



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

Mapathon Documentary

Topic Name: Flood Maps

Organization: - Here Technologies

Contact/ Email: - Kartiki.Manjrekar@here.com

Problem Statement: Flood Maps Description and its analysis

Introduction

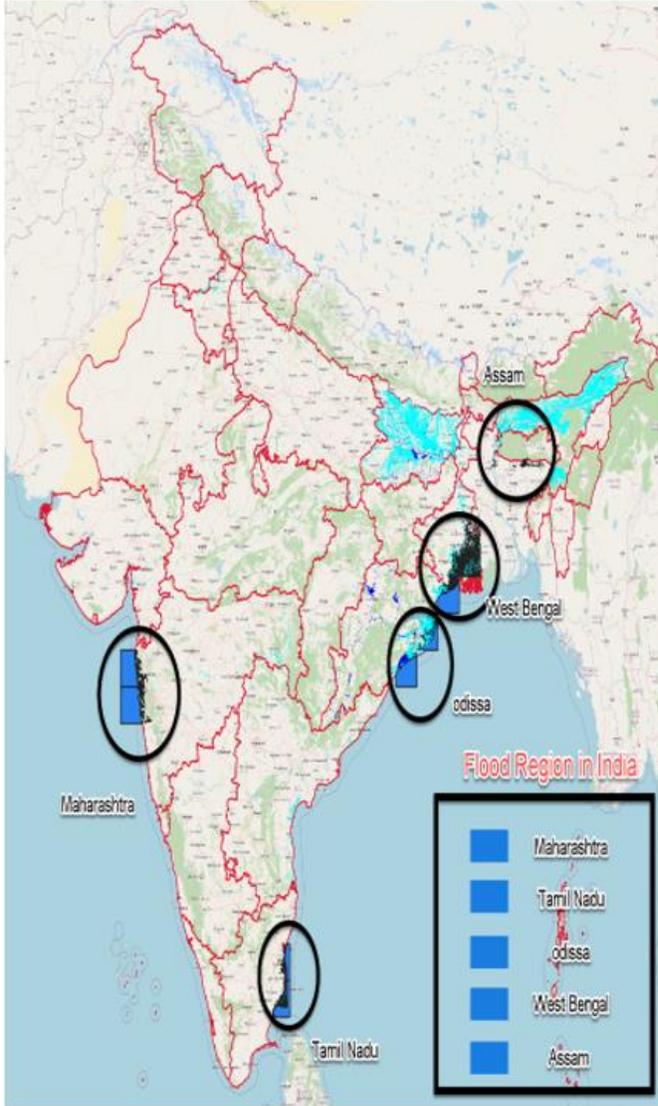
ISRO ITB-AICTE IIT Bombay (fosse)



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

Title: State-wise Flooded Maps for India



Map Description and Analysis

Introduction: This is the Map for Flooded India where we have selected the specific highest range of impacted states in which there is Presence of Floods

Flood Hierarchy: - The above image includes 5 different flooded Zones wherein

It provides the Risk of Areas impacted at the time of monsoon generally available: hazard factors, such as water depth and water velocity, such as existence of public education on flood risk, warning and communication system, coordination between emergency agencies and authorities, time of day, and warning factors, such as warning time.

We used to Plot the Ranges as per the scenarios of flooded zone based on its Meters marking to make it more modifiable when there is highest range of impact of flood Occurrences



Team Name: Titan

Topic: Flood Maps

Team Members/ Lead:

Kartiki Manjrekar

Prajakta Pandey

Mamta Tak

Akshay Chari

Organization:

Here Technologies

Email Id:

Kartiki.Manjrekar@here.com

QGIS: -Open-source desktop GIS software

Problem Statement: - Flood Maps

Flood Mapping -Many Places have been impacted due to floods during the



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

monsoon like Bihar Brahmaputra etc. In times of increasing disaster losses, the reduction (or mitigation) of consequences of natural hazard needs to be effective and efficient. An in-depth understanding of the effects of disasters, is required In this context, we developed a prototype tool: Flood Maps, a QGIS plugin that provides the assessment of flood consequences, in terms of loss of life and direct economic damages. The proposed cost assessment tool aims to be used for decision support systems and policy development of risk management. Keywords Flood map, open-source software, desktop GIS, QGIS, Bhuvan three datasets

The Map Scale includes

Normal Condition-Normal Area

how much area is inundated – (Pushed Monsoon Area)

Flood management aims to reduce the impact of floods. The quantification and evaluation of flood consequences is one of the most important factor to be considered in deciding how to reduce flood damages and to evaluate alternative intervention strategies in terms of their relative benefits and In this context, an open source and free analysis toolbox, part of the open-source geographic information system Quantum GIS, was developed for estimating flood impacts due to flooding

we have Provided the Information about the Flood Zone and its area wit its 5 population based on its effectiveness refer to Below images for its structure:

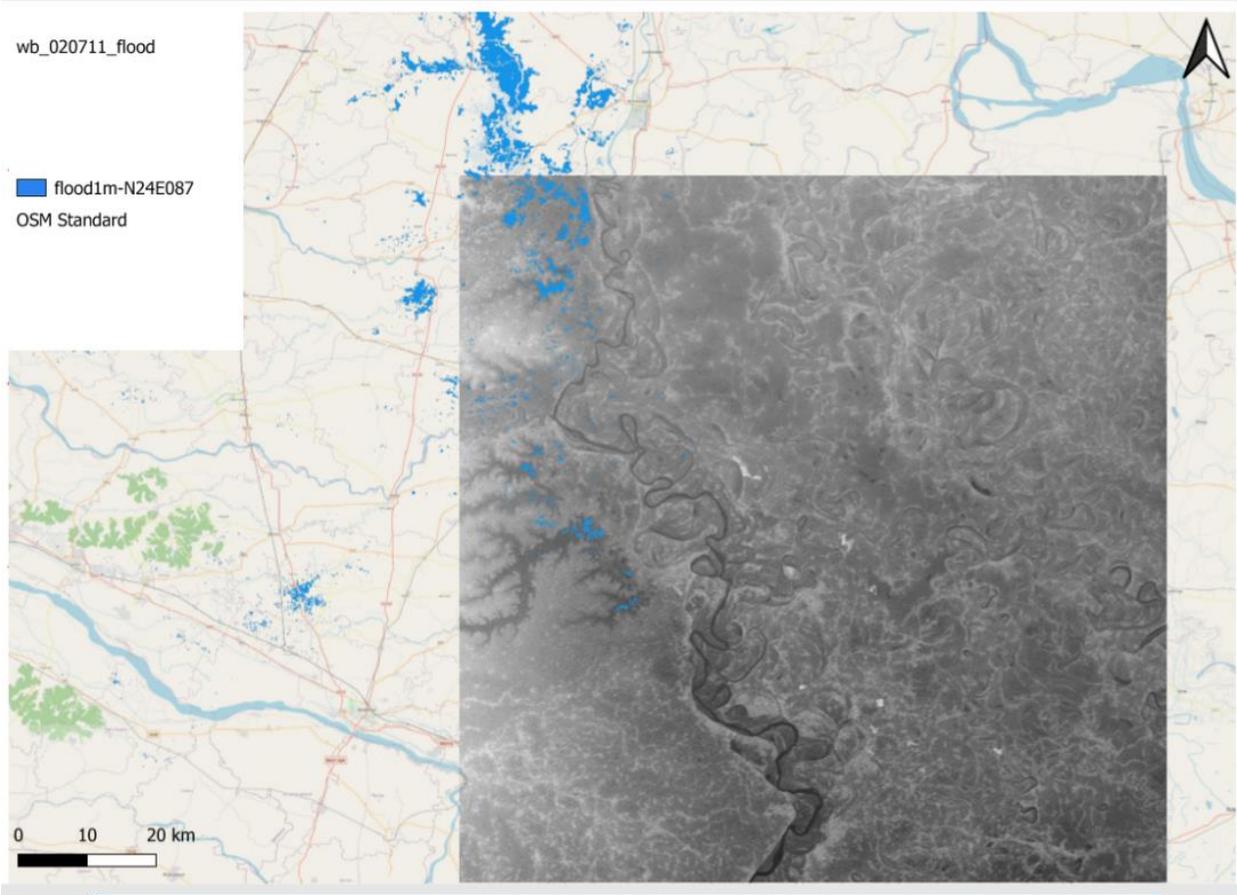
We used to Plot the Ranges as per the scenarios of flooded zone based on its

