ECOWREX 2
Implementing a complete Spatial Data Infrastructure and improved Renewable Energy resources maps for supporting sustainable energy development

Andrea de Bono, Bruno Chatenoux
Yaniss Guigoz, Cedric Gampert, Alisa Yushchenko
Université de Genève
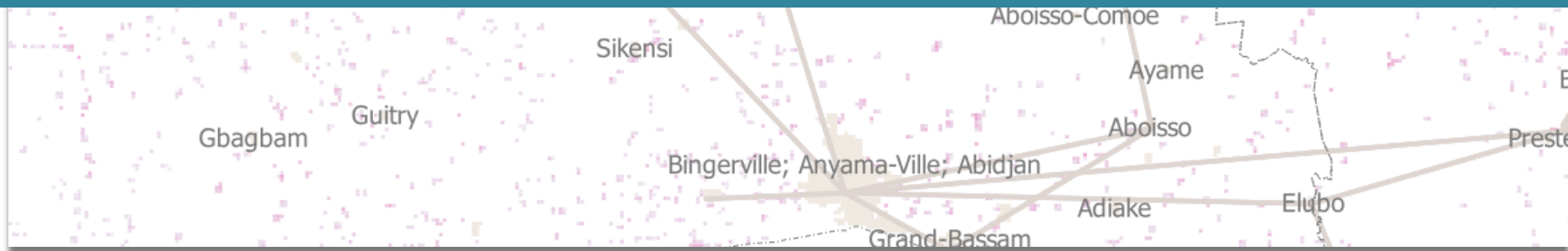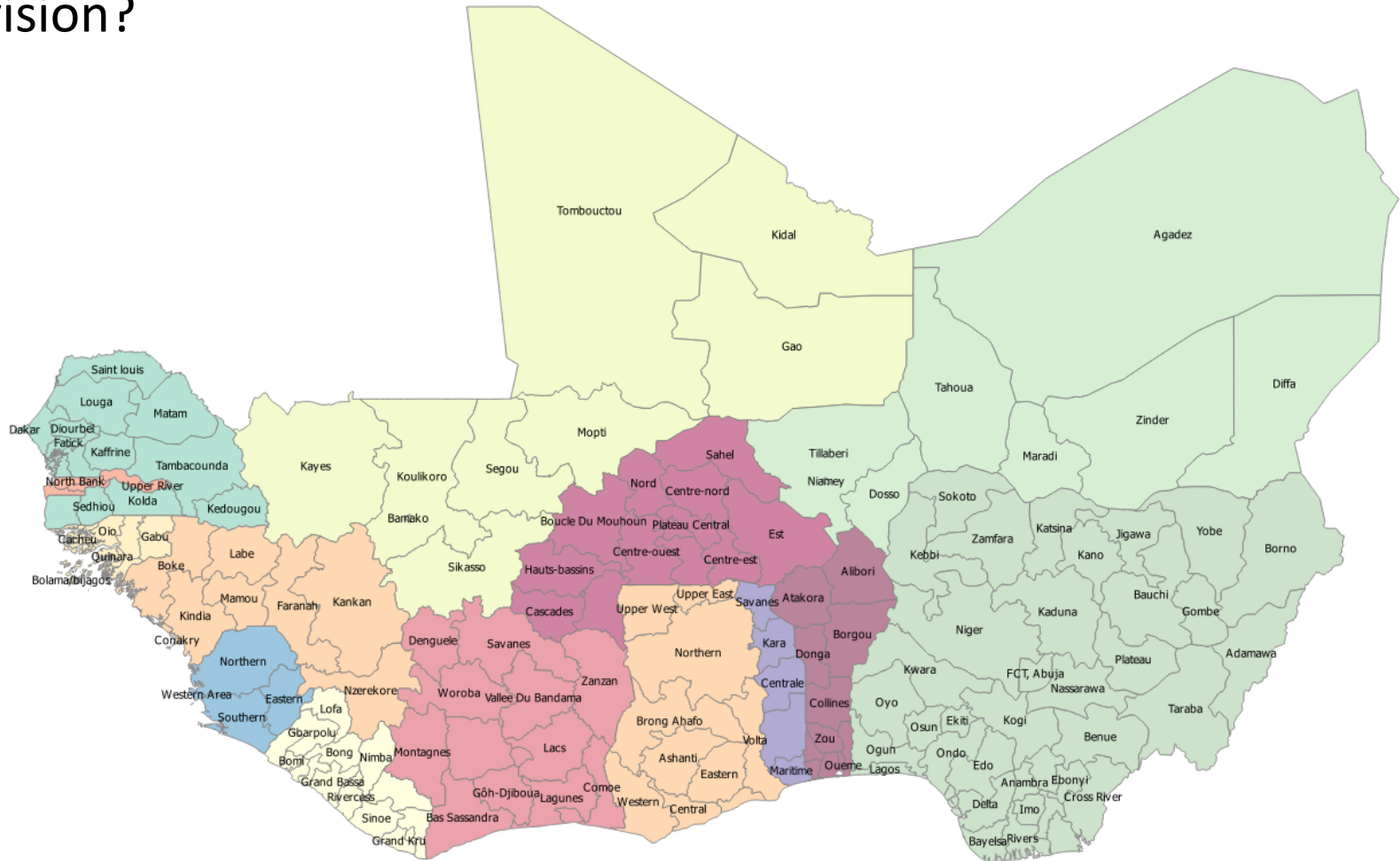UNEP/GRID-Geneva
Dakar, 26-29 July 2016

Demonstration of output useability

Sub-national

What is the potential for production of electricity (PV off-grid) at subnational level: example at first administrative subdivision?

