

An Indian-Australian research partnership

Project Title: **Climate change impacts on hydrological regimes in rural India**

Project Number **IMURA0838**

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IITB Department: Centre for Technology Alternatives or Rural Areas - CTARA

Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST <u>one</u>. For more information, see www.iitbmonash.org)</i>		Highlight which of the Academy's Theme(s) this project will address? <i>(Feel free to nominate more than one. For more information, see www.iitbmonash.org)</i>	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Infrastructure Engineering
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Water
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Nanotechnology
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Biotechnology and Stem Cell Research
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Humanities and social sciences
8	HSS, Design, Management	8	Design

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The research problem

Climate Change can have drastic impacts on the hydrological cycle (erratic rainfall, floods and droughts). India is a rural economy driven country, and with most population under rural livelihood, it is of utmost important to understand the climate change impacts on agricultural productivity and water sustainability. Under such circumstances, it is necessary to understand the downscaled climate change projections for India, and what it means to the water balance at village scales.

In this regards, a plethora of climate change data will be collected, combined with remote sensing and observed data to create a scenario of the current situation. This will lead to production of hypothetical climate change scenarios that can impact agricultural systems in India. Potential measures of adaptation and mitigation to these climate change extremes can also be researched, once the baseline information is set in this research.

Project aims

Primary objective of the project is to understand the climate change impacts on Indian agricultural regions. Secondary objectives would include understanding climate change projections for India, assessing potential of remote sensing images for aiding water balance assessments and modelling current and future scenarios.

Expected outcomes

- Sensitization of ongoing agriculture water stress and climate change impacts
- Assessment of future climate change impacts on agriculture
- Sustainable agricultural water use practices
- Realistic scenarios for agricultural water management

How will the project address the Goals of the above Themes?

The project will primarily focus on WATER theme, wherein holistic water management practices will be researched. Also, novel information on site specific surface water groundwater interactions will be studied and researched in this project, which are related to WATER theme.

This project will also use GIS and computer simulation models for data processing and simulation of surface water and groundwater interactions. This requires high level of simulation expertise which will be under the SIMULATION theme.

Capabilities and Degrees Required

- The student should have a Masters degree that has a hydrological focus (e.g. water resources management, civil engineering, hydro informatics, etc.)
- Experience in field work, remote sensing GIS and computer simulation models.
- Programming skills/data management skills to manage large datasets
- Excellent writing skills

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

Dr. Sina Alaghmand has been identified as the potential research collaborator. He has extensive experience on SW-GW interactions modelling and would be able to contribute to the project as co-supervisor. A Skype meeting has been conducted and details of the collaboration discussed.

Select up to **(4)** keywords from the Academy's approved keyword list (**available at <http://www.iitbmonash.org/becoming-a-research-supervisor/>**) relating to this project to make it easier for the students to apply.

**Water resources management, Climate change; Modelling and simulation;
Hydrogeology.**