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**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**

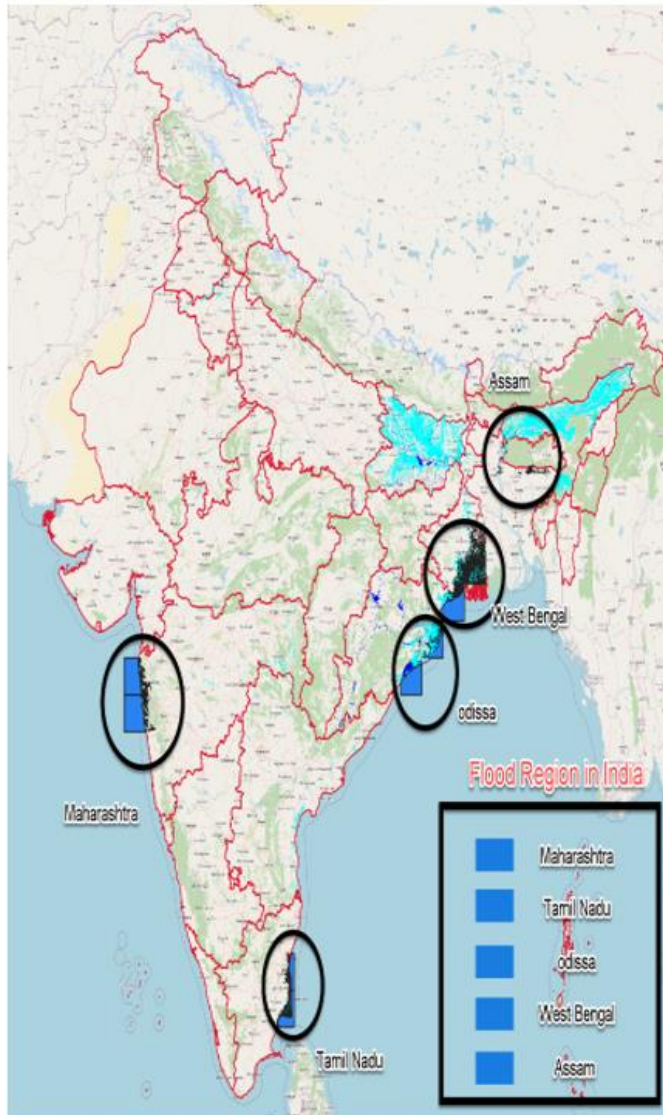
**ISRO ITB-AICTE IIT Bombay (fosse)**



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### **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**

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**QGIS: -Open-source desktop GIS software**

**Problem Statement: - Flood Maps**

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



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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

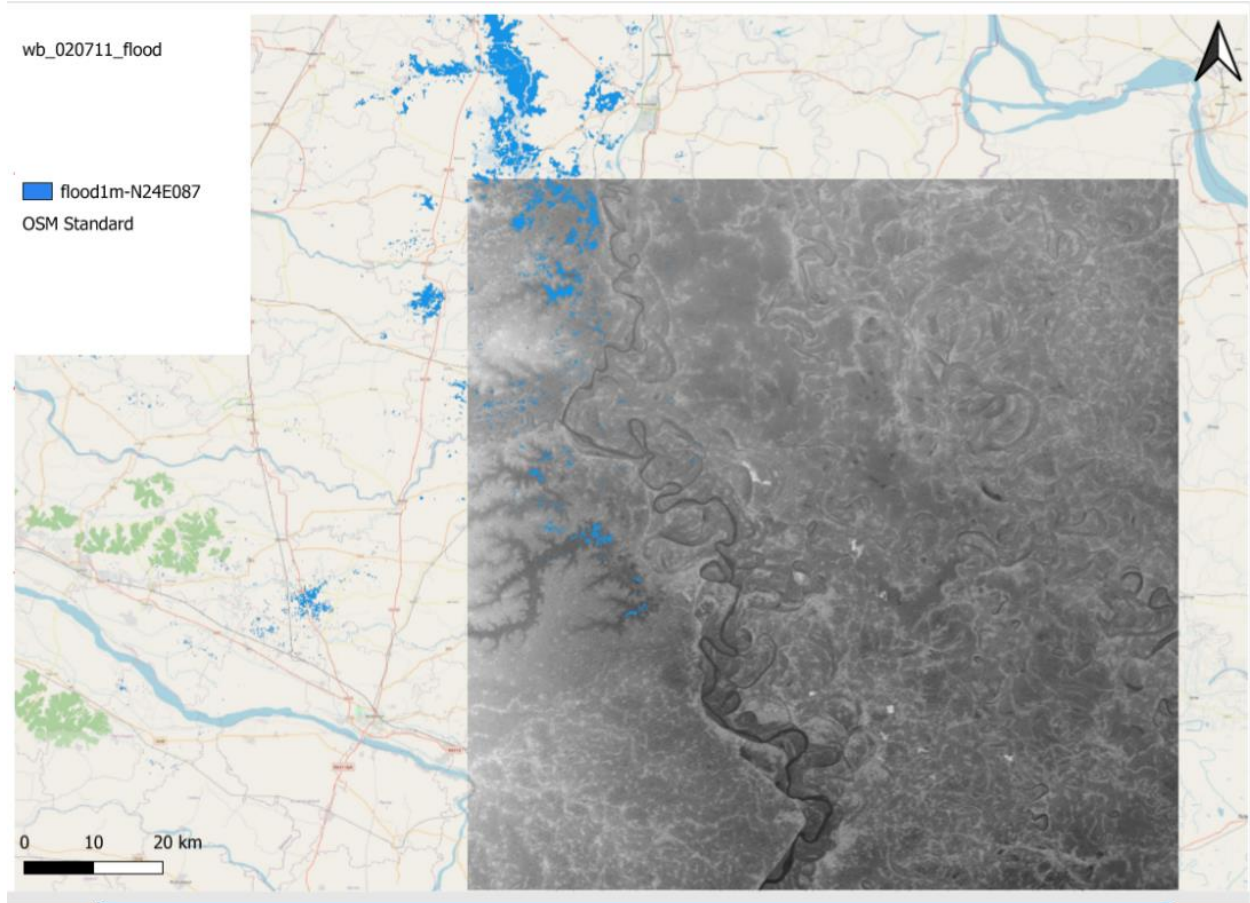
we have Provided the Information about the Flood Zone and its area wit its 5 population based on its effectiveness refer to Below images for its structure:

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



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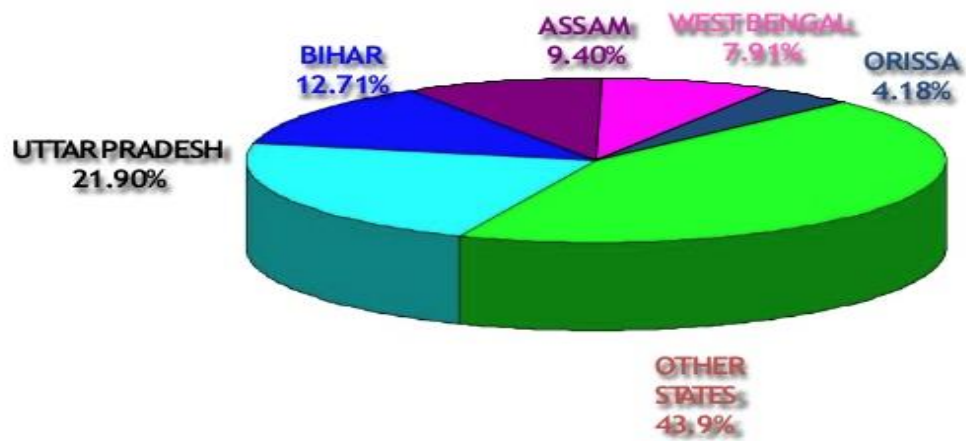




