwater resources, (ii) assessing and comparing the economic cost and/or benefits of different groundwater management options, and (iii) designing and testing groundwater regulation instruments such as prices, (abstraction/ pollution) charges or taxes and markets of water rights.

Groundwater pollution is not only the responsibility of agriculture with a highly variable ratio between agricultural/non-agricultural pollution sources, but also other users. It is thus necessary to involve all the parties to find solutions at the local scale. The types of action (preventive like local arrangements between water suppliers and groups of farmers or curative like water treatment or alternative resource) should be analysed in context to technical and economic criteria.

Dr. Sami Bouarfa can be contacted at <[sami.bouarfa@cemagref.fr](mailto:sami.bouarfa@cemagref.fr)>.



# Closing Ceremony, 23 October 2011

## Presentation of Awards, Plaques and Recognitions

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### 4th Best Performing National Committee Award 2011

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ICID in 2002 instituted an Award to recognize the Best Performing National Committee Award (BPNC). The award is presented at every triennial Congress. The performance of a National Committee is judged on the basis of various facets demonstrated by the participating National Committees between two successive ICID Congresses (over a three year period). The award consists of a citation plaque.



South African National Committee on Irrigation and Drainage (SANCID) has won the 4th Best Performing National Committee (4th BPNC) Award for its outstanding achievements and contributions to ICID activities. SANCID joined ICID the year 1993 and has been very actively contributing to various activities of ICID since then. SANCID is fairly broadbased and has organized several scientific and technical events during the years under consideration. The National Committee has also brought out a number of publications in the field of irrigation and drainage which have always demonstrated the advances made in these fields through research and on-field studies. SANCID professionals have also contributed a number of valuable papers to ICID Journal, ICID Congresses and Regional Conferences during this period.

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### 3rd Best Performing Workbody Award 2011

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The Best Performing Workbody Award (BPWA) was instituted by ICID in 2002. The performance of a workbody is adjudged based upon a set of criteria and its contribution towards the mandate and mission of ICID. The BPWA 2011 was presented to the ICID Working Group on Sustainable Development of Tidal Areas (WG-SDTA) by Prof. Madramootoo, President, ICID on 22 October 2011 during the occasion of the 62nd IEC, 21st ICID Congress and 8th IMIC held at Tehran, Iran. Dr. Park Sang Hyun (Korea), Chairman, WG-SDTA received the award.



The WG-SDTA is one of the active ICID workbodies, established in 2001 with its maiden meeting in 2002. A book titled “Towards Sustainable Development of Tidal Areas: Some Principles and Experiences” to improve the planning, design and management of irrigation and drainage projects in tidal areas was published in 2011.

The award reflects that the WG-SDTA’s contributions towards the mandate and mission of ICID were outstanding and impressive.

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## Best Paper Award 2011

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ICID has instituted the 'Best Paper Award' in 2006 in recognition of the outstanding paper contributed to Irrigation and Drainage, the Journal of ICID. Annually, starting on the occasion of the 57th IEC meeting (2006) in Kuala Lumpur, an award is given to the best paper published in the issues of the Journal in the preceding year (January-December). Decision on the best paper is made by the Editor in consultation with the Associate Editors. This



year the Best Paper Award 2011 was awarded to Messrs Yanbo Huang, Guy Fipps, Stephan J. Maas, and Reginald S. Fletcher (USA) to the paper titled "Airborne Remote Sensing for Detection of Irrigation Canal Leakage" published in Volume 59, No. 5.

The awards were citation plaques and Gift Books from M/s. Wiley-Blackwell (UK), the publisher of our Journal.

## Winners of WatSave Awards 2011

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### Innovative Water Management Award

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#### Prof. Dr. Subhash Taley (India)

Prof. Dr. Subhash M. Taley's work on "Participatory Rainwater Conservation of Rainfed Agriculture of Vidarbha Region (Maharashtra), India" has won the WatSave Innovative Water Management Award 2011. His work demonstrates as how the crop productivity can be increased in rainfed areas by the package of measures like across-slope cultivation and furrows, which are designed to enhance soil moisture in-situ and also capture runoff in farm ponds for "life saving" irrigations during dry spells.

