

Disaster Response and Economic Instability - Haiti



Introduction - From the Beginning

1. The international community's role

1. French colonial contribution
2. The international boycott of the new nation of 1804
3. The French debt of 182
4. The United States Occupation 1915-1934

2. The role of Haiti's rulers

1. Slave-like labor systems in the early republic
2. The elite's protection of its wealth
3. Haitian corruption
4. Human rights violations as a tool of oppression



Introduction - Natural Disasters

2010 Earthquake

- 7.0 earthquake, epicenter located 25 km south of the capital city, **Port-au-Prince**
- Took the lives of 200,000 and cost almost \$11 billion in reparations (close to 100% of the nation's gross domestic product)
- Resulted in displacement and economic devastation of thousands



Hurricane Matthew - 2016

- Category four hurricane, landfall over southwest Haiti
- Resulted in catastrophic damage to the Grande Anse and Sud regions.
- Cost almost two billion dollars in damage, took the lives of 500 people, and displaced many thousands across the nation.



2021 Earthquake

- August 2021, a magnitude 7.2 earthquake struck the Tiburon Peninsula
- COVID-19 makes it challenging to get resources and aid
- 2,248 people were confirmed killed, at least 137,500 buildings damaged or destroyed



Why Should We Care?



1). American Citizens

- According to the 2019 U.S. Census, there were 1,084,055 Haitian Americans living in the USA
- 78% of this population still identified as having family in Haiti.

2). A Humanitarian Crisis

- The Risk of Cholera Could Mean Many More Deaths
- Long Term Food Shortages Are a Real Danger
- Poor Infrastructure, more than 80% of buildings unlivable
- A hesitant and weak governmental force that is absent
- Improper safety regulation, healthcare, and poor education

3). Future Risk

- Conditions in Haiti could continue to worsen until the point of national collapse. What would happen to Haiti? Would the UN step in? Would a nation acquire its burdens? What nation?

What can we learn? How can we help the Haitian people for the future?



Method 1 - Phone Usage/Clustering

1). Background

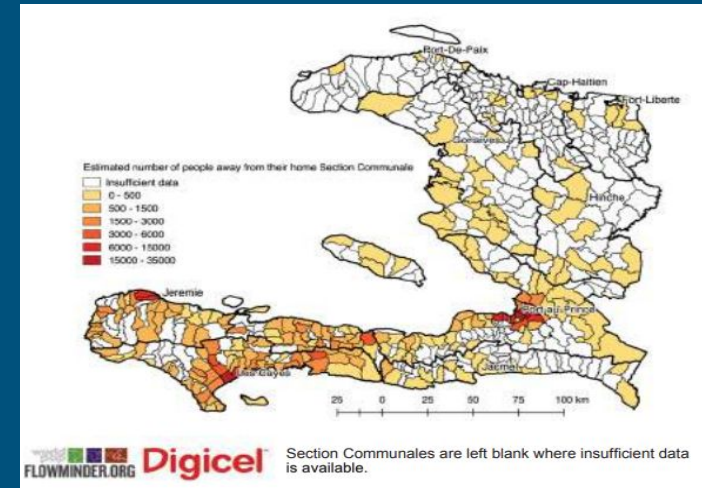
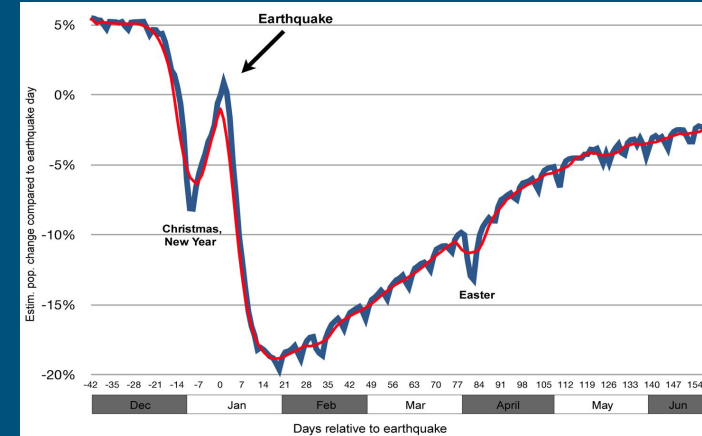
- Using mobile operator data, Flowminder /Digicel Haiti tracked population density/mobility after 2021 earthquake

2). Implementation

- Geographic positions of SIM cards were determined by the location of the mobile phone tower through which each SIM card connects when calling
- Included only the 1.9 million SIM cards that made at least one call both pre-earthquake and during the last month of study
- In Port-au-Prince, there were 3.2 people per given SIM card.