Meters marking to make it more modifiable when there is highest range of impact of flood Occurrences



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

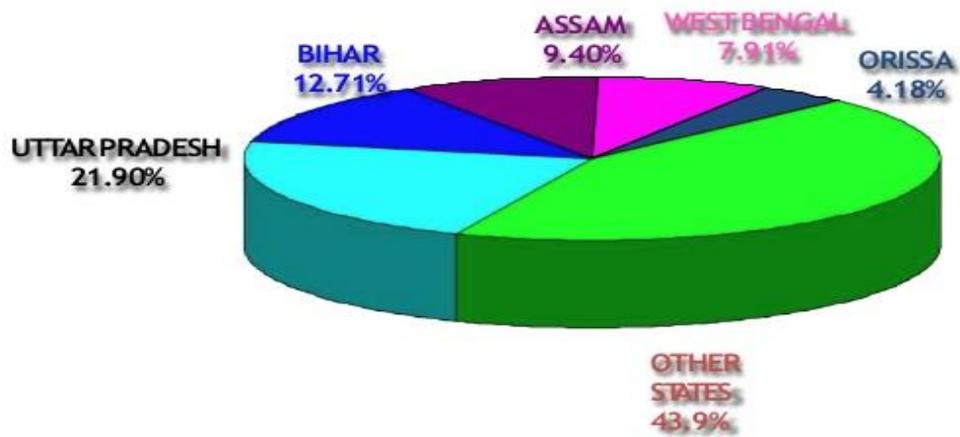




Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

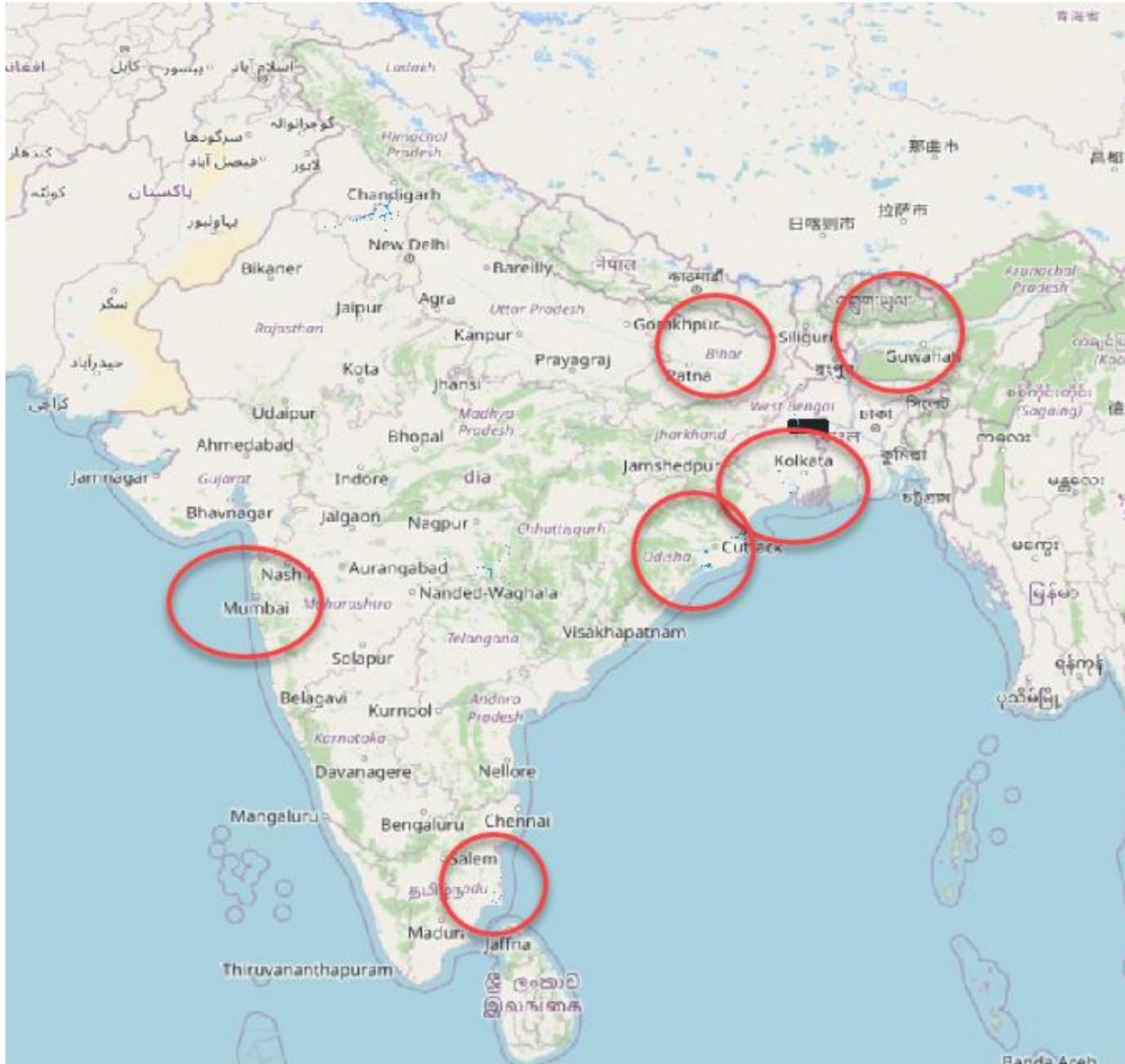
INDIA FLOOD PRONE AREA





Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan





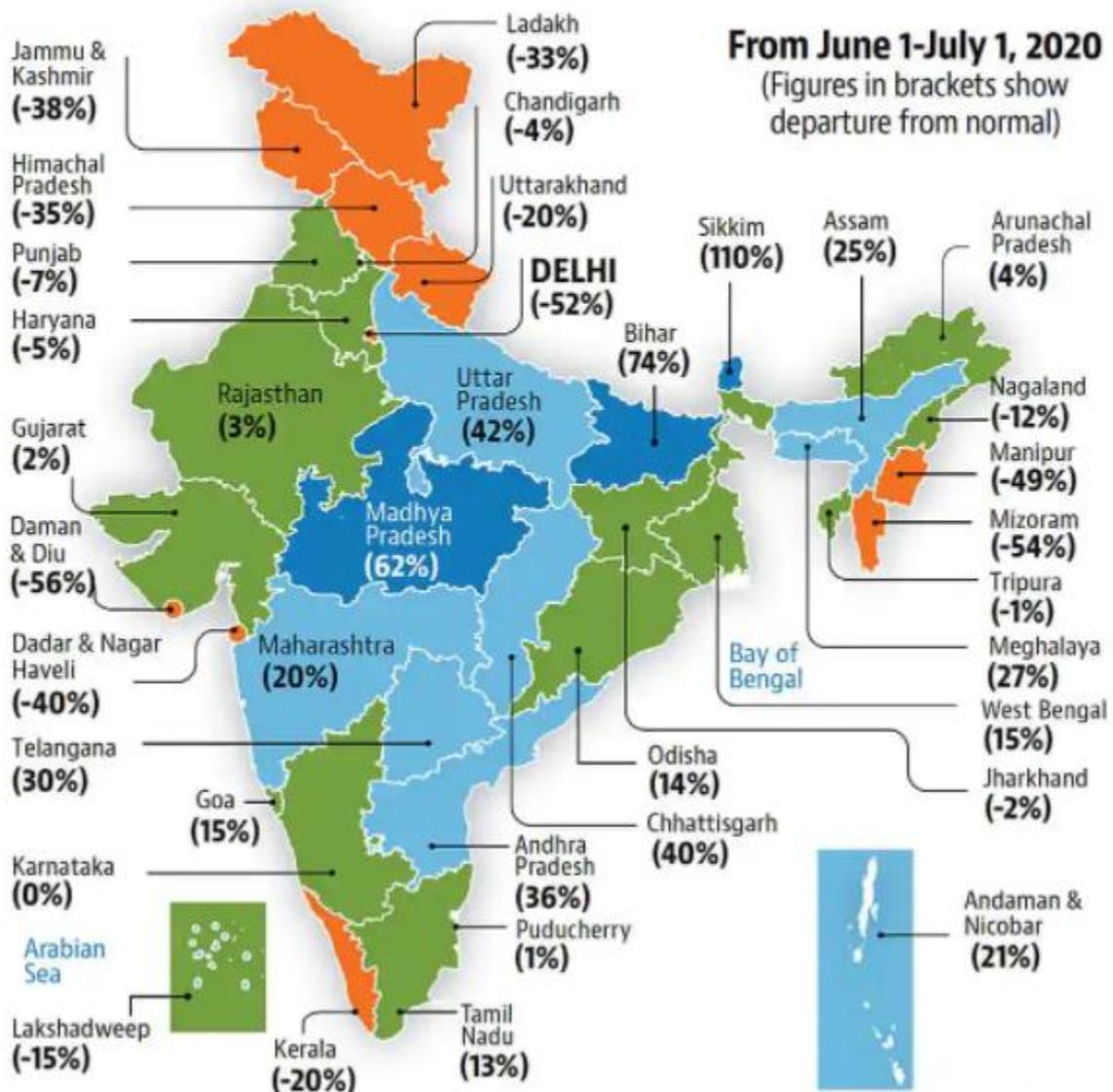
Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

One month of monsoon

The country over the last month has received 15% excess rains, IMD said

STATUS CHECK	Large excess	Excess	Normal	Deficient	Large deficient
	60% or more	20% to 59%	-19% to 19%	-59% to -20%	-99% to -60%



Source: India Meteorological Department



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

