

**Sue McAlister** reports on key water management projects in India, Pakistan and Australia that are helping all countries find better ways to balance competing water demands

# PARTNERSHIPS AND MANAGEMENT THE KEY TO SUSTAINABLE WATER USE



Water is essential for everyone's survival. Yet it is growing harder to come by every day. Living on the planet's driest inhabited continent, Australians know this only too well, and have responded by developing advanced expertise in the science, technology and management of water. To help share this knowledge, ACIAR has provided nearly A\$2 million in funding for two particular projects in India and Pakistan – water allocation in India and conjunctive water management in Pakistan. These projects combine the application of Australian expertise in water governance and service delivery with the vital participation of local administrators and users.

The Indian project is complex, as it involves three federal states agreeing on how to allocate, manage and develop the diminishing waters of the Krishna River Basin. In Australia, the often competing demands on water resources of the Murray-Darling Basin river system spread across four states. The lessons from the management of the Murray-Darling Basin are part of the reason why Australian expertise was sought for the Sri Lanka-based International Water Management Institute (IWMI) in the Krishna River Basin project.

ACIAR Research Program Manager Dr Christian Roth says there are two sides to water management: the scientific-technical-economic, and the political-administrative-societal. Australia's role in the Krishna Basin is to provide sound, impartial information on the scientific-technical-economic so that Indian authorities and communities can work on the latter. The stakes are high: the three states involved have a combined population of 215 million.

One of the challenging aspects of Australia's role in the project is marrying biophysical with socio-economic assessments; in other words, reconciling conclusions about how much water there is and where best to put it to sustain quantity and quality of supply (and the environment), with conclusions about how best to allocate and use it for economic benefits by maximising water productivity.

"Hydrologists and economists often have very different perspectives," says Dr Roth. "But members of the Australian multi-disciplinary team assembled for the Krishna Basin are all talking the same language and are working towards a shared conceptual framework for water allocation, involving stakeholders in the process of matching water resource availability and allocation against the highest economic returns."

From its beginning, the Krishna catchment area presented challenges of a uniquely Indian kind. Traditionally, its water was used mainly for irrigation. However, India's rapid population growth, especially in urban areas, and burgeoning industrial sector is placing unprecedented demands on a finite body of water and food-growers' ability to sustain themselves and their crops.

Another factor is size. One of the project's earliest stages involved collating massive amounts of water quantity and quality data, generated and stored by a large number of governmental, bureaucratic and research bodies. This was a daunting task, but has been completed by Melbourne scientist Dr Biju George and the IWMI-led team.

There has also been tangible progress in other areas. India's Federal Government has reconstituted the Krishna Basin Tribunal along the lines of the Murray-Darling Commission to mediate between competing interests, including different state governments and water authorities. One of the states comprising the Krishna River catchment area, Karnataka, was initially not that keen on participating, but has since been sufficiently impressed to increase its allocation of resources to the project. And Dr Roth explains: "The collaborating Indian institution, Jawaharlal Nehru Technological University, has

provided an enormous additional resource in the form of nine Master of Science students undertaking research aligned with the project."

The Krishna Basin project may now provide a template for Australian assistance elsewhere in the Asia-Pacific region. Already, the Mekong River Commission, with representatives – and sometimes competing interests – from Laos, Vietnam, Thailand and Cambodia, has approached ACIAR about funding for a similar project. However, as Dr Roth explains, such support is never a one-way street: "Australia is definitely building its water resource management skills and knowledge through participation in this large and significant Krishna Basin project."

Pakistani and Australian scientists, irrigation managers and farmers have worked together to develop improved conjunctive water management in the Rechna Doab, part of the Punjab region of Pakistan.

ACIAR Research Program Manager Dr Ian Willett says the irrigation agriculture system in the Rechna Doab, like many such systems in Australia, suffers from insufficient fresh water.

"Conjunctive water use involves optimising the use of fresh, saline, surface and groundwater sources," he says. "There are two sides to this. One is technical, or 'hard': planning how to physically get hold of the maximum sustainable amount of all water sources and how best to use them together, productively and safely. The other side is human, or 'soft': developing societal and institutional arrangements that will enable the scientific and engineering plan to be carried out."

It is often the 'soft' side of things that proves hardest to change, yet the Punjab Irrigation Department has adopted the models for institutional arrangements identified by the project team.

The Rechna Doab project was coupled with a project in the large Coleambally irrigation area, south of the Murrumbidgee River in south-east Australia. Both areas produce rice and wheat and both face the same fresh water scarcity, waterlogging, salinity and farm viability issues. Both also turned for help to the CSIRO.

One of two Australian scientists who completed the Rechna Doab project was Pakistani-born Dr Shahbaz Khan, who is Stream Leader of Irrigated Systems and also Professor of Hydrology at Charles Sturt University. "The conjunctive water management models developed for the Coleambally and Rechna Doab systems were an example of learning from each other's experience," he says. "For instance, the farm economics expertise of our Rechna Doab scientist guided Coleambally water management analysis, while the state-of-the-art groundwater management models developed by the CSIRO in Coleambally helped develop similar expertise in Pakistan."

A computer farm model customised for Rechna Doab was developed and given the distinctive Australian name SWAGMAN. Stakeholders in the Rechna Doab (mainly regional planning bodies) were trained to use the SWAGMAN model, which balances irrigation profitability with natural resources management. The Centre of Excellence in Water Resources Engineering at the University of Engineering and Technology in Lahore has also been given a copy for educational purposes.

The projects in Pakistan and India have helped to further the understanding of sustainable water management from a number of perspectives, most notably those of managers, farmers, hydrologists and economists. All bring their own ideas, but by building the tools needed for all views to be heard, the projects are ensuring that water management is based on a framework that incorporates everyone's needs. ◀

'Hydrologists and economists often have very different perspectives'