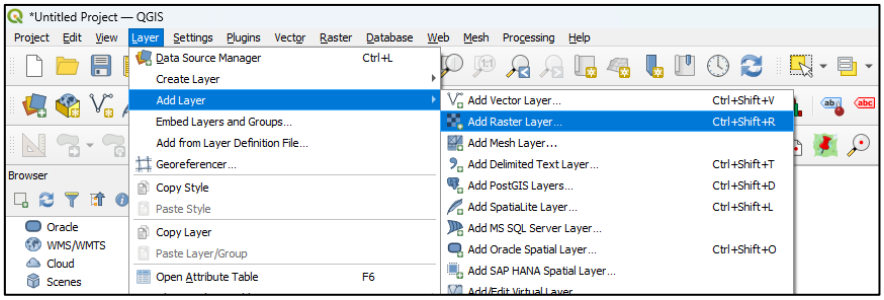
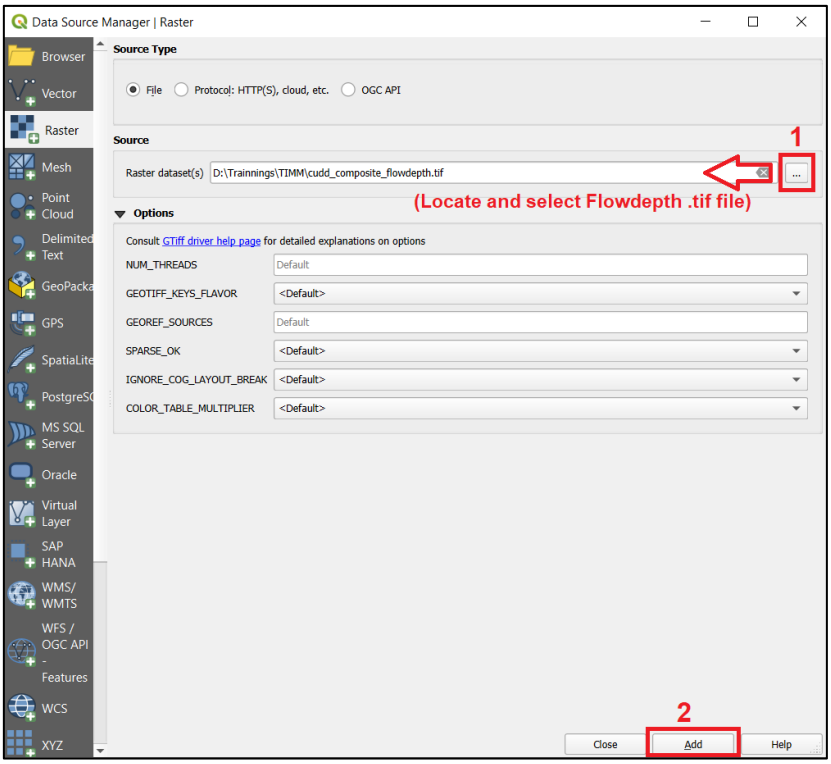
# 4.2 Generation of Hazard Classification based on flow depth

Tsunami hazard mapping based on flow depth helps identify areas with different levels of potential impact during a tsunami event. By classifying flow depth values from a raster dataset into hazard zones, it becomes easier to visualize and analyse the spatial distribution of tsunami risk.