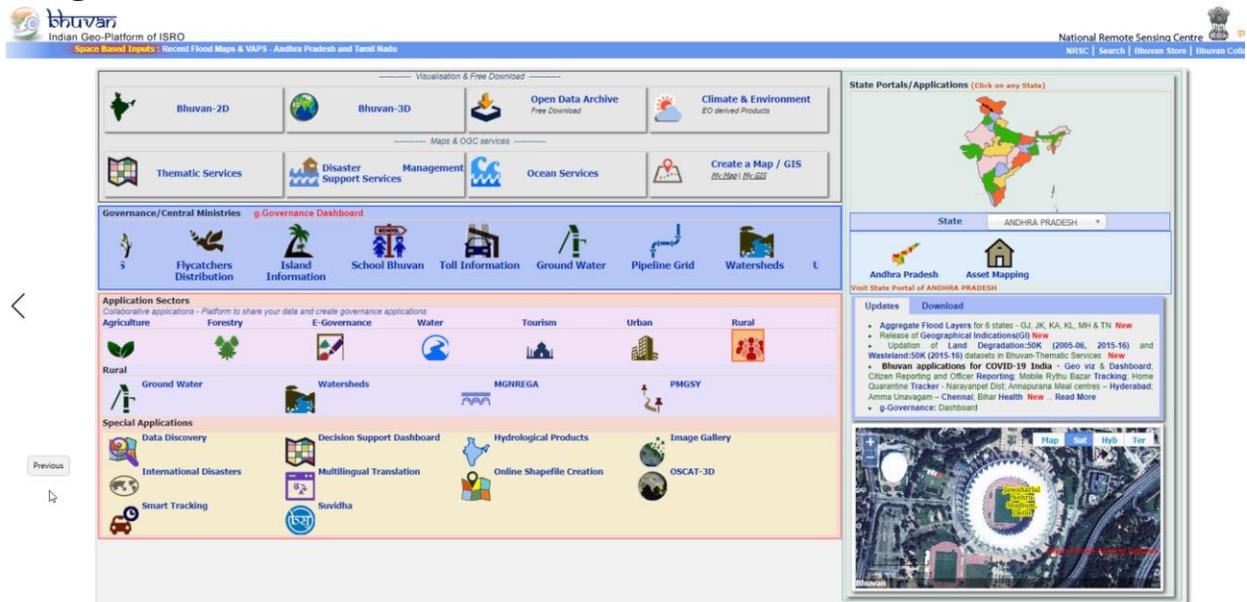
Team Name: -Titan

2) Flood Hierarchy :- The above image includes 5 different flooded Zones wherein It provides the Risk of Areas impacted at the time of monsoon

Flood Maps" utilized simple and parsimonious methods based on the contributing factors that could be generally available: hazard factors, such as water depth and water velocity, the general preparedness of the society, such as existence of public education on flood risk, warning and communication system, coordination between emergency agencies and authorities, time of day, and warning factors, such as warning time.

3) Demonstration Drive Steps: -

Image no 1



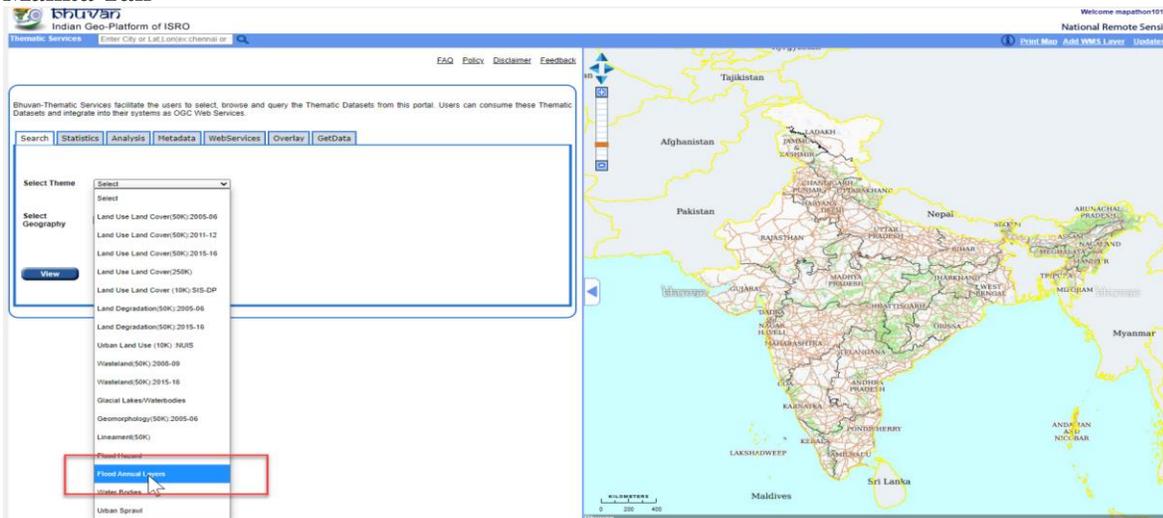
Above image is the source for our Dataset where we used the Datasets for flood maps.

