



# Mosaicking and Subsetting Images

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Using SAGA GIS

Tutorial ID: IGET\_RS\_005



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## Mosaicking and Subsetting Images using SAGA

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**Objective:** To mosaic two satellite images and then subset it using SAGA.

**Software:** SAGA GIS (6.4.0)

**Level:** Beginner

**Time required:** 3 Hour

**Prerequisites and Geospatial Skills:**

1. SAGA GIS should be installed on the computer
2. Student must have completed exercise IGET\_RS\_001 and IGET\_RS\_004.
3. Familiarity with the SAGA interface is preferable.

**Reading:** —



**Tutorial Data:** The image required for this exercise may be downloaded from [IGET\\_RS\\_005](#)

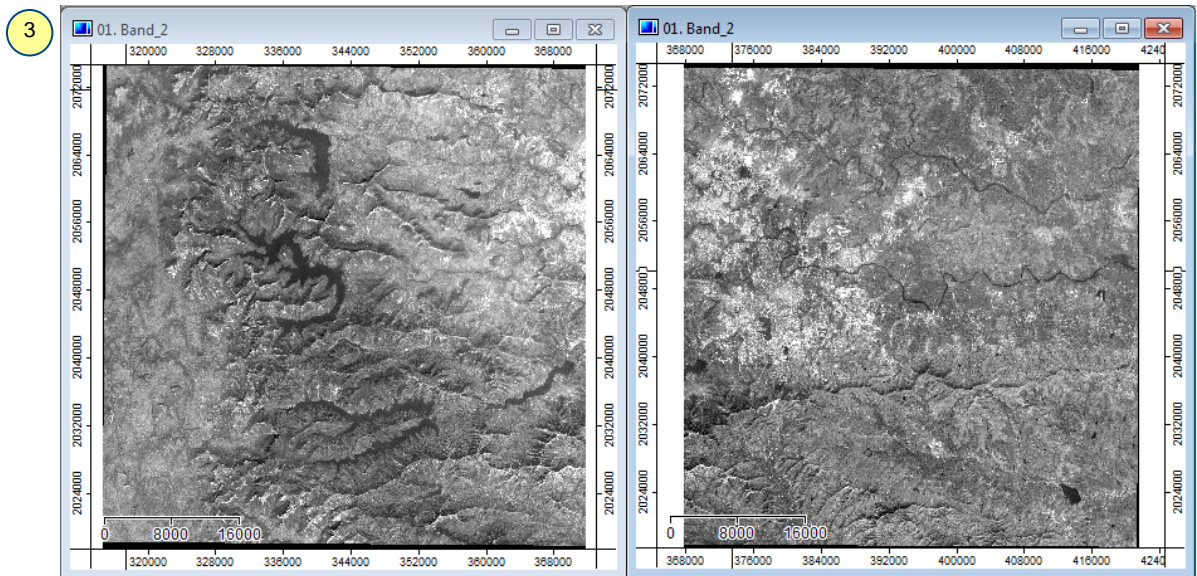




## Introduction

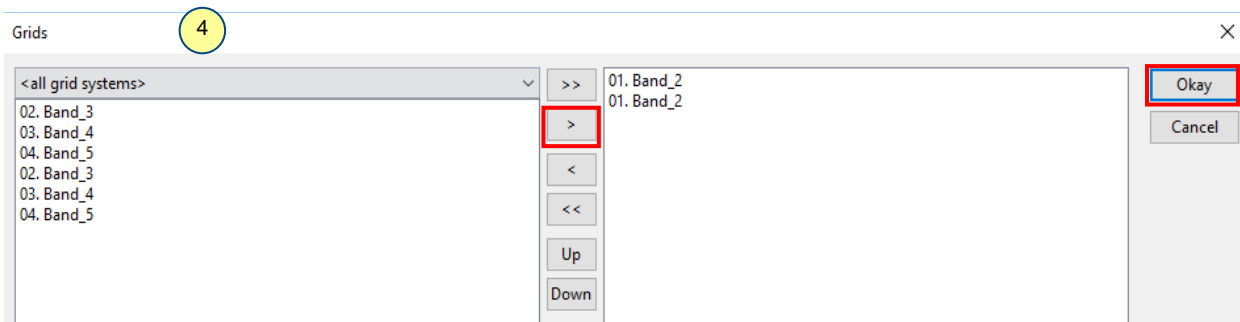
Satellite imageries come in varying swath widths, depending on their source of acquisition. For example, the LISS-3 imagery is approximately 140km swath width while the LandSat TM imagery covers 185km, and SPOT imagery is just 60km swath width. These images cover large swathes of land but in most of the cases the *Area Of Interest (AOI)* does not covered by a single satellite image. We need to assemble the satellite images which cover the individual parts of AOI to form a single composite. This composition process is known as '**Mosaicking**', it requires very accurate radiometric and geometric corrections to the constituent imageries (Rees, 1999). However, do deal with mosaic image is not recommended if our study area is smaller compare to the mosaic size. This will slows down the work, as the large size images are very demanding on computing resources. Sometimes, for management or other reasons, only a part of the entire image needs to be displayed or processed to convey the information or to represent the whole. Therefore, it becomes necessary to extract the area of interest from the images/ mosaics, and this extraction process is known as '**Subsetting**'. In some software packages it also called as *Extract, Clip or Cut*.