Objective of the exercise

- Demonstrate usability of the data generated during the project
- Prioritize locations for potential projects of solar energy generation in rural areas in ECOWAS region

Practically

- Layer(s) used are available through ECOWAS Map Viewer
- You can use **your own dataset** with administrative boundaries subdivisions
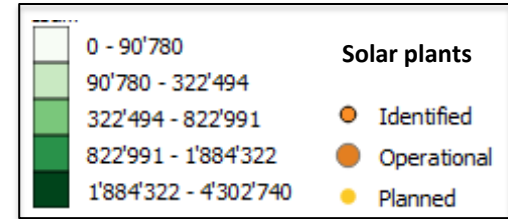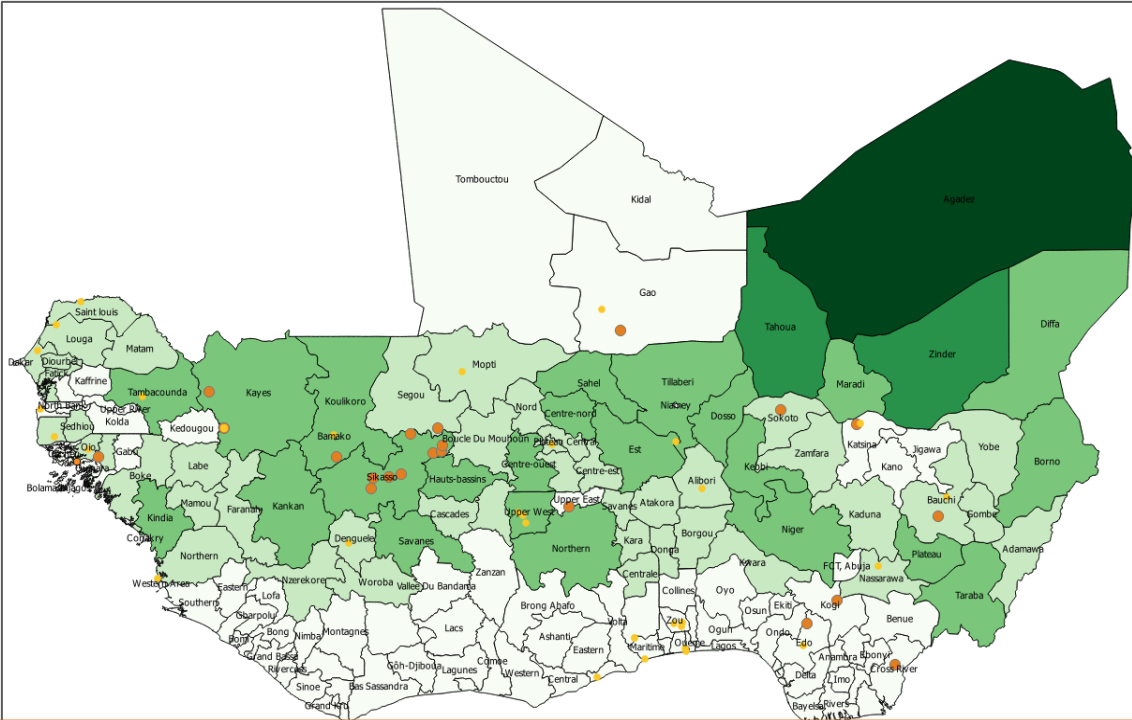- Only open source software will be used (QGIS)
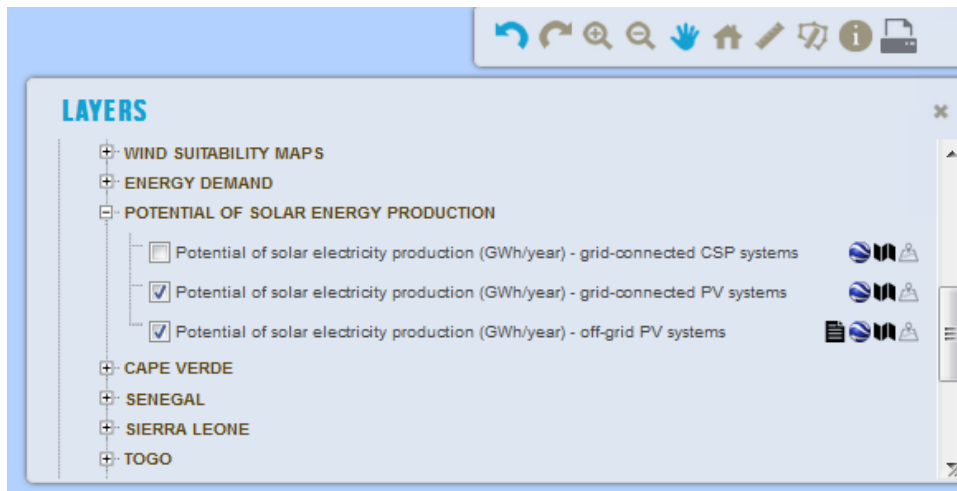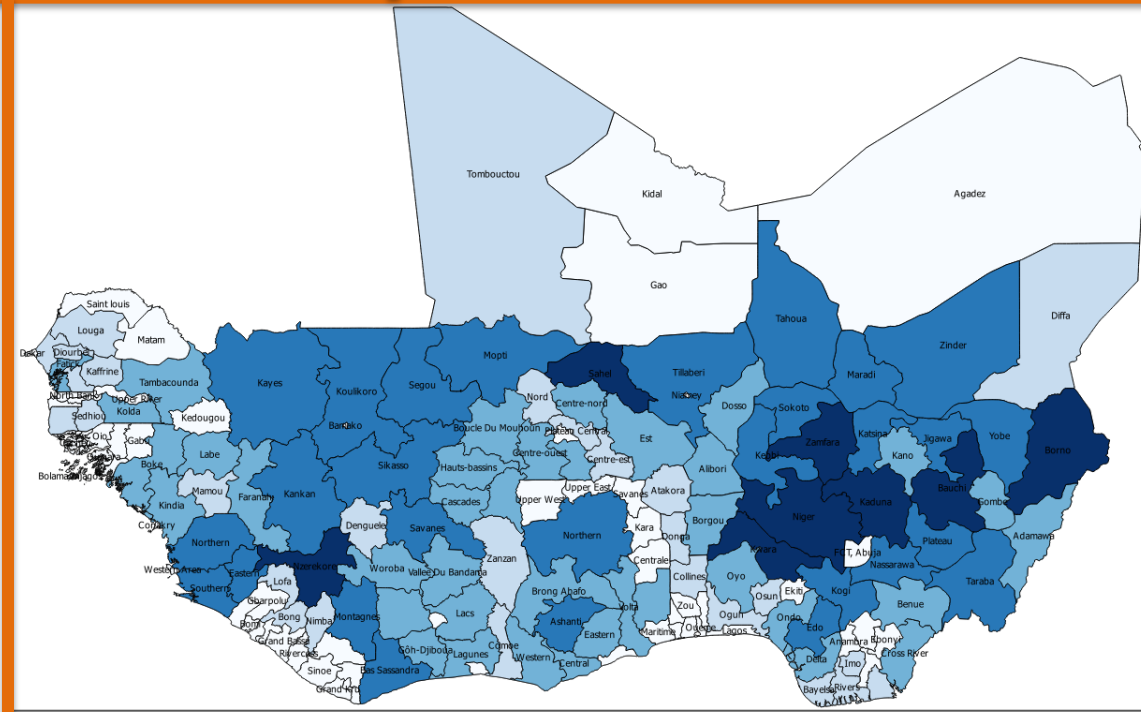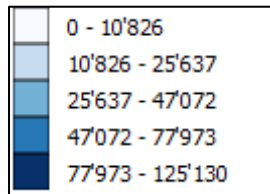
Process

