



# Fourth International Conference on Irrigation and Drainage

Sacramento, California — October 3-6, 2007

## Wednesday, October 3

7:00 a.m. - 8:00 a.m. **Continental Breakfast in Exhibit Hall**

8:00 a.m. - 9:00 a.m. **Opening Plenary Session**

Moderators — **Albert J. Clemmens**, USDA-ARS, and **Joseph I. Burns**, MBK Engineers

### *Welcomes to Conference*

Representative, California/Sacramento

**Mark Svendsen**, President, USCID

**Peter Lee**, President, ICID

**Lester Snow**, Director, California Department of Water Resources

**Kirk Rogers**, Regional Director, Bureau of Reclamation

### *Keynote Address*

**Mahmoud Abu-Zeid**, Minister of Water Resources and Irrigation, Cairo, Egypt

9:00 a.m. - 9:30 a.m. **Meet the Exhibitors**

9:30 a.m. - 10:30 a.m. **Break in Exhibit Hall**

10:30 a.m. - 12:00 noon **Opening Plenary Session, continued**

### *Keynote Address*

**Mark Limbaugh**, Assistant Secretary, Water and Science, USDI, Washington, DC

### *Integrated Regional Water Management, the New Direction in California*

**Steven C. Macaulay**, West Yost Associates, Davis, CA; and **Francis Borcalli**, Wood Rodgers, Inc., Sacramento, CA

### *Government Policy and Water Reform in Australia*

To be announced

12:00 noon - 1:15 p.m. **Lunch in Exhibit Hall**, hosted by Australian National Committee, ICID

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 1**  
***Environmental Impacts of Irrigation***

Moderators — **James D. Oster**, University of California, Riverside, Riverside, CA; and **Bryan T. Thoreson**, Davids Engineering, Inc., Davis, CA

### *Environmental Impacts and Drainage Water Disposal — Case Study of Pakistan*

**Bashir Ahmad Qureshi** and **Bashir Ahmad Sial**, National Engineering Services Pakistan (Pvt) Limited, Lahore, Pakistan

### *Change of Irrigation Water Quantity According to Farm Mechanization and Land Consolidation in Korea*

**Wook Jong Ju**, **Jin Taek Kim** and **Hyun Young Kim**, Rural Research Institute, KRC, Gyeonggi-Do, Korea

### *Application of Geospatial Technologies for Sustainable Irrigation and Reclamation of Saline Soil*

**J. N. Patel**, Sadar Vallabhbhai National Institute of Technology, Surat, India

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 2**  
***Participatory Management***

Moderators — **Gary P. Merkley**, Utah State University, Logan, UT, and **Andrew A. Keller**, Keller-Bliesner Engineering, LLC, Logan, UT

### *Local Stakeholders Participation for Small Scale Water Resources Management in Bangladesh*

**Bashir Uddin Ahmed** and **Quazi Rezaul Islam**, RDEC Bhaban, Sher-e-Bangla Nagar, Bangladesh

### *Water User Participation in Egypt: An Incremental Process Towards Irrigation Management Transfer*

**Moamen El-Sharkawy**, **Amira El-Diasty** and **Khaled Wassief**, Ministry of Water Resources and Irrigation; and **Eric Viala**, International Resources Group, Cairo, Egypt

### *The Man Swimming Against the Stream Knows the Strength of It*

**Maurits W. Ertsen**, **Ronald van Nooijen** and **Bas van Son**, Delft University of Technology, Delft, The Netherlands

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 3**  
***Advances in Estimation of Evapotranspiration***  
(organized by EWRI, ASCE)

Moderators — **Douglas J. Hunsaker**, USDA-ARS, Maricopa, AZ; and **Michael D. Dukes**, University of Florida, Gainesville, FL

### *Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho — A Statewide Update*

**Richard G. Allen** and **Clarence W. Robison**, University of Idaho, Kimberly, Idaho

### *Measuring and Estimating Open Water Evaporation in Elephant Butte Reservoir in New Mexico*

**A. Salim**, **Zohrab Samani** and **Max Bleiweiss**, New Mexico State University, Las Cruces, NM

### *Use of an FAO-56 Evaporation Model to Improve Estimates of Evapotranspiration from Simple Vegetation Indices*

**Boyd Burnett**, **Richard G. Allen** and **Ricardo Trezza**, University of Idaho, Kimberly ID

*Evapotranspiration of Deficit Irrigated Sorghum and Winter Wheat*

**T. A. Howell, J. A. Tolk, S. R. Evett, K. S. Copeland and D. A. Dusek**, USDA-ARS, Bushland, TX

3:00 p.m. - 3:30 p.m. **Break in Exhibit Hall**

3:30 p.m. - 5:00 p.m. **Concurrent Technical Session 1**  
*Environmental Impacts of Irrigation* (continued)

*Alfalfa Production Using Saline Drainage Water*

**James E. Ayars**, USDA-ARS, Parlier, CA; **Richard W. Soppe**, WaterWatch, Wageningen, The Netherlands; and **Peter Shouse**, USDA-ARS, Riverside, CA

*Soil Salinity Distributions in Drip Irrigated Vineyards of Southeastern Australia*

