Introduction to Grass GIS

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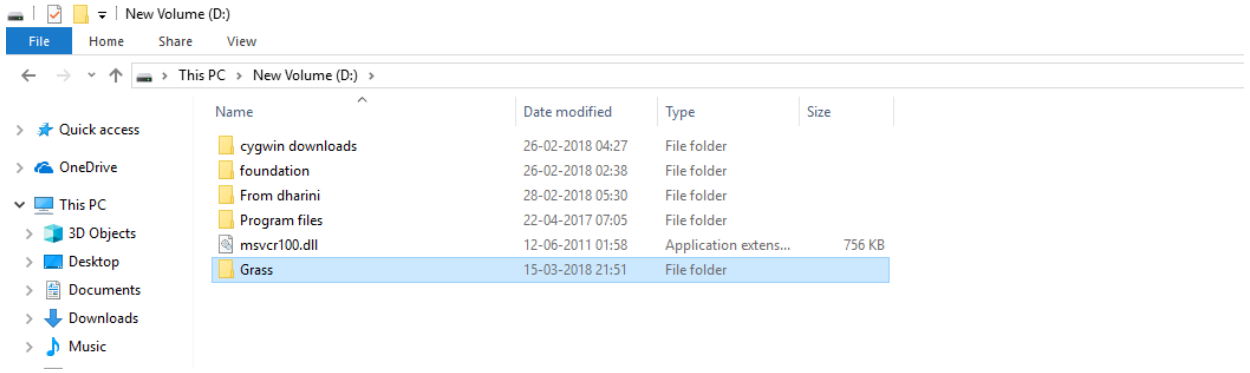
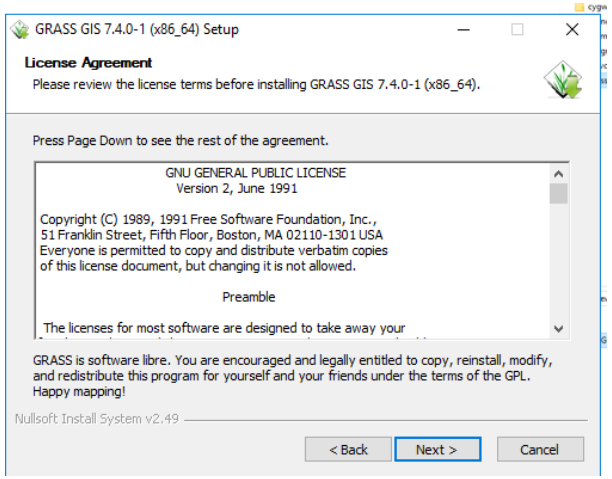
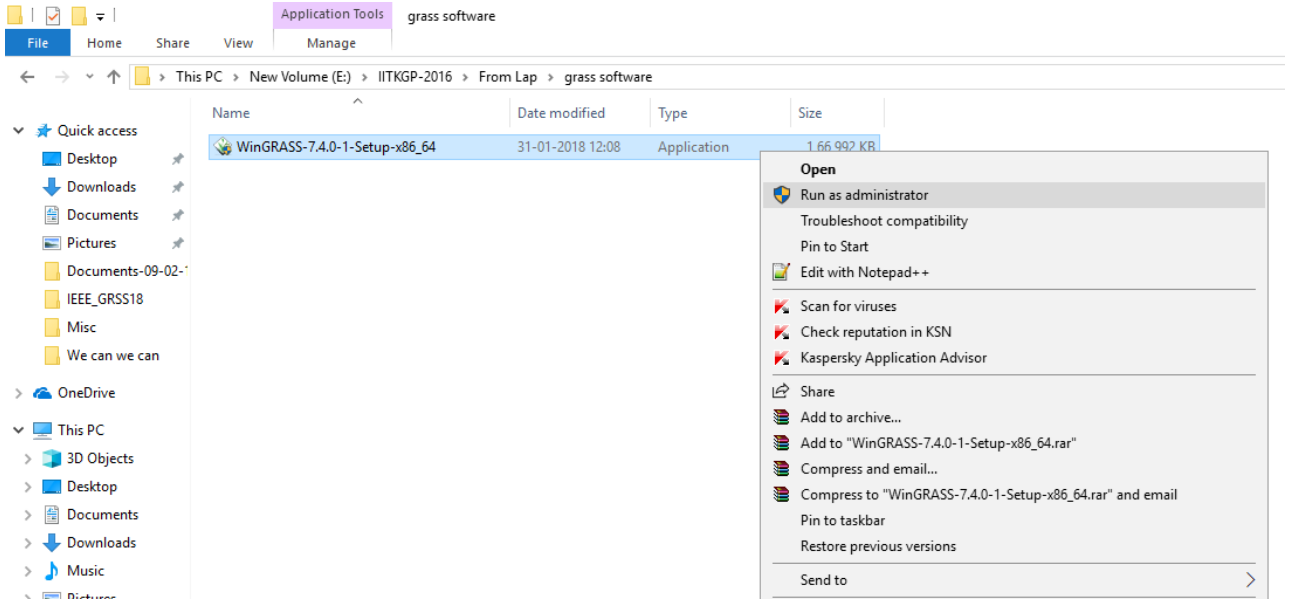
- Create a new folder in your local drive (for ex: D or E drive) and rename it as Grass. Do not add any folders inside this.

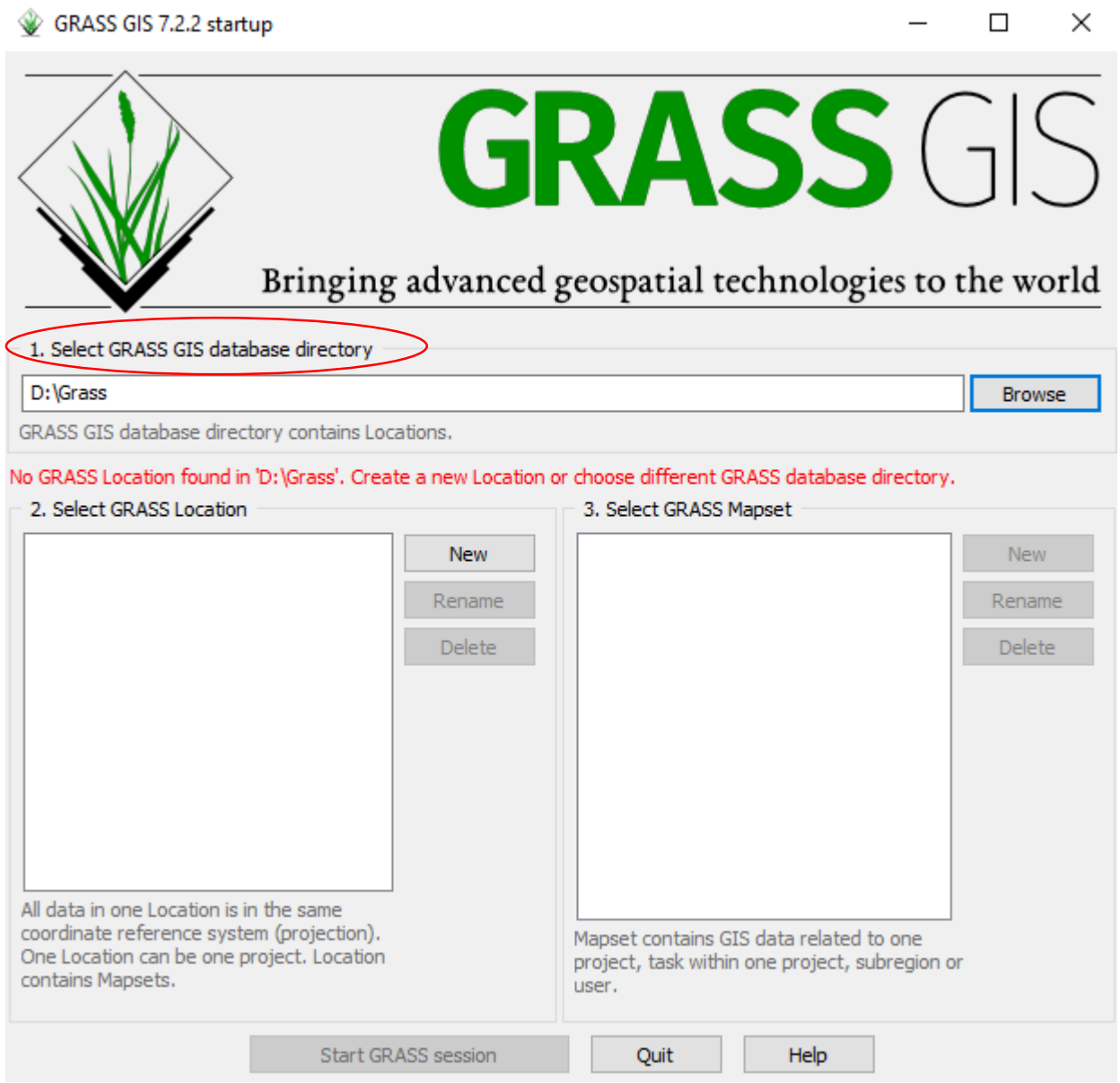


- Install Grass latest version.





1. Select “Grass” folder that you created in the previous step. All the analysis files will be stored in this directory.

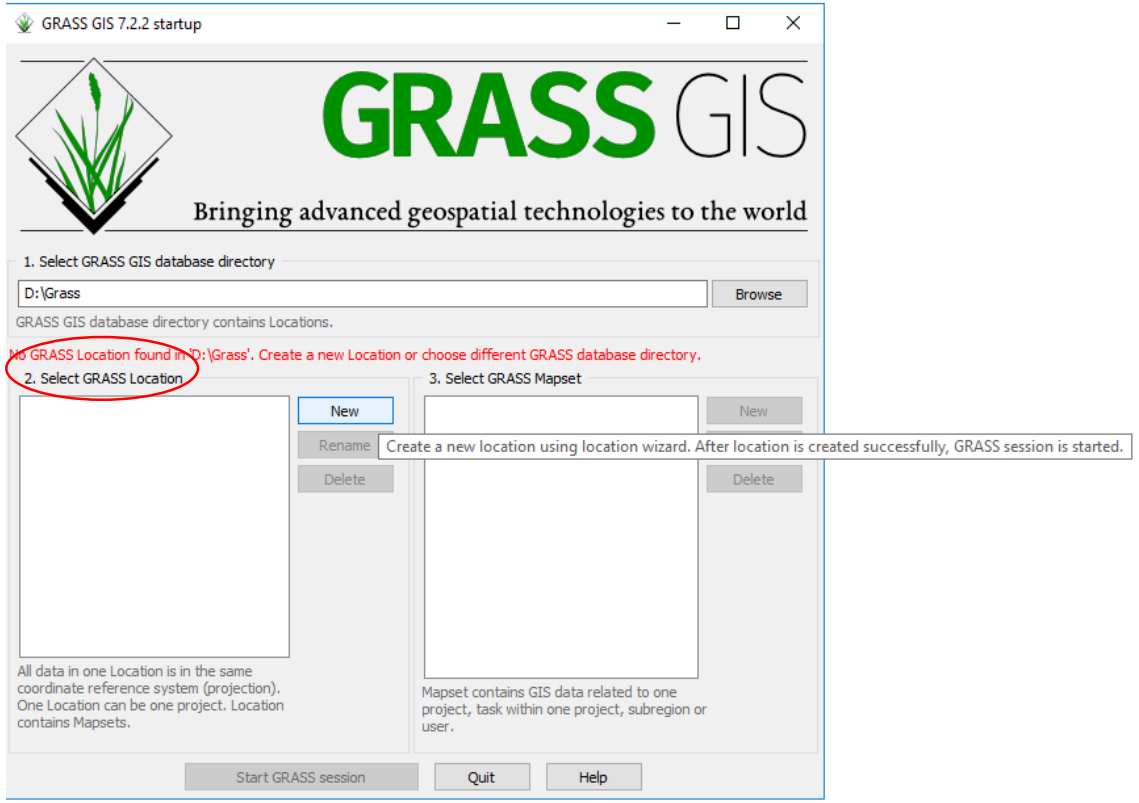


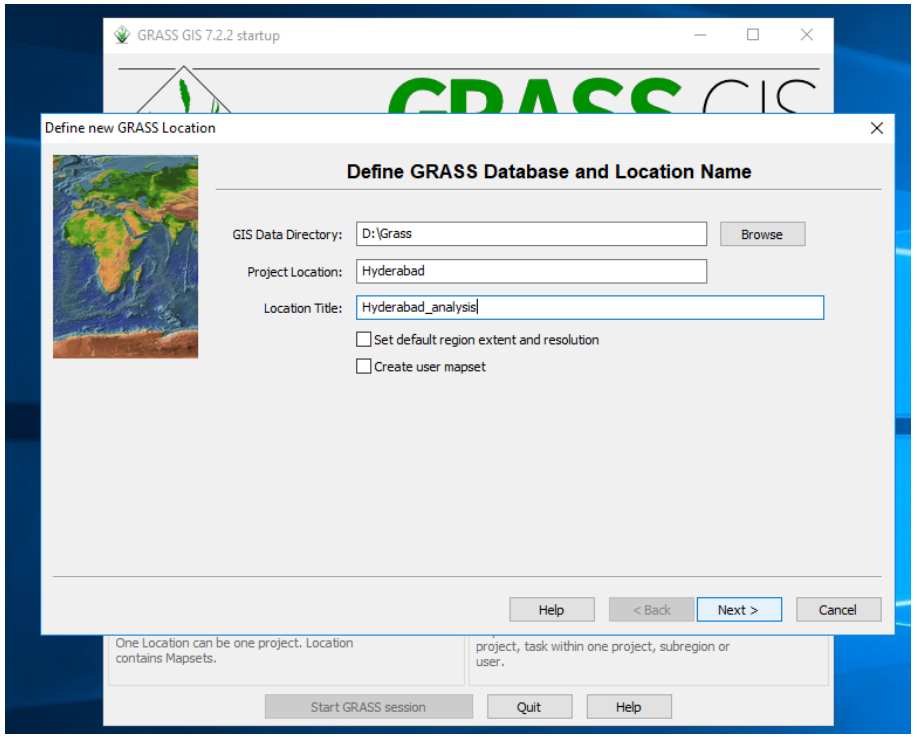
2. Select Grass location. Click on “New” tab.

Specify Project location as your study area name (ex: Hyderabad)

Specify location title

(ex: Hyderabad_analysis) and click next.

