# 21st Century Watershed Technology Conference and Workshop

## Welcome to the Fifth 21st Century Watershed Technology Conference and Workshop: Improving water quality and environment

This conference organized jointly by The American Society of Agricultural and Biological Engineering (ASABE) and IKAM University, follows the tradition established at the first conference in this series which was in Concepcion, Chile eight years ago, Earth University, Costa Rica six years ago, Bari, Italy four years ago, and the University of Waikato, Hamilton, New Zealand two years ago. As evidenced by the number of full papers and abstracts, this conference continues the tradition of bringing together presenters from many countries and showcases excellent work from the Amazon basin of South America and around the world.

This conference will provide a forum for water resource professionals to exchange information on science, applications and developments in the use of water science and technology at the field, watershed and regional scales. It will cover a wide array of topics. These range from new applications of well-established understood technologies to innovative and entrepreneurial applications of emerging technologies, in addition to issues related to policy and knowledge dissemination.

The technical presentations in this conference include information on a broad range of issues such as watershed management in developing countries, bioindicators for detecting water quality issues, aquatic ecology and ecosystem services, watershed modeling and assessment tools including GIS, climate change and water quality interactions, latest in hydrologic modeling and implications for water resource policy and management. Additional topics related to one or more of the aforementioned topics will be included as well.

The organizing committee expresses its appreciation for the excellent presentations and papers, which showcase the state of the art in water quality management. We appreciate their contribution to this meeting. We are especially appreciative of our gracious hosts, IKIAM Universidad Regional Amazonica. The ASABE staff have been a pleasure to have as collaborators and have performed in an exemplary manner.

We also thank conference committee members, and IKIAM and Tarleton Staff for all their logistical assistance and tangible contributions to the operation of the conference. We gratefully acknowledge the sponsors and supporting institutions of this conference for generous donations and support for this important conference.
Ali Saleh, Conference Chair

CIGR

-

## The Organizing and Technical Committees

**The conference organizing committee consisted of the following people:**

| Name | Affiliation | Country |
|---|---|---|
| Ali Saleh, Chair | TIAER, Tarleton State University | USA |
| Fedro Zazueta, Co-Chair | UFIT, University of Florida | USA |
| Byron Maza, Co-Chair | IKIAM | Ecuador |
| Ernest W Tollner, Proceeding Chair | University of Georgia | USA |
| Jorge Celi, Proceeding Co-chair | IKIAM | Ecuador |
| Ruben Basantes | IKIAM | Ecuador |
| Luis Maisincho | IKIAM | Ecuador |

**The technical committee included:**

| Name | Affiliation | Country |
|---|---|---|
| Ali Saleh | TIAER, Tarleton State University | USA |
| David Bosch | USDA/ARS | USA |
| Byron Maza | IKIAM | Ecuador |
| Rafael Munoz-Carpena | University of Florida | USA |
| Ali Sadeghi | USDA/ARS | USA |
| Ruben Basantes | IKIAM | Ecuador |
| Luis Maisincho | IKIAM | Ecuador |
| Jorge Celi | IKIAM | Ecuador |
| | | Ecuador |

CIGR

# 21st Century Watershed Technology Conference and Workshop

## Keynote Speakers' profile

**ALI SALEH, PH.D.**
**Conference Chair**
Associate Director/Professor at Tarleton State University
Stephenville, Texas

Dr. Ali Saleh, Conference Chair, is an associate director at Texas Institute for Applied Environmental Research (TIAER), where he develops and evaluates hydrologic models and the impacts of different management practices for local producers and land managers. His research and writings address wind and water erosion, water quality modeling and related issues, physical and chemical analysis of soil, and design and evaluation of irrigation and drainage systems.

Dr. Saleh received his bachelor's degree in general law from Tehran University and his master's in agriculture-irrigation from California State University. He also has a doctorate in soil science and biometerology soil physics from Utah State University.

CIGR

-

## RENÉ RAMÍREZ GALLEGOS

Minister of Higher Education, Science, Technology and Innovation, Ecuador

Academic, Economist, Master of Economic Development from the Dutch Institute of Social Studies and Master of Government and Public Policy from the Latin American School of Social Sciences in Mexico.

He has served as Minister of Planning and Development; Minister of Higher Education, Science, Technology and Innovation; Chairman of the Council of Higher Education; President of Yachay (EP) Public Company; Chairman of Board of the Ecuadorian Institute of Intellectual Property; Chairman of the Board of the Ecuadorian Institute of Student Loans and Grants; President pro tempore of the Council of Science, Technology and Innovation for the Union of South American Nations; President of the National Council of State Modernization; Chairman of the Board of Directors of the International Centre for Advanced Studies in Communication for Latin America; Coordinator of the Millennium Center for Social Research of the Latin American School of Social Sciences in Ecuador; Professor at the Catholic University of Ecuador, the Simon Bolivar Andean University, and at the Latin American School of Social Sciences, Ecuador.

