

Using Farmer Field Schools Approaches to Overcome Land Degradation in Agro-Pastoral Areas of Kenya

Land degradation assessment – Baseline survey on spatial analysis of land cover / degradation trends and Toolkit Development.

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LESSON 1 – DIVA-GIS BASICS

Lesson overview

In this lesson you will learn about GIS data layers, and how to add and remove them from a DIVA-GIS project, how to turn layers on and off, and change the display order. You will also learn how to retrieve information about geographic features, and see the difference between vector and image data.


Add layer to DIVA-GIS

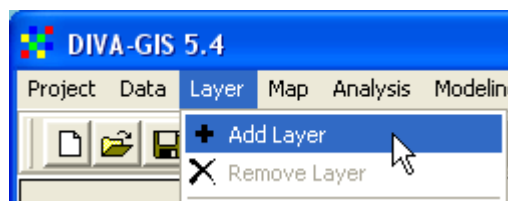
Start DIVA-GIS

Start DIVA-GIS by clicking the icon for DIVA-GIS on the desktop (see [lesson 0](#) to create an icon on the desktop if you do not have one). Open the project from the introduction (\data_spatial\ke\my diva\lesson0.div) by either clicking the Open Project tool, , or via the menu: Project – Open.

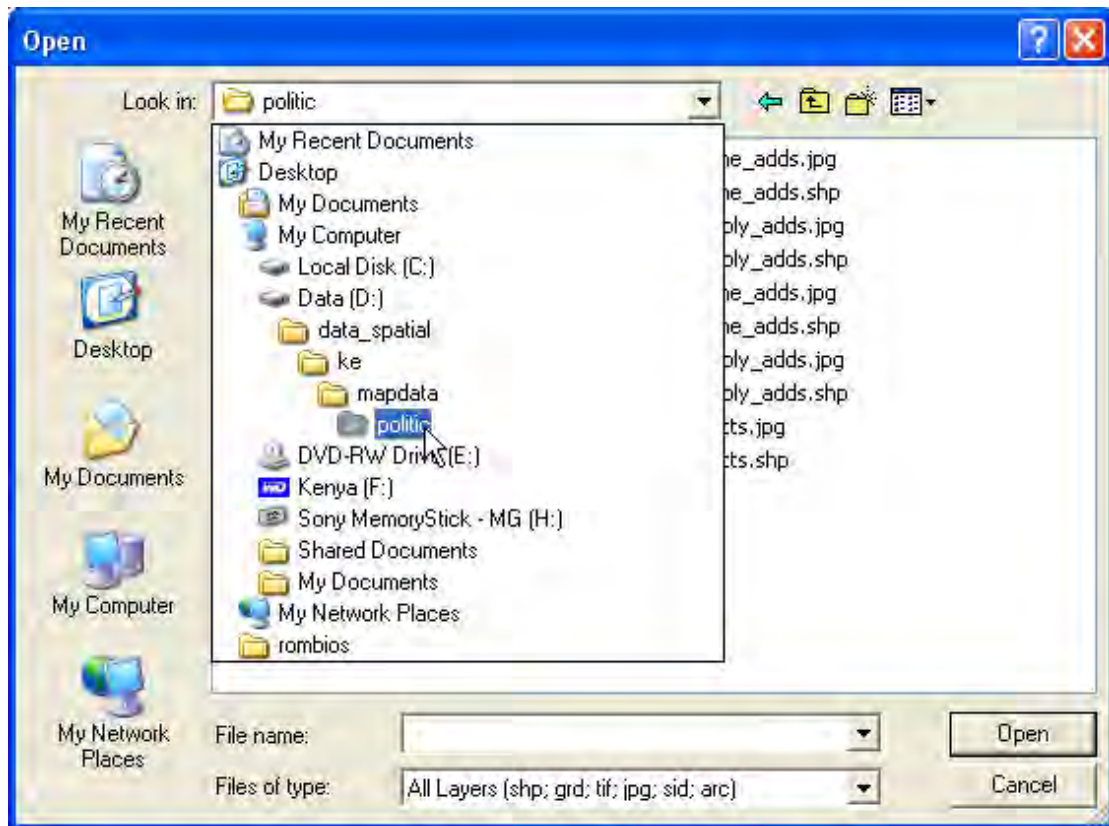
With the project opened, save it as a new project (e.g. with the name lesson1) via the menu: Project – Save As. See [lesson 0](#) to repeat saving a project if you need.

Add GIS map layer to DIVA-GIS

To add a map layer to DIVA-GIS click the Add Layer tool, , or use the menu: Layer – Add layer (most DIVA-GIS commands can be accessed either from the tool bars or via the menu system).

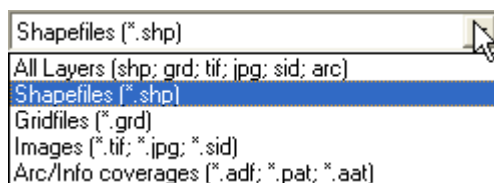


When you click Add Layer a standard windows Open folder and file navigation window will pop up. Navigate the folder \data_spatial\ke\mapdata\politic.



