QGIS _Ch1: Introduction to QGIS

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- Welcome and Setting up
- Create QGIS project
- Add and view shapefile
- Add and view raster file
- Add and view point locations
- Add location labels
- Add base map from QuickMapServices
- Re-projection (point data)
- Heatmap for point data

Welcome and Setting up

"Hello all!

These practical exercises aim to introduce and increase your familiarity with the open-source Quantum GIS software tool (QGIS) which is freely available.

First of all, special thanks to Prof Mark Stevenson, Dr Daan Vink, Dr John Lowry and Dr Robert Sanson for their guidance, expert knowledge and datasets for these exercises in our course.

Let's get started..."

CONTINUE

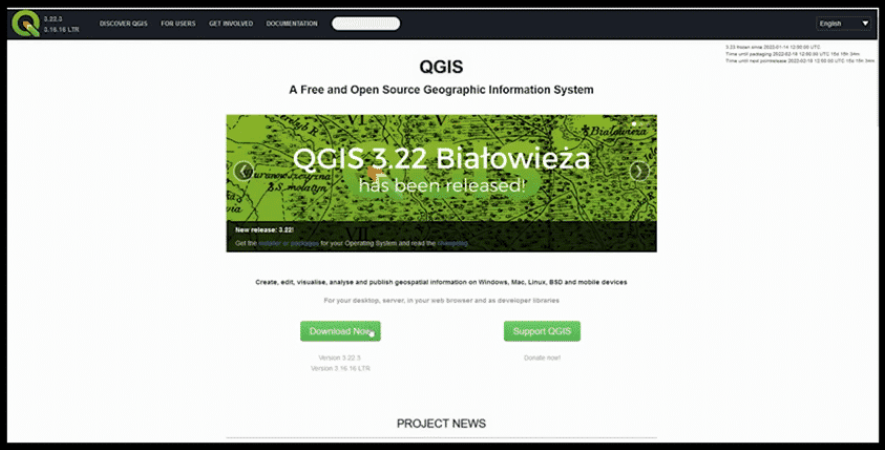
"To complete this exercise, you will need to have QGIS installed on your computer (preferably LTR version 3.16) and the dataset.

If you haven't got QGIS, go to the QGIS download page and follow the instructions to download and install the software, click here

For the exercise datasets, you can download Zip files directly from the course Stream page. Click here"

Click ▶ to play the video

Setup Guide: QGIS Install



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Create QGIS project

"Now, I believe that you have the software installed on your computer and the dataset ready for our 1st exercise.

Start QGIS by double-clicking the Quantum GIS icon on the Windows desktop. The main Quantum GIS window opens, which is called the Quantum GIS Application window. Save the project to your working folder (PROJECT → SAVE AS), giving it an appropriate name (Figure 1.1).

A project (*.qgz) file records the location of map files and data files associated with the project. Note that a Quantum GIS project file does not contain spatial information per se; it simply records details of the locations where spatial data files are stored on your computer. "

**Be warned - if you move files that have previously been saved as part of a QGIS project, the project file won't be

able to load properly the next time you try to open it.

So, be sure to save it to a proper folder in your computer.

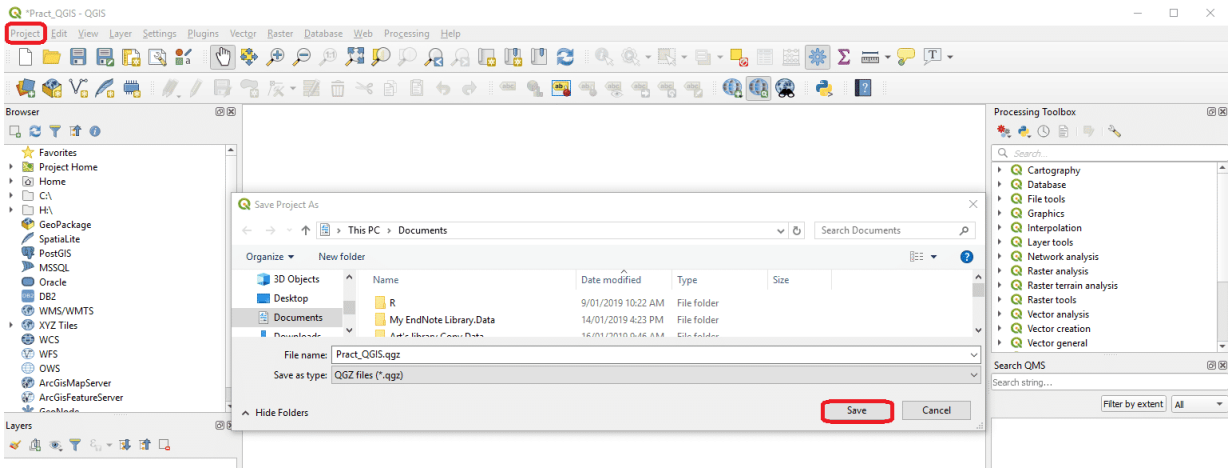

Figure 1.1: Save QGIS project

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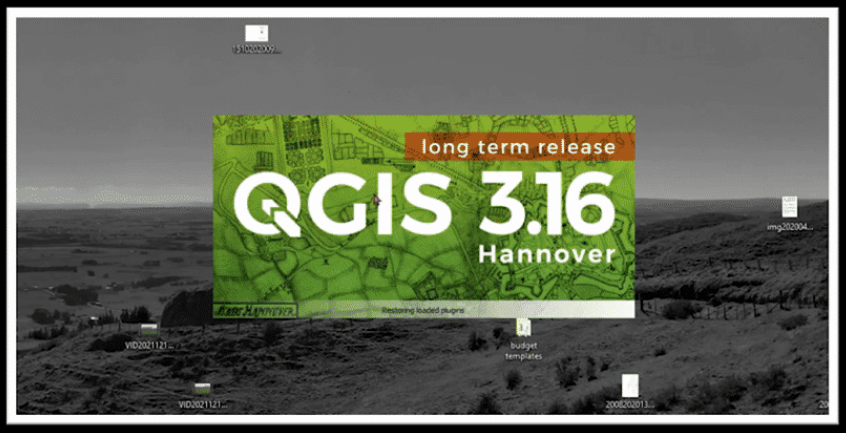
Stage 1: Save Project



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Add and view shapefile

A View is a visual representation of spatial data and the attribute data associated with it. This is where the content and visual presentation of a map are defined. Within a View, there can be multiple layers of spatial data. The View window consists of two sections. The section on the left is the Layers Panel. It lists the layers which are part of the map display. The Layers panel lists the layers by name and shows the symbols used to represent each layer. The check box next to each layer indicates if it is included in the map display.

The data for this exercise can be found in the"Korea" folder. Copy the contents to the working folder on your computer.

"From the menu bar, select LAYER → ADD LAYER → ADD VECTOR LAYER. Click the BROWSE button KOREA

dataset folder and select the KOR_adm0, KOR_adm1 and KOR_adm2 shapefiles (.shp) (Figure 1.2a).

- Layer KOR_adm0 is the national boundary map (Figure 1.2b).
- Layer KOR_adm1 shows provincial boundaries.
- Layer KOR_adm2 shows municipal boundaries.

Explore the difference between shapefiles. You can zoom in and out using the mouse scroll or zoom icon."

