

# CE203: Geospatial Engineering

## Assignment 6: Raster Analysis & Interpolation

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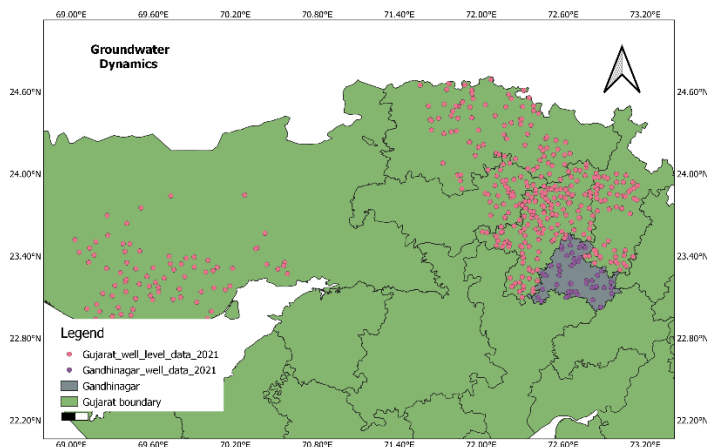
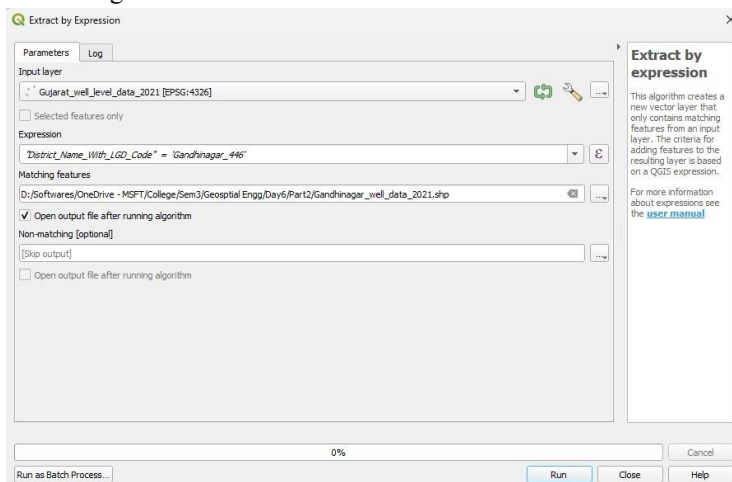
### Groundwater Dynamics

Groundwater plays a crucial role in sustaining agricultural practices and ensuring water security in many regions. Understanding the spatial variation in groundwater levels is essential for effective groundwater resource management.

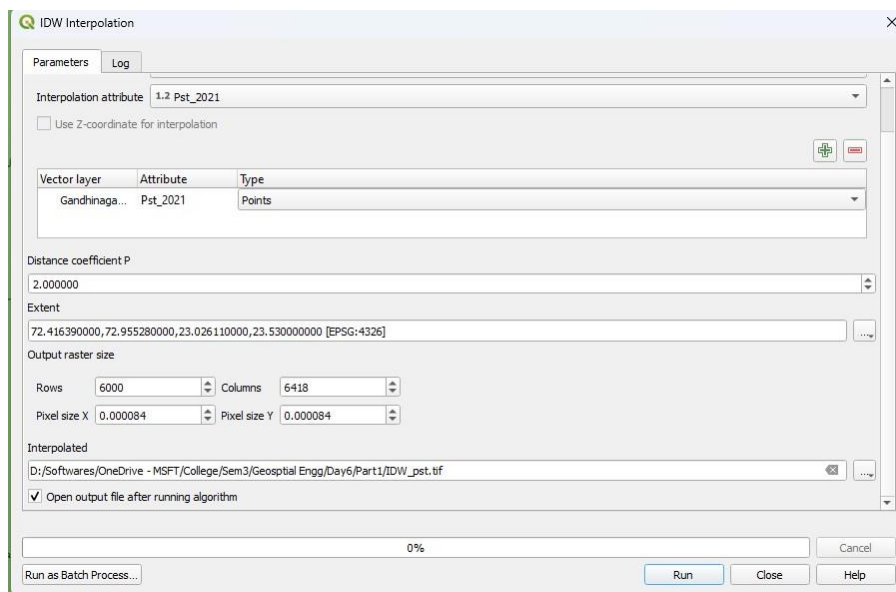
Now, based on the provided groundwater depth data of the pre- and post-monsoon season of 2021,

