

GEODESIGNING ST. RAPHAEL, HAITI

a case study



In Partnership with:



a presentation by Etta Jackson (ICGC) and Magali Regis (HIBISCUS)
January 28, 2015

Haiti

Some facts:

- Located in the Caribbean on the island of Hispaniola
- Occupies the west side of the island which it shares with the Dominican Republic
- Under Spanish control from 1492 to 1625
- French Colony from 1625 to 1804
- First Independent Nation in Latin America in 1804
- First black Republic in the world
- Capital: Port-au-Prince
- Area: 27,750 Sq. Km. (10, 714 Sq. Mi.)
- Population: 10 Million





- 501(c) 3 non-profit NGO in Special Consultative Status with the Economic and Social Council (ECOSOC) of the United Nations.
- **Our Mission:** Visualize, Analyze, Explain and Disseminate data to sustainable development plans universally accessible
- **Our Vision:** Fundamentally Change the Way Humanity Live In and Creates Its Environment
- **Our Goal:** To Build a Visual Framework to meet the UN's Sustainable Development Goals. Using Geographical Information Systems (GIS) technology and its related platforms such as geospatial service, remote sensing and geodesign to virtually design underdeveloped and developing countries.



HIBISCUS

Haiti Initiative for Building Innovative
and Sustainable Communities

- 501(c) 3 non-profit organization incorporated in the State of New York
- Multidisciplinary team of architects, engineers, urban planners and other professionals in related fields from Haiti and its global community
- Currently New York & Haiti-based
- Formed after the earthquake of 2010 to contribute towards the reconstruction and development of Haiti
- Committed to providing long-lasting design & planning solutions
- Initiate and develop viable, environmentally-focused projects for urban renewal & rural development to address the challenges of the urban and natural environment in Haiti



HIBISCUS

Haiti Initiative for Building Innovative
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**INSTITUTE FOR
CONSCIOUS
GLOBAL CHANGE**

A shared vision

for creating a comprehensive & sustainable plan in collaboration with
stakeholders on the ground to

lift people out of poverty and transform lives
from the inside out instead of from the outside in

To demonstrate how, with equal rights and opportunities for everyone, a
better world is possible.

