

An Indian-Australian research partnership

Project title

Impacts of Climate Variability and Climate Change on Water Availability for Vegetation at a River Basin Scale.

Project number: IMURA0101

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Research Academy theme/s

List only the research academy theme/s that is relevant to the project

1. Advanced computational engineering, simulation and manufacture
2. Infrastructure engineering
3. Clean energy
- 4. Water**
5. Nanotechnology
6. Biotechnology and stem cell research

The research problem

Water resources are inextricably linked with climate, so the prospect of global climate change and climate variability has serious implications for water resources and regional development. The project aims to assess the impacts of climate change on water availability and management in terms of both quantity and quality at a river basin scale. An eco-hydrological model will be developed to assess the impacts of climate change on soil moisture and groundwater, and to study the consequent effects to water availability for vegetation and human use.

Project aims

The project aims to develop an integrated eco-hydro-climatological model (either physical or statistical) for assessing the impacts of global changes and climate variability on soil moisture, groundwater and vegetation.

Expected outcomes

Eco-hydrology bridges the fields of hydrology and ecology and proposes new unifying principles derived from the concept of natural selection. We propose to develop a model that integrates the main aspects of ecology, hydrology, and climatology to describe the inter-relationship among different components of the hydrologic cycle. The main outcome of the proposed work is to determine the responses of vegetations to climate variability and climate change. The objectives of the work will also include the impacts of climate change on ground water quality and quantity for the requirements of vegetations.

Which of the above Theme does this project address?

The project mainly deals with **water** related issues.

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

It is well observed that the world wide water resources are being affected by global climate change and climate variability. As ecology (the study of vegetations) is well linked with hydrology, climatic change has a serious impacts on ecological balance. For proper water resources and ecological management it is essential to study the relationship between climatological, hydrological and ecological variables. The evolution of an ecosystem is crucially dependent on the need of its vegetation for light and water as external inputs that drive its productive mechanisms. Global changes lead to changes in these variables and their assimilation also depends on the plant characteristics and the ecosystem structure. Thus vegetation plays an active role in the space-time dynamics of soil water being both cause and effect of this dynamics. Therefore to study the impacts of global changes on ecohydrological characteristics of a river basin, it is essential to develop an integrated eco-hydro-climatological model. The model will be applied to the river basins of India and Australia.