- **Demonstrate the spatial variation in the pre and post-monsoon season**

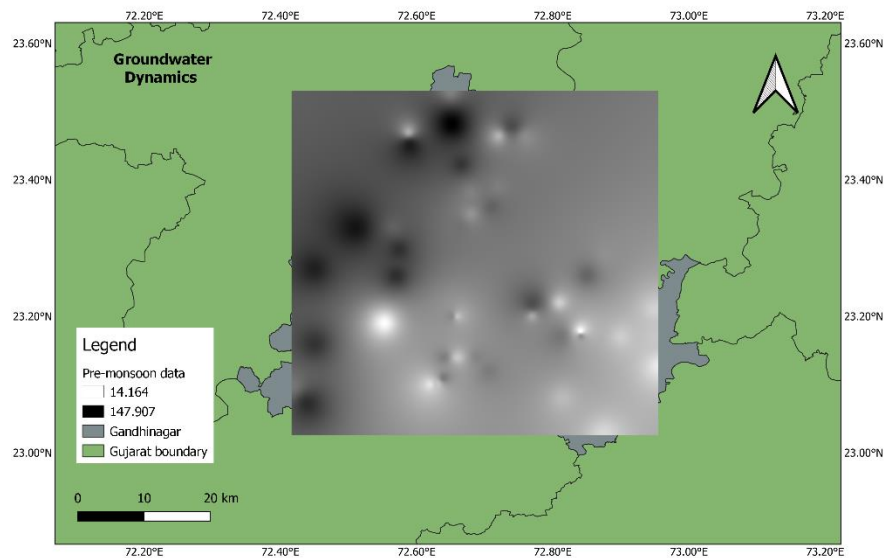
First, import the csv file and use the extract by expression to extract the points inside the Gandhinagar area.

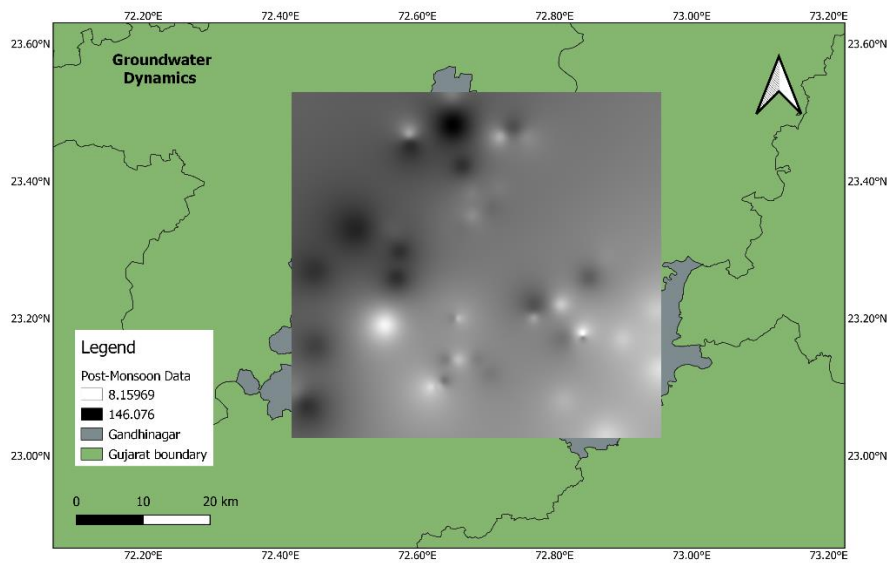


Then we'll use IDW interpolation for pre-monsoon attribute and post- monsoon attributes,



