

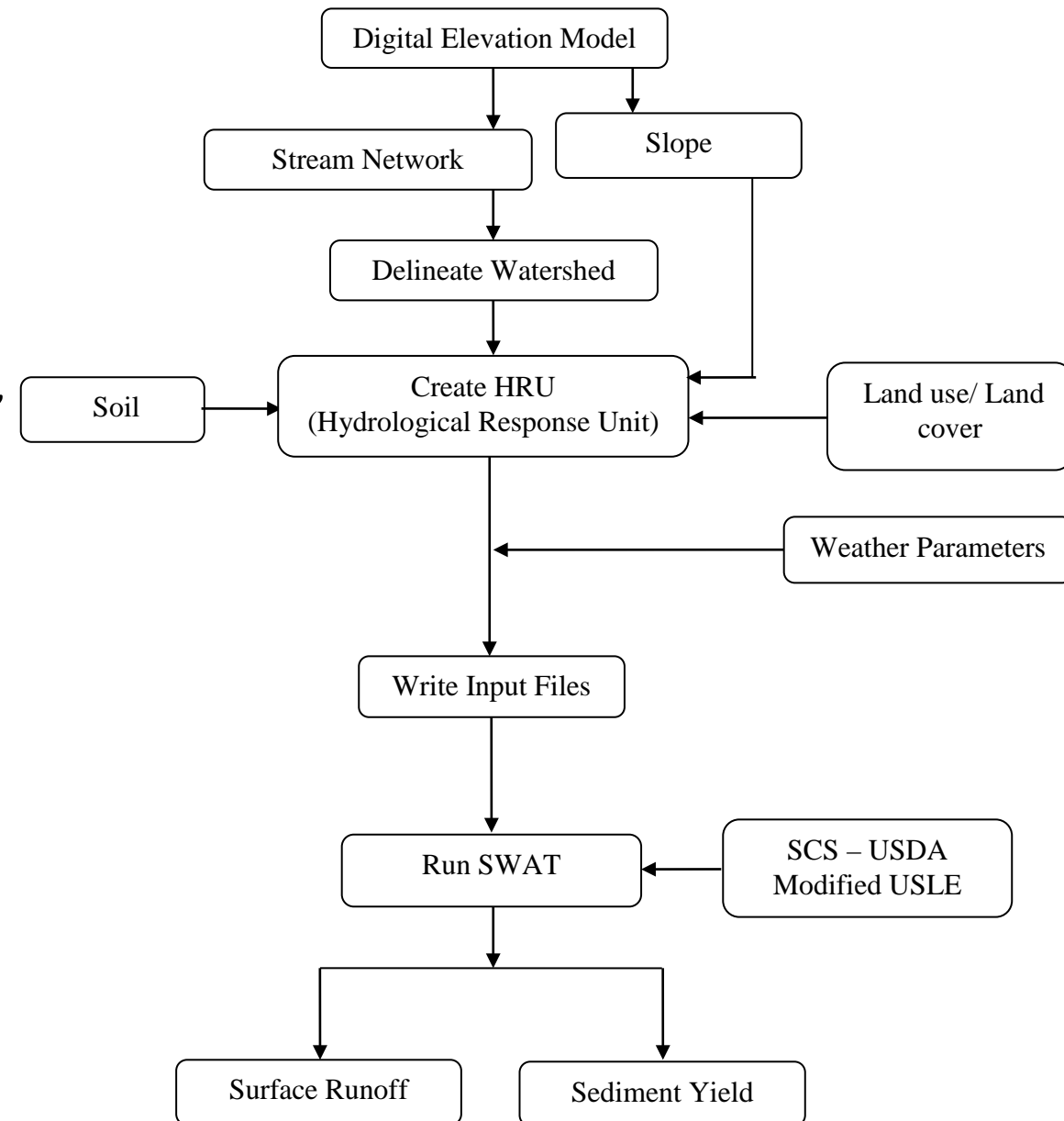
## **Soil and Water Assessment tools (SWAT) model**

**Soil Water Assessment Tool (SWAT)** is a hydrologic/water quality model to predict the impact of agricultural or land management on water, sediment and agricultural chemical yields in un-gauged basins, by (USDA–ARS)