SUSTAINABLE DEVELOPMENT GOALS



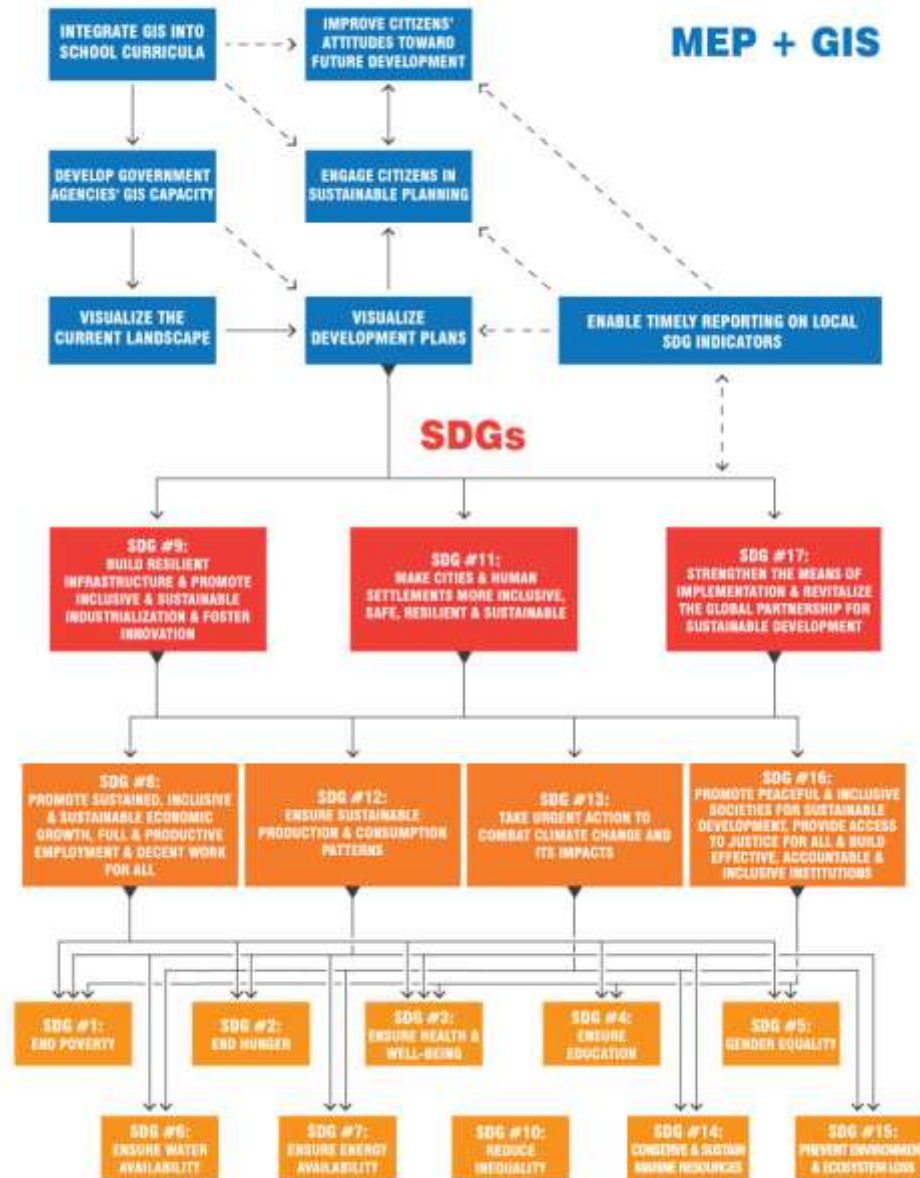
- Lay out a post-2015 agenda including 17 Goals and 169 Targets set up by the Open Working Group following the Rio+20 Conference
- The SDGs deal with issues including sustainable development, ending poverty and hunger worldwide, improving health and education and combating climate change
- A strategy that is universal in nature but local in application helps ensure no one will be left behind
- Create a governance structure in each country to allow for safety, justice and sustainability to take place