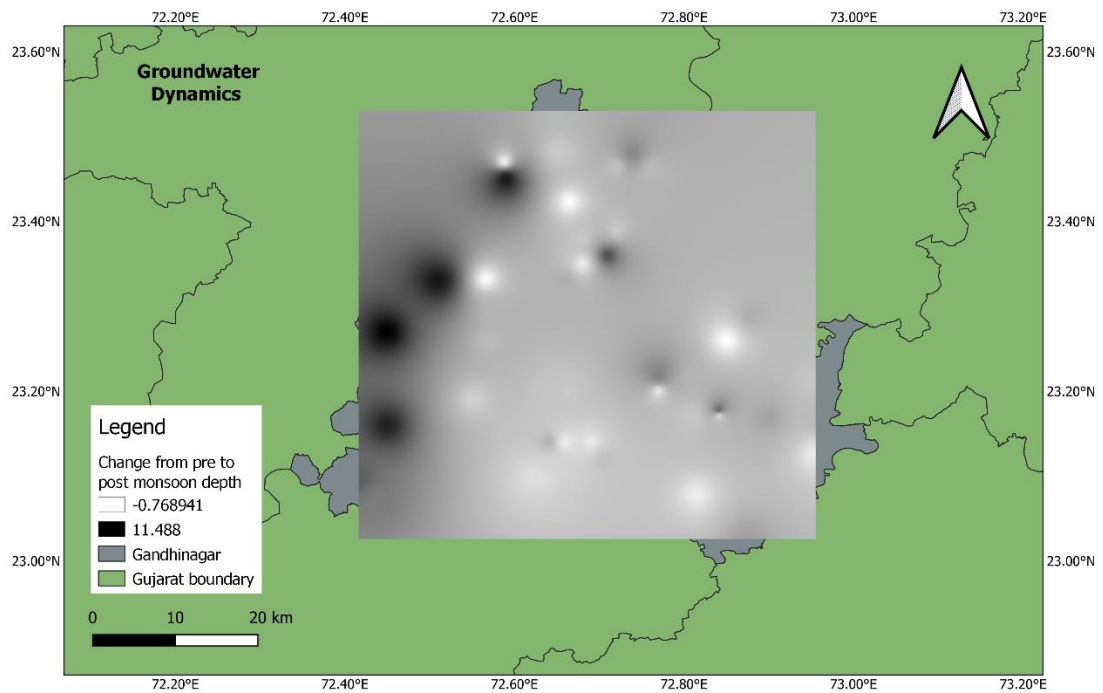
Similarly we can do it for the other case.





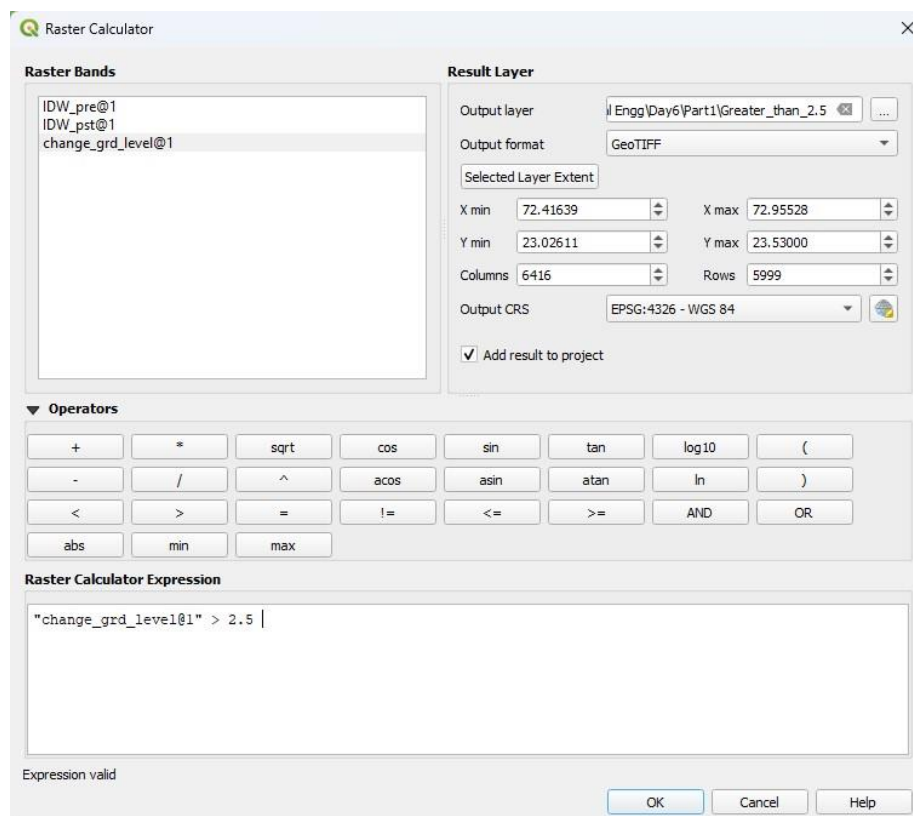
- and also the change of groundwater depth from pre and post-monsoon season (20) for the Gandhinagar block using the IDW interpolation method.