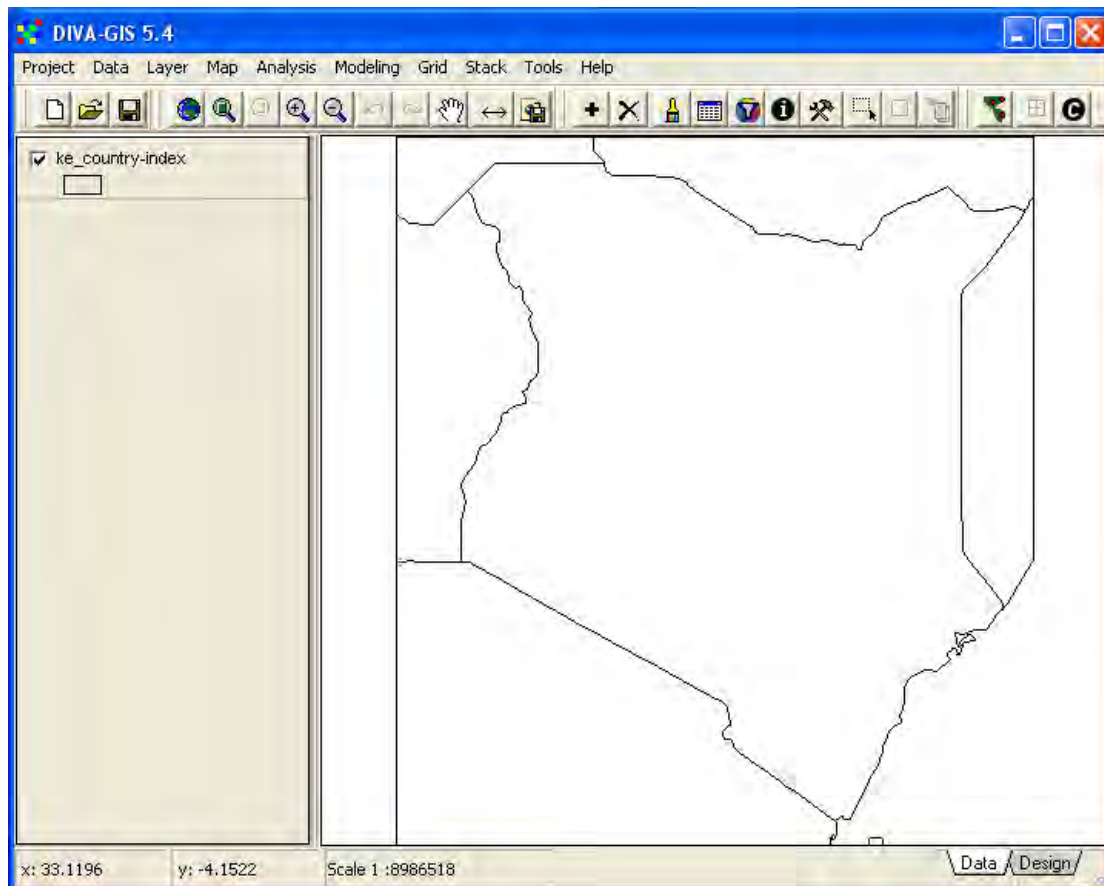
As you can see in the lower section of the Open window DIVA-GIS can work with several types of files, including: shape files (shp – files with vector GIS data), grid files (grd, files with raster GIS data), and various standard image formats (tif, jpg, sid, arc). Do not worry about this now, it will be explained later. The most common format for GIS data is as vectors, and DIVA-GIS uses shape (*.shp) files for working with vectors.

Click the drop down menu for Files of type:, and select Shapefiles (*.shp) as shown below.



Add the vector layer ke_country-index.shp (dependent on your computer setting you can also click or double click on the filename to add it).

DIVA-GIS displays the content of the shape file in the Data View, and the legend in the Legend, to the left. Note also how most of the tools became colored when you added the map layer – DIVA-GIS now has some data to operate on.