The achievements include an estimated 227 Mm<sup>3</sup> of water conserved on 21,000 ha in 2009-10, besides 50,000 m<sup>3</sup> made available for protective irrigation by the construction of 15,000 farm ponds, leading to a significant increase in crop yields.

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### Technology Award

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#### Messrs. Pieter S van Heerden and Charles T Crosby (South Africa)

Messrs Pieter S van Heerden and Charles T Crosby's work on "SAPWAT 3: Irrigation Water Planning Tool" has won them the WatSave Technology Award 2011.

The software can be used for several purposes, but the saving of water could be achieved by way of reducing the irrigation depth from 500 mm (needed to fill the soil profile to field capacity) to 320 mm in order to provide the capacity to make better use of rainfall. The consequent saving of 180 mm, if applicable to the 1.5 Mha of irrigation in South Africa, could save 2,700 Mm<sup>3</sup>.

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### Farmer Award

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#### Mr. Jerry Erstrom (USA)

Mr. Jerry Erstrom (USA)'s work on "The Willow Creek Piping Project" has won the WatSave Farmer Award 2011. He is the Chairman of a local Watershed Council and a Working Group of local growers concerned with the conversion of irrigation laterals to pipes, in order to save a high level of losses.

The saving of water is considerable especially in the first month of irrigation in this dry high-desert region, and there are other benefits including the part conversion of the area to a gravity pressurized system. Upon completion, it is estimated that the project will save 14.8 Mm<sup>3</sup> of water on 4,856 ha, of which about half has already been converted to pipe-distribution and 14% converted to sprinkler.

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## Presentation of Plaques

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At concluding session, plaques were presented to the Office-Bearers who were to retire after the 2011 Congress in Tehran, Iran. They were:

### President (2008-11)



Prof. Dr. Chandra.A. Madramootoo  
(Canada)

### Vice Presidents (2008-2011)



Dr. (Mrs.) Samia El-Guindy  
(Egypt)



Mr. Shinsuke Ota  
(Japan)



Prof. Lucio Ubertini  
(Italy)

### Secretary General (2004-11)



Er. M. Gopalakrishnan  
ICID

**Address by  
H.E. Attarzadeh, Deputy Minister of Energy for  
Water and Wastewater Affairs, and Chairman of IRNCID**

Ladies & Gentlemen  
Dear Participants

Appreciating your presence here, I hope you have a pleasurable stay in Iran beside your specific functions. I also hope that you have enjoyed the wonderful sights and capabilities of Iran up to now.

I really thank the president of ICID, Dr. Chandra MadraMootoo and the Management board to let me have an opportunity to thank the active participation of ICID National Committees and I want to congratulate your excellencies and all of the honorable participants for gathering so cooperatively, and efficiently without any political global anxieties to analyze, discuss, and exchange ideas and find solutions for the issues and strategies on water security, water supply, and water efficiency which are the most important matters of fulfilling the world peace.

In theology and in all of the God's sacred books, God the almighty has insured the human beings that there exists enough water in the world regions.

The world specialists should benefit from the God's promise by careful assessing and studying to find procedure to supply the required water in any region of the world and do not let any entity or person waste and pollute such vital source directly or indirectly and with careful professional activities introduce those who are polluting and deteriorating climate, water, and weather to the world's people.

Finding various ways for upgrading water productivity and efficiency as the human – beings duty and following up such duty and to present to the world is an urgency. In Islamic Republic of Iran, extensive activities on development is being performed. Iranian authorities do not think merely on their own country but they are interested that the whole world progress to achieve and maintain peace all over the world.