- Utilize the *Zonal statistics* function
- Calculate statistics (sum of pixels) using the raster layers:
  - Potential of solar electricity production (GWh/year) - grid-connected PV systems
  - Potential of solar electricity production (GWh/year) - off-grid PV systems
- Use your own dataset with administrative boundaries subdivisions as polygon layer congaing the zones (in this example we employed the publicly available FAO-GAUL adm1 dataset)
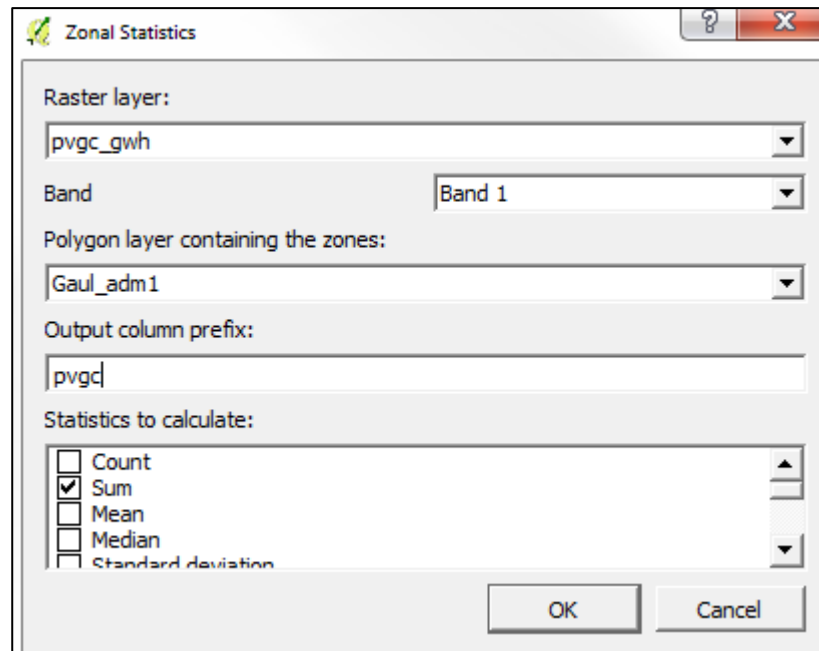
Potential of solar electricity production (GWh/year) - grid-connected PV systems and renewable energy generators (PV solar plants)

Legend:
- 0 - 90'780
- 90'780 - 322'494
- 322'494 - 822'991
- 822'991 - 1'884'322
- 1'884'322 - 4'302'740

Solar plants
- Identified
- Operational
- Planned

Potential of solar electricity production (GWh/year) – off-grid PV systems

Legend:
- 0 - 10'826
- 10'826 - 25'637
- 25'637 - 47'072
- 47'072 - 77'973
- 77'973 - 125'130