MEP PROJECT PROPOSAL



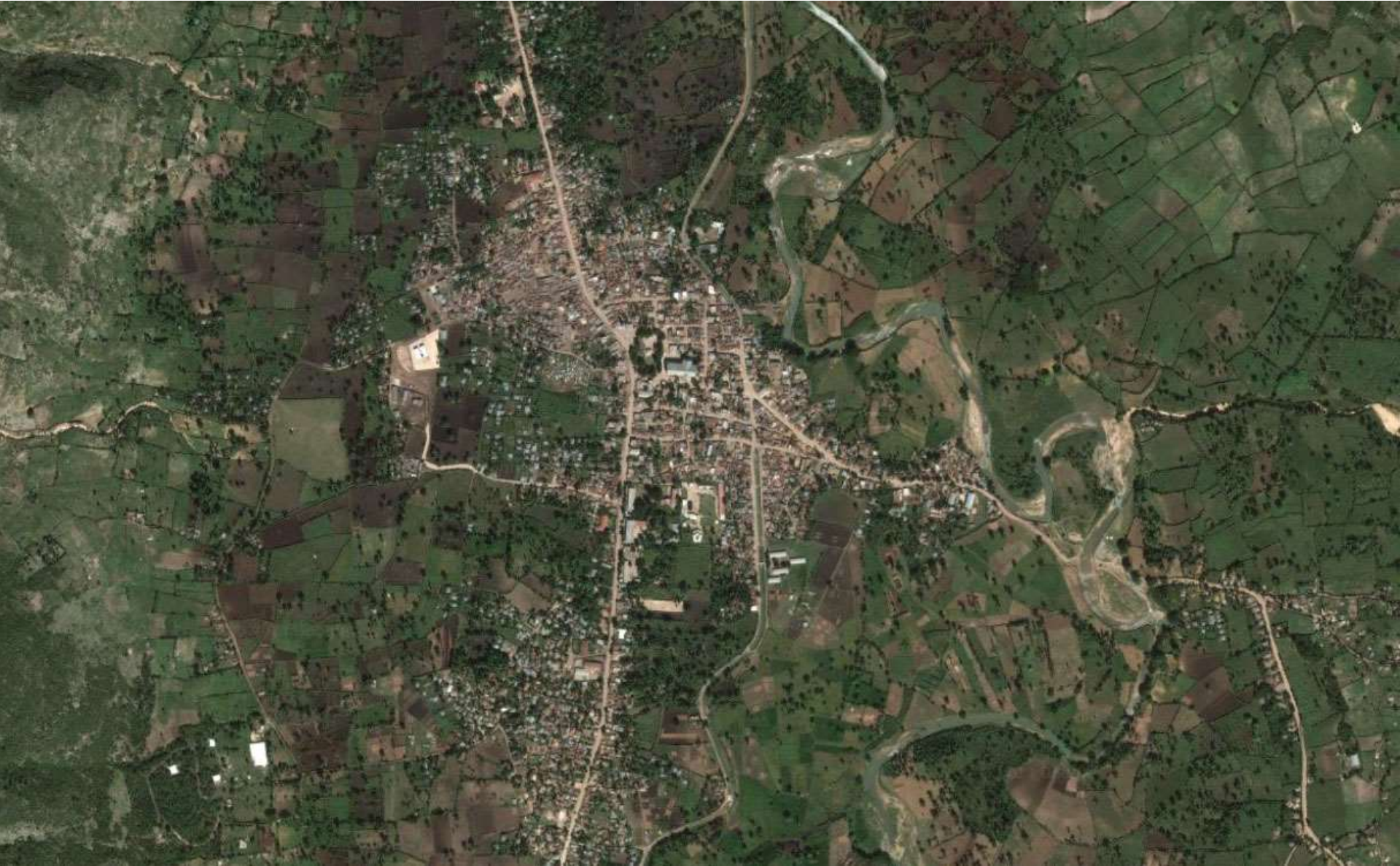
- Enable timely reporting of localized SDG indicators.
- Engage citizens in sustainable planning.
- Visualize current landscape.
- Visualize development plans.
- Integrate geospatial technology into school curriculum.
- Develop government agencies' capacity to maintain their GIS.
- Improve citizens' attitudes about future development plans.

MILLENNIUM EARTH PROJECT + SUSTAINABLE DEVELOPMENT GOALS



GEODESIGNING ST. RAPHAEL

a case study



WHY ST. RAPHAEL?



- Contact with National Center for Geospatial Information (CNIGC) in the Planning Dept. of Haiti who provided geo-spatial data for initial analysis
- Cooperation from the mayor of St. Raphael
- Photographs of St. Raphael with GIS coordinates
- St. Raphael represents a small prototypical town
- Data available from various sources (ESRI, Google Earth, Bing Maps, Haiti Data, Open Street Source)



ST. RAPHAEL facts

- Municipality as well as small town
- 48 kilometers from Haiti's second largest city, Cap Haitien
- Sits in a valley surrounded by high mountains
- Population – City of St Raphael: 13,000
Commune of St Raphael: 52,000
- Formal employment: 8% - (men 61%, women 39%) but Haitians are entrepreneurial in nature



ST. RAPHAEL current situation

- Most old growth forests long gone
- Highly eroded soils
- On-going effort to reforest
- Good irrigation system
- Predominantly agricultural economy
- Town has 24hr electricity
- Good telecommunication network
- Most houses have no indoor plumbing
- Many rivers, springs & creeks
- Water source in town: wells, cisterns
- No waste management facilities



