Workshop on

ASSESSING IMPACT OF LANDUSE/ LANDCOVER AND CLIMATE CHANGE ON WATER RESOURCES USING SOIL WATER ASSESSMENT TOOL (SWAT)

Organized by
Department of Civil Engineering,
National Institute of Technology, Tiruchirappalli
25-29th September, 2023

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Overview

Water is one of the most important natural resources which controls the human development activities and influences the living things. Planning and execution of a water resource project require information about the streamflow and hydrological components. Accurate assessment of the surface runoff, groundwater, and non-point source (NPS) pollution over a range of temporal and spatial scales is essential for better management of the water resources.

India is an agriculture-based country, urbanisation due to increase in population and expansion in agriculture activities have resulted in setting the climatic condition at an alarming state. Land-use change can result in a change of flood frequency, severity, base flow, and annual mean discharge, while Climate change has led to the changes in the hydrological cycle, resulting in severe implications on runoff, frequency and intensity of rainfall, droughts, increase in surface temperature and evapotranspiration. Hence, Potential impacts of future climate and land-use change can be quantified for a specific basin by using an integrated hydrological simulation model with downscaled climate and land-use projections derived from Global Climate Models (GCM). Establishing a relationship among these parameters is the central focus of hydrological modelling. The Soil Water Assessment Tool (SWAT) model is process-based and simulates, water flow in

soil and groundwater, crop/vegetation growth, nutrient cycling, erosion, pesticides, bacteria, the lateral flow of water, sediments and nutrients as well as environmental impact of land management practices on the main model outputs.

Land-use change and climate variability are two key factors that impact the watershed hydrology, which is strongly related to the availability of water resources and the sustainability of local ecosystems. In recent years, the SWAT model has gained international acceptance as a robust interdisciplinary water-shed modelling. It is considered as a versatile model that can be used to integrate multiple environmental processes, which could support watershed management effectively and develop better-informed policy decision. Moreover, SWAT allows users to adjust CO_2 concentration, weather parameters (such as temperature, precipitation, radiation and humidity) and land use to study the influence of these parameters in plant growth, ET, snow, and runoff generation.

In this course, the primary goal of this course is to assess the impact of land-use /landcover and climate change impacts on catchment hydrology. This short course will comprise lectures and tutorials by foreign expert, covering topics in climate change, Climate Change model – RCM & GCM, downscaling, etc. along with the introduction to ArcGIS SWAT, land-use and soil database generation, Model simulation and parameter estimation. This course is designed specifically for faculties, research scholars and experts from private organizations who are involved in water resource management, to get acquainted with the various advanced aspects and impacts of climate change on water resources

Objectives

The main objective of the course is to provide participants with an understanding of the area of wastewater treatment technology and the role of biotechnology in environmental restoration.

After completing the course, students will have the ability to

➢ Exposing participants to the fundamentals of Climate change on water resources.
➢ Introduction to SWAT model for watershed delineation.
➢ To assess the potential impacts of future climate and land use/land cover changes on water resources by using the SWAT model.
➢ Providing exposure to practical problems and their solutions, through case studies and live projects in water resources system,

➢ Review and write scientific articles in the Impact of Climate change, landuse-landcover on catchment hydrology .

Modules	➢ **Module A:** Fundamentals of ArcGIS SWAT for rainfall- Runoff Modeling, SDSM for Statistical downscaling of Climate change Modeling, Concept of climate change and climate variability Applications of long term land use/land cover changes on catchment water management –A case study of Noyyal basin. ➢ **Module B:** Basic principles Construction of climate change scenarios, Observed and projected impact of climate change, Climate change projections, Applications of GCM downscaled climate data and various scenarios for the runoff simulation using SWAT–A case study of Noyyal basin. ➢ **Number of participants for the course will be limited to 40.**
Date of the course	**25-29th September, 2023**
Who Should Attend	➢ Students at all levels (B.Tech/MS/M.Tech/PhD) or Faculty from reputed academic institutions and technical institutions. ➢ Executives, Water resource Engineers and researchers from governmentorganizations including R&D laboratories, Ground and surface water division of PWD
Fees	The participation fees for the course is as follows: **Course Fee (including GST 18%)** Faculty and Scientist — Rs. 2500 /- Students / Research Scholars — Rs. 1500 /- Industrial participants — Rs. 5000 /- Students from Abroad — US $ 200 /- Faculty and scientist from Abroad — US $ 500/- Industrial Participants from Abroad — US $ 1000/- The above fee includes all course materials, computer use for tutorials