Objective of the exercise
- demonstrate useability of the data generated during the project
- Prioritize locations for potential projects of Wind Power generation in rural areas in ECOWAS region
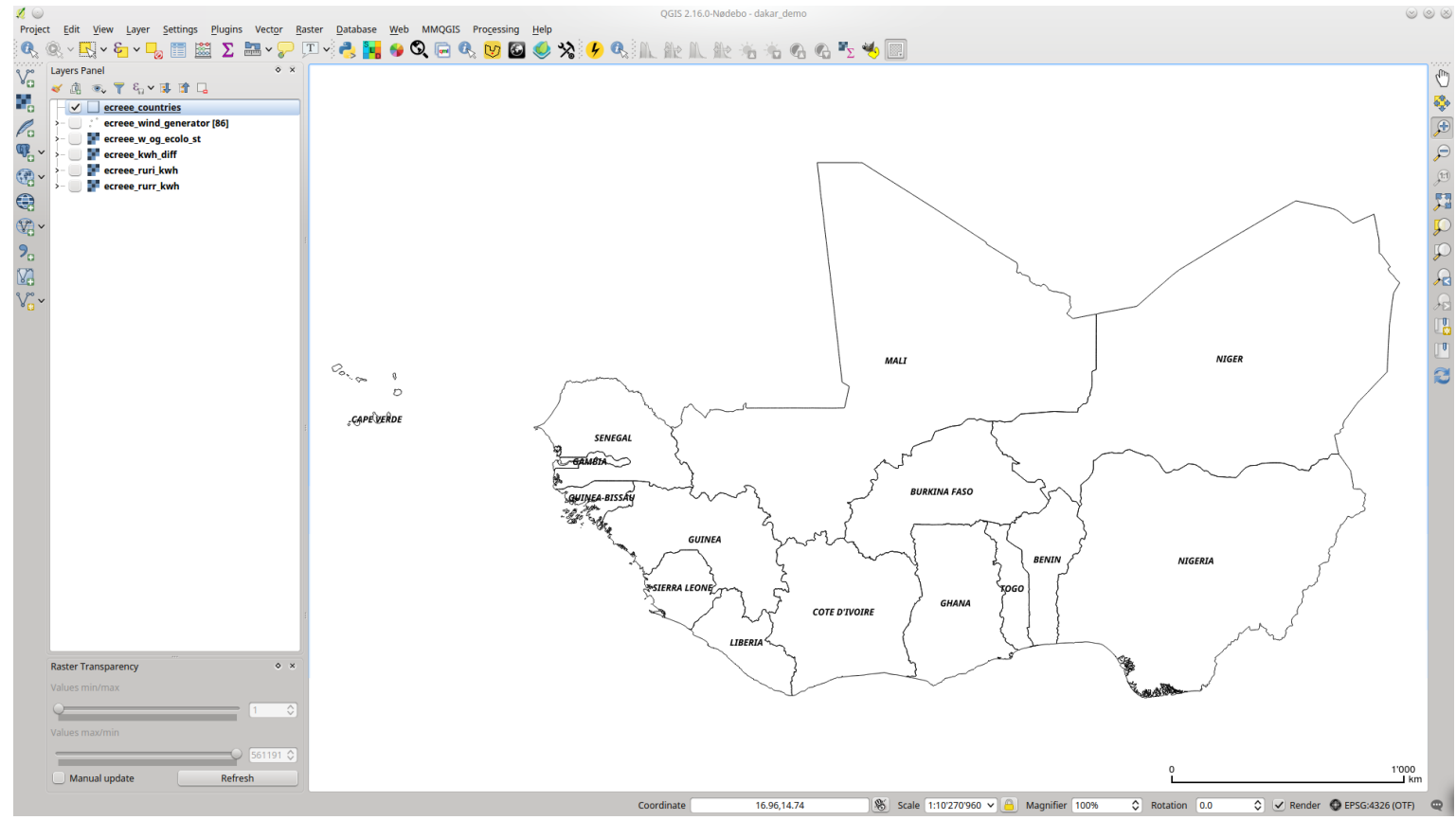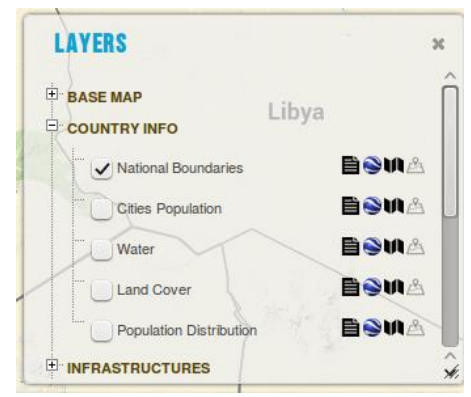
Practically
- All layers used are available through ECOWAS Map Viewer
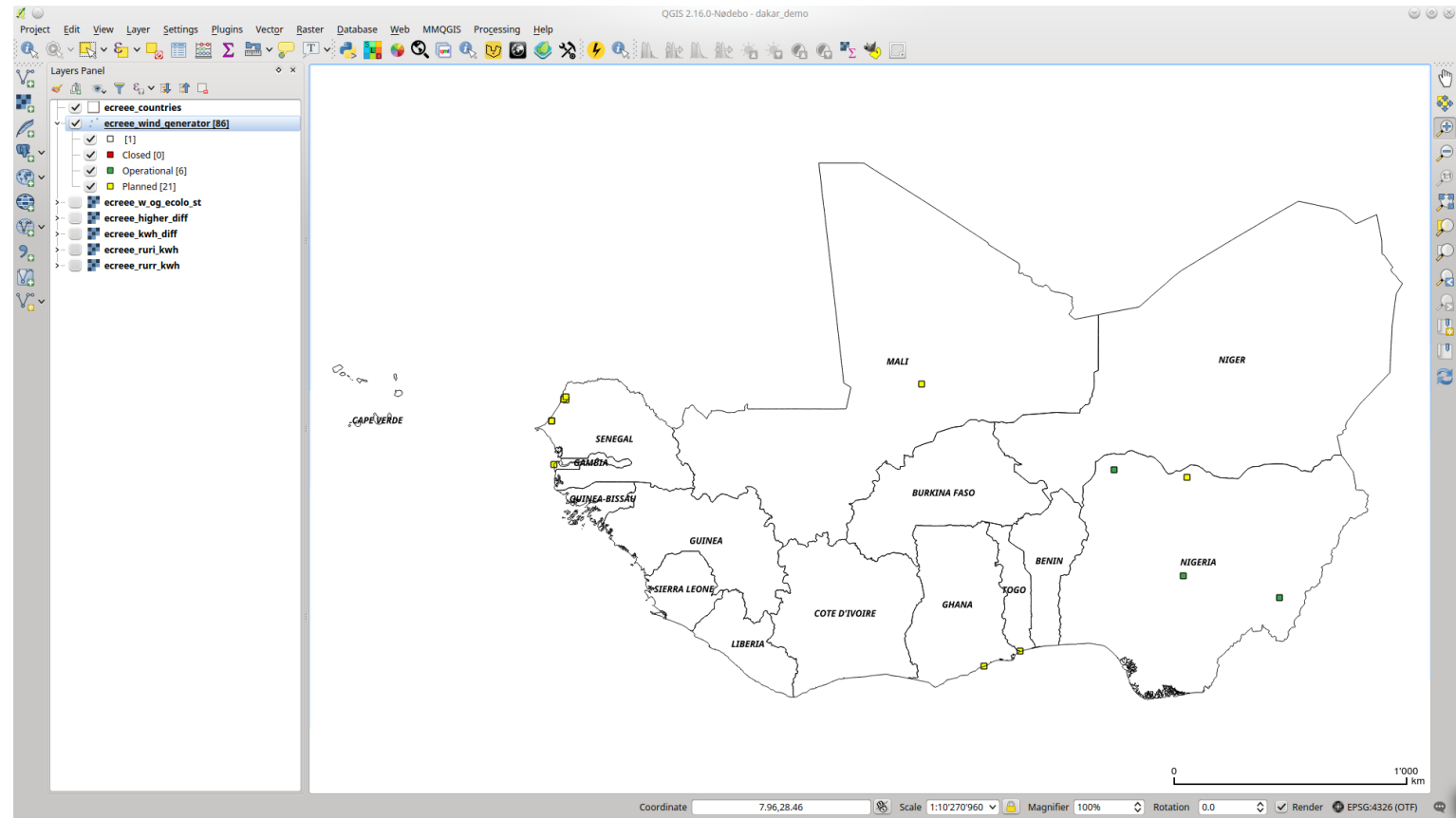- Only open source software will be used (QGIS and R)
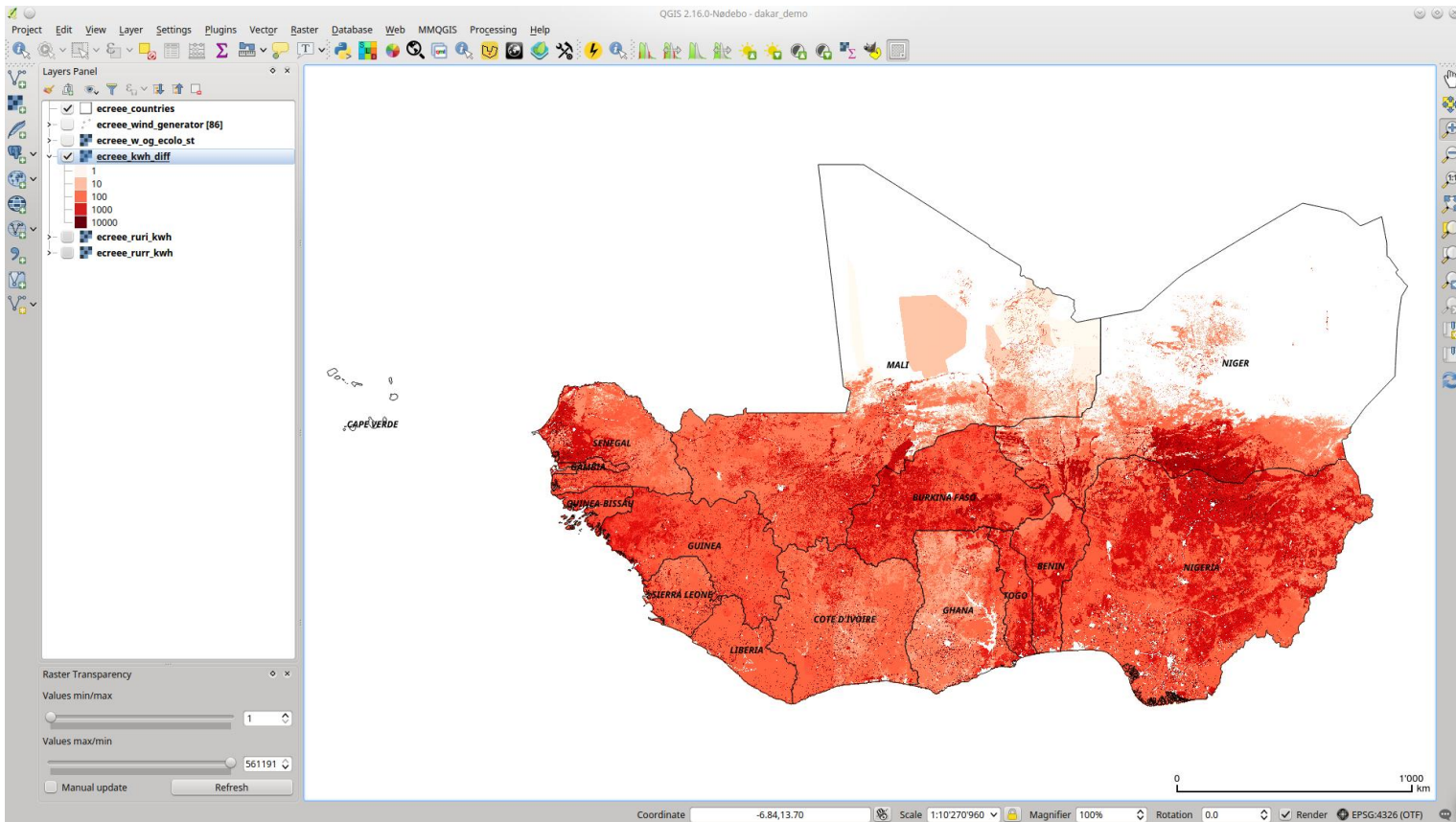
Start a new GIS project