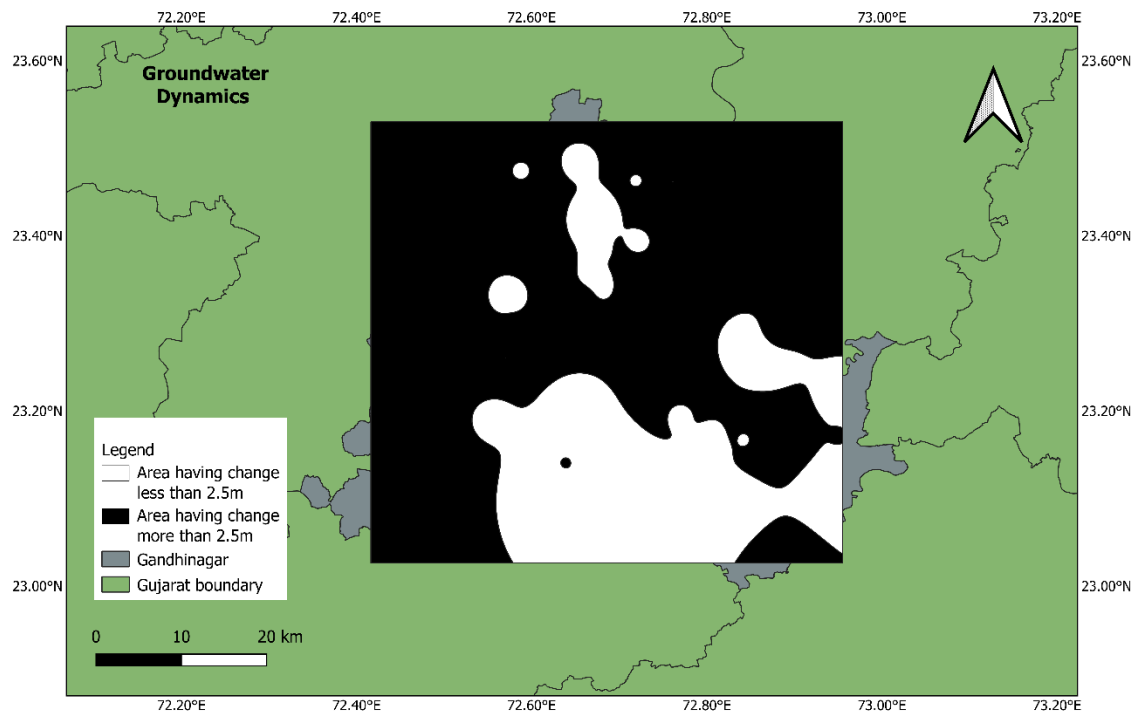
To find the change of groundwater depth from pre and post-monsoon season we can use raster calculator. By taking the difference of the elevations of the raster layers,