ST. RAPHAEL



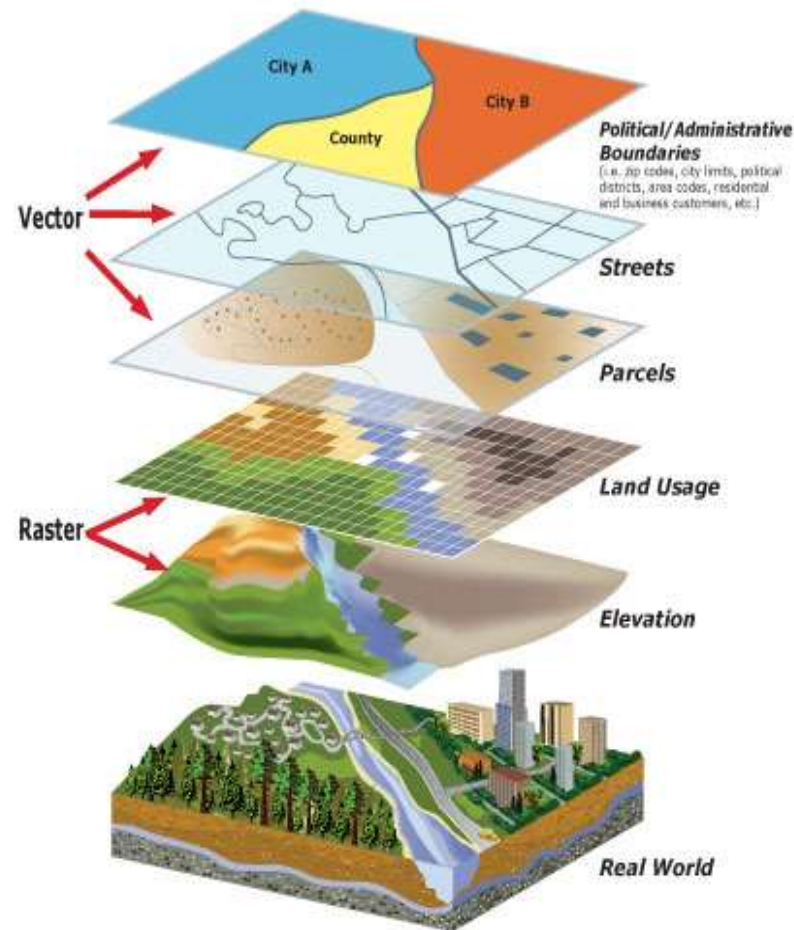
All photos have GPS coordinates

ST. RAPHAEL



GIS can provide DATA on:

- Geology
- Topography
- Environmental Factors (Weather Patterns, Flood Zones, etc)
- Roads (Width, Quality, etc)
- Agricultural Land + Production
- Building + Land Uses
- Population Demographics
- and much more...



OBJECTIVES OF GIS DATA

- Gather, Organize + Compile All Information (maps, graphs, charts, etc)
- Create different layers of information
- Look into the data to reveal stories and patterns (i.e. number of schools vs. education rate)
- Data Analysis + Local Reporting to help identify problems
- Using data + models to propose development opportunities
- Provide a vision for the future of San Raphael, an improved quality of life can be envisioned socially, environmentally and economically for everyone

EXISTING DATA SOURCES

haitidata.org

structures + buildings

haitidata.org/data/poidsdehti_structure_buildings_scm_2011021_polygones

File name: ht_structure_buildings_scm_2011021_polygones



Download raw data

Other formats: [Zipped Shapefile](#) [GML 2.0](#) [GML 3.1.1](#) [CSV](#) [Excel](#) [GeoJSON](#) [JPEG](#) [PDF](#) [PNG](#) [KML](#) [View in Google Earth](#)

Metadata: [TC211 Excel](#)

Legend

Maps

This layer is not currently used in any maps.