Click_🔎 to zoom the image

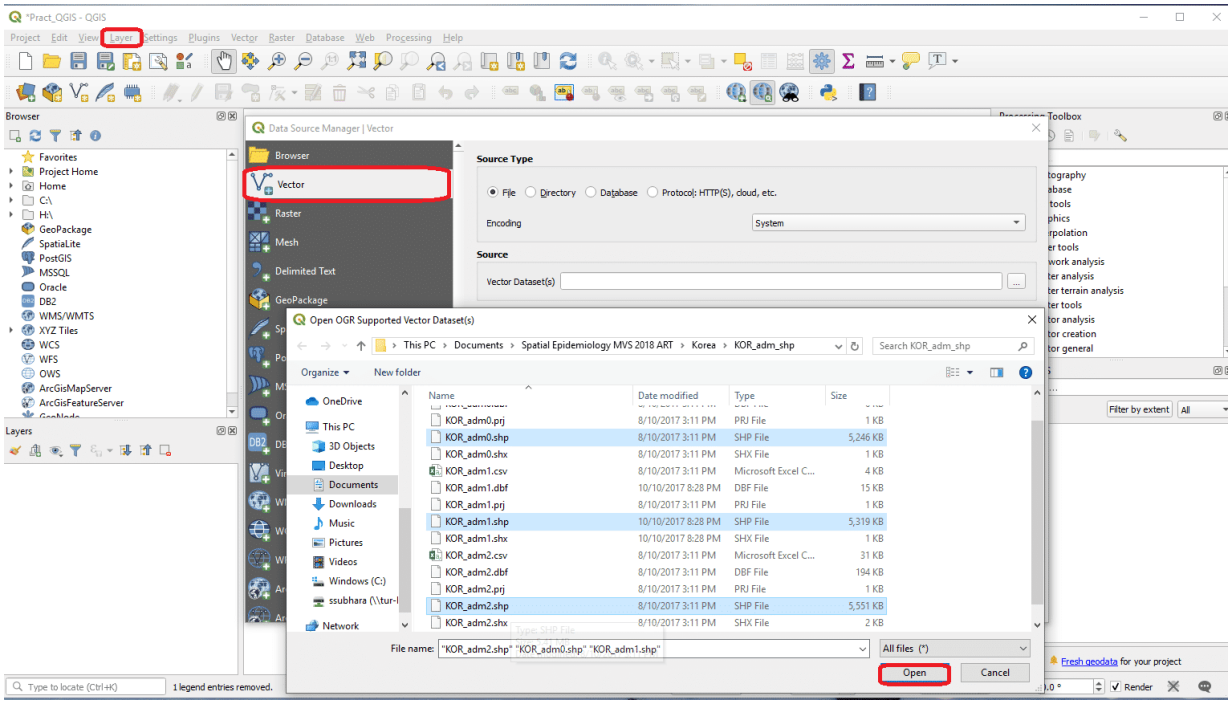

Figure 1.2a: Add shapefiles in QGIS

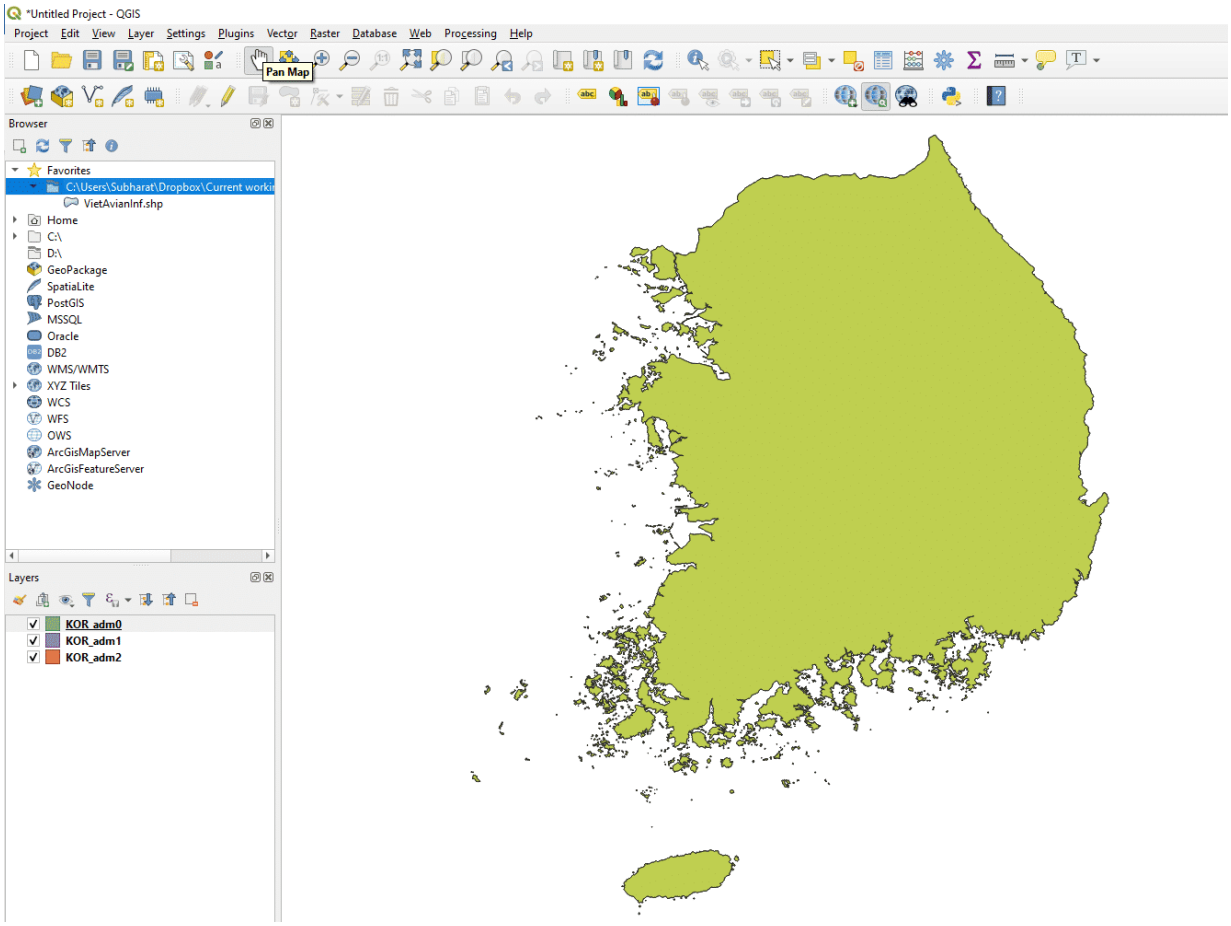

Figure 1.2b: Map of South Korea showing the national boundary (adm0)

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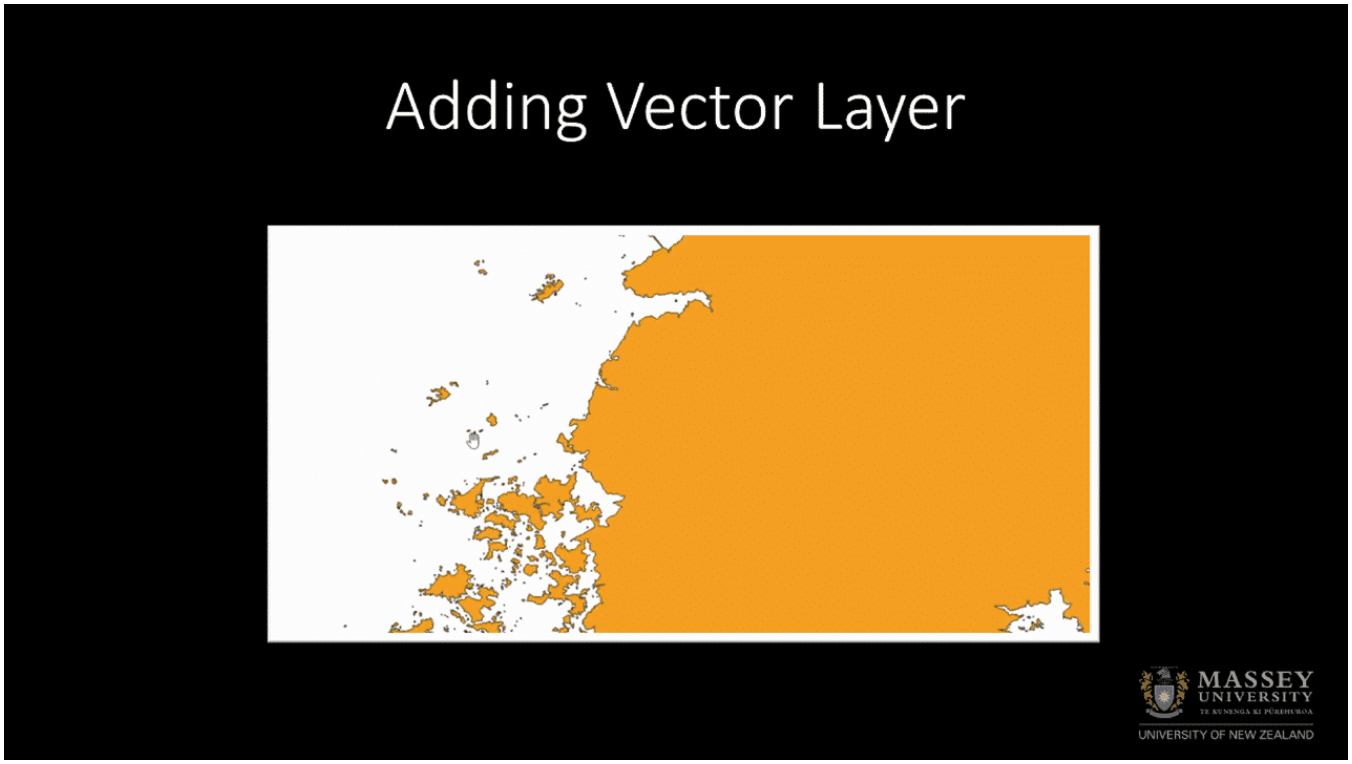
Adding Vector Layer
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Add and view raster file

"Next, add the FAO cattle density map to your view. From the menu bar, select LAYER → ADD LAYER → ADD RASTER LAYER. Browse to open the KO_Glb_Cattle_CC2006_AD.tif file. Organise your view by right click the raster layer → PROPERTIES → SYMBOLOGY. In band rendering type, select single-band pseudocolour and choose colour green and mode continuous and click APPLY (Figure 1.3)."