**Evan W. Christen**, CSIRO Land and Water, Griffith, NSW, Australia; **Sheila DeLange** and **Tony Patti**, Monash University, Melbourne, Australia; and **John Hornbuckle**, CSIRO Land and Water, Griffith, NSW, Australia

*Drainage and Irrigation Water Quality Management in Eastern Canada*

**Chandra A. Madramootoo**, McGill University, Montreal, Canada

3:30 p.m. - 5:00 p.m. **Concurrent Technical Session 2**  
*Participatory Management* (continued)

*Roles and Issues of Water Users' Associations for Sustainable Irrigation and Drainage in the Kyrgyz Republic and Uzbekistan in Central Asia*

**Koji Kitamura**, National Institute for Rural Engineering, Tsukuba, Ibaraki, Japan

*Chartered Water User Associations of Afghanistan — Self-Financing, Self-Managing, Self-Governing*

**John E. Priest**, Consultant, Littleton, CO; **A. Tawab Assifi**, Consultant, Tustin, CA; and **M. Ibrahim Sultani**, Ministry of Agriculture, Kabul, Afghanistan

*Irrigation Districts in the US and in Egypt: A Comparison of Institutional Settings and Socio-Political Interactions*

**John Wilkins-Wells**, Colorado State University, Fort Collins, CO; **Mark Svendsen**, Consultant, Philomath, OR; and **Eric Viala**, International Resource Group, Cairo, Egypt

3:30 p.m. - 5:30 p.m. **Concurrent Technical Session 3**  
**Advances in Estimation of Evapotranspiration** (continued)

*Evaluation of a Two-Layer Model to Estimate the Actual Evapotranspiration for Vineyards*

**Samuel Ortega-Farias**, **Carlos Poblete** and **Marcos Carrasco**, Universidad de Talca, Talca, Chile; and **Albert Oliosio** and **Nadine Brisson**, INRA, Climat, Sol et Environnement, Avignon, France

*Estimating Pecan Water Use through Remote Sensing in Lower Rio Grande*

**Zohrab Samani**, **A. Salim Bawazir**, **Max Bleiweiss** and **Rhonda Skaggs**, New Mexico State University, Las Cruces, NM

*Estimation of Reference Evapotranspiration Using GIS Technique*

**Masahiro Tasumi** and **Shinichi Takeshita**, University of Miyazaki; Miyazaki, Japan; and **Richard G. Allen** and **Ricardo Trezza**, University of Idaho, Kimberly, ID

*Estimating Crop Water Use from Remotely Sensed NDVI, Crop Growth Models, and Reference ET*

**Thomas J. Trout**, USDA-ARS, Fort Collins, CO; and **Lee F. Johnson**, NASA/ARC, Moffett Field, CA

5:30 p.m. - 7:30 p.m. **Reception, Exhibition and Poster Session in Exhibit Hall**

*Can Frost Damages Impact Water Demand for Crop Production in the Future?*

**Michel Baraer** and **Chandra A. Madramootoo**, McGill University, Montreal, Québec, Canada

*An Open Channel Network Modernization with Automated Structures*

**J. Natividad Barrios-Domínguez**, Universidad Autónoma de Zacatecas, Zacatecas, México; **Nahún H. García-Villanueva**, Instituto Mexicano de Tecnología del Agua, Jiutepec, Morelos, México; **Carlos F. Bautista-Capetillo** and **Julián González-Trinidad**, Universidad Autónoma de Zacatecas, Zacatecas, México; **Eduardo Bautista**, USDA-ARS, Maricopa, AZ; and **Adalberto Castro-Ávila**, **Francisco Mojarro-Dávila** and **Dagoberto Chávez Carlos**, Universidad Autónoma de Zacatecas, Zacatecas, México

*Effects of Irrigation Network Water Distribution Schedule and Different On-Farm Water Management Practices on Sugarbeet Water Use Efficiency — Case Study: Mahabad, I.R. Iran*

**Shahab Daneshvar**, Mahab Ghodss Consulting Engineering Company, Tehran, Iran; **Ali Reza Shokoohi**, Imam Khomeini International University, Ghazvin, Iran; and **Farshid Morshedi**, Mahab Ghodss Consulting Engineering Company, Tehran, Iran

*Irrigation Drainage Reuse for Stabilizing Exposed Salton Sea Playa*

**J. B. Dickey**, CH2M Hill, Inc., Sacramento, CA; **M. Hall**, Earthworks Restoration, Inc., Redding, CA; **M. D. Schaaf** and **M. D. J. Schreuder**, Air Sciences Inc., Portland, OR; and **B. Inman**, **M. H. Heilmann**, **B. M. Schmid**, **J. K. Smesrud**, **S. Asare**, **C. MacDougall** and **P. Vanderbilt**, CH2M Hill, Inc., Sacramento, CA

*Management Strategies for the Reuse of Wastewater in Jordan*

**Mohammad M. Duqqah**, University of Jordan, Amman, Jordan; **Khaled M. Bali**, University of California Desert Research & Extension Center, Holtville, CA; and **Ayman Suleiman**, University of Jordan, Amman, Jordan

*Use of Data Based Management to Support Integrated Water Management Districts (IWMD)*

**Moamen El-Sharkawy** and **Hisham Shehab**, Ministry of Water Resources and Irrigation, Cairo, Egypt

*Relationship of Operation Stability and Automatic Operation Control Methods of Open Canal*