[Create new map](#)

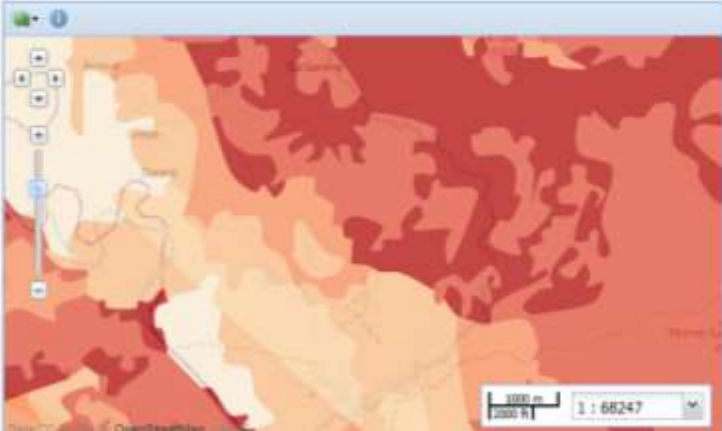
Styles

The following styles are associated with this data set. Click on a style to view it in the preview.

erosion

Title: Haiti Erosion, CNIGS [04.2008] - polygon

File name: ht_environment_erosion_polygon_042008



Download

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Other formats: [Zipped Shapefile](#) [GML 2.0](#) [GML 3.1.1](#) [CSV](#) [Excel](#) [GeoJSON](#) [JPEG](#) [PDF](#) [PNG](#) [KML](#) [View in Google Earth](#)

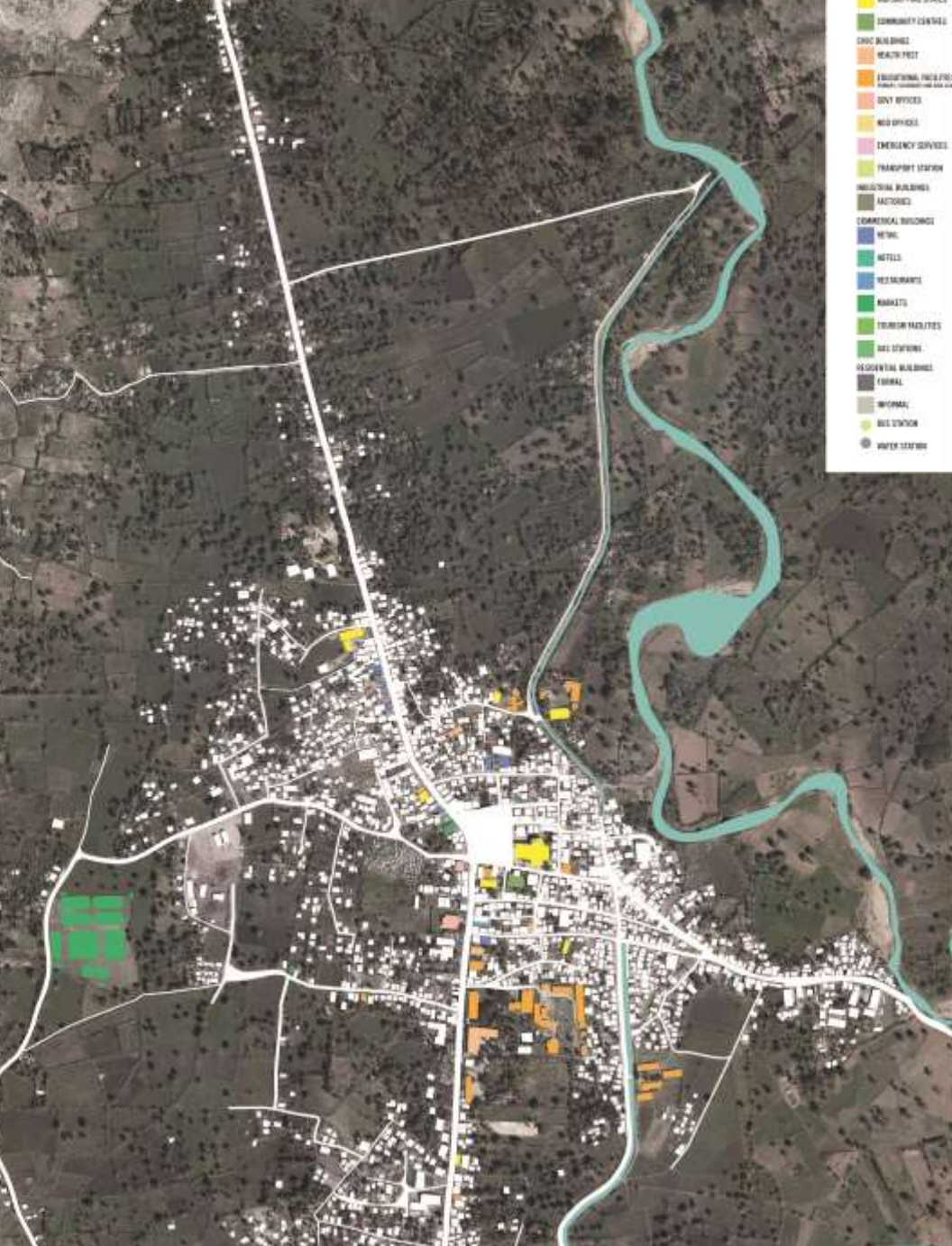
Metadata: [TC211 Excel](#)