- National Boundaries

Start a new GIS project

- National Boundaries
- Wind plants (original dataset need to be filtered)

Calculate the lack of electricity demand

- Electricity demand for rural areas (kWh/year) - based on real demand
- Electricity demand for rural areas (kWh/year) - based on threshold level
- ➢ Substract one layer from the other
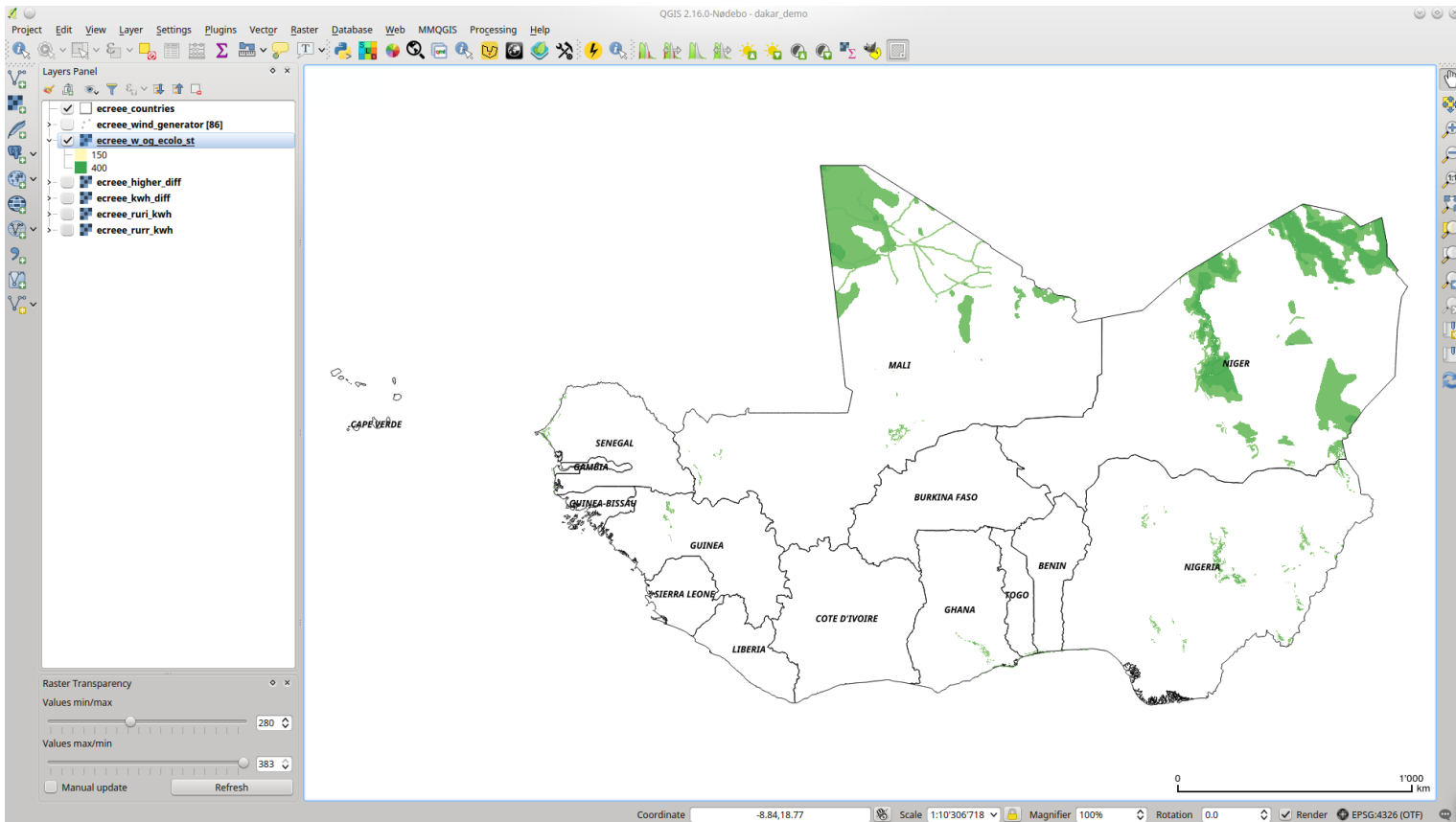
Identify areas with higher lack of electricity demand

