MANAGING WATER RESOURCES IN AGRICULTURE: OPPORTUNITIES FROM EARTH OBSERVATION

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Food security and economic livelihood of millions of people in Asia and Africa shall continue to depend upon the flows in the major rivers. Variability of water and other resources in time and space is the major natural impediment for sustainable agriculture, food production and development at large. The extremes of variability – floods and droughts – are the primary "agents" of destruction, severe crop damage and loss of human life. According to EM-DAT (2012), about 3 billion people in more than 110 countries are affected by catastrophic flooding. In 2011 alone they killed tens of thousands of people, primarily in developing countries, and caused over $150 billion in damage globally. Our present capacity to understand and make a reasonable forecast of the occurrence and thus management of such anomalies is rather inadequate. Earth observation (EO) satellites play a major role in the provision of information for the study and monitoring of the water resources and can support better understanding in Agricultural Water Resource Management. Their global nature also helps to address the problems of data continuity in trans-national basins where complete, consolidated, and consistent information may be difficult to obtain.In the years to come, EO technology will enter into a new era, where the increasing number of more sophisticated missions will provide scientists with an unprecedented capacity to observe and monitor the different components of climate variability on water resources from the local to the global scales. Already today, global observations of several key parameters governing the global water dynamics (e.g. precipitation, soil moisture, evaporation, transpiration, water levels, mass balance, gravity-derived groundwater measurements, etc.) are feasible. In addition, significant progress has been made in the area of data assimilation enhancing the capabilities to integrate EO-based product into suitable land surface and hydrological models; hence opening new opportunities for science and application. The presentation will illustrate examples of such information and solutions globally and from large river basins in Asia and Africa including flood risks and drought monitoring; Smart-ICT system for climate and weather information, irrigated area mapping etc.