"SITE SUITABLITY ANALYSIS FOR CHECK DAM IN CHITRAKOOT DISTRICT"

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ABSTRACT

Water scarcity, power crisis and natural disasters are among one of the problems our country is facing in current era. Around 70 percentage of Gross Domestic Products (GDP) of INDIA are based on Agriculture as well as 50% of the country's economy is dependent on agriculture [1] that is prone to the water scarcity issue. But still INDIA is blessed by plenty of natural resources that are in need to be utilized by proper planning and development. For the sake of development, the sustainability of land and water resources is very essential for their maximize production. Dams have provided substantial amount of benefits to the mankind. A dam is mainly a reservoir that is constructed over a path of water flow for storing the water [2]. Secondly the hydro power projects are means of clean and environment friendly sources of energy accompanied by least emission of greenhouse gases. Need is to utilize these physical resources for sustainable development like construction of small multipurpose hydro power projects that could cope with local power requirements as well as have potential to fulfil irrigation purpose of the agricultural lands. While concerning geographical information system (GIS) and the tools it incorporates, GIS could prove as a best attempt to select suitable check Dams for storing the rain water [4,5]. Literature Review Requirement of check dam sites Check Dams are one of the primary sources of rain water harvesting for the sake of agricultural and drainage usage. GIS is a tool for processing and displaying of multiple spatial data one of them which is the suitable site selection for dam. Using GIS approach, an attempt was made to select suitable sites for check dams for harvesting rain water in Chitrakoot districtof UttarPradesh that receives good rainfall but due to the hilly terrain run off was high. His area was selected on the basis of many factors such as altitude, slope, literacy, wastelands, and man to land ratio, power, irrigation and infrastructure facilities. Major part of the water in Chitrakoot district simply run off, therefore, an attempt was made to select

suitable check dam sites for storing the rain water and improvement of rain areas.

Need of the Study Area

Study area selected was Yamuna River that originates from Yamanotri and flows from Chitrkootdistric in Uttar Pradesh state in mountainous ranges, Water scarcity, power crisis and natural disasters are among one of the problems our country is facing in current era. Around 70 percentage of Gross Domestic Products (GDP) of INDIA are based on Agriculture as well as 50% of the country's economy is dependent on agriculture [1] that is prone to the water scarcity issue. But still INDIA is blessed by plenty of natural resources that are in need to be utilized by proper planning and development. For the sake of development, the sustainability of land and water resources is very essential for their maximize production. Dams have provided substantial amount of benefits to the mankind. A dam is mainly a reservoir that is constructed over a path of water flow for storing the water [2]. Secondly the hydro power projects are means of clean and environment friendly sources of energy accompanied by least emission of greenhouse gases. Need is to utilize these physicalresources for sustainable development like construction of small multipurpose hydro power projects that could cope with local power requirements as well as have potential to fulfil irrigation purpose of the agricultural lands. While concerning geographical information system (GIS) and the tools it incorporates, GIS could prove as a best attempt to select suitable check Dams for storing the rain water [3]. In addition to that the uses of geospatial technologies as well as remote sensing have contributed a lot in selection of suitable sites for water recharging or harvesting.

Aim and Objectives

Aim

Site suitability analysis for check dams in chitrakootdistrict (UP)

Objectives

➢ To find out stream order in study area.

➢ To find out suitable site for check dams in chitrakootdistric.

STUDY AREA DETAILS

Chitrakootdistric is situated in the state of Uttar pradesh, India. It is located 137 m above sea level and is the part of plateau region of India. Chitrakoot district is a part of Chitrakoot Division.The district occupies an area of 3,45,291 km².The district has a population of 990,626 (2011 Census). The chitrakootdistrict is located on Madhya Pradesh boundary. In this region agriculture is primary work and ricr, sorghum, pearl millet, pigeon pea are crops are taking mostly.

Geographical Location

Chitrakootdistric lies on the Uttar Pradesh India. It is situated at approximately 25° 12' North , latitude 80° 54' Eastlongitude. By road Chitrakoot is 605 km of Delhi, 1260 km from Mumbai, 1676 km from Chennai.its elevation from sea surface is about 137 m. the north side boundary of Chitrakoot is divided by Yamuna river and south side is divided by MP state.