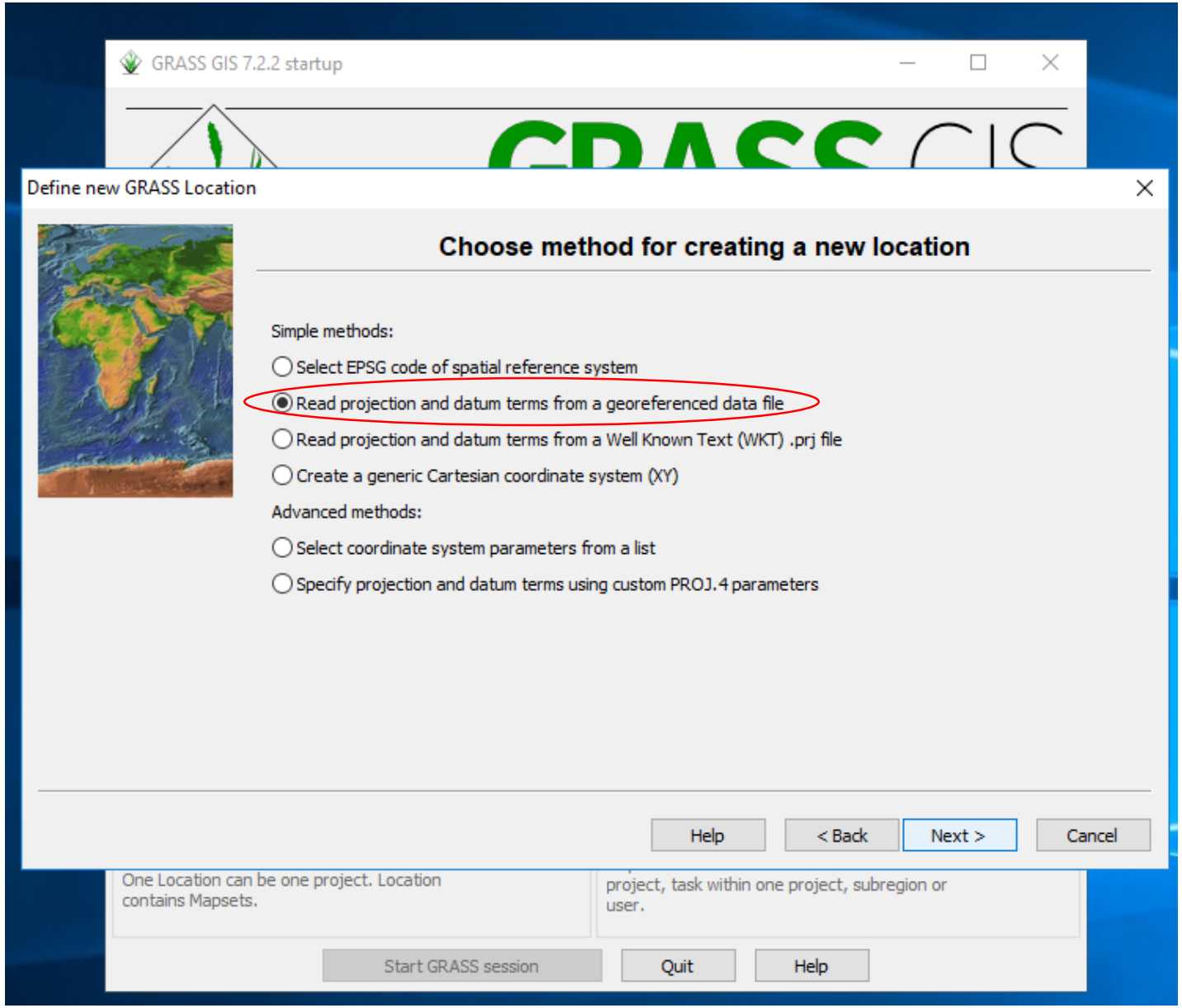




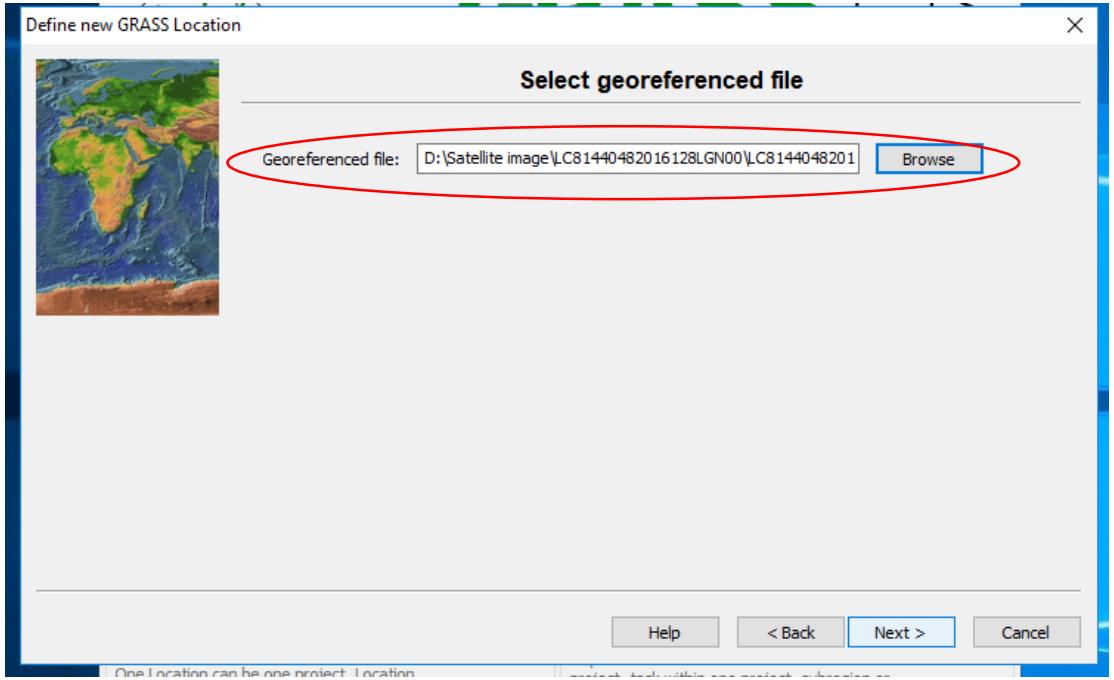
Note: Grass is a c language oriented software, hence avoid giving space, use underscore (_) instead.

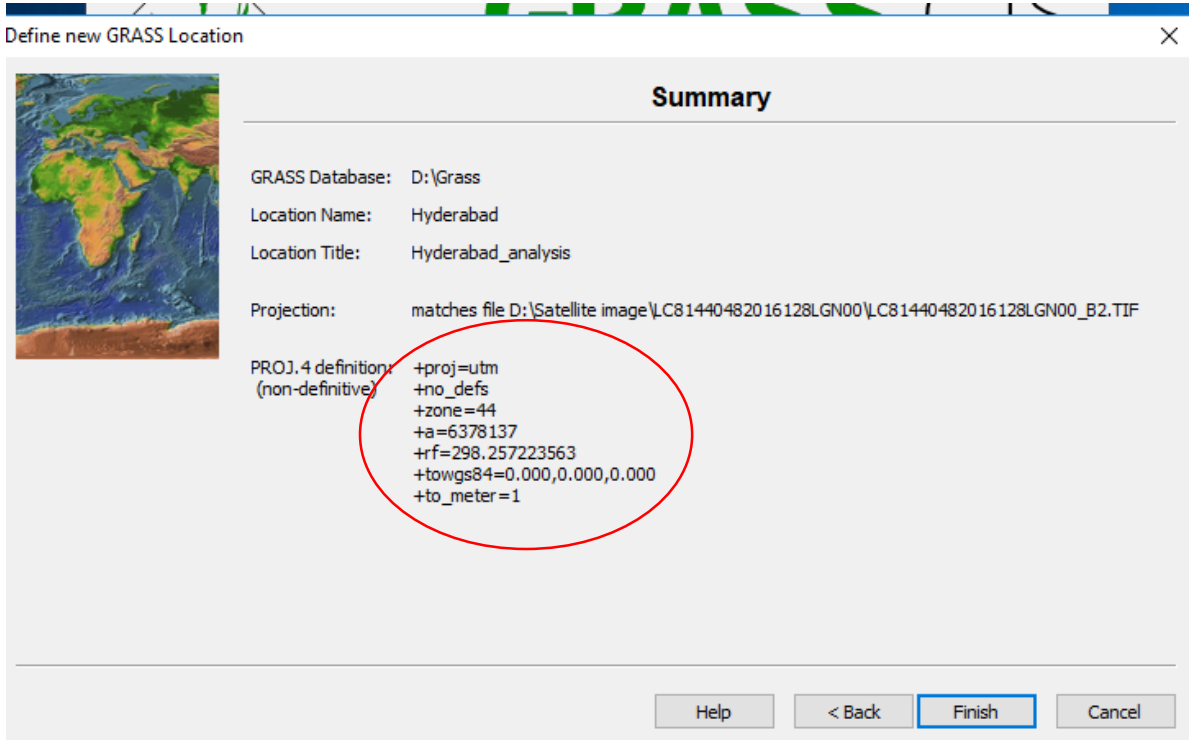
- In this step we will specify a method to create location details and coordinate extent of the area of interest.

Select option “Read projection and datum terms from a georeferenced data file” and press next.



- Select any georeferenced file (preferably in UTM coordinate system). Ex: Landsat 8, band 2
- Click next
- Carefully examine projection information and click finish.





- In the next dilouge, Click “ok” and select import data “Yes”. Import successful, click “ok”.

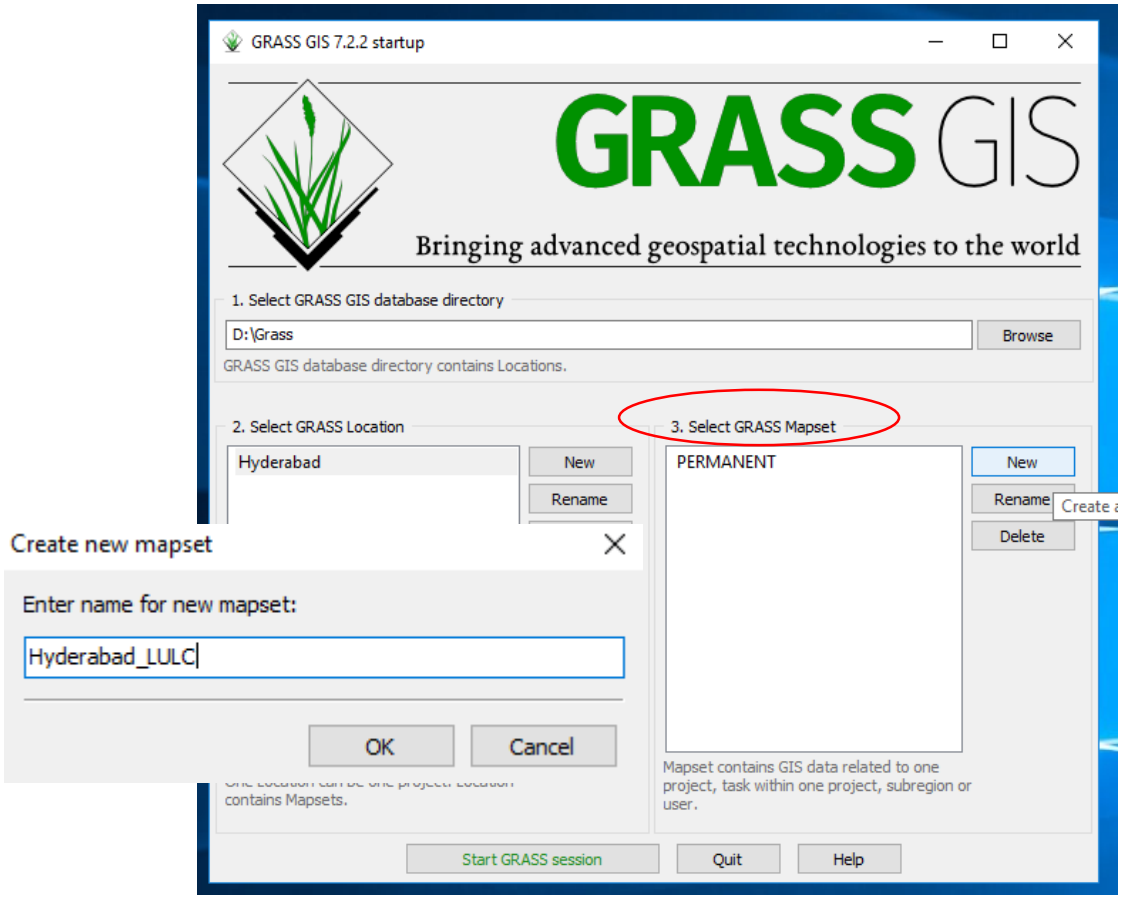
3. Creating Mapset.

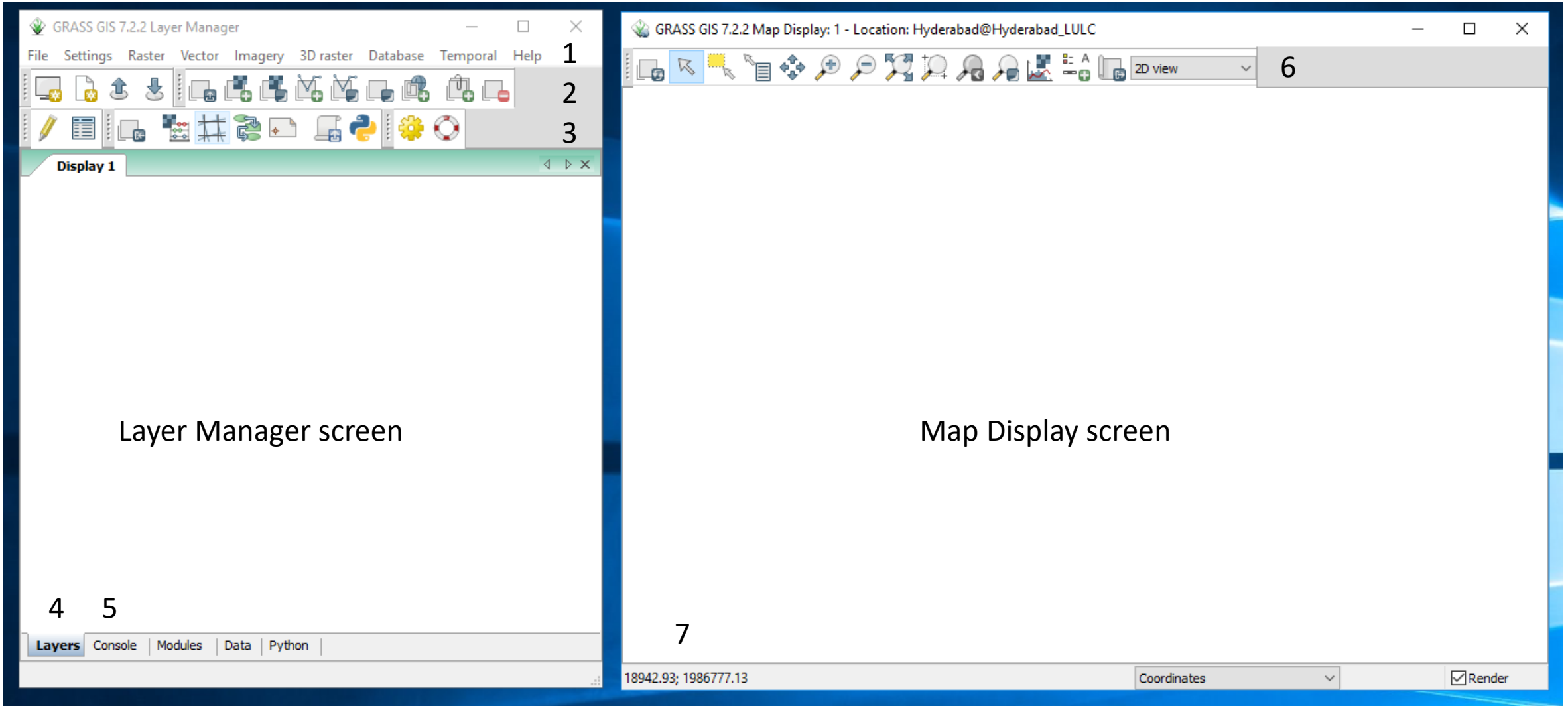
Click on “New”

Ex: Name new mapset as “Hydrabad_LULC”.