Click 🔎 to zoom the image

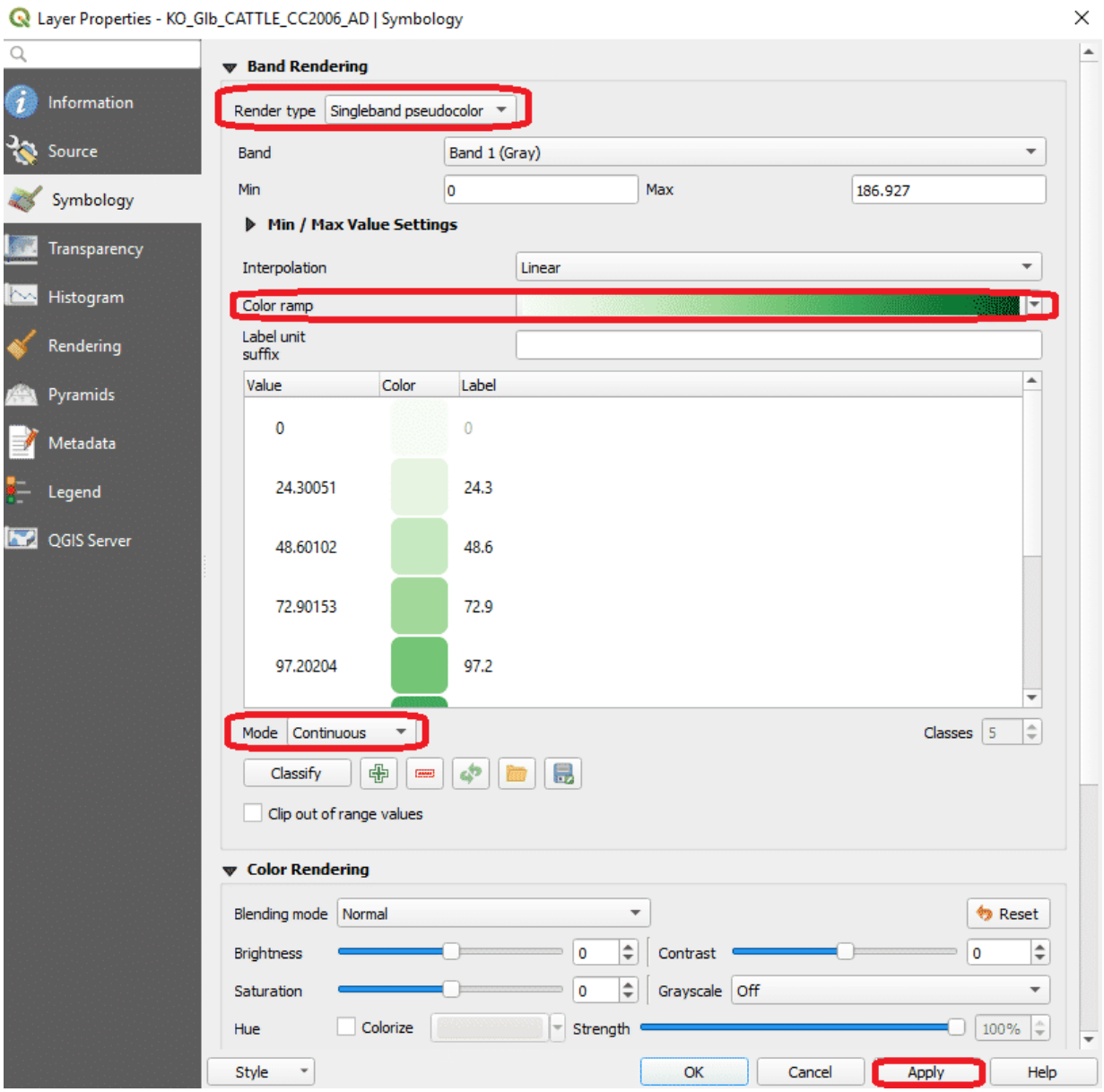

Figure 1.3a: Add raster file in QGIS

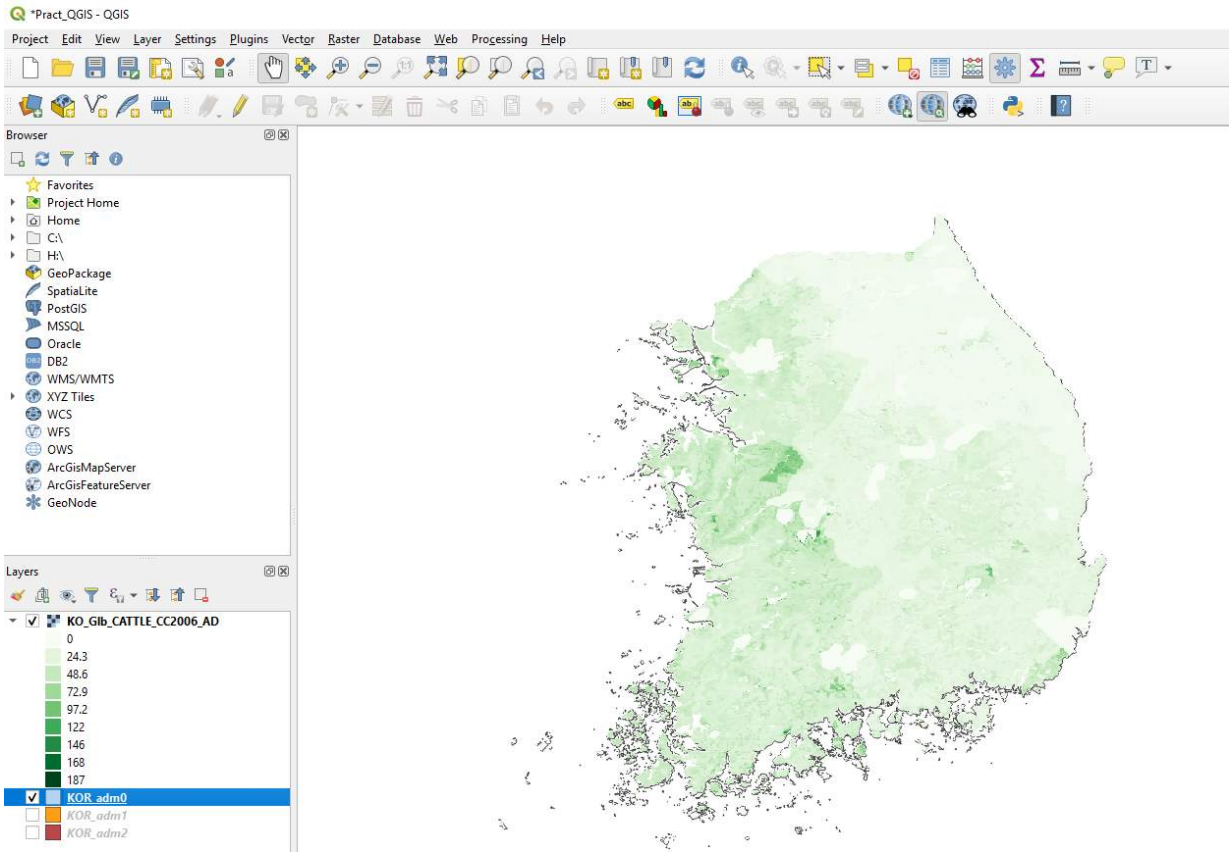

Figure 1.3b: Map of South Korea showing the density of cattle

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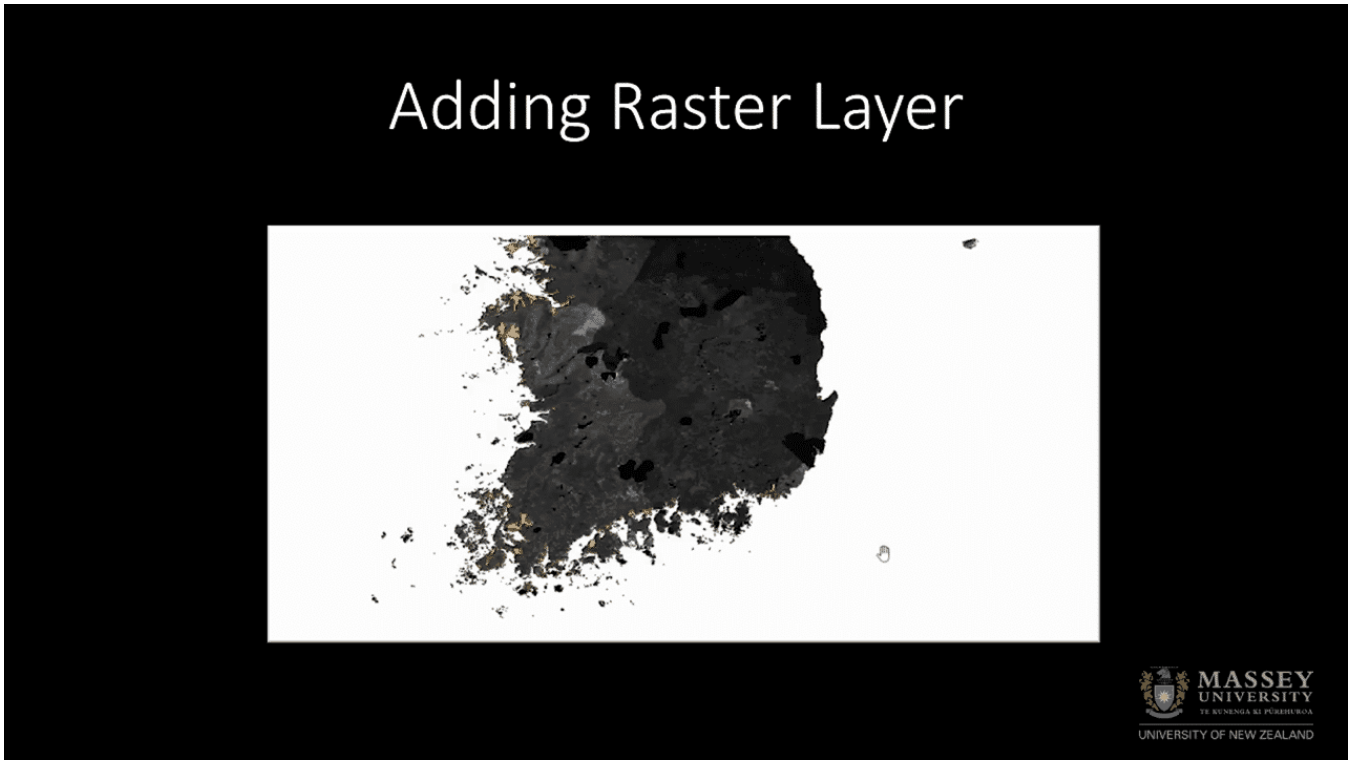
Click ▶ to play the video


Adding Raster Layer
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Add and view point locations

"Add the point locations of farms that were FMD-positive during the 2010-2011 South Korean outbreak to your map. From the menu bar, select LAYER → ADD LAYER → ADD DELIMITED TEXT LAYER. Select the KO_FMD_2010-2011.csv file you created earlier and enter the appropriate column headers to define longitude and latitude. Specify Coordinate Reference System (CRS, EPSG:4326 – WGS84). You can change the colour of point locations by right click the text layer → PROPERTIES → SYMBOLOGY and get a similar image to Figure 1.4"