Location Map of Study Area
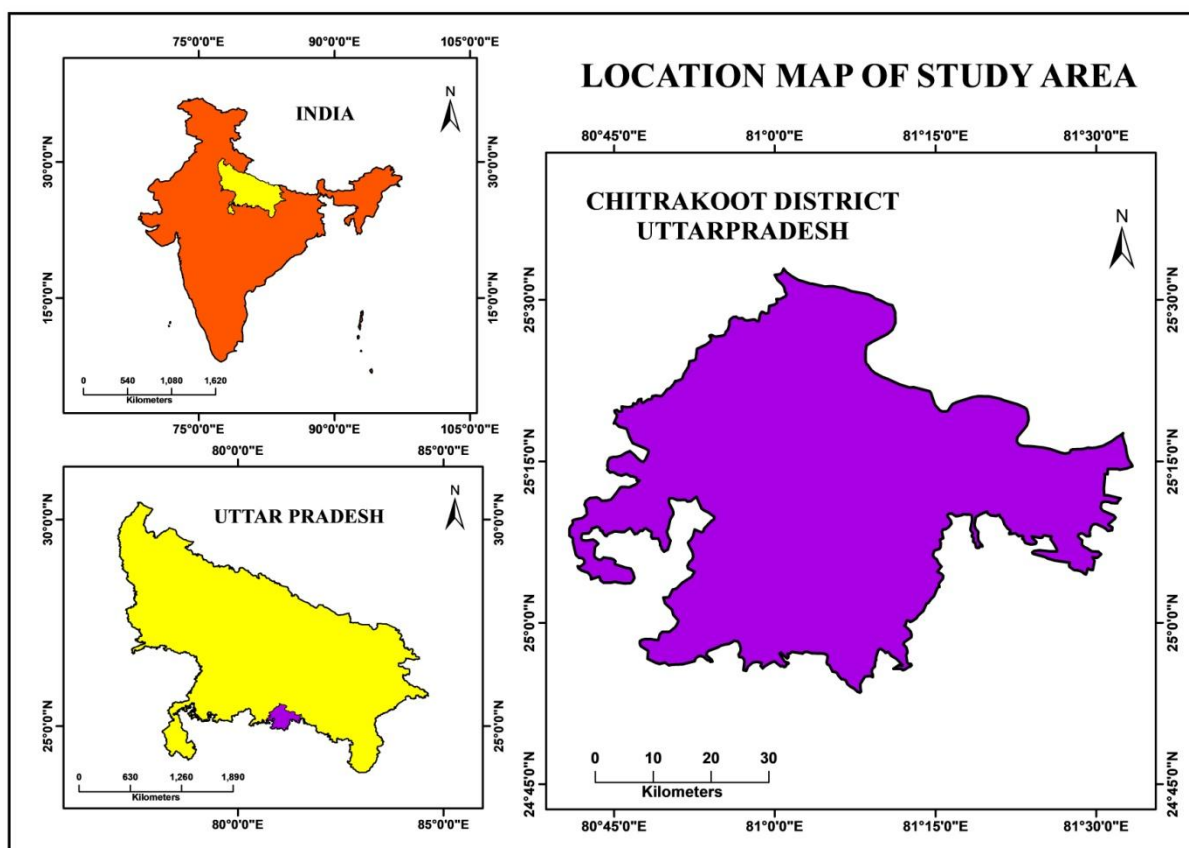
Figure 1: Location Map of Study Area

METHODOLOGY

The following methodology was adopted for this study. The base maps of study area Chitrakoot districtwas taken from the Survey of India (SOI)Topographical sheet of scale 1:250,000. In the base map it shows the water body, vegetation, roads, railway track these are feature which is being shown the base map.