Image no 2:



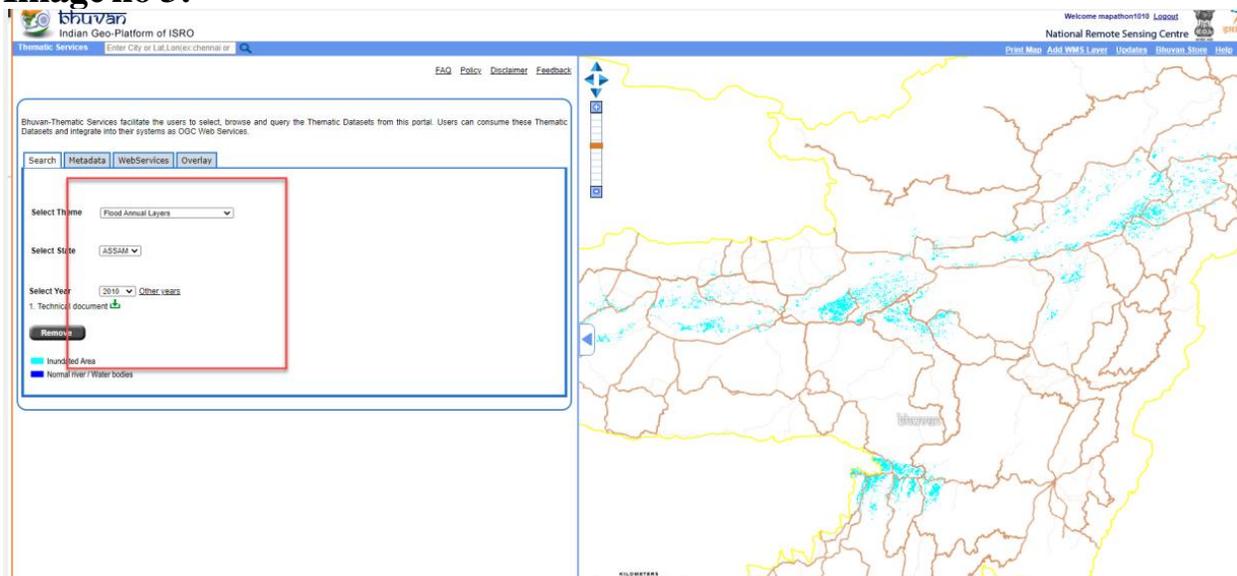
**Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak**

Team Name: -Titan



Proceed further by selecting the Flood annual Layers from Bhuvan store

Image no 3:



Here we Selected the Food Annual Layers and then Switch to the state where the Flood were impacted by selecting the Year in which it was present

After selecting the Dataset we then moved to the Web services panel where the



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

URL provides the data for Visualization of Datasets
the URL shows the Location of Layers data ,here all bhuvan's data Geospatial services can be consumed at WMS were QGIS layers are plotted

The screenshot shows the Bhuvan web portal interface. On the left, there is a search bar with tabs for 'Search', 'Metadata', 'WebServices', and 'Overlay'. The 'WebServices' tab is active, displaying a search result for a WMS layer. The search result includes the following information:

- Web Map Service (WMS) URL: <https://bhuvan-ras2.nrsc.gov.in/cgi-bin/hazard.exe>
- layer: FLD_2010
- Metadata: [View Metadata](#)
- multiSet: EPSG:4326
- layerE-ident: \$0 701.24.135.96.021.27.977
- format: 'image/png'

On the right side of the screenshot, a map is displayed showing a geographical area with a cyan overlay representing the FLD_2010 layer. The map includes a scale bar and navigation controls.

now to add WMS layer click on Layer at the top left corner tab ->then Add WMS/WMTS Layer then select "New" and add your connection Details and click on OK