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## INDIA FLOOD PRONE AREA

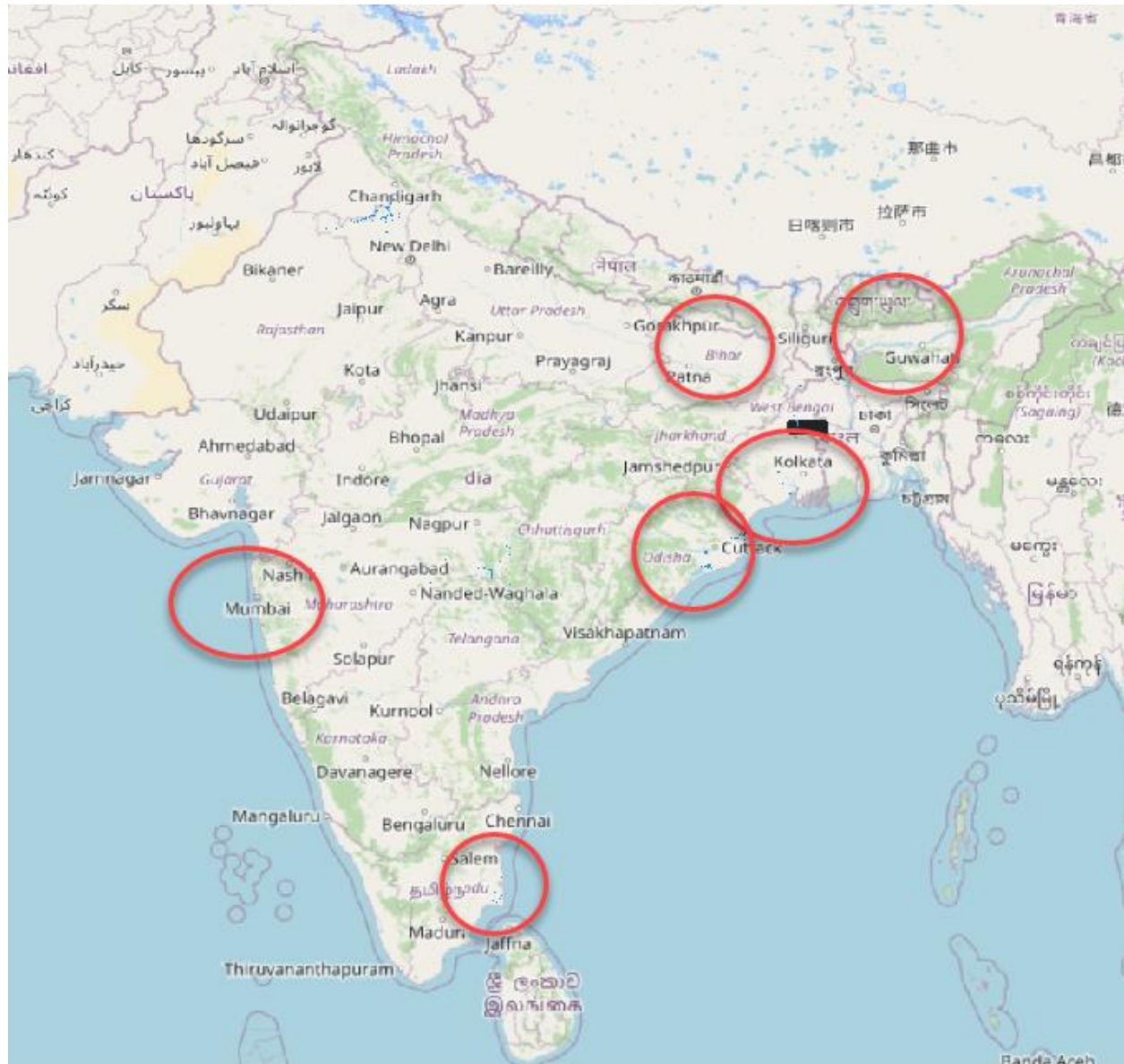






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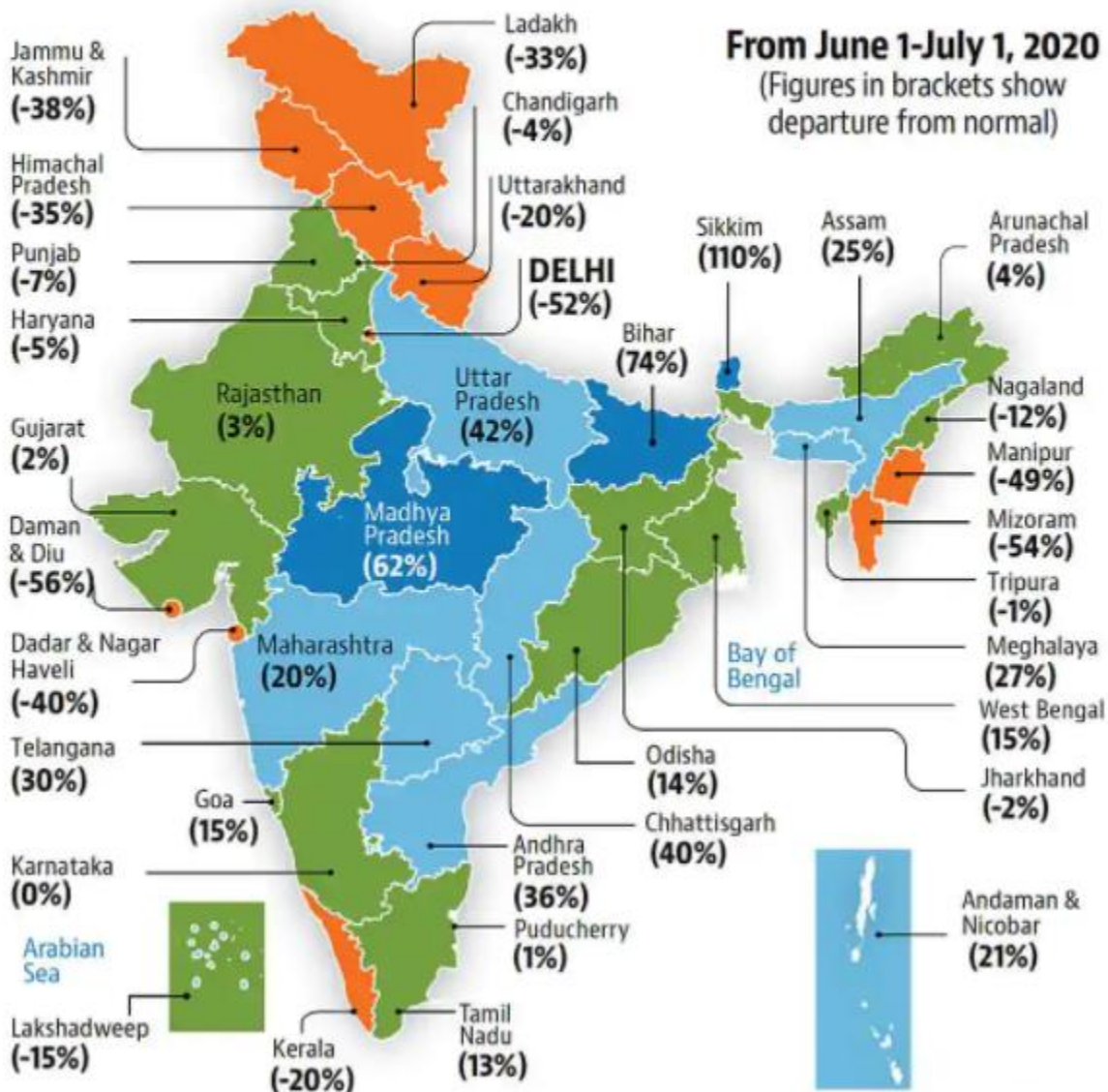
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# One month of monsoon

