

Visit Report Dr Shahbaz Khan

Swiss Federal Institute of Technology (ETH)

This report relates to a visit by Dr Shahbaz Khan to Professor Wolfgang Kinzelbach's research group at the Swiss Federal Institute of Technology (ETH) from August 11-18, 2002. This visit was sponsored by the Rice CRC.

During the visit, the following key aspects were covered:

- 1) Worked on refining the Murrumbidgee model with Professor Kinzelbach and his PhD student Philip Brunner. Professor Kinzelbach has been previously working with the CRC staff on the WASSIM model. Previous work included a funded visit by one of Professor Kinzelbach's post graduate students Anke Hildebrandt to work with Rice CRC researchers for 3 weeks during 2000. During this visit a number of suggestions were made to improve ETH model based local knowledge and technical expertise.
- 2) During the course of the visit Dr Khan became familiar with the wide range of ETH studies e.g. upscaling methods and the new PhD project in Murrumbidgee and Yanqi basins. The new ETH project would provide an excellent opportunity to further develop, customise and apply the ETH models to local conditions in the rice growing areas of Australia under the existing CRC projects and the future Rice Based Systems CRC.
- 3) Over the next couple of years Brunner and Khan will work together to develop a new framework for defining sustainability, and to bring SWAGMAN ideas into ETH spatial models.
- 4) A new initiative on comparing indicators of sustainability between four major arid basins i.e Murrumbidgee in Australia, Rechna Doab in Pakistan and Yanqi and Yellow River Basins in China has started between ETH and Rice CRC. This will bring internationally recognized research and ideas in the current and possible future CRC projects to make sure that our efforts are competitive and state of the art, considering future developments in and outside Australia.

Brunner, Khan and Kinzelbach will be writing a joint paper to the International Conference on Water- Saving Agriculture and Sustainable

Use of Water and Land Resources in Arid and Semiarid Areas (to be held in China in October 2003). The submitted abstract of this paper is given below:

Title: Comparing different sites of secondary salinity in order to define a unified definition of sustainability

Philip Brunner, Shahbaz Khan, Wolfgang Kinzelbach

Presently about 10 million ha of agricultural land are lost annually due to salinisation. While some climate and management aspects are common to all of those areas in a semi-arid or arid climate and with poor drainage, the detailed mechanisms and options for solutions may vary considerably from case to case. This paper compares three regions suffering from similar sustainability issues: Rechna Doab in Pakistan, the Liu Yuan Kou Irrigation Area (LIA), China, Henan province and Yanqi Basin, in the Chinese province Xinjiang. Soil salinity, lack of adequate water resources, water use efficiency and groundwater mining are major issues for these basins.

On the basis of key data from all three areas, efficiency parameters are identified. A unified conceptual framework to define and deal with the sustainability issues is formulated. The key data used to compare these different sites are the primary factors such as climate and soils, available water resources and their use, as well as the extent of salinisation. Furthermore we will examine the history of water resource development in these areas to understand how salinity problems can develop in semi- arid regions and what would be the consequences for these regions. Based on the efficiency parameters and the definitions of sustainability, we will explore ideas about how to approach the problems and the kind of methods that could be suggested to maintain productivity and environmental sustainability in a socially viable and environmentally acceptable irrigation context.