Click_🔎 to zoom the image

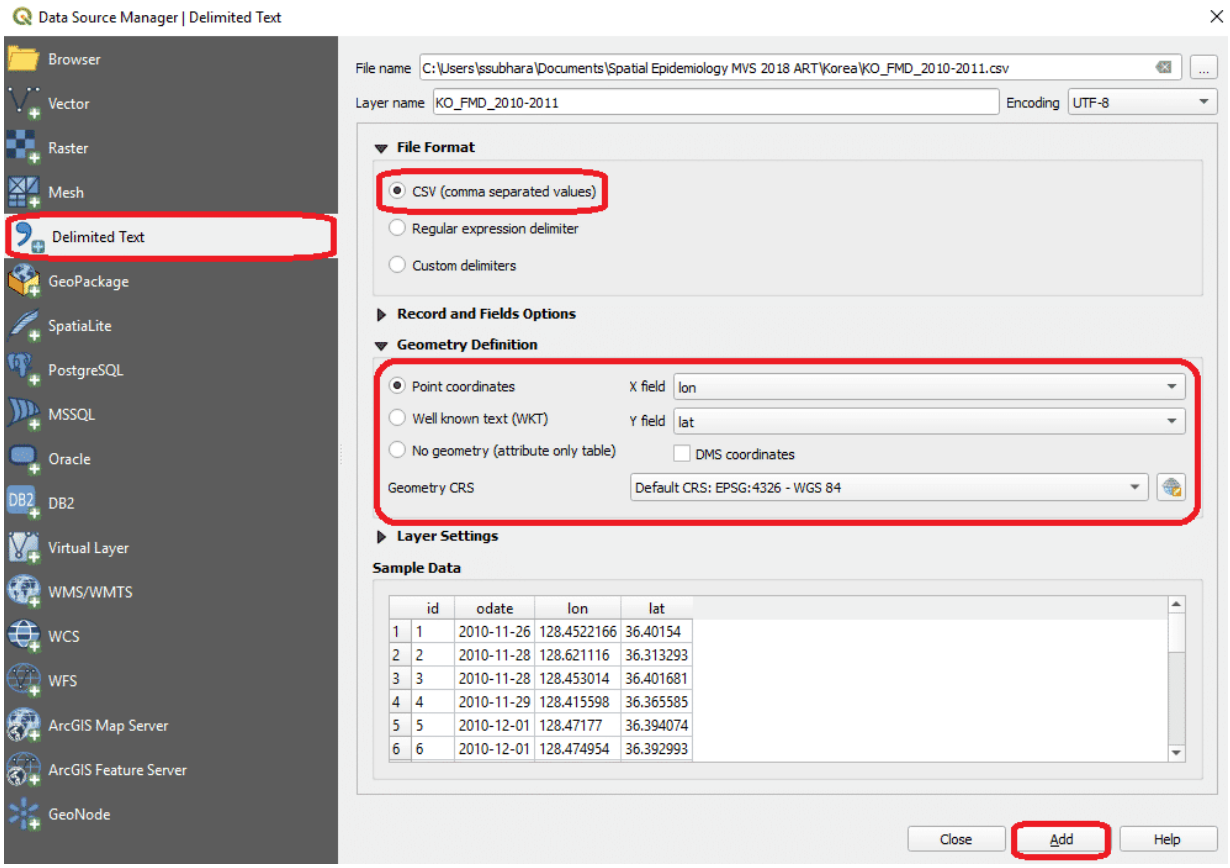


Figure 1.4a: Add point location (.csv) data to QGIS

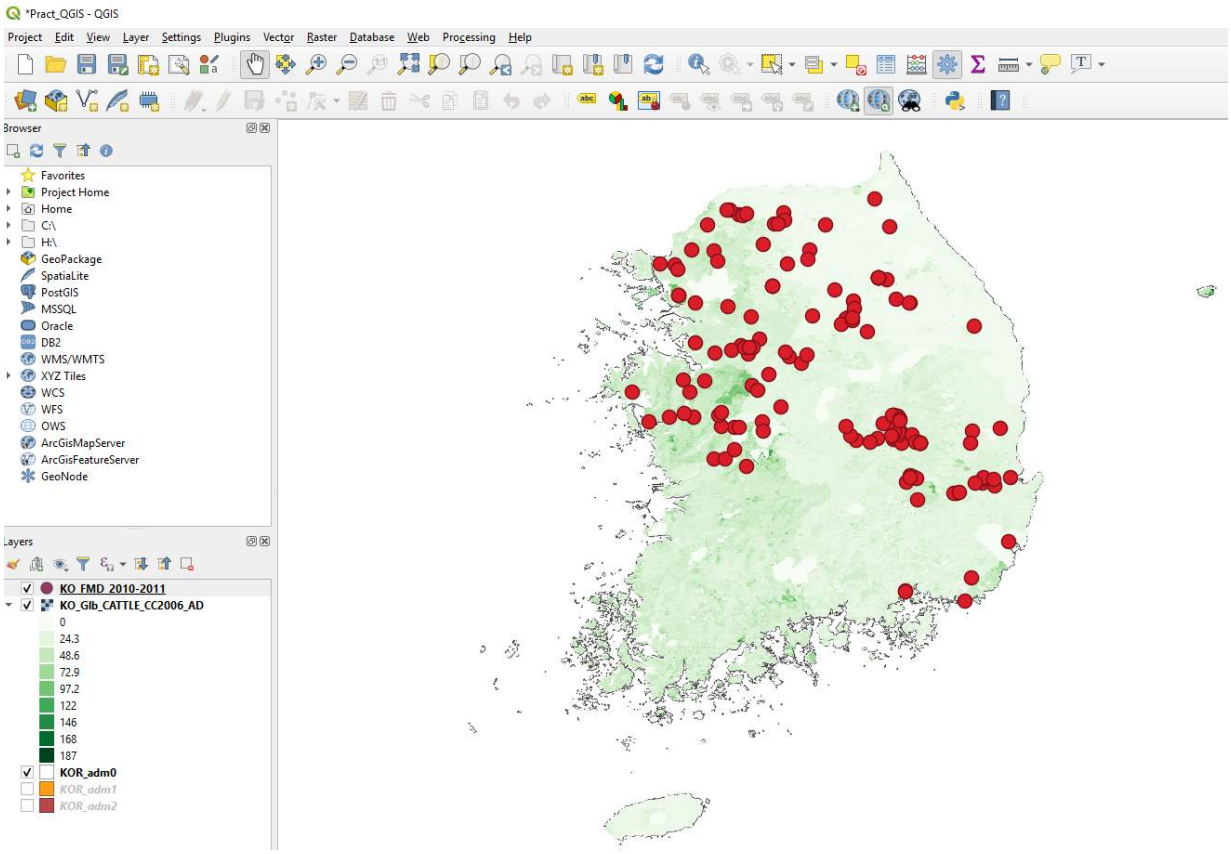
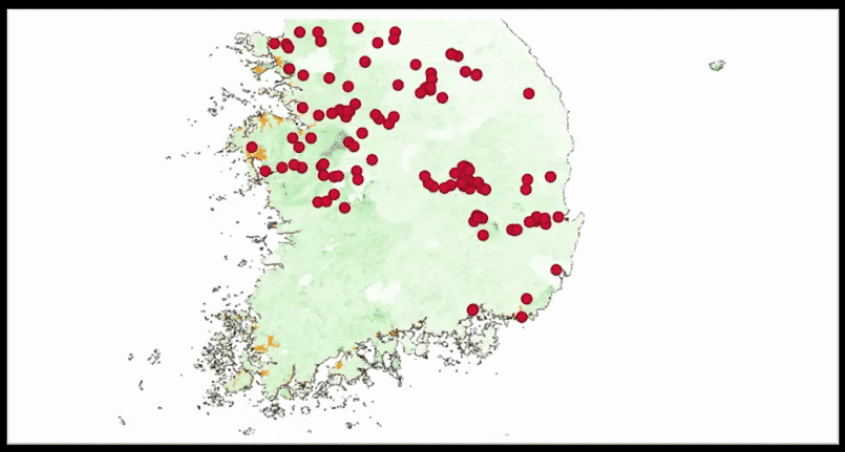


Figure 1.4b: Map of South Korea showing point location of FMD Outbreak 2010-2011

Click ▶ to play the video

Adding View Point Locations



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Add location labels

"To show labels of province names on the map, right-click on KOR_adm1 listed in the Layers Panel, select Properties, then select the tab Labels. In the drop-down box showing No Labels, select Show labels for this layer and for Label, select NAME_1, then click OK. The names of each of Korea's provinces will be displayed on your map (Figure 1.5)."