About the data on this CD

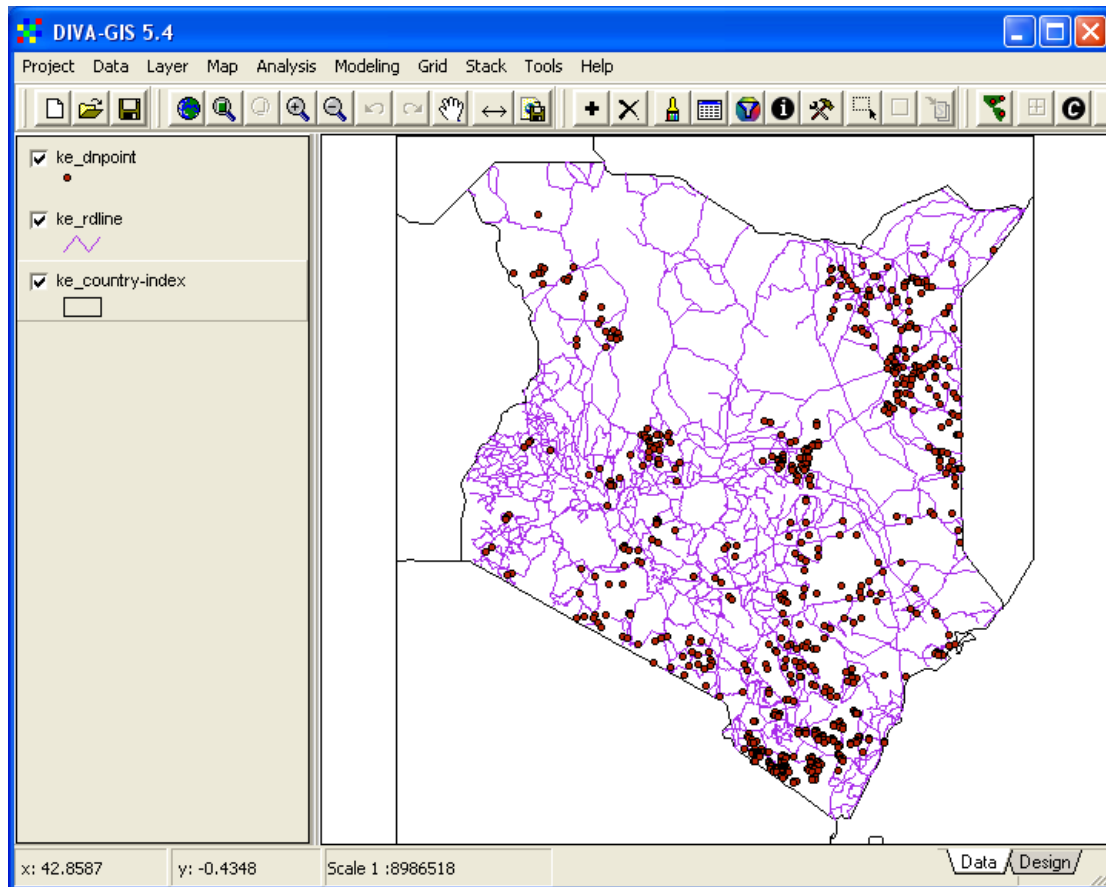
The project CD contains around almost a hundred shape files for you to start working with. With each shape file follows a jpg-image file (*.jpg). The jpg file can be viewed with most image programs (paint, photoshop etc), or using a web-browser (Internet Explorer, FireFox, Netscape, Opera, Safari etc). The jpg-images that are included can all be viewed via the project [data catalogue web-page](#). But they are also possible to view in DIVA-GIS (or any other GIS). The jpg-images are almost all symbolized (that is, have colors and patterns) that are standard. And you can use the jpg-images in your projects, just as background images, or as templates for symbolizing your own GIS data layers. If you have a license for ArcView or ArcGIS there is a ready-made project file that contains most of data layers available on the CD (except the time-series data, there are simply too many layers to include). The ArcView project file is in the directory \av on the project CD. You might have to install some of the included extensions (also under the \av folder on the project CD) if you want to see all the data in ArcView.