**Xiaobo Feng, Changde Wang** and **Guanghua Guan**, Wuhan University, Wuhan, China

*Real Time Water Delivery Management and Planning in Irrigation and Drainage Networks*

**Vahid Karami**, Mahab Ghodss Consulting Engineers, Tehran, Iran; **Roghayeh Samadi Bahrami**, ZEISTAB Consulting Engineers, Tehran, Iran; and **Ali Hosseinzadeh dalir**, Tabriz University, Iran

*Growth Response of Palm Trees to the Frequency of Irrigation by Bubblers in Khuzestan Province, Iran*

**H. A. Kashkuli** and **K. Khodadadi**, University of Ahwaz, Tehran, Iran; **H. Siadat**, Soil and Water Research Institute, Tehran, Iran; and **M. Vaeli Zade**, Sharab Consulting Engineers, Ahwaz, Iran

*Optimization of Limited Irrigation Water: A Case Study of Jamal Shah Distributary in Sindh, Pakistan*

**Zarif Iqbal Khero**, Sindh Irrigation and Power Department; and **Abdul Latif Qureshi** and **Bakhshal Lashari**, Mehran University of Engineering and Technology, Jamshoro, Sindh, Pakistan

*Development of Canal Monitoring System Using Sensor Network Technology*

**Jin Taek Kim**, Rural Research Institute, KRC, Gyeonggi-Do, Korea

*Application of Backpropagation Neural Network to Estimate Evapotranspiration for ChaiNan Irrigated Area in Taiwan*

**Sheng-Feng Kuo**, Leader University, Tainan, Taiwan; and **Min-Hwa Tsai, Wei-Taw Lin** and **Yi-Fong Ho**, Council of Agriculture, Taipei, Taiwan

*Community Managed Aquifer Recharge for Sustainable Agriculture in Sindh, Pakistan*

**Bakhshal Lashari**, Mehran University of Engineering and Technology; and **Zarif Iqbal Khero**, Irrigation and Power Department, Government of Sindh, Pakistan

*Improvements in Float Method Accuracy through Calculated Surface Velocity Coefficients for Rectangular Open Channels*

**Nat Marjang** and **Gary P. Merkley**, Utah State University, Logan, UT

*Soil Salinity Influence to Crop Yield, Water Consumption and Hydraulic Resistance*

**Atsushi Marui** and **Aimin Hao**, Kyushu University, Higashi-ku Fukuoka, Japan; **Tomokazu Haraguchi**, Saga University; **Yoshisuke Nakano**, Kyushu University, Higashi-ku Fukuoka, Japan; and **Koji Inosako**, Tottori University

*Ecological Risk Assessment for Selenium in the Evaluation of Restoration Alternatives for Salton Sea, California*

**H. M. Ohlendorf, T. S. Pulley, B. E. Sample, S. P. Long, E. R. Byron** and **K. J. Nielsen**, CH2M Hill, Inc., Sacramento, CA

*The Satellite Remote Sensing Approach for the Assessment of Rice Yield (A Case Study of Sri Lanka)*

**Samatha Perera**, Sri Lankan Irrigation Department, Colombo, Sri Lanka

*Bean Yield and Root Development in Different Soil Managements Under a Center Pivot System*

**Leonardo Pretto de Azevedo, João Carlos Cury Saad** and **Marcelo Augusto de Aguiar Silva**, São Paulo State University, Botucatu, Brazil

*Traditional Rainwater Harvesting Techniques and Their Impact on Livelihoods in Sindh, Pakistan*

**Abdul Latif Qureshi**, Mehran University of Engineering and Technology; and **Zarif Iqbal Khero**, Irrigation and Power Department, Government of Sindh, Sindh, Pakistan

*Transient Rootzone Salinity in Precision Irrigated Viticulture in Langhorne Creek South Australia*

**Amy Richards**, CRC for Irrigation Futures, Flinders University, Aedlaide, South Australia, Australia

*Water Retention, Compaction and Bean Yield in Different Soil Managements Under a Center Pivot System*

**João Carlos Cury Saad, Leonardo Pretto de Azevedo** and **Marcelo Augusto de Aguiar e Silva**, São Paulo State University, Botucatu, Brazil

*Development of Digital Mapping System to Support IWRM Implementation*

**Hisham Shehab**, and **Moamen El-Sharkawy**, Ministry of Water Resources and Irrigation, Cairo, Egypt; and **Tom S. Sheng**, Computer Assisted Development, Inc., 636 South Shields Street, Fort Collins, CO

*Increasing Water and Fertilizer Use Efficiency through Rain Gun Sprinkler Irrigation in Sugar Cane Agriculture*

**P. P. Shinde**, Vasantdada Sugar Institute, Pune, India

*Testing and Evaluation of Inexpensive Horizontal-Axis Mechanical Current Meters*

**Kirk Thibodeaux**, U.S. Geological Survey, Stennis Space Center, MS

*Reoptimizing Global Irrigation Systems to Resotre Floodplain Ecosystems and Human Livelihoods*

**Gregory A. Thomas**, Natural Heritage Institute, San Francisco, CA

*Soil and Water Conservation through Improved Irrigation Practices: A Case Study*