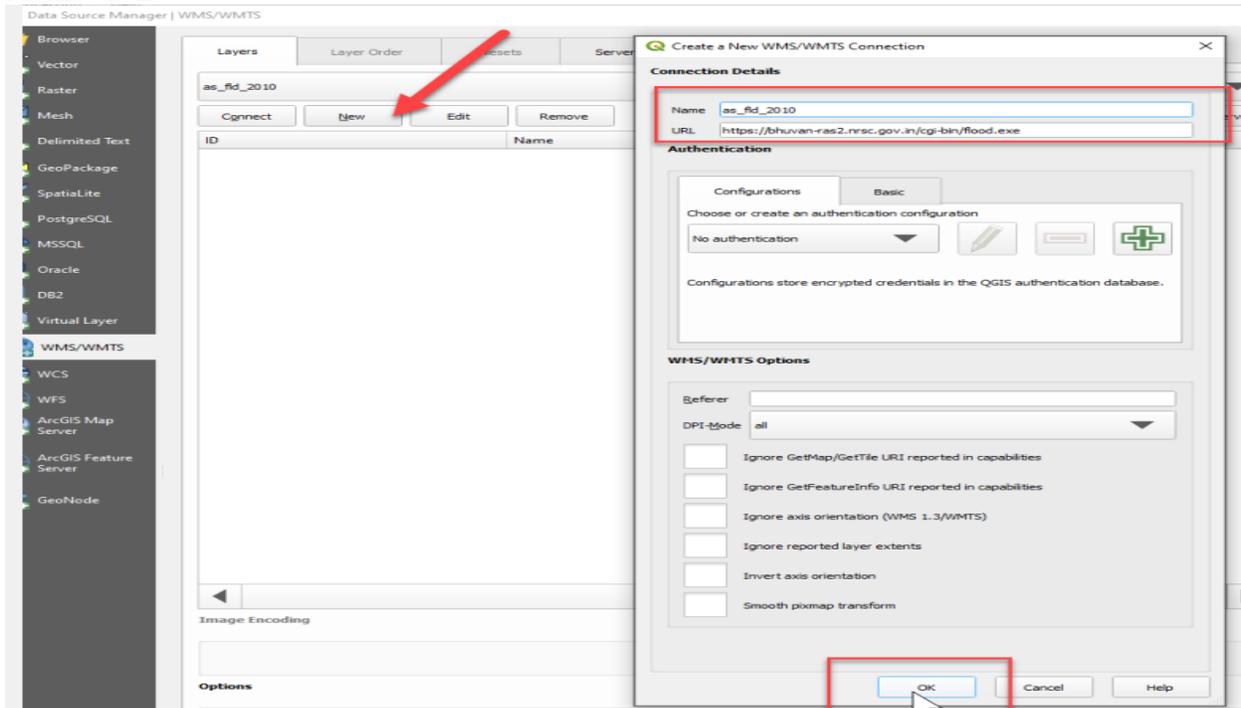
Name :- As_FLD_2010

URL: WMS: <https://bhuvan-ras2.nrsc.gov.in/cgi-bin/hazard.exe>



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

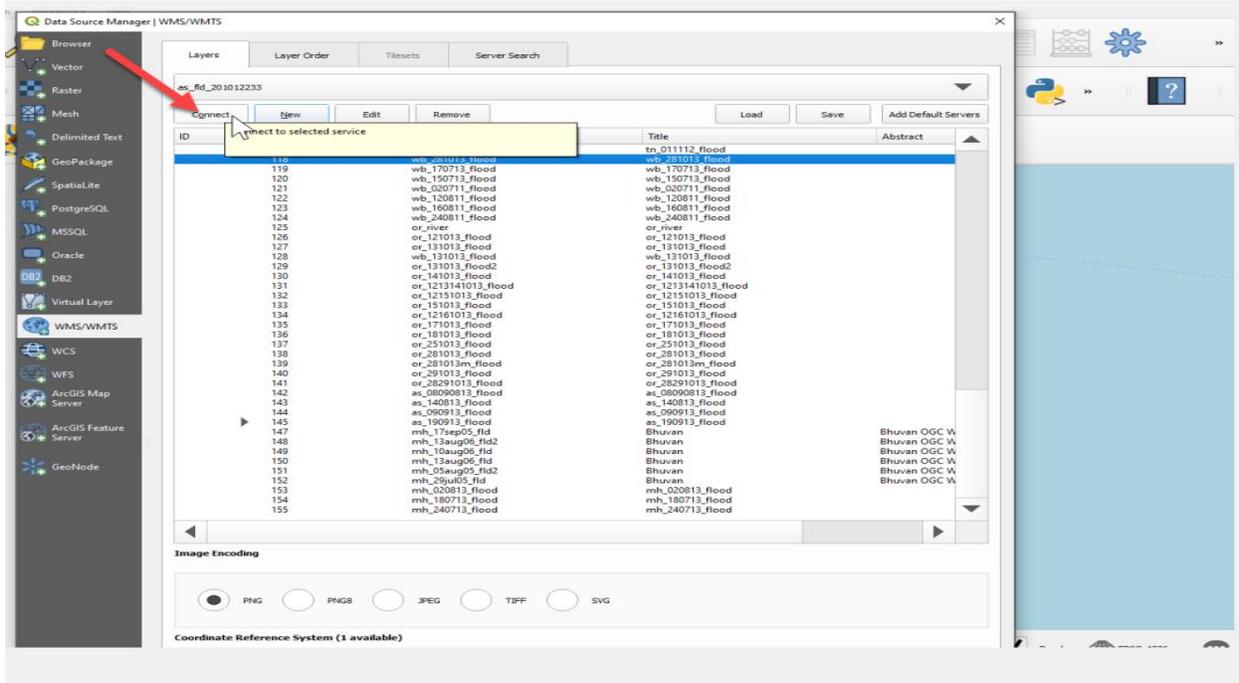


After clicking on the Ok button you can find the connection tab through which we can get the different Datasets and Services Layers



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan



Select the Services and Drag on the Layers session.

Further We followed with the Process Steps:

A) QGIS-3.10 Coruna Version → New Project

B) Download The QMS (Quick Map services) Downloader and then click on the web OSM -> OSM Standards, also after this we build the Canvas images by setting its properties for downloaded image from SRTM Downloader

C) Open the ISRO Data where we can start coding and visualizing the Datasets to make it more analyzed for remote sensing datasets . we have loaded this dataset from the data <https://bhuvan-app1.nrsc.gov.in/thematic/thematic/index.php#> website and we downloaded from Bhuvan 2D store i.e. (flood Annual layers)

D) then after the downloaded data just drag it in Layer and According to your visualization we can set its Properties to make it more visible

Layer properties-> render type -> single band pseudo color

Band-Band1

min :-1 max :10



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

Interpolation-linear

Color Ramp :create new color -Catalog : ctp City

Topography ->Elevation and Apply

then switch again to Min & Max

Statistics extent ;whole Raster

Accuracy-Actual slower

next switch to layer properties and copy its style attributes and Paste to next image Properties

next we have to give the elevated Part Height to our layers for that we have to jump to Raster Calculation and double click on the First Hgt for further Calculation derive flood map layer <1 and save the file by ext as . tif and save as floodlt 1 it will show you the colorless data so we can change its styling by clicking on properties and single band pseudocolor -> two values as 0 and 1 as not flooded an flooded by mentioning its color

blue will reflect I flooded and the rest is not flooded

if u want you can have transparency to view it more clearly

E)Next Raster Calculation -> for Raster Bands Results for layer Stack and Mentioned it as Flooded and Non- flooded by its properties and calculation .

after resuming with this Layers we then started to plot out Project :

Here are its Coding Steps how we drive through :

Step 1: First Add the Layer for respective state to which we are coding

Name :- As_FLD_2010

Layer->add Layer->add WMS/WMTS ->new -> add your Name and URL->OK ->Connect and it will show all the Data which will used to code the Flood in the Form of JPEG.



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

The screenshot shows the Data Source Manager (WMS/WMTS) interface. The left sidebar contains various data source categories: Browser, Vector, Raster, Mesh, Delimited Text, GeoPackage, SpatiaLite, PostgreSQL, MSSQL, Oracle, DB2, Virtual Layer, WMS/WMTS, WCS, WFS, ArcGIS Map Server, ArcGIS Feature Server, and GeoNode. The main panel displays a list of layers under the 'as_fid_2010' group. The layers are listed in a table with columns for ID, Name, Title, and Abstract. The 'as_fid_2010' layer is selected, and its details are shown in the table below.

ID	Name	Title	Abstract
0	Flood	Flood_Layers	Bhuvan O
1	br_fid_1998	Bhuvan	Bhuvan O
3	br_fid_1999	Bhuvan	Bhuvan O
5	br_fid_2000	Bhuvan	Bhuvan O
7	br_fid_2001	Bhuvan	Bhuvan O
9	br_fid_2002	Bhuvan	Bhuvan O
11	br_fid_2003	Bhuvan	Bhuvan O
13	br_fid_2004	Bhuvan	Bhuvan O
15	br_fid_2005	Bhuvan	Bhuvan O
17	br_fid_2006	Bhuvan	Bhuvan O
19	br_fid_2007	Bhuvan	Bhuvan O
21	br_fid_2008	Bhuvan	Bhuvan O
23	br_fid_2009	Bhuvan	Bhuvan O
25	br_fid_2010	Bhuvan	Bhuvan O
27	as_fid_1998	Bhuvan	Bhuvan O
29	as_fid_1999	Bhuvan	Bhuvan O
31	as_fid_2000	Bhuvan	Bhuvan O
33	as_fid_2001	Bhuvan	Bhuvan O
35	as_fid_2002	Bhuvan	Bhuvan O
37	as_fid_2003	Bhuvan	Bhuvan O
39	as_fid_2004	Bhuvan	Bhuvan O
41	as_fid_2005	Bhuvan	Bhuvan O
43	as_fid_2006	Bhuvan	Bhuvan O
45	as_fid_2007	Bhuvan	Bhuvan O
47	as_fid_2008	Bhuvan	Bhuvan O
49	as_fid_2009	Bhuvan	Bhuvan O
51	as_fid_2010	Bhuvan	Bhuvan O
53	as_river	Bhuvan	Bhuvan O
55	br_river	Bhuvan	Bhuvan O
57	ap_011112_flood	Bhuvan	Bhuvan O
58	ap_021112_flood	Bhuvan	Bhuvan O
59	ap_051112_flood	Bhuvan	Bhuvan O

Image Encoding options: PNG, PNG8, JPEG, TIFF, SVG

Options (0 coordinate reference systems available)