➢ Calculate quantile
➢ Visualize values distribution
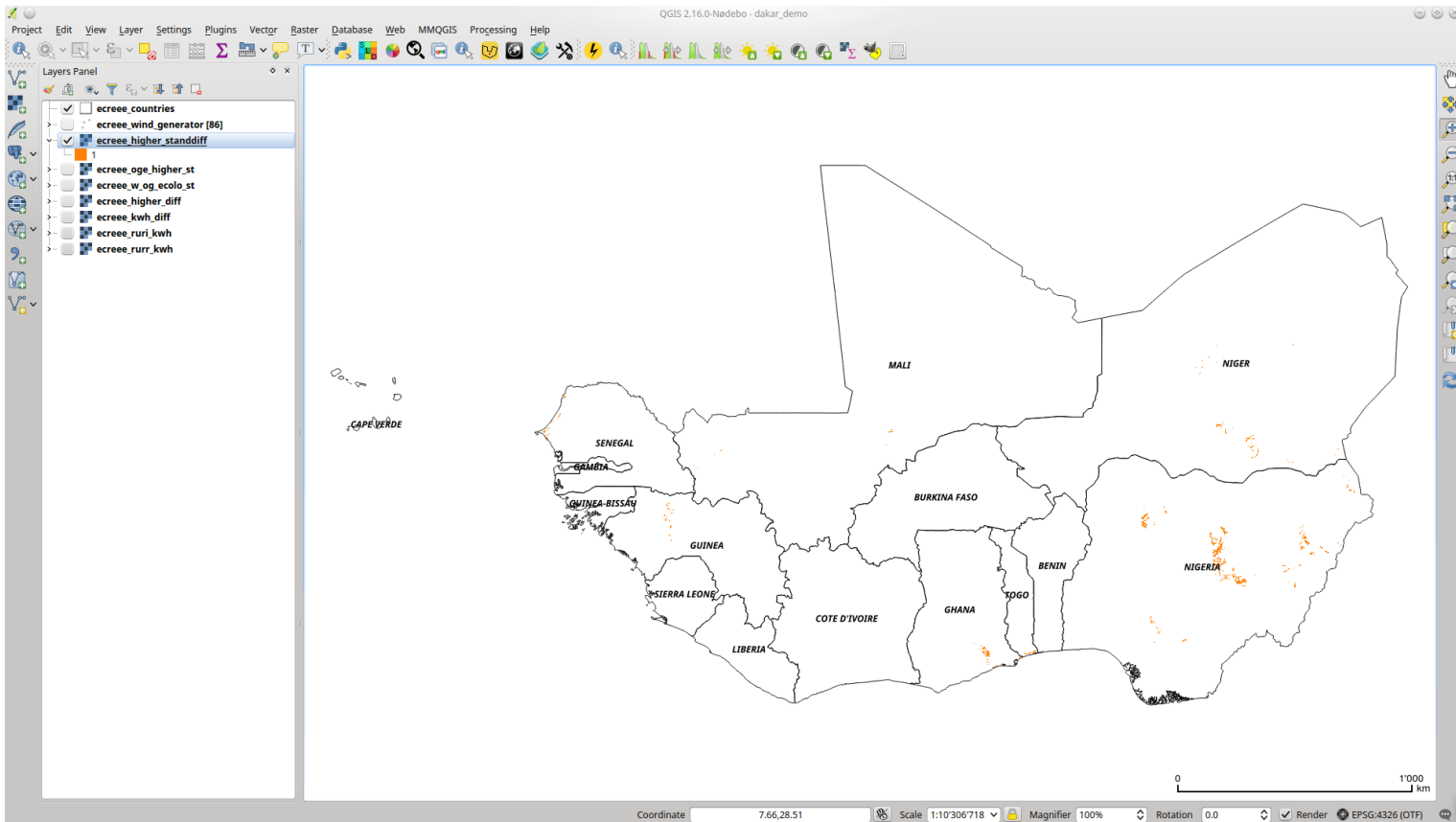➢ Extract all values higher than 75% quantile (646)
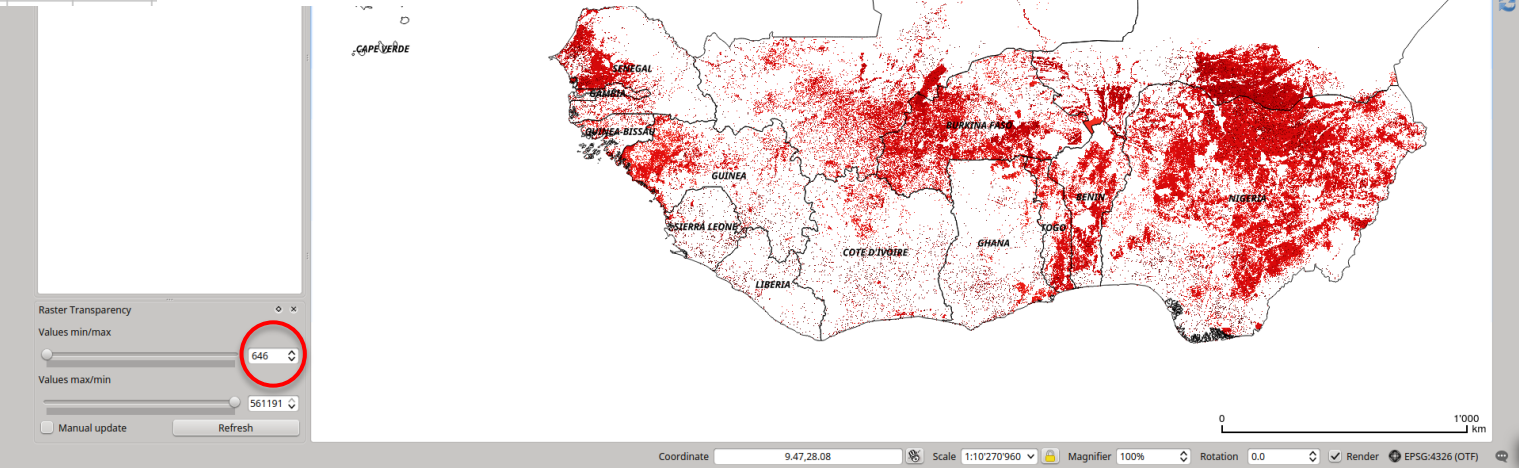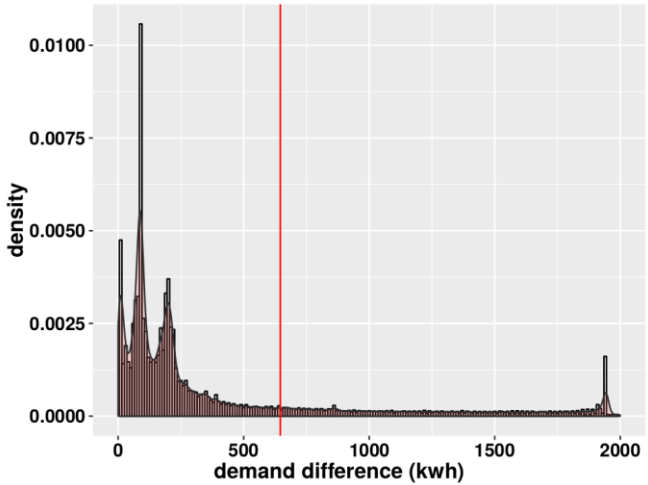
Identify areas with higher land suitability