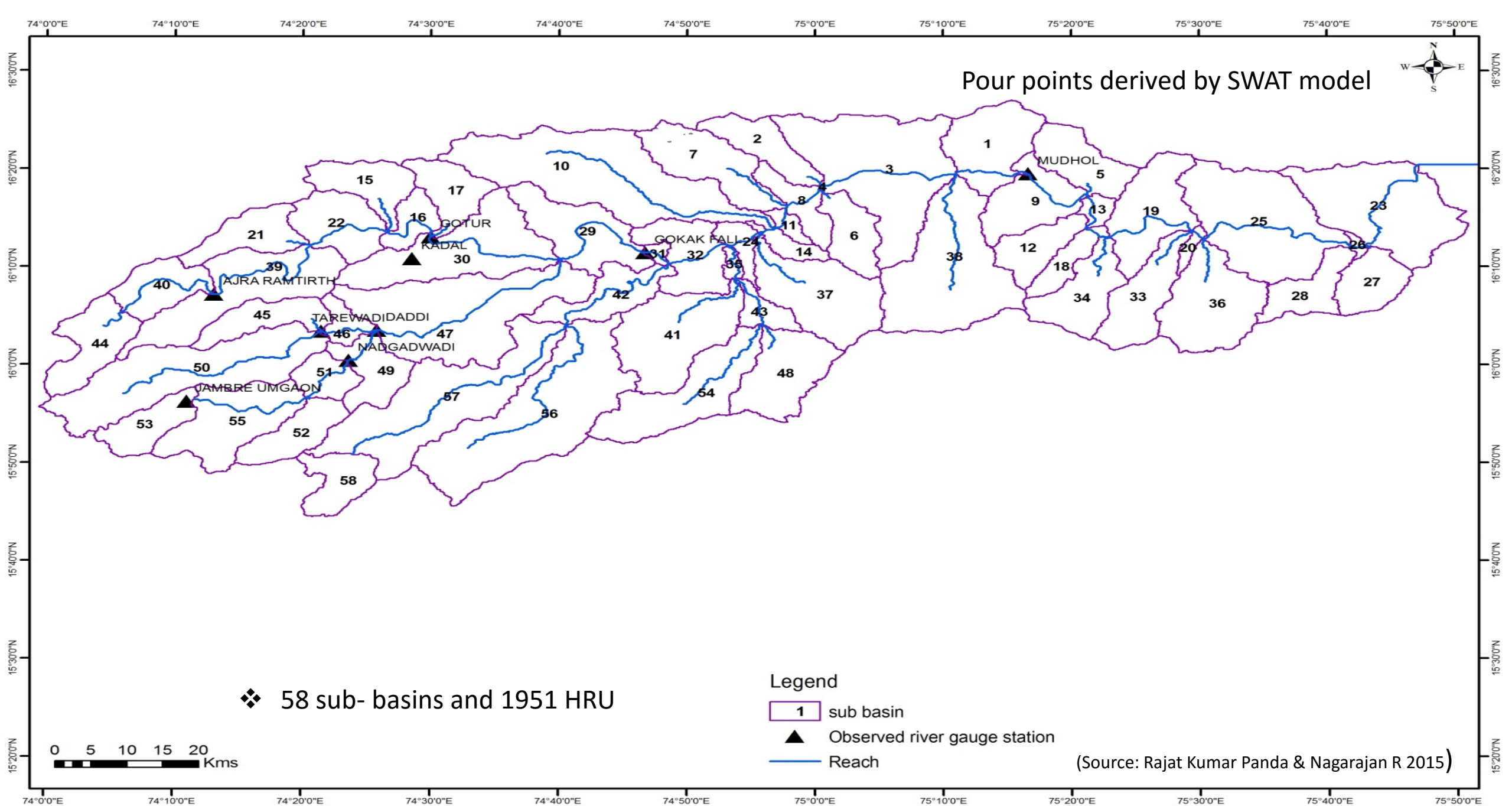
Physically based, semi-distributed and continuous time model, which can simulate water, sediment, nutrient and pesticide transport at a watershed scale on a daily time step, based on (**hydrologic response units (HRUs)**).

**Individual HRUs** represents land use, soil type and slope within the sub-basin. Other components are **weather conditions**, hydrology, soil properties, **plant growth and land management** as well as loads and flows of nutrients, pesticides, bacteria, and pathogen.