In this tutorial, you are supplied with two satellite images of east and west of Pune metropolitan, east part belongs to Pune-Haveli Taluka and west part belongs to Mulshi Taluka and one South Pune Toposheet. The objective of this tutorial is to provide hands on guide to mosaic and subset the satellite images.

1. Load the LISS3 images in SAGA by clicking on the  '**Load**' button. In the window that pops up, navigate to the tutorial data's Liss3 image folder '**Left**'. The layers may not be immediately visible, so change the dropdown menu selection (beside File name) from '*All Recognised files*' to '**All files**'. Select all the \*.tif files and click '**Open**'. Do the same for the layers in the folder '**Right**'.
2. The layers are imported into SAGA now and can be seen in the  Data tab of the Workspace window. They are placed under two grid systems. Both images having 4 bands each.
3. These are the left and right images covering Pune and Mulshi. They have a slight overlap. We will have to mosaic them one band layer at a time. The following figure showing band-2 image of west and east parts of Pune Metropolitan.

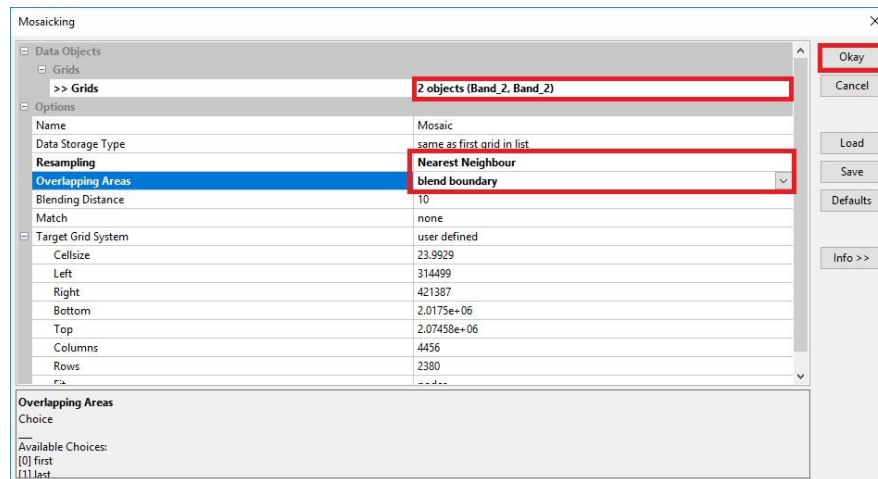



- Start mosaicking the image by clicking on *Geoprocessing* → *Grid* → *Grid System* → *Mosaicking*. This will open the Mosaicking window. In the field 'Input Grids' click on the  button. A window called 'Grids' will open in which we select both the Band\_2 layers and click on the  button to send them to the right part of the window. This means that only the Band 2 images will be mosaicked. Click *Okay*.



- In 'Mosaicking' windows, change the resampling to '*Nearest Neighbor*', Overlapping Areas to '*blend boundary*' and leave the Target Grid to User Defined and Click '*Okay*'. Another window appears showing the *Mosaicking* options. Click '*Okay*'.