The secondary data Land sat TM, TM+ 5 satellite images of the year 2018 wastaken for USGS/NRSC for modelling Normalized Difference Vegetation Index (NDVI), Land use and Land cover (LULC). The secondary data SRTM DEM image taken forcreate the slop map, watershed map; sink map and calculating for site suitable analysis. To create watershed we use hydrological tool for the study analysis.In the Arc map we do calculation on sin map attribute table to select suitable site for dam by using select by location tool.
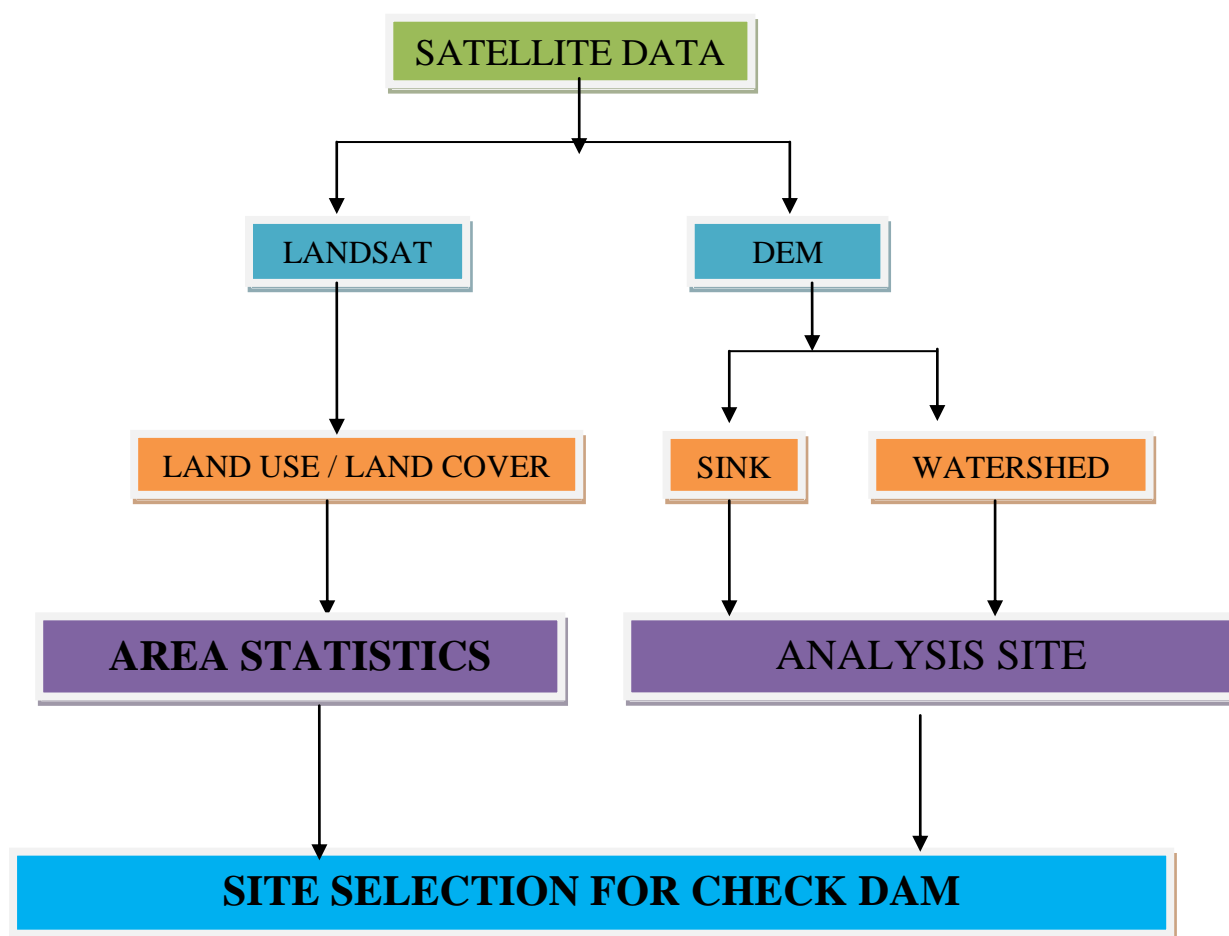

Figure-2:Methodology Flow Chart

Data acquisition

Landsat-8 &data Aster DEM of February 2018 was downloaded from the earth explorer site:https://earthexpolrer.ugcs.govTable 1 depicts the type of satellite data used. Topographical sheet downloaded from Survey of India (SOI).And also Astordem was download from the usgs.