**Adham U. Tulagamov**, Central Asian Scientific Research Institute for Irrigation, Tashkent, Uzbekistan; and **Deepak Khare, Bhaskar R. Nikam** and **Raj Pal Singh**, WRD&M, IIT Roorkee, India

*Status and Controlling Research of Non-Point Source Pollution in China*

**Shaoli Wang**, China Institute of Water Resources and Hydropower Research; and **Binghui Zheng**, China Research Academy of Environmental Sciences, Beijing, China



## Thursday, October 4

7:00 a.m. - 8:00 a.m. **Continental Breakfast in Exhibit Hall**

8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 4**  
*Impacts and Use of Poor Quality Water*

Moderators — **Franklin E. Dimick**, Dimick Water Resources Engineering, Monroe, UT; and **Kenneth K. Tanji**, University of California, Davis, Davis, CA

*Low Cost Wastewater Treatment Facilities for Rural Areas to Improve Water Quality*

**Mohamed H. Abdel-Latif** and **Wadie F. Mankarious**, Ministry of Water Resources and Irrigation, Cairo, Egypt

*Performance Evaluation of Subsurface Drainage System Under Unsteady State Flow Conditions in Coastal Saline Soils of Andhrapradesh, India*

**S. Ramesh Chandra** and **K. Shyamsundar**, Agricultural College Farm, Bapatla, India

*The Environmental and Economic Impacts of Using the Effluent of Drarga Wastewater Treatment Plant in Irrigating Potato Crop*

**Haga O. Mohamed**, UNESCO, Khartoum, Sudan

8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 5**  
*Irrigation Project Operations*

Moderators — **Charles M. Burt**, California Polytechnic State University, San Luis Obispo, CA; and **Neil W. Schild**, MWH, Sacramento, CA

*Oakdale Irrigation District Water Resources Plan — A California Water Management Case Study*

**Steven R. Knell**, Oakdale Irrigation District, Oakdale, CA; and **Gregory W. Eldridge**, CH2M Hill, Inc., Sacramento, CA

*Use of Information Technology to support IWRM Implementation*

**Moamen El-Sharkawy** and **Hisham Shehab**, Ministry of Water Resources and Irrigation, Cairo, Egypt

*Decision-Support Systems for Efficient Irrigation in the Middle Rio Grande*

**Ramchand Oad** and **Kristoph-Dietrich Kinzli**, Colorado State University, Fort Collins, CO; **Nabil Shafike**, Interstate Stream Commission, and **David Gensler**, Middle Rio Grande Conservancy District, Albuquerque, NM

8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 6**  
*Management of On-Farm Irrigation Systems*

Moderators — **Kevin L. King**, Oakdale Irrigation District, Oakdale, CA and **David G. Cone**, Kings River Conservation District, Visalia, CA

*Field Tests of OSIRI — A Decision-Making Tool for Irrigation of Sugarcane Farms in Reunion*

**J.-L. Chopart**, CIRAD, Saint Pierre, France; **F. Aure**, Chambre d'Agriculture de la Réunion, Saint Denis, France; **L. Le Mézo** and **M. Mézino**, CIRAD, Saint Pierre, France; **J. Antoir**, Chambre d'Agriculture de la Réunion, St Denis, France; and **M. Vauclin**, CNRS, LTHE-UMR, Grenoble, France

*Feedback Based Control of Turfgrass Irrigation in the Humid Region*

**Michael D. Dukes**, **Bernard Cardenas-Lailhacar** and **Melissa B. Haley**, University of Florida, Gainesville, FL

*Using Satellite Imagery for Irrigation Scheduling*

**Mohamed Rami Mahmoud** and **Ragab Abd Elazim**, Ministry of Water Resources and Irrigation; and **Jeffrey W. Fredericks**, International Resources Group, Cairo, Egypt

9:30 a.m. - 10:30 a.m. **Break in Exhibit Hall**

10:30 a.m. - 12:00 noon **Concurrent Technical Session 4**  
*Impacts and Use of Poor Quality Water* (continued)

*Soil Resource Investigations for Reclamation of Salt Affected and Waterlogged Soils in Mutluru Channel Command of Krishna Western Delta in Andhra Pradesh State of India*

**P.R.K. Prasad**, **D. Srinivas**, **T. V. Satyanarayana**, **S. Ramesh Chandra**, **G. Subba Rao**, **B. Mukunda Rao** and **A. Srinivasulu**, A. P. Water Management Project, Bapatla, India

*Providing Recycled Water for Crop Irrigation and Other Uses — The Recycled Water Program in Gilroy, California*

**Craig J. Smith** and **Benjamin R. Herston**, MWH Americas, Inc., Gilroy, CA; and **Saeid Vaziry**, South County Regional Wastewater Authority, Gilroy, CA

*Effects of Industrial and Municipal Wastes to the Quality of Water and Soil Properties and Relevant Research Works in Turkey*

**M. Yildirim**, **Z. Gokbayrak**, **C. Turkmen**, **M. Y. Yavuz** and **A. Dardeniz**, Çanakkale Onsekiz Mart University, Çanakkale, Turkey

10:30 a.m. - 12:00 noon **Concurrent Technical Session 5**  
*Irrigation Project Operations* (continued)