Click on ok.

Click on “Start GRASS session”.





1 Tool bar
2 Layer manager options
3 Editing and other options
4 Layer details
5 Command console

6 Map display tool bar
7 Coordinates

Type	Commands used	Description
Vector commands	v.in.ogr	Importing vector file
	v.out.ogr	Exporting vector file
	v.to.rast	Vector to Raster conversion
	v.proj	To project a vector file
	v.build.polylines	To correct line features
Raster commands	r.in.gdal	Importing raster file
	r.out.gdal	Exporting raster file
	r.reclass	Raster reclassification
	r.colors	Assigning colors to raster map
	r.report	Raster report
	r.mapcalc	Raster map calculator
	r.composite	Raster map composition
	r.patch	Raster map patching
Image commands	i.colors.enhance	To enhance raw satellite band
	i.group	To group images
	i.gensig	To generate signatures
	i.maxlik	Maximum likelihood classifer

IMPORTING RASTER

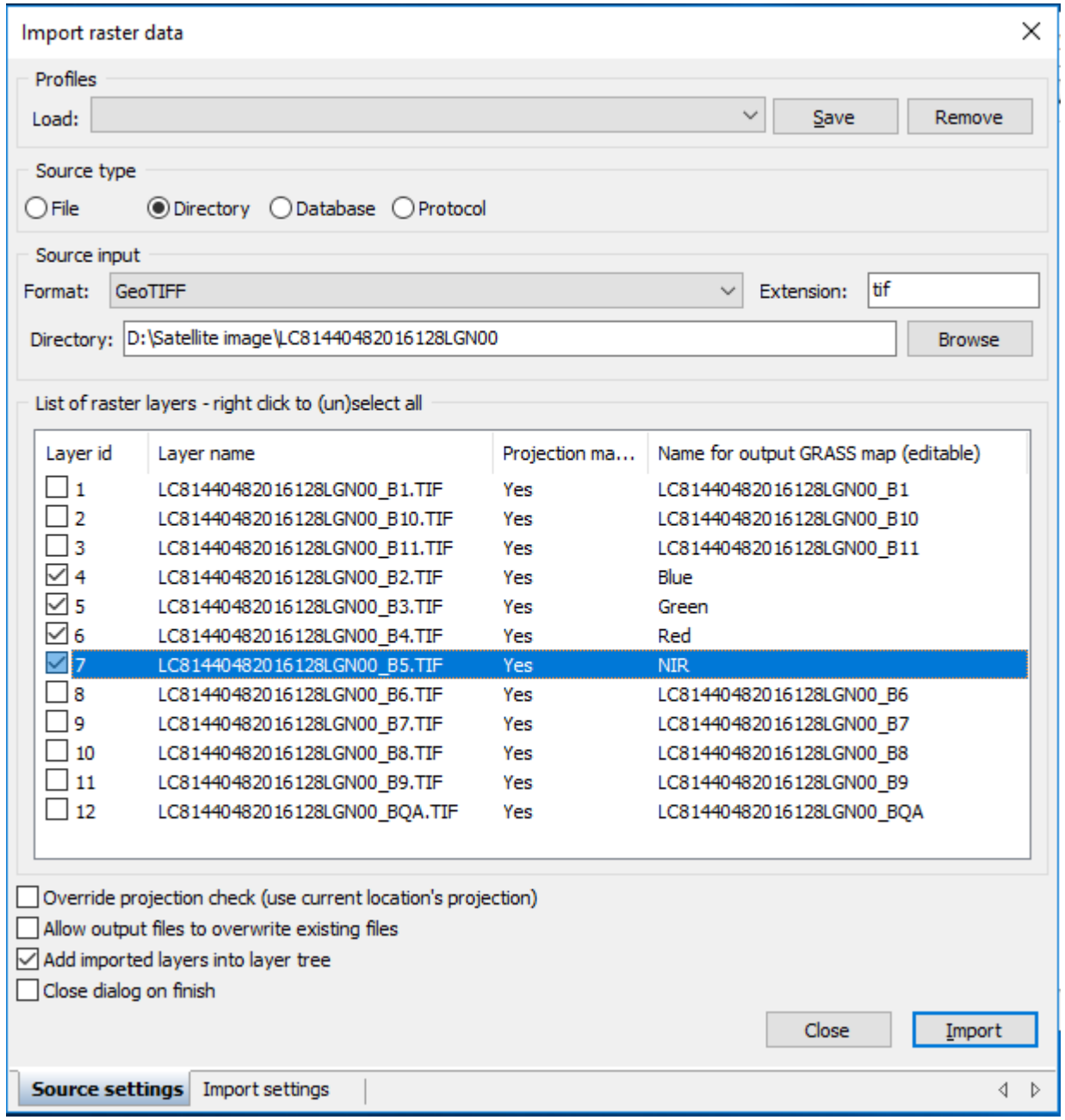
Command: r.in.gdal

Under source type choose directory, browse to navigate to the satellite image folder.

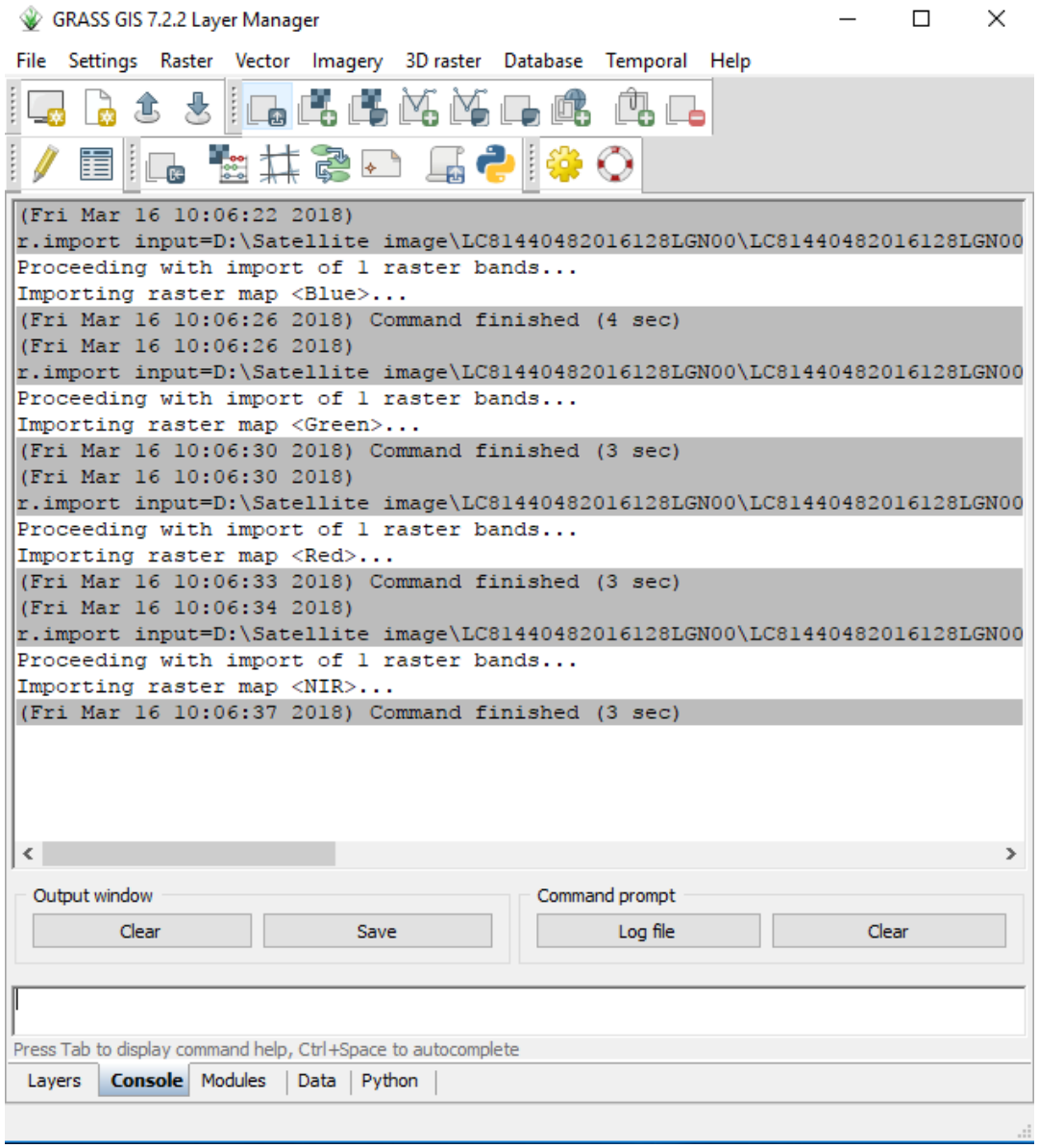
Ex: Landsat folder

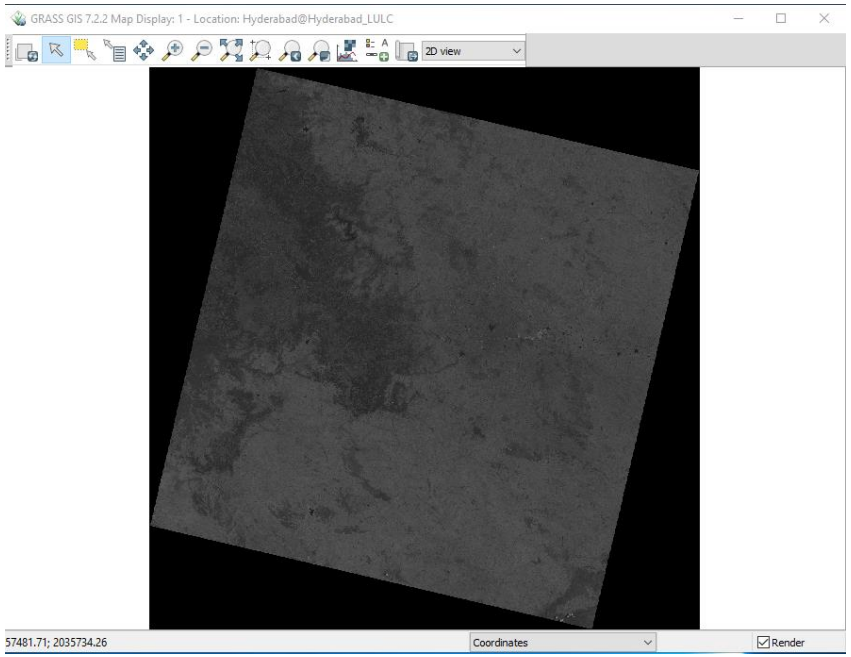
Layer name is editable. Rename B2 as Blue, B3 as Green, B4 as Red and B5 as NIR.

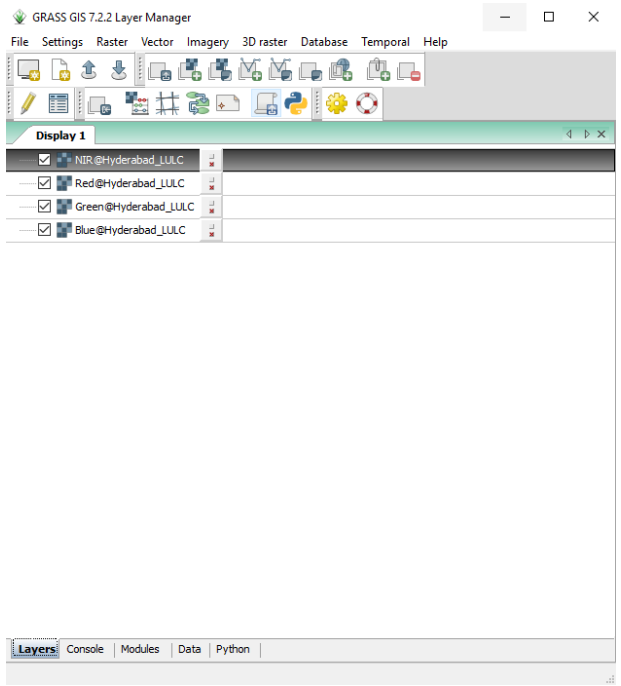
Click on Import.



IMPORTING RASTER







IMPORTING VECTOR

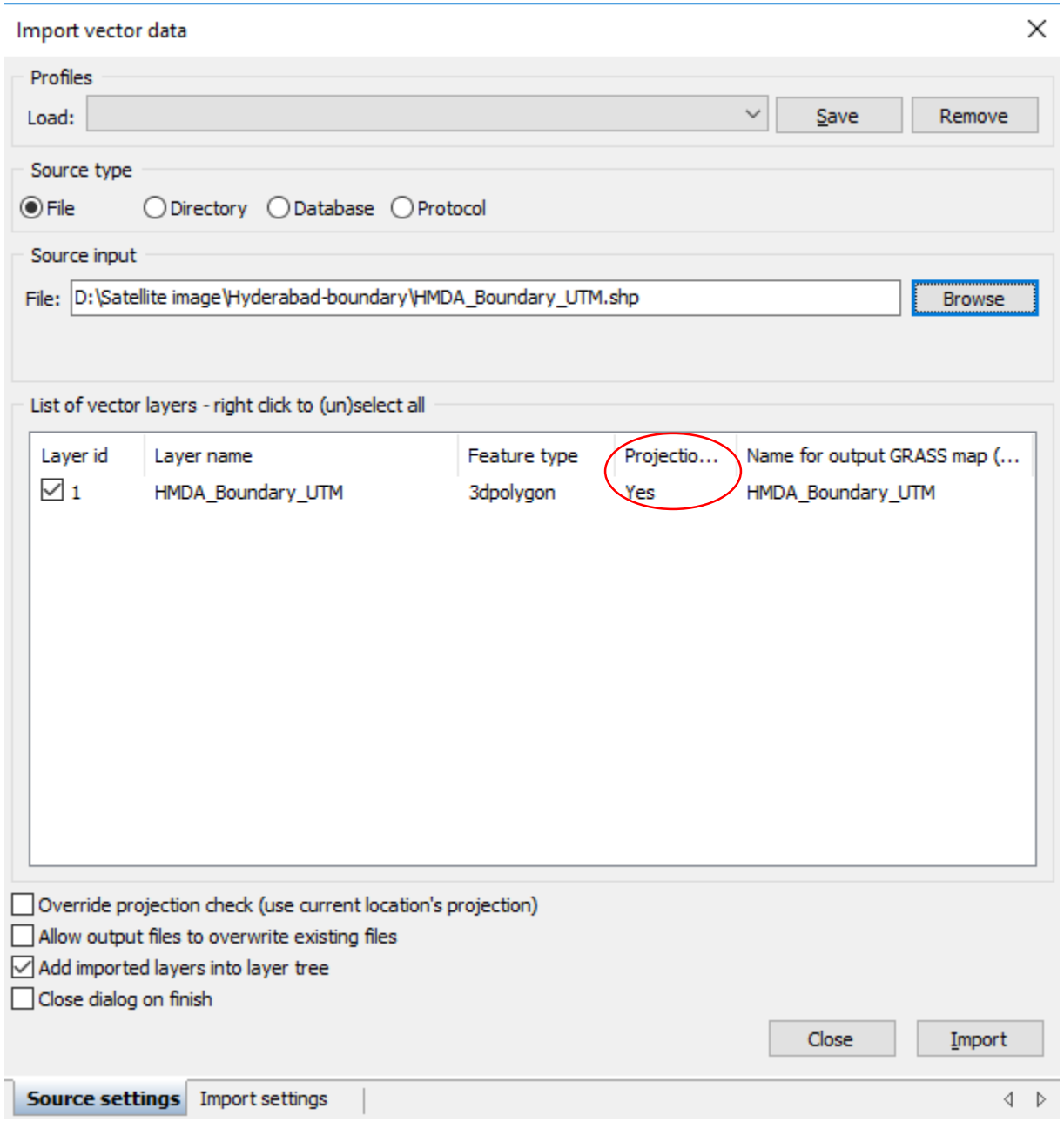
Command: v.in.ogr

Under source type choose file, browse to navigate to the boundary shapefile folder.

