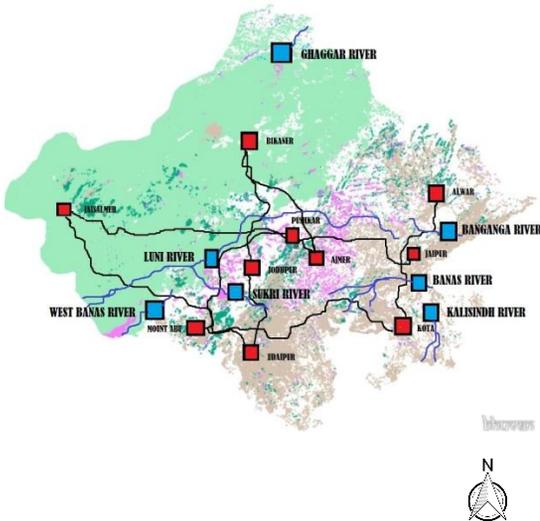


# Land Degradation in Rajasthan

## LEGEND

|                            |                                    |
|----------------------------|------------------------------------|
| Sheet erosion slight       | Frost Shattering                   |
| Sheet erosion moderate     | Industrial effluent affected areas |
| Sheet erosion severe       | Mining and dumping areas           |
| Rills                      | Brick kiln                         |
| Gullies                    | Mass movement                      |
| Ravines-shallow            | Barren rock/ stony waste           |
| Ravines-Deep               | Riverine sands                     |
| Sheet erosion slight       | Normal                             |
| Sheet erosion moderate     | Water erosion                      |
| Sheet erosion severe       | Wind erosion                       |
| Stabilized dunes           | Water logging                      |
| Partially Stabilized Dunes | Glacial                            |
| Unstabilized Dunes         | Anthropogenic                      |
| Surface ponding            | Rann                               |
| Subsurface waterlogged     | Acidic                             |
| Saline                     | Frost Heaving                      |
| Sodic                      | Cities/ Towns                      |
| Saline-sodic               | River                              |

|               |  |
|---------------|--|
| Team Name:    | <b>Amigos</b>  |
| Topic:        | <b>Land Degradation Map</b>                              |
| Team Members: | <b>Hemanth. D<br/>Keerthikasri. G<br/>Guru Prasad. M</b> |
| Organization: | <b>National Engineering College,<br/>Kovilpatti</b>      |



Data Courtesy: *BHUVAN*

## **Map Description and analysis**

### **Introduction:**

Rajasthan is a state in India which consists of 33 districts. The region of interest has been chosen on the basis of extent of land degradation. In Rajasthan 180.3 Lakh Ha of land has undergone degradation.

### **The Great Rann of Kutch:**

The word Rann means "salt marsh". The Rann of Kutch covers around 26,000 square kilometres (10,000 square miles). The Great Rann of Kutch is the larger portion of the Rann. It extends east and west, with the Thar Desert to the north and the low hills of Kutch to the south. It provides food and shelter to a number of migratory and local wildlife species. ... The marshy Rann of Kutch, with its surrounding Thar desert area in Sindh, is one of the most potential habitats for a number of animals and birds in the province.

### **Wildlife:**

Rajasthan is also noted for its national parks and wildlife sanctuaries. There are four national parks and wildlife sanctuaries: Keladevi National Park of Bharatpur, Sariska Tiger Reserve of Alwar, Ranthambore National Park of Sawai Madhopur, and Desert National Park of Jaisalmer. A national-level institute, Arid Forest Research Institute (AFRI) an autonomous institute of the ministry of forestry is situated in Jodhpur and continuously works on desert flora and their conservation.

### **Land degradation:**

Land degradation is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the land.

### **Causes:**

The major causes of land degradation include, land clearance poor farming practices, overgrazing, inappropriate irrigation, urban sprawl, and commercial development, land pollution including industrial waste and quarrying of stone, sand and minerals.

### **Effects:**

The effect on the soil productivity and the environment around, decline in the land usefulness, loss of biodiversity, shifting ecological risk and a reduction on the land productive capacity.