*Salt Management: A Key to Irrigation Sustainability in Arid Climates*

**J. D. Oster**, University of California, Riverside, Riverside, CA; **S. R. Kaffka**, University of California, Davis, Davis, CA; and **D. Wichelns**, Hanover College, Hanover, IN

*Ghazi Barotha Project on Indus River in Pakistan*

**Illahi B. Shaikh**, Ministry of Water and Power, Islamabad, Pakistan

*Using Virtual Reality Technology to Describe the Environmental Impact of the Flood Mitigation Project and the Yuanshanzi Flood Diversion Project in Taiwan*

**Harold Yih-Chi Tan** and **J. S. Lai**, National Taiwan University, Taipei, Taiwan

10:30 a.m. - 12:00 noon **Concurrent Technical Session 6**  
**Management of On-Farm Irrigation Systems** (continued)

*Water Requirements, Irrigation Evaluation and Efficiency in Tenerife's Crops (Canary Islands, Spain)*

**A. Pérez-Buenafuente**, Cabildo Insular de Tenerife; **J. Rodrigo**, Universidad de La Laguna; **N. Machín-Barroso**, **F. López-Manzanares** and **J. M. Hernández Abreu**, Cabildo Insular de Tenerife; and **J. F. González Hernández**, AGRIMAC, S.L., Canary Islands, Spain

*Using Wireless Technology to Reduce Water Use in Rice Production*

**Earl D. Vories**, USDA-ARS, Portageville, MO; **Daniel K. Fisher**, USDA-ARS, Stoneville, MS; **Phil L. Tacker**, University of Arkansas, Little Rock, AR; and **Kenneth A. Sudduth**, USDA-ARS, Columbia, MO

*Variability of Crop Coefficients in Space and Time — Examples from California*

**Byron Clark**, SEBAL North America, Davis, CA; **Richard Soppe**, WaterWatch, Wageningen, The Netherlands; **Deepak Lal** and **Bryan Thoreson**, SEBAL North America, Davis, CA; **Wim Bastiaanssen**, WaterWatch, Wageningen, The Netherlands; and **Grant Davids**, SEBAL North America, Davis, CA

12:00 noon - 1:15 p.m. **Buffet Lunch in Exhibit Hall**

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 7a**  
**Justifying Continued Investment in Irrigation**

Moderators — **James E. Ayars**, USDA-ARS, Parlier, CA; and **Dennis Wichelns**, Rivers Institute at Hanover College, Hanover, IN

*Assessing the Implementation of Integrated Water Management Approach in Closed Basins*

**Wael M. Khairy**, Ministry of Water Resources and Irrigation, Giza, Egypt

*New Donors' Strategies in the Irrigation Sector in Africa*

**Herve Levite**, Food and Agricultural Organization, Rome, Italy; **Mayouma Loumouamou**, ENGREF, Montpellier, France; **Florent Maraux**, CIRAD, Montpellier, France; **Julienne Roux**, World Bank, Washington, DC; and **Estelle Godart**, French Ministry of Foreign Affairs, Paris, France

*Holistic Perspective for Investments in Agricultural Drainage in Egypt*

**M. A. S. Wahba**, Drainage Research Institute; and **M. H. Amer**, National Water Research Center, Cairo, Egypt

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 8**  
**Modernization of Irrigation System Operations**

Moderators — **Joseph C. McGahan**, Summers Engineering, Inc., Hanford, CA; and **Brian T. Wahlin**, WEST Consultants, Inc., Tempe, AZ

*Study on Operation of Long Distance Water Transfer Canal System*

**Wang Changde** and **Yao Xiong**, Wuhan University; **Fan Jie**, Changjiang Water Resources Commission; and **Guan Guanghua**, Wuhan University, Wuhan, China

*A Practical Method for Volumetric Delivery of Water*

**Ahmad Pourzand**, Mahab Ghodds Consulting Engineers Company, Tehran, Iran

*MApping System and Services for Canal Operation TEchniques: the MASSCOTE Approach*

**Daniel Renault**, Food and Agriculture Organization, Rome, Italy; **Thierry Facon**, Food and Agriculture Organization, Bangkok, Thailand; and **Robina Wahaj**, Food and Agriculture Organization, Rome, Italy

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 9**  
**Technical Advances in On-Farm Irrigation Methods**

Moderators — **Eduardo Bautista**, USDA-ARS, Maricopa, AZ; and **John I. Sweigard**, Patterson Irrigation District, Patterson, CA

*Simulation on the Effect of Microtopography Spatial Variability on Basin Irrigation Performance*

**Mei Jian Bai**, **Di. Xu** and **Yi Nong Li**, China Institute of Water Resources and Hydropower Research, Beijing, China

*Influence of Modified Sub-Surface Drip on Vegetable Crop Establishment, Soil Moisture and Drainage*

**Viola Devasirvatham** and **Peter S. Cornish**, University of Western Sidney, Sidney, Australia

*Drip Irrigation as a Sustainable Practice Under Saline Shallow Ground Water Conditions*

**Blaine R. Hanson**, University of California, Davis, CA; **Don M. May**, University of California Cooperative Extension, Fresno, CA; **Jan Hopmans**, University of California, Davis, CA; and **Jirka Simunek**, University of California, Riverside, CA