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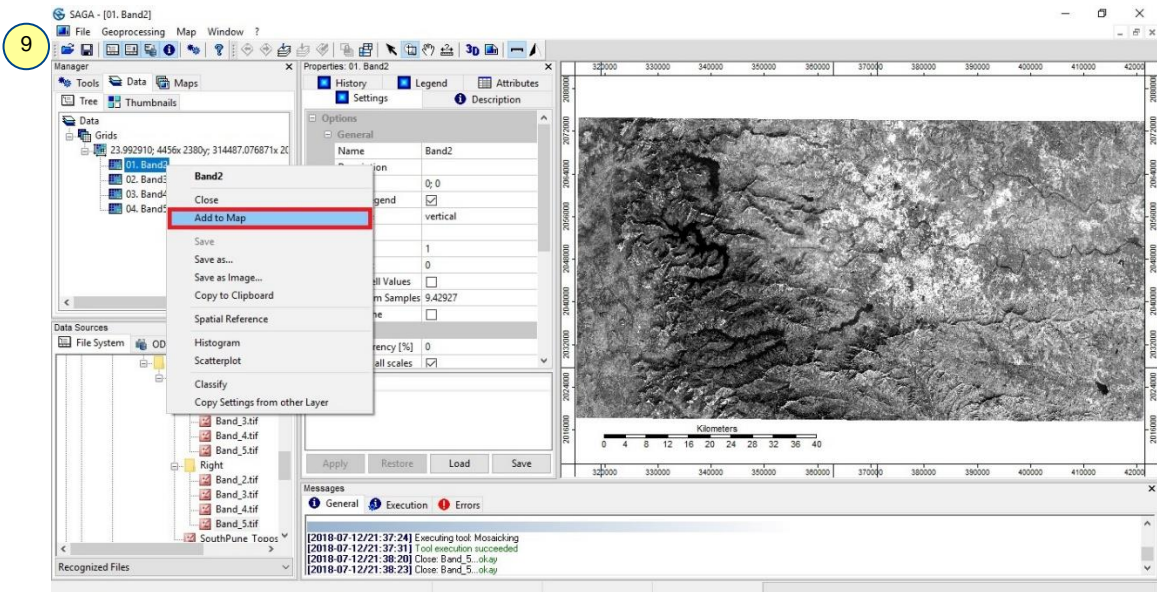


6. The merged grid will appear in a separate grid as '*Mosaic*' under *Data* tab. Click on this layer and change its name to '*Band2*' via the '*Name*' field in the  **Settings** tab. Press '*Tab*' in keyboard then click '*Apply*' .
7. Do the same for the other three bands and name the layers accordingly.
8. We can now remove the original images from the data list by right-clicking on their grids and selecting '*Close*' (Click on '*Yes*' and '*Close*' in the successive prompt windows).


**Task 1:** what are the prerequisites to be carried out on the individual images before mosaicking?


**Task 2:** Brief out the various overlapping techniques and operations used in Mosaicking module of SAGA? Do you any guess about the option we used in step 5?

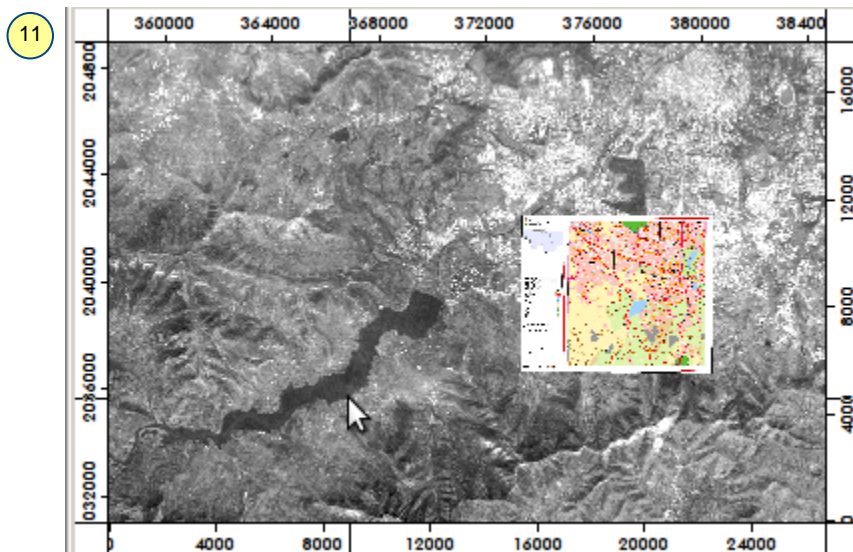
9. Right-click on an image (For example: *Band2*) and select '*Add to Map*' . The full image will have opened up in the Map Area.