Click_🔎 to zoom the image

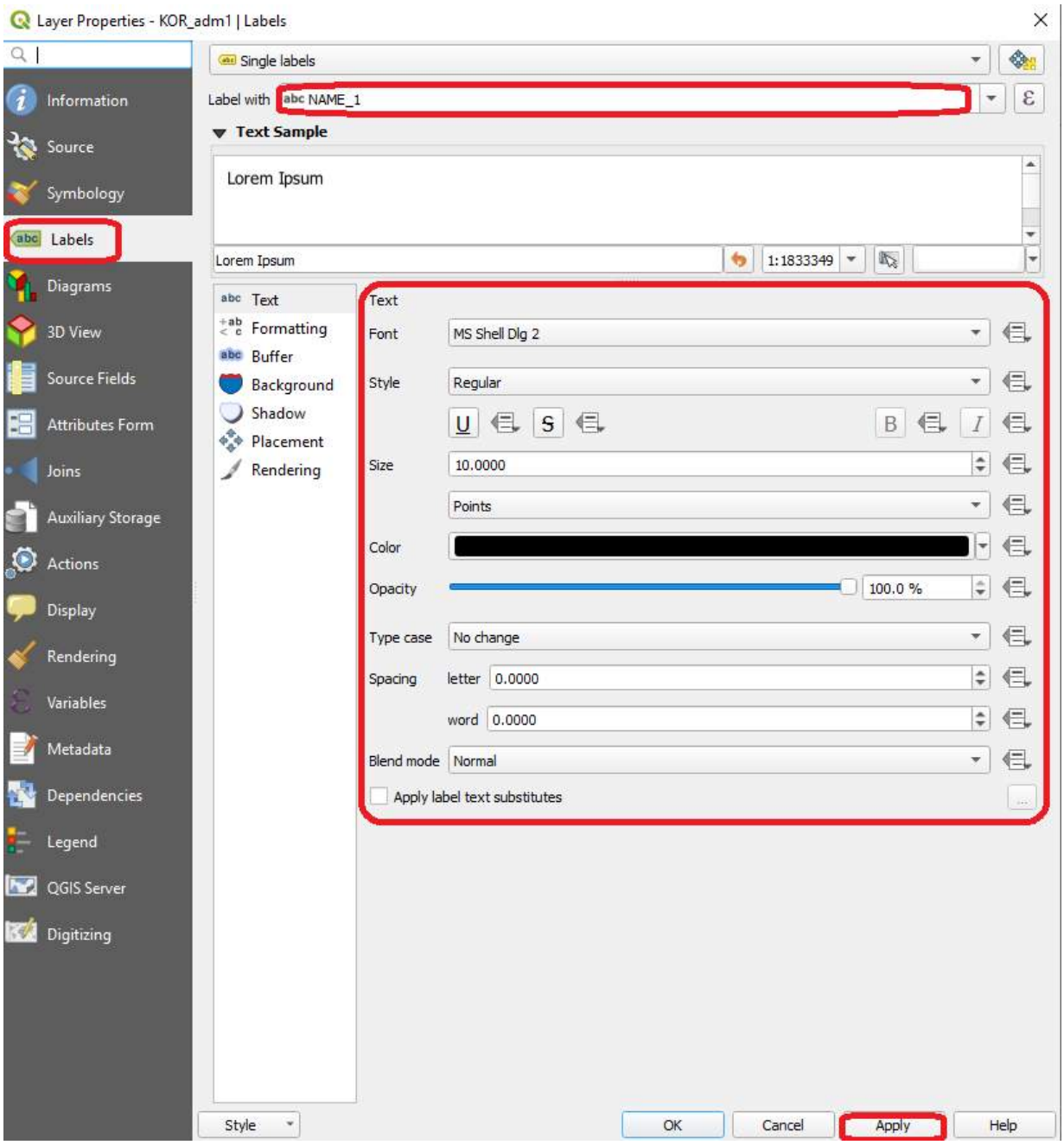

Figure 1.5a: Set up to show location label

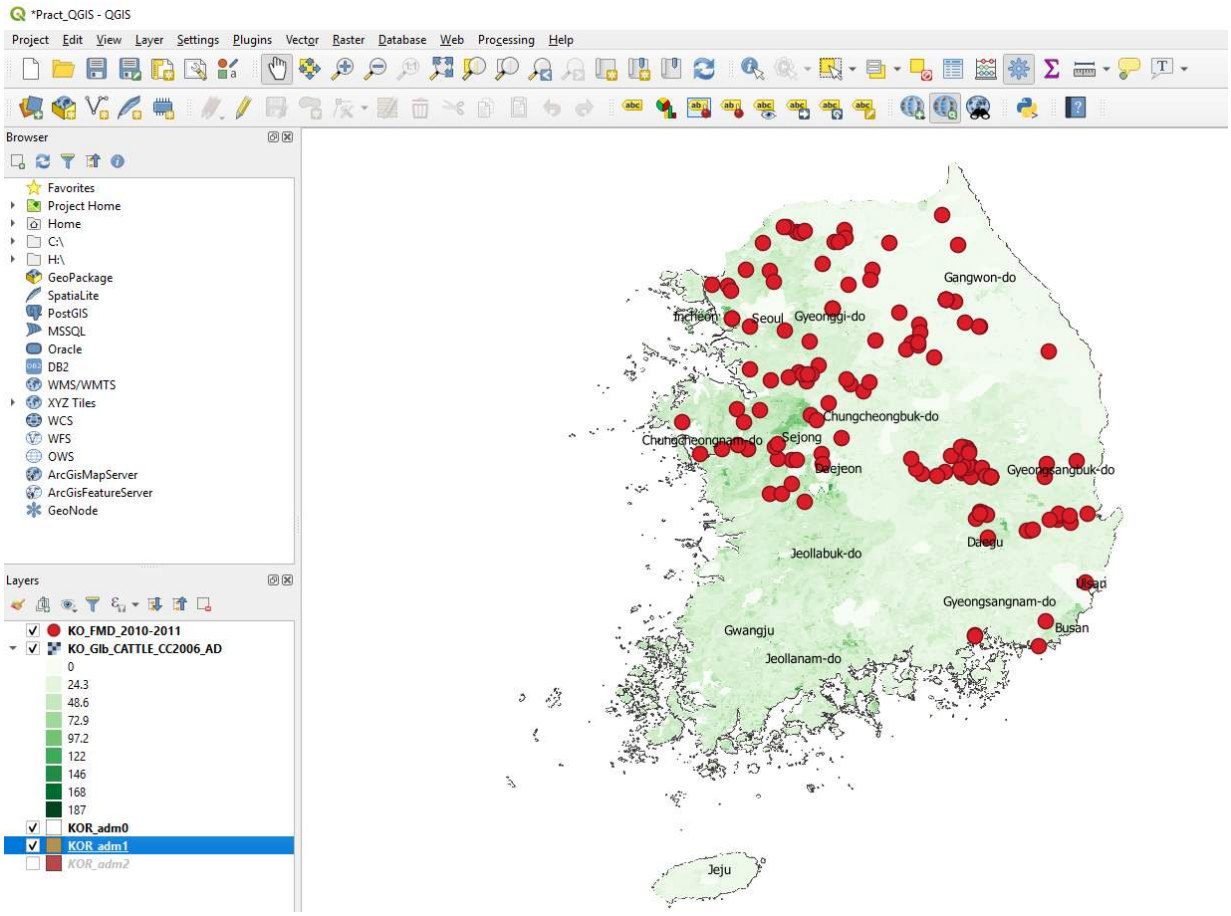

Figure 1.5b: Map of South Korea showing point location of FMD Outbreak 2010-2011 and province names

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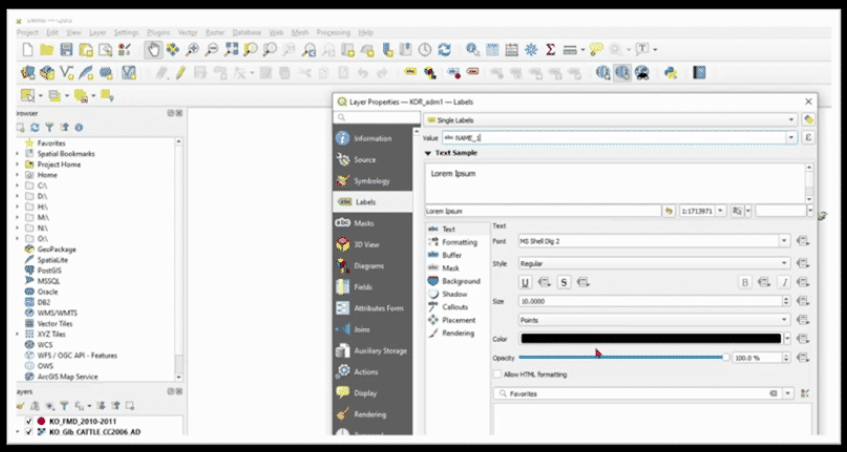
Click ▶ to play the video

Adding Location Labels



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Add base map from QuickMapServices

"We will be using some functionality that is not included in the basic installation version; this functionality is provided by plugins. To install, click on Plugins Tab → Manage and Install Plugins, and select and install the following plugins: QuickMapServices Plugin (Figure 1.6) "