URL: WMS: <https://bhuvan-ras2.nrsc.gov.in/cgi-bin/hazard.exe>

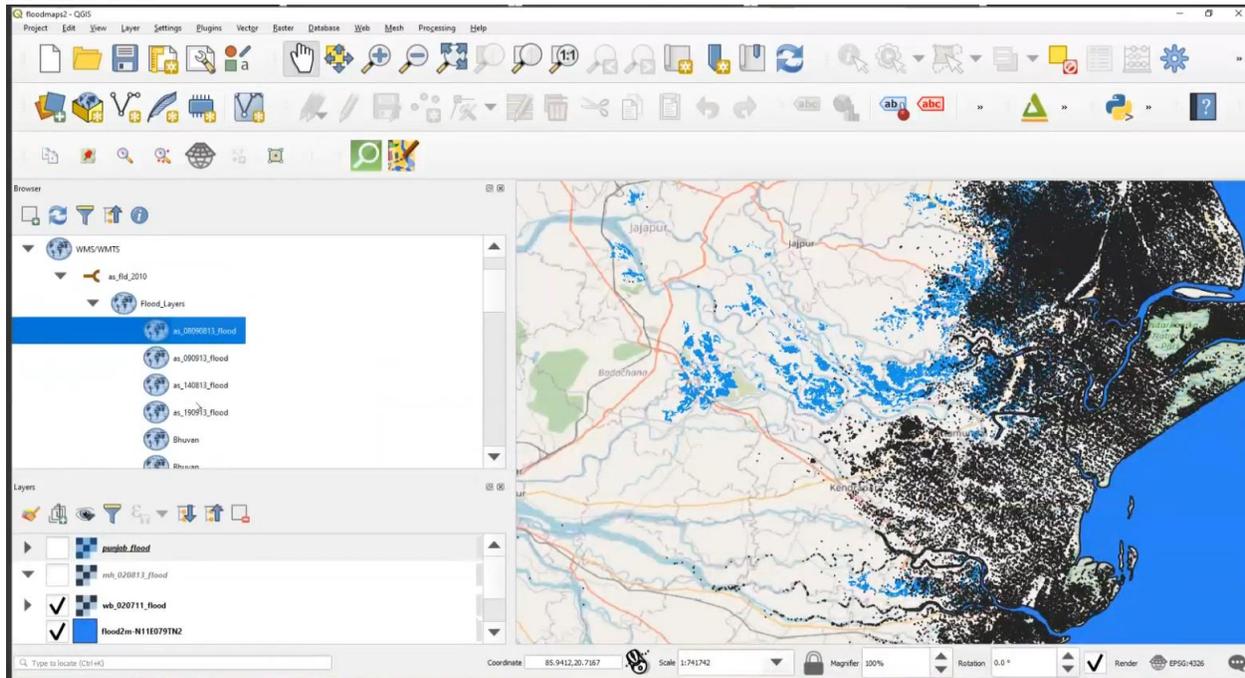
Here as soon as we added this ISRO link the Layer gets start Processing

Step 2: now drag the states from Browser Panel in to Layer Panel

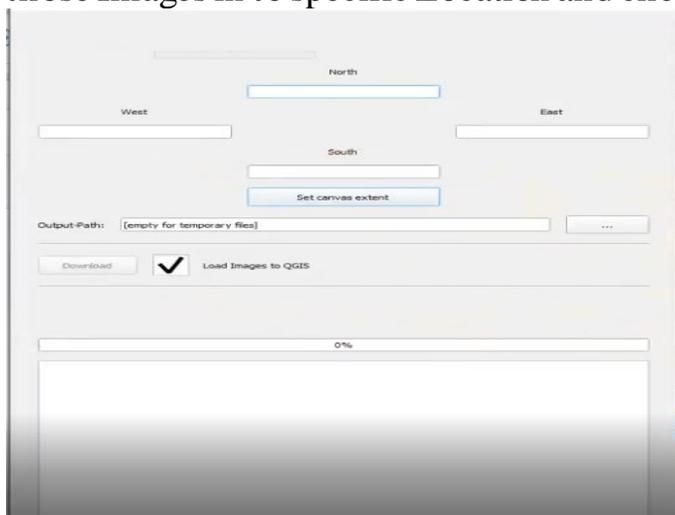


Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan



Step 3 : Zoom to Respective Layer state and Right click Bottom and select
EPGS:WGS84 ->click on ok to redirect it in project format
Now switch to Canvas Setting by creating and Saving your files and download
those Images in to specific Location and check the box to see the flood zone area

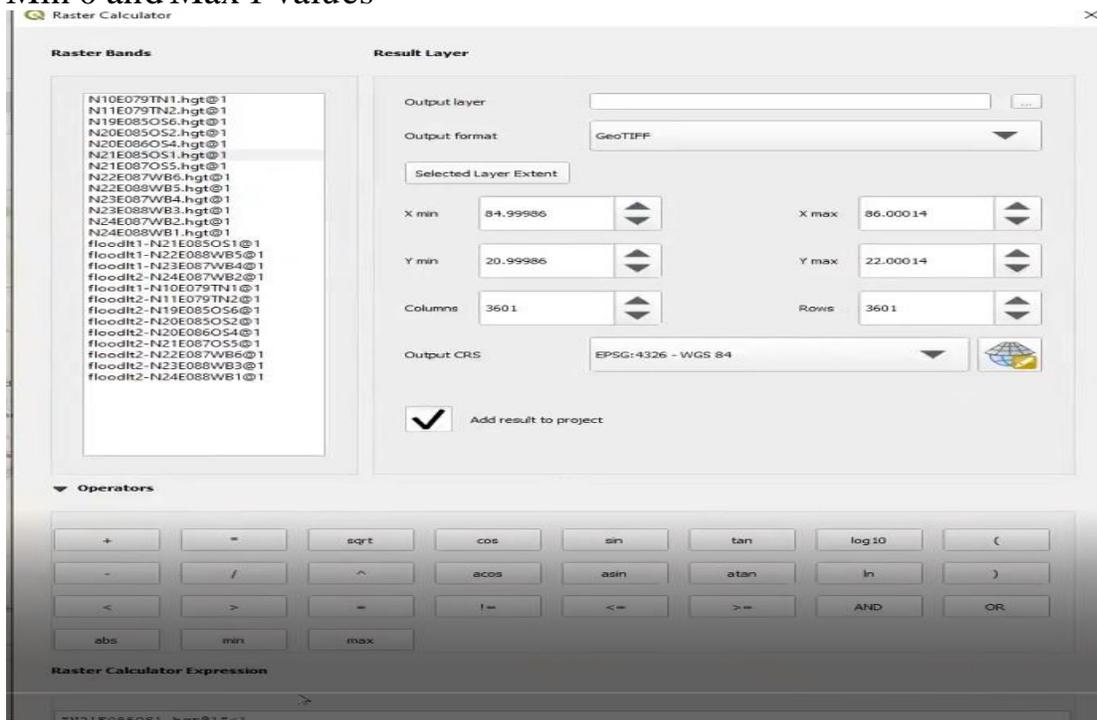




Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

Step 4 : Further we moved for Raster Calculation to visualize it's Calculus expressions and double click on the specific Layer and we measured it as < 1 meter and save that conversion file to folder as floodlt1-N21E085OS1.tif extension and set their Properties by its color and Flooded and non-Flooded by setting its Min 0 and Max 1 values

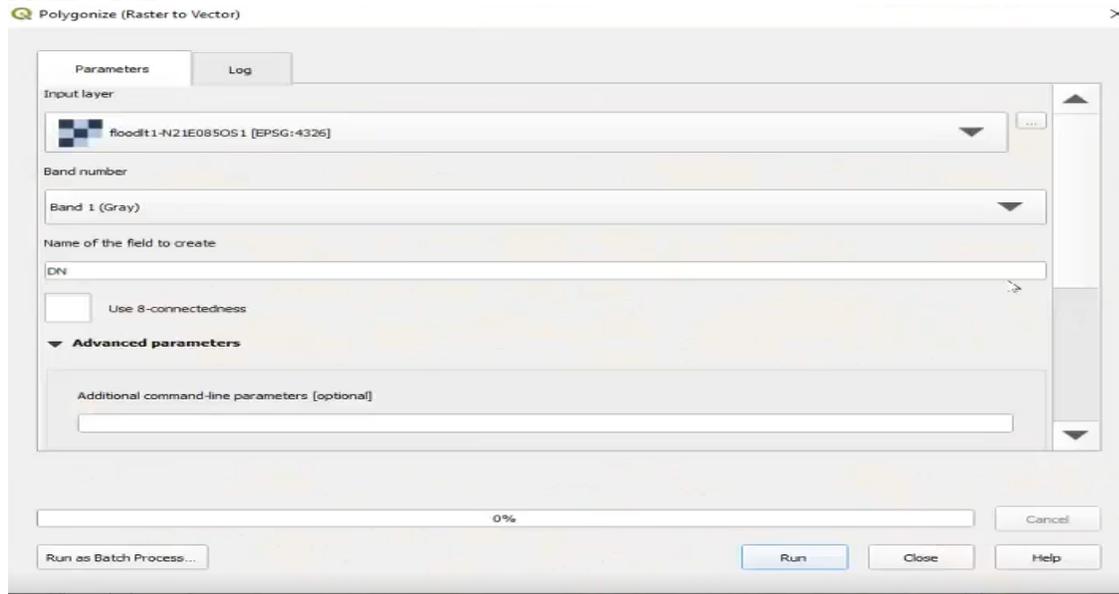


Step 5: Further after Raster Calculation we moved ahead to conversion and selected polygonise(Raster to Vector) by saving it's file as "Floodlt1m-N21E085OS1WB1.shp and save in the given location