## **Features of the map**

### **(i) Sheet erosion:**

Sheet erosion occurs when rainfall intensity is greater than infiltration. Rarely seen but accounts for large volumes of soil loss.

### **(ii) Rills:**

Rills are narrow and shallow channels which are eroded into unprotected soil by hillslope runoff. Since soil is regularly left bare during agricultural operations, rills may form on farmland during these vulnerable periods.

### **(iii) Gullies:**

Gully erosion is the removal of soil along drainage lines by surface water runoff. Gullies move by headward erosion or by slumping of the side walls.

### **(iv) Ravines:**

Ravine formation begins along river sides and encroaches upon the catchment area by headward growth. Ravines expand through Chasms flank the Chambal in a 10 km wide belt, which extends southward from the Chambal-Yamuna confluence, some 480 km, to the town of Kota in Rajasthan, through Madhya Pradesh.

### **(v) Stabilized dunes:**

In Rajasthan dunes occur in Bikaner, Barmer, Jaisalmer, Churu, Dugargarh, Jhunjhunu, Nohar, Sikar, Sardar Shahar etc. These are the spectacular features of Great Indian desert and occupy 58% of area.

### **(vi) Saline:**

It is a nonsodic soil containing sufficient soluble salt to adversely affect the growth of most crop plants Soil Salinity Class Conductivity of the Saturation Extract (dS/m)

Slightly saline [2 – 4 (dS/m)], Moderately saline [4 – 8 (dS/m)], Severe saline [8 – 16 (dS/m)]

### **(vii) Sodic soil:**

Sodicity in soil is the presence of a high proportion of sodium ions relative to other cations. Soils are often considered sodic when the amount of sodium impacts soil structure. Sodicity degrades soil properties by weakening the bond between soil particles.

### **(viii) Frost heaving:**

Frost heaving is an upwards swelling of soil during freezing conditions caused by an increasing presence of ice as it grows towards the surface, upwards from the depth in the soil where freezing temperatures have penetrated into the soil.

### **(ix) Frost shattering:**

Propagation of fractures due to expansion of freezing water in intergranular spaces and fractures in a rock body. Result is mechanical disintegration splitting, or breakup of rock.

### **(x) Barren rock:**

Barren Land has thin soil, sand, or rocks. Barren lands include deserts, dry salt flats, beaches, sand dunes, exposed rock, strip mines, quarries, and gravel pits.

(xi) **Water erosion:**

Water erosion is the removal of soil by water and transportation of the eroded materials away from the point of removal

(xii) **Wind erosion:**

Wind erosion can be caused by a light wind that rolls soil particles along the surface through to a strong wind that lifts a large volume of soil particles into the air.

(xiii) **Water logging:**

Waterlogging occurs when there is too much water in a plant's root zone, which decreases the oxygen available to roots.

(xiv) **Salinisation:**

The process by which a nonsaline soil becomes saline, as by the irrigation of land with brackish water.

(xv) **Acidification:**

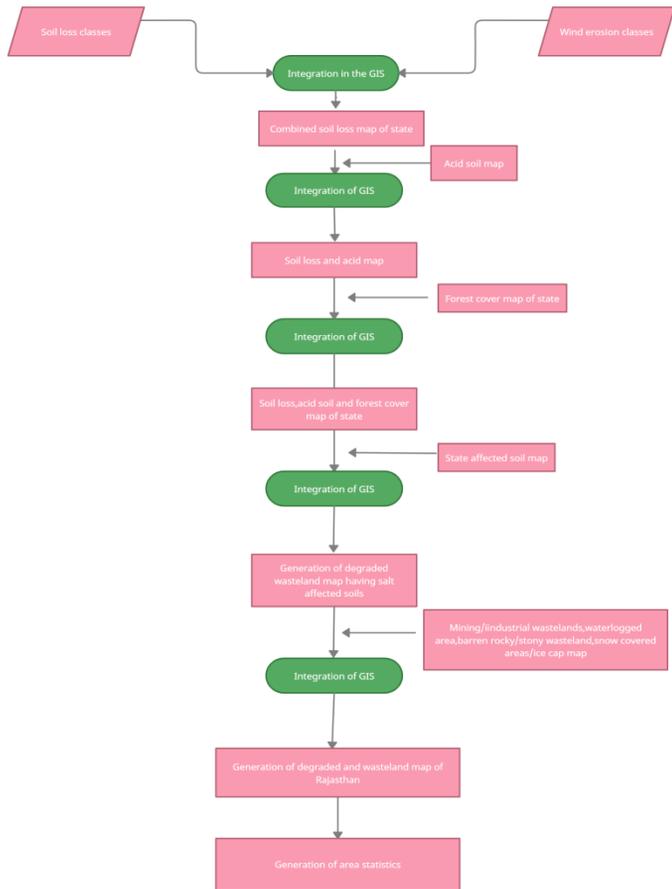
The process of becoming an acid or the act of making something become an acid.

