Laboratory Practices in Earth Sciences: Landscape Mapping

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Week- 02
Lecture- 10

Welcome back. So, in the last lecture we saw how we can download all the freely available data from the different websites which are managed by the different space agencies. And we have also seen how we can purchase data from the NRSC. So, now in this lecture we will discuss QGIS, which is a freely available GIS platform. You can visualize and manage all your satellite data using this QGIS platform. So, first we will see how we can download and install this QGIS software on our PC.

So, the link is given here when you click on this link. So, this web page will open and in this web page you can see this is here you can see the download option that is the QGIS 3.34. So, this is the QGIS version 3.

34. So, this one is the latest version and here in this all release option you can see when you will click in this option here. So, in the window option, this QGIS is available for the android, MacBook and the windows. So, this is for all the QGIS versions starting from the 0.10 to the 3.

34 that is the latest version of the QGIS. So, you can download any version of this on your PC to use this QGIS software. So, you can say to download this QGIS setup you just have to click any of this version setup and your QGIS setup will download and you have to install it on your PC. Once you install this in your PC, after opening the QGIS software your page will look like this. So, here you will see a few options are given, one is news and the other is the project template.

So, in this project template because we have this new empty project you can see over here. So, you have to just open this empty new project. So, once you click on this empty project, you can see this type of outlet and first you have to explore this website and you have to understand a few of the options to get a hands- on experience on this website, on the software. So, there are few options mentioned over there. First is the project in this project option you can see the new and new from template.

So, these are the options through which you can create a new template and the edit option there is some other information given in the view option. So, in the view option you can see there is a panel option. In the panel option you can enable some of the options like the

browser or the layer. So, this layer option is important because all the data which you will open on this platform. So, that will show in the layer option. So, suppose now this layer option is enabled by default if I close this.

So, here you can see that your layer option is not available here and to see the layer option you have to just enable the layer option now you can see this is your layer option and this one is the your browser option from here you can see this will direct you to your PC storage. So, from there you can directly import your data on this software. And another option is if you want to so that on the right side of this your screen you can see this is completely black. So, here you will see all the data which you are importing on this platform. So, suppose I want to import the data which I have downloaded in the earlier lectures.

So, suppose I want to analyze my SRTM data. So, to import the SRTM data. So, you have to go to the layer option and here you can see there are a few options given . One is creating a layer. So, this is important when you want to create a new shapefile layer. So, in that time you can use this option and now we want to add data.

So, we have to go to the add layer option and in the add layer option you can see there are few options given : add vector layer, add raster layer, mesh layer and likewise there are many options. So, these all options are basically showing a kind of data format. So, the vector layers mean that all your digitally acquired data has some kind of information. So, either it is a vector layer or it is a raster layer. So, all the images have the pixel values or the dn values associated with it.

So, those data are known as the raster data and the data or the layers which have only points or the lines which are connected by the points or the polygon which are connected by the lines. So, all these data are the vector layers. So, if you want to add a vector layer. So, in that case you have to go to the vector layer option or if you want to open the raster layer means you have any kind of image you want to open. So, in that case you have to go to the raster layer.

So, I want to just add the dm that we have downloaded. So, that dm is a raster layer. So, I will click on the raster layer. So, once you click the raster layer this will ask you to choose the source where you have saved your data. This was the file which I have downloaded in the earlier lectures.

So, I will just open and here in adoption you just open your data. So, once you open your data. So, you can see this is your SRTM data which we have downloaded. So, in the layer panel you will see that your data is open. So, on the left side.

So, once you click on this layer and you right click on this layer. So, you will see some of the options are given. So, you have to explore all these options with time. So that you will get a kind of hands-on experience. So, what all these options are used for.

So, suppose zoom to the layer means that once you click to zoom to the layer this will directly zoom on the layer. And the copy layer means you can just copy your layer, rename layer duplicate your layer or you can remove your layer. And one of the most important options is the property. So, once you go to the property option. So, here you can see you here you can mean manage your data by giving some of the information.

So, in the property option first you will see the information tab. So, in the information all the information which was saved in the form of metadata in your raw data that you can see over here. So, here you can see the CRS, which is the coordinate reference system. So, every data has its own coordinate data acquired in a certain geographic reference system. So, one of the most commonly used geographic reference systems is a WGS 84.

So, that is the world geodetic system and this was developed in 1984 that is why it is called the WGS 84. So, WGS 84 is a datum or is a reference frame which is used to distance or measure or identify any point on the earth surface. So, you need a kind of reference system. So, this WGS 84 is a datum and it is a geocentric datum that means it considers the earth center of mass as a point and with respect to the earth center of mass it just calculates the latitude and longitude on the surface of the earth. So, another information is also given over here the pixel size and the latitude longitude of this particular scene.

So, all the information you can get from here in the symbology option you can simply change or you can analyze your image by giving or changing some of the information. So, by default you can see here in the band rendering option render type it is a single band gray color. So, that is why your image looks like a black and white color. So, you can make it more interpretable by giving some of it the color or you can generate the hillshade from this image because this is the DEM and it is associated with the elevation data. So, you can create the hillshade.

So, to generate the hillshade you can see here the hillshade option is given. So, after clicking the hillshade you can just apply and now you can see this is the hillshade and you can enhance this hillshade by changing the z factor. So, the z factor is basically your exaggerated elevation value. So, you can change it accordingly so that your data will smooth. So, here you can see that by changing the z factor value you will be able to get a clearer picture of your DEM.