1. Add Flowdepth layer to map layer by clicking Layer → Add Layer → Add Raster Layer..



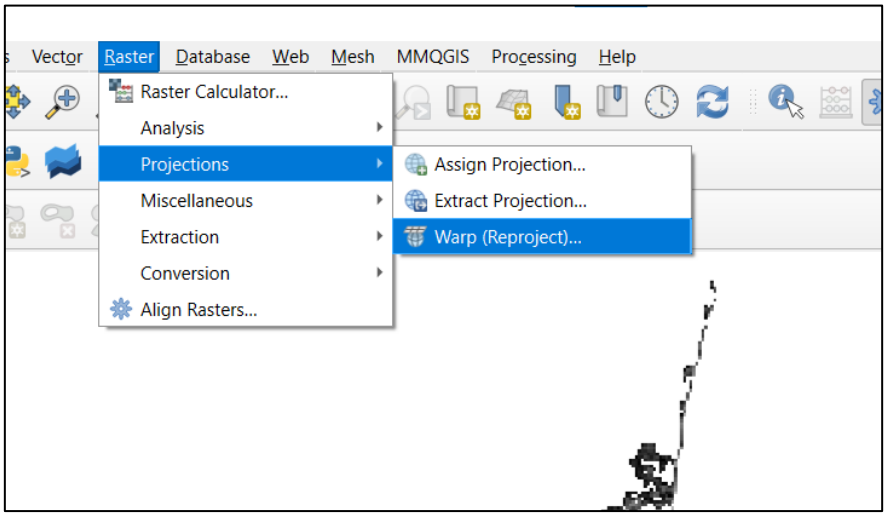

2. Use browser button to locate directory and select .tif file → Add → Close



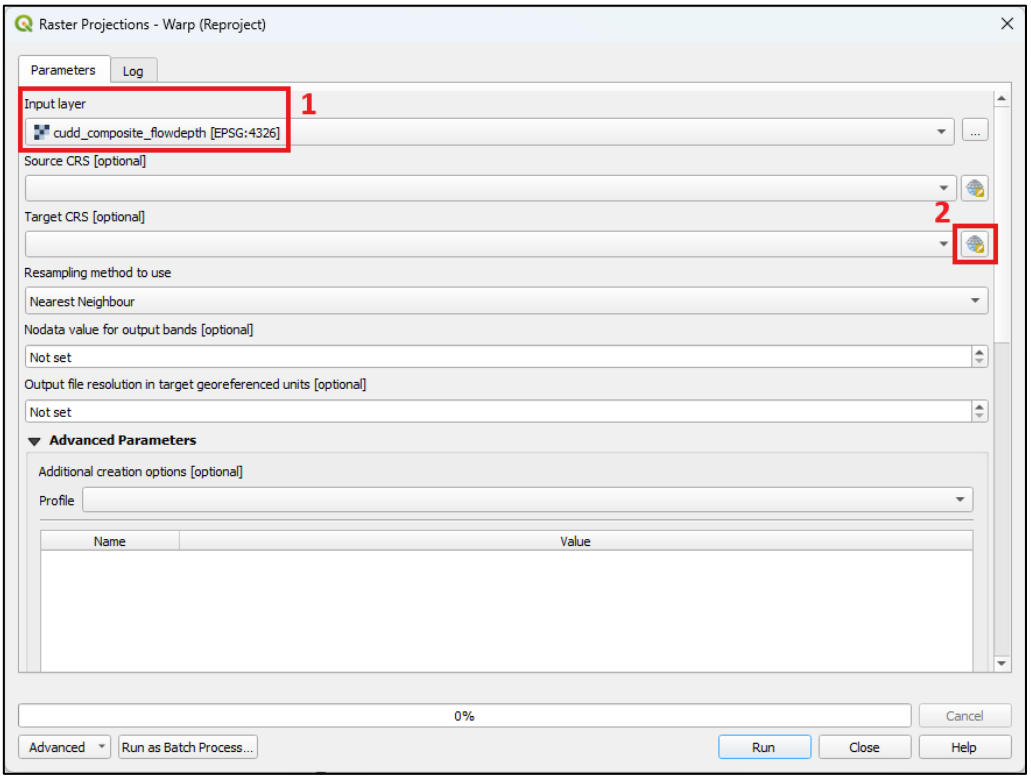

3. Image Wrap:

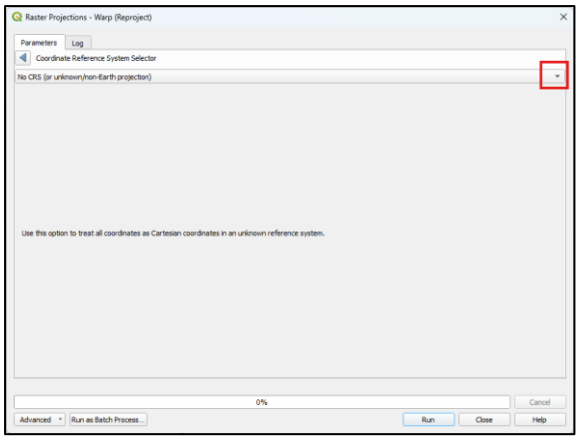
   We reproject the image to the coordinate system in which the map is being developed and worked. This step is very important because ComMIT contains the WGS-84 projection in this direction and many applications may experience problems when making projections with automatic coordinates.

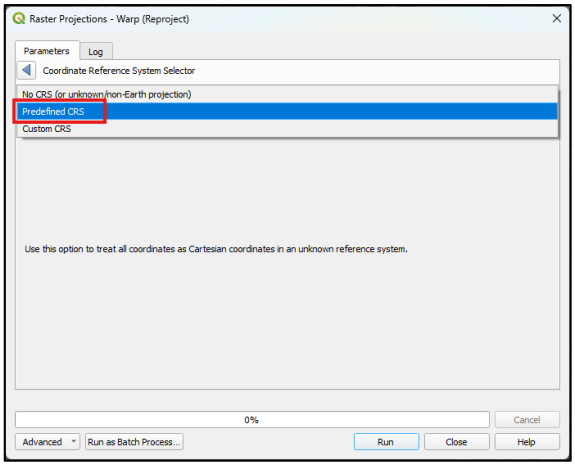
- Go to Raster → Projections → Warp (Reproject)…