Areas of expertise at work include social public policy, inequality, poverty, the economics of happiness, use of time, citizen participation and the knowledge economy.

René has contributed to the construction of the National System of Planning for Ecuador, the National Plan for Good Living and to the process of transforming Ecuador's Higher Education System. He coordinated and led Ecuador's National Development Plan, 2007-2010, and the National Plan for Good Living, 2009 -2013.

CIGR

-

## ALEXIS SÁNCHEZ MIÑO

Minister of Water

He studied Hydraulic Engineering in the Higher Institute of Architecture and Civil Engineering – Sofia, Bulgaria. He has a master's degree in Hydrotechnical Engineering.

He has served as Dean of the Faculty of Systems Electronics and Industrial Engineering, of the *Universidad Técnica de Ambato;* Governor of the Province of Tungurahua; Congressman of the Republic of Ecuador; Vice-minister of Water and Sanitation. Moreover, he has been a Professor at the *Universidad Técnica de Ambato,*

*Universidad Técnica de Manabí, Universidad Tecnológica Indoamérica, Pontificia Universidad Católica del Ecuador-Sede Ambato.*

CIGR

-

## BERT DE BIÈVRE, Ph.D.

Technical Secretary of Water Fund for Quito FONAG (*Secretaría Técnica del Fondo de Agua para Quito*)

Bert De Bièvre has 25 years of work experience in the Tropical Andes. He acted as an academic in Universidad de Cuenca, Ecuador, for more than 12 years, where he contributed to the establishment of research groups working on water and soil management and Andean hydrology. Afterwards, he led projects in Venezuela, Colombia, Ecuador and Peru during 10 years, and focused on Andean ecosystems such as the páramo, watershed management, and hydrology of Andean watersheds.

In recent years, while member of CONDESAN in Lima, Peru, Dr. De Brièvе worked as advisor for the Ministry of the Environment of Peru and for the regulatory body of the potable water, SUNASS. He also worked in the design and implementation of policies to foster the hydric and ecosystem services, in partnership with Forest Trends and the Swiss Cooperation. For the past year, Dr. De Bièvre has led the Technical Secretary of Water Fund for Quito FONAG (*Secretaría Técnica del Fondo de Agua para Quito*), which aims at preserving and recovering the water resources of the Metropolitan District of Quito.

In addition, Dr. De Brièvе holds a PhD in Applied Biological Sciences (2002) and a Master in Sciences on Hydro Resources (1991). He also holds a degree in Civil Engineering (1990) from Katholieke Universiteit Leuven, Belgium.

CIGR

-

## JESÚS RAMOS-MARTIN, Ph.D.

President/Chancellor of *Universidad Regional Amazónica IKIAM*

Born in 1974 in Santa Coloma de Gramenet, Barcelona, Spain. His main research interests are biophysical prospective planning, economic development, energy, ecological economics and societal metabolism.

He holds a PhD in Environmental Sciences (Ecological Economics), a Master in Environmental Management and a Degree in Development Economics by Universidad Autonoma de Barcelona. He completed a Master in Environmental Politics and a Master in Ecological Economics at Keele University, United Kingdom, where he was researching on complex systems, self-organisation, and thermodynamics applied to the analysis of energy metabolism of societies.

Currently he is Rector at Universidad Regional Amazónica IKIAM. Previously, he was researcher at Universidad Nacional de Educación (UNAE), and at Facultad Latinoamericana de Ciencias Sociales (FLACSO), Ecuador. He has also worked as Dean and researcher of the Centro de Prospectiva Estratégica (CEPROEC) at the Instituto de Altos Estudios Nacionales (IAEN) in Ecuador. He has also served as Assistant Professor at the Unit of Economic History, Department of Economics and Economic History of the Universidad Autonoma de Barcelona. He also worked with the Institute of Environmental Science and Technology of the same university. Previously he has worked at the Institute of Social Ecology of the University of Klagenfurt IFF-SOCEC carrying out research on Integrated Assessment of Sustainability, and in Transition Studies; The Italian National Institute for Research on Food and Nutrition, in charge of a project on integrated assessment of large scale GMO introduction; the Universidad Autonoma de Barcelona where he worked as lecturer of Natural Resource Economics from 1999 to 2003; the Universitat Oberta de Catalunya as an external consultant; and the Latin American Faculty of Social Sciences FLACSO-Ecuador where he has been lecturer in Ecological Economics. He is also founding partner of the consultancy ENT Environment and Management, where he has worked in the environment area and in charge of Administration and Finance, and founding member of the Scientific Society LIPHE.