Table No.1 Satellite data used for the study

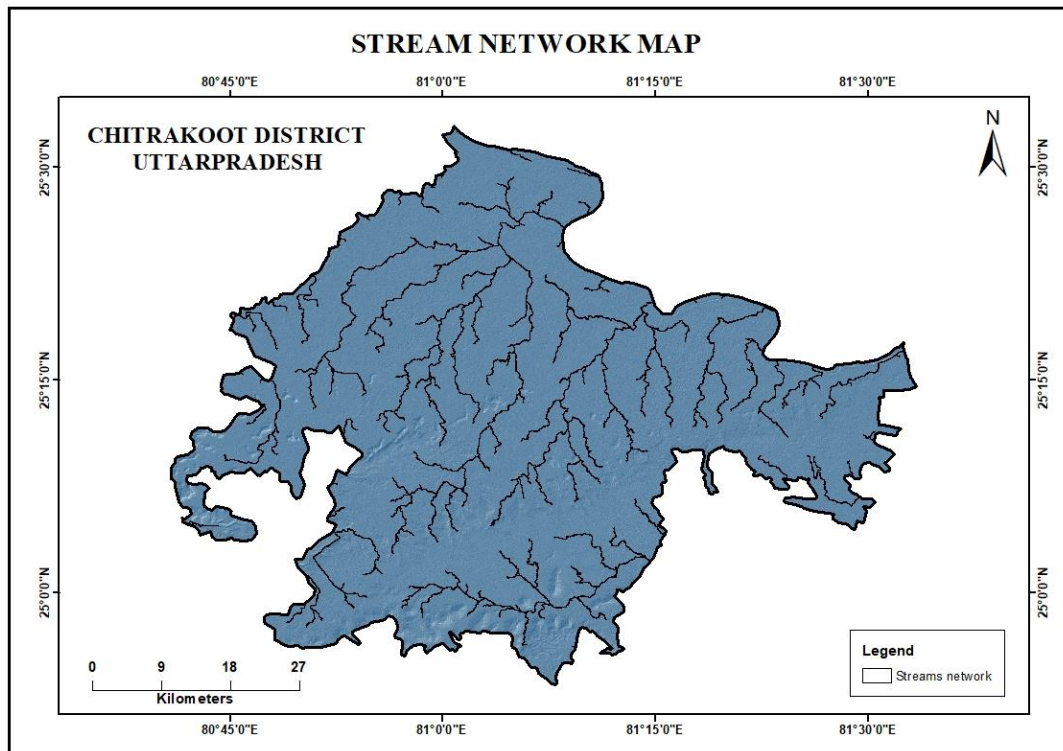| SL.NO	Data	Source	Scale/Resolution
1	DEM (ASTER)	USGS Earth Explorer	30m
2	Land Sat 8 (OLI/TIRS) Operational Land Imager/ Thermal Infrared Sensor	USGS Earth Explorer	30m