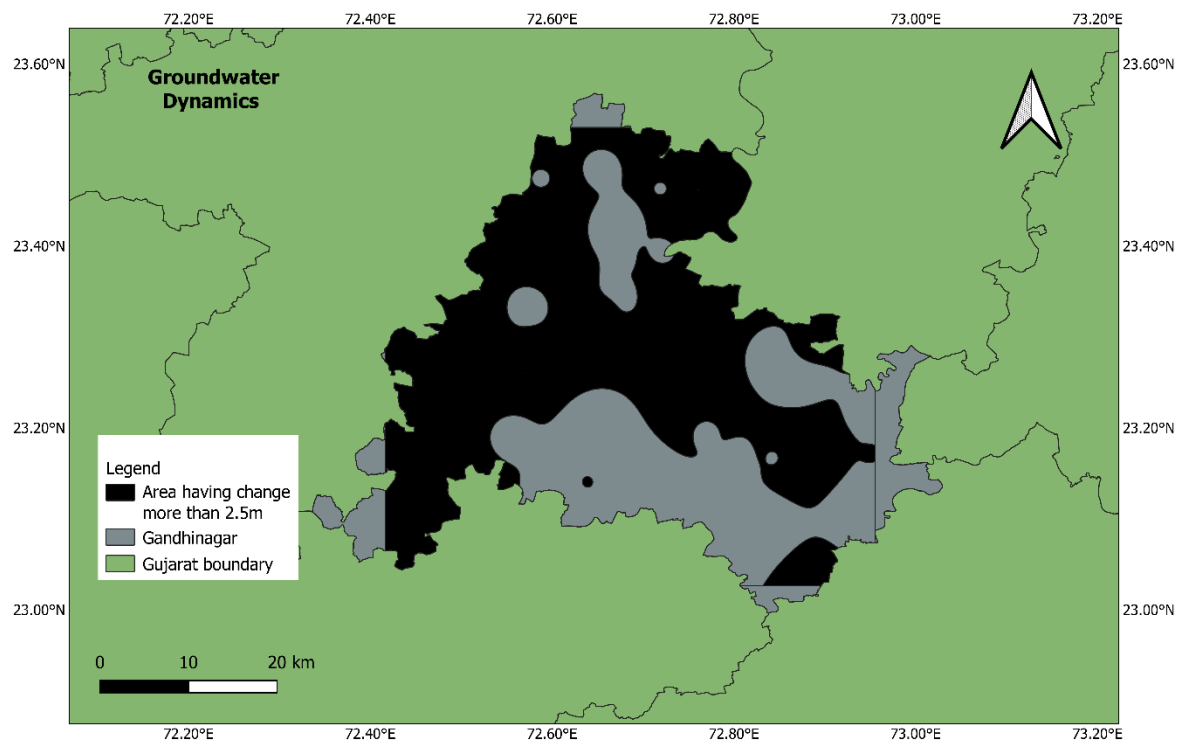
- Also, show the regions having more than 2.5m change in groundwater depth.

We will use raster calculator to show the regions having more than 2.5m change in groundwater depth,





Here, is the final part showing the area having more than 2.5m change in groundwater depth in the monsoon season in the Gandhinagar district,

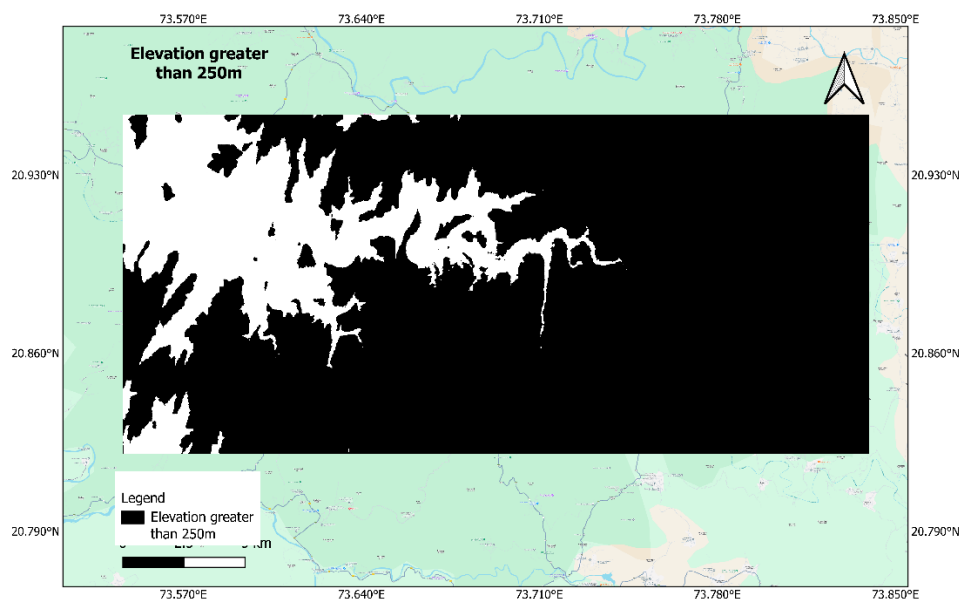
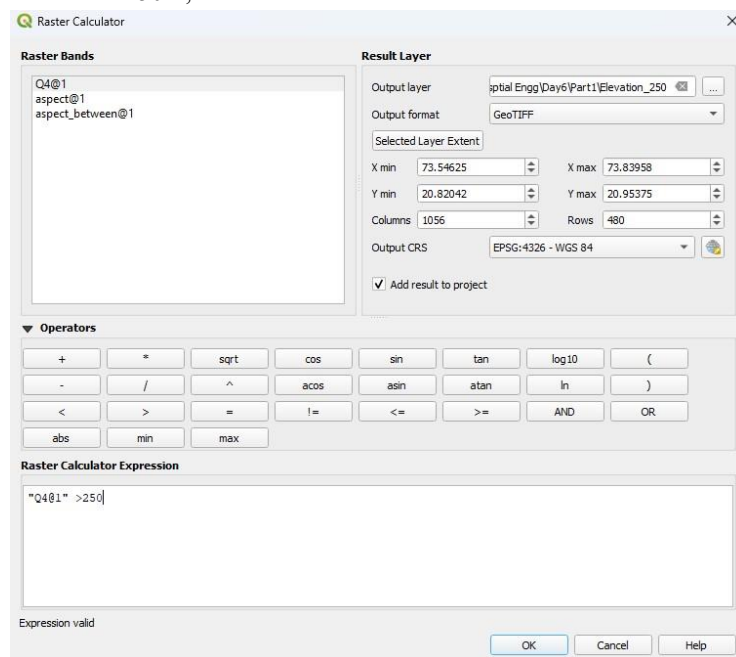


