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# SITE SUITABILITY ANALYSIS OF TOMATO CROP IN SONBHADRA DISTRICT USING REMOTE SENSIG AND GIS TECHNOLOGY

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**Abstract -** *Land suitability assessment of tomato crop in Sonbhadra district is the primary objective of this study. Tomato is an important crop in Uttar Pradesh and the crop is grown in around 12.10 Thousand hectares of land .In this study an attempt was made to distinguish between the GIS and Remote Sensing technology to determine the land type suitable for the production of tomato crop in Sonbhadra district . The characteristics are determined by various parameters to be specific land use type, slope, surface elevation above MSL, drainage pattern and so on. All these factors determine the suitability of a given area for a particular type of crop cultivation. The various agricultural crop produce in this district are Paddy ,Wheat ,Gram, Lentil and vegetables like Tomato ,Brinjal ,Chilli, and broad beans., LULC, soil, slope, drainage, erosion ,texture and depth of Sonbhadra district is used to find the suitable area for the cultivation of tomato crop in the district .*

***Key Words*: LULC, Slope, Soil, Drainage Pattern, GIS, Remote Sensing**

## 1. INTRODUCTION

Tomato comes under the family of Solanaceae and its scientific name is Solanum lycopersium. Potato, tobacco, and peppers are some examples that comes under this family. Andhra Pradesh is the leading producer of tomatoes in India. It is estimated that 852 thousand hectares of land are under tomato cultivation in India. In Uttar Pradesh total area estimated under tomato, cultivation is 12.10 thousand hectares. Tomato is a crop of warm season it requires a warm and cool climate. High humidity and withstand frost lead to damage of plant. It is grown well in a temperature range of 21 to 24 degree Celsius. And this temperature range is best suitable for fruit colour and quality. Tomato is good source of vitamin A and C.

### Objective

The principal objective of this study is-
Site Suitability Assessment of Tomato crop in Sonbhadra district.

## 2. STUDY AREA

### Location and Area

Sonbhadra or Sonebhadra is the second largest district by area of Uttar Pradesh after Lakhimpur Kheri. It is the only district in India that borders four states, namely Madhya Pradesh to the west, Chhattisgarh to the south, Jharkhand in the south-east, and Bihar to the north-east. The district has an area of 6,788 km.

### Geography and Physical Features

Sonbhadra District lies between 24.6850 N latitude and 83.0684' E longitude.

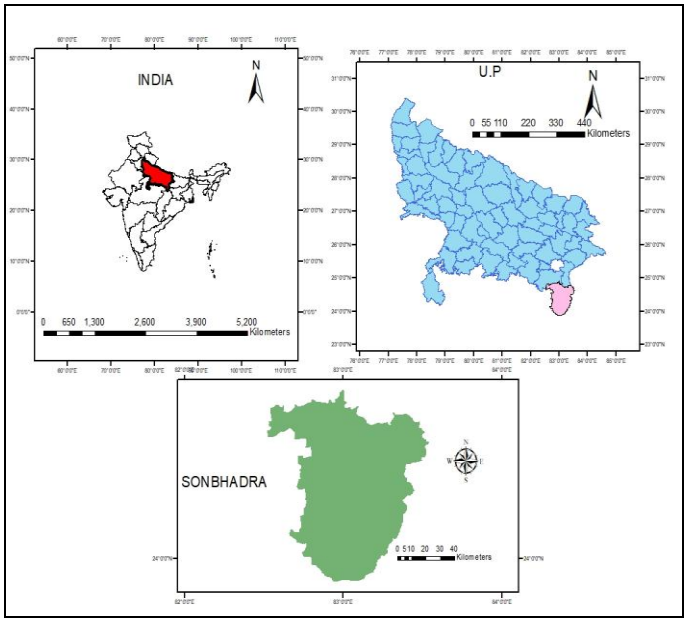


**Figure -1:** Study area map of Sonbhadra district

## 3. MATERIAL USED

Description of data used for this study
1. DEM (Digital Elevation Model ) downloads from Bhuvan (http://bhuvan.nrsc.gov.in/).