The great success of our country is based on the strategic instructions of the Great Islamic Leader, Honorable Khamenae, and round – the – clock attempts of honourable president of I. R. Iran, the Cabinet and the Parliament, as well as, the dominant unity existing among them on supporting the activities on productivity promotion, water security and water supply especially by benefiting from the Islamic instructions.

During the last year, by executing the rational subsidization program in Iran, about 5 percent of potable water was saved. Executing great projects of water supply, developing irrigation canals, and benefiting the modern irrigation systems in the farms have paved the way for food supply & food security in spite of a decade aridity events in Iran so for that not only we could satisfy the local food requirement, in some food items but also have begun to export certain food products.

Iran engineering capabilities, project execution, operating water structures, absorbing further participation of operators and farmers and high-level authorities of the system, and execution and fulfilling comprehensive water management can be a paradigm for the world.

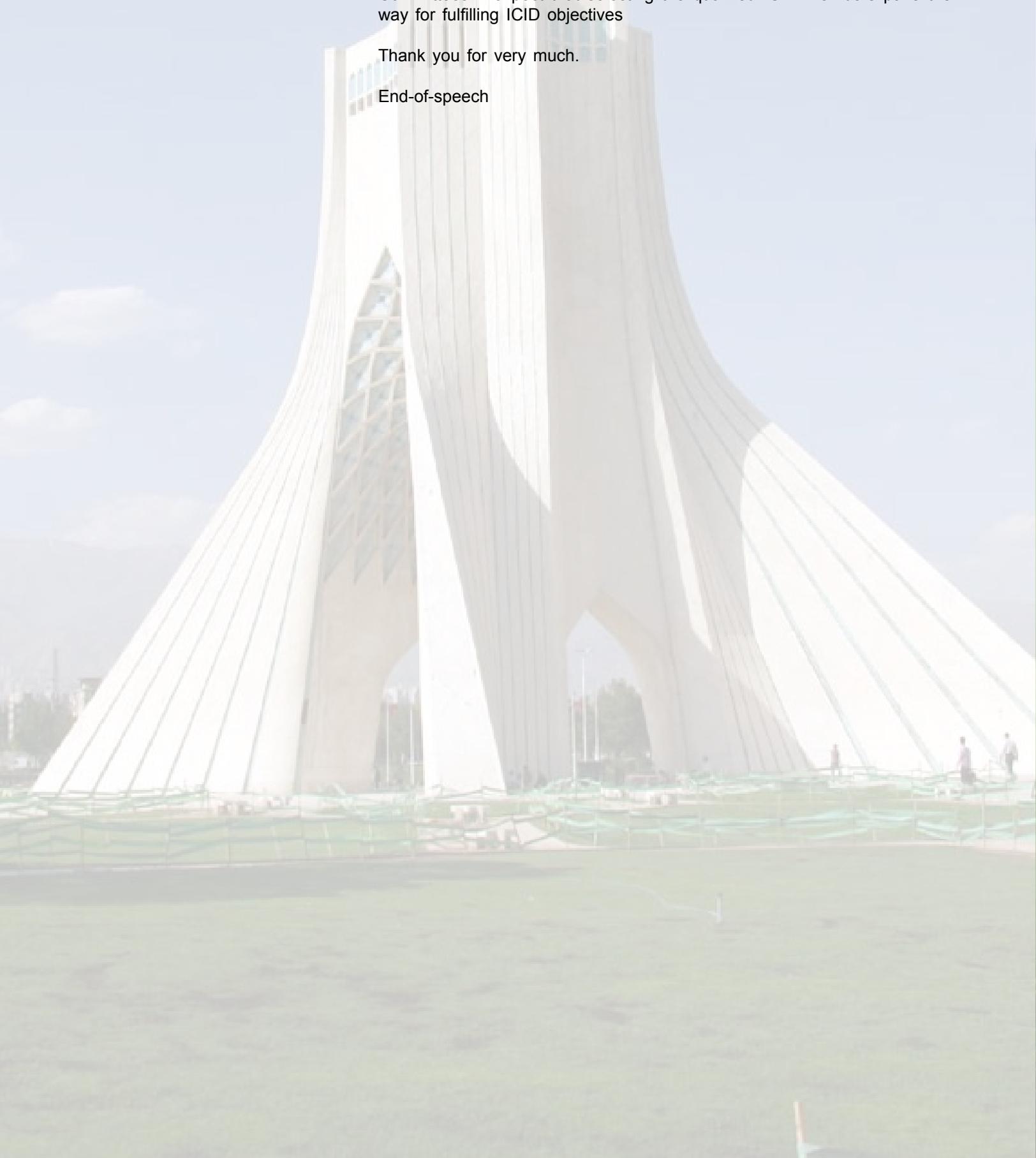
Appreciating the presence of all ICID National Committees, I think it is urgent to select proficient productive managers to administer ICID in the highest level. Once again, I emphasize that we have a long way to select and use the best national committees qualified manager experiences to enhance ICID objectives and have them completely fulfilled.