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



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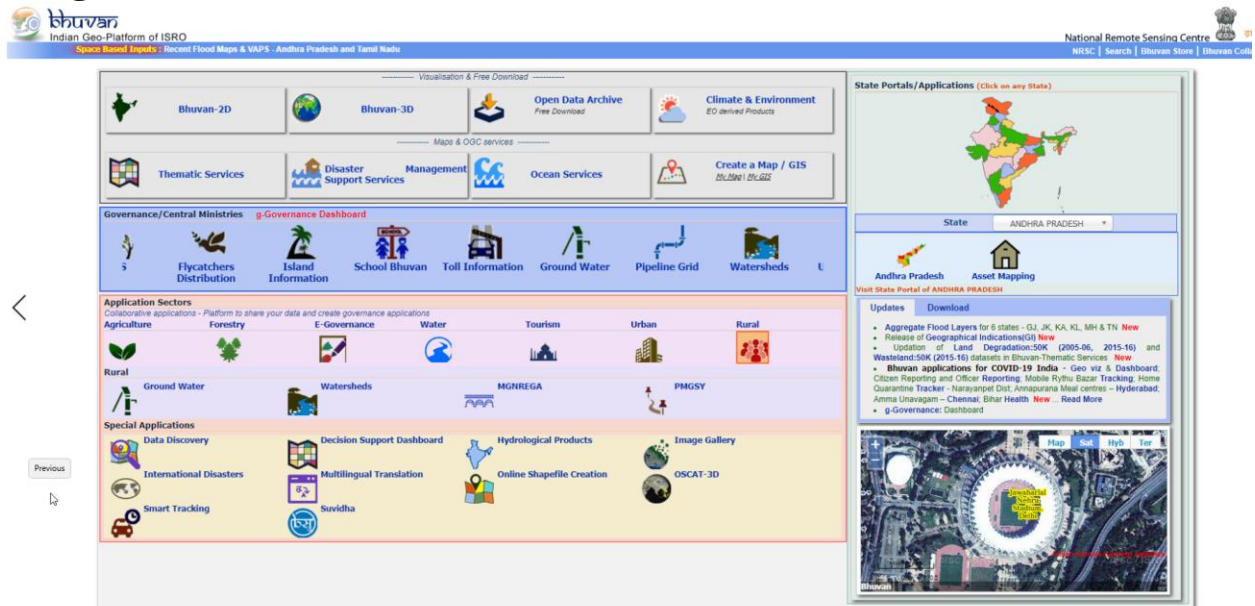
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2) Flood Hierarchy :- The above image includes 5 different flooded Zones wherein It provides the Risk of Areas impacted at the time of monsoon

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.

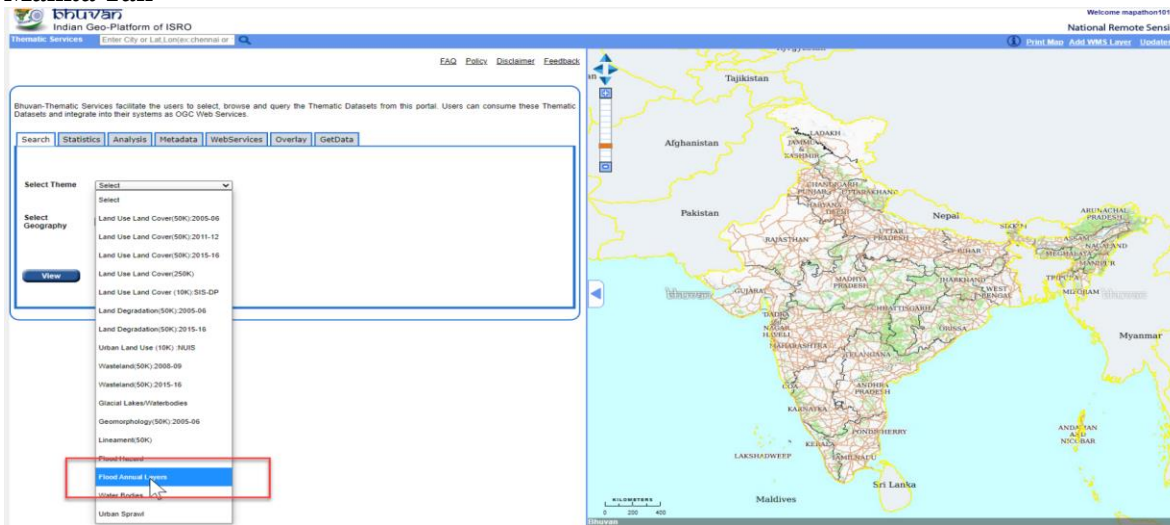
#### Image no 2:





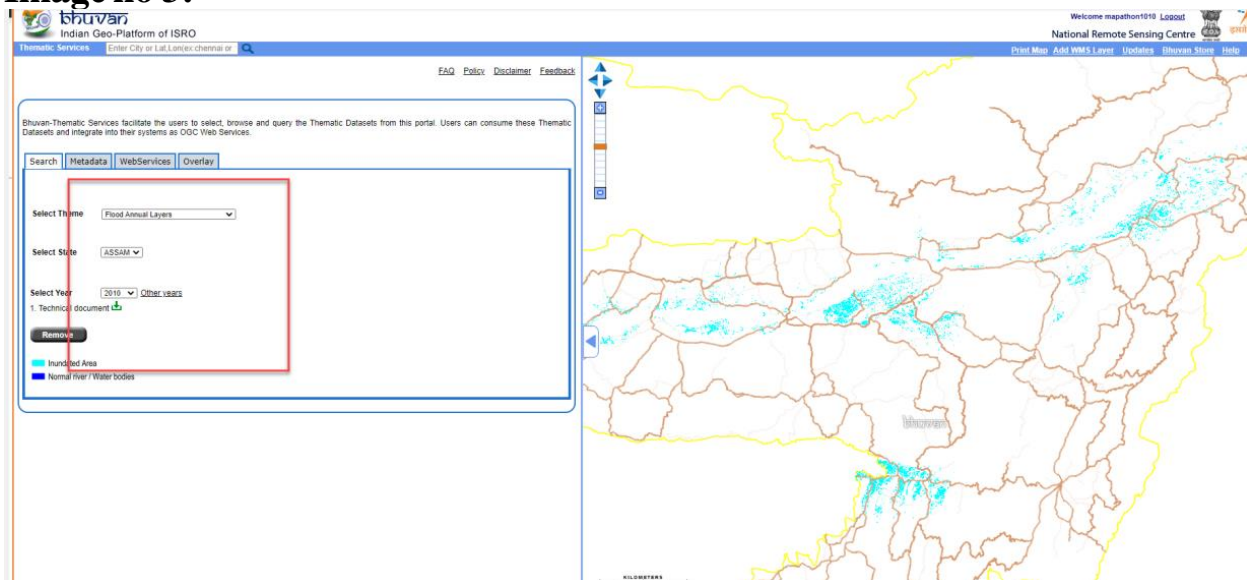
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Proceed further by selecting the Flood annual Layers from Bhuvan store