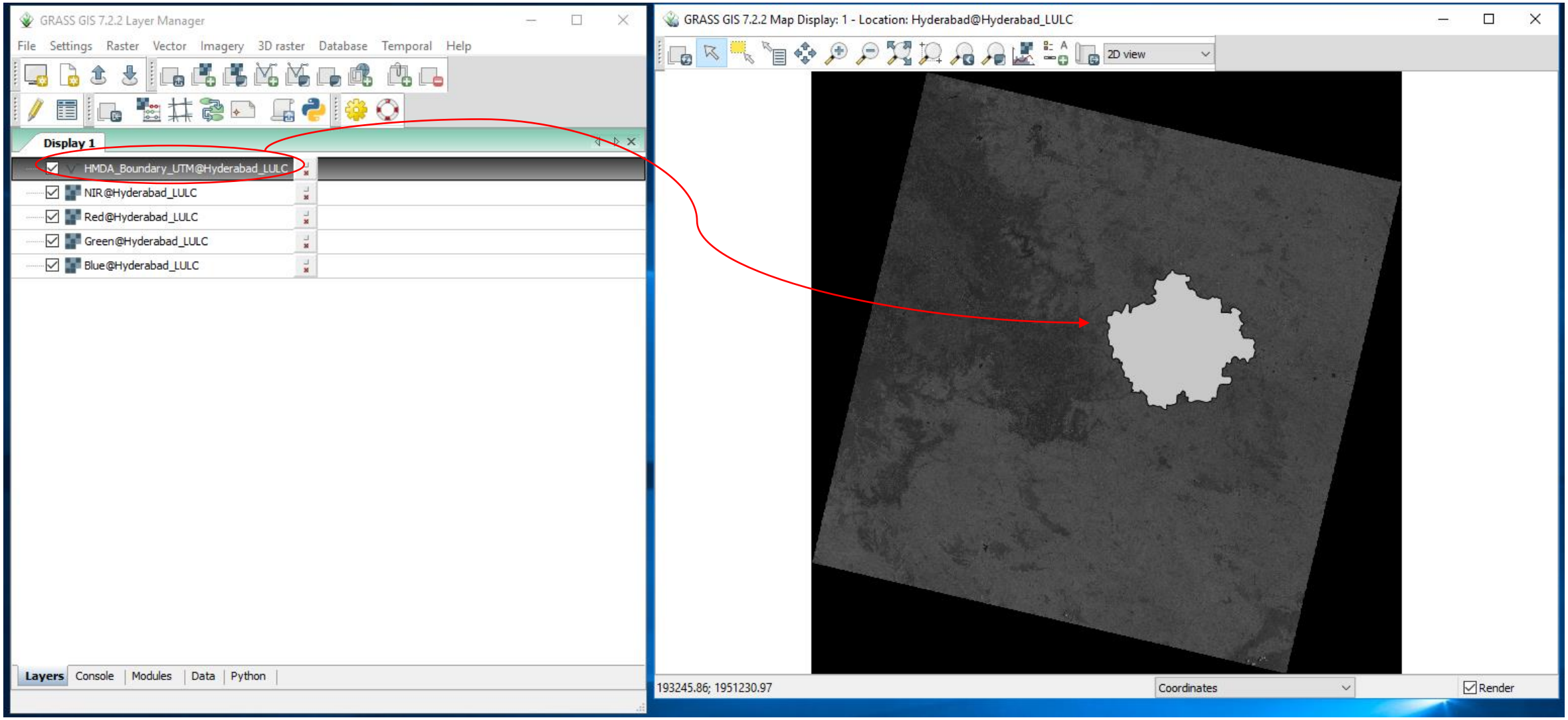
Ex: Hyderabad boundary.

Make sure Projection information is present (yes).

Click on Import.



IMPORTING VECTOR



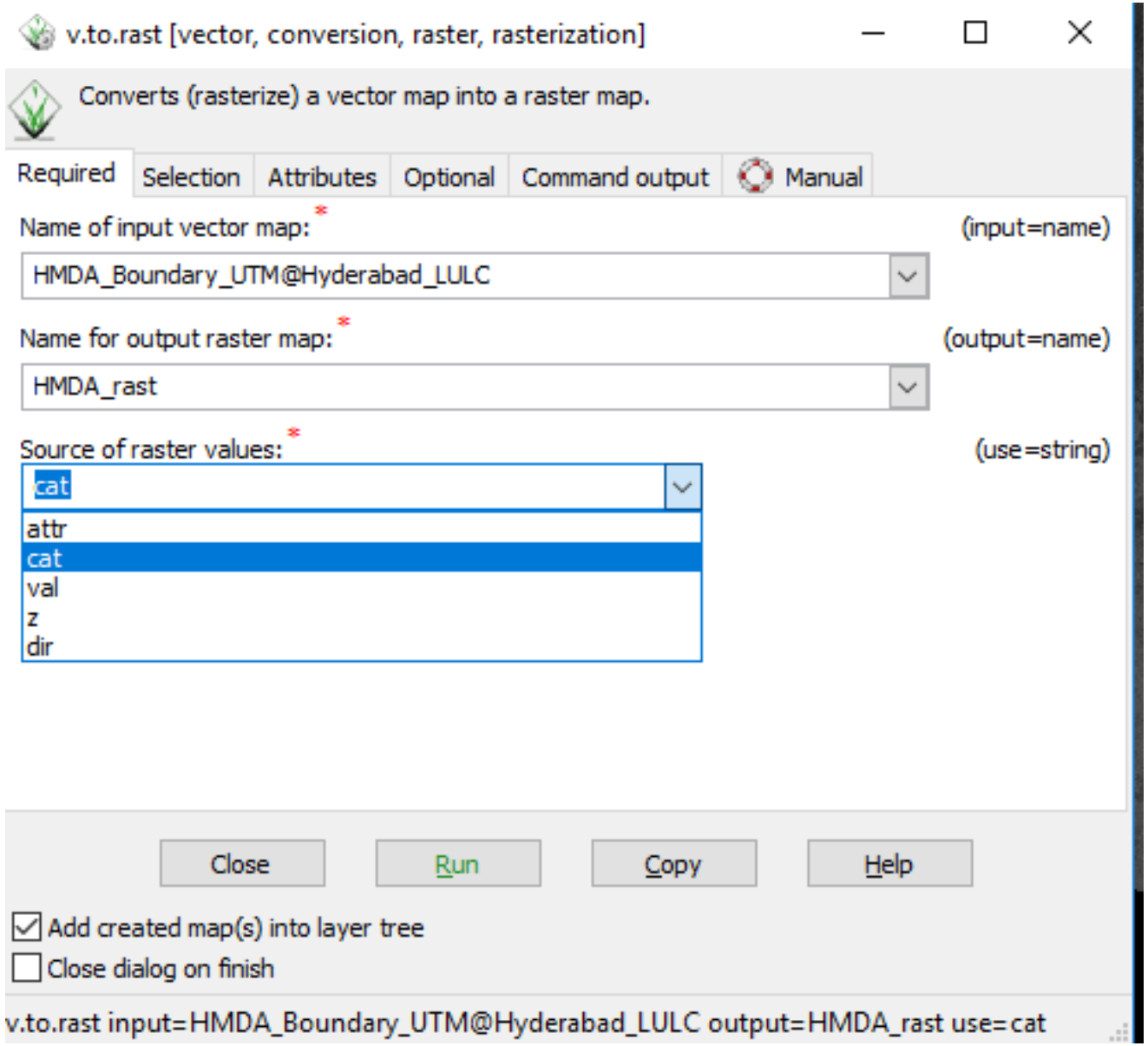
CONVERTING VECTOR TO RASTER

Command: v.to.rast

Give input and output name.

Select source of raster values as cat (category).

Click on Run.



CROPPING SATELLITE IMAGE ACCORDING TO STUDY AREA.

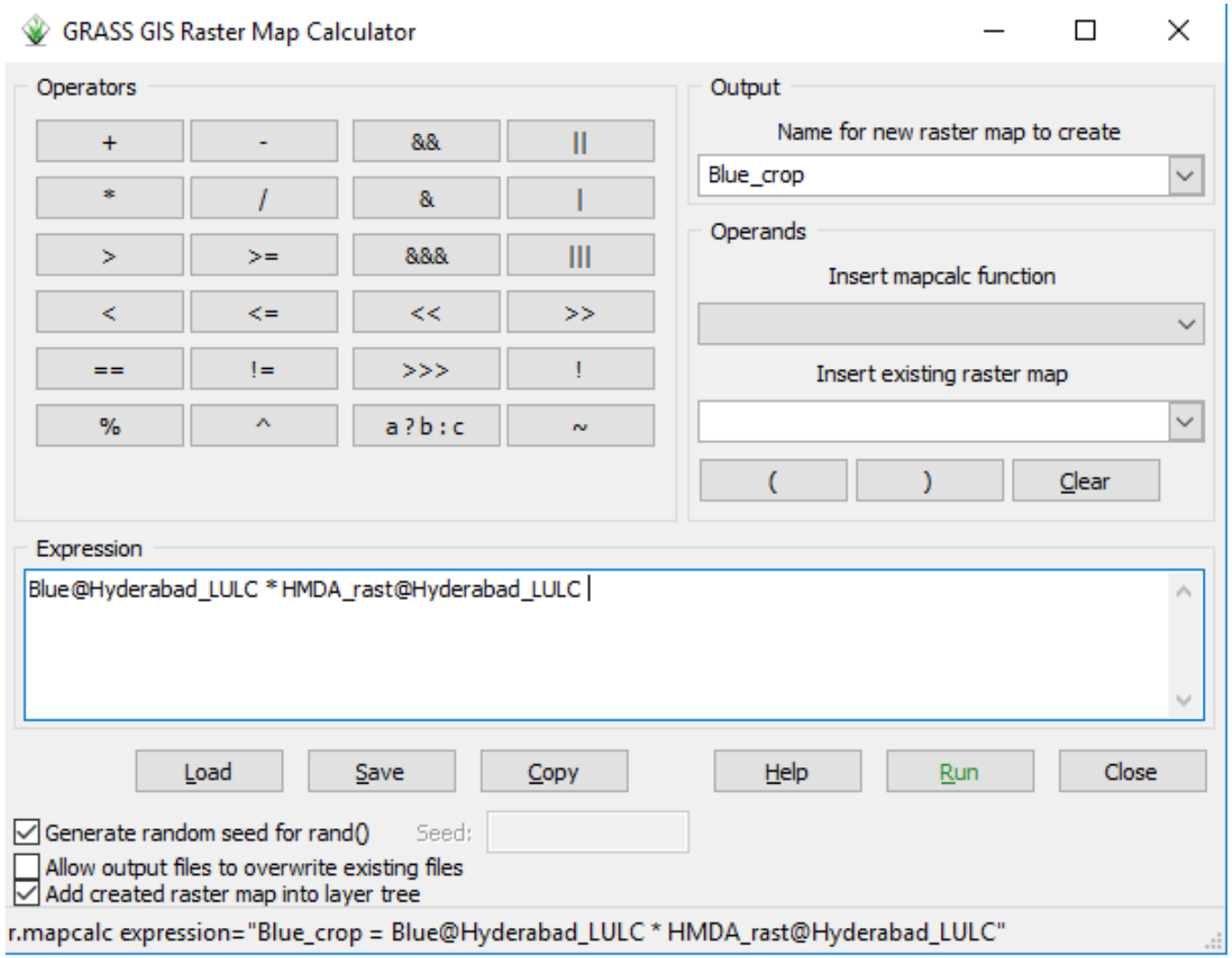
Command: r.mapcalc

Give Output (New name)

Give Map1*Map2 in Expression tab.

Ex: Blue band * Hmda_rast = blue_crop (cropped blue band according to hmda).

Click on Run.



NDVI ANALYSIS

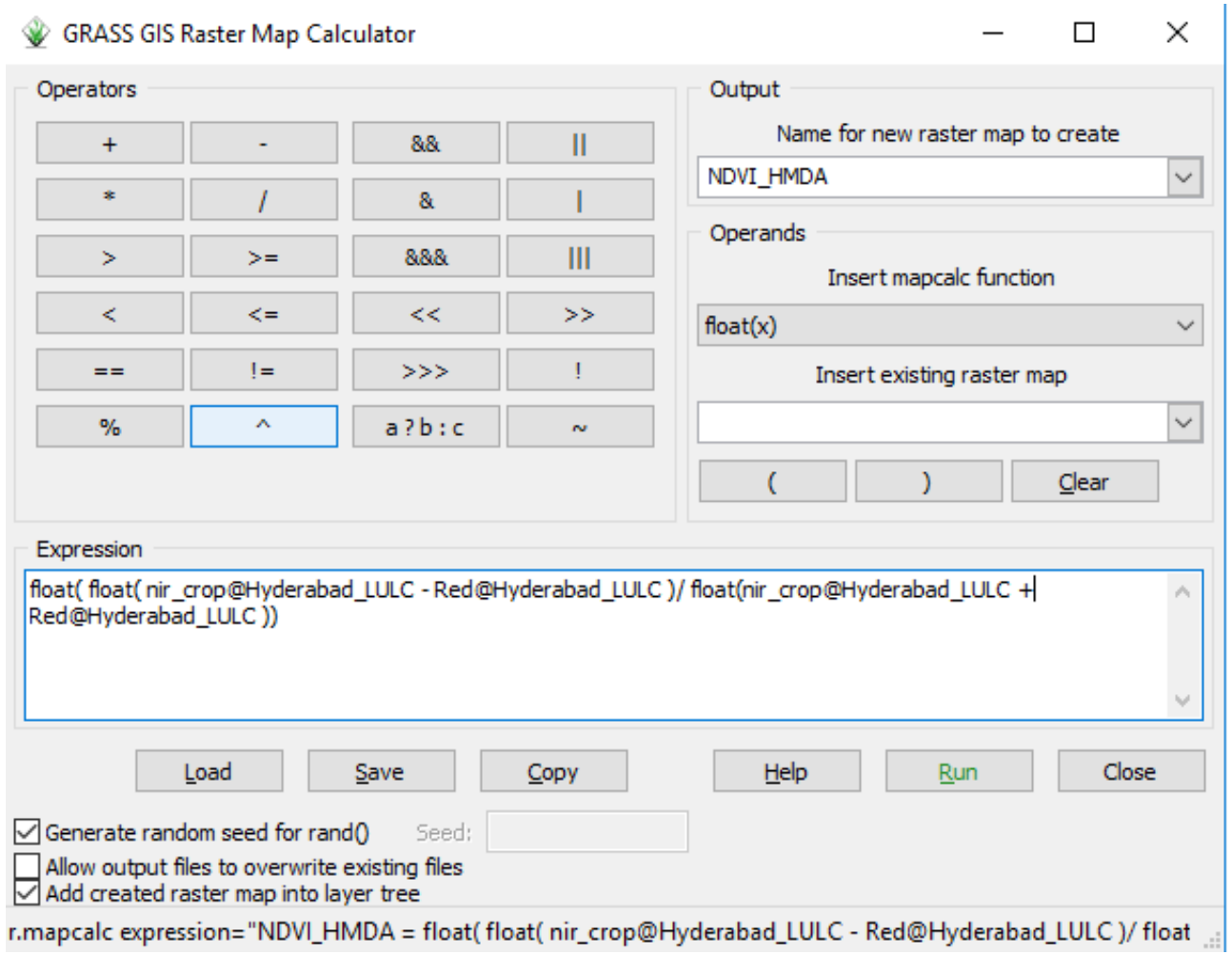
Command: r.mapcalc

Give Output (New name)

Ex. Expression

float(float(Num)/ float(Den))

Click on Run.



