



Tropentag, October 9-11, 2007, Witzenhausen

“Utilisation of diversity in land use systems:  
Sustainable and organic approaches to meet human needs”

## Assessment of On-Farm Water Use Efficiency in the Public Irrigated Schemes in the River Nile State of Sudan

ELGILANY A. AHMED<sup>1</sup>, HAMID H.M. FAKI<sup>1</sup>, HASHIM A. ELOBEID<sup>2</sup>

<sup>1</sup>*Ministry of Science and Technology, Agricultural Economics Research and Policy Center, Sudan*

<sup>2</sup>*University of Khartoum, Faculty of Agriculture, Sudan*

### Abstract

The problem of water scarcity worldwide is becoming severe. Water resources are also experiencing an adverse trend viz rainfall rates are decreasing due to the determinant of the vegetation cover, the ground water is dropping.

River Nile State (RNS) is the most important agricultural district in the northern region of Sudan, with its resources endowments; the option of irrigation is mandatory in RNS from the River Nile (RN) by pumps. The scarcity of irrigation water rose due to population pressure. The water diverted for irrigation are not effectively used. It is estimated that on average only 45 % is effectively used by the crop, with an estimated loss of 15 % in the irrigation conveyance system, 15 % in the field channels and 25 % in inefficient field application. This coupled with low crop productivity, lack of cheap source of power, more than 60 % of the RN water flow only during a limited period annually from August to September and lack of tenants' awareness about the recommended amount of crop water requirements. The paper aims to assess the on-farm water efficiency under irrigated sector, the role of State, water users and market allocation manner in structuring the productivity per unit of water used equity and saving water resource of the RNS. Integrated techniques involving economic and hydrologic components are used to assess water use efficiency in RNS. GAMS, Crop Wat4 and Cobb-Douglas function have been employed to evaluate the on-farm water efficiency.

The results suggest that vast irrigation water devoted for agricultural production in the State coupled with low production will need attention on water management, allocation, quantities and introduction of water saving technologies. Water management institutions are not well qualified to handle irrigation water. Lack of tenants' awareness led to inefficient water use. These are the major challenges that might save irrigation water in the future.

**Keywords:** Water quantities, yield per unit water