2.Soil Map of Sonbhadra district collected from NBSS&LUP
3.Geology Map of Sonbhadra district collected from GSI

## 4. METHODOLOGY

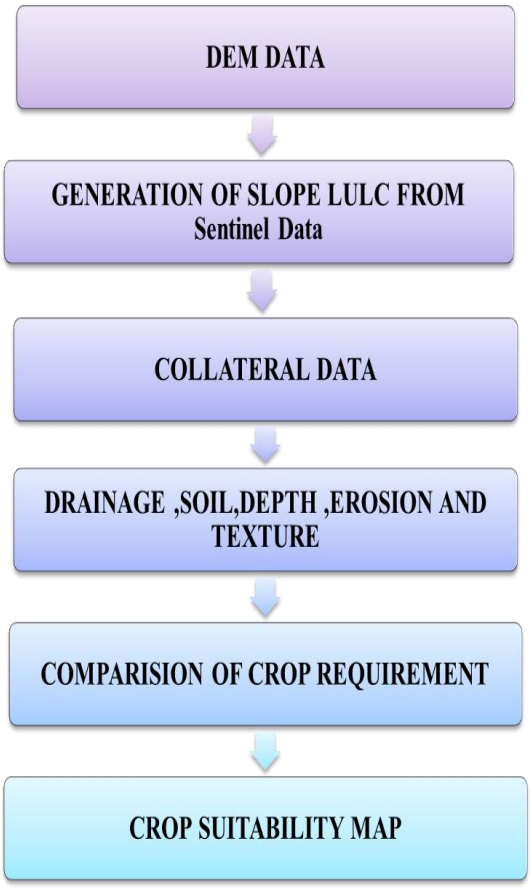


**Figure -2:** Flow chart of methodology used

### 1.Slope

The slope map of Sonbhadra district is created from DEM image of Sonbhadra district .Slope of 0-6.20 degree is of flat land and good for agriculture practices .6.20 -15.51 degree slope has some steepness and is reasonably good for agriculture practices .Area having greater than 15.51 degree of slope is not good for agriculture practice .

### 2. Land Use/ Land Cover

Sentinel image of resolution 10*10 m is used to create LULC map of the district .The five class present in this study area is Agriculture land which covers 2182.51 sqkm area ,Forest which cover area of 1460.32 sqkm ,River body 440.27 sqkm,Fellow land 2464.41sqkm and builtup area of 216.20 sqkm area.

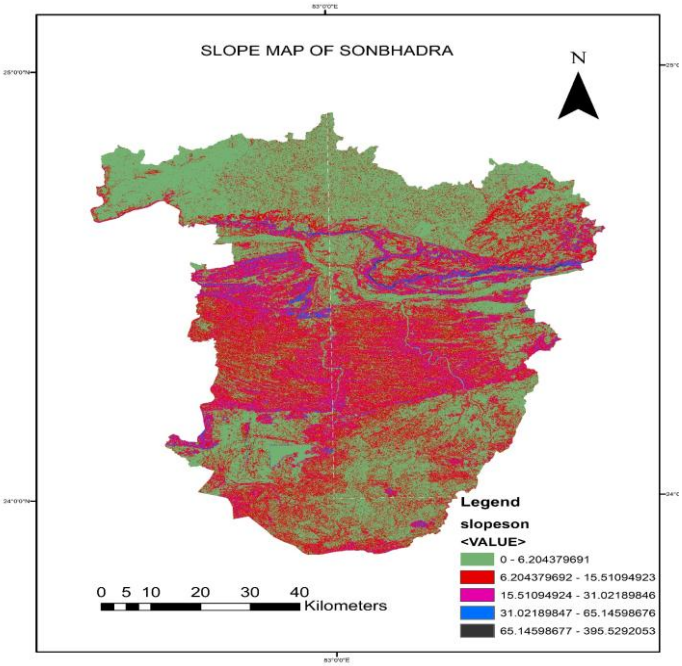


**Figure -3:** Slope map of Sonbhadra district

**Table -1:** Land Use Land Cover pattern of district

| LULC TYPE | AREA SQKM |
|---|---|
| AGRICULTURE LAND | 2182.51 |
| FOREST | 1460.32 |
| RIVER | 440.27 |
| FELLOW LAND | 2464.41 |
| BUILTUP | 216.20 |