### 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

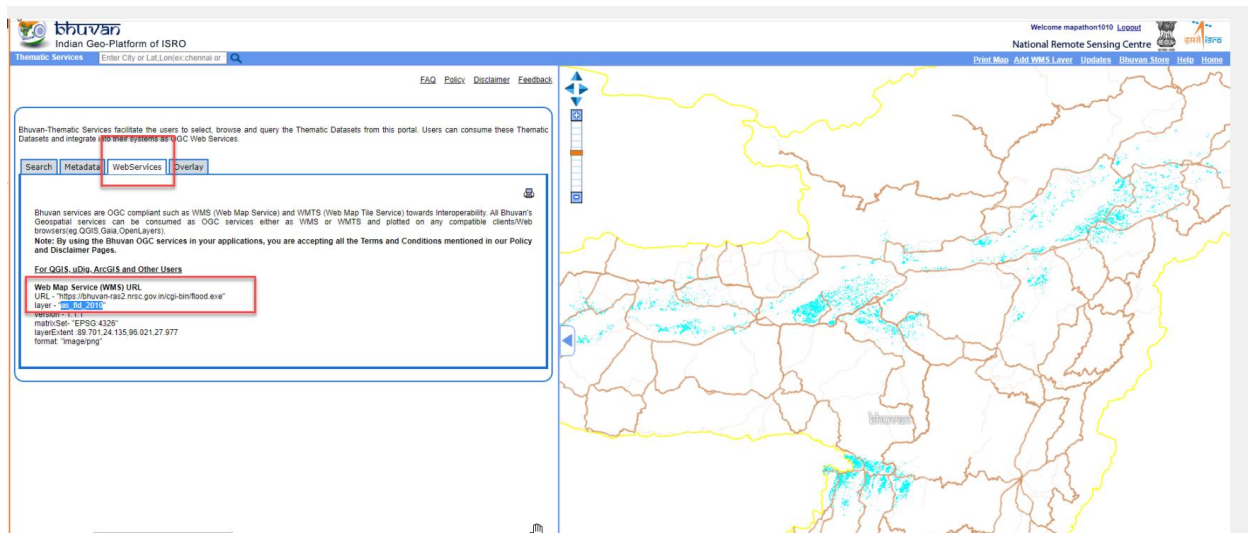
After selecting the Dataset we then moved to the Web services panel where the



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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