CIGR

-

## DOMINIC DOTTAVIO, PH.D.

President of Tarleton State University
Stephenville, Texas

Dr. F. Dominic Dottavio became the fifteenth president of Tarleton State University on August 1, 2008. As president, he oversees more than 1,200 employees, manages an average annual budget of $175 million, and provides strategic direction for an enrollment of over 13,000 students at sites in Stephenville, Fort Worth, Waco, Midlothian and on-line.

Dr. Dottavio came to Tarleton from the presidency of Heidelberg University, a 166 year old private college in Tiffin, Ohio. At Heidelberg, he increased student enrollment, led successful fund-raising campaigns, expanded the curriculum and initiated student engagement strategies and programs.

Prior to his tenure at Heidelberg, he served as the dean and director of The Ohio State University at Marion. During his time at Ohio State, the Marion campus maintained one of the lowest tuition rates among the 37 Ohio public colleges, opened a university center in nearby Delaware, Ohio, and received a $10 million gift, which was one of the largest ever given to the Ohio State system. When named to head Ohio State-Marion, Dr. Dottavio was working as the regional chief scientist for the National Park Service in

CIGR

Atlanta, Georgia. Research programs he led there included coastal zone management, water quality management and conservation biology.

# Technical Program

# Saturday, December 3, 2016

**7:30AM-5:00PM** **REGISTRATION OPENS**

**9:00AM-5:00PM**

**CPD #1 Application of Integrated Environmental and Economic Simulation Models Using CEEOT-SWAPP to Evaluate BMPs at the Field and Watershed Levels**
**Presenters:** Ali Saleh**,** Oscar Gallego, and Narayanan Kannan
*Location: La Hacienda*

**8:30AM-12:00PM** **CPD #2 Water Supply, Pond Design and Levee Pond Economic**
Presenter: William Tollner
*Location: Amazonas G*

**1:00PM – 5:00PM** **Vegetative Filter Strips with VFSMOD-W to Control Surface Runoff Pollution by Pesticides in Long-Term Environmental Assessments**
**Presenters:**
Muñoz-Carpena Rafa (Professor at University of Florida) and PAZMINO-HERNANDEZ, MARCO (Graduate Student at at University of Florida)

*Location: Esmeralda*

CIGR

-

# Sunday, December 4, 2016

**7:30AM -5:00PM** **REGISTRATION OPENS**

**9:00AM-5:00PM**

**CPD #4: "Nutrient Tracking Tool (NTT)" and "Chesapeake Bay NTT" – User-friendly tools for calculating nutrient losses under various agricultural and forestry management practices**
**Presenters:** Ali Saleh, and Oscar Gallego
Location: La Hacienda

**6:00PM-8:00PM** **WELCOME RECEPTION**
*Location: Amazonas Ballroom*

# Monday, December 5, 2016

**7:30AM -5:00PM** **REGISTRATION OPENS**

**8:30AM-9:50AM Official Opening of the Conference**

Location: Amzonas D
**Moderator:** Fedro Zazueta (University of Florida)
**8:30-8:35AM**
Introduction by Moderator

**8:35-8:50AM**
Welcome and message from ASABE
**Ali Saleh (Conference Chair)**

**8:50-9:20AM**
Role of education ministry in promoting environmental research in Ecuador
**RENÉ RAMÍREZ GALLEGOS, Minister of Higher Education, Science,**

CIGR

-

**Technology and Innovation, Ecuador**

**9:20-9:50AM**
Ecuadorian national water plan
**ALEXIS SÁNCHEZ MIÑO, Minister of Water, Ecuador**

## 9:50AM-10:15AM BREAK

## 10:15AM-12:00PM OPENING CEREMONY (GENERAL SESSION)

**Location: Amazonas D**
**Moderator:** Ernest Tollner (University of Georgia)

**10:15-10:40AM**
Role of regional Ecuadorian universities in natural and environmental research and education
**JESÚS RAMOS-MARTIN President/Chancellor of Universidad Regional Amazónica IKIAM**

***10:40-11:05AM***
Role of US Universities in advancing natural and environmental research and Education
**Dominic Dottavio, President of Tarleton State University**

***11:05-11:30AM***
The challenges of source water protection for the high Andes
**Bert De Bièvre, Technical Secretary of Water Fund for Quito FONAG (Secretaría Técnica del Fondo de Agua para Quito)**

***11:30-12:00AM***
The role of computer models in solving environmental issues: Advantages and disadvantages
***Ali Saleh: Associate Director of TIAER and Professor at Tarleton State Universiy***

## 12:00PM-1:20PM LUNCH (Provided)

## 1:30-3:10PM CONCURRENT SESSIONS

-

## *I. Bioindicators and water quality*

**Location: Amazonas G, H**
**Moderator**: Rafael Munoz-Carpena (University of Florida)

**1:30-1:50 PM**
Assessing the real-life behavior of biocomplex systems: application to water quality analysis **(Rafael Munoz-Carpena)**