3). Results

- Nearly half of the relocated people (45,000 persons) were widely spread across 62 communal sections
- Estimated net outflow of people corresponded to 20% of the Port-au-Prince pre-earthquake population



Method 2 - Satellite Imagery

1). Background

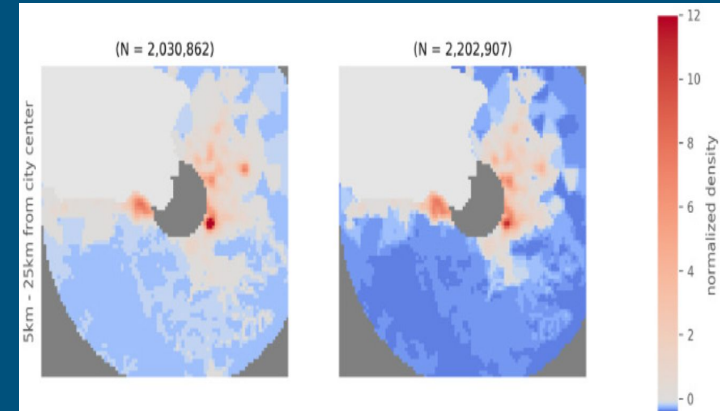
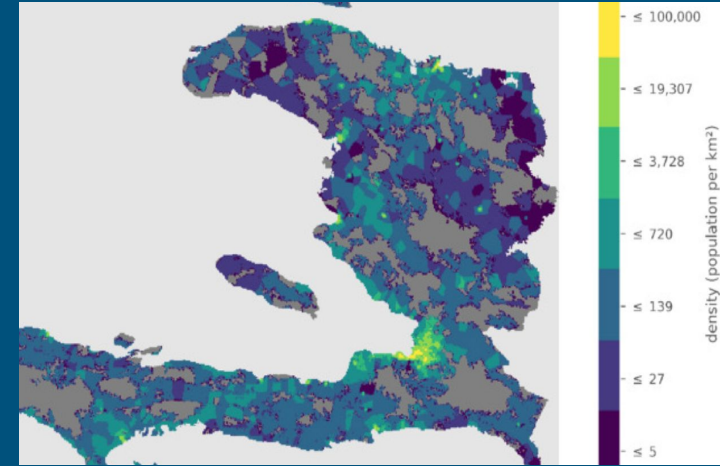
- Rapid urbanisation with the absence of economic growth has led to increasing socioeconomic challenges in Haiti, data is scarce

2). Implementation

- K-clustering = each pixel understood as a three-dimensional numerical vector,
- K-mean algorithm is then conducted (very complex)
- This work by assigning each pixel to the cluster whose vector is closest to the pixel

3). Results

- The center of Port-au-Prince increased up to 60,000 people per square kilometer during the evening hours
- Another urban area, Canaan, saw densities of between 10,000 and 15,000 people during the sampled time period, an ~ 1,800 rise from before quake



Research Gap and Error

A Unrepresented Population

- Study 1 used Digicel Haiti, with 2.2 million subscribers and a network that covers 90% of the inhabited areas, leaving other 10% not represented
- Only 61.6% of Haitian people have access to a smartphone (as of 2012), leaving out almost 40% of the population
- These statistics could result in skewed data, error, and population distribution numbers that are larger than expected



When disaster strikes in a burdened nation, how do those impacted respond and how can we effectively track population movement to direct response efforts?


Research Plan


Nationwide Census - Post Natural Disaster

- Instead of using phone data or satellite imagery, a simple online survey could be used.
- At the city hall of each municipality or in a designated area, computer systems could be set up and a backup paper survey could be available if the internet isn't working.
- This takes away the need for an electronic device or any device at all
- In order to get a proper turnout, some type of incentive could be put into place (most likely money) in order to incentivize Haitian citizens to come fill out the survey.



Example Survey - Population Mobility

 sjcooper01@email.wm.edu (not shared)
[Switch account](#)



Please write your full name

Your answer

What Department (State) were you in before the natural disaster?

Choose

What Department (State) are you currently in?

Choose

Submit **Clear**

Never submit passwords through Google Forms