Name: Yadhav Deerpaul **Date:** Tuesday, March 28, 2023 **Assignment:** Final Project Proposal
Class: C R P 558 - Web Mapping and Spatial Data Visualization

Note: *The project is an ongoing research paper. For the GIS component, I had started working on it for the class 'C R P 551 - Introduction to Geographic Information Systems' (attached poster) and I am also currently developing a research proposal for the course 'GEOL 588 - GIS for Geoscientists II' for a suitability analysis and cost distance raster. While there might be some overlaps on the datasets being employed, the web maps and charts I will develop will only be for the current class.*

1. Your Name and Date:

Yadhav Deerpaul
Tuesday, March 28, 2023

2. Project Title:

Climate, Sunspots, and Forestry: Global Approaches to Understanding Malaria in British Mauritius

3. Abstract: (This will be used on a web page listing all the LA 558 projects (~150 Words max)

Malaria was spreading at an alarming on the island of Mauritius during the late nineteenth century. The British Government instated a Sanitary Commission in 1879 to recommend laws which could potentially reverse the spiraling outbreak. Charles Meldrum, a meteorologist and astronomer based in Mauritius, wrote a report exploring the links between the spread of malaria, global climatic anomalies, sunspot theories and the impacts of deforestation. He contested the report that Andrew Davidson had prepared for the Sanitary Commission of 1882. Davidson was a physician in Mauritius and he attributed the spread of malaria to miasmatic influences exacerbated by deforestation. The now obsolete miasma theory attributed the cause of diseases to the miasma from

rotting organic matter. Meldrum relied on what would soon proved as the scientifically correct germ theory, notably that microscopic organisms are the cause of diseases, to counter Davidson. The project is a visual analysis of the colonial datasets.

4. Overview: (~300 to 500 words)

In the GIS project, I will analyze the datasets on health, population, and weather statistics compiled by Charles Meldrum during the nineteenth century from different districts and observatories of Mauritius. My main hypothesis will be to determine that there was a strong correlation between malaria, climate and deforestation in Mauritius.

Firstly, such correlations could be because of global climatic anomalies occurring in cyclical phases, the climatic patterns in Mauritius being attributed to regional attributes such as elevation or deforestation or that there were in fact no direct correlations between health and disease in Mauritius during the period 1871–1879. Secondly, I will make a visual chronology of how the specific cases throughout the island during the period 1865–1868 overlaid by a historical 1880 map by Alexander Descubes. Thirdly, depending on time constraints, I will transcribe the world data from the period compiled by Charles Meldrum to show global comparisons.

The final aim of the GIS project would be to assess the main cause of malaria in Mauritius during the late nineteenth based on the variables available. Such an assessment can then be linked to the different analyses of Meldrum and Davidson.

5. Technology: proposed to use to complete the project

Cleaning: OpenRefine.
Mapping: ArcGIS Pro.
Visualization: Leaflet, R, Shiny.

Unsure: Tableau/StoryMaps.

6. Data: List of data sources you will utilize

Historical (Meldrum):

Weather, health, and forests: https://wellcomecollection.org/works/a2kgnftu. Note: I already transcribed and organized the datasets with the exception of the chronological list.

1. Fever and total mortality; monthly - 1871–1879; districts.
2. Deaths from all causes; monthly - 1861-1866; districts.
3. Rainfall, mean temperature of air and relative humidity; monthly - 1871–1879; weather stations.
4. Wind directions; yearly - 1861-1880; island.
5. Demography, gender and race; 1881; districts.
6. Chronological list of spread of each known malaria case in each location during 1865–1868 with potential source.

Railways (Jessop):

https://nla.gov.au/nla.obj-52524382/view

Overlay (Descubes):

https://upload.wikimedia.org/wikipedia/commons/6/6d/Mauritius_1880_map_by_Descubes.jpg

Basemap (HDX):

https://data.humdata.org/dataset/cod-ab-mus?

DEM/Deforestation (M-Hinkamp):

https://github.com/M-Hinkamp/Deforestation-Mauritius/blob/master/metadata_general.txt

Water (ISCGM):

https://maps.princeton.edu/catalog/sde-columbia-iscgm_maritius_2011_watrcrsl
https://maps.princeton.edu/catalog/sde-columbia-iscgm_maritius_2011_inwatera

Note: *I will have to digitize the deforestation maps and the water sources on my own besides the other element in Descubes' map after the semester.*

7. Inspiration: List of Web Sites used for inspiration for the project

The main inspiration of the project came from the Appraising Risk project (https://www.appraisingrisk.com/) in which I am also involved. I started the project when the pandemic had started and I would also say that the Covid-19 dashboards especially the explanatory ones were a huge inspiration (https://www.ft.com/content/a2901ce8-5eb7-4633-b89c-cbdf5b386938).

8. Potential Challenges: List items you will need to work through on the project

Displaying the datasets temporally in *R*.
Adding temporality to one marker in *Leaflet*.
Free ways of showing DEMs online in 3D other than *StoryMaps*.

9. Timeline: Goal dates showcasing what you home to complete by certain dates. For example data collection, cleaning

Data collection: Mostly done.
Data cleaning: April 7.
First Draft: April 15.
Second Draft: April 30.
Final Draft: May.