Working with layers

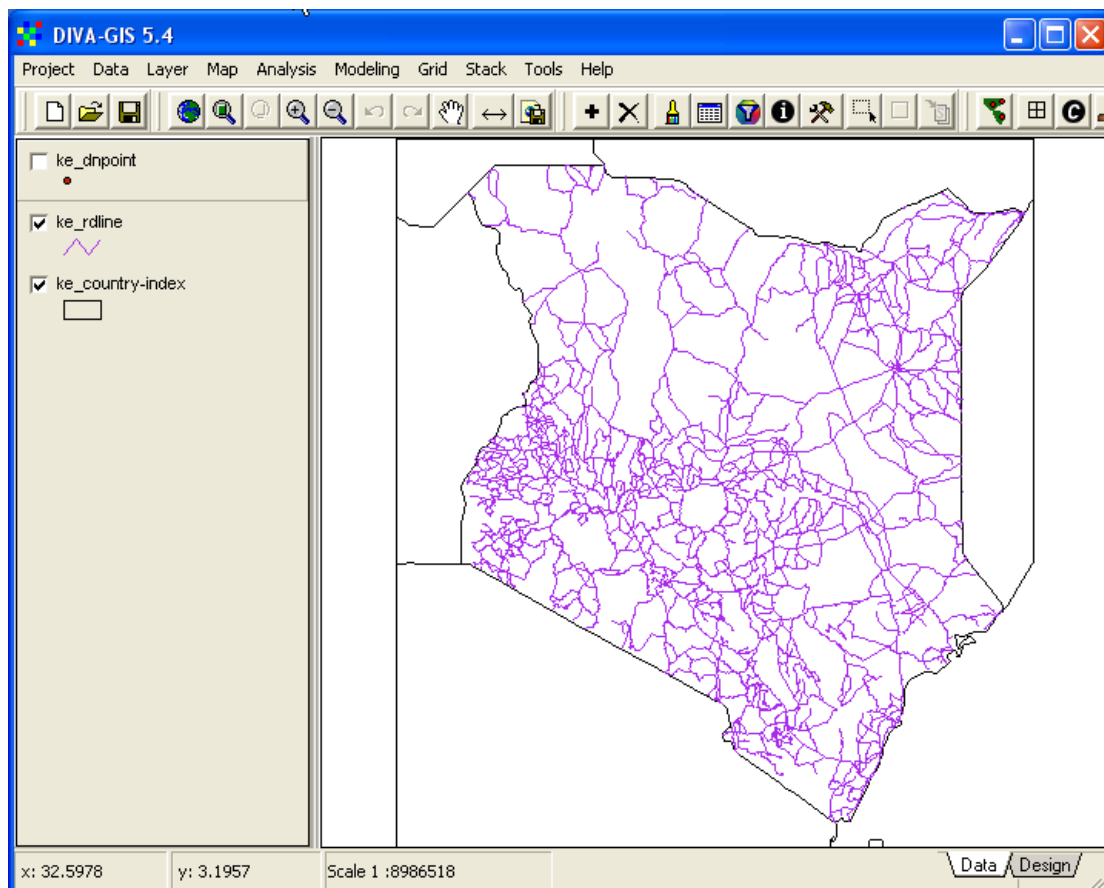
Turn layer on and off

Use the Add Layer tool, , and add the map layer ke_rdlne.shp, found in the folder data_spatial\ke\mapdata\infra. Then use Add Layer again to add a point layer (another word for layer is theme in GIS-jargon), this time navigate to the folder data_spatial\ke\mapdata\hydro and the theme ke_dnpoin.shp (dnpoin stands for drainage points). Your Data View and Legend should now contain three layers, one

point layer (ke_dnpoint), one line layer (ke_rdlane), and one polygon layer (ke_country-index).



In the Legend View you select which layers to be shown in the Data View, and also which layer(s) the Tools should operate on. To turn on and turn off a layer, click the checkbox to the left of the layer name. In the example below the checkbox for ke_dnpoint is unchecked, and the drainage points are not shown in the Data View.




To check/uncheck all layers in the Legend hold down the ctrl-key and click any layer that is on.

Active Layer(s)

When you clicked in the checkbox the layer you clicked also got a highlighted frame around it (ke_dnpnt in the example above). The lifted frame of ke_dnpnt indicates that ke_dnpnt is now the *active layer*. Any layer-related operation that you will now do will work on the highlighted layer(s) only. You do not need to check or uncheck the checkbox to highlight a layer – just click anywhere else on the layer in the Legend (e.g. on the small symbol or the text) and that layer will be selected as the active layer. To select more than one layer to be active, hold down both the ctrl and shift keys, then use the mouse to click on the layers you want to make active in the Legend. All active layers will appear lifted in the Legend View. You can also deselect layers in this way.





Remove layers

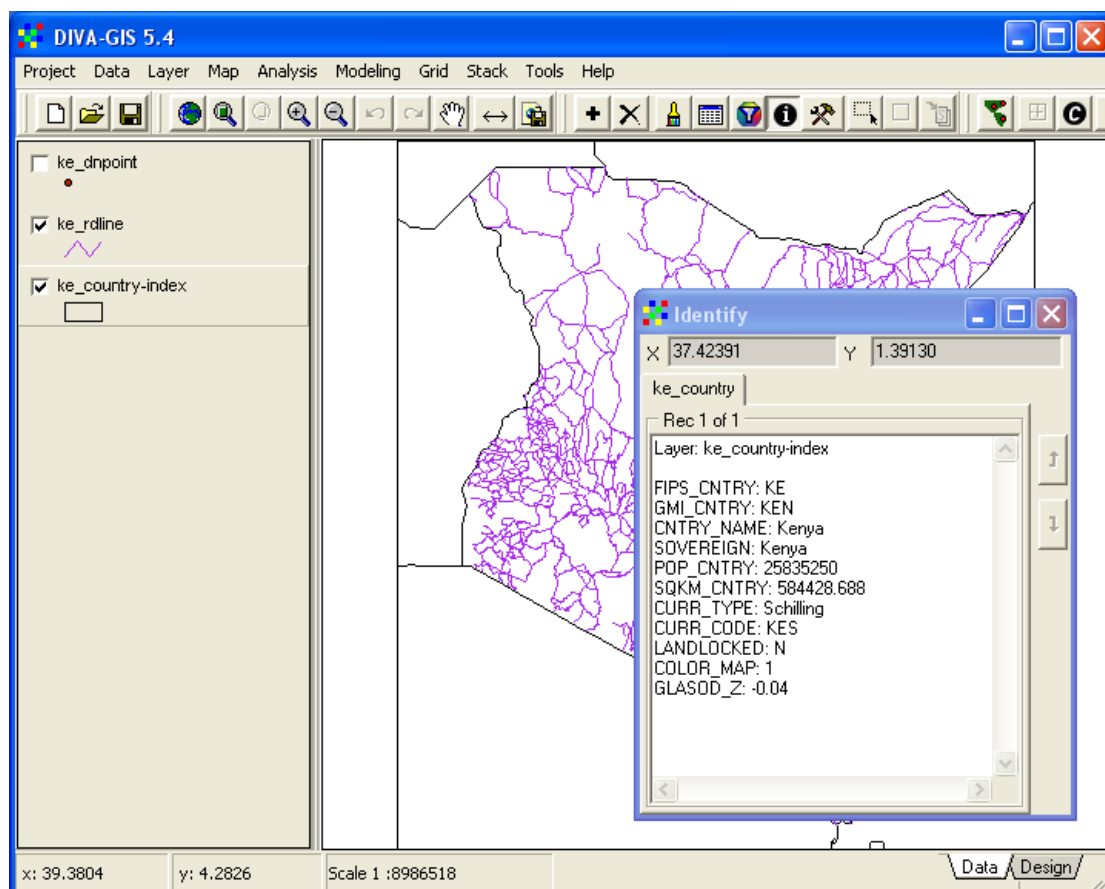
You can remove the active layer by clicking the Remove Layer tool, , or via the menu: Layer – Remove Layer. Before the layer is removed you are prompted to

confirm the removal. If you remove a layer it is not deleted from the hard drive or CD, it is only removed from the DIVA-GIS Data View and Legend.

