**Runoff Potential Map for Vadodara City Using Curve Number**

**Team ID: mapathon4349**

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Vadodara is the third largest city in the western state of Gujarat. It is located on the banks of the Vishwamitri river on the downstream side.

Vadodara has been experiencing heavy rainfall and flood situations from past few years. The 2019 Vadodara Flood event was quite disastrous.

**Need of study**

* High runoff increases the probability of inundation during heavyrains. Runoff potential is really low in urban areas due to increase in builtup area which is one of the reasons for urban floods. Thus it is really impprtatnt to map the runoff potential as it may be a really important parameter for any flood inundation/hazard/ vulnerability study.

The runoff curve number is based on the area's hydrologic soil group, [land use](https://en.wikipedia.org/wiki/Land_use), treatment and hydrologic condition.

It denotes the runoff potential of a particular area. Thus to understand and prepare a runoff potential map of Vadodara CN number was derived.

**Data Requirements:**

* **Hydrological Soil map**

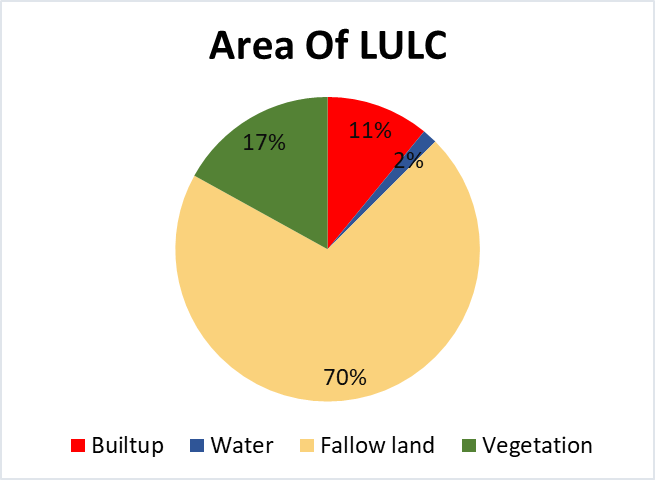
Vadodara contains hydrological soil Group C and D , C being the major class.

**Data Source** : *Estimation of Runoff and Soil Erosion for Vishwamitri River Watershed, Western India Using RS and GIS Vishvam H. Pancholi1, Pradeep P. Lodha2, Indra Prakash*

***Group C.*** Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

**Group D**. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.(www.nrcs.usda.gov)

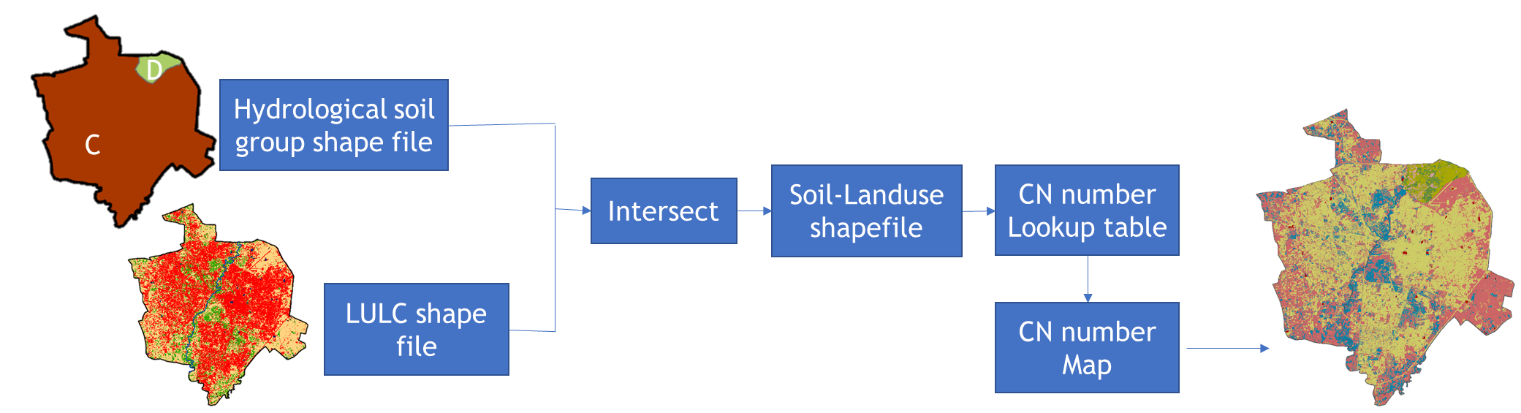
* **Land Use Land Cover Classification:**
* **Dataset used**: LISS 4 (5.8m spatial Resolution)
* **Date of Acquisition** : 01 / 05 / 2019
* **Platform used** for Classification : Google Earth Engine (open source)
* SVM technique is used for the Supervised Classification of the Image . 4 classes were categorized namely : **Builtup , Water Body, Vegetation, Fallow Land.**
* Majority filter was used to post process the image and remove the salt and pepper effect.



* Accuracy assessment was also carried out in Google Earth engine.

**Methodology**

The LULC Raster was converted to vector file. As both the data sets are in vector form now, intersect tool was used in QGIS to generate the final output shape file and CN numbers were provided for each class using a look up table based on the LULC and corresponding hydrological soil group.



The Final map shows the runoff potential of Vadodara in terms of Curve number. It helps in analysing a city during high rainfall conditions and can help in mapping vulnerable/hazardous areas.

Higher Curve number denotes higher runoff potential. It can be observed that Waterbodies have highest runoff potential followed by Builtup.Fallow land has least runoff potential as the e=water infiltrates.