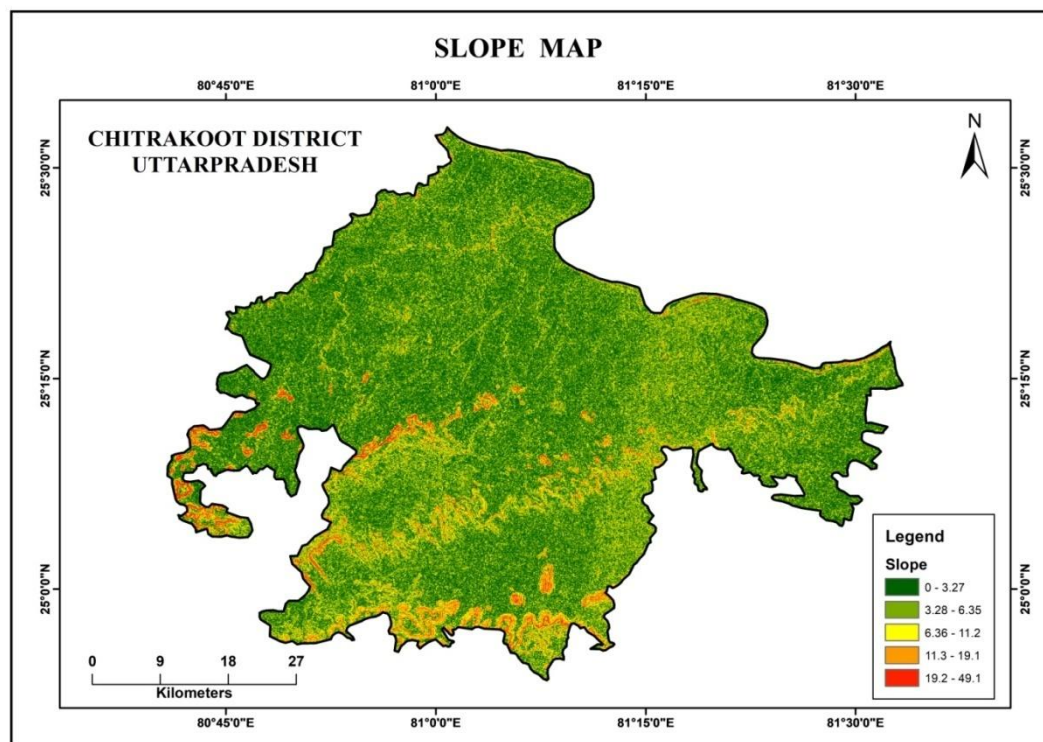## Land Use/ land cover Based on Satellite Data
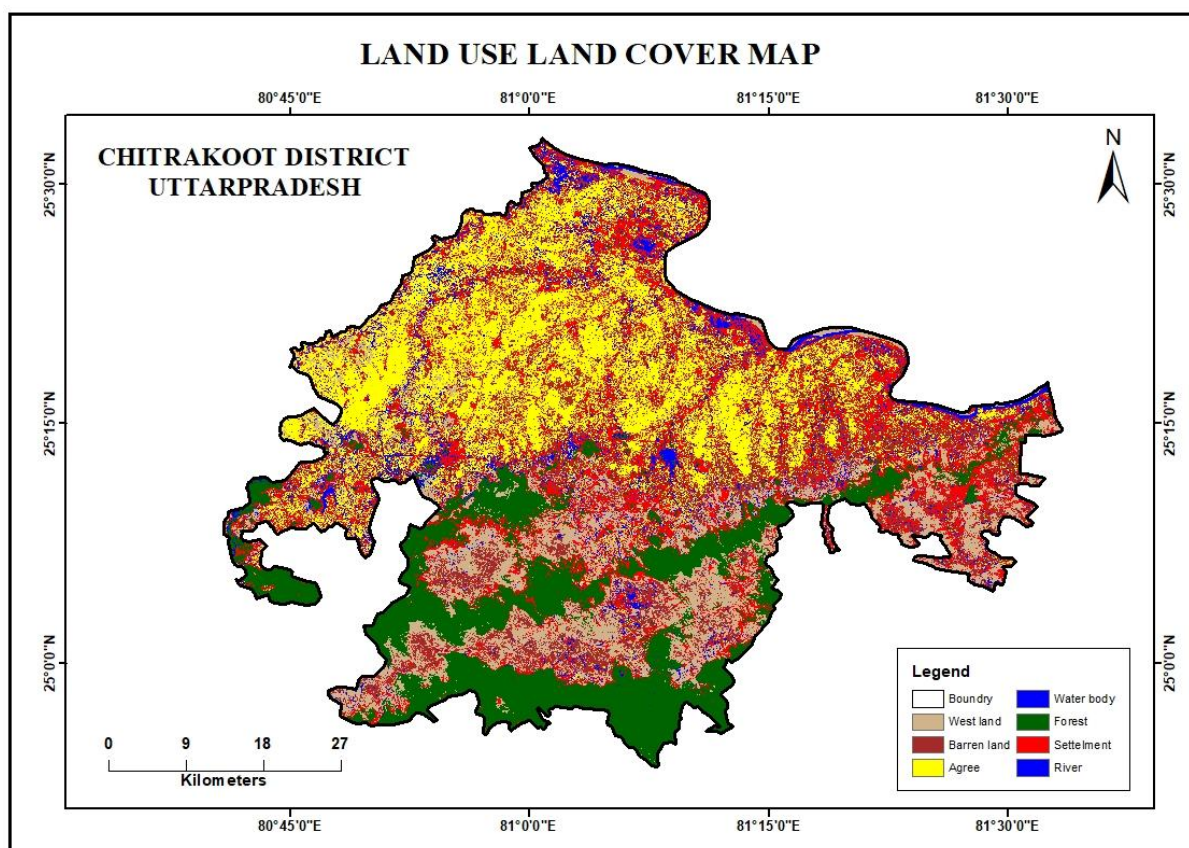
Figure-3:Land Use/ land cover
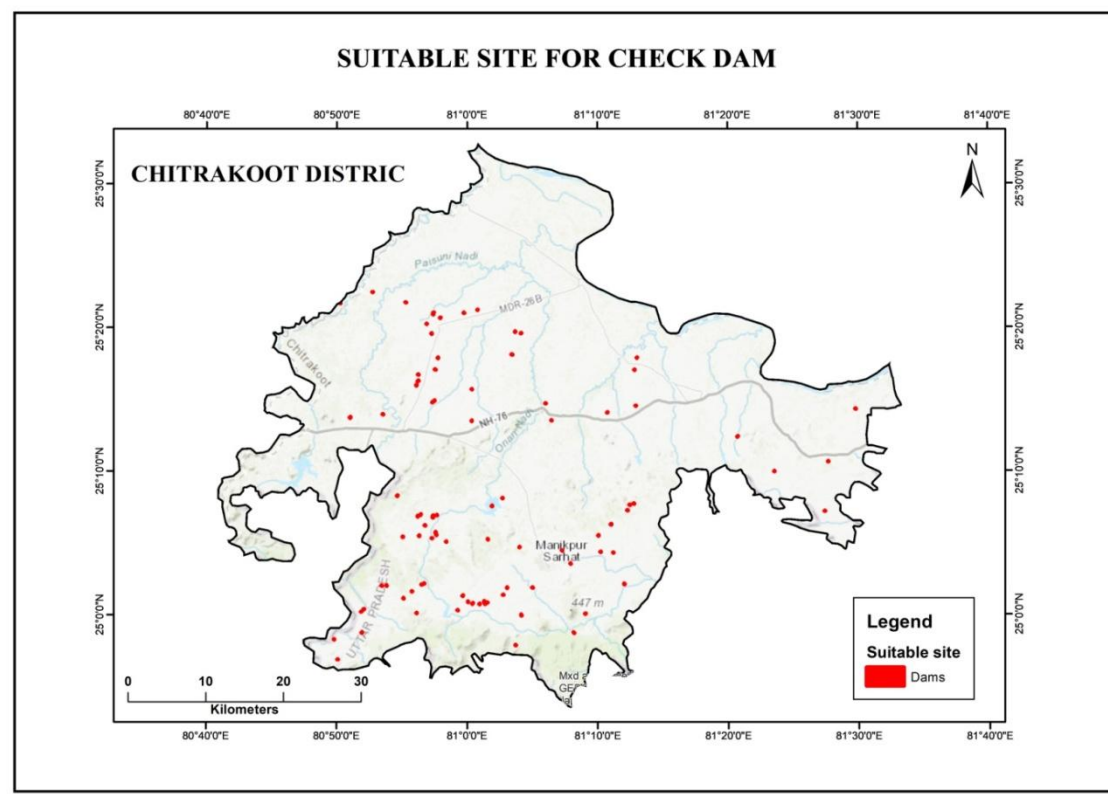
Water Shed Map Based On DEM Image