**1:50-2:10PM**
Assessment of water quality in the Tahuando River stretch influenced by the city of Ibarra by physico-chemical and macroinvertebrates indicators (**Castro Jorge Arturo, Valarezo Carla, Pozo Mariela, Tafur Christian**)

**2:10-2:30PM**
Quantifying infectious Cyclospora oocysts in the environment using tissue-culture infectivity assays (**Nora H. Onstad, William H. Witola, Michelle L. Green, Paul C. Davidson**)

**2:30-2:50PM**
Study of the quality of the water with bio-indicators and geomorphology for the eco-systemic development of the interbasin of the river Ambato (EC) (**Benito Guillermo Mendoza Trujillo, Wilmer Javier Tingo Cali)**

**2:50-3:10 PM** **Questions and Discussion**

## *II. Modelling applications for water quality control*

**Location: Amazonas B, C**
**Moderator:** Fedro Zazueta (University of Florida)

***1:30-1:50PM***
Monte Carlo simulations based modelling of $NO_3$-N leaching from a maize field (**A. El-Sadek, R. F. Vázquez, H. Hampel, M. Radwan**)

***1:50-2:10PM***
Assessment and forecast of the contamination of surface water as the result of oil extraction in the watershed Pacayacu, Ecuador. (**Fonseca Largo Kalina Marcela**)

CIGR

***2:10-2:30PM***
Analysis of Sedimentation in the Guayas River at Guayaquil, Ecuador (**Barrera Crespo P., Becker A., Ottevanger W., Nabi M., Giardino A., de Keizer O., Arias M., Sanchez D., Pazmiño Nelson A., Mosselman E.**)

***2:30-2:50PM***
Predicting Water Quality based on Multiple Classifier Systems (**Iván D. López, Cristian H. Valencia, Juan C. Corrales**)

**2:50-3:10 PM Questions and Discussion**

***3:10-3:30 PM BREAK***
***3:30-5:10PM CONCURRENT SESSIONS***

***III. Hydrological modelling: Applications of SWAT***
***Location: Amazonas B, C***
**Moderator:** Fedro Zazueta (University of Florida)

***3:30-3:50PM***
Modeling effect of changes in land use and land cover in the Upper Ruvu Watershed, Tanzania, using SWAT-VSA **(Winfred Mbungu and Conrad Heatwole)**

**3:50-4:10 PM**
Performance evaluation of SWAT model with scarce data in an Amazon head catchment (**Guido Tamayo, Manuel B. Narváez, Páez-Bimos Sebastián, Isabel C. Bernal**)

**4:10-4:30 PM**
Using SWAT+ to improve the simulation of hydrological processes in the Little River Experimental Watershed in Georgia **(Katrin Bieger, Jeffrey G. Arnold, Hendrik Rathjens, David D. Bosch)**

**4:30-4:50 PM**
The use of grid computing for modeling agricultural systems **(Fedro Zazueta**)

**4:50-5:10 PM Questions and Discussion**

## *IV. Aquatic ecology and ecohydrology*

**Moderator:** Rafael Munoz-Carpena (University of Florida)
**Amazonas G, H**

**3:30-3:50 PM**
Stable isotopes and RNA:DNA reveal the importance of floodplains to temporally sustain fish reproduction (**Francisco Villamarín, William, E. Magnusson, Timothy D. Jardine, Dominic Valdez, Ryan Woods, Stuart E. Bunn**)

**3:50-4:10 PM**
General effects of forest fires on water quality and quantity (**Juan C. Escobar**)

**4:10-4:30 PM**
Role of woody debris in a tropical river from the coastal region of Ecuador. (**Jon Molinero Ortiz**)

**4:30-4:50 PM**
The role of vegetation and precipitation on the storage of an Andean Tropical Ecosystem **(Patricio X. Lazo, Giovanny M. Mosquera Patricio Crespo)**

**4:50-4:10 PM** **Questions and Discussion**

## 5:00-7:30 PM POSTER SESSION (REFRESHMENT AND SNACK FOOD IS SERVED)

**Location: Foyer**
**Moderator:** Ali Sadeghi (USDA-ARS, HRSL)

1. Inclusion of Riparian Wetland Module (RWM) into the SWAT Model for Assessment of Wetland Hydrological Benefits. (**S. Lee, A. M. Sadeghi, I.-Y. Yeo, M. W. Lang, G. W. McCarty**)

2. "The provision of public water in Ecuador's Municipalism during the "Citizens Revolution" (2007-2013)" (**Andres Martinez Moscoso**)

CIGR

3. GIS and multispectral imaging for the conservation of the basin Pichan, by modeling water stress and pollution excess N2 (**Mónica Delgado, Erika Quevedo, Leslie Salazar, Dennys Mora**)

4. Impact of precipitation estimation in hydrological simulation in Páramo ecosystem (**Adrián Sucozhañay, Rolando Célleri, Johanna Orellana, Daniela Ballari**)