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

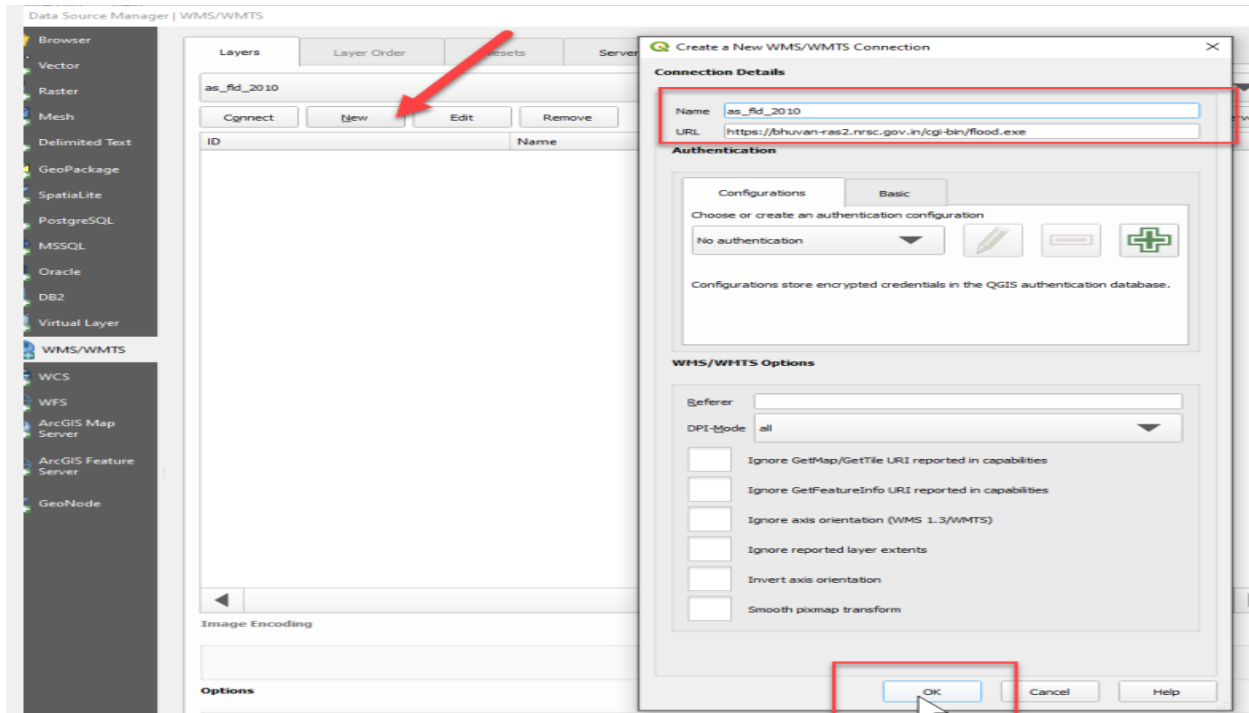
Name :- As\_FLD\_2010

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



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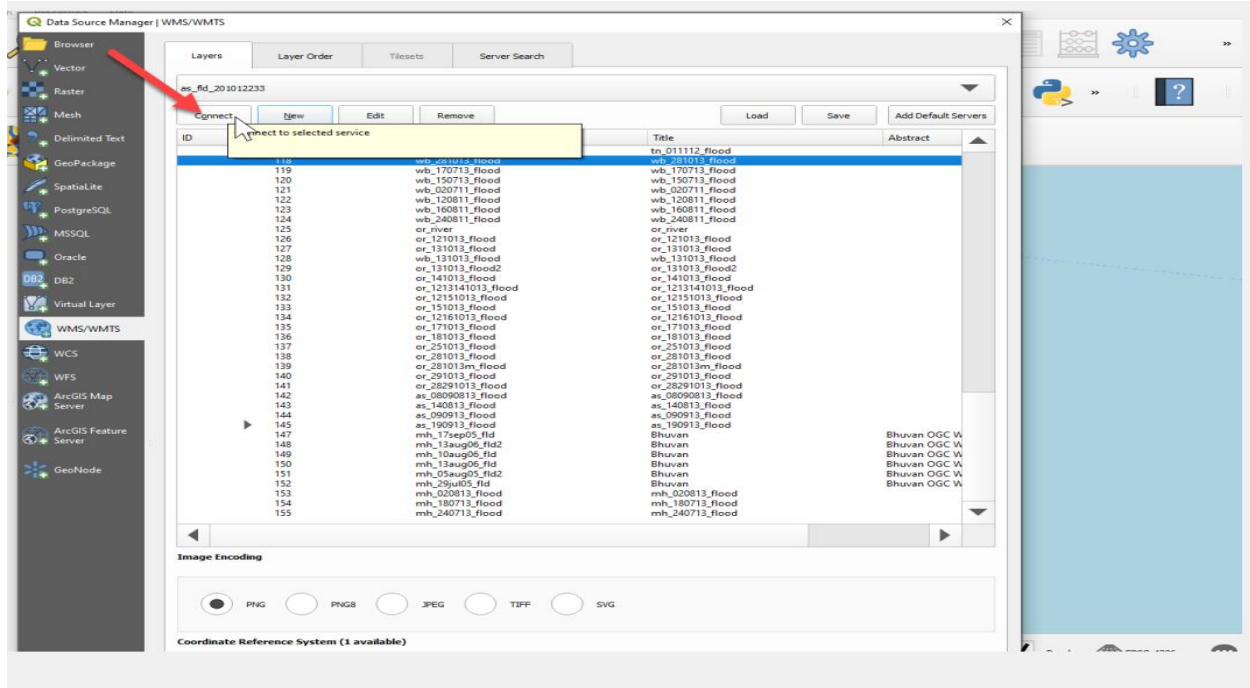


After clicking on the Ok button you can find the connection tab through which we can get the different Datasets and Services Layers



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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





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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 and 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

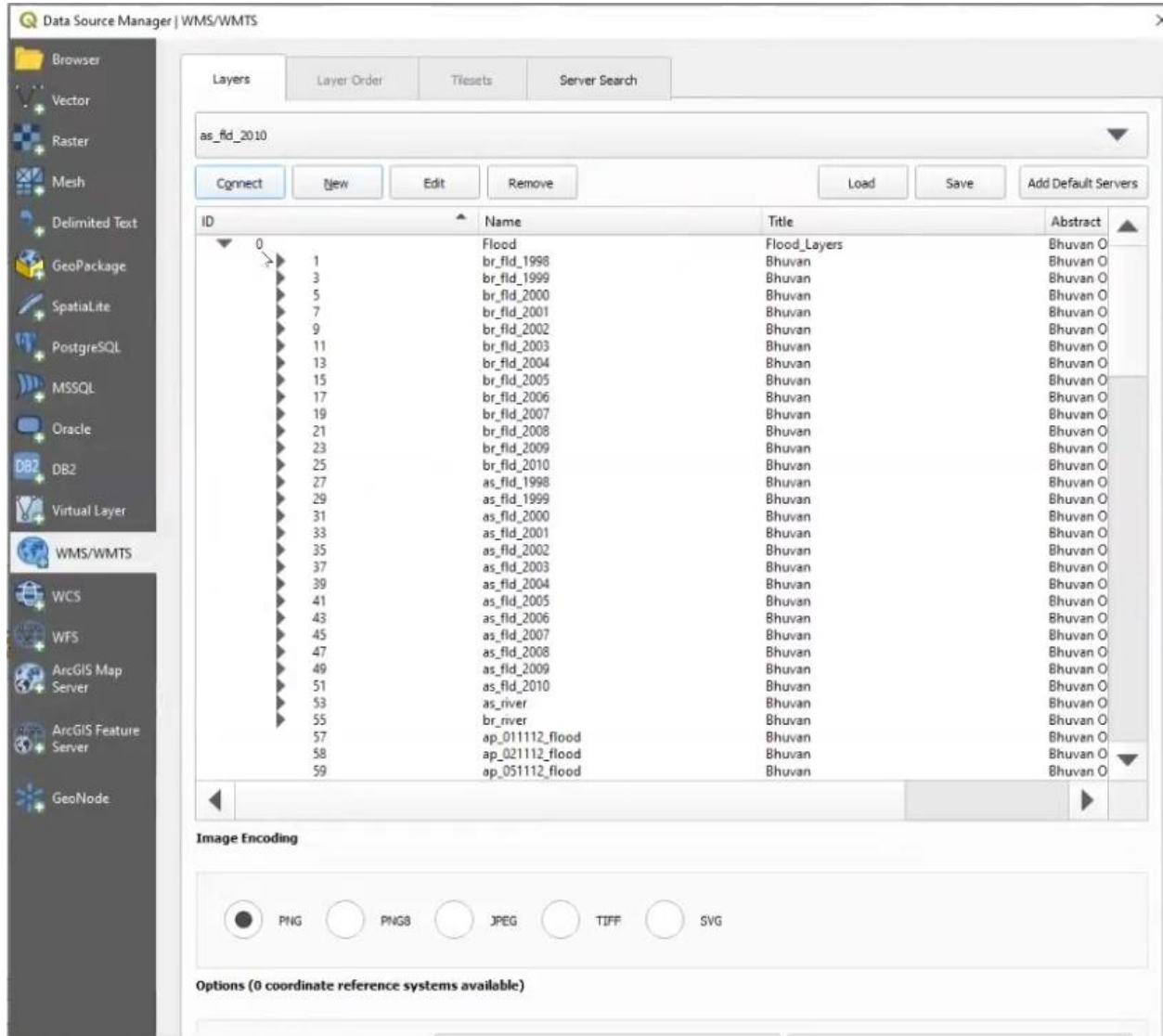
Name :- As\_FLD\_2010

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.