Figure-4:Water Shed Map

Slope Map Based On DEM Image

Figure-5:Slope Map

Suitable site for check dam

Figure-6:Suitable site for check dam

CUNCLUSION

In those day availability ofwater problem is very big issue. And minimise that problem we can create the check dams for water and increase the ground water level and is was so good and eco friendly. But before creating dams we should need some parameters without that we can't make any check dam. For build the check dam first we need water streams and water shed without stream we can't build check dam we should build the dam on water stream. For water stream we need a slope cause water always run with slope when slope is available then water stream is defiantly there so slope is must required.we should think about the settlement transport network agriculture area etc. Cause that check dam backwater was increase in rainy season and that time those area going to block and it'screate big problem so we must need to think about that.

After that all analysis and calculation we good the sites which are good for create check dam and that sites are suitable for check dam.

REFERENCES

1. Athavale, (2003) worked on water harvesting and sustainable supply in India. Pawar (2003) has made an assessment of watershed development programmed at micro level.

2. Gosain& Rao (2004) have applied GIS based technologies for watershed management. Linsley and Franzini worked on water resource engineering.

3. McCoy, (2005) has given very useful techniques for field work by using remote sensing. The potential of roof rain water harvesting in R.K. Nager Sub-urban area of Kolhapur city has been assessed by Panhalkar et al., (2009).

4. S.S.Panhalkr water runoff management in Kolhapur district. Using remote sensing and geoinformatics in suk Kolhapur (2009)

5. USGS (2018). USGS. Retrieved 1998, 2008, 2018 from Earth Explorer: http://earthexplorer.usgs.gov/