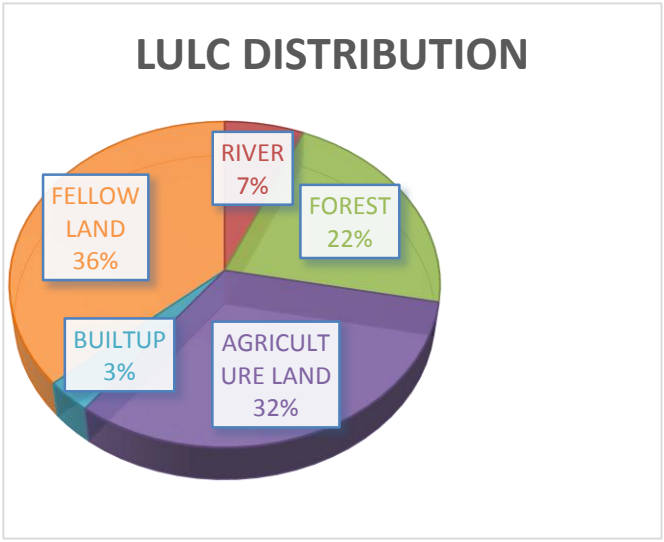


**Figure -4:** LULC distribution of Sonbhadra district

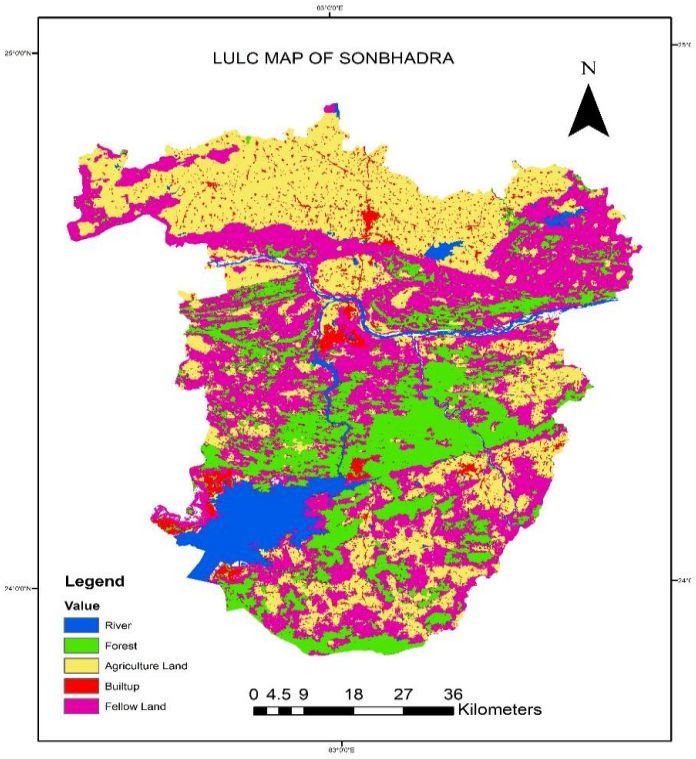


**Figure -5:** LULC map of Sonbhadra district

## 3. Soil Texture

Soil texture found four major texture types in the district ,they are fine ,fine loamy ,loamy and loamy skeletal. Overall texture pattern of the district is fine .Loamy texture is found in the region of Myorpur block and fine loamy texture pattern is present in the block region of Roberstganj and Ghorawal .

## 4. Sonbhadra Drainage

Drainage pattern of sonbhadra district is very well .Ghorawal and Roberstganj has moderate well drainage pattern and fit good for the cultivation of tomato crop in this particular area..