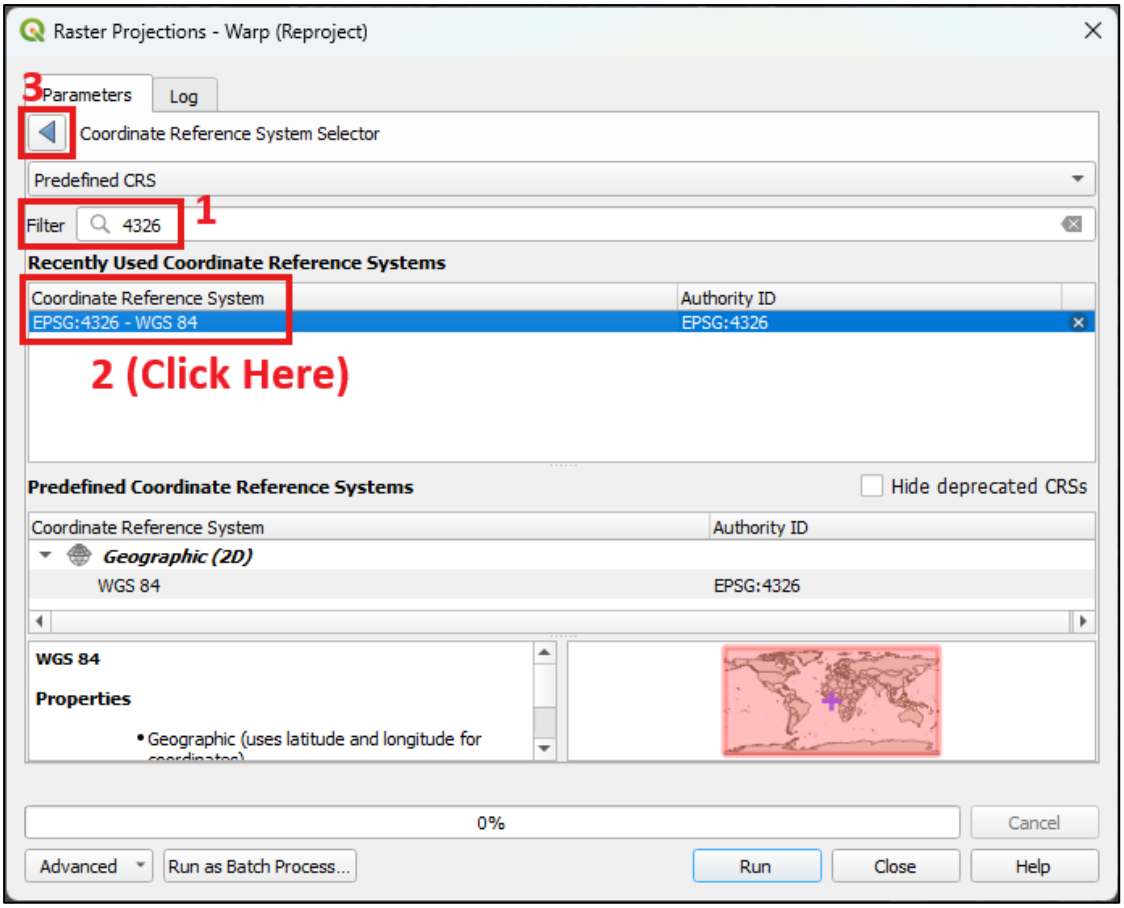


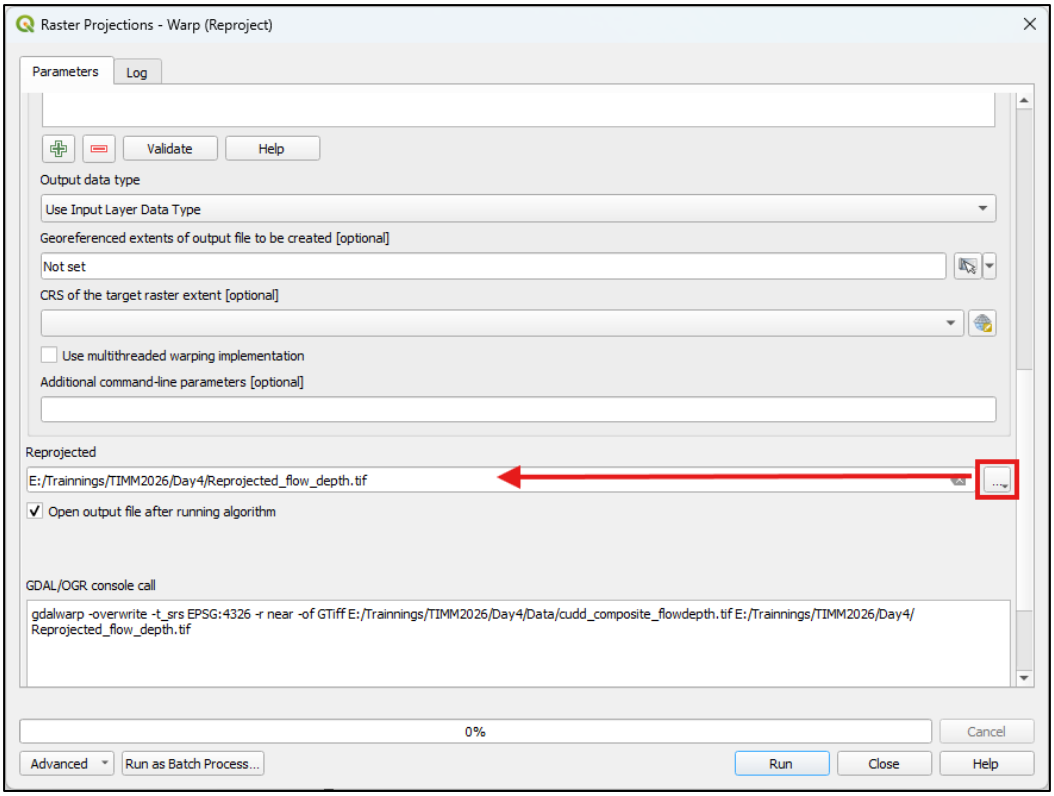

- The following dialog appears keep blank as source CRS, target CRS as EPSG: 4326-WGS 84 as given in the following.
- Enter the output file name as reproject.tif



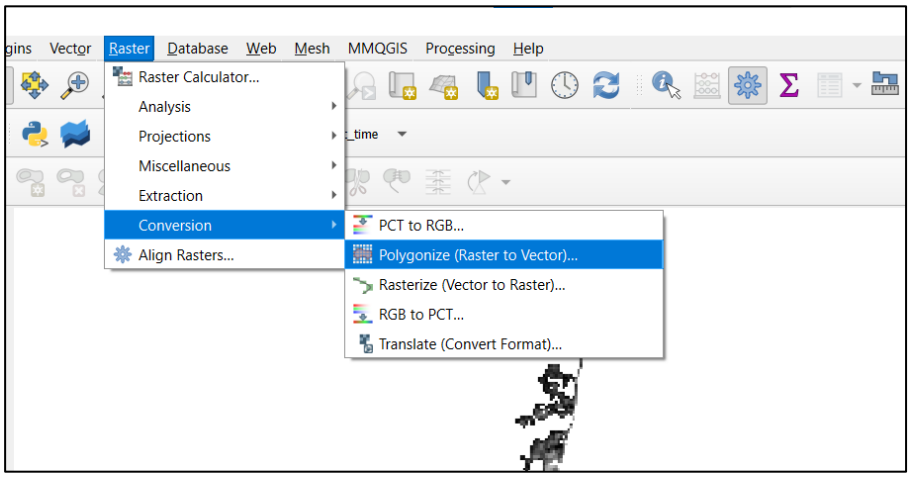

Raster Projections - Warp (Reproject)
Parameters
Log
Coordinate Reference System Selector
No CRS (or unknown/non-Earth projection)
Use this option to treat all coordinates as Cartesian coordinates in an unknown reference system.
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help


Raster Projections - Warp (Reproject)
Parameters
Log
Coordinate Reference System Selector
No CRS (or unknown/non-Earth projection)
Predefined CRS
Custom CRS
Use this option to treat all coordinates as Cartesian coordinates in an unknown reference system.
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help

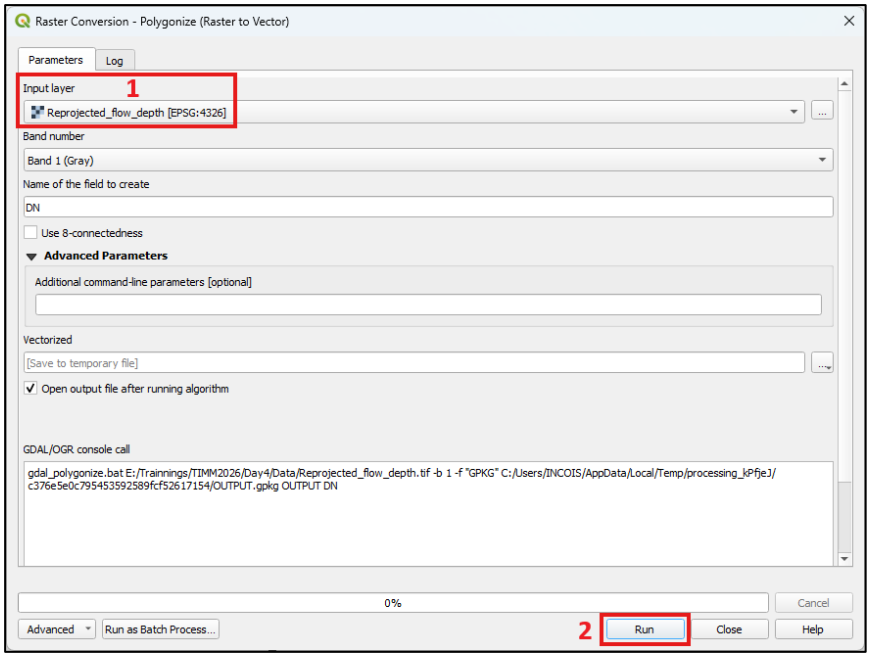

Raster Projections - Warp (Reproject)
3
Parameters
Log
Coordinate Reference System Selector
Predefined CRS
Filter
4326
1
Recently Used Coordinate Reference Systems
Coordinate Reference System
Authority ID
EPSG:4326 - WGS 84
EPSG:4326
2 (Click Here)
Predefined Coordinate Reference Systems
Hide deprecated CRSs
Coordinate Reference System
Authority ID
Geographic (2D)
WGS 84
EPSG:4326
WGS 84
Properties
• Geographic (uses latitude and longitude for
0%
Cancel
Advanced
Run as Batch Process...
Run
Close
Help