5. WRF simulation of a precipitation event over the Paute Basin, Ecuador– an assessment using remote sensing and ground observations (**Edgar C. Albuja, Lenin Campozano, Esteban Samaniego, Rolando Célleri**)

6. Hydraulic assessment of UASB reactor: Analysis of residence time at laboratory scale (**Juan D. Zúñiga Andrés Alvarado Juan F. Cisneros**)

7. Spatial variability of total organic carbon in a micro catchment of southern Ecuador (**Juan D. Zúñiga, Franklin G. Marín**)

8. Identification of Water in High Andean Mountain (**Jorge D. Ramón; Edison Timbe, Patricio Crespo**)

9. Evaluation of Evapotranspiration models based on Vegetation Index on grassland and shrubbery ecosystems in an Andean valley of southern Ecuador (**Mayra E. Ramon, Galo Carrillo**)

10. The effects of the vegetation loss by grazing in the soil water content in a páramo region (**Paola Montenegro, Rolando Célleri, Galo Carrillo, Ana Elisabeth Sánchez, Patricio Crespo)**

11. High resolution spatial and temporal monitoring of stream water quality in a headwater catchment in Southern Ecuador (**Sarah Schob, David Windhorst, Patricio Crespo, Lutz Breuer**)

12. Ostracods And Copepods (Crustacea): Diversity And Distribution As Indicators For The Aquifer Types And Boundaries Determination (Tajo River Basin, Central Spain) – (**Rasines-Ladero, R.; Meffe, R.; Carreño,**

**F.; Mostaza Colado, D.; Sundberg, A.; Iepure S**)

13. Effects of agriculture in the hydrology of an alluvial aquifer: differences between groundwater exploited and induced infiltration areas. (**Mostaza Colado, D.; Carreño Conde, F.; Leal Meca, M.; Iepure S., Rasines Ladero, R.; Sundberg A.)**

14. Exploring the potential of native trees for restoration of highland (montane forest) ecosystem in the Andes under climate change predictions (**Ximena Palomeque, Ana E. Ochoa, Eduardo Chica, Juan J. López, Patricio Crespo, Rolando Célleri**)

15. Assessing the applicability of the RUSLE model with rainfall simulation data on two watersheds in the Ecuadorian Andes (**Carlos Montufar Delgado**)

16. Environmental Resistomas in hot springs spa from Quito, Ecuador (**Felix Andueza, Carina Naranjo, Judith Araque, Sandra Escobar, Carlos Espinoza, Gerardo Medina**)

17. Automated control system of irrigation channels in the area Yamburara (Vilcabamba) using open source hardware and software **(Pablo Ortega)**

18. Hydrological implications at mesohabitat scale on aquatic macroinvertebrates communities of Andean rivers of southern Ecuador: towards the determination of environmental flow **(Diego Vimos-Lojano, Francisco Martínez-Capel, Henrietta Hampel, Raúl F. Vázquez)**

19. Enabling the flow of ecosystem services from agriculture to improve Puerto Rico's water quality and mitigate global climate change (**Jonathan R. Winsten, Luis Perez-Alegria, Neville Millar, Fabian Carmona**)

20. Effect of land cover and hydro-meteorological controls on carbon stocks and export in a high elevation tropical environment (páramo) **(Juan Pesántez, Sarah Schob, Giovanny Mosquera, David Windhorst, Patricio Crespo and Lutz Breuer)**

21. Error propagation of digital elevation models on flood modeling **(Daniel**

**Orellana, Luis Timbe, María Marín)**

22. The effects of vegetation cover in soil moisture dynamics in wet Andean páramo **(Daniel O. Tenelanda, Patrico J. Crespo)**

23. Sensitivity Analysis of a 1D Flood Inundation Model **(Melissa Carolina,Rodas-Bustamante, Luis Manuel Timbe-Castro, Juan Pinos)**

# Tuesday, December 6, 2016

**7:30AM -5:00PM REGISTRATION OPENS**

## General Session: 8:00-8:50

Hydrological evolution of the Amazon Basin and perspectives in the context of the climate change (**Jhan Carlo Espinoza; Instituto Geofísico del Perú (IGP) Lima, Peru**)

## 9:00-10:40AM CONCURRENT SESSIONS

### *V. Water quality issues at the basin level*

**Location: Amazonas B, C**

**Moderator:** Jhan Carlo Espinoza (Instituto Geofísico del Perú (IGP) Lima, Peru)

***9:00-9:20AM***

Isotope signatures to trace the origin and fate of nitrate from an agricultural sub catchment within Soyang lake Watershed, South Korea (**Silvia Parra, Gerhard Gebauer**)

***9:20-9:40AM***

Fluvial Rehabilitation of Chicharron River (**William Jaén, Torres M. Julio, Andrade M. Pedro, Bajaña Raul, Pacaji Marlon, Ortega Jose**)

