

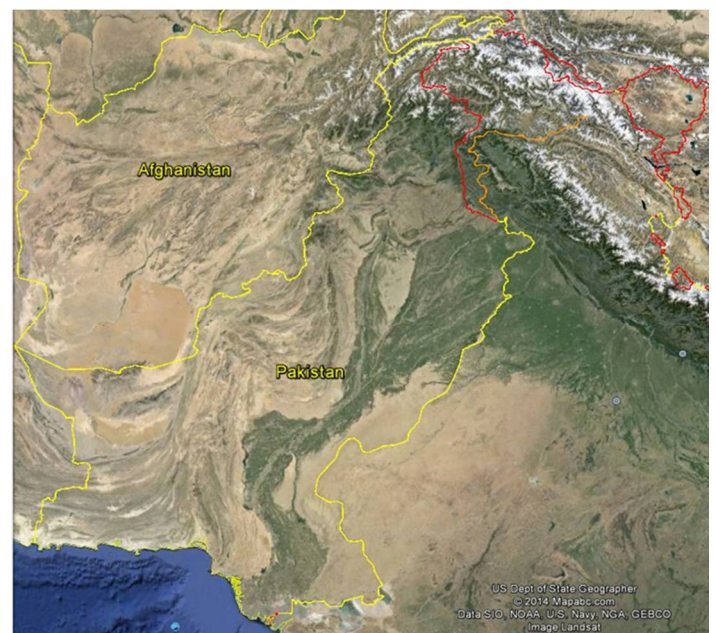
Building knowledge and capacity to support integrated water resources management in Pakistan

The Australian government through its Sustainable Development Investment Portfolio (SDIP) is helping Pakistan to build modern water management and assessment tools for the Indus Basin. Impacts on water, food and energy security from future climate change, population growth, and infrastructure development on water resource availability are considered. Water availability predictions are provided for the coming cropping season. These predictions are used as part of modelling storage operations, river flow, water sharing and irrigation delivery. The modelling framework considers the interaction between river and groundwater resources. The implementation of Australian water management technologies and associated capacity building is supporting a productive and water secure Pakistan.

Background

Pakistan is totally reliant on the surface and groundwater resources of the Indus Basin to support water, food, energy and economic security. Pakistan faces some significant challenges with very low per capita water availability and a rapidly growing population. The challenges are exacerbated by unsustainable use of groundwater, changes in the seasonality and amounts of rainfall, and limited storage (~10% of mean annual flows, about 30 days of use). On this basis the Indus is one of the most vulnerable river basins in Asia.

Pakistan and Australia have a long history of collaboration and the similarities between the Indus and the Murray-Darling Basin provide a foundation for a water partnership. Building on this foundation, the Australian Government is working with Pakistan to implement Australian water resources management technologies, and building local capacity in integrated water resources management and impact assessment.



Pakistan's reliance on the Indus as seen from space: Pakistan's irrigation system is sustained by the river and groundwater resources of the Indus Basin. [Source: Google 2014]

A new generation of water management products provides a defensible and agreed understanding of the water resources of Pakistan. They provide a means of assessing the impact and trade-offs of external drivers and management interventions on the nation, its provinces and the communities who depend on the waters of the Indus.



ACKNOWLEDGEMENTS

This fact sheet designed and implemented by CSIRO contributes to the South Asia Sustainable Development Investment Portfolio and is supported by the Australian aid program. We acknowledge the support of the Ministry of Water Resources, the Water and Power Development Authority, Indus River System Authority, office of the Pakistan Commissioner for Indus Waters, Pakistan Meteorological Department, Pakistan Council of Research in Water Resources, Provincial Irrigation Departments, University of Agriculture Faisalabad, Sindh Agriculture University and Pakistan Institute of Development Economics.

A new generation of water management knowledge products

New products to support integrated water resources management and evidence-based policy formulation are under active development and include:

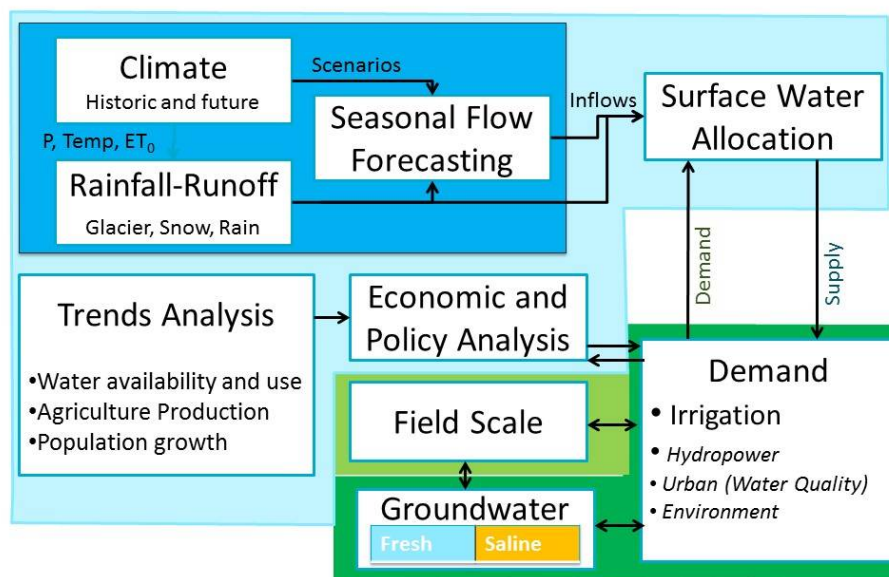
- *climate and rainfall-runoff models* to assess the volume of water available for use in Pakistan
- *seasonal flow forecasting tools* to predict water availability for the coming cropping season
- *river system models* to support seasonal planning and water allocation decision-making
- *groundwater use assessment models* to support decision-making in sustainable groundwater use as part of an integrated water system
- *water quality assessments* to support managing the delivery of safe and secure drinking water
- *time series hydrological data management system* to support robust decision making
- *food security analysis and cropping systems modelling* to explore future food and water trends along with the implications of different water availability scenarios on food production
- *investigation of women's participation in farm production activities* as well as policies that lead to the gender pay gap and gender inequality in Punjab rice-wheat system.

Impact assessment

The water management products are linked within the *Indus Integrated Modelling Framework* to explore water related development scenarios for Pakistan. Scenarios of interest include:

- *climate change*: assessing the impact of changes in volume and timing of river flows entering the irrigated plains of Pakistan
- *population growth*: assessing the impacts on energy and food security into the future as a finite water resource is shared amongst a greater number of people – with a focus on impacts on the poor and vulnerable
- *infrastructure development*: assessing the trade-offs between different development options. Understanding what this means for the different provinces, local and downstream riparian communities
- *economic development*: assessing impacts of agricultural policies on changes in cropping patterns and agricultural commodities trade.

Indus Integrated Modelling Framework Linking Field, Irrigation System and Basin scales



CONTACT US

t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

AT CSIRO WE SHAPE THE FUTURE

We do this by using science to solve real issues. Our research makes a difference to industry, people and the planet.

FOR FURTHER INFORMATION

Dr Mobin-ud-Din Ahmad
SDIP Indus Project Leader
CSIRO Land and Water
t +61 2 62465936
e mobin.ahmad@csiro.au