Legend

- Risque nul ou très faible
- Risque faible
- Risque moyen
- Risque élevé
- Risque grave
- Risque très grave

Maps

The following maps use this data set.



Target: **ST. RAPHAEL**

We have been developing the concept phase for this city

They all interconnect to create a comprehensive and durable development plan

In this presentation we will illustrate how GIS technology can help transform this city.

- Data reveals relationships, patterns, & trends through the use of maps, reports & charts
- To allow stakeholders and interested citizens to develop better decision-making strategies



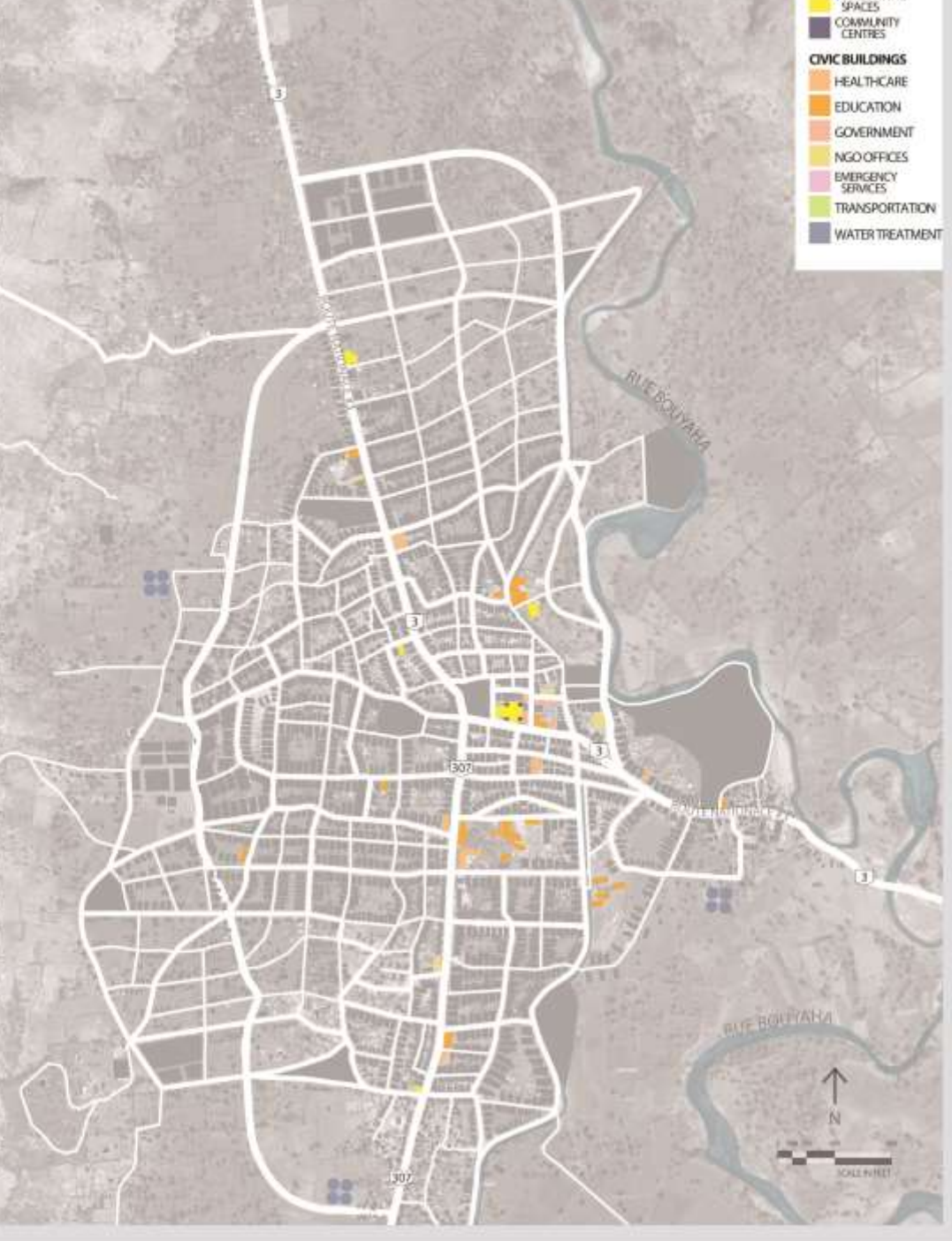
- GIS can identify existing certain commercial and industrial structures