	and assignments, laboratory equipment usage charges, internet facility.
Payment Procedure	**https://www.onlinesbi.sbi/sbicollect/icollecthome.htm** → Accept the terms and conditions → State: Tamil Nadu → Type: Educational Institutions → select: Conference and Workshop NIT Trichy → **category: GIAN CIV SWAT 2023**" and provide details of payment and submit. Please use the link below for the course registration.
Registration Form	**How to Register?** **Stage-1: Web Portal Registration:** Visit http://www.gian.iitkgp.ac.in/GREGN/index and create login User ID and Password. Fill up the registration form and complete web registration by online payment of **Rs. 500/-.** This provides the user with life time registration to enroll in any number of GIAN courses offered. **Stage-2: Course Registration:** Login to the GIAN portal with the user ID and Password already created in Step 1. Click on Course Registration option at the top of Registration form. Select the Course titled "**Assessing Impact of Landuse/ Landcover and Climate Change on Water resources using Soil Water Assessment Tool (SWAT)**" to Confirm your registration by clicking on Confirm Course. **Step – 3 : Fill the google form using the link given below.** **https://forms.gle/pemFBiDXbkCPRtkz6**
Important Dates	Last date for submission or Registration : **18th September 2023** Confirmation of participation : **20th September 2023** Workshop Dates : **25th - 29th September 2023**

ORGANIZING COMMITTEE

Dr. Sangam Shrestha

Dr. Sangam Shrestha is a distinguished Professor and Chair of the Water Engineering and Management Program at the Asian Institute of Technology (AIT) in Thailand. He is also a Visiting

Faculty of the University of Yamanashi, Japan, National University of Laos, and a Research Fellow of the Institute for Global Environmental Strategies (IGES), Japan. He is an expert in hydrology and water resources, focusing on climate change impact assessment and adaptation, integrated water resources management, and groundwater assessment and management. He received prestigious awards, including The Takeda Techno-Entrepreneurship Award (2007) from The Takeda Foundation, Japan, for his contributions to global environmental well-being. He has received scholarships such as the AIT-DANIDA full scholarship (2002-2004) for his Master of Science in Integrated Water Resources Management at AIT and the Tribhuvan University Merit Scholarship (1997-2000) for his Bachelor of Science in Agriculture at the Institute of Agriculture and Animal Science, Nepal. He is an active member of professional organizations, including WAWSC, AGU, IAHS, IWA, and JSCE. He delivered keynote speeches and presentations at international conferences and published over 140 journal papers and 20 book chapters. He is highly regarded in the field of hydrology and water resources management.

Dr. S. Saravanan

Dr. S. Saravanan is an Associate Professor at the National Institute of Technology, Tiruchirappalli, India. He specializes in remote sensing and GIS applications for disaster modeling, including flood, soil erosion, landslide, and distributed rainfall-runoff modeling. His expertise also extends to studying the impacts of climate change on water resources. he received notable awards and recognition for his work, including the Berkner travel grant (AGU-2013). He was also awarded the Endeavour Post-Doctoral Research Fellowship (2009) from the University of Melbourne, Australia. He has been recognized as the first Indian to be invited for the COE program (2007) at the University of Yamanashi, Japan, and has received an International Travel Grant from DST for presenting a technical paper at the 3rd biennial IWA Young Researchers Conference at Nanyang Technological University, Singapore. He also received the Best Project award (Kurath Alwar Award) in the Engineering/Technology category from P.S.G. College of Technology, Coimbatore

in 1999. With over 70 journal papers and 20 book chapters to his name, he is highly regarded for his research contributions in the field of remote sensing, GIS, Disaster modeling and water resources management.

Course Coordinator

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