

## **Session II – Envisioning New Approaches to Managing Great Deltas, Great Rivers, and Great Lakes**

**1:30 PM**

### **The Use of Remote Sensing for the Characterization of Large River Basins: Studies Pertaining Water Use, Water Productivity, Wetlands, and Agricultural Cropland Changes**

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#### **Abstract**

The study of large river basins offer many great challenges that include the vastness and complexity of river basins, and a critical need for harmonized and standardized sets of quantitative data in order to understand, synthesize, and model various basin characteristics. This paper presents the results of agricultural land use dynamics, their water use, water productivity, and their wetland and deltaic characteristics studied using remotely sensed data for 6 large river basins: Syr-Darya (Central Asia), Ganges, Krishna, and Ruhuna (Asia), and Volta and Limpopo (Africa).

In Central Asia, the main cause for fast depletion of the Aral Sea, the world's fourth largest saline body of water, is a result of the massive irrigation in the Amu Darya and Syr-Darya river basins. In this paper, we will provide: (a) irrigated areas of Syr-Darya river basin mapped at various spatial resolutions ranging from 30 m to 10,000 m; (b) water use of these crops determined using surface energy balance models, and (c) water productivity (WP) maps to pin-point areas of low and high WP. The results will highlight opportunities that exist to grow more crops using existing allocations of croplands and water to feed the ballooning populations. We will also provide irrigated and rainfed

cropland maps produced at 30-10,000 m using various satellite sensor data in Ganges, Krishna, and Ruhuna basins of Asia. Generally, irrigated areas increased with decrease in spatial resolution due to the ability of finer spatial resolution to detect fragmented irrigated areas better.

In Asia's Krishna basin, we will show the massive changes in agricultural land use during a water-deficit year when compared with a water-surplus year. The implications of such changes on food security will be discussed. Finally, the contrasting use of wetlands in Africa versus Asia and their implications on food, water, and environments will be highlighted.