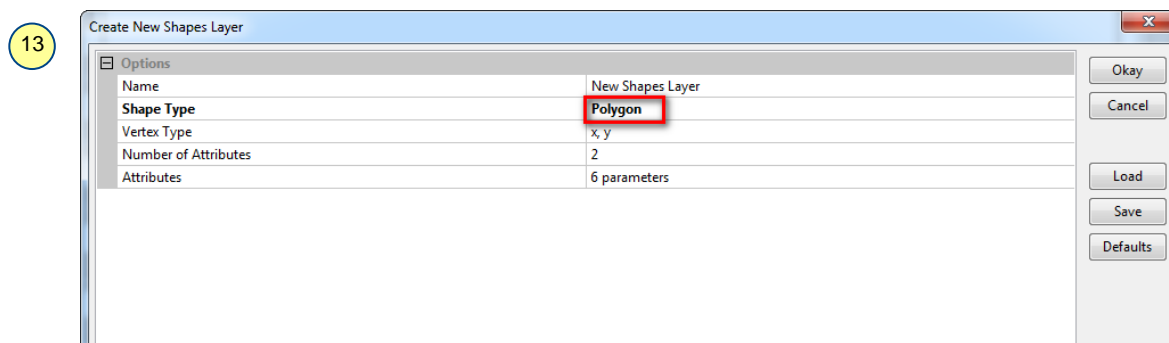
**Sub-setting using a Polygon**


10. Next, open the 'UTM\_Pune\_Toposheet.tif' layer by clicking on the  'Load' button. In the window that pops up, browse to the tutorial data folder and select the toposheet and click on 'Open'.

11. Under Right-click on the toposheet and add it to the image map (i.e., *Band2*). The toposheet is overlaid on the image. The color ramp may be different than below, select the toposheet under *Data* tab, click on  **Settings** tab, and change the '*Color → Type*' to '*RGB Composite*' and then click on '*Apply*'. Now you can see the Toposheet in true color and it covers only a small area of the image. *Zoom in* and *out* of the map to get a better idea of the extent of the toposheet.

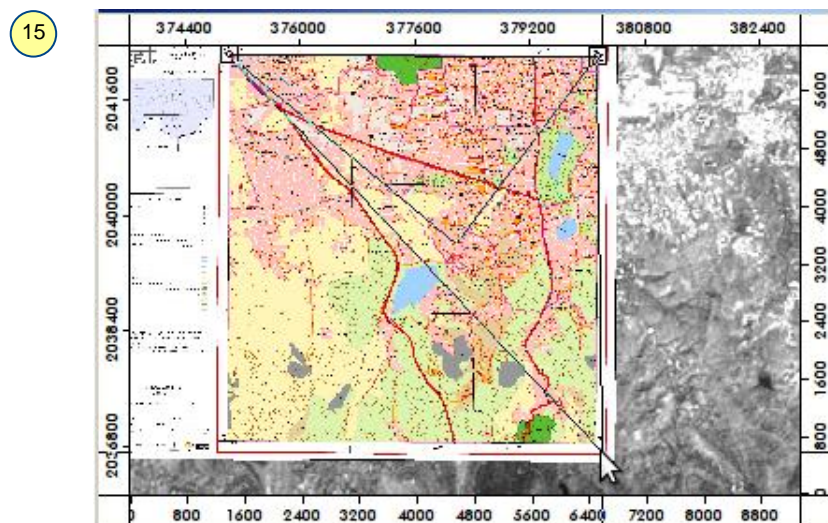


12. We do not require our subset to extend over peripheral parts of the toposheet like the legend, title and scale. Therefore we will create a polygon over the data area of the toposheet. This would act as the cutting shape for our layer.
13. Open the shape creation module via *Module* → *Shapes* → *Construction* → *Create New Shapes Layer*. A window will open with a number of options. We assign a name and change the shape type to *'Polygon'*. Accept the rest of the default options. Click *'Okay'*.