NDVI ANALYSIS

Command: r.colors

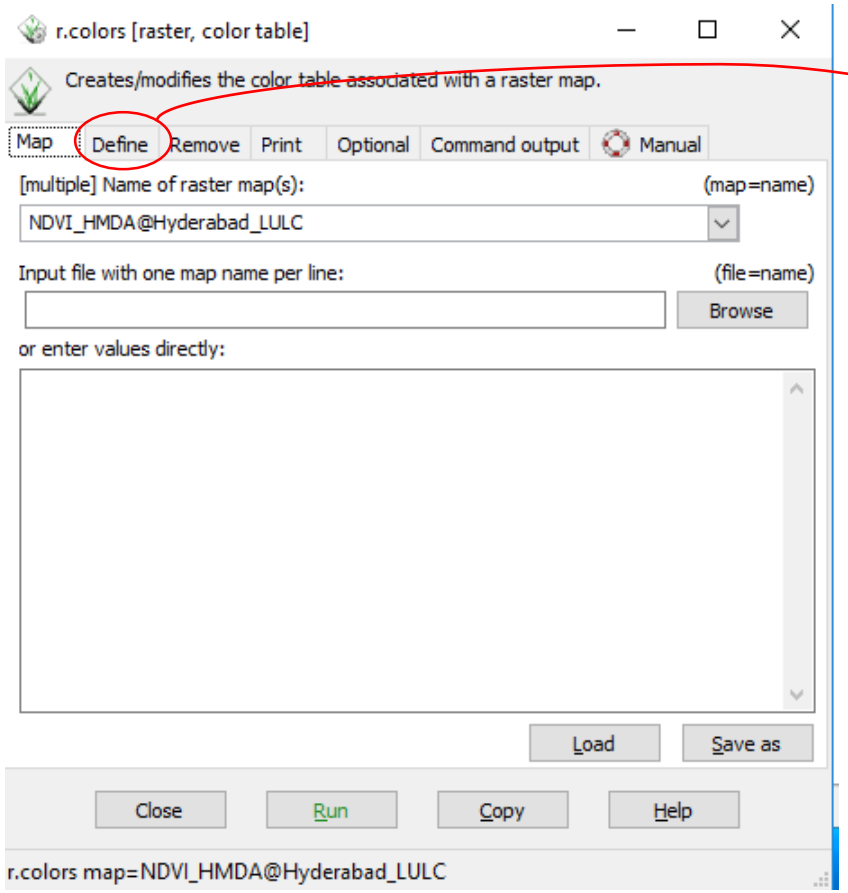
Choose NDVI map

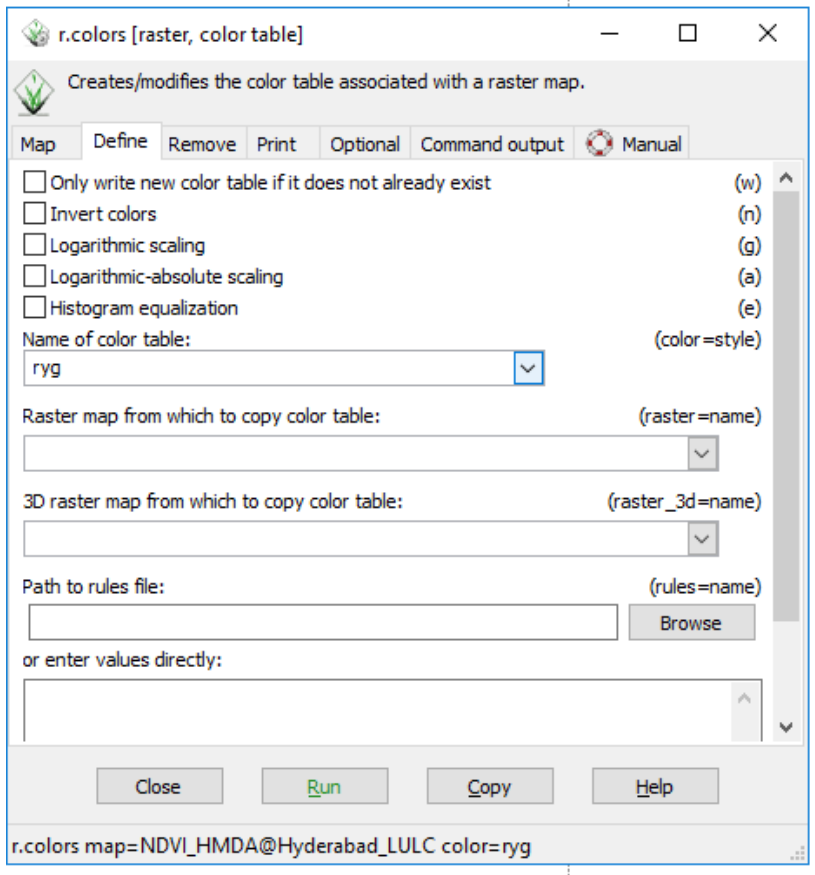
Go to “Define” tab

Select “ryg”

for Name of color table

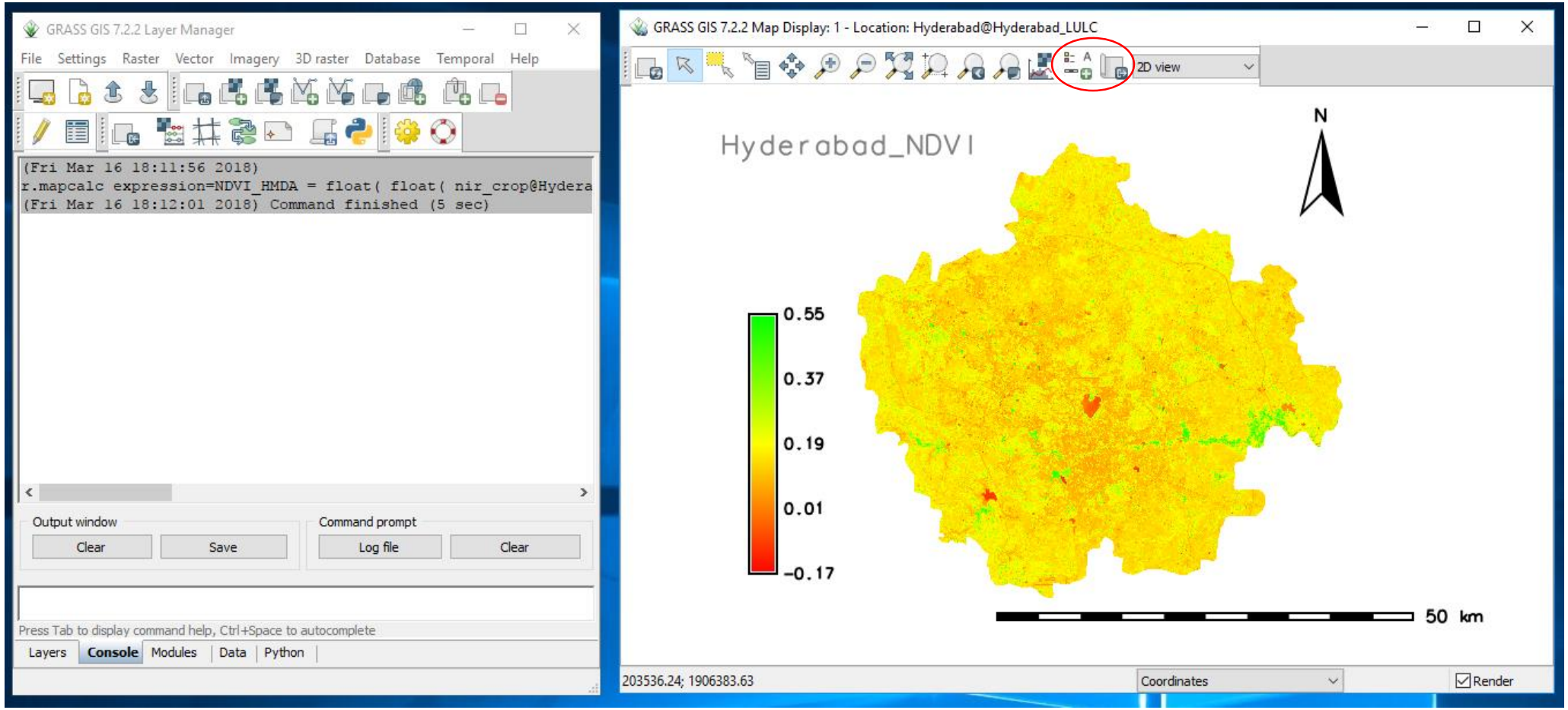
Click on Run.





NDVI analysis

- Insert map elements like text, north arrow, scale and legend. Export map as jpeg (using save display to file option).



NDVI ANALYSIS - REPORT

Command: r.report

Choose NDVI map

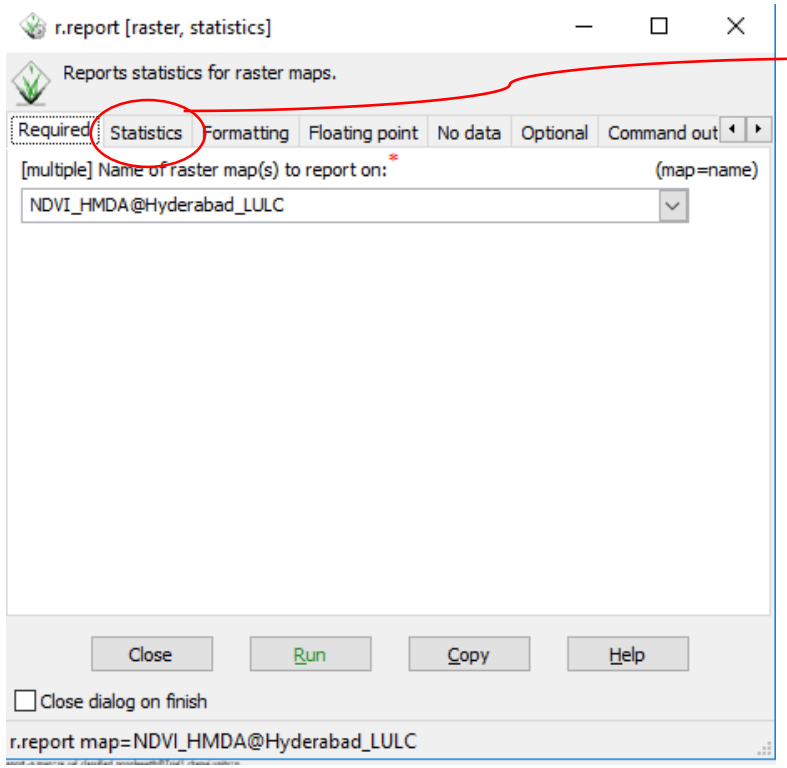
- Go to “Statistics” tab

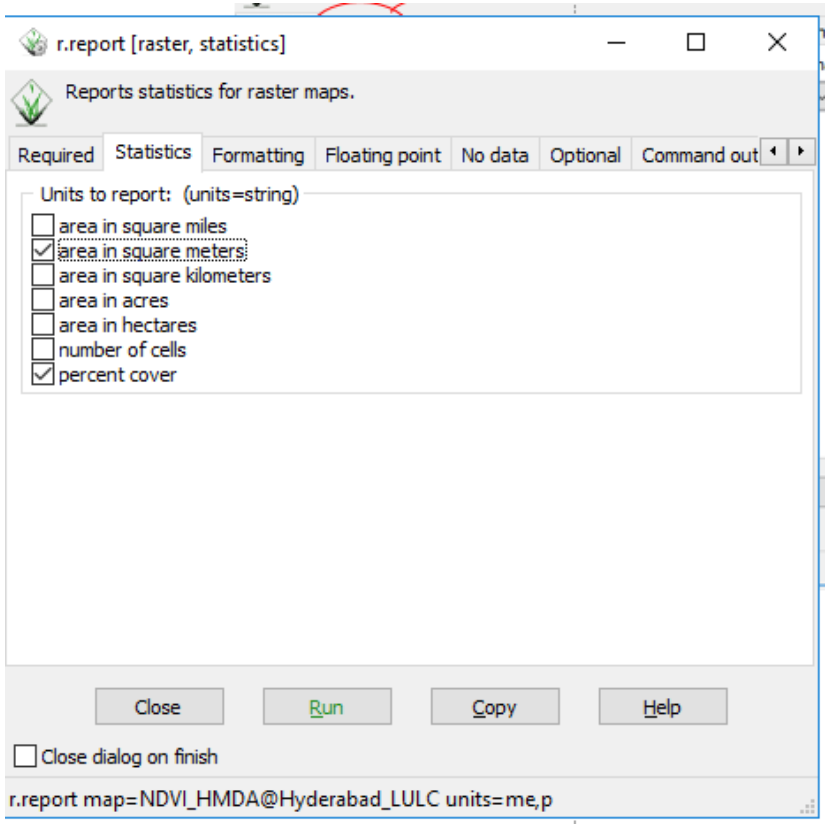
Select required units

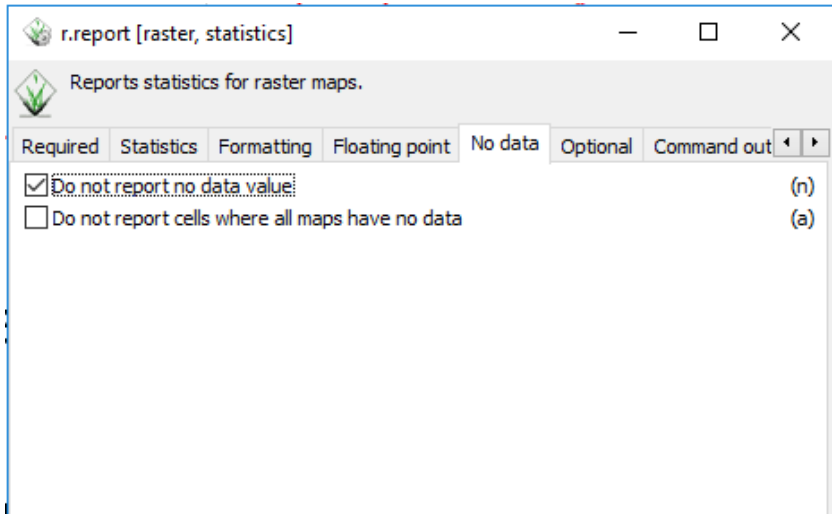
- Go to “No data” tab and check

“Do not report no data value” option

Click on Run.