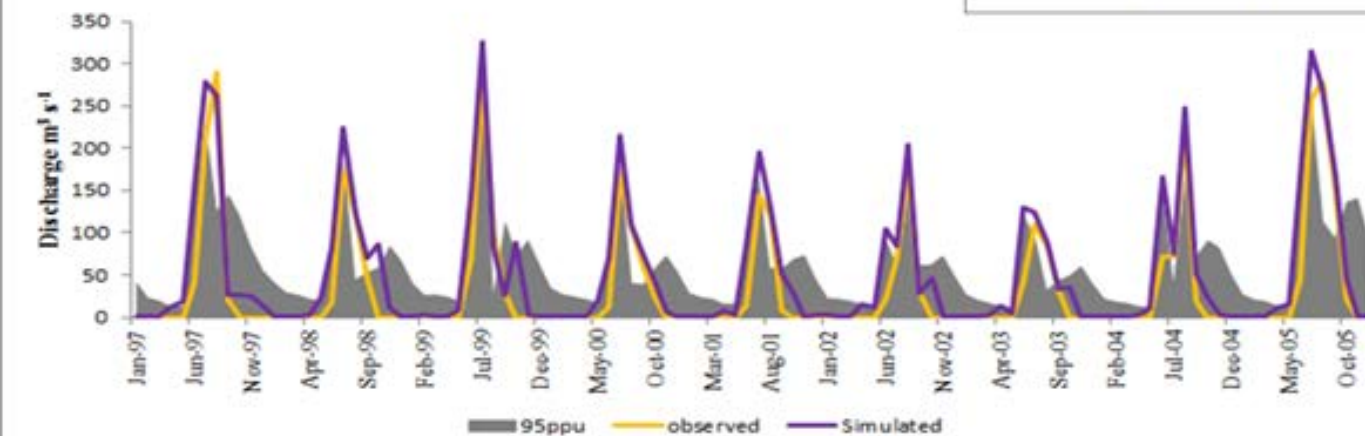
ArcGIS 9.3 and ERDAS IMAGINE 9.1 (ERDAS, 1978) for GIS and remote sensing data analysis, Arc-SWAT- 2009 (Soil and Water Assessment Tool) were used



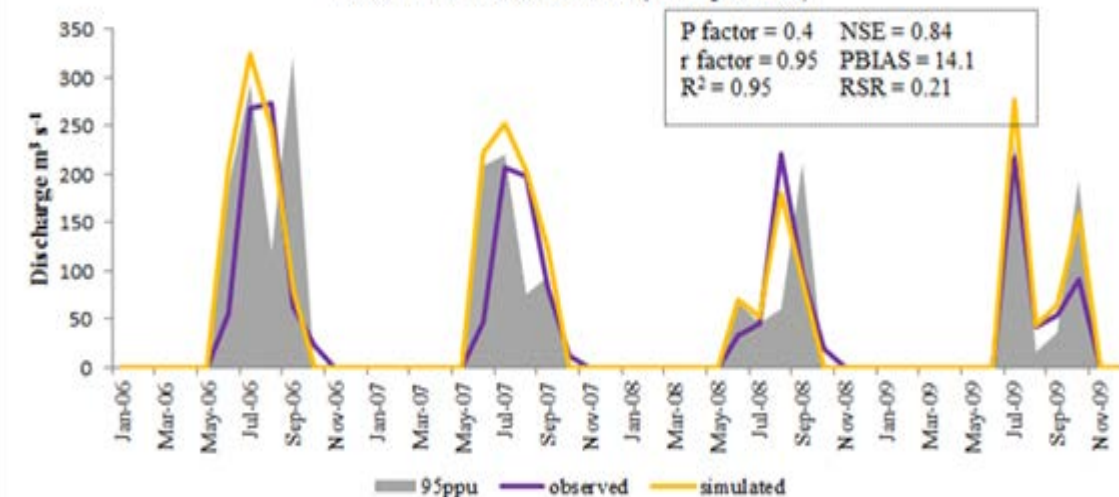
**Figure 3.24** Methodology of SWAT Model



