

## **CIE5401: GIS and Remote Sensing for Water Resources Management**

### **Assignment 1: Population and water demand in the Volta Basin**

**Due date: 19<sup>th</sup> February 2018**

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**Before you start, read the Lecture Notes, and the Course Reader.**

#### **Questions**

##### **Part 1: Population**

- 1) Use Zonal Statistics to calculate the total population of the Volta Basin.

Use QGIS Print Composer to make a map showing the Volta Basin outline overlaying the population count map.

##### **Part 2: Household water demand**

Assume that household water use is 90 liters per person per day in urban areas and 40 liters per person per day in rural areas. Use raster calculator to calculate the total household water demand for the population in the Volta basin.

##### **Part 3: Transboundary River basin**

- 1) Use field calculator to calculate the area in km<sup>2</sup> of the Volta Basin.
- 2) The Volta basin is shared by six countries: Burkina Faso, Ghana, Togo, Mali, Benin, and Cote d'Ivoire. Calculate the percentage of the total Volta basin area belonging to each of the six countries. Use QGIS Print Composer to make a map showing the Volta Basin outline and the country outlines.

NOTE: Make sure all maps include a title, legend, north arrow, scale bar (in km) etc..

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#### **Data**

You will need the following data to complete this exercise. Full details are given in CIE5401\_GettingStarted\_Assignment1.pdf about which datasets you need and how to download them.

- 1) Go to the GADM database of Global Administrative Areas (gadm.org), and download shapefiles for the six countries listed above. You will use the "Level 0", i.e. country level data.
- 2) Download the "Hydrological basins in Africa (Derived from Hydrosheds)" dataset from FAO.
- 3) Download population count data (2015) from the Gridded Population of the World (GPW,v4) dataset, NASA SEDAC

- 4) Download Urban Extents gridded data from the GRUMP project (v1), at the NASA SEDAC

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**Your report:**

In addition to the maps and answer, your report must include a complete description of which QGIS tools you used and the process you used to come up with your solutions.

For each QGIS tool, you should state what layers were used as input and include any parameter values or settings used.

It should be possible to re-create your results and maps from the description in your report. If not, you get no marks.

You are encouraged to help each other figure stuff out, but you **MUST** submit your own individual report. Plagiarism will not be tolerated.