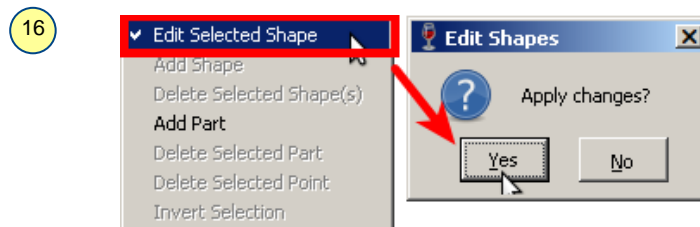


14. A new shape layer will have been created and will be seen in the *Data* tab list. Add this shape into the already opened *Band2* map (refer Step 11).
15. Enable the editing of the shape via *Right-click* on the *'New shape layer'* under *Data* tab → *Edit* → *Add Shape*. Make sure that the  *'Action'* tool is selected. We can now start the creation of the polygon in the layer by clicking on the corners of the toposheet extent. While adding the points, the connecting lines will be seen drawn out among the points and the cursor.

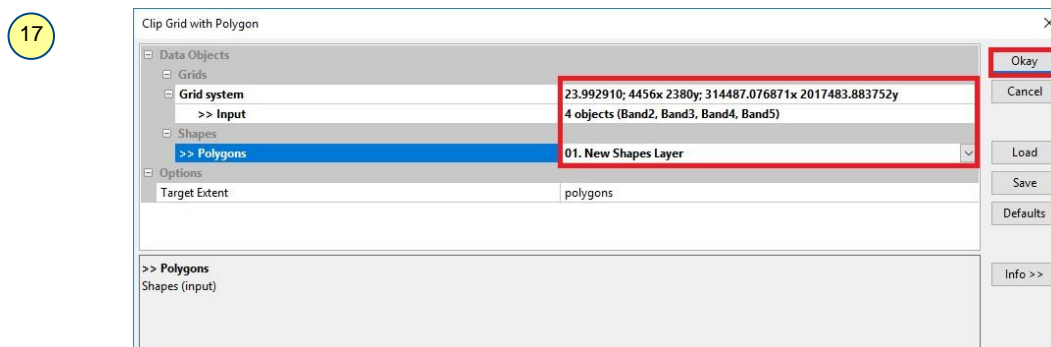
**Tip:** Use the scroll wheel to zoom in and out of the map. This can also be used with the arrow keys to navigate around the map.



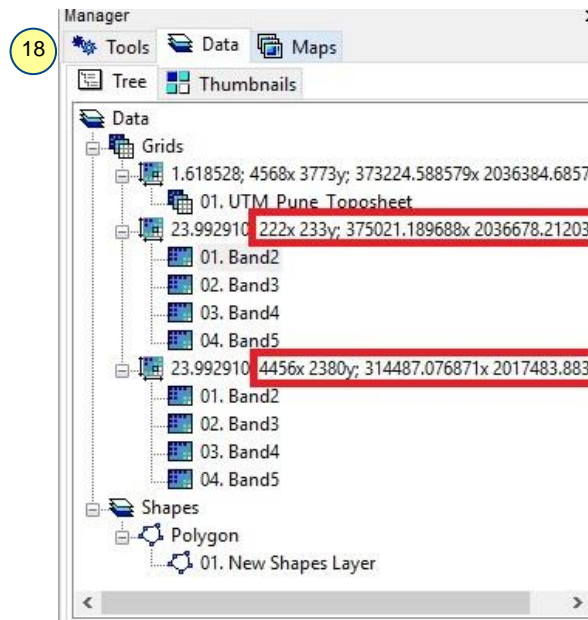
16. Close the polygon by right clicking on the map. Save the polygon by *right-clicking on the layer* → *Edit* → *uncheck Edit Selected Shape*. Click **'Yes'** on the pop up window. The polygon will be created and covers the toposheet.