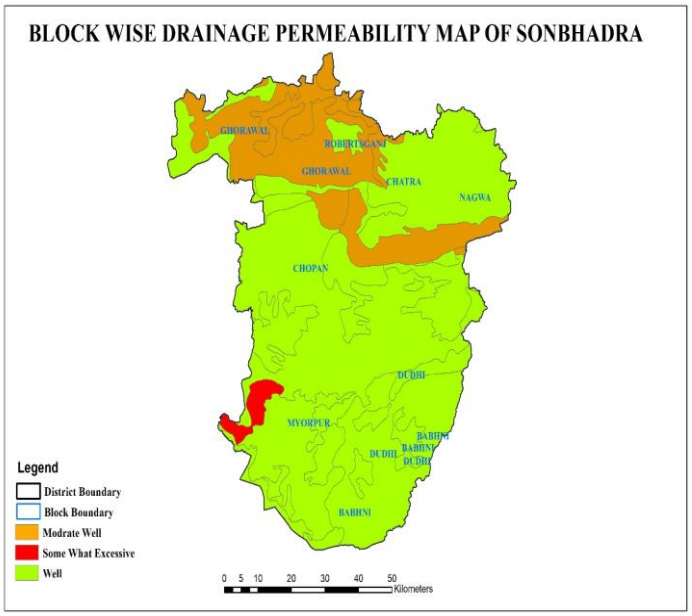


**Figure -6:** Block wise Drainage permeability map of Sonbhadra district

## 5. Sonbhadra Depth

Depth map classify the district into three categories Deep, Moderate Shallow and Shallow.

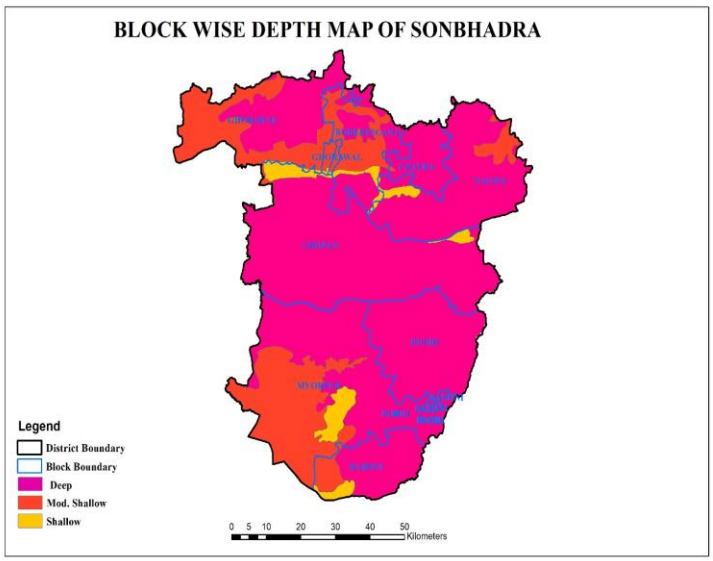


**Figure -7:** Block wise Depth map of Sonbhadra district

## 6. Sonbhadra Erosion

Erosion pattern of the district is mainly divided into two categories severe erosion and moderate erosion .Only Myorpur area is effected by severe erosion as area is situated near Rihand dam apart from this area overall erosion pattern of the district is moderate .

