# Reservoir Inflow Modelling using Soil Water Assessment Tool-Tungabhadra Reservoir, India

INTRODUCTION

- The hydrological cycle has many interconnected components, with runoff connecting precipitation to water bodies.
- Surface runoff is an important area of interest for monitoring water resources, as well as solving water quality and quantity problems such as flood forecasting and ecological and biological relationships in the water environment.

STUDY AREA & DATA

Tunga-Bhadra River is one of the major tributary of Krishna River, India. Tunga-Bhadra River is the confluence of both Tunga and Bhadra rivers in the state of Karnataka. The catchment area of the basin is 71,417 km^2. Rainfall data, other climate data from 1991 to 2014 were obtained from Global weather data for SWAT.
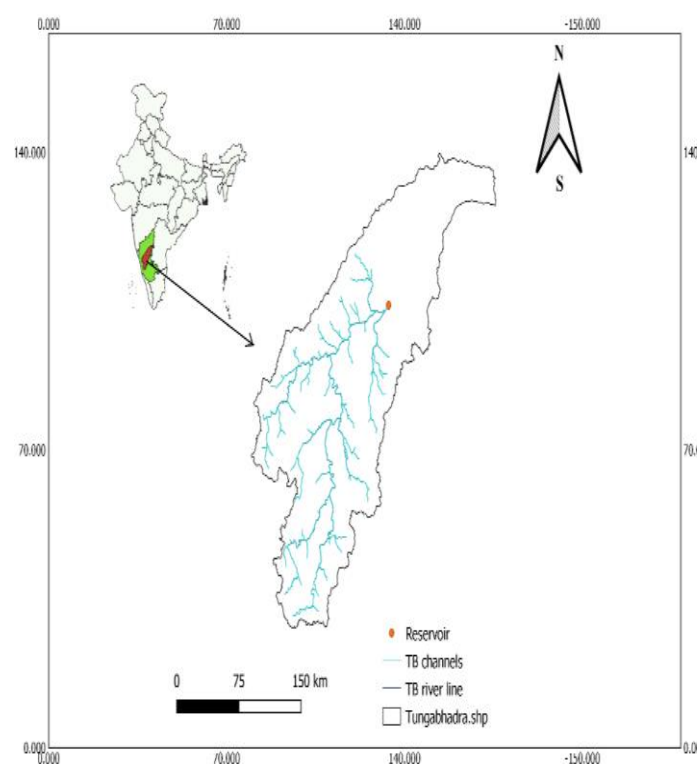
OBJECTIVE

- Building a hydrological model using SWAT such as delineating watershed, generating HRU of watershed.
- Simulating and run the swat model.
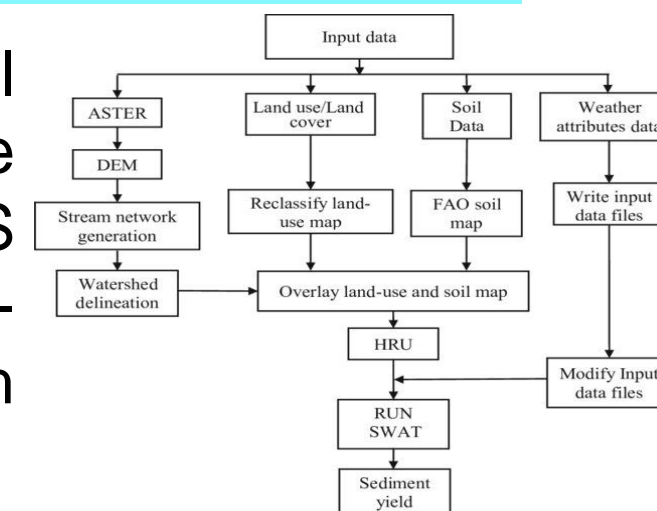- Performing the trend analysis of Rainfall-Runoff distribution of the watershed.

METHODOLOGY

- The SWAT is a small watershed to river basin-scale model developed by the US Department of Agriculture-Agricultural Research Services(USDA-ARS).
- It is semi distributed, physical and process based and data driven river basin model. The hydrological cycle is simulated by SWAT model according to the equation below of water balance

Where,
SW0= initial soil water content
SWt=final soil water content (i days)
Qsurf= surface runoff
Ea=evapotranspiration
wseep=seepage loss
Qgw= return flow
R=excess runoff

$$SW_t = SW_0 + \sum_{i=1}^{t} (R_{day} - Q_{surf} - E_a - w_{seep} - Q_{gw})$$ → 1

$$Q_{surf} = \frac{(R_{day} - I_a)^2}{(R_{day} - I_a + S)}$$ → 2

RESULTS & DISCUSSION

- The rainfall variations and runoff variations throughout the watershed obtained from SWAT simulation.
- Trend analysis of Rainfall-Runoff were shown from 1991 to 2014.
- The reservoir inflow simulations can help for the river water quality and quantity management.