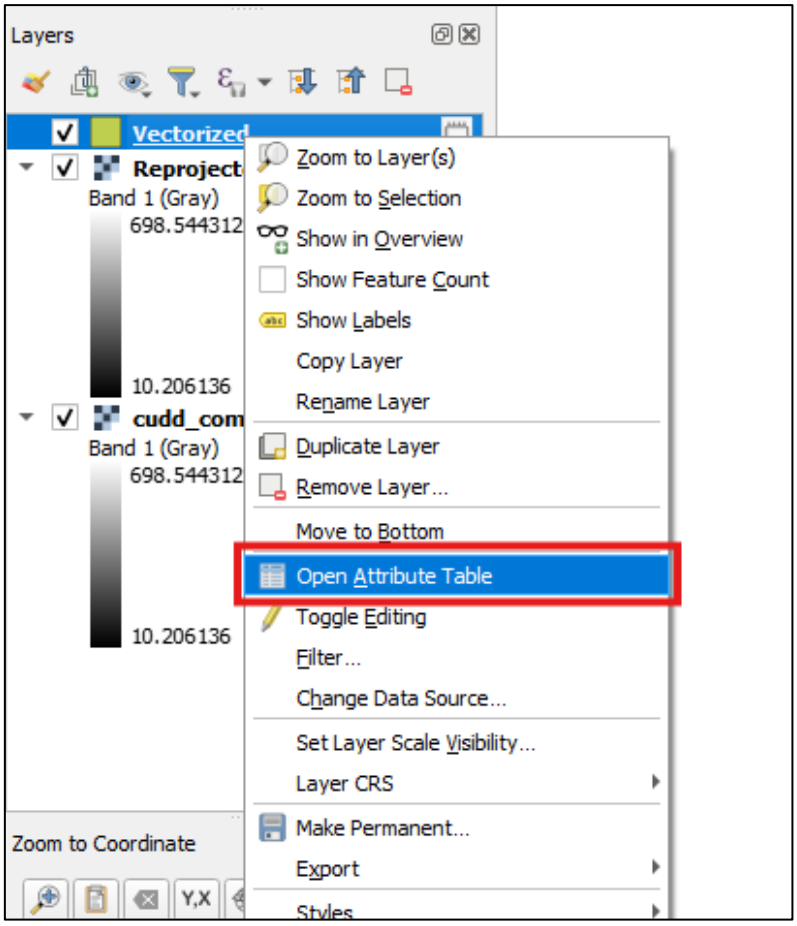

4. Raster to Vector Conversion:
    - Raster → Conversion → Select the option "Raster, Conversion, Polygonize (Raster to Vector)".



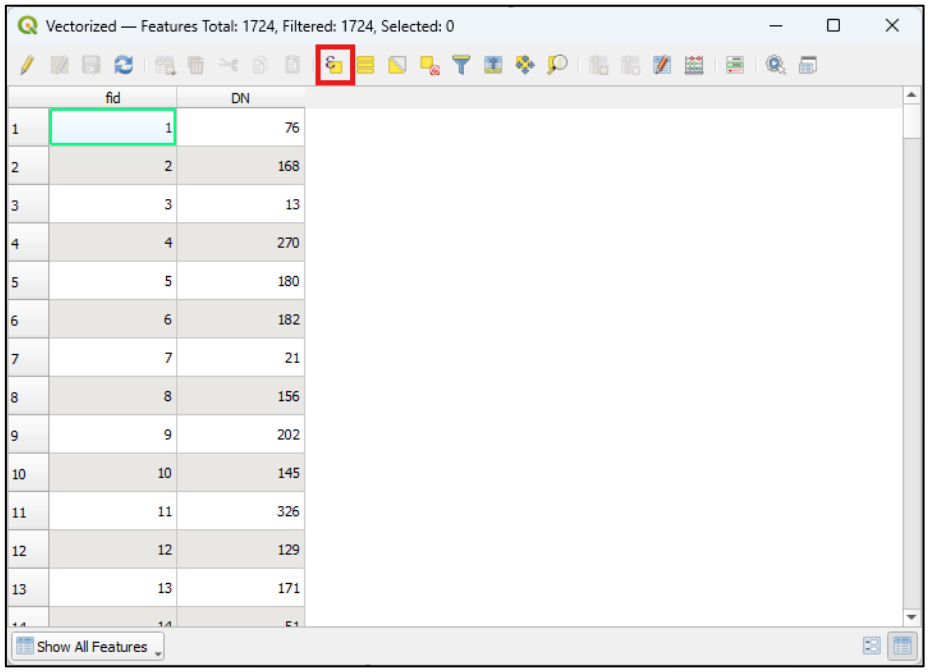

- Make sure the input file “reproject.tif” is selected, then select “DN” in the field. Then run the vector file that corresponds to the flow depth is created.