***9:40-10:00AM***

Environmental and economic impacts of management practices on water quality and quantity at field and basin levels **(Saleh, A., E. Osei, and O. Gallego)**

**10:00-10:15 AM Questions and Discussion**

## *VI. Emerging Water Quality / Quantity Case Studies*

**Location: Amazonas G, H**
**Moderator:** Luis Maisincho. (IKIAM)

***9:00-9:20AM***
Human Pharmaceutical Compounds in Aquatic Ecosystems - The Significance of Ecotoxicological Approach (**Iepure S., Castaño A., T. Di Lorenzo, P. García-Doncel P., C. Alonso-Alonso, A. Petre**)

***9:20-9:40AM***
Fecal Contamination Analysis on intermittent estuaries
(**William Jaén, Andrade M. Pedro, Bajaña Raul, Pacaji Marlon, Ortega Jose**)

***9:40-10:00AM***
Zinc in controlled compositing process based on organic waste (**Gordillo F., Guzman M., Sanchez E.**)

**10:00-10:15 AM Questions and Discussion**

## 10:15AM-10:35AM BREAK

## 10:35-12:15AM CONCURRENT SESSIONS

## VII. *Water quality and climate change mitigation strategies*

**Moderator:** Jhan Carlo Espinoza (Instituto Geofísico del Perú (IGP) Lima, Peru)
**Location: Amazonas B, C**

**10:35-10:55AM**
Effects of Buffer Strips and Grazing Management on Sediment Loss from Pastures (**P.A. Moore, Jr., C. Pilon, D.H. Pote, J.H. Pennington, J.W. Martin, D.K. Brauer, R.L. Raper and J. Lee)**

**10:55-11:15AM**
Achieving Cost-effective N Loss Reductions for Water Quality and Climate Change Mitigation (**Jonathan Winsten**)

**11:15-11:35AM**
Assessment of climate change effects on flow and nutrient loads (**Manoj Kumar Shrestha, Friedrich Recknagel, Wayne Meyer**)

**11:35-11:55AM**
Swine Production: Deep Bed Swine System an alternative in the use of water facing climate change **(Tommy F. Cueva, María L. Zambrano, Beatriz B. González, Ernesto A. Hurtado, Fernando Mestre Sanchís)**

**11:55-12:15AM Question and Discussion**

## *VIII. Software for water resources management*

**Location: Amazonas G,H**
**Moderator:** Luis Maisincho. (IKIAM)

**10:35-10:55AM**
Water management and habitat suitability study along the Ocmulgee River **(Natalia V. Bhattacharjee and Ernest W. Tollner)**

**10:55-11:15AM**
Application of the SWAT Model in a Pay-For-Performance Agricultural Conservation Program to Reduce Phosphorus Losses (**Rebecca Logsdon Muenich, Margaret Kalcic, Don Scavia, Jonathan Winsten, Glenn O'Neil, Monica Day, Kristin Fisher**)

**11:15-11:35AM**
Computer modeling of beef cattle grazing under changing climate, land use, and markets (**A. Saleh, E. Osei, O. Gallego, N. Kannan)**

**11:35-11:55AM**
Evaluation of the Agricultural Policy/Environmental eXtender (APEX) and the Nutrient tracking Tool (NTT) with Edge-of-Field (EOF) monitoring data. (**R.B. Confesor, A. Saleh, K. King, M. Williams, O. Gallego**)

**11:55-12:15AM Questions and Discussion**

## 12:15PM-1:45PM LUNCH (Provided)

## 1:45-3:10PM CONCURRENT SESSIONS

### *IX. Best management practices in the field*

***Location: Amazonas B, C***
**Moderator:** Susan Payne (Maryland Department of Agriculture)

***1:45-2:05PM***
Demand of smallholders for the use of pesticides and other crop protection chemicals in the Catamayo-Chira watershed (South of Ecuador) – (**Ochoa P.A. & Coronel P.I.)**

***2:05-2:25PM***
Organic soil improvement with pellets produced from poultry manure, an alternative to chemical fertilizers in order to reduce the soil and water pollution (**María Belén Vallejo Vargas, Stefan Breitenmoser, José Luis Pantoja, Andrés Cadena**)

***2:25-2:45PM***
The wastewater as a source of nutrients
(**Horacio A.Cedeño**)

***2:45-3:05PM***
Use of winter rye (secale cereale l.) cover crop for nitrogen recycling in a corn-based cropping system (**Jose L. Pantoja, Krishna P. Woli, John E.Sawyer, and Daniel W. Barker**)

**3:05-3:20 PM Questions and Discussion**

## *X. Hydrological modelling II*

**Location: Amazonas G, H**

**Moderator:** Remegio Confesor (National Center for Water Quality Research)

***1:45-2:05PM***

Comparing time of concentration for a tropical watershed using direct and indirect methods (**Conrad Heatwole, Glécia Oliveira de Deus, Yago Ricardo de Oliveira, Sidney Sára Zanetti, Marco A.C. Caiado**)

