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## Climate projections for regional hydrology

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Climate change is expected to have large impacts on regional hydrological cycles, affecting spatio-temporal distributions of water availability and water sustainability. A major requirement, therefore, is reliable estimates and assessments for pro-active planning, adaptation and mitigation. A critical input for such assessment is reliable projections at regional scales. However, assessing reliability of projections based on current data is both a conceptual and a methodological challenge. A major issue, given the large uncertainties in climate simulations, is the choice of an ensemble for enhanced reliability. A methodology is presented for assessment of impact of climate change based on different climate ensembles like event-based and trend-based ensembles as well as conventional all-model ensemble based on IPCC projections; these ensembles highlight the spread in projections and the need for quantitative estimates of reliability. We consider the continental Indian monsoon as an example and apply a hierarchical approach for assessing reliability, using the accuracy in simulating the historical trend as the primary criterion. The assessments based on trend-based or event-based ensemble are appreciably different from those based on a conventional all-model ensemble. While the scope has increased in CMIP5, there is essentially no improvement in skill in projections since CMIP3 in terms of reliability (confidence). Thus, it may be necessary to consider acceptable models for specific assessment rather than simple ensemble. While trend-based ensembles can provide enhanced reliability, the event-based ensemble can provide more accurate assessment of impacts of climate extremes for designing management practices.

### Biography

Prashant Goswami obtained his PhD in Theoretical and Mathematical physics from IISc, Bangalore; before taking up research in atmosphere, climate and multi-disciplinary modeling. He is the recipient of prestigious Shanti Swarup Bhatnagar Award in Earth Science for the year 2001. He leads the group on Climate and Environmental Modelling at C-MMACS. He had been a Lead Author (Working Group I, Chapter 14) of recently concluded IPCC Assessment Report 5. He has more than 60 publications in reputed SCI journals and has many national and international collaborative programmes; he also coordinates a national data infrastructure termed Climate Observation and Modelling Network.

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## The extent of nutrient removal by wastewater treatment plants along the Nyalenda Wigwa stream and the river Kisat (Kenya)

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Kisat Wastewater Treatment Plant (KWWTP) and Nyalenda Waste Stabilization Ponds (NWSP) clean wastewater before discharge into Winam Gulf (Lake Victoria), but there is lack of information on their efficiency. The current study was carried out to determine the efficiency of nitrogen and phosphorus removal from Kisumu City wastewater disposal by KWWTP and NWSP. Samples of water were collected from the inlet, within and outlet of the treatment plants, preserved, processed and analyzed using standard methods. The concentrations varied significantly ( $P \leq 0.05$ ) between inlet, within and outlet at KWWTP and NWSP except for  $\text{NH}_3 - \text{N}$  which had no significant difference. Percentages of nutrient removal at KWWTP were 41.3%  $\text{NO}_2 - \text{N}$ , 13.7%  $\text{NO}_3 - \text{N}$ , -5%  $\text{NH}_3 - \text{N}$ , 27%  $\text{NO}_x$  and 10.4% (T-P); while at NWSP the levels were 50%, 10.4%, 0%, 16.6% and 30.8%, respectively. These percentage removals of nitrogen and phosphorus in both the treatment plants were below the internationally acceptable minimum values. Hence urgent mitigation steps are necessary to modernize KWWTP and possibly widen and deepen the NWSP to counter this problem.

### Biography

Chamula Patrick Musungu is studying for his PhD in Chemistry at Maseno University, Kenya. He is a holder of MSc in Environmental Chemistry and is a Lecturer of Chemistry. He has published some papers in reputed journals (Environ. Earth Sci. and Ecohydrology & Hydrobiology) and has been serving as an editorial board member {Board Member of the Global Research Journal of Business Management (GRJBM) and Global Research Journal of Marketing Management (GRJMM), Editorial Board Member of the Landmark Research Journal of Agriculture and Soil Science (LRJASS) and Academic Journal of Environmental Sciences (AJER)}.

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