(xvi) **Glacial:**

It is relating to or denoting the presence or agency of ice, especially in the form of glaciers.

**Methodology:**

- Soil loss classes, wind erosion classes, acid soil map, forest cover map, salt affected soil map and wasteland maps were integrated in the GIS using data from BHUVAN portal through QGIS software. Detailed flowchart and analysis have been attached.
- IRS LISS – III data was interpreted in GIS environment.

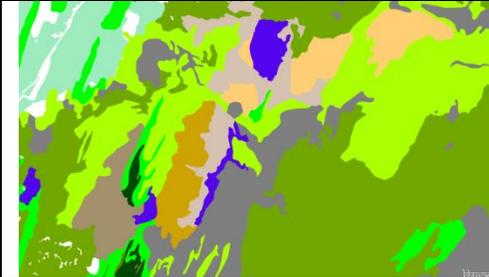


## APPLICATION OF OUR MAP

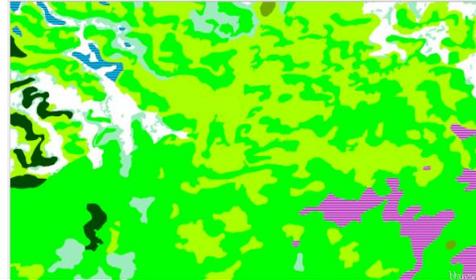
- The cost of land degradation can be substantial for India where agriculture is a large contributor to the country's Gross Domestic Product,lost productivity can weigh heavily on the economy.A study by Delhi-based The Energy and Resources Institute (TERI) estimated that the economic losses from land degradation and change of land use in 2014-15 stood at 2.54 percent of India's GDP or Rs. 3,177.39 billion (Rs. 317,739 crore or US\$ 46.9 billion) for that year. Land degradation alone accounted for 82 percent of those costs.
- To prepare a degradation combating plan at the district or village-level,we need to map land degradation at a finer scale.
- It is better for preparing combating plans aimed at afforestation and conserving soil and water. Systematic implementation of watershed interventions should be a long-term priority in order to check soil erosion, improve soil moisture, increase recharge, stabilise river basins (catchments) and making agriculture and communities climate resilient.

| <b>Process of Desertification / Land Degradation</b> | <b><u>Area (ha)</u></b> | <b><u>Area (%)</u></b> |
|--|-------------------------|------------------------|
| Vegetation Degradation                               | 26,06,221               | 7.62                   |
| Water Erosion  | 2116314                 | 6.18                   |
| Wind Erosion   | 15197874                | 44.41                  |
| Salinity   | 363778                  | 1.06                   |
| Water Logging  | 18421                   | 0.05                   |
| Man-made   | 53058                   | 0.16                   |
| Barren/Rocky   | 1052374                 | 3.07                   |
| Settlement   | 118482                  | 0.35                   |
| Total Area under Desertification                     | 21526512                | 62.90                  |
| No Apparent Degradation                              | 12546925                | 36.66                  |
| Total Geographical Area (ha)                         | 34223900                |                        |

Most affected areas:-



**Jaisalmer Region**



**Churu Region**



**Bhilwara Region**



**Jalore Region**