Identifying features

Click on the Identify Feature tool, , or go via the menu: Layer – Identify Feature. Note how the tool appears pressed down in the menu, and how the cursor changes - . From the look of the cursor, and the tool-button that appears pressed DIVA-GIS will tell you which command is active at any time.

Click on the layer ke_country-index in the Legend to make it active (it appears lifted), make sure the Identify Feature tool is active, and click inside the map (Kenya in the example below).



A pop up window (called Identify) will show you information about the *feature* you clicked. A *feature* or *record* is a single point, line or polygon (as in the case above) that represent one particular phenomena in the map layer – in this case a country in the map layer ke_country-index.









Zooming and panning

Zooming in and out, and panning (moving) around in the map are key tasks that can be done with GIS. In DIVA-GIS there are several tools for zooming, and one for panning. If you did not try zooming on your own, the tool buttons will look like this -

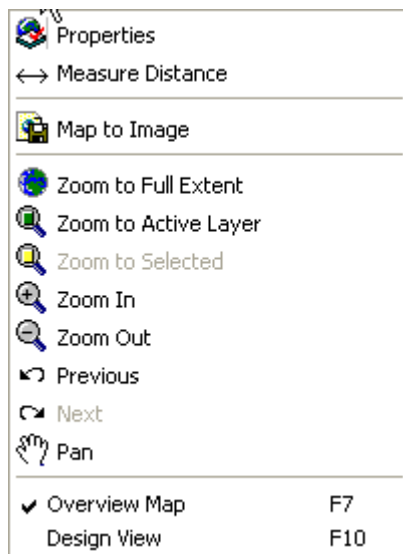


If you tried them out, the arrow tools will be black instead of gray – as they are for returning or go forward to a previous zoom (i.e. they

are not activated until you actually do a zoom or pan). The Tools have the following functions:

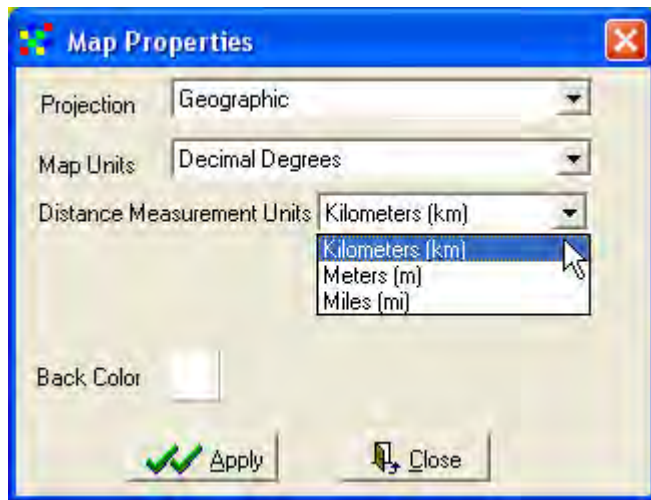
-  Zoom to Full Extent, zooms the Data View to show all layers in the Legend,
-  Zoom to Theme, zooms the Data View to fit the active layer(s),
-  Zoom to Selected, zooms to selected features of the active layer(s) (you will learn to select features in the next lesson),
-  Zoom In, zooms in centering the Data View to the click point on single click, or to a defined box if the left mouse button is clicked and held down and the mouse is used for creating a rectangle,
-  Zoom Out, zooms out centering the Data View to the click point,
-  Zoom to Previous Extent, returns the Data View to the previous zoom,
-  Zoom to Next Extent, becomes active if Zoom to Previous Extent is used, and returns the Data View to the view before this tool was clicked,
-  Pan, used to move the position of the Data View by clicking and holding down the left mouse button, and then drag the mouse.

You can also get the zoom and pan functions from the menu, under the Map option.



Map properties

Under the map menu you also find the Properties option. Select the Properties option to see the Map Properties of your project.



All the data layers on the Project CD are in Decimal Degrees (Longitude and Latitude as X and Y). DIVA-GIS can reproject data in Decimal Degrees to many other projection, so if you later want to combine data from this project CD with data projected into your national (or other) projection, DIVA-GIS can do it for you (if you want to try it is in the menu under: Tools – Projection). In the Map Properties window you can also set the distance properties that you want DIVA-GIS to show you, e.g.


