3rd Inter-Regional Conference on Land and Water Challenges: "Tools for developing"

Colonia, Uruguay, September 27-30, 2015 (34°20'19.39" LS; 57°41'24.29" LW)

Organized by the National Research Institute of Agriculture (INIA) and the Ministry of Livestock, Agriculture and Fisheries (MGAP), Uruguay.

Under auspices of CIGR Section I on Land and Water and PROCISUR

The objective of the conference is to present and discuss the latest achievements and advances in sustainable land and water engineering and to promote the sustainable future development of agriculture and biosystems.

Uruguayan agriculture has undergone dramatic changes since the beginning of the XXI century. The cropped area increased by a factor of 3, with soybean as the leading crop. Moreover, there was a switch from rotation soil use systems of crops with seeded grass and legume pastures, towards no-till continuous cropping systems.

Uruguay climate determines, on average, annual precipitation from 1200 mm in the south up to 1500 mm in the north. During late spring and summer, some soil water deficits are to be expected, but inter annual rainfall amount variability determines that in some years this deficit arrives to be severe drought and in others arrives to be negligible. This variability could be explained, in some extent, by the ENSO phenomenon. Therefore, as a response to climatic global change, that in Uruguay appears to determine increased inter and intra annual variation, and greater frequency of extreme events occurrence, irrigation is being considered to be developed as a national strategy. Given the climate characteristics described before, this irrigation has to be supplementary of the actual rainfall occurrence.

This situation is different from the irrigation developments more frequent around the world, designed to avoid water deficits in arid and semiarid environments. In these cases, irrigation is intensively used every cropping season. Meanwhile in Uruguay, in some years not only irrigation could arrive to be not needed, but also to have water excess instead of deficit.

Water erosion is a serious risk under Uruguayan climate, if soils are unprotected. Soil water content has proven to be an important factor of soil erosion, because runoff reduces significantly when soils are relatively dry. As irrigation aims to maintain high soil water contents, increased erosion risk should be considered. Efficient soil erosion control is reached using no or reduced tillage systems, when high surface soil cover with residues is obtained. This conditions irrigation water application systems to be used. Also, because of the rolling landscape predominant in the areas with agricultural soil capabilities, there should be limitations to the use of big central pivots irrigation equipments in all the cases. Moreover, in these landscapes, because of geologic characteristics, water sources usually should be dams holding surface runoff, instead of groundwater extracting wells.

In addition of increased soil erosion risk, it exist the possibility of increased soil degradation, both physical and chemical. The first could be due to decreased soil organic carbon content (SOC), if the income of plant residues does not match SOC oxidation, and because of higher compaction due to machinery traffic. Chemical degradation could also be due to lower SOC content, and to decreased mineral nutrients soil content due to higher crop extraction.

All these issues concern the people focusing in irrigation development in Uruguay, and they are of particular interest to be discussed in the CIGR Congress next year.

The themes and topics, aiming to present advances and challanges (preliminary):

A) Dealing with limited resources

1. Land and topographic resources for irrigated agriculture.
2. Energy, nutrient and water cycles in irrigated agriculture
3. Use of treated and low quality water in agriculture
4. Groundwater exploitation
5. Drought risk management
6. Climate change adaptation and mitigation

B) Planning and Management

1. Changing land and water uses and their societal impacts
2. Landscape preservation and ecology
3. Transition toward a sustainable food systems
4. Policies, governance and institutional development

C) Irrigation and drainage

1. Variable Rate Irrigation (VRI) / Site Specific Irrigation (SSI)
2. Micro-irrigation
3. Subsurface drip irrigation
4. Sprinkler irrigation
5. Surface irrigation and water conveyance
6. Innovative drainage technologies

D) Measuring systems

1. ET measurement
2. Canal automation
3. Measuring water flow
4. Gravity and pressurized systems
5. Irrigation and soil monitoring systems
6. Weather stations and networks

E) Decision support systems

1. Decision support systems and modelling tools
2. Innovative data-acquisition and information and communication technologies
3. Irrigation technologies and management practices for environmental upgrading
4. Geo-information and remote sensing technologies for land and water management