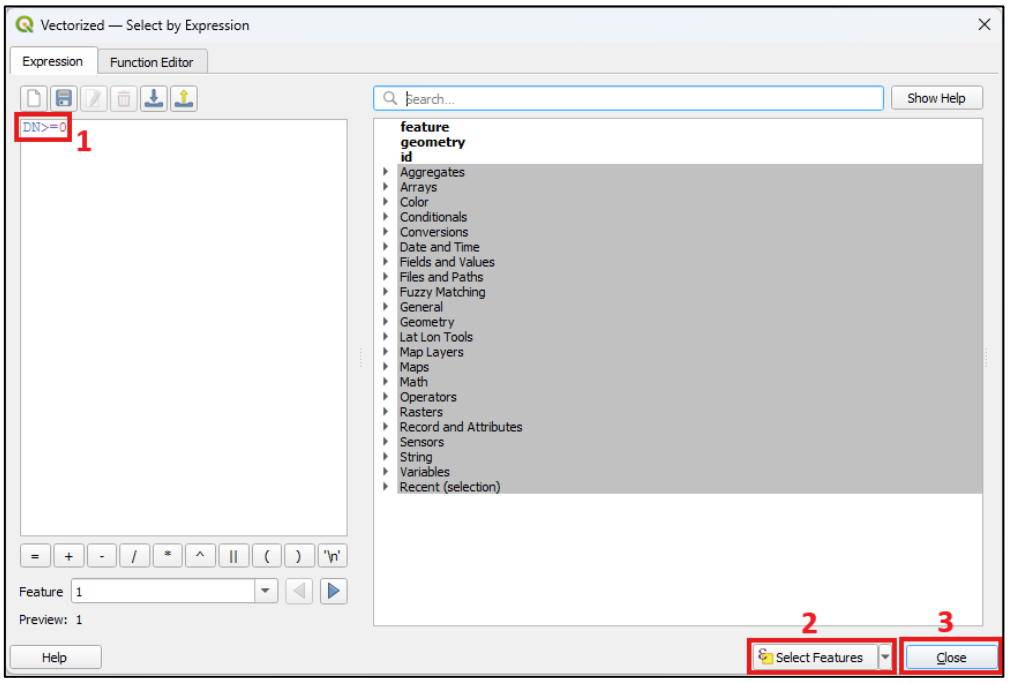



5. We must retain the inundation areas as the flow depth values (DN values here) are greater than zero. The DN values zero are the areas outside the inundation, hence we must remove the zero values in the vector. To do this we have to open the attribute table of the Vectorized.shp by right clicking on the layer select open attribute table as shown below.