***2:05-2:25PM***

Mermaid: A new computer algorithm applied to the classification of shellfish growing areas of Virginia, USA (Fred S. Conte and Abbas Ahmadi)

***2:25-2:45PM***

Development of Urban Modeling Tools for Soil and Water Assessment Tool ***(*Narayanan Kannan, Jaehak Jeong, Jeff Arnold, Raghavan Srinivasan, Roger Glick, Leila Gosselink)**

***2:45-3:05PM***

Feasibility of estimation flows characteristics by using the Sacramento model in Colombian basins **(Edgar F. Espitia, Nathalia V. Victorova, Kalina Fonseca Largo)**

**3:05-3:20 PM Questions and Discussion**

## 3:20-3:40 PM BREAK

## 3:40-5:10PM CONCURRENT SESSIONS

## *XI. Water resource policy and management*

***Location: Amazonas B, C***

**Moderator:** Susan Payne (Maryland Department of Agriculture)

CIGR

***3:40-4:00PM***
Model at the farm, measure at the watershed pay-for-performance conservation: A solution for the 21st century
**(Jonathan Winsten)**

***4:00-4:20PM***
Building the tools to link urban demand for water quality credits with agricultural suppliers (**Susan Payne and Jason Keppler**)

***4:20-4:40PM***
Fetching Water through technology catchers on Peasant Communities in Galte, Guamote, Province of Chimborazo, Ecuador ***(David Carrera, Iveth C. Robalino, Deysi Hidalgo)***

***4:40-5:00PM***
Locating sites for implanting plants of co-digestion of animal slurries and crop wastes through GIS (**Villamar Cristina Alejandra ,Aguayo Mauricio, rin Diego, Patricio Espinoza, Nathalia Valencia, Mónica Delgado**) (Moved From Poster Session)

**5:00-5:20 PM Questions and Discussion**

## *XII. Water quality monitoring for watershed planning*

**Location: Amazonas G, H**
**Moderator:** Remegio Confesor (National Center for Water Quality Research)

***3:40-4:00PM***
The success of the Heidelberg Tributary Loading Program (HTLP): There is more than only the long-term data. (**Remegio Confesor Jr., Ellen Ewing, Jakob Boehler, David Baker, Saptashati Biswas, Laura Johnson, Jack Kramer, Barbara Merryfield, Nancy Miller, Peter Richards, Aaron Roerdink**)

***4:00-4:20PM***
Tempisque-Bebedero Watershed Network (**Marco Pazmino-Hernandez, Alice Alonso, Rafael Muñoz-Carpena**)

***4:20-4:40PM***

Sanitation to a Tributary of Chicharrón River (Cucaracha) Through an Artificial Wetland **(Valencia R., Jaén W., Andrade P., Bajaña R., Pacaji M., Ortega J)**

***4:40-5:00PM***

Impacts of the pine plantations and grazing on the hydrophysical properties on Andean soils in the south of Ecuador **(Franklin Marín Molina)**

**5:00-5:20 PM Questions and Discussion**

***6:30-830PM Dinner (provided for full registered attendees)***

# Wednesday , December 7, 2016

**7:30AM -5:00PM REGISTRATION OPENS**

## 8:00AM – 8:50 General Session
## Nutrient Tracking Tool (NTT): A fast review and Demo (Ali Saleh)

## 9:00AM -10:15AM CONCURRENT SESSIONS

### XIII. Political and social ramifications

**Location: Amazonas G, H**

**Moderator:** Jonathan Winsten (Winrock International)

**9:00-9:20AM**

The Research Station “Agua y Páramos”: gathering water stakeholders and knowledge to optimize research efforts **(Rafael Osorio, Juliette Delerue, Tania Calle, Bert De Bievre, Homero Castanier, Ximena Riofrio, Luis Calvopiña)**

**9:20-9:40AM**

Social enterprises and their applications in lagged behind societies **(Manuel Enrique Muñoz Mainato)**

**9:40-10:00AM**
Environmental characterization and potential zoning by coffee production in the Ecuadorian Andes
**(Yesenia Chamba, Edwin D. Capa and & Ochoa P.A.)**

**10:00-10:15 AM Questions and Discussion**

## XIV. Human Activities and Environment

***Location: Amazonas B, C***
**Moderator:** Ruben Basantes **(IKIAM)**

**9:00-9:20AM**
Chemical characterization of surface and ground waters supplying the population of La Isla Santa Cruz **(Nelson W. Bustamante)**

**9:20-9:40AM**
Influence of Geodynamics and human activity in the Coca River Fluvial Geomorphology **(Isabel Carolina Bernal, Lucia Andrade, Natalia Horna, Sebastián Páez, Guido Tamayo, Armando Molina, Diego Maldonado)**