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

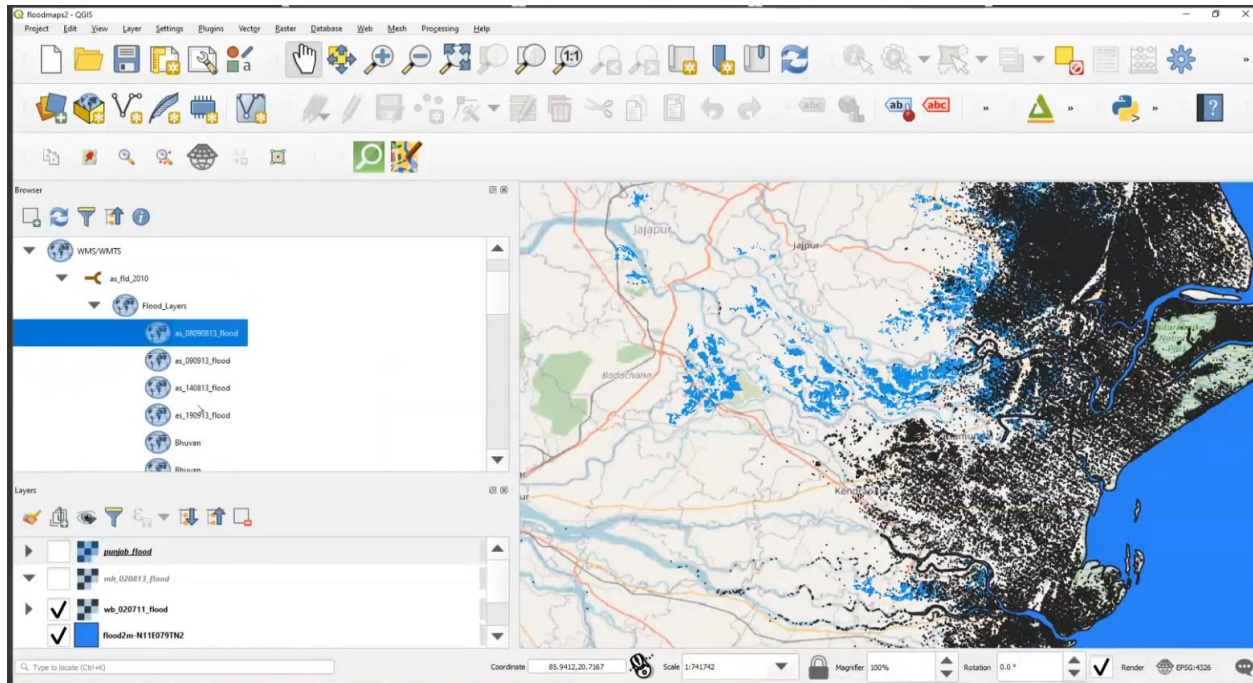
Here as soon as we added this ISRO link the Layer gets start Processing

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

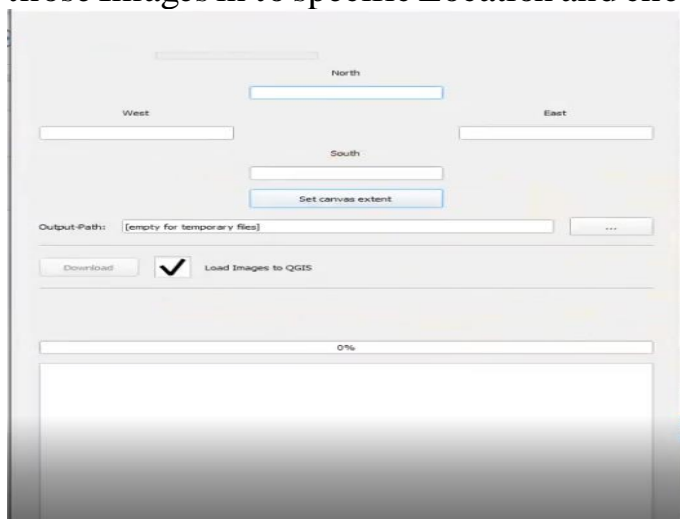


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**Step 3** : Zoom to Respective Layer state and Right click Bottom and select  
 EPGS:WGS84 ->click on ok to redirect it in project format  
 Now switch to Canvas Setting by creating and Saving your files and download  
 those Images in to specific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

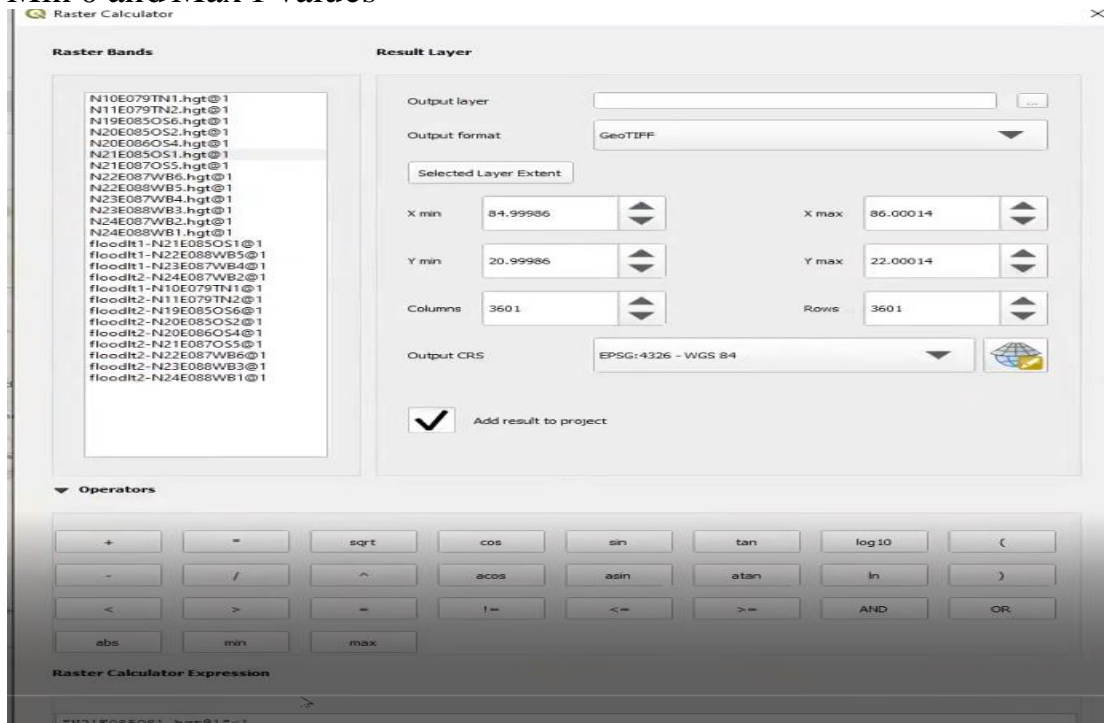




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**Step 4** : Further we moved for Raster Calculation to visualize it's Calculus expressions and double click on the specific Layer and we measured it as < 1 meter and save that conversion file to folder as floodlt1-N21E085OS1.tif extension and set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



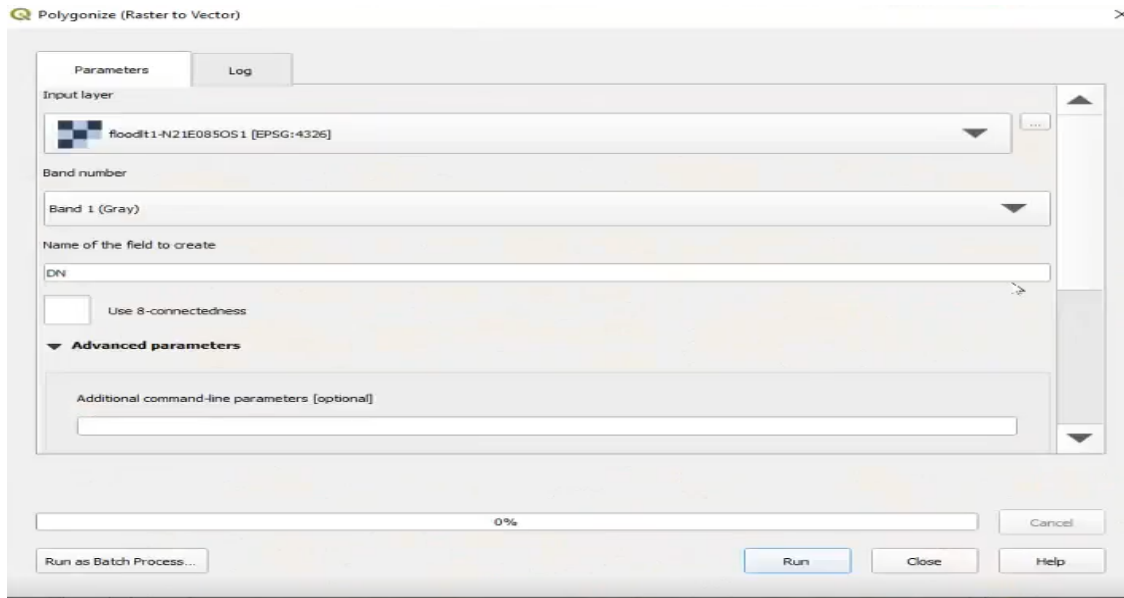
**Step 5:** Further after Raster Calculation we moved ahead to conversion and selected polygonise(Raster to Vector) by saving it's file as "Floodlt1m-N21E085OS1WB1.shp and save in the given location