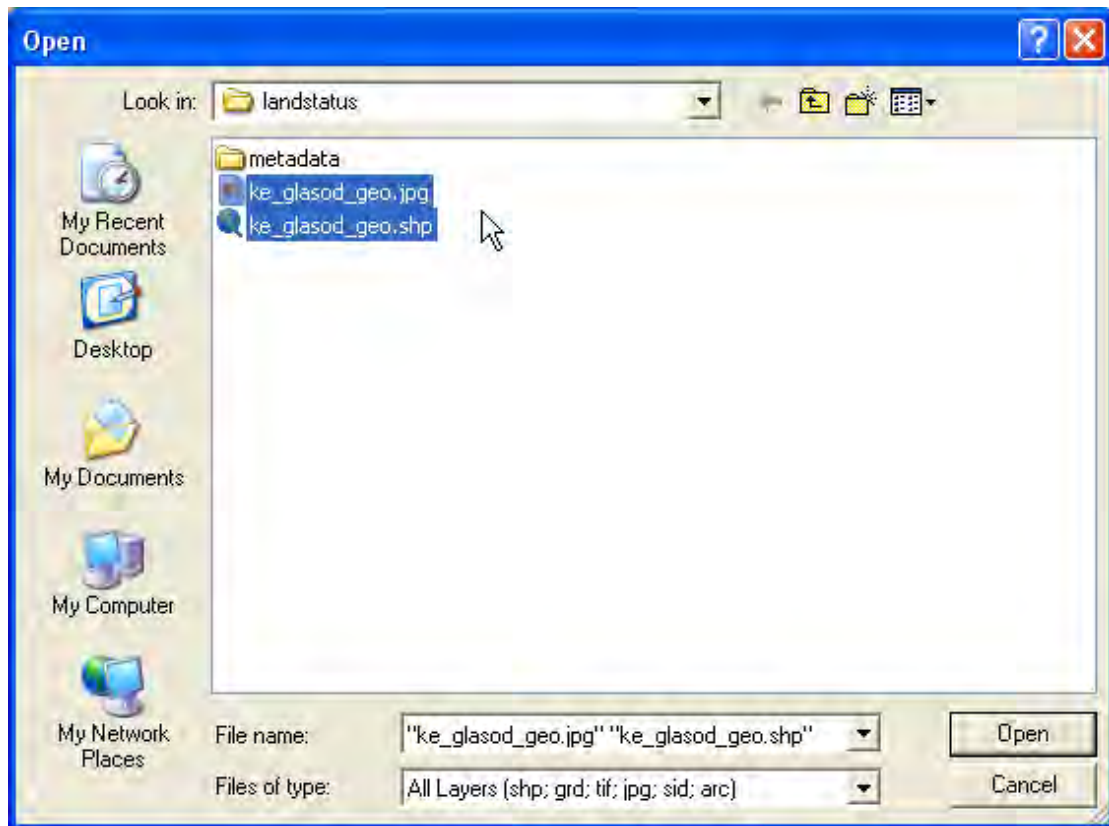
when using the Measure tool, . Set the Distance Measurement Units you feel most comfortable with from the drop down menu as shown above.

Image data layer

So far you have only worked with vector map layers. But DIVA-GIS can also work with images (jpg, tif, sid and arc) and grid files (introduced in [lesson 4](#)). Use the Add Layer tool to add both a vector file and an image file showing land degradation, navigate to `\data_spatial\ke\mapdata\landstatus` and add both the jpg and shp file for the layer `ke_glasod_geo` – you can select both at the same time by holding down the ctrl key.



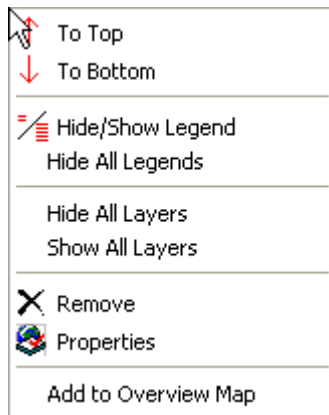
In the Data View the added layers end up at the top in the Legend. As the jpg layer is an image it covers all the layers below in the Legend, hence you only can see the image and the layers positioned above it in the Legend.

Change display order

You can easily change the hierarchical display order in DIVA-GIS. Use the mouse to grab the image layer for ke_glasod_geo (image), make it active and click and hold the left mouse button, then drag the legend of the layer to the bottom of the Legend. A black frame will indicate the movement and position of the legend.

