**Introduction**

- Water is necessary for the sustenance of life, but its availability at sustainable quantity and quality is often complicated by numerous factors.
- A considerable increase in population, migration and socio-economic activities has led to drastic changes in the environment over the last few decades.
- These changes have in turn affected the stationarity of climate, that is climate change is beyond the past variability.
- Massive land use/land cover change (LULCC) is a result of human activities.
- Studies indicate the effect of LULCC on hydrological regime and mark the necessity of its timely detection at appropriate scales for efficient water resource management.
- Nethravathi River Basin is of great socio-economic importance in the region.
- The river water is used for religious, industrial, domestic and irrigation purposes.
- Hence detailed spatial-temporal assessment of impacts of climate change and LULCC on streamflow and sediment yield of the basin is crucial for watershed management.

**Objectives**

To obtain the effect of LULC and climate changes on streamflow of Nethravathi basin using SWAT.

**Methodology**

- **Data**
  - Streamflow Data: 1990-2018 Daily Data, Central Water Commission, India.
  - Meteorological Data: 1990-2018 Daily Data, Indian Meteorological Department, India.
  - Soil Data: 2012 Description of soil types (1 km x 1 km), Food and Agriculture Organization (FAO 2012).
  - Land use: 2013 Land Use Dataset.
  - DEM: ALOS/PALASAR 12.5 m.

- **Model**
  - SWAT Model
  - Simulate Streamflow
  - SWAT-CUP
  - Adjust sensitive parameters

**Results**

- The streamflow increased steadily (5.02%) with changes in LULC from 1990 to 2018.
- The spatial extent of the LULCC classes of built-up (3.82%–6.51%), water bodies (0.76%–0.99%), agriculture (11.96%–17.89%) increased, whereas that of forest (66.56%–51.7%), fallow (3.82%–6.13%), and barren land (13.07%–16.76%) decreased from 1990 to 2018.

**Conclusions**

- The results indicate that LULC changes in urbanization and agricultural intensification have contributed to the increase in runoff, in the catchment during this period.
- Thus, hydrological modelling integrating climate change and LULC can be used as an effective tool in estimating streamflow of the basin.

**Selected References**