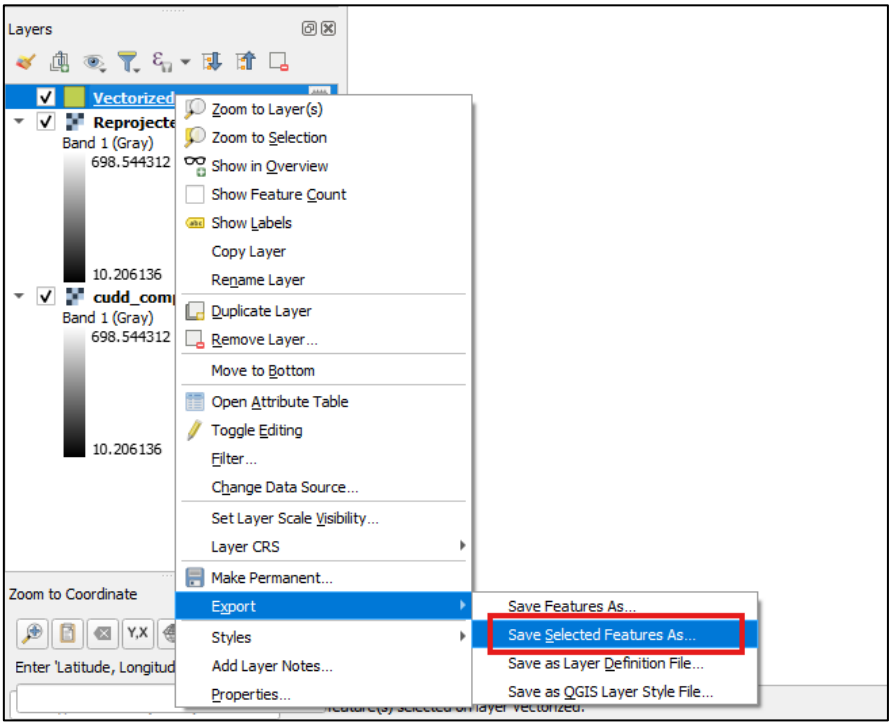


- Select the tool "Select feature by expression" ( ) and type DN >= 0 and select

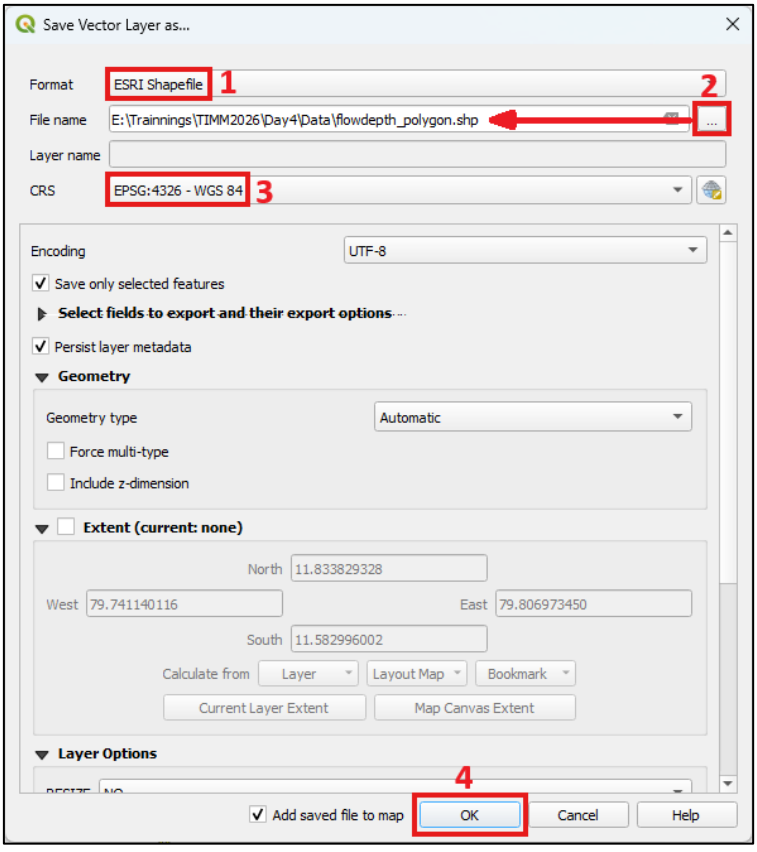


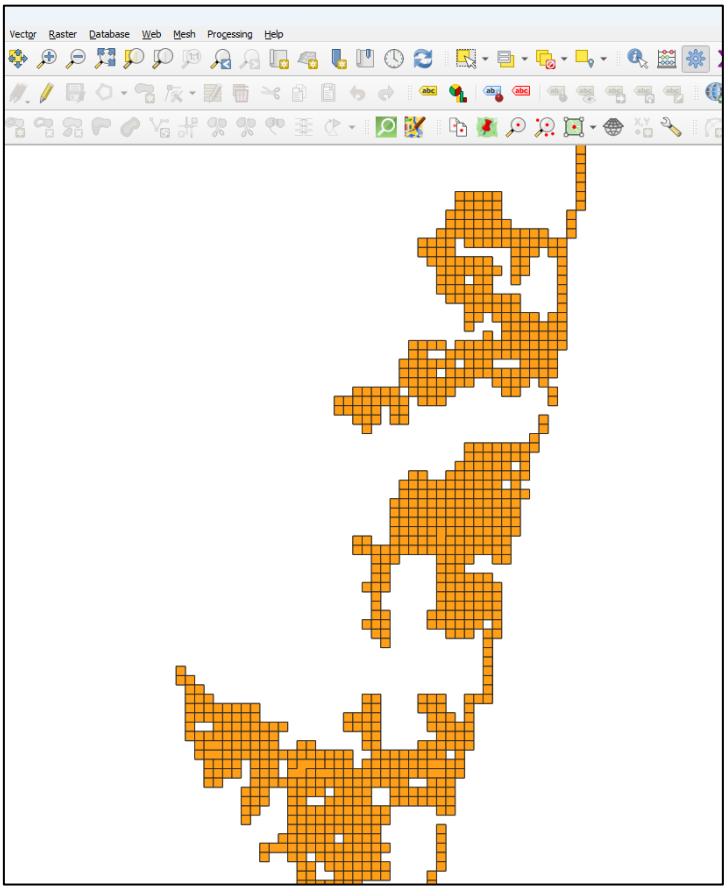

- All the features having DN value greater than or equal to zero will be selected
- Save the selected features into new shape file by right click on Vectorized.shp select export-save selected feature as flowdepth_polygons.shp in the working folder.



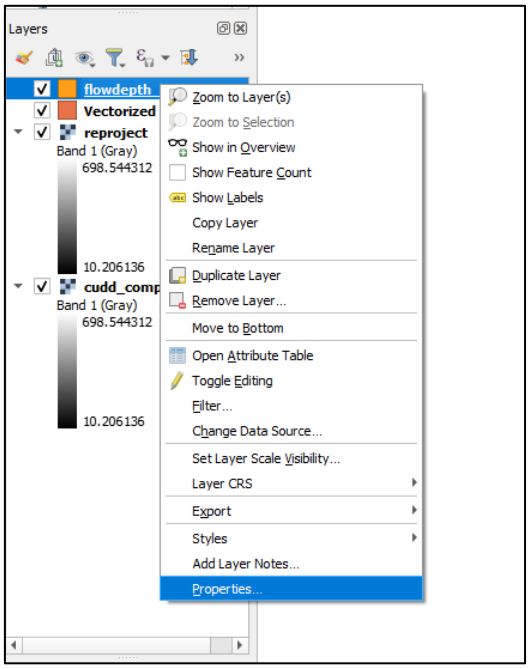

- Following dialog will open and enter new file name and don't forget to select "Save only selected features" and select format as “ESRI Shapefile, give output file name as flowdepth_polygons.shp and click ok.



- Output will look like this:

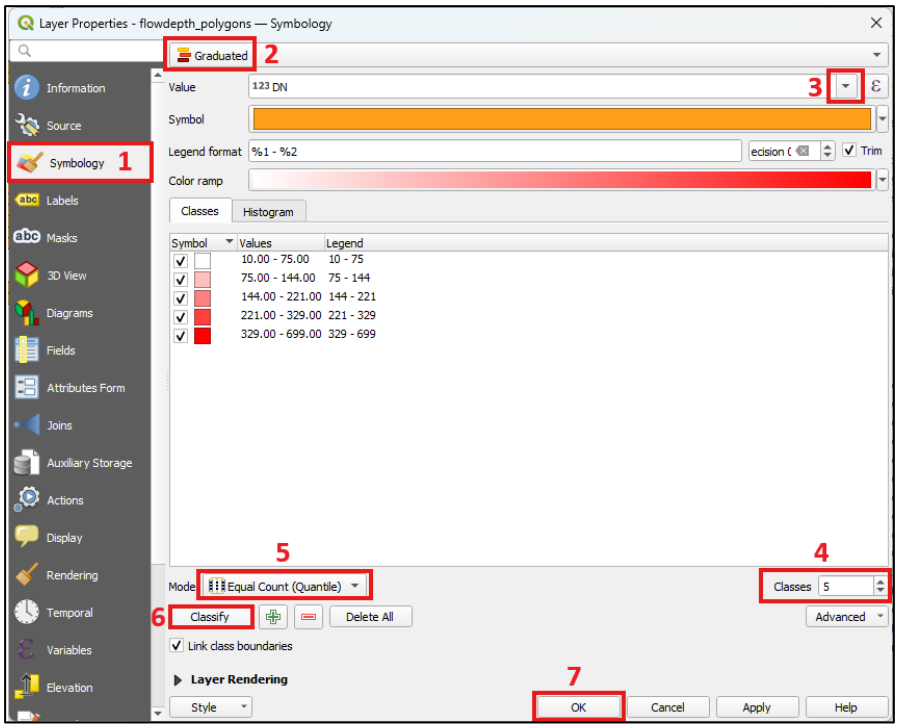



6. For classification, go to property section of flowdepth_polygon layer by right click.

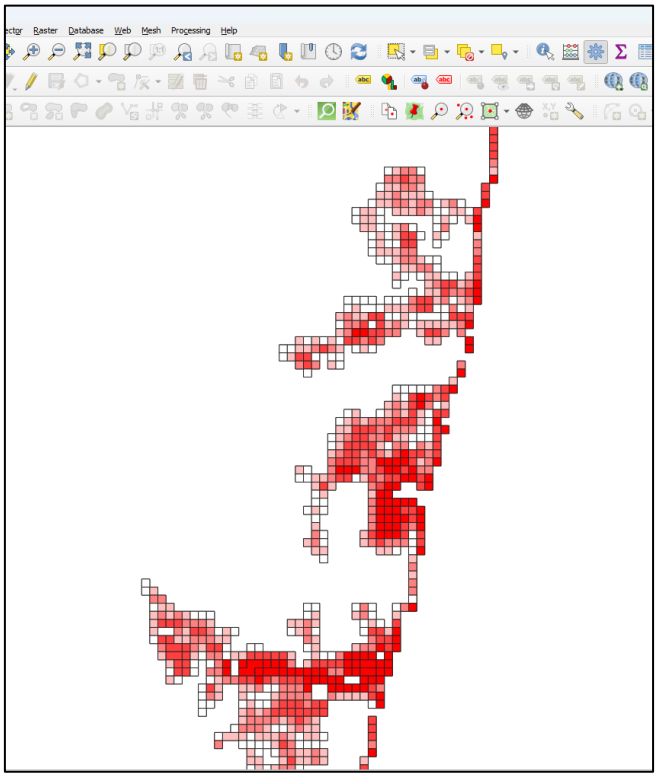



- In property section select symbology in left panel.