## The Ultimate Hideout amongst Hilly Havoc!

You and your friends are planning to visit some hilly mountains during your winter break. All the hotels are already booked and that's why you are interested in finding a better place that you can use as a campsite. Choosing a campsite is all about choosing a good neighborhood, proper drainage system, water source and best scenic views around. Find out a suitable location (in km<sup>2</sup>; 10 marks) for the campsite using the following criteria. (Area falls in UTM zone 43N.)

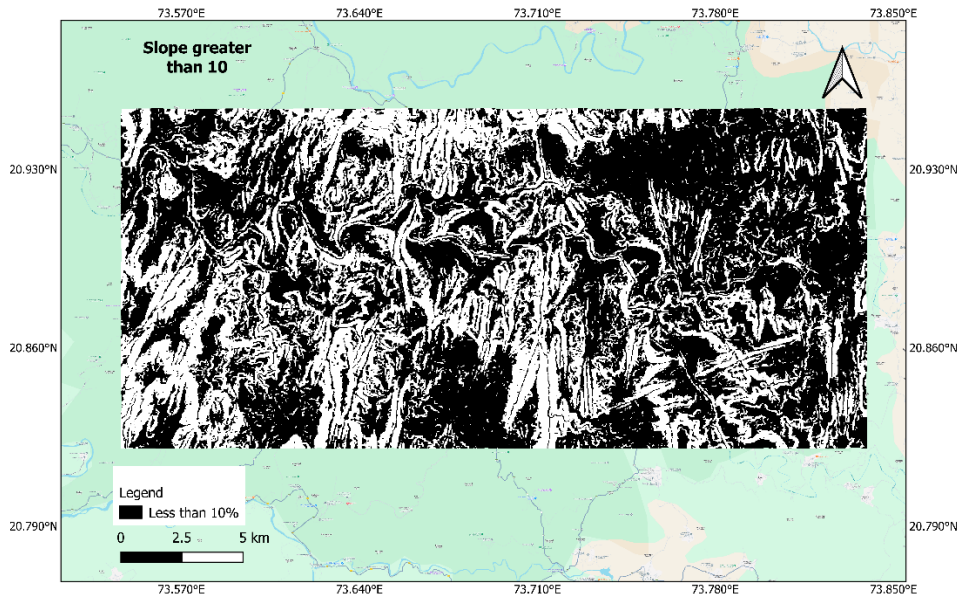
- The site should have an elevation of more than 250 m.

We'll import the given raster layer and use the raster calculator to create a layer having the elevation more than 250m,