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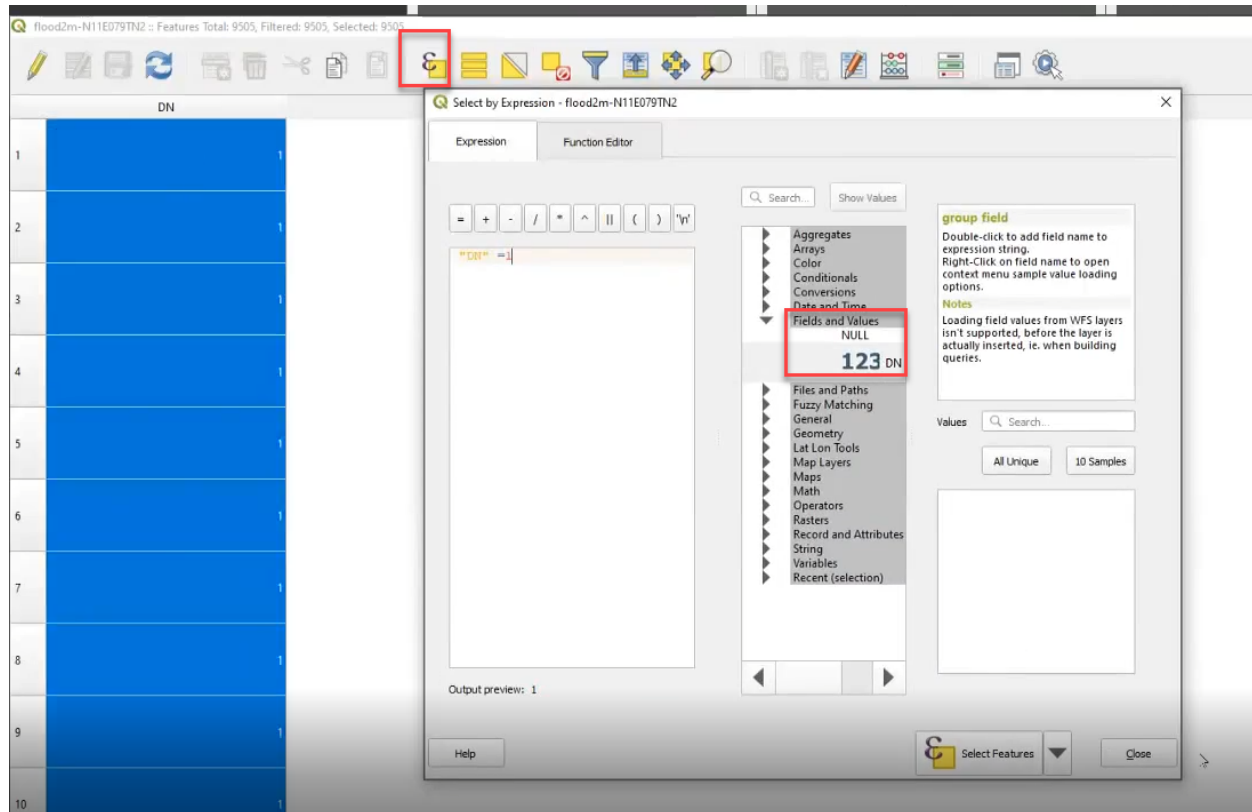


**Step 6:** After Raster to Vector Conversion we generated the File for the specific region and for that layer right click on the generated converted layer ->click on open attribute Table :and click on DN map and select the Fields and Values to make all the Visible selected meter range of floods in the 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 .



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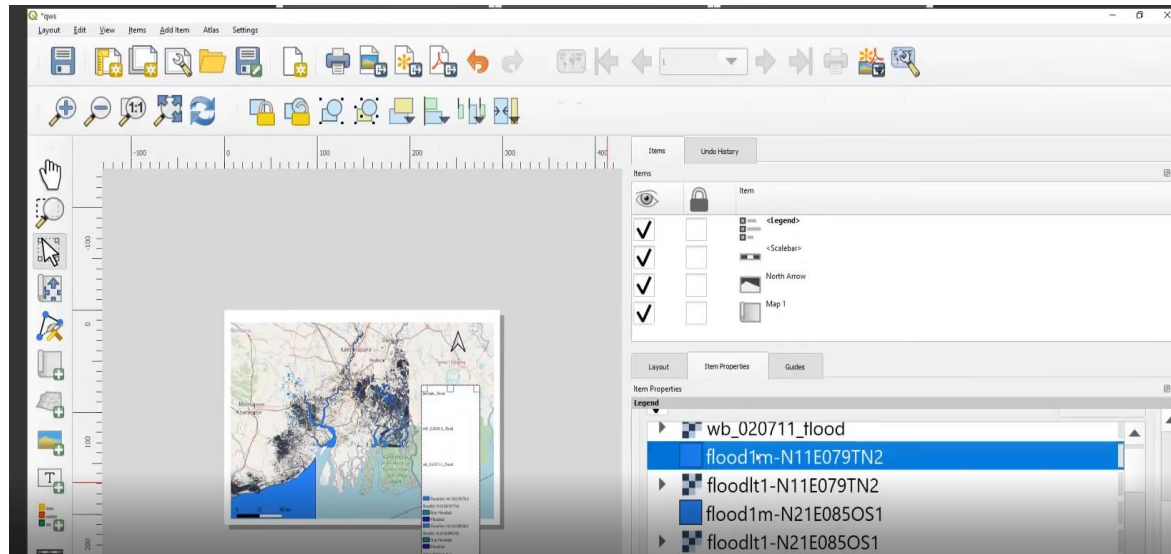


**Step 7:** Now we moved to Save these all Project to our final output by creating it's PDF Converted print layout Map in the form of Map  
Select Project->new Print Layout->save it by giving it name and ok ->click on add items add Maps , North Arrow and Legend and Scale Bar for More information and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