CREATING FALSE COLOR COMPOSITE (FCC)

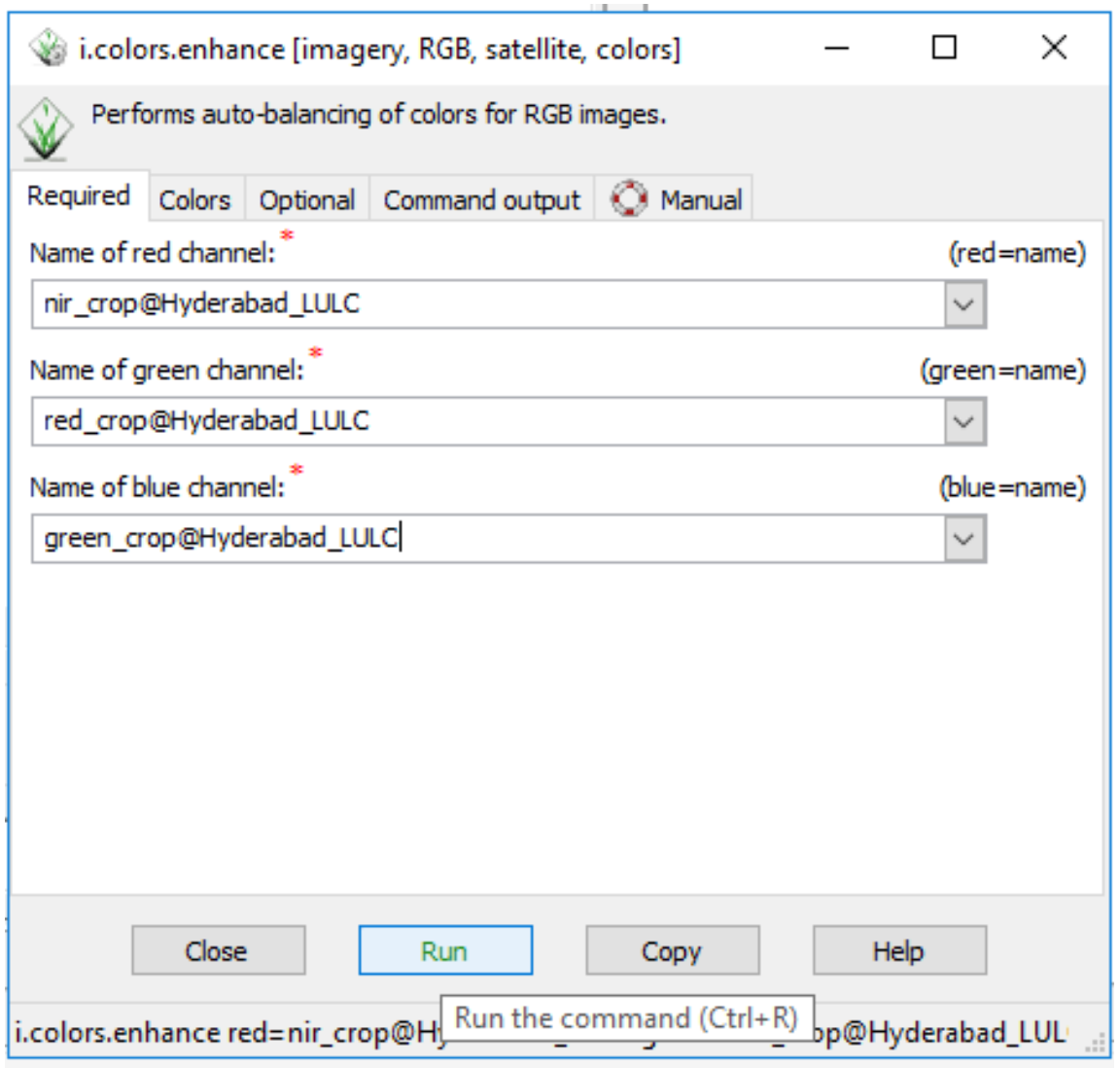
Command: i.colors.enhance

Red channel = nir cropped

Green channel = red cropped

Blue channel = green cropped

Click on Run.



CREATING FCC

Command: r.composite

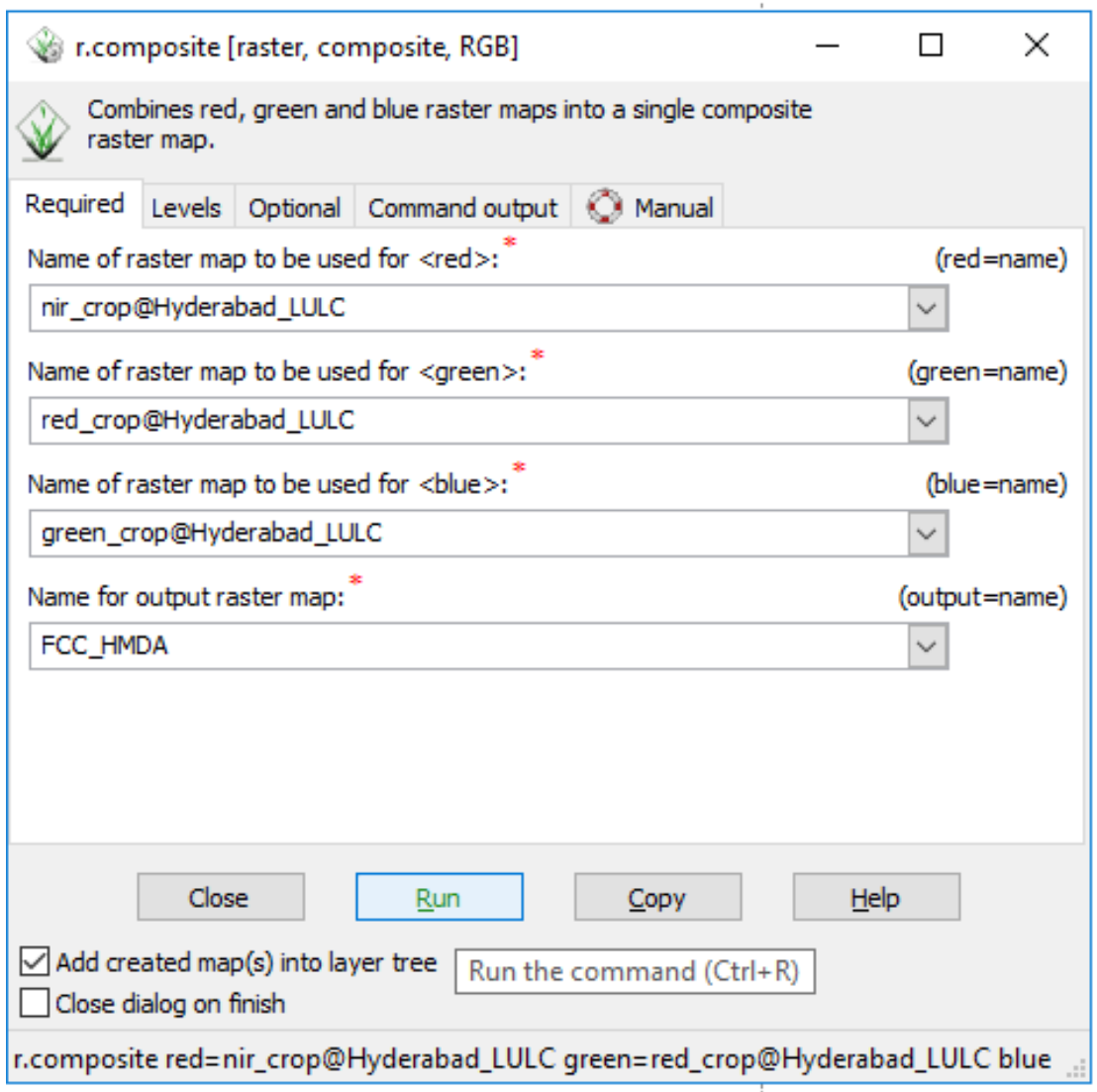
Red channel = nir cropped

Green channel = red cropped

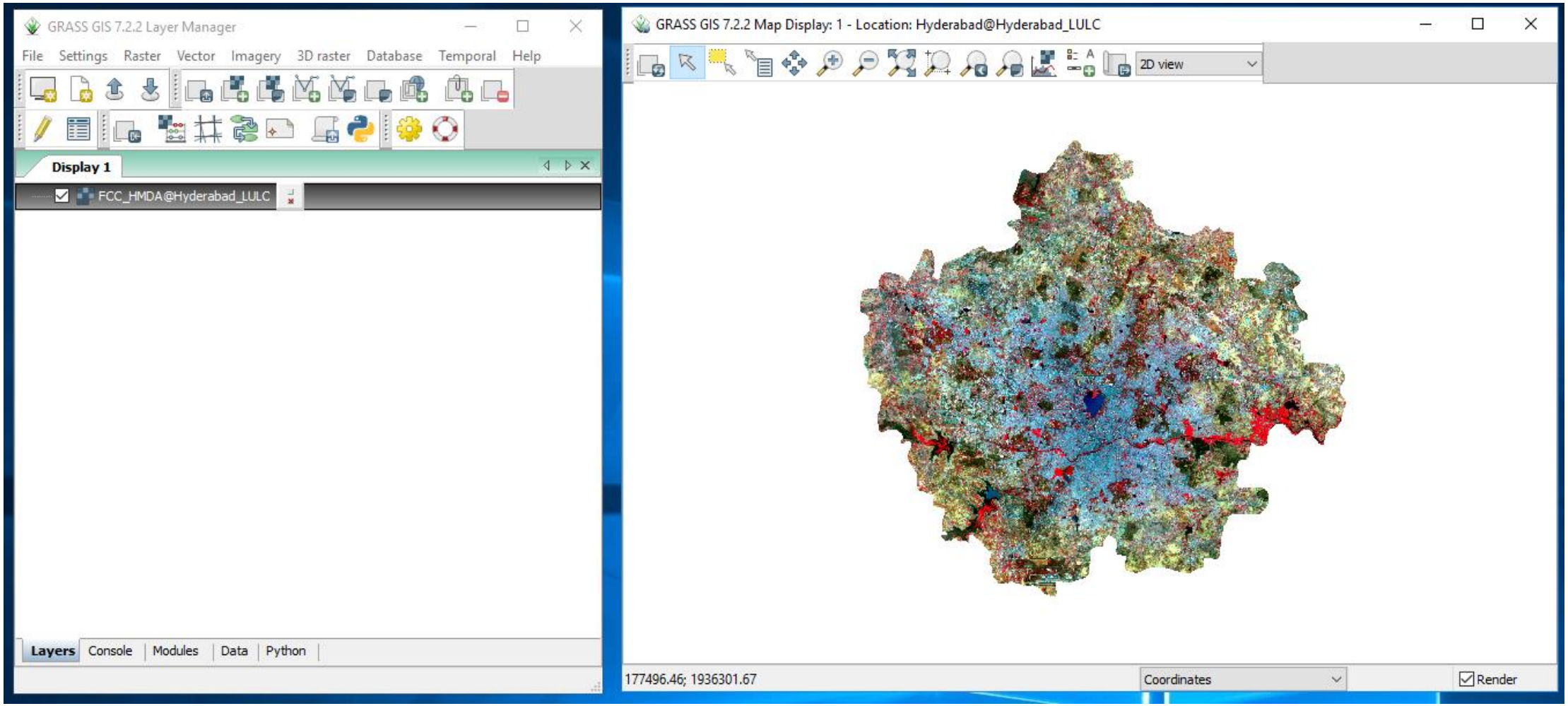
Blue channel = green cropped

Specify Output name (new name)

Click on Run.



CREATING FCC

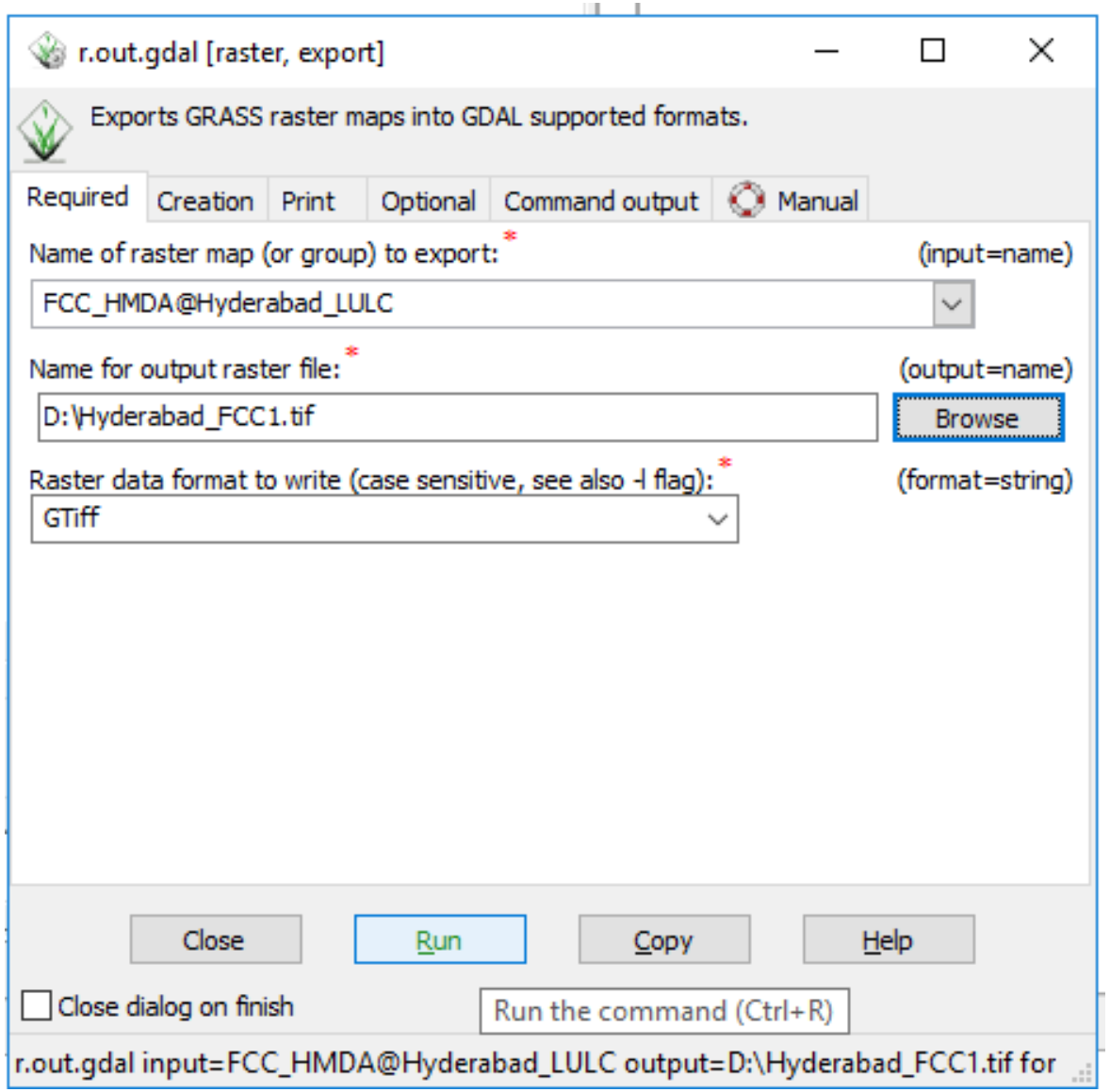


EXPORTING RASTER

Command: r.out.gdal

Output raster: Specify path by browsing. Make sure extension is <filename.tif>

Click on Run.