Eventually, I really appreciate cordial attempts of honorable Professor Dr. Chandra A. Madramootoo, President, ICID; and Honorable M. Gopalakrishnan, Secretary General, during their successful period of responsibilities. I also appreciate the round - the - clock sincere attempts of my colleagues especially cooperation of successful team of dear students who helped us in holding such a great, unique 2011 event in Tehran.

I.R. of Iran President, Dr. Ahmadinejad; Ministers of Energy and Jihad Agriculture have announced their serious supports to enhance ICID objectives, to benefit from exchanging the expertise and experiences of ICID National Committees. I expect that selecting the qualified ICID members pave the way for fulfilling ICID objectives

Thank you for very much.

End-of-speech



# Tehran Declaration

The 21st ICID Congress, the 8th International Micro-irrigation Congress and the 62nd IEC meeting of ICID were held between 15-23 October 2011 in Tehran, Iran. More than 200 papers were presented. Representatives from FAO, ADB joined the IEC events, given the importance of topics of the Congresses, and other sideline joint meetings on Investment in Agricultural Water Sector.

While the Congress was focused on considering the theme on "Water productivity towards food security," the Micro-irrigation Congress deliberated on issues related to "Innovations in Technology and Management of Micro-irrigation for the enhanced productivity." As a result of intense deliberations following the presentations, the following recommendations emerged:

1. Throughout the world the increasing signs of water stress, accentuated by the climate change are too imminent. The changes in the pattern of precipitation and temperatures impacts agricultural sector severely, particularly the rainfed. Increasing physical water productivity reduces the need for additional water required in irrigated lands to meet the increasing demand for doubling food production, meeting other water requirements, while at the same time providing sufficient water for the sustainability of ecosystems.
2. As water becomes a more limiting resource than land and other resources it is logical to focus on "maximizing water productivity." Creating an enabling environment allows the adoption of improved water management and other rainfed agriculture technologies to achieve this productivity increase. Where needed, the national policies can be changed involving all stakeholders to encourage maximizing water productivity by valuing water. A financial policy which reallocates to water use efficient practices and options can yield the desired results.
3. Rainfed agriculture is very important to enhance food security and ecosystems sustainability. However, the rainfed produces much below the potential achievable. Returns on investment in rainfed systems is high and hence essential in many areas where with supplemental irrigation, water harvesting and soil and water conservation in addition to facilitating access to necessary inputs, better results are achievable.
4. Impacts of climate change and droughts on rainfed production require more emphasis and consideration. It is important to increase support to research and capacity building in rainfed agriculture. Especially for understanding the impacts of climate change and adaptation measures in addition to optimizing water management.
5. Cost of desalination of water for agriculture use is prohibitively high. Therefore water productivity efforts should focus on:
  - (i) decreasing water losses in different phases of supply, distribution and consumption; (ii) improving irrigation methods, optimizing farming, garden and green area patterns; and (iii) reuse of wastewater for agricultural and city green areas.
6. Irrigation Water Productivity (IWP) is a promising tool to evaluate the effectiveness of water allocated to agriculture from economical and environment consideration particularly within water stressed regions. Local knowledge and modern techno-logical information are required to increase water user efficiency.
7. It is important to realize that irrigation has only a part role in the crop production process. In order to have high water productivity there are other important key players in this process which should be aligned with irrigation technology and management. The examples are, proper agro technology, improving the soil condition, better seeds, appropriate fertilization, and above all the importance of farm management is to be emphasized.
8. Evaporation from the field is an actual water loss within irrigation schemes, which is not recoverable. So attempts should be directed to the technology and management of irrigation planning and operation to minimize such water losses.
9. Supplemental irrigation is the key strategy, so far underutilized on a regional basis to unlock the yield potential under rainfed water scarcity conditions. Realizing that sub-surface drip irrigation is more effective than conventional drip irrigation systems in decreasing water evaporation and deep percolation especially in warm regions and light soils.
10. The concept of crop water requirement needs to be reconsidered with the aim to focus on the actual water consumed by crops. Irrigation technology should be directed to the systems which minimize losses and hence moving towards more water productivity.
11. Water management practices and technologies with high irrigation efficiencies should be studied and recommended for planning and decision making, based on basin water balance rather than measurement at the farm level.
12. There is an urgent need to improve designs and to increase micro-irrigation systems efficiency by incorporating latest research findings. Recognizing the priority of training illiterate farmers to apply pressurized and micro-irrigation systems in countries with low literacy level of the farmers.
13. Recognizing that increase in water productivity based on crop for drop needs to be given prime importance in the 21st century.

# 21st Congress on Irrigation and Drainage, Tehran, Iran, 2011

## Number of Participants (Country-Wise)

Sl. No.	Country	Number of participants	
		Member Countries	Non-member Countries
1	Australia	7	-
2	Bangladesh	2	-
3	Canada	2	-
4	China	25	-
5	Chinese Taipei	15	-
6	Finland	3	-
7	France	7	-
8	Germany	4	-
9	India	14	-
10	Indonesia	30	11
11	Iran	5 (441 local)	-
12	Italy	8	-
13	Japan	25	-
14	Kazakhstan	1	-
15	Korea	14	-
16	Malaysia	10	-
17	Mali	3	-
18	Nepal	1	-
19	The Netherlands	2	-
20	Niger	1	-
21	Pakistan	4	-
22	Philippines	1	-
23	Russia	7	-
24	South Africa	5	-
25	Spain	3	-
26	Syria	3	-
27	Tanzania	5	-
28	Thailand	4	-
29	Turkey	4	-
30	Ukraine	1	-
31	United Kingdom	2	-
32	USA	5	-
33	Uzbekistan	4	-
		<b>227</b>	<b>11</b>