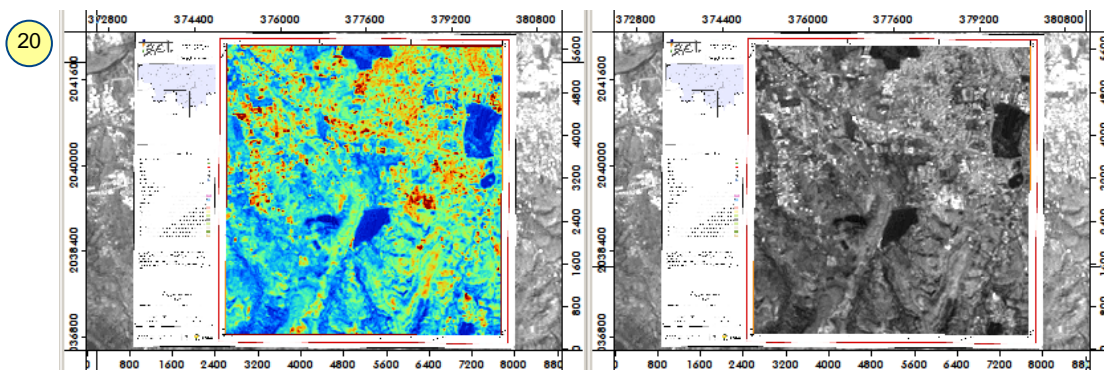
17. Now we use this shape layer to clip the image layers via *Geoprocessing* → *Shapes* → *Grid* → *Spatial Extent* → *Clip Grid with Polygon*. A window will open in which we will assign the *grid system of the satellite image*. Click on the **...** button to the right of the Input field. In the popup window use the **>>** button to add all the layers to the list. Click **'Okay'**. In the Polygon entry we will use the shape layer that just we created. Click **'Okay'**.



18. The newly clipped satellite image will appear in its own grid system. You will see that the pixel size is the same, but the location and extent are different.



19. Add these layers to the map window (Refer *Step 11*) to see the clipped image extent.



20. The visualization may be different, but this can be changed by changing the colour ramp to *Gray Scale* via the '*Colors*' section of the '*Settings*' tab (Refer *Steps: 15-17* of *IGET\_RS\_001: Introduction to SAGA GIS*).

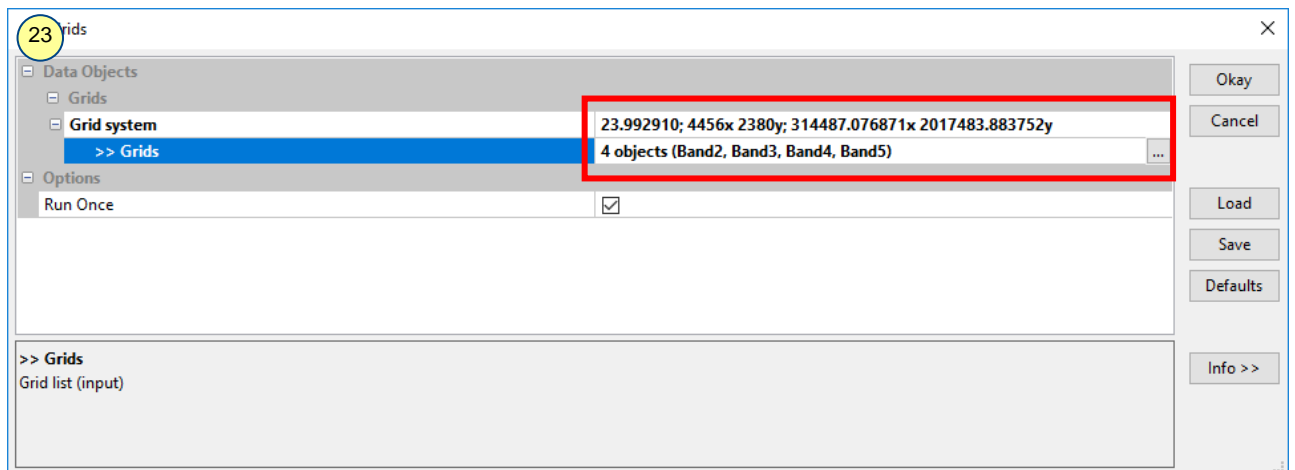
21. If you zoom in to a corner of the toposheet, you will see that the clipped image extends slightly beyond the toposheet boundary. This is because the clip shape extends beyond centroid of the pixel and we cannot have half a pixel in an image.