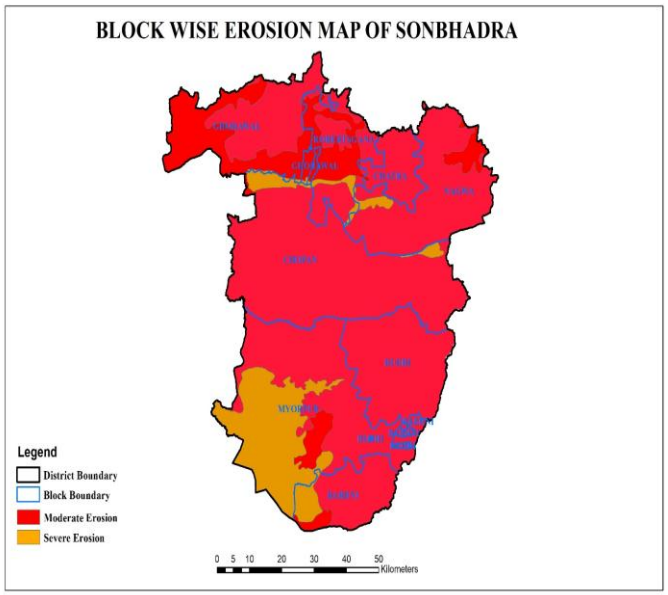


**Figure -8:** Block wise Erosion map of Sonbhadra district

## 5. RESULTS AND CONCLUSIONS

Soil suitability map of Sonbhadra is divided into three class .Class S1,S2 and S3. Class S1 is highly suitable for tomato cultivation and covers mainly Ghorawal and Roberstganj block of Sonbhadra district .Total area of 870.9 sqkm falls under S1 category . Soil depth of this area is deep ,drainage

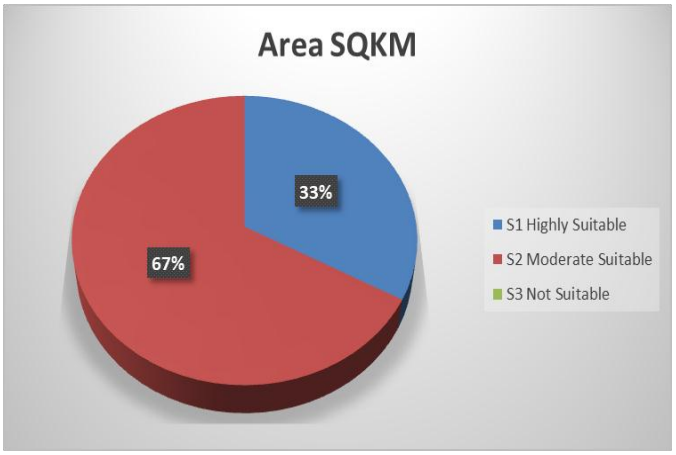


**Figure -9:** Suitability of area in district

pattern is between moderate to well ,soil texture is fine loamy ,slope is very gentle ,erosion pattern is moderate erosion which is highly suitable for tomato crop cultivation .Chatra and Nagwa block of this district is moderately suitable for the cultivation of tomato crop while Chopan and Myorpur block of this district is not suitable for the cultivation of tomato crop .

**Table -2:** Suitability of area in tabular form for Sonbhadra district

| Category | Suitability | Area SQKM |
|---|---|---|
| S1 | Highly Suitable | 870 |
| **S2** | Moderate Suitable | 1760 |
| **S**3 | Not Suitable | 4158 |

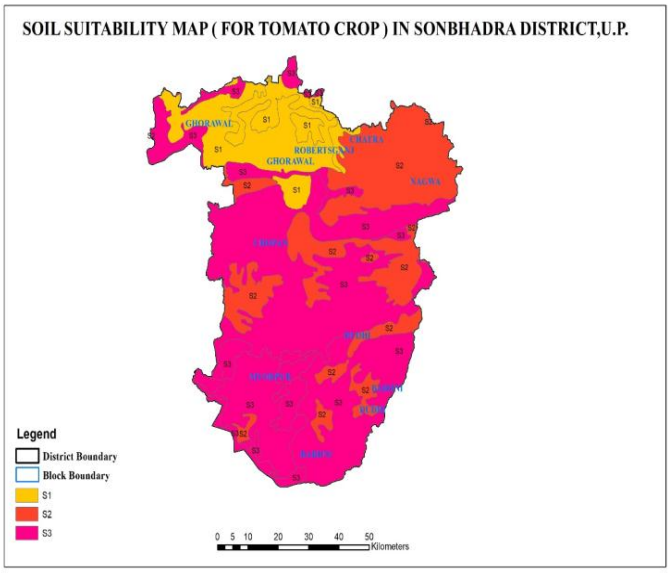


**Figure -10:** Soil Suitability map of Tomato crop for Sonbhadra district

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