Impacts of climate change and watershed development on whole-of-basin agricultural water security in the Krishna Basin, India and Murray-Darling Basin, Australia

Project Leader: Hector Malano
Staff: Hector Malano
Collaborators: The Energy Resources Institute (TERI), India, The Indian Institute for Tropical Meteorology, The International Water Management Institute (IWMI)
Sponsors: Australian Centre for International Agricultural Research (ACIAR)
Primary Contact: Hector Malano (h.malano@unimelb.edu.au)
Keywords: Climate change adaptation; water resources
Disciplines: Infrastructure Engineering
Themes: Sustainable Systems & Energy

The long term impacts of climate change and watershed development (WSD) on water security in many river basins worldwide including the Krishna and the Murray-Darling basins are expected to be considerable. Climate change and WSD are expected to have a significant impact on the hydrologic behaviour of the catchment. The Krishna river basin is closing as a result of the combined impacts of vast irrigation developments over the past 50 years and extensive WSD programs promoted by the Indian Government. It is predicted that, by the year 2100, India will experience a 3 to 5^{o}C increase in average temperatures and the Krishna basin will experience a 20% decline in precipitation. Accordingly, runoff in the Krishna basin is predicted to decline from 30% to 50%.

The main aim in this project is to assess the impacts of watershed development and climate change on the long-term water security for agriculture in the Krishna river basin and compare this with the forecast impacts and adaptation strategies in the Murray-Darling basin. This assessment will provide the basis to ascertain whether these strategies can support future food production and the concomitant effects this may have on farmer's livelihoods.

Specific objectives of the project are:

- To compile and synthesise the current understanding of historical climate change in the Krishna and Murrumbidgee basins and model future regional climate change scenarios.
- To assess the combined impact of watershed interventions and climate change projections on surface and groundwater hydrology at different spatial scales.
- To develop a framework for identification of stakeholder defined adaptation scenarios in the context of relevant policies.
- To integrate the hydrological outputs from objectives 1 and 2 and create a coupled hydro-economic methodology to assess response strategies to the combined impacts of climate change and watershed development at basin and sub-basin level.