# 21st Congress on Irrigation and Drainage, Tehran, Iran, 2011

## Names List of Participants (Country-wise)

Country	Name of the Participant
Australia	1. Mr. Iran Atkinson 2. Mr. Carl Walters 3. Ms. Jane Ryan 4. Mr. Stephen Mills 5. Kevin Minogue 6. Mrs. Helen Reynolds 7. Ms. Mary Harwood
Bangladesh	1. Dr. Abdul Sharifullah 2. Mr. MD. Ahasan Ullah
Canada	1. Dr. Chadra Madramootoo 2. Mr. Aly M. Shady
China	1. Mr. Li Guoying 2. Mr. Wang Aiguo 3. Prof. Dang Ping 4. Prof. Yan Guanyu 5. Mr. Li Yangbin 6. Mr. Liu Zhiguang 7. Mr. Hao Zhao 8. Prof. Hu Peing 9. Prof. Huang Jiasheng 10. Prof. Yang Jinzhong 11. Prof. Yu Jian 12. Prof. Gao Zhanyi 13. Prof. Yang Jifu 14. Mr. Gao Lihui 15. Prof. Bao Xiaoping 16. Prof. Zhang Riqiang 17. Prof. Cai Lingen 18. Prof. Tan Xuming 19. Dr. Yu Yingduo 20. Prof. Kuang Shangfu 21. Prof. Peng Jing 22. Ms. Wang Yanwei 23. Mr. Li Changyou 24. Prof. Cao Yinbai 25. Mr. Tao Qingbo
Chinese Taipei	1. Prof. Ray Shyan Wu 2. Dr. Chang-Chi Cheng 3. Dr. Ming-Young Jan 4. Dr. Kuang-Ming Chuang 5. Prof. Ruey-Chy Kao 6. Dr. Pao Shan Yu 7. Ir. Yi-Fong Ho 8. Ir. Ping Chen 9. Ms. Chun-Yi Liu 10. Ir. Ying Chen Lo 11. Ir. Chu Peng Hsu 12. Ir. Sheng Hsien Hsieh 13. Ir. Ming-Hsiu Chou 14. Ir. Wng-Hsiung Chen 15. Ir. Mei-Chang Chen
Finland	1. Mr. Jaakko Sierla 2. Mr. Olli-Matti Verta 3. Mr. Osmo Purhonen
France	1. Mr. Francois Brelle 2. Mr. Sami Bouarfa 3. Mr. Jacques Plantey 4. Mr. Bernard Vincent 5. Dr. Sylvain Perret 6. Ms. Anna Dupont 7. Ms. Fabienne Latapie
Germany	1. Prof. Klaus-Dieter Vorlop 2. Prof. Jano Anter 3. Prof. Klaus Roettcher 4. Ir. Sabine Walser
India	1. Dr. Kumar Veluswamy 2. Dr. Natarajan Asokaraja 3. Mr. Howard Nial White 4. Dr. Ramanagowda Patel 5. Dr. Kaluvai Yella Reddy 6. Dr. Bharat Sharma 7. Prof. Dr. Venkat Mayande 8. Prof. Dr. Subhash Taley 9. Er. M. Gopalakrishan 10. Dr. Suresh Kulkarni 11. Dr. Vijay K. Labhsetwar 12. Mr. Avinash C. Tyagi 13. Dr. Suhas Wani 14. Dr. Raghuvarthan Reddy Suravaram
Iran	1. Mr. Mohamadreza Attarzadeh 2. Mr. Seyyed Asadollahi 3. Mr. Alireza Salamat 4. Mr. Mehrzad Ehsani 5. Mr. Rahaman Davtalab
Indonesia	1. Dr. Momon Sodik Imanudin 2. Dr. Abdul Hafied Abdullah Gany 3. Mr. Syaiful Mahdi Naumin 4. Mrs. Mashati Malik Siddik 5. Mr. Fabian Priandani 6. Mr. Abang Emir Faridz 7. Mr. Heru Sunarto 8. Mr. Eddy Purnomo 9. Tris Radian 10. Mr. Martoredjo Somodiredjo Mudjadi 11. Mrs. Chalida Hanun Thayib Ida 12. Dr. Mochamad Basoeki Hadimoeljono 13. Mrs. Nurani Hadimoeljono Kartia 14. Mr. Imam Agus Nugroho 15. Mrs. Ley Astuti Oesmani Nugroho 16. Mr. Mohamad Hasan 17. Mrs. Nennie Gian Anggraenie 18. Mrs. Lolly Martina 19. Mr. Budianto Budi 20. Mr. Zulfan Zahar 21. Mr. Dadang Ridwan 22. Mr. Mudjadi 23. Mrs. Mustika Ike 24. Mr. Simanjuntak Bistok 25. Mrs. Riry Simarmata 26. Mr. I. Gusti Ngurah Wisnu 27. Mr. John Paulus Pantouw 28. Dr. Momom Sodik Imanudin 29. Colbert Thomas Pangaribuan 30. Mrs. Marsaulina Pardede Clara 31. Mr. Usmana Tonih 32. Mr. Ferdinand Pakpahan 33. Mrs. Rolina Sitompul Lina 34. Mr. Idris Fauzi 35. Mr. Setiadi Moerwanto Arie 36. Mrs. Zuhriati Arie Setiadi Ati 37. Mr. Dwi Cahyo Handono Setyawan 38. Mr. Iwan Nursyirwan 39. Mrs. Lena Magdalena Nuraini Nursyirwan 40. Prof. Budi Santoso Wignyosukarto 41. Mr. Satyagraha Baria
Italy	1. Dr. Anna Tedeschi 2. Dr. Ghinassi Graziano 3. Mr. Steduto Pasquale 4. Ms. Robina Wahaj 5. Mr. Daniel Renault 6. Dr. Abolghass Praviz Koohafkan 7. Dr. Fabio Russo 8. Prof. Lucio Ubertini

