

# Geospatial Investigation of Clean Water Indicators in Developing Countries: Liberia

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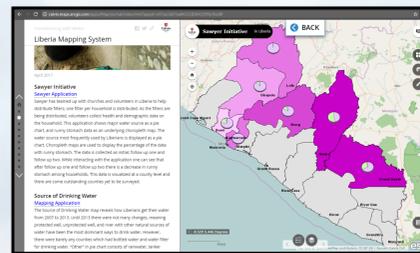
Web Link

<http://gis.calvin.edu/lms>

Results

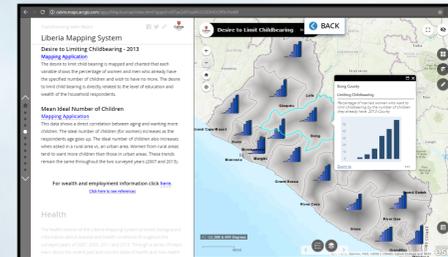
## Introduction

A geospatial investigative look into water, health and demographics of Liberia's recent past and its current state. The implementation of the mapping system allows the user to explore and geospatially analyze Demographic and Health Survey data, alongside Sawyer water filter data. The mapping application is fully interactive to provide a learning and visually compelling experience for any user interested in Liberia or clean water. This mapping system has been designed in efforts to help Sawyer analyze the immediate and long-term effects their hand-held water filters have had on the overall health of households that have received their filter. The Liberia Mapping System will be evolving over the upcoming years as more Sawyer and USAID data becomes available.



To the left is the Sawyer data application. Currently viewing drinking water sources as pie charts and runny stomach symptoms as a choropleth map.

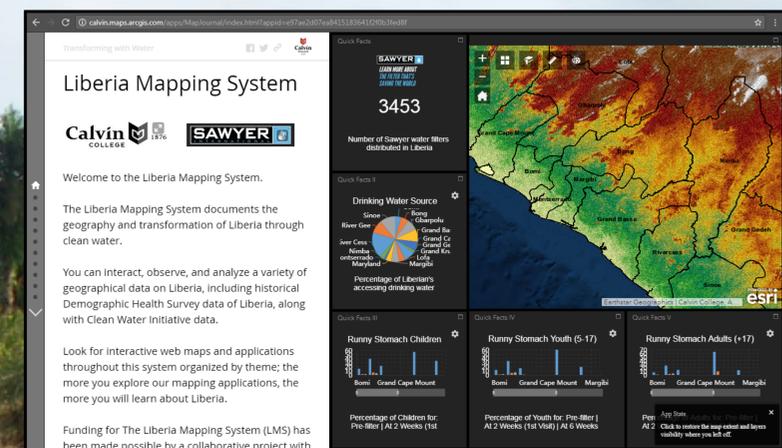
To the right is the Desire to Limit Childbearing application. Currently viewing married women's desire to continue having children based on her current number of children.



## Objectives

- To oversee the production of GIS layers, ArcGIS development servers, REST service endpoint construction
- To create an interactive web mapping application using ESRI ArcMap and ArcGIS Online environments \
- To aggregate Demographic and Health Survey data and Sawyer water filter data into a format that is geospatially useable and compatible with ESRI software
- To create an online environment that provides visual representation of background health and demographic data and provides context for Sawyer water filter data progressions over the duration of the initiative

To the right is the front page of the LMS. In the panel to the right is the served Digital Elevation Model of Liberia. Surrounding the map are 5 interactive infographics that display symptoms of runny stomach, drinking water sources and total number of filters distributed by Sawyer.



## Methods

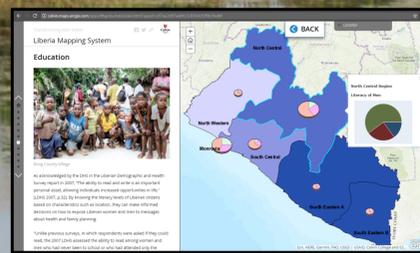
- Created a mapping system using ESRI ArcGIS Online template Story Map Journal
- Created GIS layers
  - Joined data with geographies
  - Published GIS layers to Calvin's ArcGIS server
  - Imported served layers into ArcGIS Online
- Created web maps and web mapping applications using Web AppBuilder using GIS services on Calvin's ArcGIS REST service endpoint

## Conclusions

Drastic differences in initial and follow up data from Sawyer, suggests that the water filters are effective in decreasing symptoms of runny stomach. As a result, projections of an increase in overall health has been made. As this is the first of five years of data, definite conclusions on the effectiveness of Sawyer filters will not be made at this time.

## References

- Bureau of Statistics: Ministry of Planning and Economic Affairs; Institute for Resource Development/Westinghouse. (1988). Liberia Demographic and Health Survey 1986.
- LISGIS, Ministry of Health and Social Welfare, National AIDS Control Program, Macro International Inc. (2008). Liberia Demographic and Health Survey 2007.
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To the left is the literacy rates of men web map. The percentage of men who are literate by region is displayed as a choropleth with more specific information provided as a pop-up.

To the right is the nutrition application. The percentage of women who are considered to have a normal BMI is displayed by county as a choropleth map. A pop-up is available for additional information on nutrition.