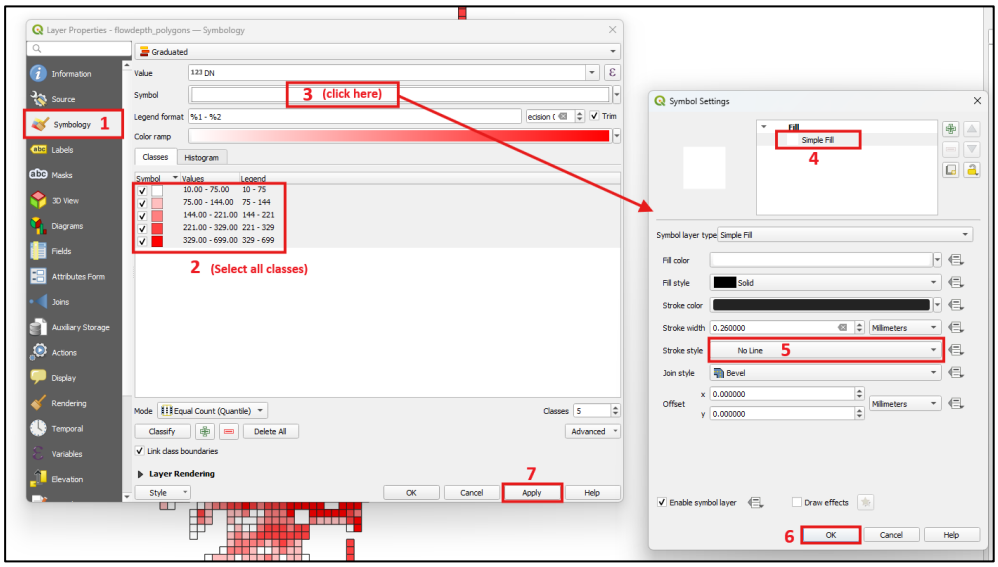
- Drop down **single symbol** field and **select Graduated**
- Select **Value** field **: DN**
- Select the number of **Classes** you want to convert hazard zones
- Choose appropriate **mode** of classification (Natural breaks, Quantile, Equal Interval etc)
- Click on **Classify** then click on OK



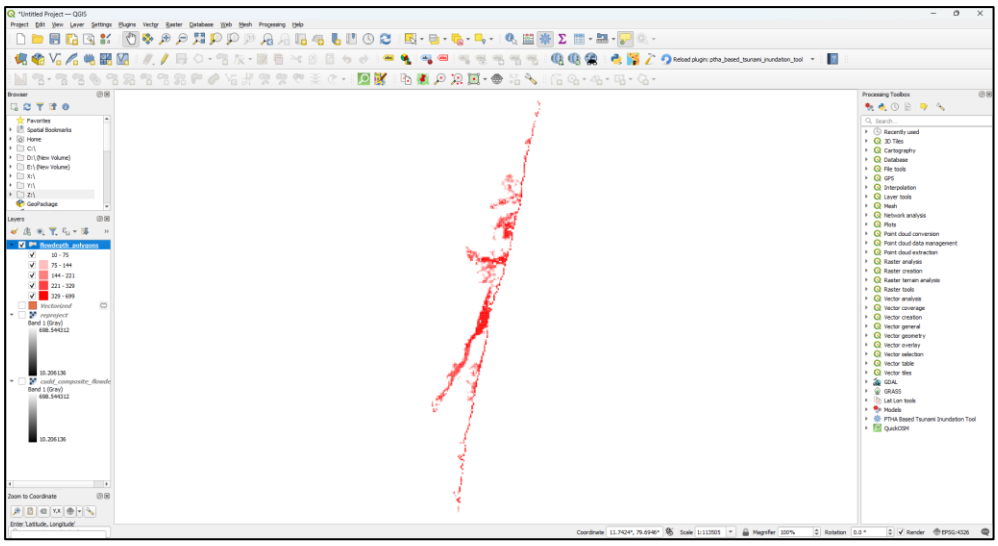

- Output will look like this:



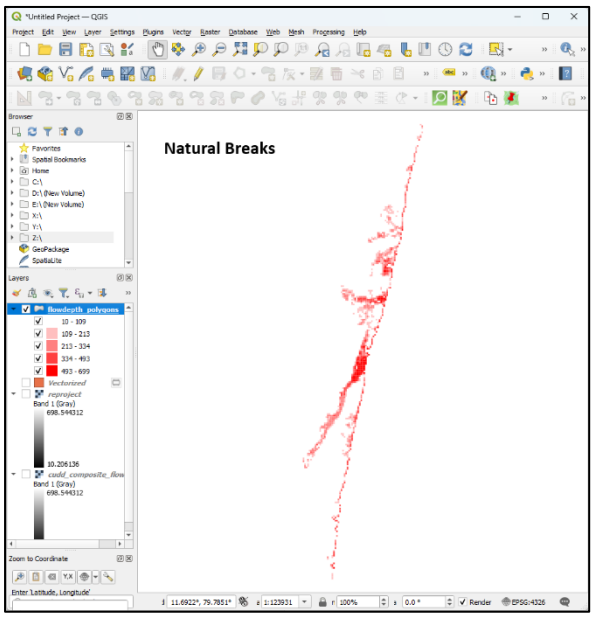
7. To remove the black border from each pixel, Go to properties → Symbology and Select all the classes → Click on **Symbol** field → New dialog box will open → Click on **Simple Fill** → in Stroke style select **No Line** → OK → Apply → Ok