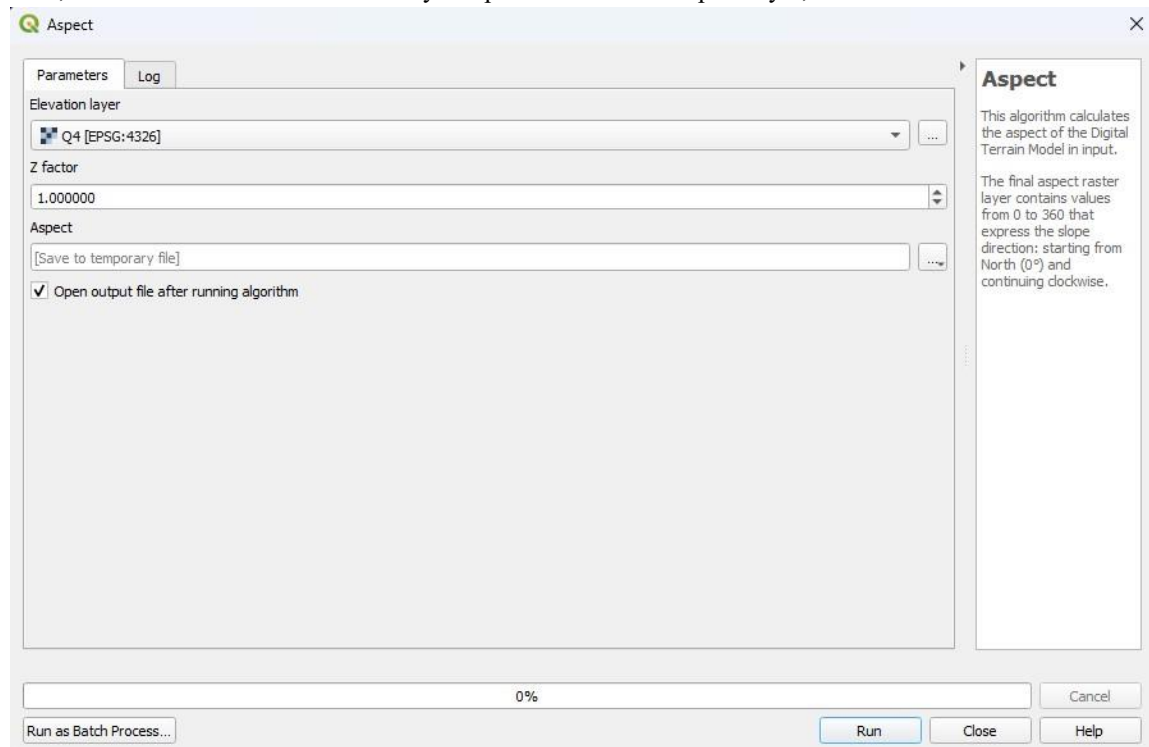
- **The site should have a slope value of less than 10%.**

Using raster calculator to calculate the sites having slope values of less than 10% ,



- **The site should have an aspect value between 90° and 270°.**

First, we'll use the Raster Terrain Analysis option to create an aspect layer,



Then we'll use the raster calculator to calculate the aspect between 90° and 270° ,



Raster Calculator

Raster Bands

Elevation\_250@1

Q4@1

aspect@1

aspect\_between@1

Result Layer

Output layer

...

Output format

GeoTIFF

Selected Layer Extent

X min

73.54625

X max

73.83958

Y min

20.82042

Y max

20.95375

Columns

1056

Rows

480

Output CRS

EPSG:4326 - WGS 84

☒ Add result to project

▼ Operators

+

\*

sqrt

cos

sin

tan

log10

(

-

/

^

acos

asin

atan

ln

)