**Task 3:** Try to subset the approximate outer boundary of built-up area of Pune urban agglomeration by using irregular polygon.

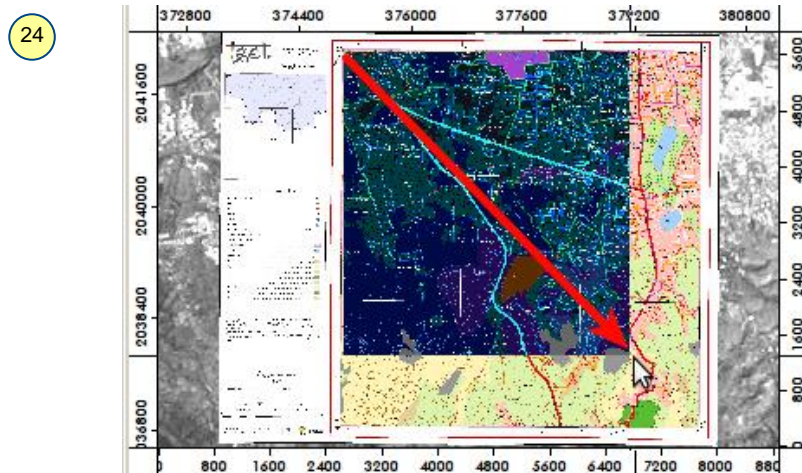
### Cutting the Grid Layers by Interactive Method

22. Another way to subset an image is to use the interactive '*Clip Grids*' module. Open this module via '*Geoprocessing* → *Grid* → *Grid System* → *Clip Grids [interactive]*'. A

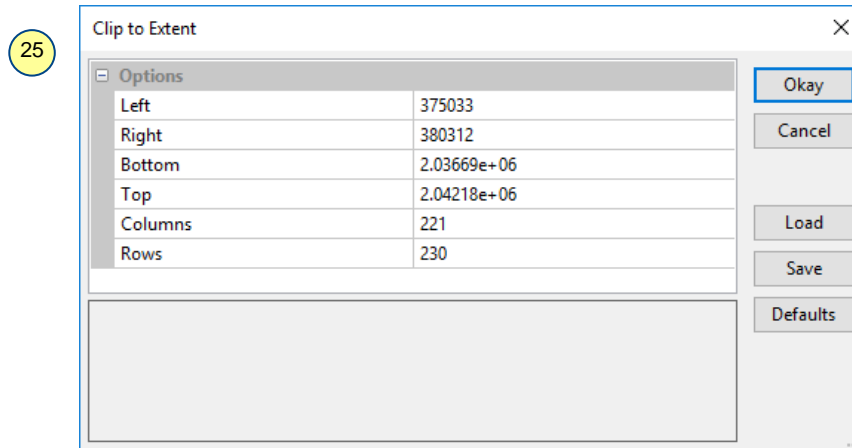
window will open in which fill in the options for the grid system of the layer to be cut. In the Grids field select the grids, you want to clip. Click *Okay*.



23. The cursor will turn into a '+' sign. Click and drag across the map to the desired extent.



24. A window will open describing the extents of the image in the North, South, East and West directions as well as the number of rows and columns. If you wish you may change these values, otherwise click '*Okay*' .



25. The newly clipped layers will be created and placed in the *Data* tab.

26. Stop the execution of the module by unchecking it from *'Geoprocessing → Clip Grids [interactive]'* . Click *'Yes'* in the pop up window.

**Note:** The *'Clip Grids [interactive]'* module only creates rectangular subsets. For irregularly shaped subsets use *'Clip Grid with Polygon method'* .

27. Now save the project via the *File → Project → Save Project As.* In the *'Save AS'* popup window browse to the desired folder to save, and enter the desired name i.e., *'IGET\_RS\_005'* and click on *'Save'* . In the popup window check the Checkbox *'Save all'* and click *'Okay'* .