## **DIVA-GIS v5 - Tutorial**

February 2005

This tutorial guides you through some commands in DIVA-GIS, in order to become familiar with the some of the most basic aspects of the program.

More details can be found in the manual and in the exercises.

The data used in this tutorial can be downloaded from the Internet at <u>http://www.diva-gis.org</u>. You can place these in any folder, but here we assume they are in the "C:\DIVA\tutor\" folder, and we will refer to this folder as the "data folder".

## 1. Layers

Start DIVA-GIS and Click on Layer – Add Layer

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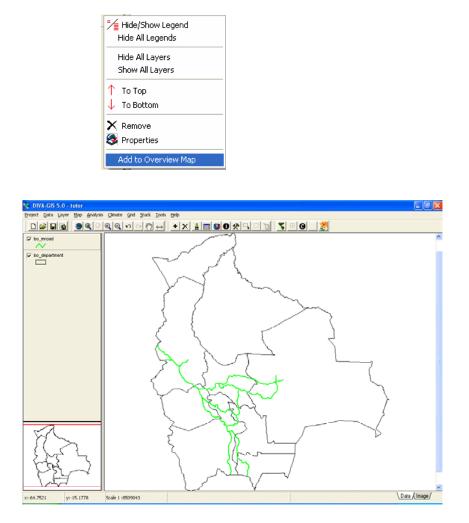
The "*Open*" window appears. In this window, go to the data folder and select the file bo\_mroad and press the Open button.

Again do *Layer-Add Layer* and select the file bo\_department.shp and press "Open".

Two "layers" should now be present in the "Table of contents (TOC)" (left hand side of the window) of DIVA. You can see these layers on the map, by clicking on

the checkboxes next to their names in the TOC. After that, your screen should show a map of the Departments and main roads in Bolivia. This map was created by adding two "shapefiles" to the map. Shapefiles are files representing points, lines, or polygons (areas) and associated data.

Right-click on the "bo-department" layer in the TOC, and select "Add to overview map".



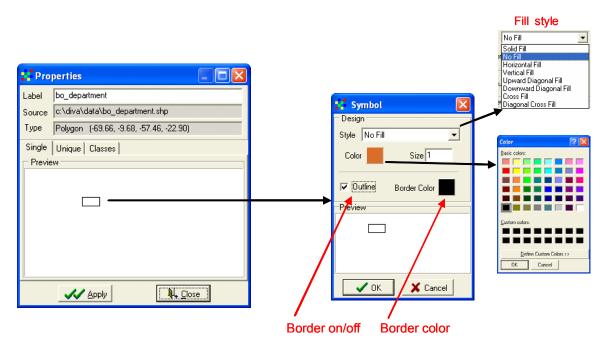
Now try out zooming in and out, and "pan" (moving the center of the map after zooming in), using the commands from the *Map* menu or from this toolbar:



Notice how you can also pan through your map by clicking on the overview map (when the map is zoomed in).

To change the way this layer is displayed, click once on the bo\_department layer in the table of contents (not on the checkbox, but next to it). This makes that

layer the "active Layer". Now click on *Layer/Properties* and the *Properties* window appears. (This window also appears after double clicking on the layer in the table of contents). Now you can change display properties such as the color and border size.



Change the *Style* to "SolidFill", and the *Fill Color* to green (double click on the rectangle in the Preview to show the color palette). Change the *label* to "Departments". Click on *Apply* and *Close*. The departments layer should now be green.

Now go to the Properties of the departments layer again. Go to the "Unique" tab, select the field "Departments", press *Reset Legend* and *Apply*. Each department should now have a different color.

Change the color back to green.

Double click on bo\_mroad (in the table of contents) and change the *Style* of the lines to "Dash line", the *Color* to red, the *Size* to 3. Change the *label* to "Main roads".

To be able to see the roads layer, drag (click on it and move it while keeping the mouse button down) it to the top in the TOC.

Departments	Main roads	5
Main roads	Departments	

Save your work using the *Save* or *Save As* commands in the *Project* menu and save the "Project" in a folder of your choice. Then use *Project-Close* to close the project and *Project-Open* to open it again. (note that you can also pick this file from the "recently used files" list in the Project menu).

The project file only stores the names of layers and some information about them, not the data. If you want to save the project with the data in a single file, you can use *File-Export*. This can be handy for sending a project to somebody else.

