



GROUNDWATER HYDROLOGY AND MANAGEMENT

PROF. PENNAN CHINNASAMY

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INTENDED AUDIENCE : Students in Civil Engineering, Rural, Development, Earth Science, Geology and Rural development departments

COURSE OUTLINE :

Groundwater is the most important water resource that aids during climate change extremes (floods and droughts). Groundwater has also been the key factor for increase in cropped area, rotation and profit for farmers. However, the groundwater science is not well understood and hence it is depleted at alarming rates. India is the highest extractor of groundwater in the world and it is necessary to understand groundwater hydrology to better work in water resources management activities.

ABOUT INSTRUCTOR :

Prof. Pennan Chinnasamy obtained his Masters degree in Physics from Wesleyan University, Connecticut -US, followed by a doctoral degree, with focus on hydrology, from University of Missouri, US. After his Research fellow position with Ashoka Trust for Research in Ecology and the Environment (ATREE), he joined the International Water Management Institute (IWMI) as a Researcher (Geohydrology and Remote Sensing), and was stationed in Nepal and Indian offices, where he focused on climate change impacts on under developed and developing nations. He then joined Nanyang Technological University, Singapore, as a Senior Researcher developing real time flood predicting models for Singapore. He is currently an Assistant Professor with Indian Institute of Technology, Bombay - India, under the Centre for Technology Alternatives for Rural Areas (CTARA) department, where his work primarily focuses on natural resources assessment, monitoring and management in rural regions. He is the founding director of the Rural Data Research and Analysis (RuDRA) lab, which is the first Big data lab for rural regions, housed in an academic institution in India. He is also an associate faculty with the Interdisciplinary Climate Program and Policy Study Centre in IITB. Prof. Pennan Chinnasamy is also a visiting professor with University of Oulu, Finland. Over the past decade, Prof. Pennan Chinnasamy has experience working in NGOs, national and regional government agencies and academic institutions, focusing on sustainable surface and groundwater management plans, climate change impacts, large data analysis and hydrological simulation models. His work has been recognized in many internationally peer reviewed journals, policy briefs and government reports (e.g. EPA, NEA- Nepal, World Bank, Asian Development Bank) and are being used to formulate scientifically validated best management plans.

COURSE PLAN :

Week 1: Introduction to Groundwater

Week 2: International importance of groundwater and focus groundwater use in India

Week 3: Physics and hydrology of Groundwater

Week 4: Groundwater governing equations 1 (unconfined aquifer)

Week 5: Groundwater governing equations 2 (confined aquifer)

Week 6: Groundwater recharge and discharge

Week 7: Types of groundwater wells and pumping sources

Week 8: Conceptual model for groundwater

Week 9: Groundwater data in India

Week 10: Management of groundwater quantity and quality in India

Week 11: Introduction to Groundwater modeling and groundwater software packages

Week 12: Case studies of Groundwater in India