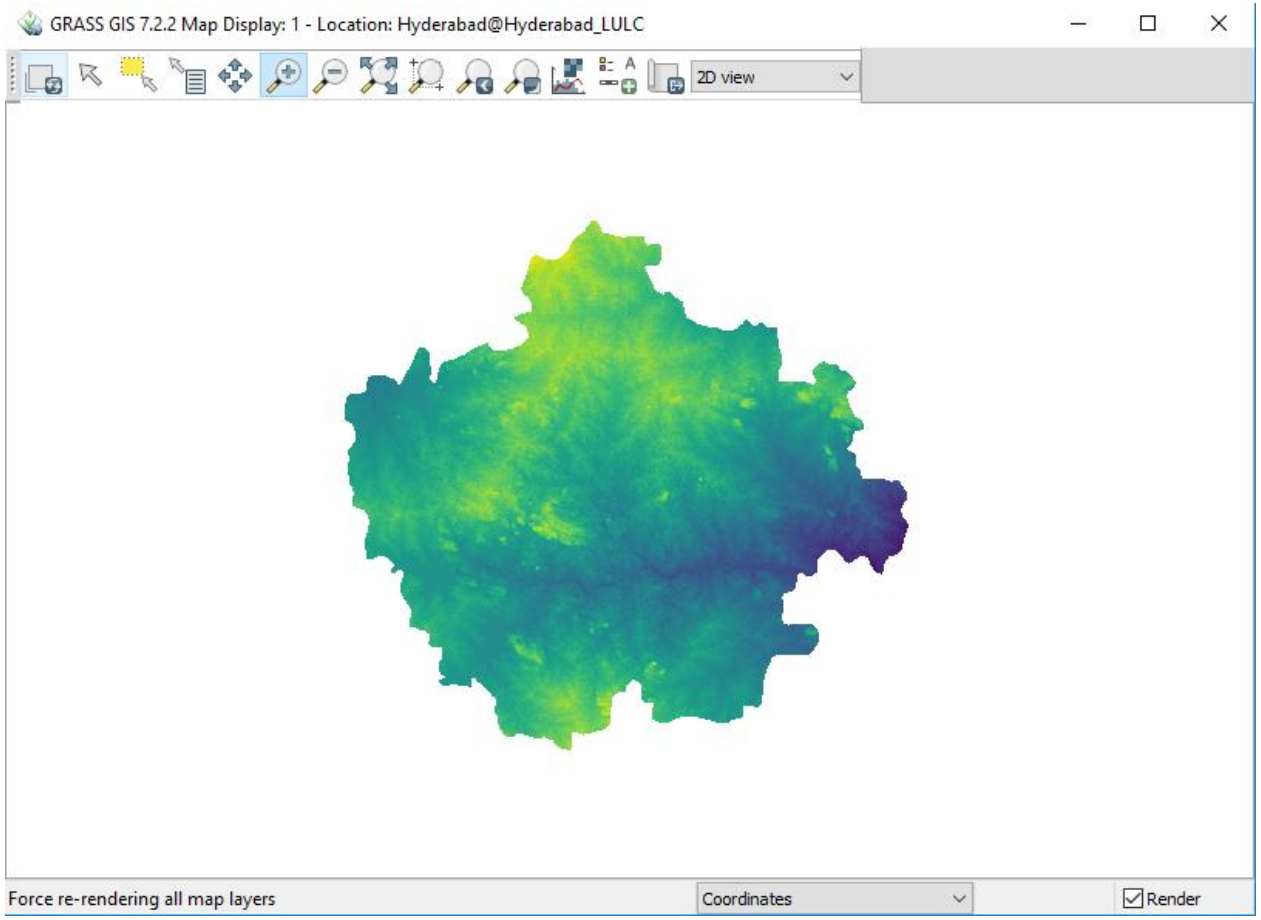


WATERSHED ANALYSIS

Import DEM and crop according to study area.

Command: r.in.gdal

Command: r.mapcalc



Note: DEM should be in UTM projection system.

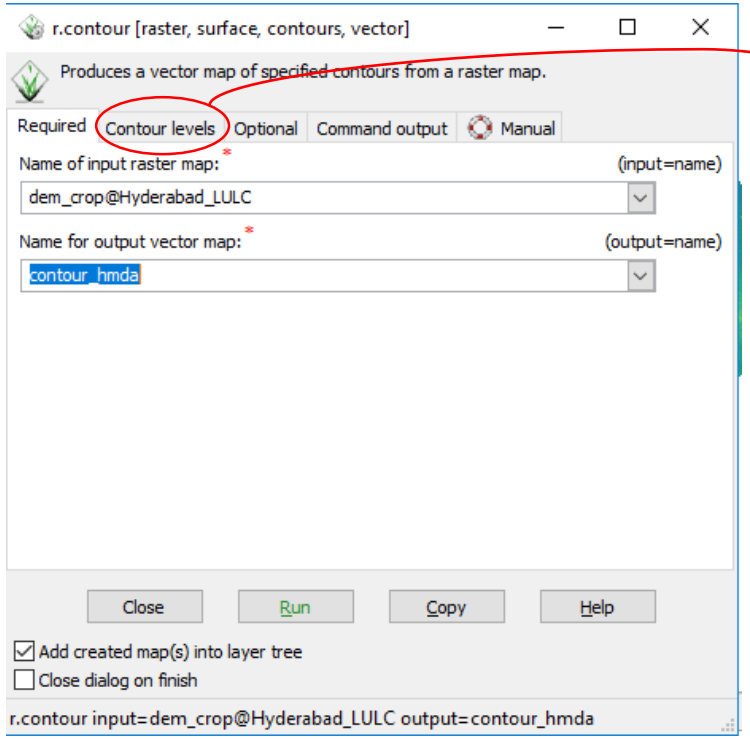
WATERSHED ANALYSIS

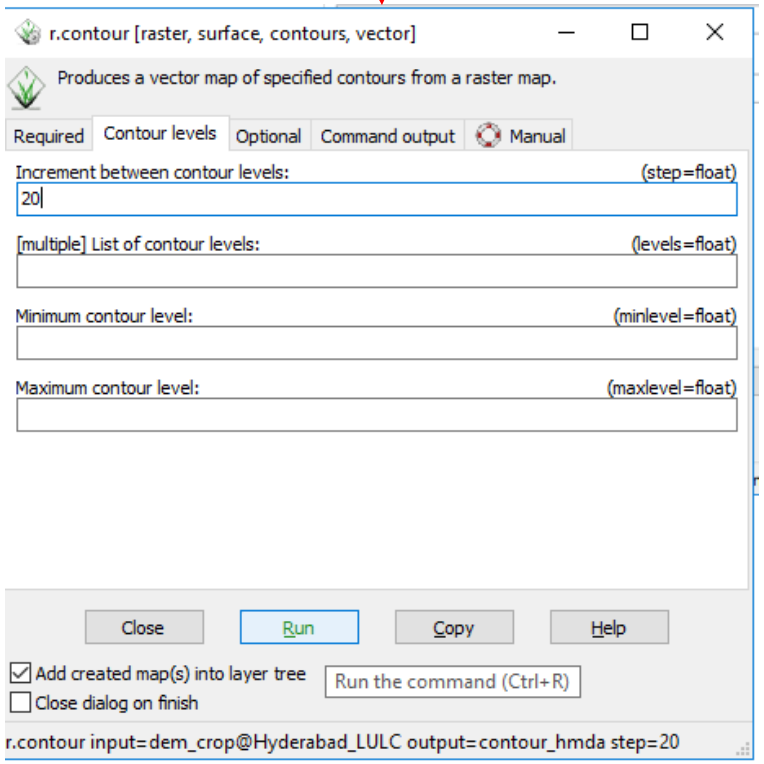
Command: r.contours

Contour levels tab choose contour interval (increment)

Click on Run.

Note: Output will be vector file.



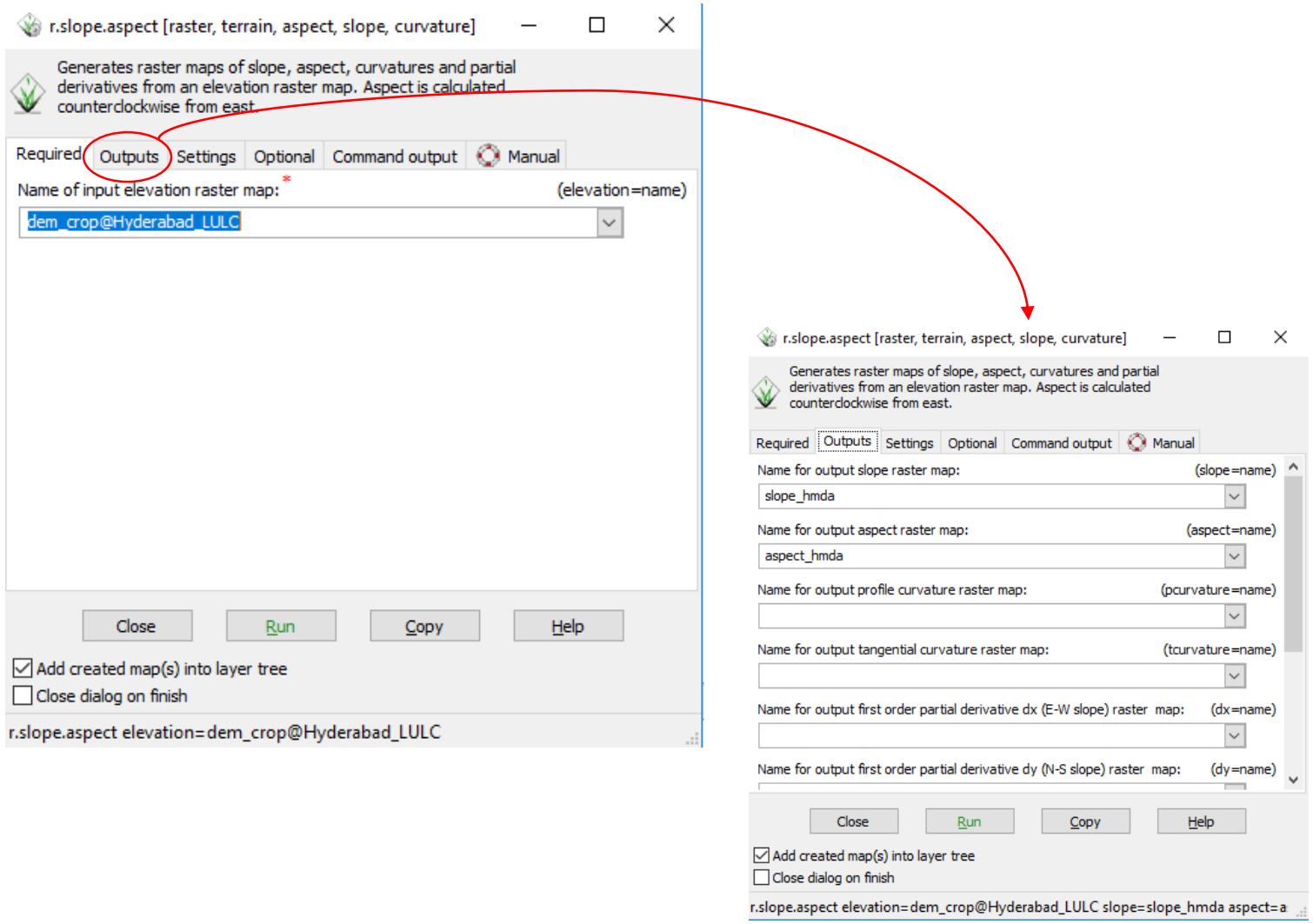


WATERSHED ANALYSIS

Command: r.slope.aspect

- Select DEM image for input.
- Output tab, specify name for slope and aspect map.

Click on Run.

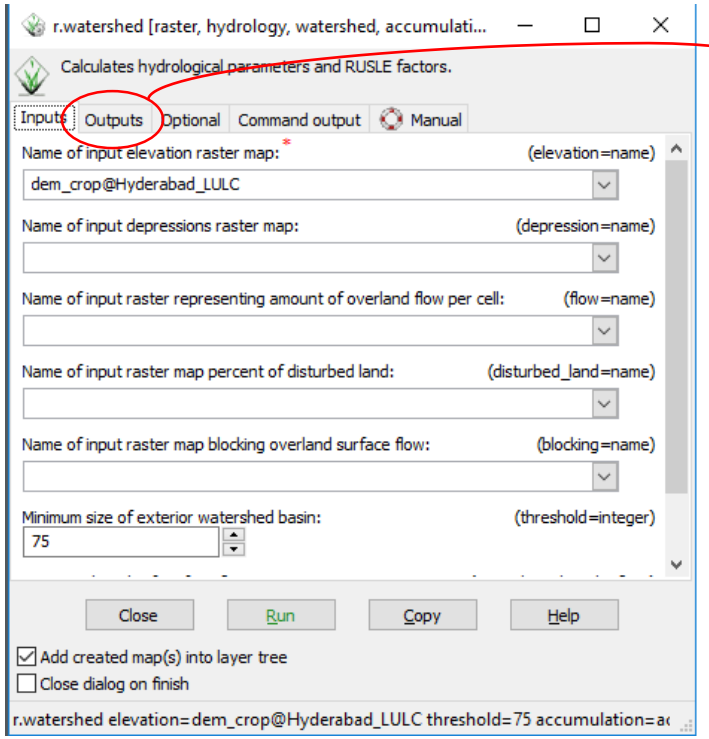


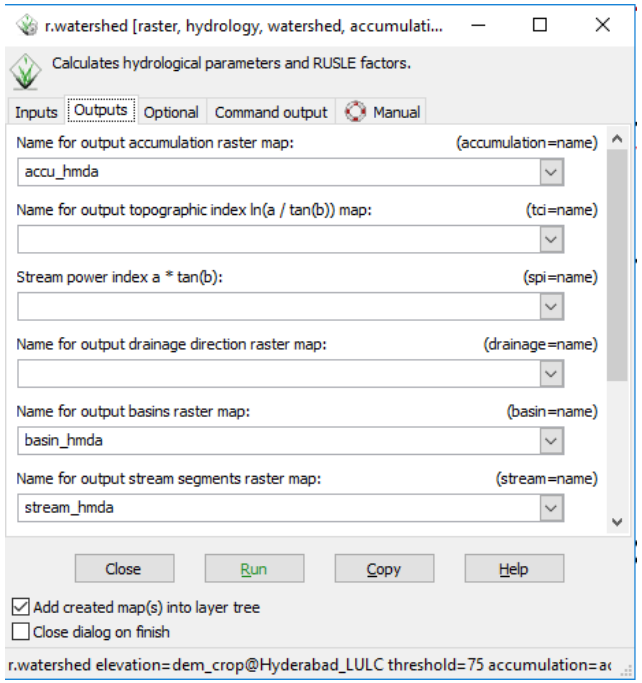
WATERSHED ANALYSIS

Command: r.watershed

- Select DEM image for input. Specify minimum size as 75.
- Output tab, specify name for accumulation, basin and stream.