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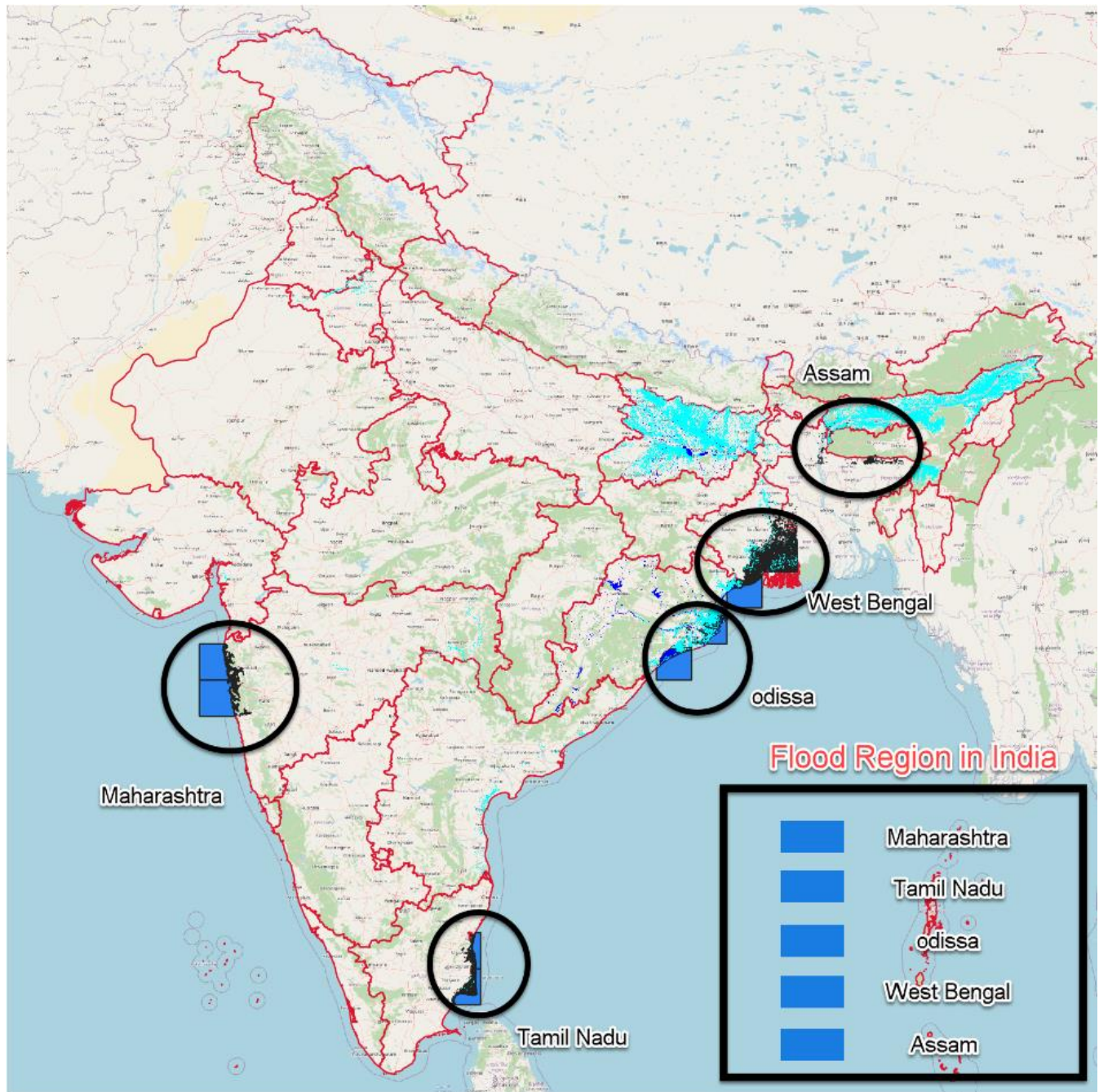


and after the final stage with the addition of Different sub Map Items we get one Generated club Map for all the coded area  
and we coded for all the Five States where we Found and Analyzed the large number of Flood Risk Portion (Assam, Tamil Nadu, West Bengal, Orissa, Maharashtra)



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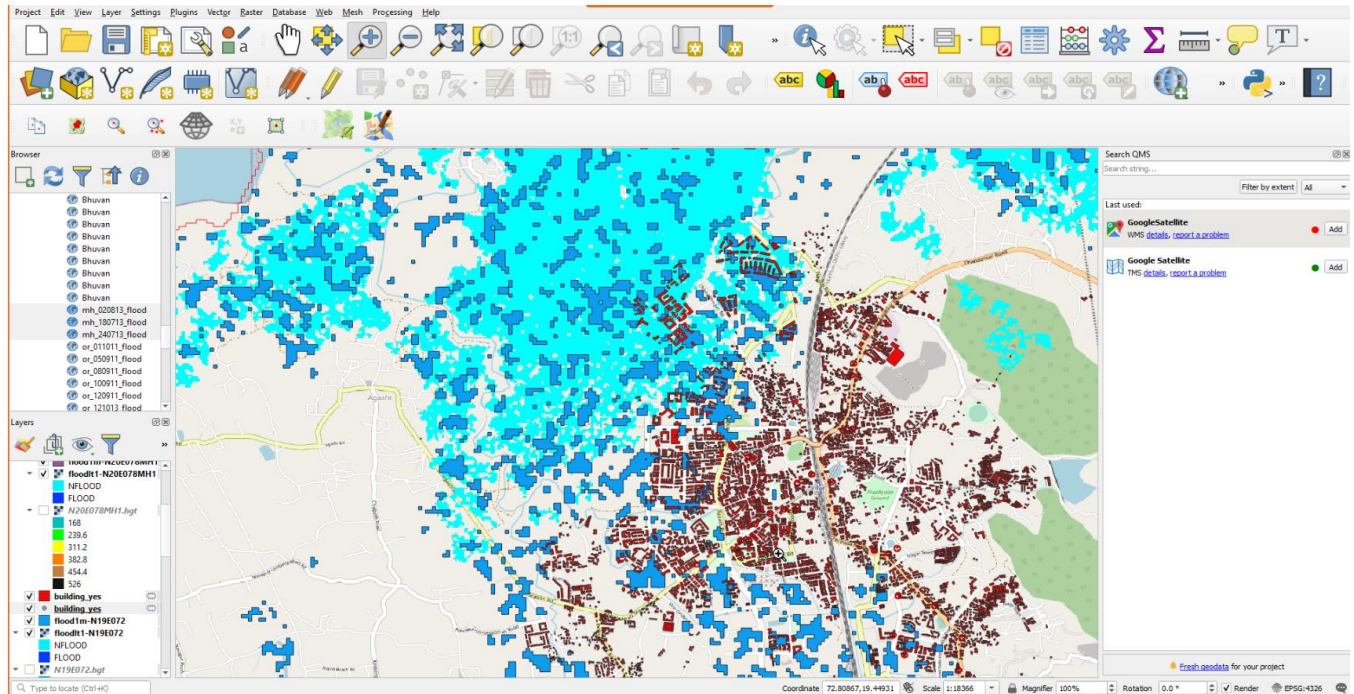
Also we added Buildings to make it more Visualized manner for the Flooded regions





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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



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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#](https://bhuvan.nrsc.gov.in/bhuvan_links.php#)

Resource page :FOSSIEE

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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 and Spatial analysis

solve Complex Spatial analysis Problems



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