- Wind Land Suitability for off-Grid installations - ecological scenario
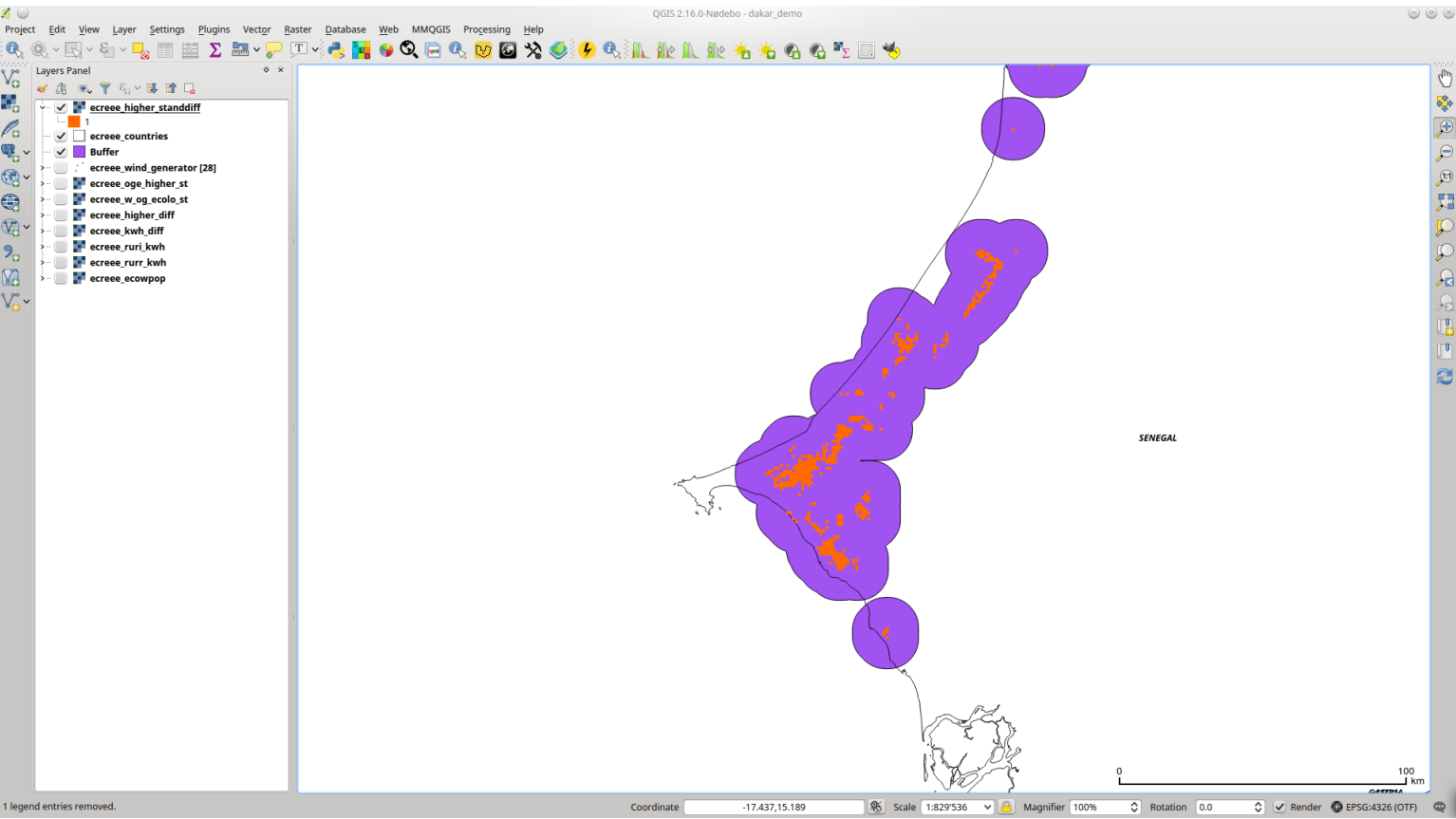- ➢ Extract all values higher than 75% quantile (280)