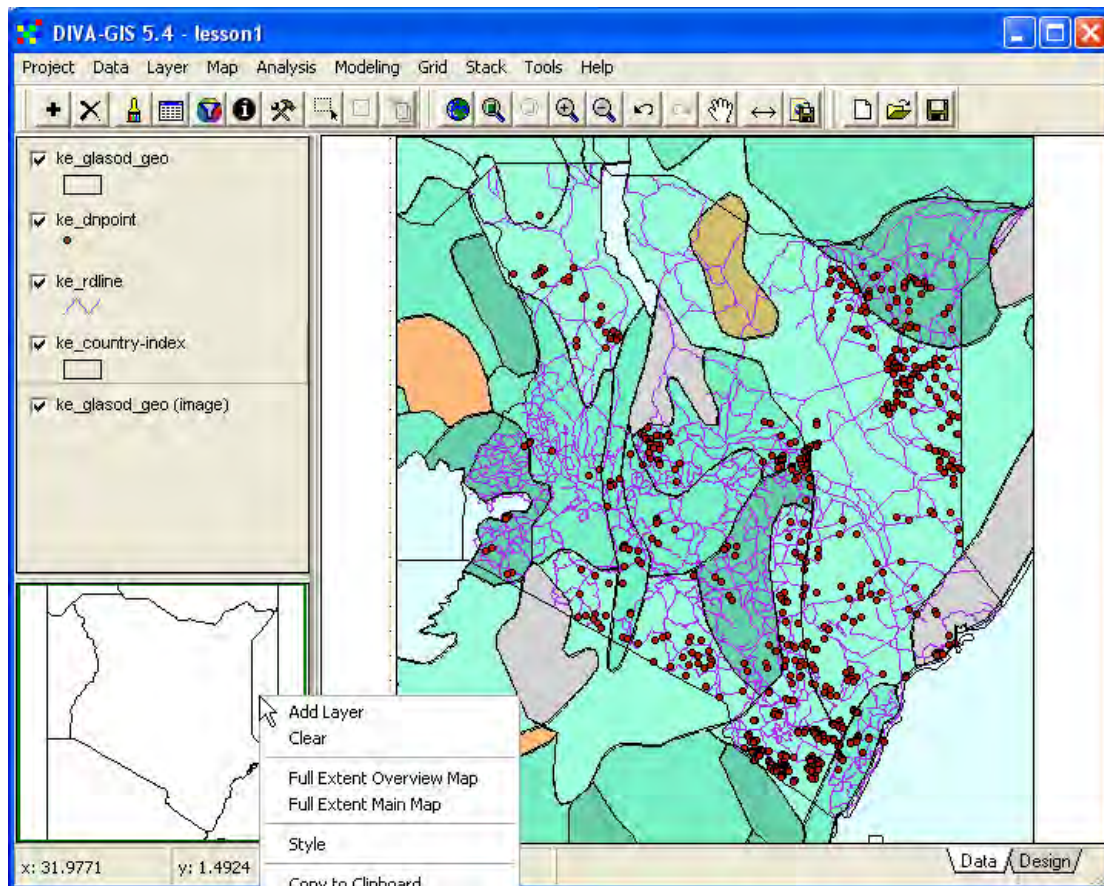


You can also change a layers legend position, and do other things, by making a layer active and then click the right mouse button pointing at the layer in the Legend. By doing that a small popup window will appear as shown below.




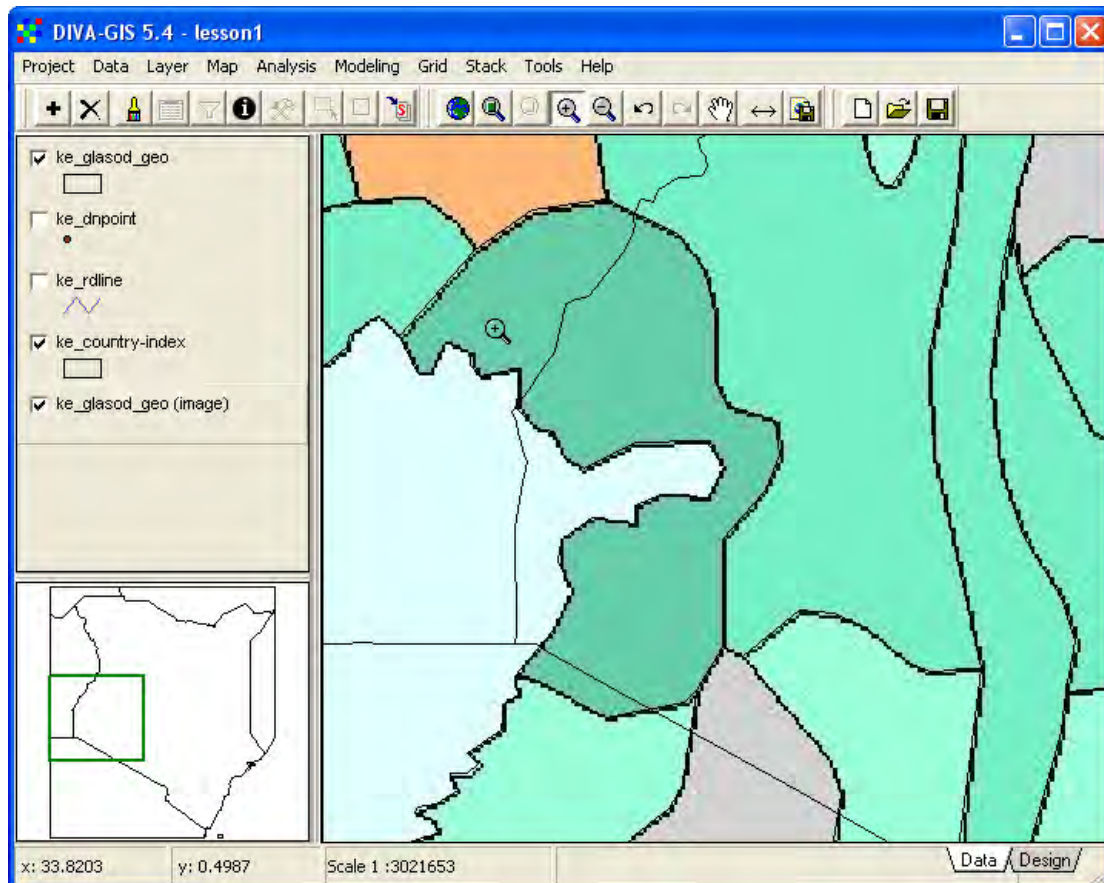
Overview Map


One of the options in the popup menu above is to include an overview map. To make an overview map you can also just click F7, or go via the menu: Map – Overview Map. You can toggle between including and excluding the map by clicking F7 (or one of the other options) again. Choose the layer you want to use for making an overview map, and make it active. Then right click on the legend, and click Add to Overview Map, in the popup window (the one shown above). In the example below, the ke_country-index layer was used to create the overview map. By right clicking in the overview map, you get different options for designing the overview map, including adding layers not used in the Data View.

