Assessment of Climate Change Impacts on Surface Water Resources. The Case of Ruvu Sub-Basin

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Abstract

Changes in climate have had adverse effect on natural system including hydrological cycle. It is agreed that climate change has occurred and inevitable to stop. Climate change has affected socio-economic activities of all nations especially the developing nations. In this study, climate change impacts on surface water resource of Ruvu sub-basin was assessed by downscaling the coarse GCM output, HadCM3, into local level using statistical downscaling model (SDSM) for precipitation and temperature for A2 and B2 emission scenario. For flow simulation, physically based and distributed rainfall-runoff hydrological model, SWAT was used. The climate projection was done by dividing the coming 90 years period into three periods of 2020s, 2050s and 2080s. The 1971-2001 was taken as baseline period against which comparison was made. The downscaled and projected average monthly maximum temperature indicated increasing trend from 0.2oC to 7.5 oC in 2020s to 2080s time period. The minimum temperature showed decreasing trend from -0.4oC to -1.5oC. The monthly average precipitation showed increase and decrease trend. The overall annual precipitation showed increasing trend which extends from 1.1 mm to 3.1 mm compared with the baseline period. The impact of climate change resulted in decreasing river flow. The seasonal average flow showed decrease up to -2.57 cumecs in Masika season in 2020s for B2 scenario and increase up to 6.6 cumecs in 2080s of A2 scenario. The net annual flow indicated the decreasing river flow. This decrease in river flow may create conflict among water users in the sub-basin. Therefore, the area needs strategic water use plan with an integrated framework.

Image

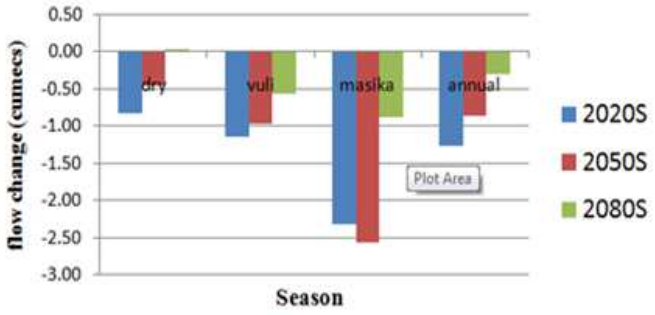
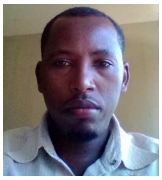


Figure 4: Absolute Change in Seasonal and Annual River Flow in Respect to Baseline Climate for the B2a Scenario

Recent Publications

1. Gulacha and Mulungu (2016) Generation of climate change scenarios for precipitation and temperature at local scales using SDSM in Wami-Ruvu river basin Tanzania. Physics and Chemistry of the Earth Parts A/B/C.



Biography

Metekiya menza has started his carrier in Meteorology science at the early warning and forecast and eveentually he has changed to hydrometeorology case team. In this case team he has been providing hydrometeorological forecast and early warning for the areas vulnerable to flood hazards. And then He went to Tjhe University of Dar es Salaam to pursue his MSc. In Water Resources Engineering. Currently, he is researcher and hydrometeorologist at the National Meteorological Agency (NMA) of Ethiopia. He has already published one paper on Physics and Chemistry of the Earth.

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