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

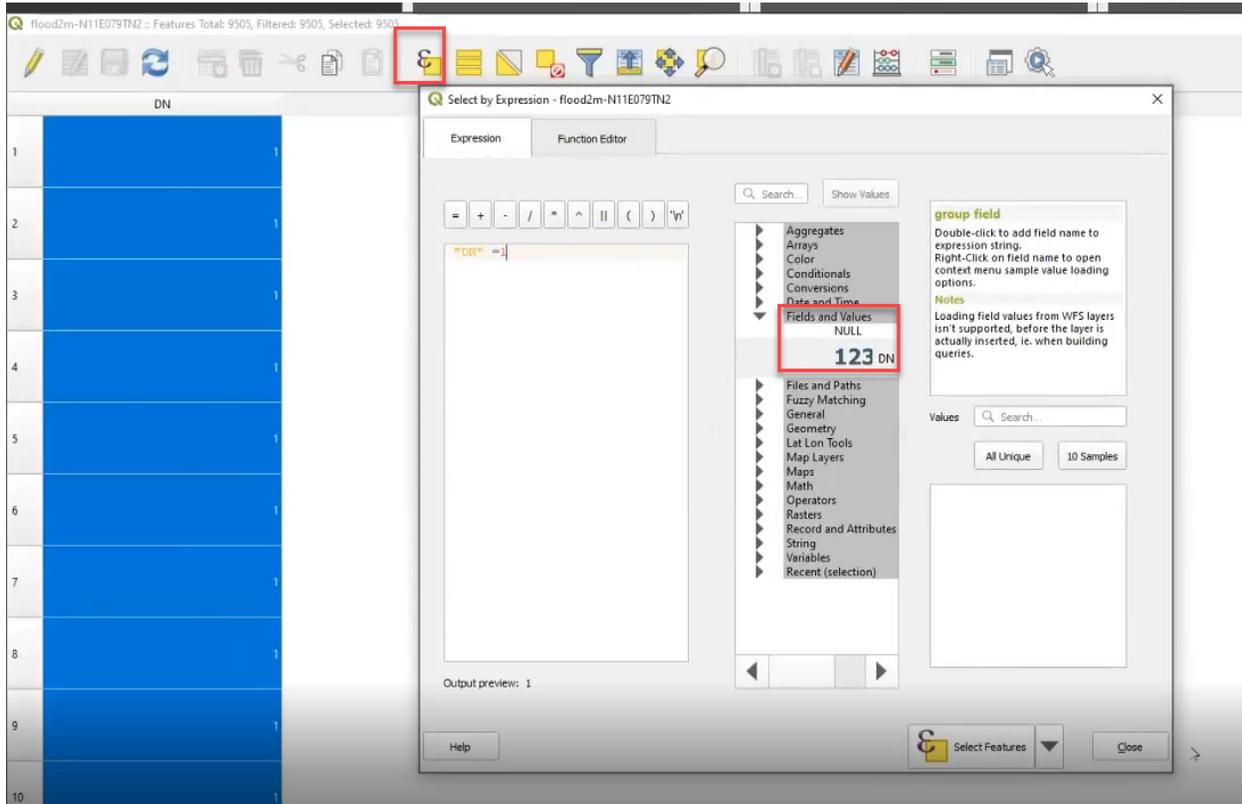


Step 6: After Raster to Vector Conversion we generated the File for the specific region and for that layer right click on the generated converted layer ->click on open attribute Table :and click on DN map and select the Fields and Values to make all the Visible selected meter range of floods in the Map and make it as =1 and select the features from bottom down to make it same for all next click on edit pencil and in vert Selection tab to delete all the Other entries apart from Flooded Zone for inversion and make it as 1 and update those features and save the file .



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

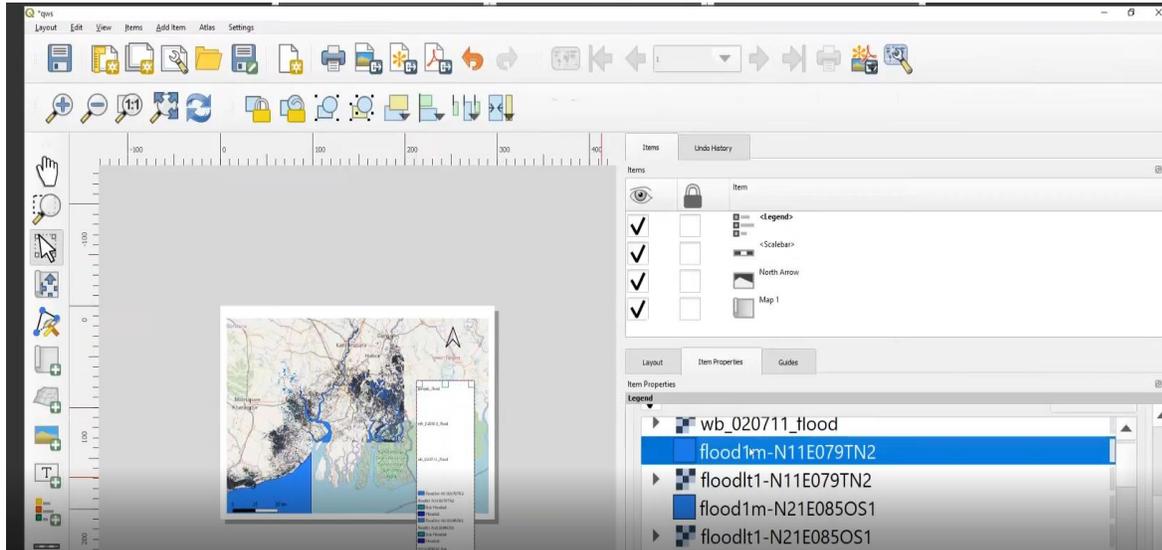


Step 7: Now we moved to Save these all Project to our final output by creating it's PDF Converted print layout Map in the form of Map
Select Project->new Print Layout->save it by giving it name and ok ->click on add items add Maps , North Arrow and Legend and Scale Bar for More information and select the Specific state which you want to show.



