

An Indian-Australian research partnership

**Project Title:** **Groundwater depletion scenario for India – use of isotopes and modeling**

**Project Number** **IMURA0930**

**Monash Main Supervisor**  
 (Name, Email Id, Phone)

Prof. Ian Cartwright  
[Ian.Cartwright@monash.edu](mailto:Ian.Cartwright@monash.edu)

Full name, Email

**Monash Co-supervisor(s)**  
 (Name, Email Id, Phone)

NA

**Monash Head of Dept/Centre** (Name,Email)

Prof Sandy Cruden

Full name, email

**Monash Department:**

School of Earth Atmosphere and Environment

**Monash ADGR**  
 (Name,Email)

Prof. Emanuele Viterbo  
[Emanuele.Viterbo@monash.edu](mailto:Emanuele.Viterbo@monash.edu)

Full name, email

**IITB Main Supervisor**  
 (Name, Email Id, Phone)

Prof. Pennan Chinnasamy,  
[P.Chinnasamy@iitb.ac.in](mailto:P.Chinnasamy@iitb.ac.in),

Full name, Email

**IITB Co-supervisor(s)**  
 (Name, Email Id, Phone)

NA

Full name, Email

**IITB Head of Dept**  
 (Name, Email, Phone)

Prof. Satish Agnihotri,  
[Head.ctara@iitb.ac.in](mailto:Head.ctara@iitb.ac.in)

Full name, email

**IITB Department:**

Centre for Technology Alternatives or Rural Areas - CTARA

## Research Clusters:

## Research Themes:

<b>Highlight which of the Academy's CLUSTERS this project will address?</b> (Please nominate JUST <u>one</u> . For more information, see <a href="http://www.iitbmonash.org">www.iitbmonash.org</a> )		<b>Highlight which of the Academy's Theme(s) this project will address?</b> (Feel free to nominate more than one. For more information, see <a href="http://www.iitbmonash.org">www.iitbmonash.org</a> )	
1	Material Science/Engineering (including Nano, Metallurgy)	1	<b>Advanced computational engineering, simulation and manufacture</b>
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	<b>Water</b>
5	<b>Earth Sciences and Civil Engineering (Geo, Water, Climate)</b>	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

--	--	--	--

## 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 groundwater impacts due to climate change stressors.

In India, the highest extractor of Groundwater, there is good amount of research on groundwater quantity but not quality. The groundwater quantity is also based on groundwater level records and not on isotopes, which would give a different hypothesis.

## Project aims

Primary objective of the project is to understand the reasons for groundwater depletion using a combination of groundwater level and chemistry data. Secondary objectives include understanding reasons for ongoing groundwater depletion in rural India.

## 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](http://www.iitb.ac.in) OR Monash Website [www.monash.edu](http://www.monash.edu) to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

Prof. Ian Cartwright has been identified as the potential research collaborator. He has extensive experience on groundwater modelling. 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.**