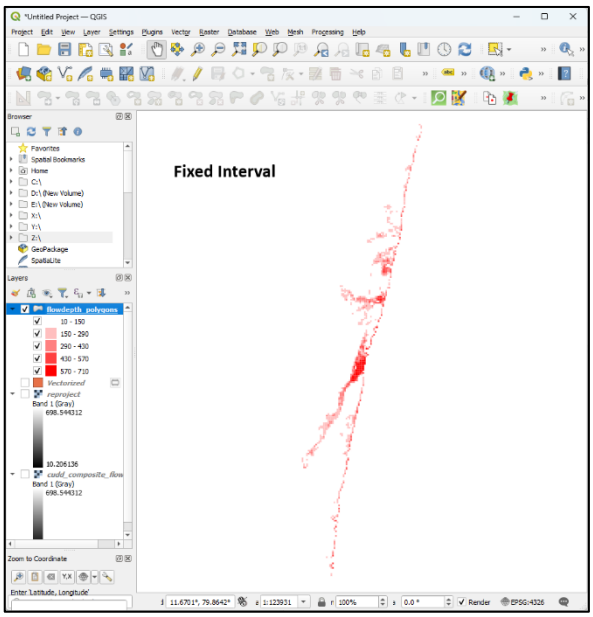


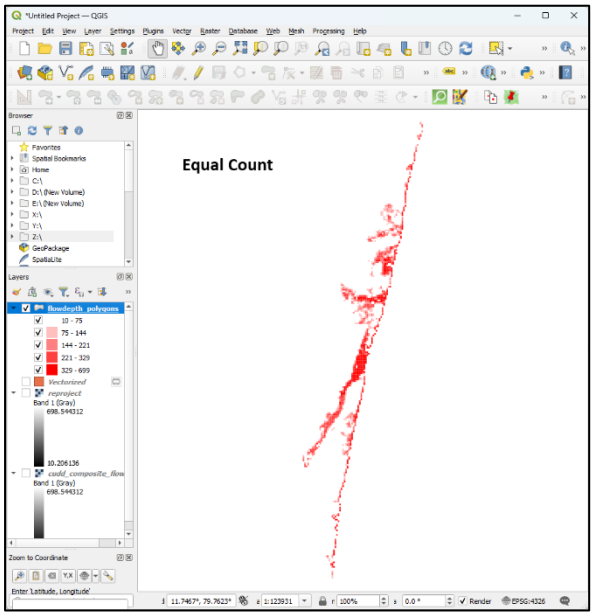

Result will look like this:

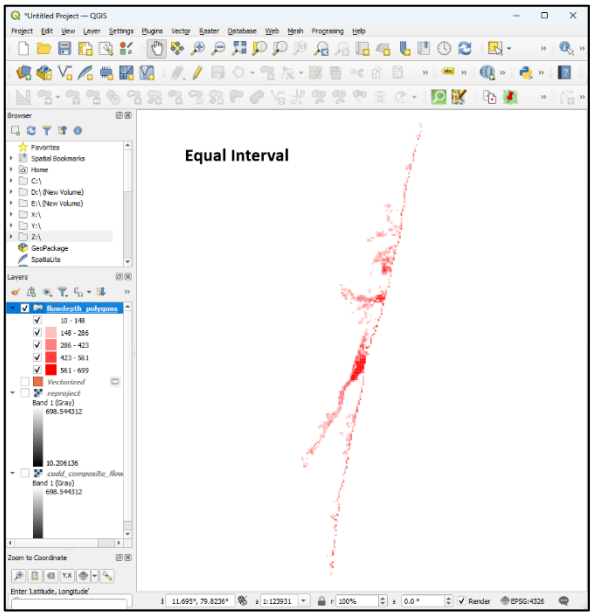


8. Example of different mode of classification:

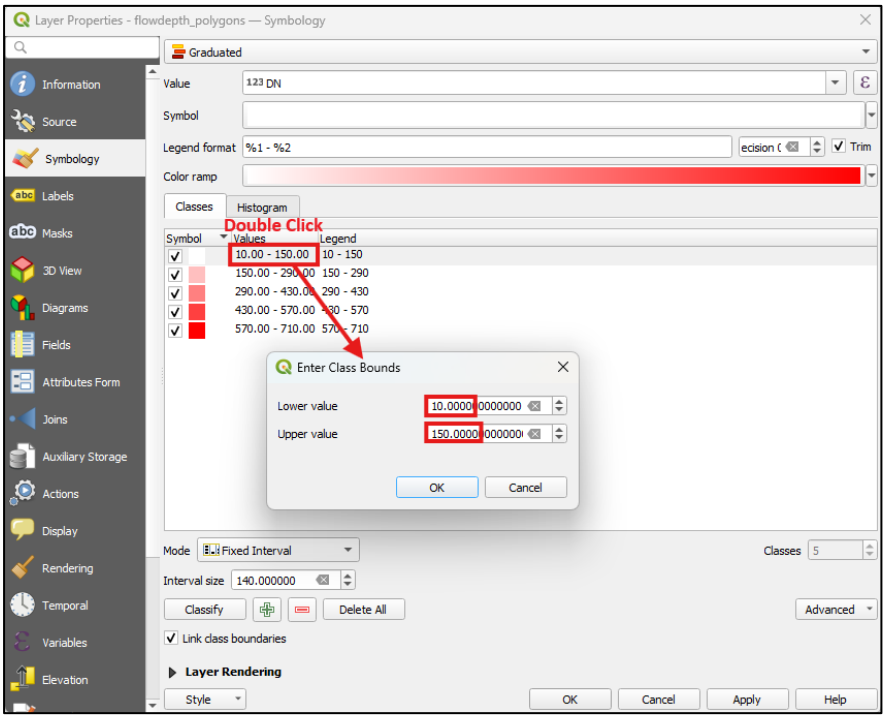


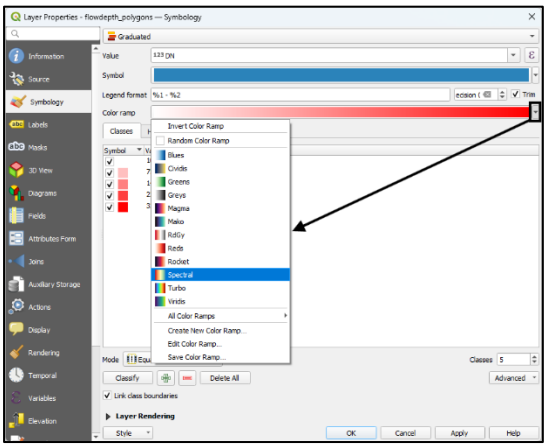



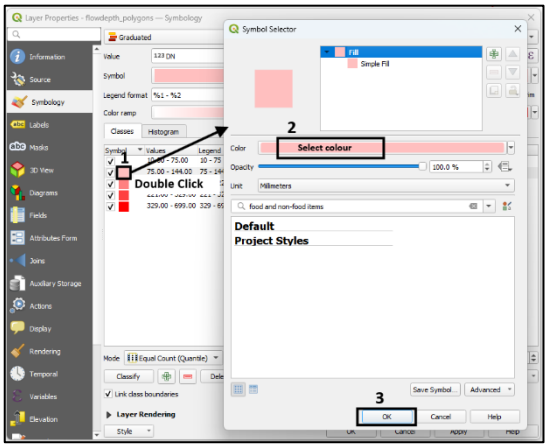



9. To change the classification values, go to properties → symbology→ Double click on value field of a particular class → assign Lower and Upper values → Ok




10. To change the colour of legends, there are two ways, either click on Colour ramp and select colour ramp or you can also change colour of each legend by clicking on Symbol field of a particular class.



11. Output of hazard classification layer: