Outflow of Different Land-use Scenarios under Down-scaled GCM in Silang-Sta. Rosa Subwatershed, Philippines

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Overview
- Three land-use scenarios (current: 2014 LU-Ls8, future: 2025 LU-Pm, and future: 2025 LU-Pop) were generated and analyzed for hydrologic modelling.
- The Global Climate Model: MRI-AGC M3.2S containing 1979-2003 and 2075-2099 daily precipitation data was used to model the outflow in the subwatershed under the three different land-use scenarios.
- Outflow volumes were generated for the 24 year-past (1979-2003) simulation and 24 year-future (2075-2099) prediction. The daily rainfall average was used to run the model for 365 days or one year (GCM down-scaling).
- Result from this study will be used as input to derive the flood extent in the downstream of the subwatershed to see the effect of the future precipitation in the area.

Results
- The GCM’s daily precipitation average shows that more rainfall events with measurements of 10mm and above can be observed in the Future projection than the Past precipitation data. Thus, under the 2014 Current LU-Ls8, the outflow from the Future precipitation has the higher peaks and greater total outflow than the Past precipitation (Fig.1).
- The outflows from the three land-use scenarios follows the same pattern for both the Past and Future GCM data (Fig. 2 and 3). The 2014 Current LU-Ls8 has the lowest peak and lowest total outflow, followed by 2025 Future LU-Pm, then the 2025 Future LU-Pop has the highest peak and total outflow.
- The flood simulation accounts for both land-use and climate change. The higher the land-use conversion to built-up areas, the higher the risk of flooding in downstream areas of the subwatershed. Based on the down-scaled GCM, there will be an increased number of extreme rainfall events in the future thus, risk of flood occurrence in the future also increases.

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