Click 🔎 to zoom the image

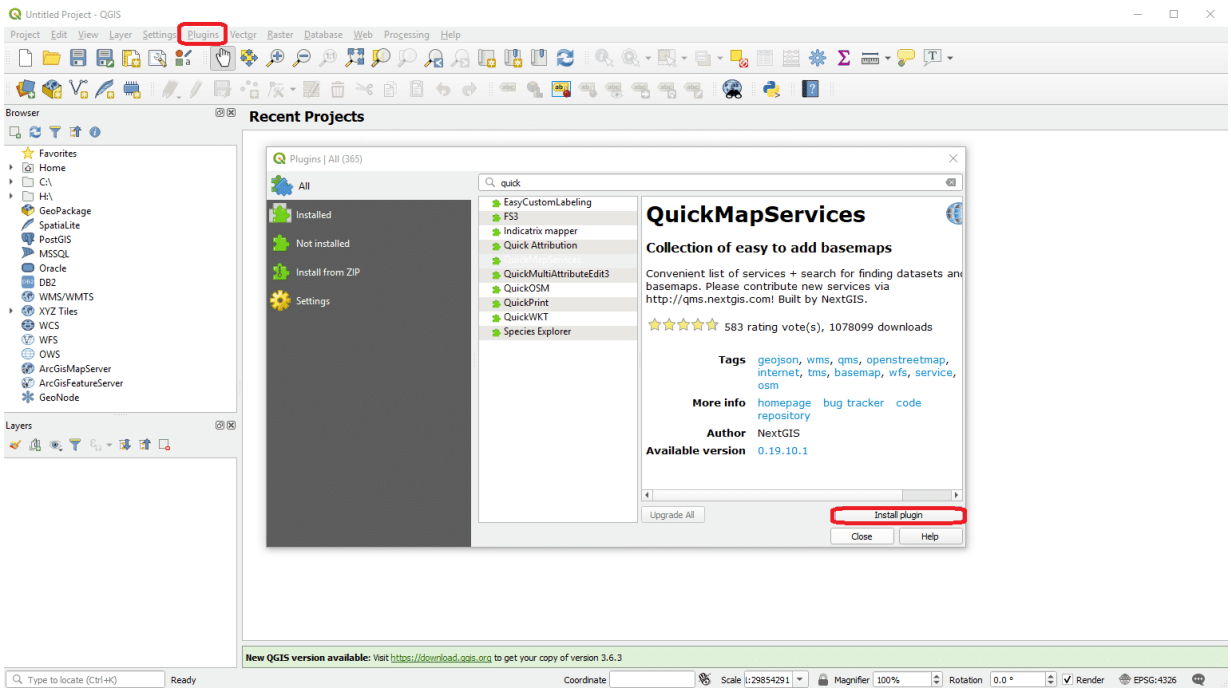
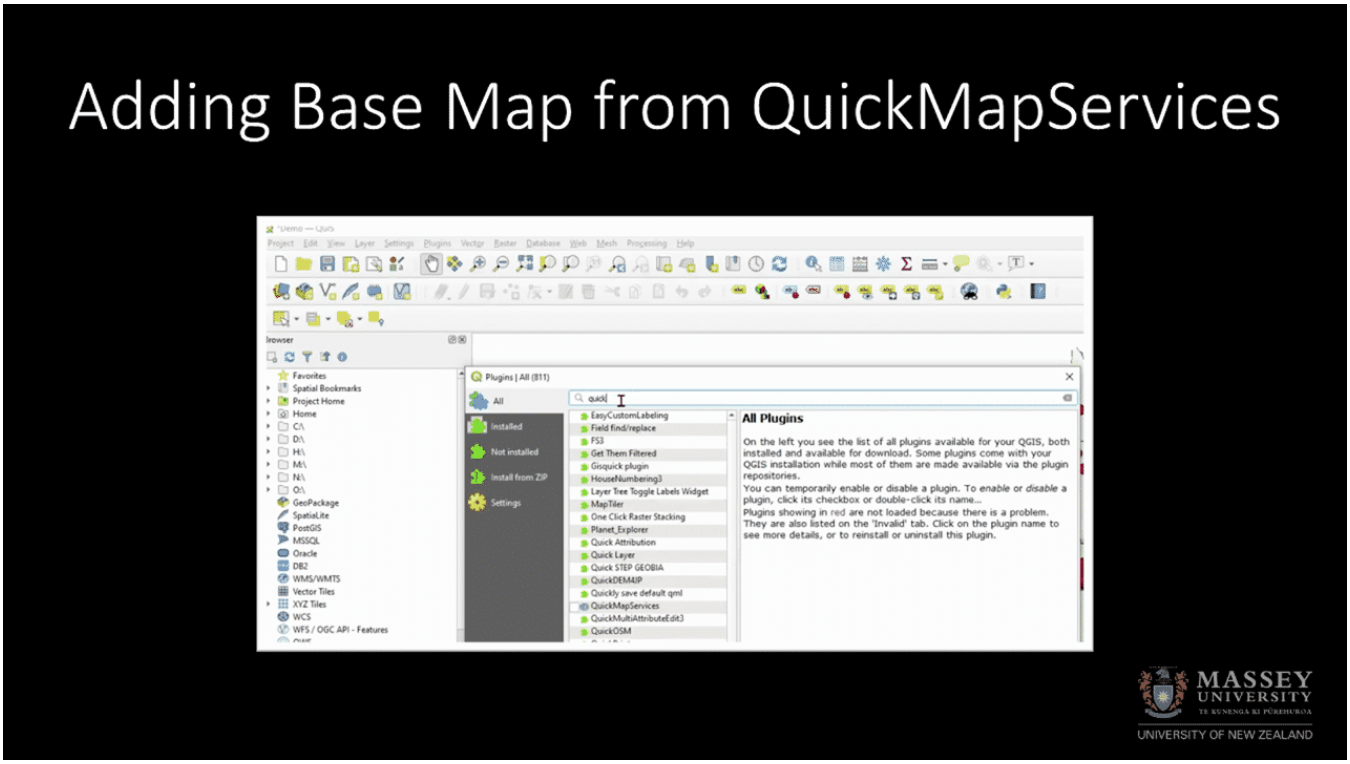


Figure 1.6: Installation of QuickMapServices Plugin

"To display base map using pre-installed QuickMapServices plugin, e.g. OpenStreetMap (OSM), select WEB → QUICKMAPSERVICES → OSM → OSM STANDARD. OSM Standard layer will appear in the Layers box. Re-arrange the layers' order to display the South Korea map showing the point location of FMD Outbreak 2010-2011, province names on an OSM base map."

Click ▶ to play the video



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Re-projection (point data)

Projections

Map projections are used to represent the 3-dimensional surface of the earth on a 2-dimensional plane in cartography (mapmaking). A map projection is a systematic transformation of the latitudes and longitudes of locations from the earth's surface (a 3-dimensional object) into locations on a plane (i.e. a 2-dimensional map). There are numerous geographic projection systems in use with individual map projection definitions favoured in different world regions. While the simplest approach for storing spatial information requires analysts to store and share spatial data in longitude-latitude format, it is common for those collecting spatial data to store and share spatial data in local projection formats which display distance in metric units.

"In this exercise, we would like to re-project our FMD point location to display distance in metres. Re-project the CSV file KO_FMD_2010-2011 from WGS84

(EPSG:4326) to UTM52N (EPSG:32652) by exporting and save new vector layer as shapefile (.shp). Select new CRS as EPSG:32652 and tick add saved file to map (Figure 1.7a)"

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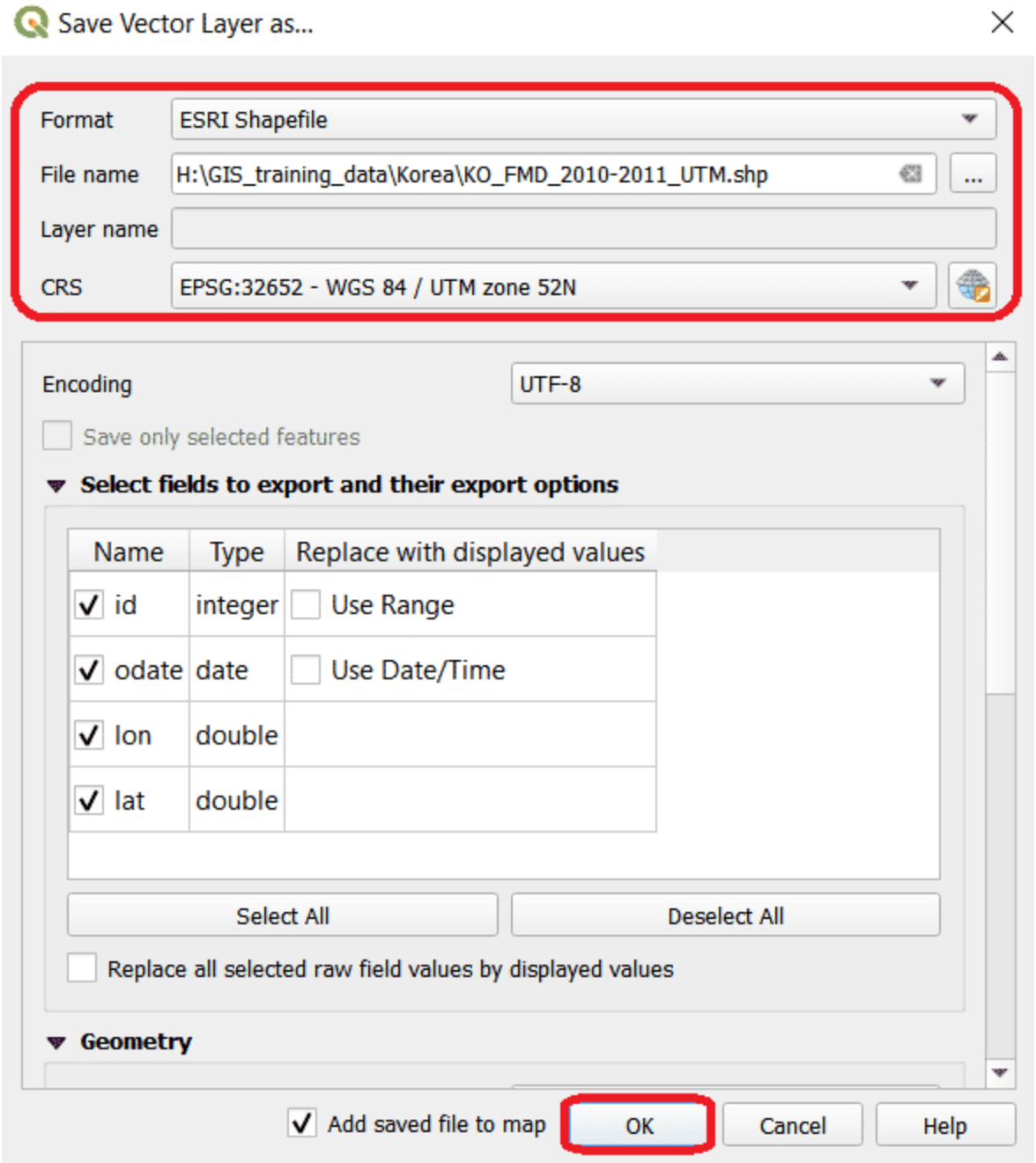

Figure 1.7a: Exporting CSV file into new shapefile format with UTM52N (EPSG:32652) coordinate reference system

"You can also change the overall project display into the new coordinate reference system by clicking Project →

Properties → CRS or the icon on the bottom right corner. Then, search for the UTM52N EPSG code (32652). Select and click “Apply” (Figure 1.7b).”