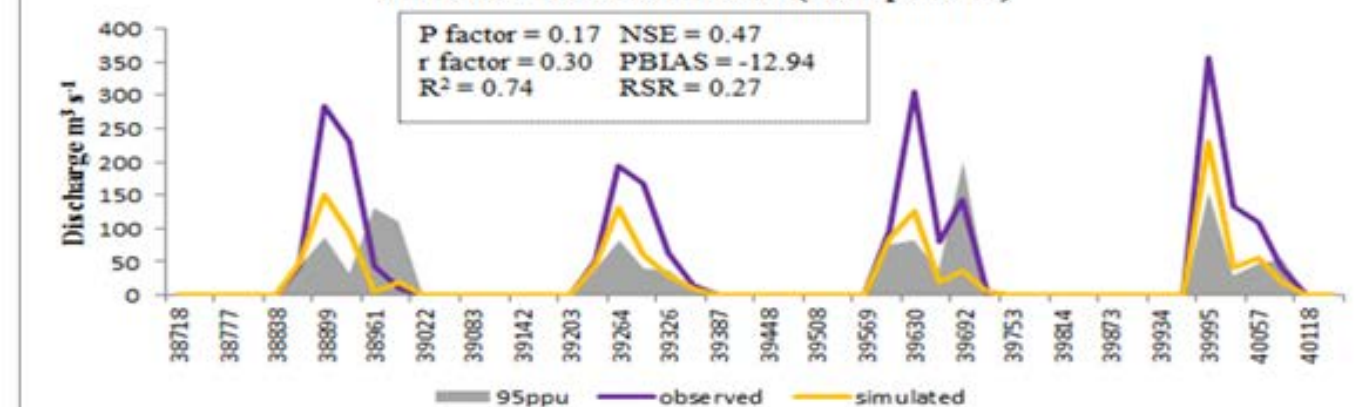
**Hydrograph showing measured (River Gauge) and simulated (SWAT) water flow -Kadal station (Pour point 30)**



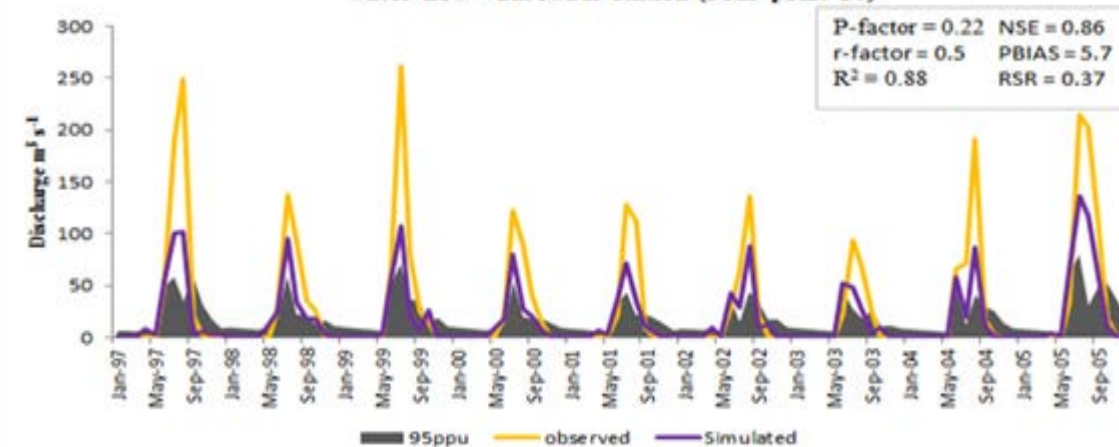
**Hydrograph showing measured (River Gauge) and simulated (SWAT) water flow - Kadal station (Pour point 30)**



**Hydrograph showing measured (River Gauge) and simulated (SWAT) water flow -Tarewadi station (Pour point 50)**



**Hydrograph showing measured (River Gauge) and simulated (SWAT) water flow - Tarewadi station (Pour point 50)**



**Recommended statistics for a monthly time step for stream flow analysis**

Performance rating	RSR	NSE	PBIAS (%)
Very good	$0.00 \leq \text{RSR} \leq 0.50$	$0.75 < \text{NSE} \leq 1.00$	$\pm 10$
Good	$0.50 < \text{RSR} \leq 0.60$	$0.65 < \text{NSE} \leq 0.75$	$\pm 10 \leq \text{PBIAS} \leq 15$
Satisfactory	$0.60 < \text{RSR} \leq 0.70$	$0.50 < \text{NSE} \leq 0.65$	$\pm 15 \leq \text{PBIAS} < \pm 25$
Unsatisfactory	$> 0.70$	$\leq 0.50$	$\geq \pm 25$

**Reference :** Moriasi, et al., (2007) "Model Evaluation Guidelines for Systematic Quantification of Accuracy in Watershed Simulations".

**P factor** – Percentage of measured data captured by the 95ppu band, **r factor** – average width of the band divided by the standard deviation of the measured variable, **R<sup>2</sup>** – Coefficient of determination, **NSE** – Nash-Sutcliffe Efficiency, **PBIAS** – Percent BIAS, **RSR** – RMSE observations standard deviation ratio

(Source: Rajat Kumar Panda & Nagarajan R 2015)

**Thank you**