3:00 p.m. - 3:30 p.m. **Break in Exhibit Hall**  
(exhibition closes)

3:30 p.m. - 5:30 p.m. **Concurrent Technical Session 7b**  
**Managing Water Quality in the San Joaquin Valley**

*The Framework Approach*

**W. Ward**, Modesto Irrigation District, Modesto, CA; **J. Edmunds**, **T. Cooke** and **L. S. Hunt**, URS Corporation, Oakland, CA

*East San Joaquin Water Quality Framework: 2005/2006 Water Quality Monitoring Results*

**Jody Edmunds**, **Lisa S. Hunt** and **Terry Cooke**, URS Corporation, Oakland, CA; and **Walter Ward**, Modesto Irrigation District, Modesto, CA

*East San Joaquin Water Quality Framework: Effects of Urbanization on Water Quality*

**T. Cooke, L. S. Hunt** and **J. Edmunds**, URS Corporation, Oakland, CA; and **W. Ward**, Modesto Irrigation District, Modesto, CA

*East San Joaquin Water Quality Framework: Pesticide Management Studies Addressing Surfacewater Quality*

**M. Blankinship**, Blankinship & Associates, Davis, CA; **J. Edmunds, L. S. Hunt** and **T. Cooke**, URS Corporation, Oakland, CA; and **W. Ward**, Modesto Irrigation District, Modesto, CA

3:30 p.m. - 5:00 p.m. **Concurrent Technical Session 8**  
*Modernization of Irrigation System Operations* (continued)

*The Frequency of Computer Models, Implemented in Irrigation Systems: the Causes of Approval and Non-Approval of these Systems by Experts and University Academic Staff*

**Abdolkarim Behnia**, Shahid Chamran University, Tehran, Iran

*Canal Control Alternatives in the Irrigation District 'Sector BXII del Bajo Guadalquivir,' Spain*

**David Lozano**, Instituto de Agricultura Sostenible-CSIC, Córdoba, Spain; **Carina Arranja** and **Manuel Rijo**, Universidade de Évora, Évora, Portugal; and **Luciano Mateos**, Instituto de Agricultura Sostenible-CSIC, Córdoba, Spain

*Hydrodynamic Behavior of a Canal Network Under Simultaneous Supply and Demand Based Operations*

**Sarfraz Munir** and **Bart Schultz**, UNESCO-IHE, Delft, The Netherlands; **Abdul Hakeem Khan**, International Water Management Institute, Lahore, Pakistan; **F. X. Suryadi**, UNESCO-IHE, Delft, The Netherlands; and **Francis Gichuki**, International Water Management Institute, Colombo, Sri Lanka

3:30 p.m. - 5:00 p.m. **Concurrent Technical Session 9**  
*Technical Advances in On-Farm Irrigation Methods* (continued)

*Precision Mechanical Move Irrigation for Smallholding Farmers*

**Jacob LaRue**, Valmont Industries International Irrigation, Valley, NE

*Wild Flood to Graded Border for Irrigation Efficiency Enhancements in the Klamath Basin*

**Jason Smesrud** and **Mark Madison**, CH2M Hill, Inc., Portland, OR

*A Method to Describe Precise Water Application Intensity Under a CPIS from a Limited Number of Measurements*

**Bruno Molle, J. Granier** and **A. Drechsel**, Cemagref, Aix en Provence, France

Evening

**“On Your Own” Visit to Old Sacramento**

## Friday, October 5

7:00 a.m. - 8:00 a.m. **Continental Breakfast**

8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 10**  
*Adapting to Limited Water Supplies in Australia*

Moderators — **Samuel W. Schaefer**, Bookman-Edmonston Engineering, A Division of GEI Consultants, Inc., Glendale, CA; and **Laura A. Schroeder**, Schroeder Law Offices, PC, Portland, OR

*An Irrigation Sustainability Assessment Framework for Reporting Across the Environmental- Economic-Social Spectrum*

**Evan W. Christen** and **Nihal S. Jayawardane**, CSIRO Land and Water, Griffith, NSW, Australia; **Mark Shephard**, University of New England; **Basant Maheshwari** and **Debbie Atkins**, University of Western Sydney; **Penny Davidson** and **Michael Mitchell**, Charles Sturt University; and **Bruce Simmons**, University of Western Sydney, Australia

*Planning for Future Irrigation Landscapes*

**John Ginnivan**, Goulburn-Murray Water Authority, Kerang, Victoria; Australia

*One Size Does Not Fit All — Recognizing Heterogeneity in Australian Farmers*

**G. Kuehne** and **H. Bjornlund**, University of South Australia, Adelaide, South Australia, Australia

8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 11**  
*Adapting to Increasing Competition for Water*

Moderators — **Robert H. Edwards**, Bureau of Reclamation, Byron, CA; and **Michael C. Archer**, MBK Engineers, Sacramento, CA

*Irrigation System Modernization in the Middle Rio Grande Valley*

**David Gensler**, Middle Rio Grande Conservancy District, Albuquerque, NM; and **Ramchand Oad** and **Kristoph-Dietrich Kinzli**, Colorado State University, Fort Collins, CO