Make the bo\_department layer active by clicking on it in the TOC.



Choose the option *Layer – Identify Feature* from the Layer menu or from the toolbar:

After that, click on any part of the map of Bolivia. The *Identify* window will appear and show the data that are associated with the part of the map you clicked on (e.g., the name of the department).

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Layer: Departments		
ID: 4 PAIS: Bolivia		t
DEPARTMENT: COCHA	ВАМВА	
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Click on *Climate/Point* and then click anywhere on the map (where there is land) to find out what the climate is like at that location (if you have a climate database installed – you can download these from the diva-gis website).

To see the whole table related to the active layer, click on *Layer-Table* or on this icon:

📕 Depa	rtments	
ID	PAIS	DEPARTMENT
1	Bolivia	PANDO
2	Bolivia	BENI
3	Bolivia	SANTA CRUZ
4	Bolivia	COCHABAMBA
5	Bolivia	ORURO
6	Bolivia	POTOSI
7	Bolivia	CHUQUISACA
8	Bolivia	TARIJA
9	Bolivia	LA PAZ
	Rov	v: 4 of 9
Statisti	c (Highligh	t Pan To Zoom To

You can select a record in the database and then use *Highlight, Pan To* or, *Zoom To*, to see the location of the object related to this record on the map.

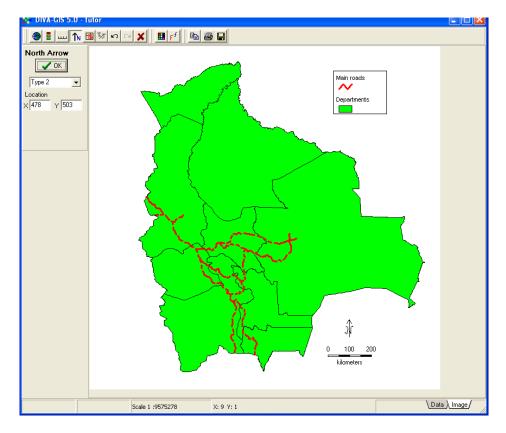
You can save a map as a graphics file using *Project/Map to Image* and copy the map to the clipboard. Try pasting it again into Powerpoint.

You can also make a more elaborate map by clicking on the "image" tab at the lower right of the DIVA window. There you can add a legend, scale, and more (e.g. text).

Start with adding the main map. Then you can set where other objects are displayed by selecting them in the toolbar, setting some options on the left hand panel, and then by clicking on the map.

It may take a couple of rounds of trial and error to get the placement and properties right. You can repeat the placement of an object (e.g. scale bar) until you have found the place you like. The settings are stored in the text boxes and the objects can be placed on the exact spot on the map again by pressing OK (instead of clicking on the map). Thus, you can go through all the objects, and then start all over again with a fresh map, and only press the OK buttons.

In some cases it can be easier to add additional pieces to the map in Powerpoint or comparable program.



Open the file bolivia\_wp.txt with Excel (or other spreadsheet program). Each record (row) in this file describes localities where wild potatoes have been collected.