**9:40-10:00AM**
Agro-touristic model to promote rural tourism in the San Francisco, Ecuador
**(Carmen Trujillo, Kenendy Lomas)**

**10:00-10:15AM Questions and Discussion**

## 10:15-10:35AM BREAK

## 10:35-12:15PM CONCURRENT SESSION

## *XVI. Effects of climate change on water resources*

***Location: Amazonas B, C***
**Moderator: Ruben Basantes (IKIAM)**

**10:35-10:55 AM**
Adaptation of community drinking water and irrigation systems (**Jorge Rodrigo Núñez Jara**)

**10:55-11:15 AM**
Effects of climatic changes on crops, area of Santa Rosa de Cusubamba, Cayambe-Pichincha, Ecuador (**Emilio R. Basantes, Robert Erreis, G. Jaffer Mohiddin, Alexandra E. Cuaycal)**

**11:15-11:35 AM**
Slight mass loss revealed by reanalyzing glacier mass-balance observations on Antisana 15α glacier (inner-tropics) during the 1995–2012 period (**Ruben Basantes**)

**11:35-11:55AM**
Effects of climate variability on animal production in the Southern Great Plains **(Narayanan Kannan, and Ali Saleh)**

**11:55-12:15 PM Questions and Discussion**

## *XV. Data collection to support water quality/quantity development*

***Location: Amazonas G, H***
**Moderator: Jonathan Winsten (Winrock International)**

**10:35-10:55 AM**
Advection effect on weather radar images in a mountainous region (**Mario Guallpa, Johanna Orellana-Alvear and Rolando Célleri**)

**10:55-11:15 AM**
A framework based on data assimilation to facilitate the integration of simulation models & remote sensing in agriculture (**Javier Osorio Leyton, Juan Landivar, Murilo Maeda, Jinha Jung, Jeff Arnold)**

**11:15-11:35 AM**
Estimating of Debris volumes deposited by Debris flows by adjusting of Multivariate Statistical Models **(Williams Méndez, José R. Córdova, Lelys I. Bravo de Guenni, Henry A. Pacheco)**

-

**11:35-12:55 PM** **Questions and Discussion**

## 12:15-1:30 Lunch (provided)

## 1:30-3:00 CONCURRENT SESSION
## XVII. Interdisciplinary approaches for flood forecast, assessment and control in tropical regions

***Location: Amazonas G ,H***
**Moderator:** Jorge Celi (IKIAM)

**1:30-1:50PM**
Flooding Related Issues **(Jorge Celi)**

**1:50-2:10AM PM**
The Pastaza River, Fluvial style variations and Floodplain (**Isabel Carolina Bernal, Frederic Christophoul, José Darrozes**)

**2:10-2:20PM**
Flood Forecasting Systems in Latin America –Lessons learned **(Otto de Kezier, Marta Faneca, Jan Talsma, Micha Werner)**

**2:20-2:50PM** **Questions and Discussion**

## *XVIII. Ecosystem Services*

***Location: Amazonas B,C***
**Moderator:** Patricio Crespo **(University of Cuenca)**

**1:30-1:50PM**
Design methodology for estimating the Impact of water scale watershed restoration (**Paola Fuentes Salcedo, Bert de Bievre, Boris Ochoa, Mario Guallpa, Tania Calle**)

**1:50-2:10AM PM**
Influence of land cover and climate change on water resources availability in the Napo River Basin in Northern Ecuador (**Xavier Zapata-Rios**)

CIGR

**2:10-2:20PM**
Groundwater Ecosystem Services and Agriculture: An Ecological Approach towards the Sustainable use of Artificially Recharged Aquifers **(Lepure S., Sundberg A., A. Vázquez-Gonzalés, D. Mostaza Colado, F. Carreño)**

**2:20-2:50PM** **Questions and Discussion**

## 2:50- 3:15 PM BREAK

## 3:15 – 5:00 PM *WRAP UP SESSION (Final Discussions)* and CERTIFICATE CEREMONY

***Location: Amazonas D***

## *5:00 PM* *Meeting Adjourned*

-

# Technical and Non-Technical Tours

**A. TECHNICAL TOURS: Please register at the conference site or at the registration desk before Tuesday 12/6/2016 before 5:00 PM)**

**1. THURSDAY (7:00AM-7:00 PM): Proyecto Hidroeléctrico Coca Codo Sinclair EP[1] - San Rafael Waterfall (lunch and refreshments included)**
**Location: Marriott Hotel Lobby**

**2. FRIDAY (7:00AM-7:00 PM): Universidad Regional Amazónica IKIAM Campus in Tena, Napo – Napo River (lunch and refreshments included)**
**Location: Marriott Hotel Lobby**

**B. NON-TECHNICAL TOURS: Please see the University staff at the registration desk**

CIGR