*Modernization of Irrigation Infrastructure and Operations in Pakistan*

**Abdul Hakeem Khan**, International Water Management Institute, Lahore, Pakistan; **Peter G. McCornick**, International Water Management Institute, Colombo, Sri Lanka; and **Masood Pervez Qureshi**, Irrigating Department, Mardan, Pakistan

*Responsive Strategies of Agricultural Water Sector in Taiwan*

**Chang-Chi Cheng**, Ching-Yun University, Tao-Yuan, Taiwan; **Chun-E Kan**, National Taiwan University, Taipei, Taiwan; **Kuang-Ming Chuang**, Agricultural Water Management Research and Development Foundation, Taipei, Taiwan; and **Ming-Young Jan**, I-Shou University, Kaohsiung, Taiwan



8:00 a.m. - 9:30 a.m. **Concurrent Technical Session 12**  
***Innovative Approaches to Irrigation Management***

Moderators — **Anisa J. Divine**, Imperial Irrigation District, Imperial, CA; and **Larry J. Schluntz**, Consultant, Longmont, CO

***A New E-Platform Launched to Propagate Knowledge of Three Roles of Rice Paddies***

**Chia-Chen Kuo**, **Chuan-Lin Lai**, **Yi-Haur Shiau** and **Chang-Wei Yeh**, National Applied Research Laboratories, Hsinchu, Taiwan

***Land and Water Uses and Carrying Capacity on Ly Son Island, Quang Ngai Province, Vietnam***

**Le Trinh Hai**, **Luc Hens** and **Emmanuel Boon**, Free University of Brussels, Brussels, Belgium; **Pham Hoang Hai**, Vietnamese Academy of Science and Technology; and **Dinh Thi Huong Giang**, Hanoi Department of Natural Resources and Environment, Hanoi, Vietnam

***Stratification of Political Will in the Irrigation Transfer Process***

**L. Humberto Yap-Salinas**, Utah State University, Logan, UT

9:30 a.m. - 10:30 a.m. **Break**

10:30 a.m. - 12:00 noon **Concurrent Technical Session 10**  
***Adapting to Limited Water Supplies in Australia***  
(continued)

***Water Information Networks Towards an IT Infrastructure for Efficient Management of Water Resources***

**Iven Mareels** and **Su Ki Ooi**, The University of Melbourne; **Gavin Thoms**, National ICT Australia; **Stan Skafidas**, The University of Melbourne; **Tony Oakes**, Rubicon Systems Australia, Pty Ltd.; and **John Langford**, The University of Melbourne, Victoria, Australia

***Total Channel Control — A Role in Determining System Losses***

**Bruce Rodgerson**, Rubicon Systems Australia Pty Limited, Hawthorn East, Australia

***Gravity Irrigation System Modernisation: The Coleambally Irrigation Area Modernisation Project***

**Mark Nayar**, Marsden Jacob Associates, Camberwell, Australia; and **Murray Smith**, Coleambally Irrigation Cooperative Limited, Coleambally, Australia

10:30 a.m. - 12:00 noon **Concurrent Technical Session 11**  
***Adapting to Increasing Competition for Water (continued)***

***Coping with the Evolving Competition for Water: An Economic Framework***

**Ernie Niemi** and **Kristin Lee**, ECONorthwest, Eugene, OR

***Allocation of Water Use Rights in Irrigated Agriculture: Experience with Designing Institutions and Facilitating Market Processes in South Africa***

**Gerhard R. Backeberg**, Water Research Commission, Pretoria, South Africa

***The Formulation of the Sacramento Valley Integrated Regional Water Management Plan: A Foundation for Continued Regional Coordination***

**Mark T. Oliver**, CH2M Hill, Inc., Redding, CA; and **David J. Guy**, Northern California Water Association, Sacramento, CA

10:30 a.m. - 12:00 noon **Concurrent Technical Session 12**  
***Innovative Approaches to Irrigation Management***  
(continued)

***Irrigation System Management Transfer: An Important Tool for Development of Rural Societies***

**L. Humberto Yap-Salinas**, Utah State University, Logan, UT

***Socio-Economic Interactions Among Multiple Uses of Water in Himachal Pradesh-India***

**K. Randev** and **Uma Randev**, Rajkeya Kanya Maha Vidyalaya, Shimla, India

***Effects of Social Capital on Participatory Management for Irrigation Facilities: SEM Approach***

**Yoji Kunimitsu**, National Institute for Rural Engineering, Ibaraki, Japan

12:00 noon - 1:15 p.m. **Lunch with Speaker**

Moderator — **Mark Svendsen**

***Goulburn-Broken Catchment***

**Stephen Mills**, Tatura, Victoria, Australia

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 13**  
***Increasing Competition for Water — Irrigation vs Urban Uses***

Moderators — **Robert S. Gooch**, Salt River Project, Phoenix, AZ; and **Reed R. Murray**, U.S. Department of the Interior, Provo, UT

***Salt River Project's Canal Multiple Use Program***

**James C. Duncan**, Salt River Project, Phoenix, AZ

***Beet Fields To Ball Fields — Adaptation of the Colorado-Big Thompson Project to Changing Water Needs***

**Gerald Gibbens** and **Andy Pineda**, Northern Colorado Water Conservancy District, Berthoud, CO

***Cities vs. Agriculture: Revisiting the "Allocation Stress"***

**François Molle**, Institut de Recherche pour le Développement, Montpellier, France; and **Jeremy Berkoff**, Consultant, London, England