Click on Run.





RIVER NETWORK EXTRACTION

Used to detect main channels.

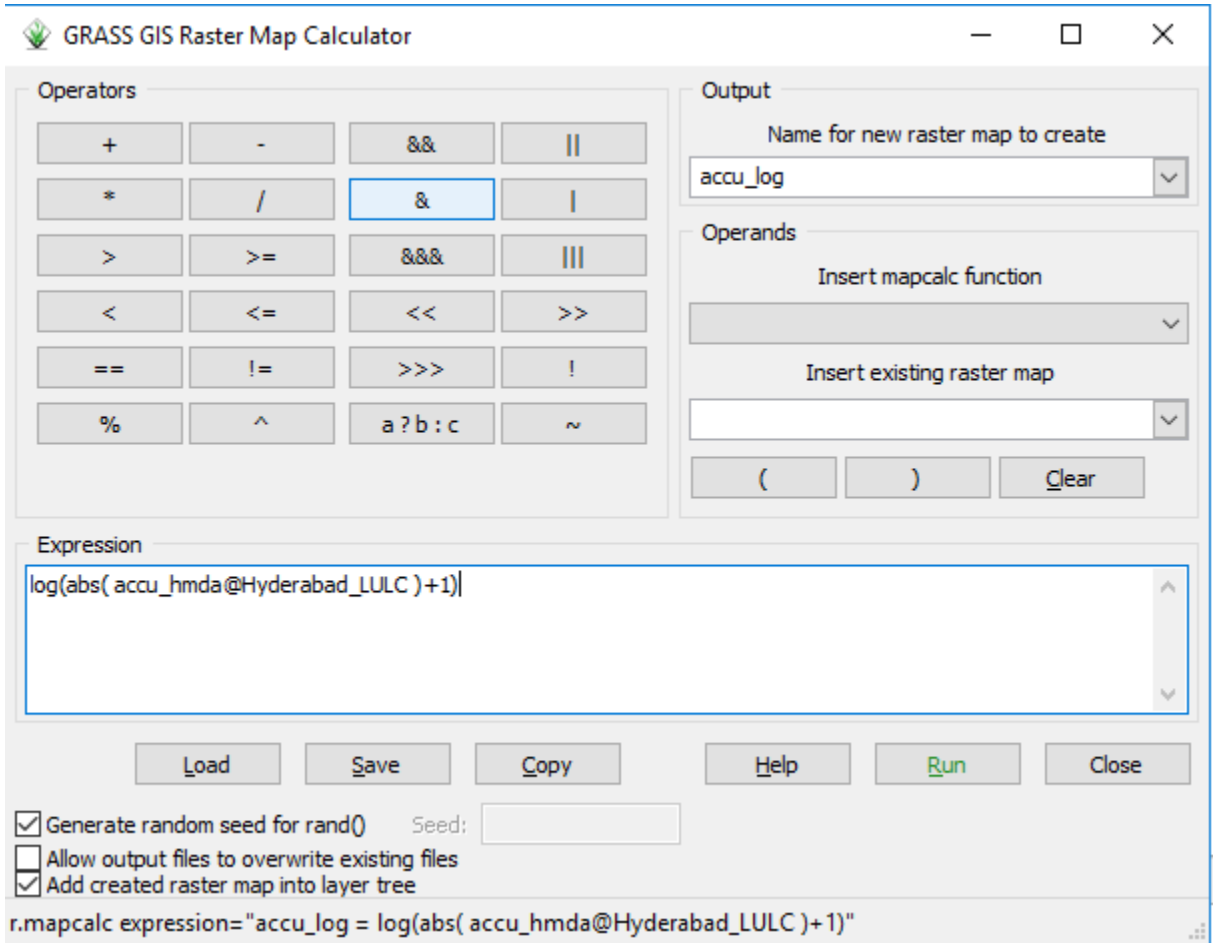
Command: r.mapcalc

- Specify output name. Ex. <accu_log>

- Use expression

log(abs(accumulation_map)+1)

Click on Run.



RIVER NETWORK EXTRACTION

Used to get river network.

Command: r.mapcalc

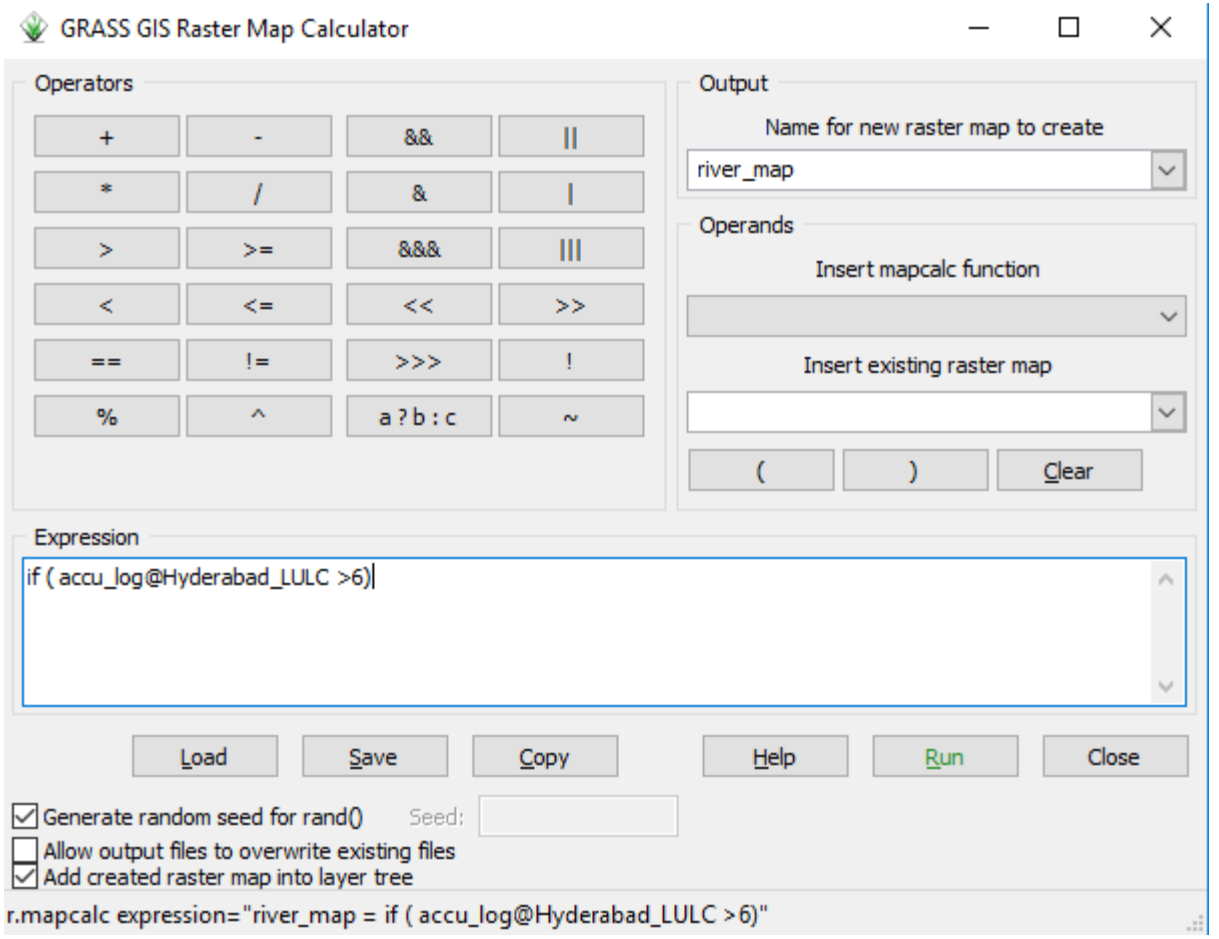
- Specify output name. Ex. <river_map>

- Use expression

If (accu_log_map > 6)

Click on Run.

Note: The number 6 is arbitrary. It may change according to study area selected.



RIVER NETWORK EXTRACTION

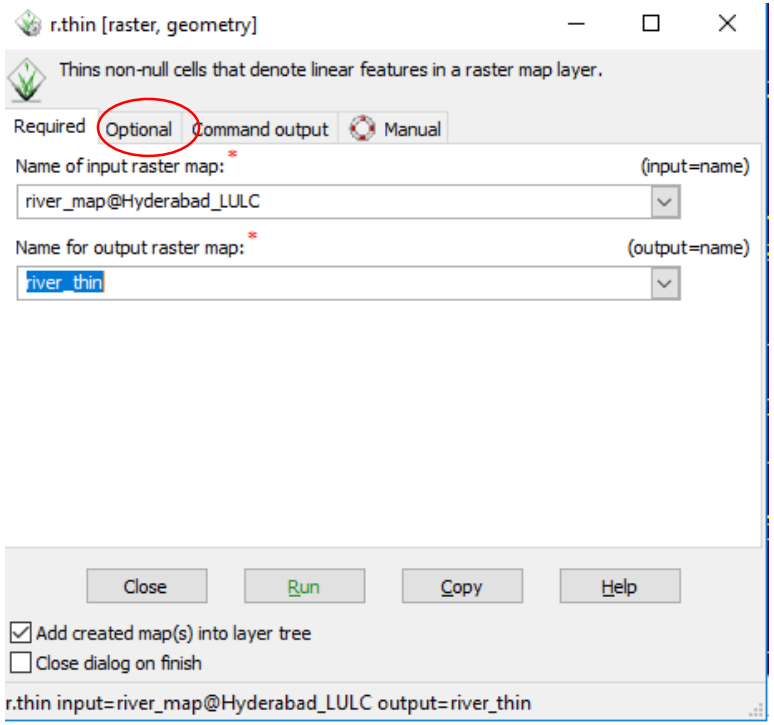
To thin raster map. Removes null cells and highlights only linear raster features.

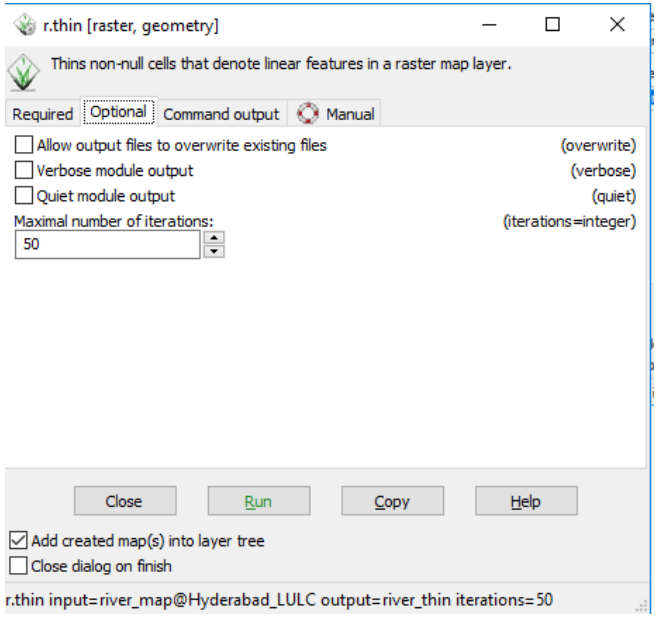
Command: r.thin

- Specify output name. Ex. <river_thin>
- Optional tab, specify number of iterations as 50.

Click on Run.

Note: The number 50 is arbitrary. It may change according to study area selected. This process takes time depending on number of iterations specified.





RIVER NETWORK EXTRACTION

To convert raster to vector.

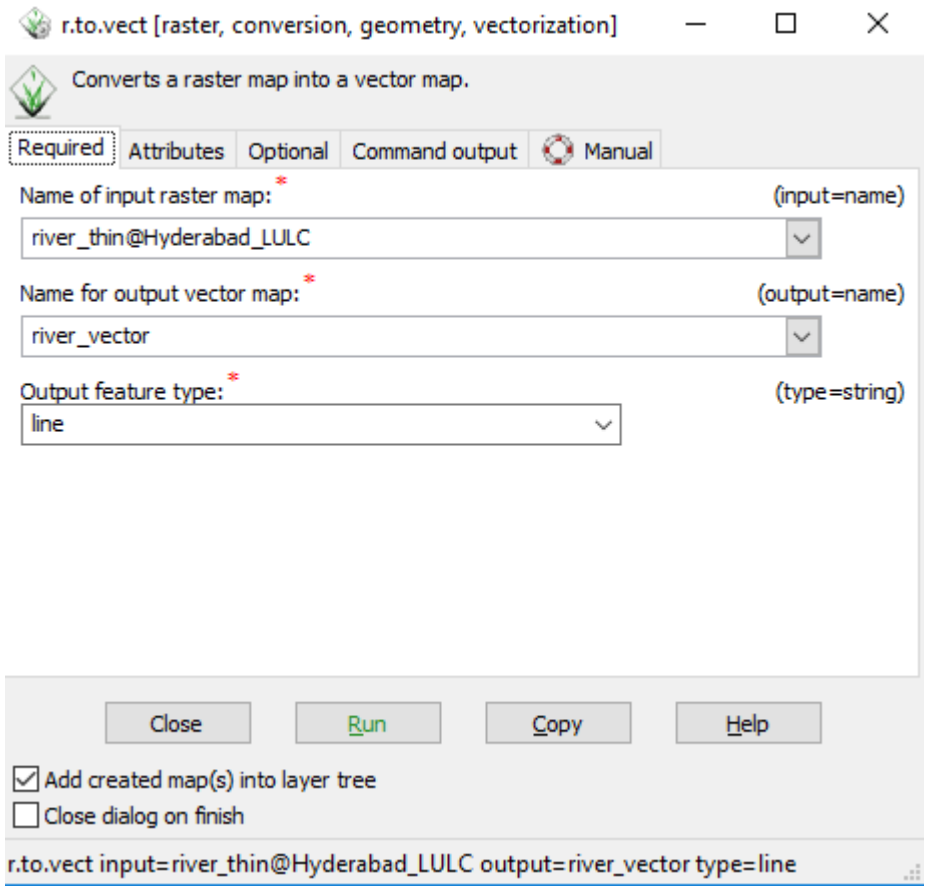
Command: r.to.vect

- Specify output name. Ex. <river_vector>

- Output feature type “line”.

Click on Run.

Note: This process takes time. The output vector can be exported and compared overlaying on Google earth.



THANK YOU.