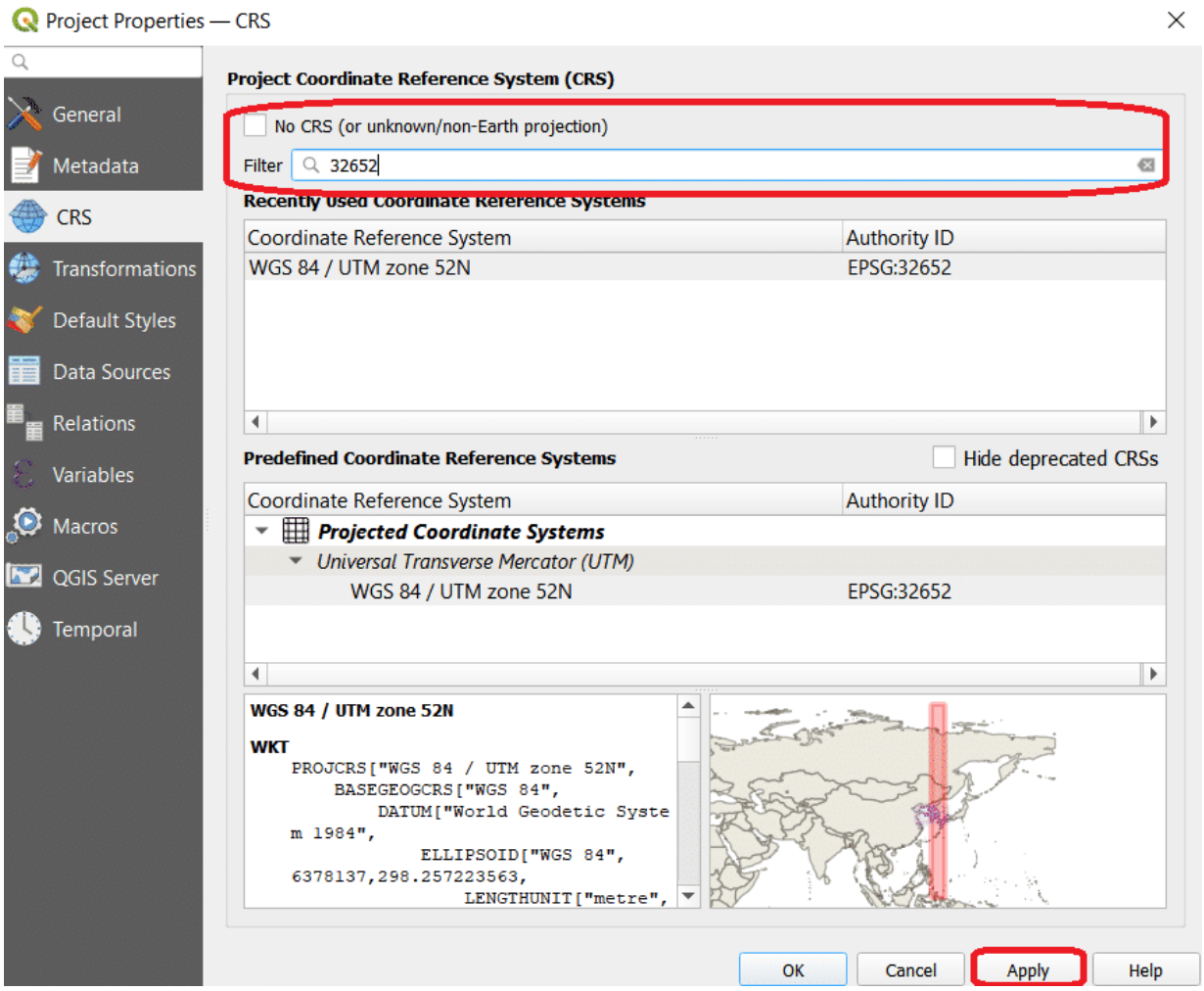

Figure 1.7b: Settings to change Project coordinate reference system

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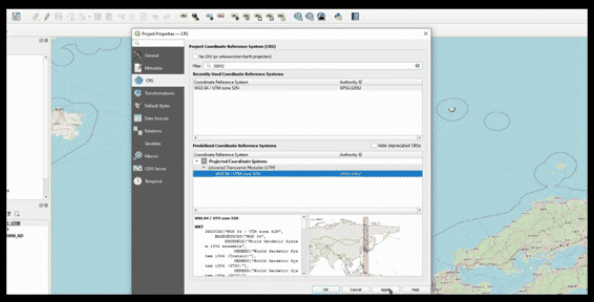
Re-projection (point data)



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Heatmap for point data

Heatmap is another visualisation tool for point data. Heatmap is an interpolation technique that is useful in determining the density of input features. QGIS has a heatmap renderer that can be used to style a point layer and a Processing algorithm Heatmap (Kernel Density Estimation) that can be used to create a raster from a point layer.

"Select and click the Open the Layer Styling panel button. Right-click the new KO_FMD_2010-2011_UTM layer → PROPERTIES → SYMBOLOGY. Select heatmap and set the colour ramp with your preferred colour. Set radius unit at 15,000 map units in metres (equivalent to 15km). In Layer Rendering, select "Darken" layer for Blending mode (Figure 1.8). You can modify the layers (colour, labels, background, etc.) as you prefer."

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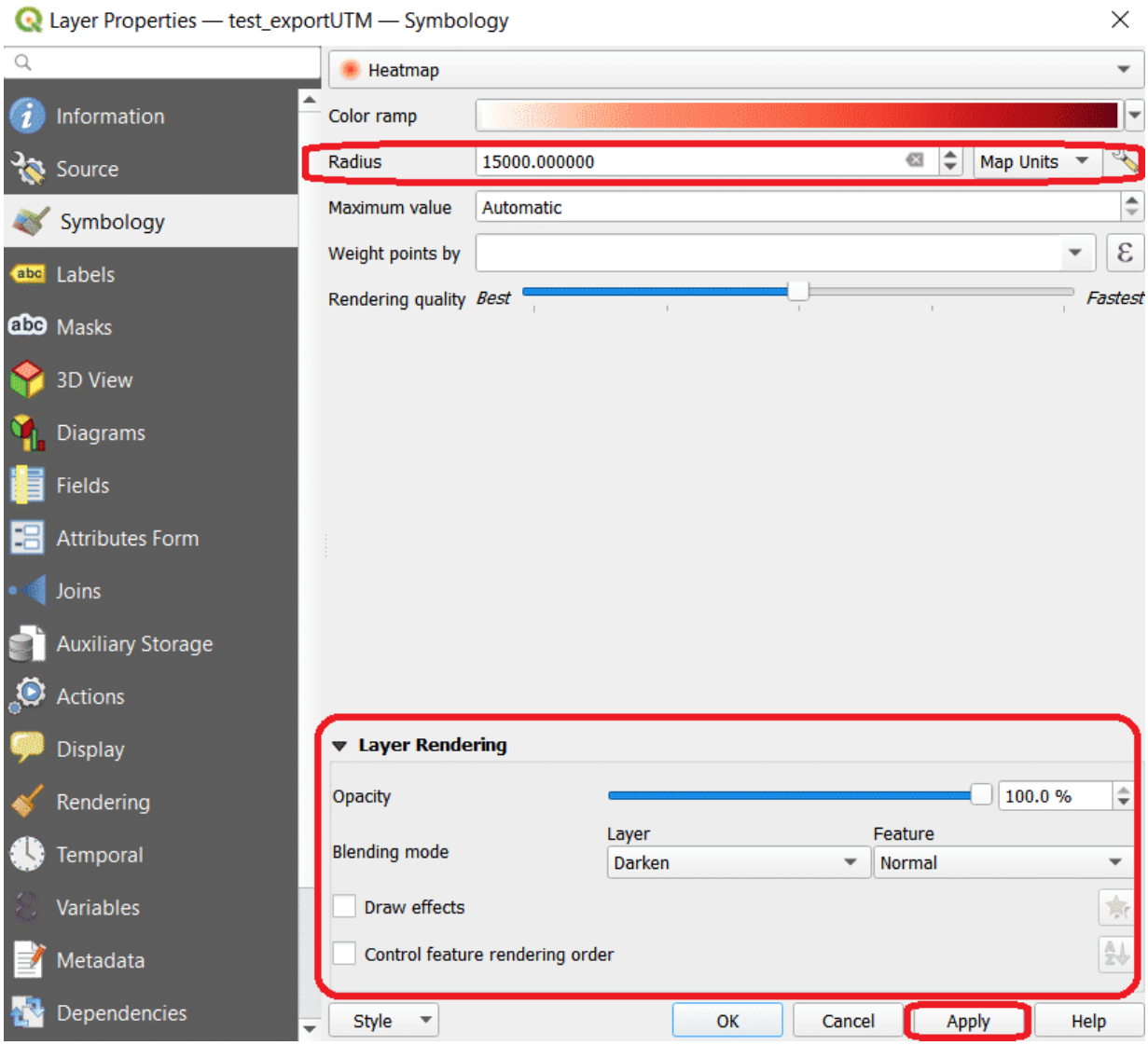