Japan	1. Prof. Teruyuki Fukuhara 2. Ir. Taji Hajime 3. Dr. Katsuhiro Higuchi 4. Mr. Yohei Sato 5. Mr. Koji Inosako 6. Mr. Akira Iwamoto 7. Mr. Shinsuke Ota 8. Mr. Masayoshi Satoh 9. Mr. Atsushi Marui 10. Mr. Akira Nakazawa 11. Mr. Takanori Nagano 12. Mr. Nobumasa Hatcho 13. Mr. Kazuaki Hiramatsu 14. Mr. Takao Masumoto 15. Mr. Kazumi Yamaoka 16. Mr. Tsugihiko Watanabe 17. Mr. Hajime Tanji 18. Mr. Motomu Uchimura 19. Mr. Hiroki Minakawa 20. Mr. Hiroyuki Suzuki 21. Mr. Daisuke Watabe 22. Noriyoshi Konzo 23. Dr. Shuichi Matsushima 24. Mr. Tomohiko Taminato 25. Mr. Kunihiko Naito
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Korea	1. Dr. Ki Wook Park 2. Mr. Sung HeeLee 3. Dr. Tai Cheol Kim 4. Ms. Chang Youn Park 5. Ir. Dong Koun Youn 6. Ir. Hun Sun Lee 7. Ir. Sang Ok Chung 8. Ir. Eun Mi Hong 9. Ir. Gil Chai Sin 10. Ir. Jin Hoon Jo 11. Mr. Hyun Tai kim 12. Ir. Sun Ju An 13. Ir. Byong Tae Park 14. Mr. Jin Yong Choi
Malaysia	1. Ir. Kim Mon Loh 2. Mohamad Zaki Mat 3. Dr. Chee Sheng Chan 4. Prof. Mohd. Amin Mohd. Soom 5. Ms. Hayati Zainal 6. Mr. Nik Ab Hadi Hassan 7. Mr. Ahmad Sharidan Ab. Rahman 8. Mr. Ahmad Zawawi Mohamed 9. Mr. Shaipuddin Shapii 10. Mr. Mukhlis Zainol Abidin
Mali	1. Dr. Adama Sangare 2. Mr. Aliou Bamba 3. Mr. Mamadou Baba Diallo
Nepal	1. Mr. Uttam Raj Timilsina
Netherlands	1. Mr. Zeleke Agide Dejen 2. Prof. Bart Schultz
Niger	1. Mr. Amadou Moussa
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Ukraine	1. Prof. Peter Kovalenko
USA	1. Mr. Larry Stephens 2. Mr. Bryce Contro 3. Dr. Charles Burt 4. Mr. Maurice Roos 5. Ms. Marylou Smith
Uzbekistan	1. Prof. Victor Dukhovny 2. Dr. Shukhrat Mukhamed Janov 3. Dr. Akmal Karimov 4. Dr. Shavkat Khamraev



**21st International Congress on  
Irrigation and Drainage  
and**

**62nd IEC Meeting**

October 2011, Tehran, Iran

**Photo Gallery**































