So, I will just keep it. I will change this according to the data. So, now you can see this is my DEM here you can see all the elevation information. So, this is the river. One of the famous rivers of this region is the Kosi river and here you can see the fan shape. So, with this DEM when you analyze or process this DEM on the GIS platform that will help you to interpret the information from your image. So, with this DEM with a 30-meter resolution you can see you can at least identify the fans, rivers, mountains or the indo gangetic plain.

So, this is the image of the Himalaya: this portion is the sub Himalaya and this is the indo gangetic plain. So, this is the Kosi river, this one is the Dabka river and this one is the Baur river. So, this is the central Himalaya portion. So, this is a completely blackened bite image. So, you can give the color to this image.

So, that you can interpret the image. So, to assign the color you have to just go to the single band pseudocolor. So, because this is a single band image. So, for that you have to go to the single band pseudocolor. If your image has multiple bands in case for example, in the Landsat data you're in Landsat data you have multiple bands.

So, in that case you analyze your Landsat data in the QGIS platform. So, you can choose the multiband colors for this option. If I choose the multiband color you can see here I can see only one band, that is the gray band. Because this is the single band image. So, I have to choose the single band pseudocolor. So, I can assign a color to this. To assign the color in your single band image you have to go to the single band pseudocolor and in single band pseudocolor here you can see the color ramp in from the color ramp option you can choose the color ramp and you just apply.

So, this will assign the color according to elevation of your elevation data available in your image. So, this blue color is basically your highly elevated area and this red color is your low elevation area in this image. So, this is simply a color map of your DEM. So, you can assign color in your hillshade map also. For that you have to just first make it to the gray scale and you just copy and duplicate the layer. So, now just make one of the images to the hillshade. Suppose I will just make this one the hillshade.

So, you increase the z factor little bit. Now, go to this first one and give it to the single band pseudocolor applied. You can see this one is overlaid on the hillshade above the hillshade. So, to make it the hillshade you have to just do the blending. So, in blending option you have to just multiply and that will create the hillshade in the color form. So, you can see now the image is much more interpretable. So, you can get extract the information more you can get the clearer information from this color hillshade map.

So, likewise you can change the color also if you because this is the elevation map or

elevation data. So, in the color RAM you have to just go to the create new color RAM and in the catalog option you will see different options according to the topography. So, in the topography, there is some standard color chart available and you can use this color chart. So, here you can see in the topography option there is elevation. So, this is the standard color RAM for the elevation and you can use this elevation chart for your map also.

So, now you can see your map looks much more interpretable and you can get clear information about the elevation. This brownish region is your high elevation region and this bluish region is your low elevation region. So, this is your DEM map and apart from this you can do much more with this GIS software. So, you can add the base map. Also to add the base map you have to just go to the map portion. Here in the map portion you can see only the meta search is available and one plugin is available in the software. So, that is known as the quick map service. You have to just search quick map service in your plugin and here you can see the quick map service that you have to install in your software.

So, from this install plugin option you can install the quick map service and this quick map service will allow you to open the base map. So, now you go to the web page and here you can see the quick map service and you can see the so in the quick map service you can see there is some of the information is available and if you want to add more information you have to just search in the search QMS option from this tab you can add the Google satellite images to the your quick map service. So, here you can see different maps are available and we will choose Google. So, here you can see the Google maps are also available. So, Google road, Google satellite hybrid, Google terrain, Google terrain hybrid, Google traffic.

So, we will just choose the Google satellite hybrid map. So, you have to just add and now you can see your base map is also added to your software. So, with this base map you can see where your image is lying over the globe. So, that you can easily see through this. So, this one is the Google hybrid and you can just add the Google terrain.

So, here in your layer option you can see the Google terrain option is also available. You can see the Google satellite hybrid map is also open here and you can add the Google satellite map also. So, the Google satellite map will only show you the geographic information and you have to just disable this Google satellite hybrid. Here you can see this is the Google satellite map. So, similarly you can add many more maps based on your interest you can add these maps over your QGIS platform.

So, many more options are available on this platform. So, through this plugin option you can install or you can add different plugins in your software according to your interest. Suppose I want to just have one plugin called map. So, there is one option: map swiping tool. So, this tool will be useful when you are dealing with multiple images over this

platform.

So, here once you install this plugin you can see the map swiper tool is available over here. So, you can just swipe your map with this map swiper tool. So, to swipe your map you just have to click on which map you want to swipe and then you go to the map swipe tool and see you can just swipe your map. So, suppose you are using two or three maps or multiple maps or those maps are overlapped and you want to just analyze the maps below the bottom bottom map so that you can do so by using this swiping tool. So, similarly there are many more options available that will make your work easier.

So, you have to just explore all these options and you have to get a hand on experience to use this software. So, this QGIS software is a similar kind of software similar to the ArcGIS that ArcGIS most of you might have worked on. ArcGIS is a paid software. You have to purchase the license from the software provider and after that you can use that software, but the QGIS is a freely available software you can do all the tasks similar to ArcGIS on the QGIS. So, this is very easy to use and with light software you can use this software to analyze or interpret all your satellite data. So, you have to just explore this software and we will also give you a hand on experience on this software over the time on this course.

So, in the next lecture we will explain or we will show you how we can use this software to mosaic or merge different images or to generate the shape file or georeferencing map. So, all kinds of things we will see in the next lecture. Thank you.