

Geospatial Investigation of Clean Water Indicators in Developing Countries: Liberia

Dr. Jason E. VanHorn, Lyall Blanché, Seth Haase, Taek Soo

The developing nation of Liberia lies on the west coast of Africa and has a recent history of civil war and government corruption. Nationwide, there is relatively poor infrastructure and a lack of clean water. The main sources of drinking water for people in Liberia are creeks and rivers; however, some households have piped water or an open well. A large portion of Liberian people do not have access to clean, drinkable water causing unsanitary and unhealthy conditions.

Sawyer, an American company, has started an NGO with hopes in providing each individual household with a portable hand held water filter. The filter will allow people in all parts of Liberia to have access to clean water. Sawyer has partnered up with volunteers and churches in Liberia to help distribute filters and record health conditions when recipients are first given the filter. They then follow up with the households to record health conditions after the filters have been used for a period of time. The data that is being collected will help Sawyer analyze and see how effective their filters are for the people of Liberia. Sawyer has teamed up with Calvin College's Geography, Mathematics and the Sociology departments. These departments have been tasked with interpreting the collected data.

The Geography team has been tasked with visualizing the collected Sawyer data, as well as contextualize the data with Demographic and Health Survey data from previous years. Once receiving the aggregated data from the Math Department, this data is used in the Liberia Mapping System. Using the ArcGIS Online tool 'Story Map Journal,' the story of Liberia will be effectively told and documented through the perspective of clean water as transformations may occur in the nation over the next 5-10 years.

Mapping tools used to build the mapping system are ArcMap and ArcGIS online both products of ESRI. To create these maps we built datasets in excel and brought the datasets across into ArcMap. Joining these datasets to geospatial shapefiles of Liberia we were able to create numerous maps such as choropleth maps and charts. Maps were then served as a 'Map Service' on Calvin College's GIS-Server. They were then brought into the online environment as a service. Template applications, as well as Calvin College organizational account privileges allowed the team to create many applications and link them to one big application known as the Liberia Mapping System. With more than 15 applications and over 35 maps, the team has created an interactive world for any user interested in clean water or Liberia.

Through this research on Clean Water in Liberia, I learned how severe the environmental settings are in Liberia and the direness of the health problem of Liberians as well. Not only that, but also through mapping and visualizing the data in GIS I gained tangible experience of the real research skill as well as teamwork with other teammates and also problem solving skills. This opportunity will definitely help me both in academics and personally since I found myself enjoying doing GIS research, specifically when I realized that I am contributing to this big project of distributing water filters in Liberia.