- And can also project where it is best to develop retail corridors for maximum impact as well as where industrial zones can be implemented for the least impact and most efficiency



- GIS can identify existing religious, civic, educational buildings



- And can also show where it is necessary and appropriate to introduce more



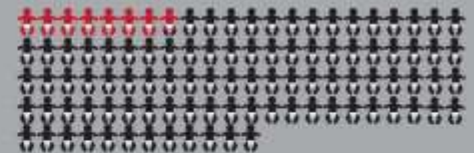
Goal #3:

Ensure Healthy Lives and Promote Well-Being for All at All Ages

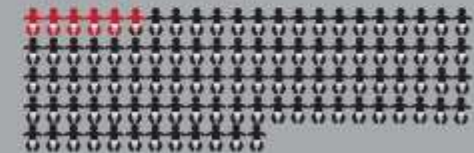
Current Conditions

As of 2014 Saint-Raphaël has one healthcare facility for a population of about 41,458

In 2012 Haiti's Under 5 Mortality Rate was 78 per 1,000 live births



and the Infant Mortality Rate (Under 1) was 57 per 1,000 live births

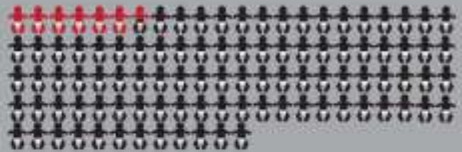




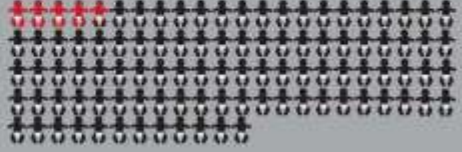
Goal #3: Ensure Healthy Lives and Promote Well-Being for All at All Ages