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

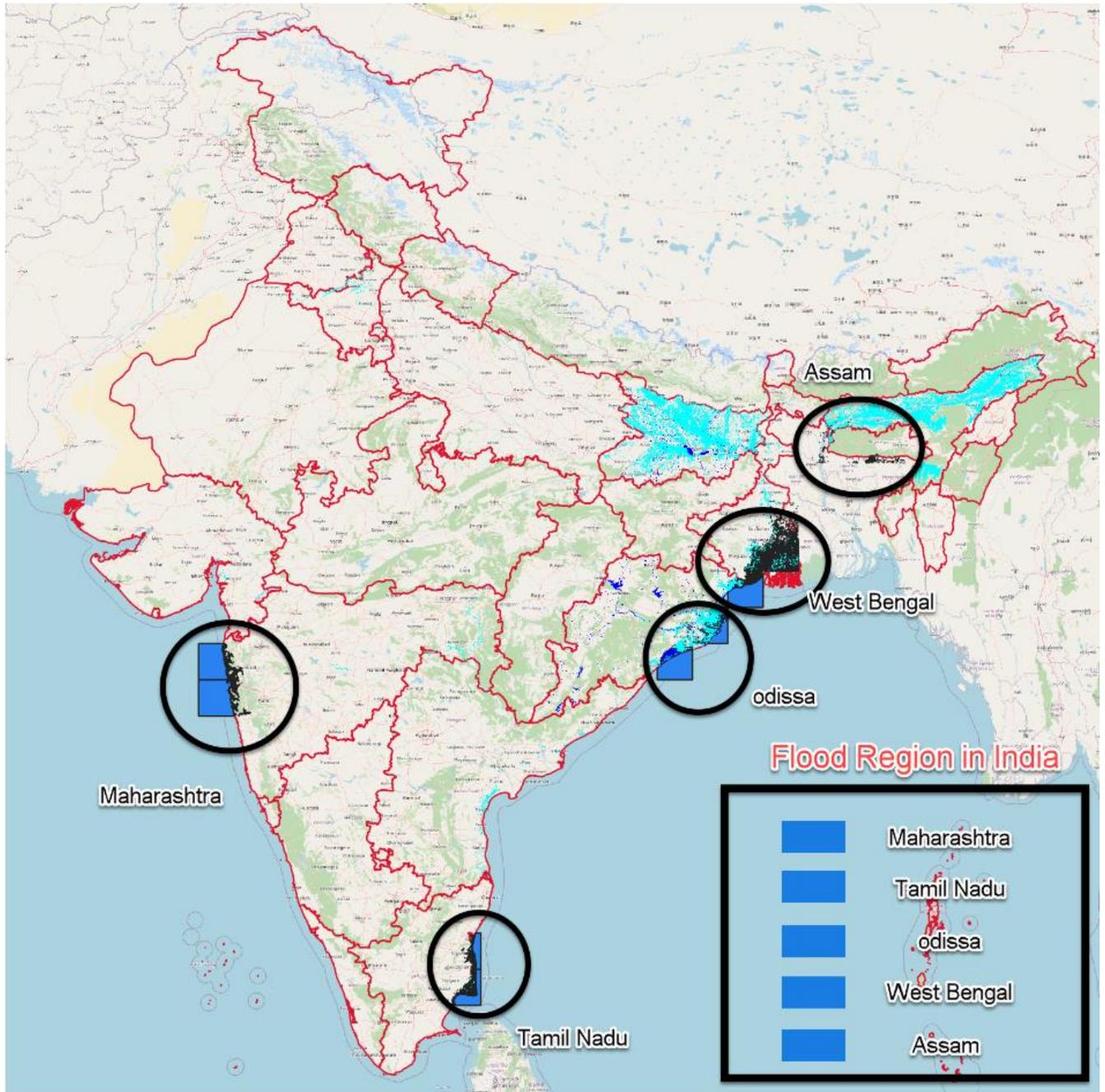


and after the final stage with the addition of Different sub Map Items we get one Generated club Map for all the coded area and we coded for all the Five States where we Found and Analyzed the large number of Flood Risk Portion (Assam, Tamil Nadu, West Bengal, Orissa, Maharashtra)



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan

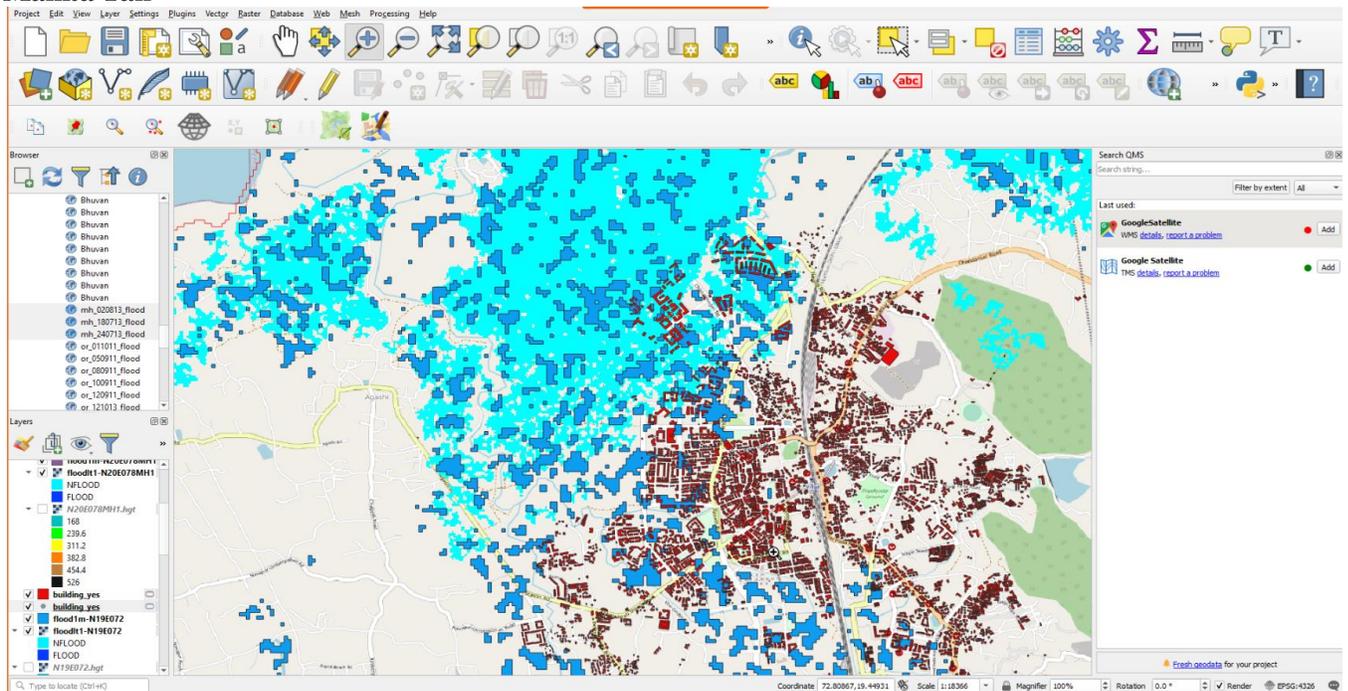


Also we added Buildings to make it more Visualized manner for the Flooded regions



Team Members: -
Kartiki Manjrekar
Prajakta Pandey
Akshay Chari
Mamta Tak

Team Name: -Titan



The assessment of the consequences of flooding requires the analysis of the extent and distribution of intensity of the hazard (for example, depth of the water and its velocity) and the overlap with the spatial distribution of people and property exposed. Geographical information systems (GIS) tools are ideal to manage spatial information, providing adequate spatial processing and visualization of results. For this reason, we chosen to adopt a GIS as a basis for the development of a tool for assessing flood maps

Conclusion: The QGIS tool is used for the rapid and consistent evaluation of consequences of flood in terms of number of people at risk, number of loss of life and economic damages for residential, commercial, industrial buildings and properties in general.



References used : QGIS



Team Members: -

Kartiki Manjrekar

Prajakta Pandey

Akshay Chari

Mamta Tak

Plugins :QMS (Quick map Services)

Quick OSM

SRTM

Raster Calculator

Raster To vector Polygonise Calculation

QGIS Tutorials

ISRO Data Links : Bhuvan : https://bhuvan.nrsc.gov.in/bhuvan_links.php#

Resource page :FOSSIEE

Team Name: -Titan

Learning outcomes :Ability to work with Different types of Spatial Data

Visualize and analyze location based datasets

Integrate Spatial data in data science Workflow

Ability to use QGIS for mapping ad Spatial analysis

solve Complex Spatial analysis Problems



HERE Technologies

Office Address

N 19° 09'07.4" E 72° 51'21.6"



HERE Solutions India Private Limited, Regd Office: 10th – 12th Floor, B Wing, Nesco IT Park - Tower 4,
Western Express Highway, Goregaon East, Mumbai – 400063 CIN: U72900MH2008FTC178295, Tel: +91 022
6607 9000 Fax: +91 022 6607 9001 www.here.com