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		Solanum		Cochabam	Tiraque	at Estación			17	28.621	S	65	35.21	W	3578	
		Solanum		Cochabam		at km 71.			17	28.621	S	65			3578	2
5	SEVU 650	Solanum	b Bolivia			km 29, roa			17	29.536	S	66	20.185	W	2554	2
		Solanum				km 49 5, a			17			66			2567	
7	SEVU 660	Solanum	n Bolivia	Cochabam	Quillacolle	along km 4			17	42.157	S	66	25.737	W	4006	3 2
8	SFVU 650	Solanum	is Bolivia	Oruro	Dalence	ca. 25 km			18	23.052	S	66	39.56	W	4149	3 2/
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3	SEVU 651	Solanum	b Bolivia	Potosi	Bustillos	16 km SE			18	34.447	S	66	23.897	W	3879	1 2/
4	SFVU 651	Solanum	b Bolivia	Potosi	Bustillos	ca 26 km 5			18	38,105	ŝ	66	18.229	W	3430	2/
5	SEVU 651	Solanum	b Bolivia	Potosi	Chavanta	4 km E of			18	50.526	S	68	0.633	W	3840	12/
16	SFVU 652	Solanum	n Bolivia	Potosí	Chavanta	4 km E of			18	50.526	S	66	0.633	W	3840	1 21
17	SFVU 652	Solanum	aBolivia	Potosi	Chavanta	4 k E of M			18	50.526	S	66	0.633	W	3840	1 2/
18	SFVU 657	Solanum	n Bolivia	Potosi	Chavanta	ca 2 km W			18	52 403	S	65	49.36	W	4270	1 21
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80	SFVU 652	Solanum	b Bolivia			5 km SE o			18	49.964	S	65	28.725	W	3260	12/
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		Solanum		Chuquisac		ca. 4 km V			19			65	14.883	W	2594	
23	SEVU 657	Solanum	t Bolivia	Chuquisac		ca. 45 km			19	18.553	S	65	10.226	W	2614	1.2/
24	SFVU 652	Solanum	s Bolinia			roughly 52			19	21.277	S	65	10.035	W	2242	21
15	SEVU 652	Solanum	t. Bolivia			70 km S o			19	26.584	S	65	11.836	W	2570	
6	SEVU 653	Solanum	b Bolivia	Potosí	Saawedra	70 km S o			19	26,584	S	66	11.8%	W	2570	1 2/
7	SFVU 653	Solanum	b Bolivia	Potosi	Saavedra	11.2 km S			19	38.505	S	65	14.898	W	3275	5 21
		Solanum		Potosí		7.5 km SE			19			65			3122	
		Solanum		Potosi	Saavedra	7.5 km SE			19			65	24.845	W	3122	
		Solanum		Potosi		6.7 km W			19			65			3404	
31	SEVU 653	Solanum	b Bolivia	Potosi	Saavedra	6.7 kn W c			19	33.979	S	65			3404	2/
27	CFV/LEAT	Colonum.	n Rolivia			ina 1 km F			10	34 100		R.F.			4015	
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First complete the LATITUDE and LONGITUDE columns by filling them with coordinate data in decimal degrees. Use the columns LATD, LATM, LATH,

LOND, LONM, LONGH. LATD y LOND have degrees data, LATM y LONGM have decimal minutes (not minutes and seconds)), LATH and LONGH indicate the hemisphere (N/S and E/W). To calculate Latitude use a formula like "=-1\*(LATD+LATM/60)" (but replace the variable names by the cell references in excel). The values in the first data row have already been calculated.

It is important that in Excel you set the format of the cells to a certain number of decimals (e.g. 5). Otherwise, all the decimal numbers may be cut off when exporting the file.

When you are done save the file under a different name. After that, save it as a TAB delimited text file again (.TXT).

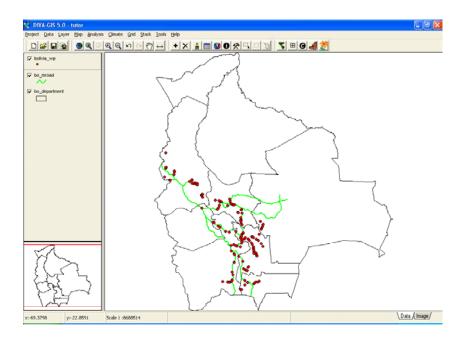
Use *Data/Points (text) to Shapefile* to create a shapefile from the TXT file you just made with Excel. Select the TXT file as *Input File*, and for Longitude and Latitude select the columns LONGITUDE and LATITUDE.

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Assign Coordinates			Output File		bol.shp				
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			PLANTID	COUNTRY		PROVINCE	LOCALITY LATD	LATM 🔥	
			SFVU 6500	Bolivia	Cochabamba	Punata	along the old 17	31.486	
			SFVU 6501	Bolivia	Cochabamba	Tiraque	at Estación E 17	28.621	
			SFVU 6502	Bolivia	Cochabamba	Tiraque	at km 71, alo 17	28.621	
			SFVU 6503	Bolivia	Cochabamba	Quillacollo	km 29, road f 17	29.536	
			SFVU 6505	Bolivia	Cochabamba	Quillacollo	km 49.5, alor 17	37.248	
			SFVU 6507	Bolivia	Cochabamba	Quillacollo	along km 49. 17	42.157 🗸	
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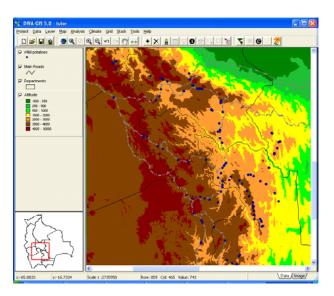
Click on *Output file*, Set the name of the output file to "bolivia\_wp". Click Apply.