Figure 1.8a: Heatmap settings

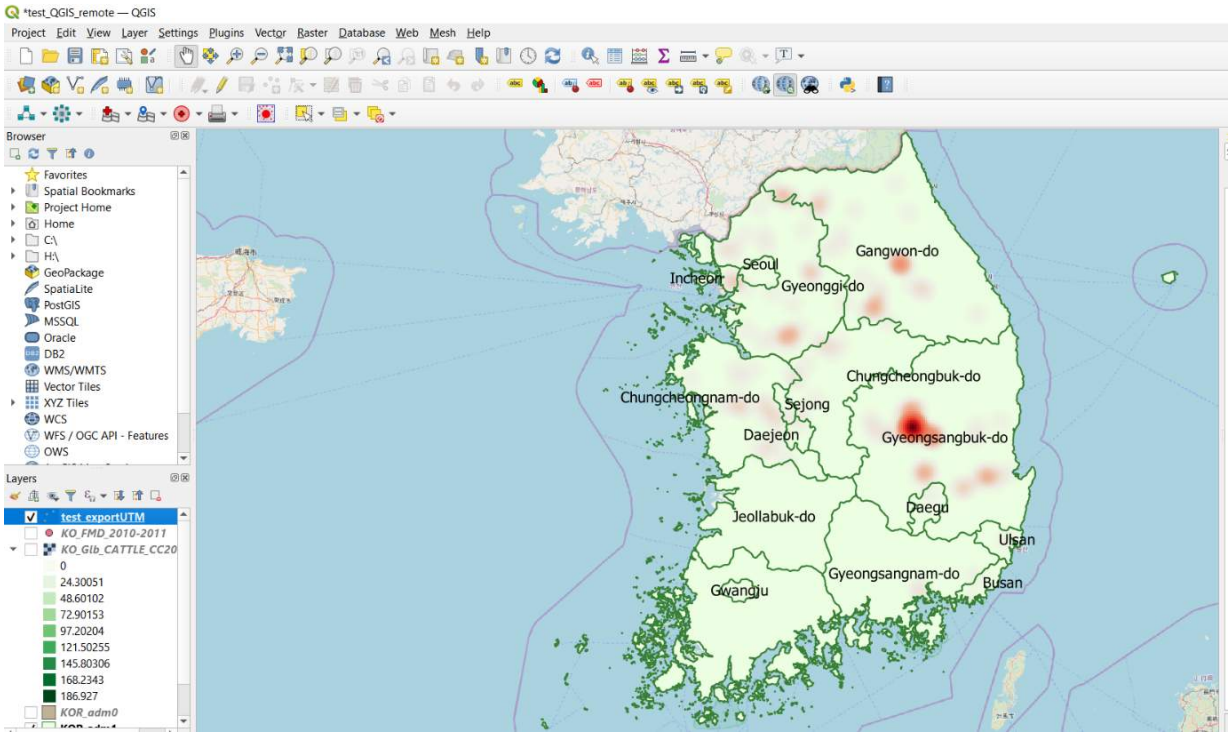
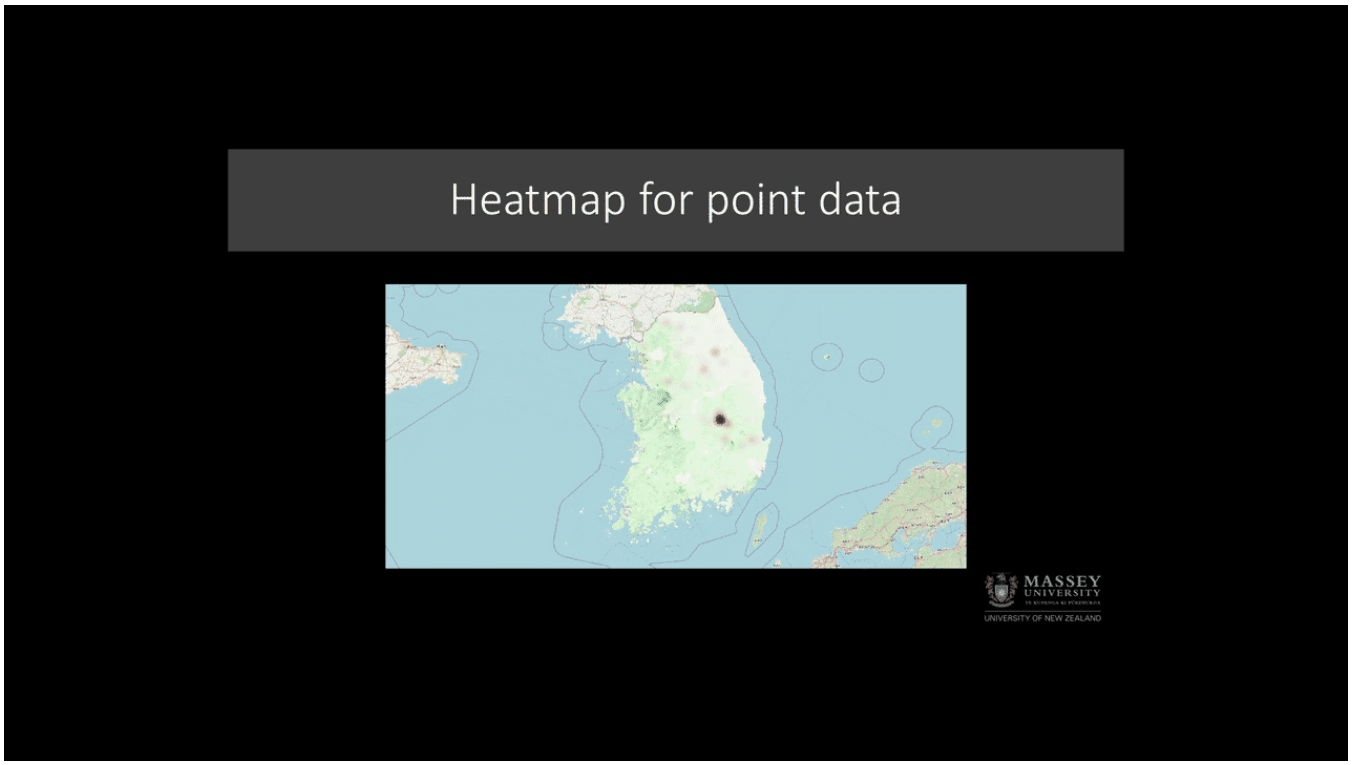


Figure 1.8b: Heatmap of South Korea showing point location of FMD Outbreak 2010-2011



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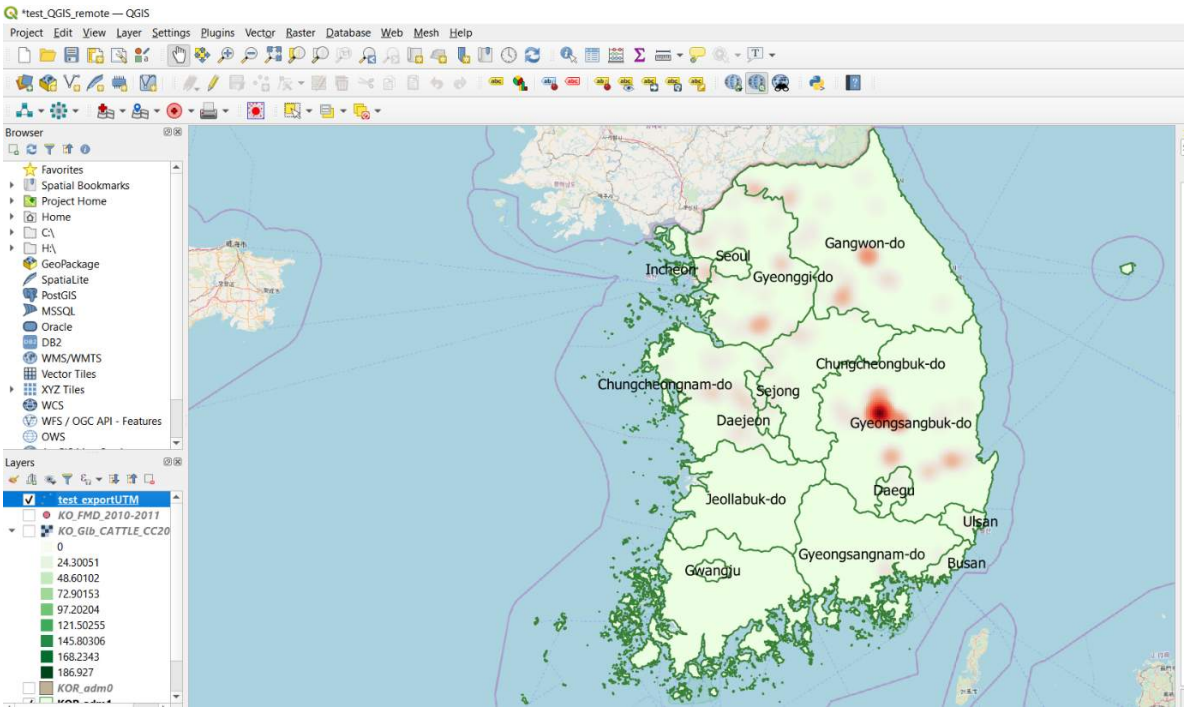
Quiz

From the heatmap you just created, what inferences can you make about the way FMD spread from the spatial distribution of FMD-positive farm locations? Tick all that apply.



- [ ] FMD-positive farms are more tightly clustered in the province of Gyeongsangbuck-do indicative of a local spread of infection in this province.

- [ ] Apart from the province of Gyeongsangbuck-do, cases are more widely dispersed geographically, indicative of a long-distance spread of disease
- [ ] None of the above

SUBMIT

CONTINUE

Congratulations - end of lesson reached

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Australian Government Department of Agriculture, Water and the Environment