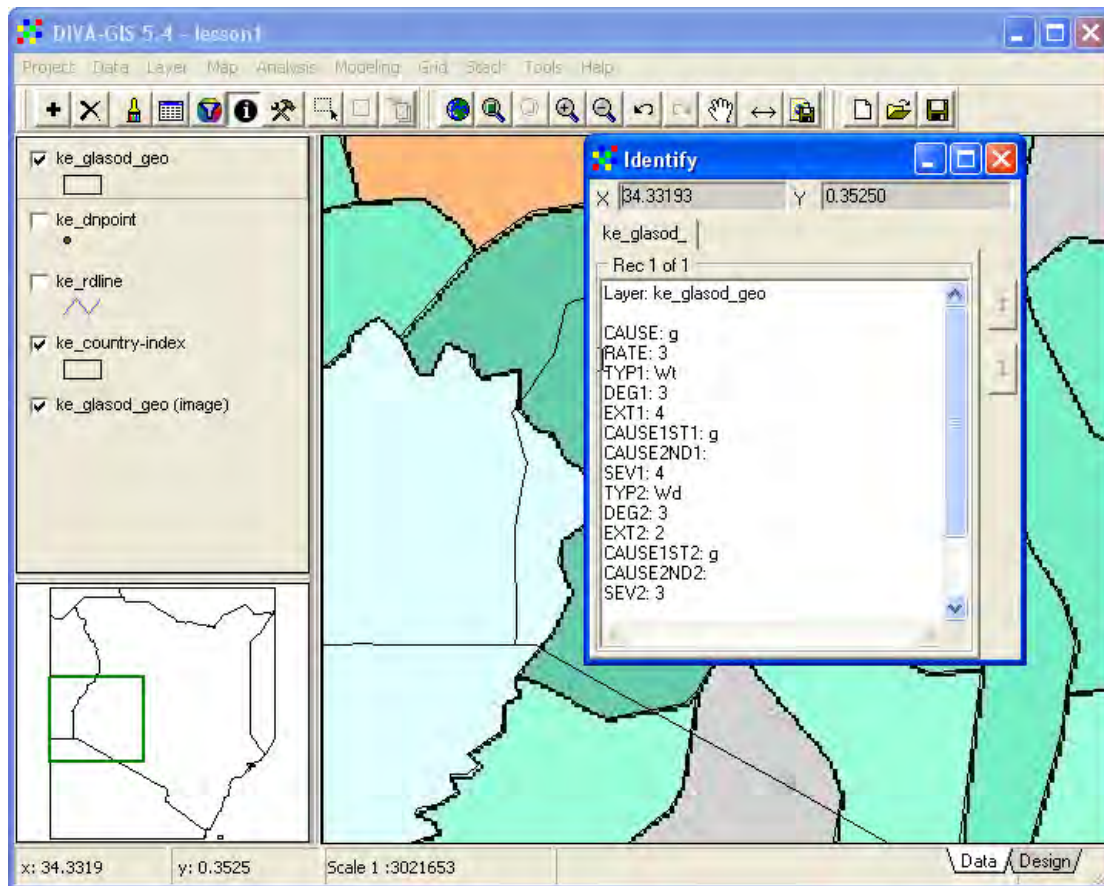


Vector and image data

Put the image (jpg) file to the bottom of the Legend, and turn the layers ke_dnpnt and ke_rdlne off by unchecking their checkboxes. Use the Zoom In tool, , to zoom in to one of the boundaries in the map as shown below, the overview map will show you the zoom position.



In the example above you can see one of the important differences between vector data on one hand, and image and grid data on the other. The vector data retains its width and size as you zoom in and out, but image (and grid) data turns up as pixels (pixel = picture element) when you zoom in beyond the image resolution. The positional accuracy of the image (jpg) is not as good as the accuracy for the vector. The image file does further not have any data associated with it; so clicking the Identify tool will just generate an error message (an image can be associated with a grid, in which case data from the grid can be identified, more about that in [lesson 4](#)). Instead make the shape file for ke_glasod_geo the active theme (click it in the Legend so it appears lifted up). Then choose the Identify tool, , and click in the map.



In the Identify window information about land degradation for the feature you clicked will be shown. The land degradation map in ke_glasod_geo is from the Global Assessment of Human-Induced Land Degradation ([GLASOD](#)), a United Nations Environment Program ([UNEP](#)) funded project that compiled land degradation data in cooperation with a large number of soil scientists throughout the world. The legend for GLASOD as symbolized (colored) in ke_glasod_geo.jpg is shown below, to see the full documentation [click here](#). All the documents and backgrounds on the data layers, as well as jpg image files, and most legends can be reached via the project [data catalogue web-page](#).

Water erosion



Wind erosion



Chemical erosion Physical erosion



You will work more with GLASOD in other lessons. Before ending this lesson, save your project.