When the program finishes it will add the shapefile to the map.

A layer showing locations where wild potatoes were collected in Bolivia should be shown. Your screen should look similar to this:



Now add a new layer "bol\_alt.grd" to the map, rearrange the layers and zoom in to make a map like this:



This layer is made from a "gridfile", which is a different file type than the files previously used. It does not store features such as points, lines, or polygons, but rather it stores a rectangular raster (grid) of values. In this case, the values represent altitude (in meters above sea level).

Make the bol\_alt the active layer and move your mouse over the map. Note that you can see the values of the layer displayed on the status bar (the bottom of the window).

## 2. Data analysis

Let's make a new gridfile with the number of observations of wild potatoes in Bolivia. Make Bolivia\_wp the active layer, and then click on *Analysis – Point to Grid -Richness*.

	Point to Grid
	Options Parameters Input Shapefile c:\diva\bolivia_wp.shp
Define parameters (x, y, resolution) of the new grid or	Define Grid  Create a new Grid  Options
use those from an existing gridfile.	Output Variable
	Number of different classes (Richness)
	Simple
Output filename —	Output
	Apply 🛼 Close

Choose which field in the database should be used for analysis

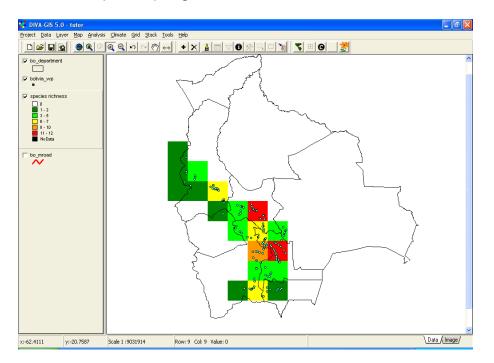
Go to the Parameters tab and select the field "Species".

Point to Grid	
Options Parameters	
Field: SPECIES	
28 classes	
Selection: All Clear Invert	
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Go back to the Options tab, choose an output filename and press Apply.

When the program is finished, drag the bo\_department layer to the top and change (in the *Properties* window) its *Style* to *No fill.* 

The map shows a grid that consists of five colors, each indicating a range of the number of species per grid cell.



When the grid is the active layer, the row and column number and the value of the cell are shown at the bottom of the screen, when moving the mouse over the map.

To change the way the grid is displayed and show other ranges (e.g.,: 1-10, 10-20, etc), or individual values, double click on the grid. The grid *Properties* window appears. Click on a value in the "To" column and change it. You can also insert more rows (ranges) using "Insert row" (+).

Filena	ame c:\diva	a/species ric	hness.grd	
Lege	nd Info	History		_
Color	From	To	Label	Auto complete
	0	0 2	0	<ul> <li>Edit values</li> <li>Select rows</li> </ul>
	3	5	3-5	Classify
	6	7	6 - 7	Select color scheme
	8	10	8 - 10	·
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Г	NoData T	ransparant		

Make some more grids. First activate the bolivia\_wp layer. Then select *Analysis/Point to Grid/Richness*. Select *Define Grid-Options*. In the *Adjust With* use Rows/Columns. Change the resolution (size) of the cells to 0.5 degrees and click OK. Then click Apply in the *Create Grid* window. The result is a grid with smaller cells than the previous grid (and hence with different values).

	👯 Grid Options	×	
coordenates (derived from the foints)	X         Y           Minimum         •72         •24           Maximum         •61         •11		
Cell size —	Cell size 1	Fix Corner Lower Right	
Number of columns and rows	# Columns 11 # Rows 13	Adjust With Rows/Columns 💌	– Returns to
			the default values
	🗸 ок	X Cancel	
	/ Define the output area by d	rawing it on the	

screen.

Make another grid using the same data, but now of the number of observations per grid cell. In *Output Variable* select *Richness / Number of Observations*. Choose an output file name and click on *Apply*.

Save your project (Project / Save).