<

>

=

!=

<=

>=

AND

OR

abs

min

max

Raster Calculator Expression

"aspect@1"<270 AND "aspect@1" >90

Expression valid

OK

Cancel

Help

Aspect between 90 to 270 degree

Legend

Aspect between 90 to 270 degree

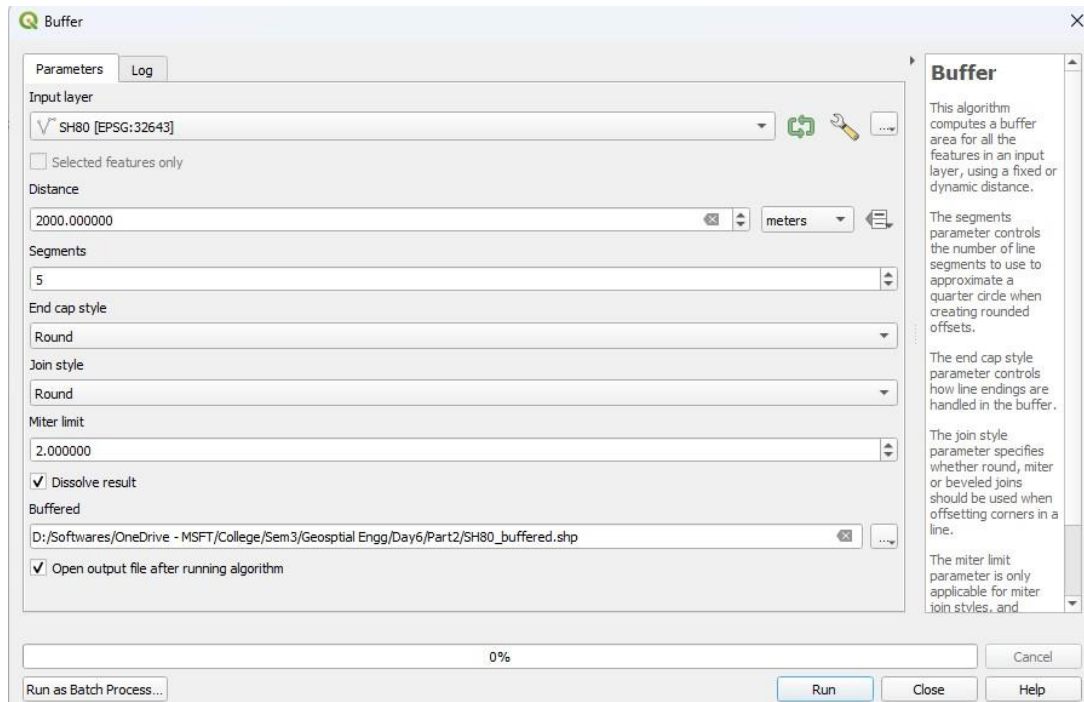
73.570°E 73.640°E 73.710°E 73.780°E 73.850°E

20.930°N 20.860°N 20.790°N

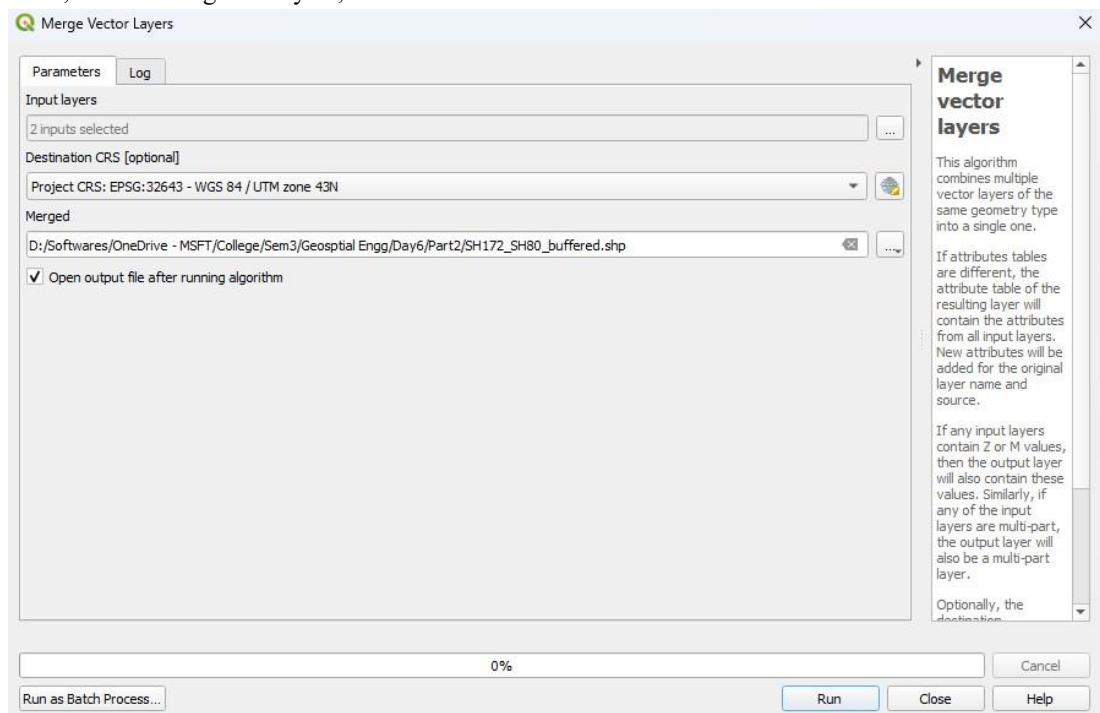


- **The site should not fall within the 3km range of SH172 and 2km from SH80.**

First of all, we will create buffers of for the given Highways,



Then, we will merge the layers,



Now, we will convert this buffer to raster.

Since due to some error this process was showing error,

Then I can't do the rest of the questions