Identify areas with higher land suitability

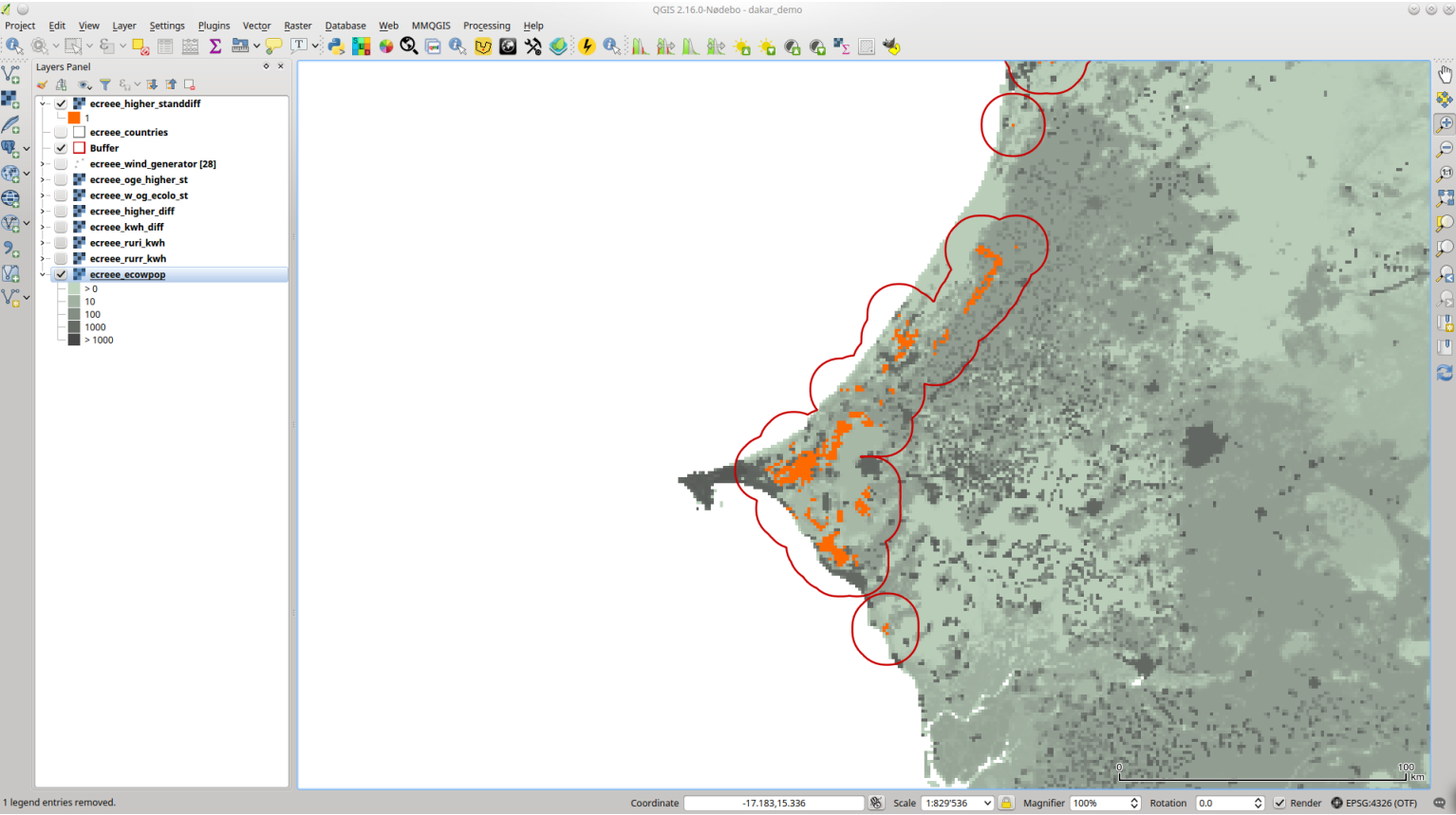➢ Intersect higher demand with higher suitability

Buffer potential areas of interest
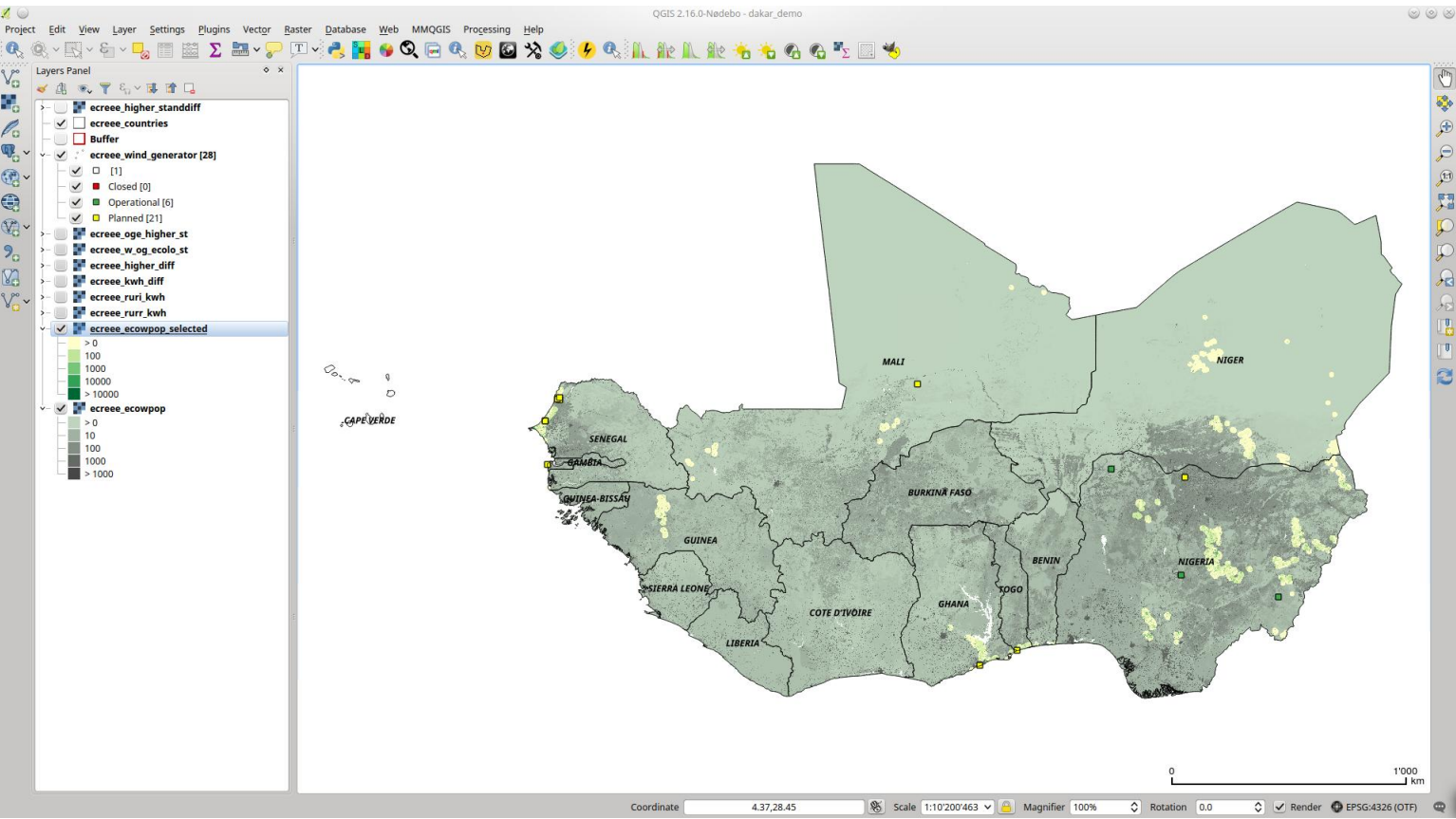
➢ Apply a 10 km buffer

Extract population on buffered potential of interest

➢ Download Population Distribution
➢ Clip it with the buffer

Extract Analyse your output

➢ Compare with existing and planned infrastructures
➢ Look at new potential areas

Extract Analyse your output

➢ Compare with existing and planned infrastructures
➢ Look at new potential areas