1:30 p.m. - 3:00 p.m. **Concurrent Technical Session 14**  
***Technical Advances in Irrigation System Operations***

Moderators — **Thomas E. Mitchell**, Bureau of Reclamation, Denver, CO; and **Robert J. Strand**, USDA-ARS, Maricopa, AZ

***Variable Frequency Drive (VFD) Considerations for Irrigation***

**C. M. Burt**, **F. Gaudi** and **X. Piao**, Irrigation Training and Research Center, California Polytechnic State University, San Luis Obispo, CA

*Accuracy of Radar Water Level Measurements*

**Janice M. Fulford**, U.S. Geological Survey, Stennis Space Center, MS; **Lee Ester**, Salt River Project, Phoenix, AZ; and **John W. Heaton**, U.S. Geological Survey, Tempe, AZ

*Transition Submergence and Hysteresis Effects in Three-Foot Cutthroat Flumes*

**Alfonso F. Torres** and **Gary P. Merkley**, Utah State University, Logan, UT

1:30 p.m. - 3:00 p.m.      **Concurrent Technical Session 15**  
*Water Supply Sustainability*

Moderators — **Maurice Roos**, California Department of Water Resources, Sacramento, CA; and **Mark F. Madison**, CH2M Hill, Inc., Portland, OR

*Water Management Technologies for Sustainable Agriculture in Kenya*

**Herbert G. Blank**, Consultant, Bend, OR; **Stephen N. Ngigi**, Food and Agriculture Organization, Entebbe, Uganda; and **I. V. Sijali**, Kenya Agricultural Research Institute, Nairobi, Kenya

*Impacts of Changing Rice Irrigation Practices on the Shallow Aquifer of Nasunogahara Basin, Japan*

**Ali Elhassan**, New Mexico Interstate Stream Commission, Santa Fe, NM; and **Akira Goto** and **Masakazu Mizutani**, Utsunomiya University, Utsunomiya City, Japan

*Drought Protection from an In-Lieu Groundwater Banking Program*

**Owen E. Kubit** and **Richard M. Moss**, Provost and Pritchard Engineering Group, Inc., Fresno, CA; and **John P. Roldan**, Orange Cove Irrigation District, Orange Cove, CA

3:00 p.m. - 3:30 p.m.      **Break**

3:30 p.m. - 5:00 p.m.      **Concurrent Technical Session 13**  
*Increasing Competition for Water — Irrigation vs Urban Uses* (continued)

*Nevada Irrigation District: Meeting the Challenges of Urbanization*

**W. Martin Roche**, Consulting Engineer, Grass Valley, CA

*Concepts and Methods on Integrated Water Resources Management (IWRM): Using Water Efficiently Among Competing Uses in South Africa*

**Daniel Tsegai**, Bonn University, Bonn, Germany

*Water Banking and Traditional Irrigation Enterprises: How Lessons from the Past Lead to Successful Water Banking and Marketing*

**John Wilkins-Wells** and **Troy Lepper**, Colorado State University, Fort Collins, CO

3:30 p.m. - 5:00 p.m.      **Concurrent Technical Session 14**  
*Technical Advances in Irrigation System Operations* (continued)

*Practical Irrigation Flow Measurement and Control — an Update*

**John A. Replogle**, USDA-ARS, Maricopa, AZ

*Linear Anionic PAM as a Canal Water Seepage Reducing Technology*

**Delbert M. Smith**, Bureau of Reclamation, Denver, CO; **Chad Martin**, Colorado State University, Fort Collins, CO; **Rick Susfalk**, Desert Research Institute, Reno, Nevada; and **Timothy Gates**, Colorado State University, Fort Collins, CO

*In-Situ Non-Destructive Monitoring of Water Flow in Damaged Agricultural Pipeline Using Acoustic Emission Method*

**Tetsuya Suzuki**, **Masao Aoki** and **Riota Nakamura**, Nihon University, Fujisawa, Japan; and **Masayasu Ohtsu**, Kumamoto University, Kumamoto, Japan

3:30 p.m. - 5:00 p.m.      **Concurrent Technical Session 15**  
*Water Supply Sustainability* (continued)

*Development of Agricultural Drought Evaluation System in Korea*

**Ki-Wook Park**, **Jin-Taek Kim** and **Wook Jong Ju**, Rural Research Institute, KRC, Gyeonggi-Do, Korea

*Analysis of Pond Irrigation System Efficiency for Taoyuan Irrigated Area in Taiwan*

**Ray-Shyan Wu**, **Shih-Wei Chen** and **Shan-Fong You**, National Central University, Taoyuan, Taiwan

*Restoration in the Eco-Conservation Area of the Gente River of Pungitius Sinensis, a Fish Species Locally Called Tomiyo*

**Shinichi Hirose** and **Hiroshi Takimoto**, Toyama Prefectural University, Toyama, Japan

7:00 p.m. - 10:00 p.m.      **Closing Reception and Banquet in Sheraton Grand Hotel**

## Saturday, October 6

8:00 a.m. - 5:00 p.m.      **Local Field Tours**

(Updated 1 April 2007)