2020

By 2020 Haiti's Under 5 Mortality Rate must be reduced to 65 per 1,000 live births



and the Infant Mortality Rate (Under 1) must be reduced to 48 per 1,000 live births

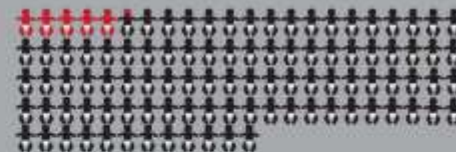




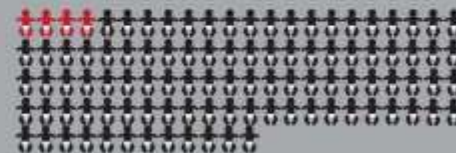
Goal #3: Ensure Healthy Lives and Promote Well-Being for All at All Ages

2025

By 2025 Haiti's Under 5 Mortality Rate must
be reduced to 52 per 1,000 live births



and the Infant Mortality Rate (Under 1) must
be reduced to 38 per 1,000 live births

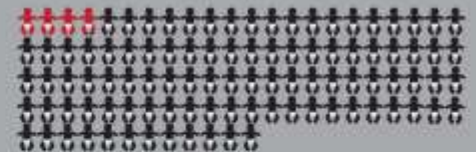




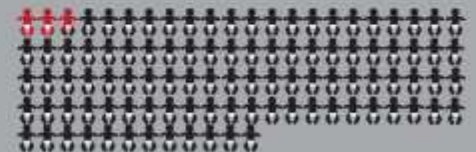
Goal #3: Ensure Healthy Lives and Promote Well-Being for All at All Ages

2030

By 2020 Haiti's Under 5 Mortality Rate must be reduced to 39 per 1,000 live births



and the Infant Mortality Rate (Under 1) must be reduced to 28 per 1,000 live births



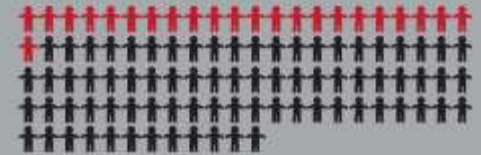


Goal #4:

Ensure Inclusive & Equitable Quality Education & Promote Lifelong Learning for All

Current Conditions

As of 2012 Primary School participation in Haiti sits at about 77%



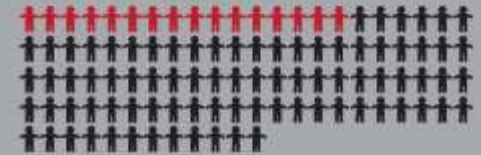


Goal #4:

Ensure Inclusive & Equitable Quality Education & Promote Lifelong Learning for All

2020

By 2020 Haiti's participation rate in Primary School should be about 84%



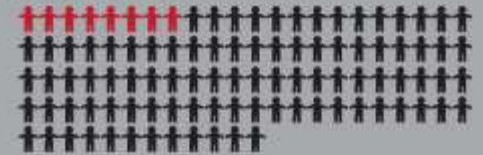


Goal #4:

Ensure Inclusive & Equitable Quality Education & Promote Lifelong Learning for All

2025

By 2025 Haiti's participation rate in Primary School should be about 92%



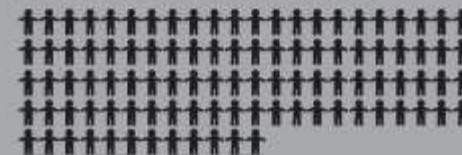


Goal #4:

Ensure Inclusive & Equitable Quality Education & Promote Lifelong Learning for All

2030

By 2030 Haiti's participation rate in Primary School should be at or near 100%





Goal #6:

Ensure Availability & Sustainable Management of Water and Sanitation for All

Current Conditions

Waterborne illnesses such as typhoid, cholera, and chronic diarrhea are the cause of more than half of the deaths in the country every year.



Goal #6:

Ensure Availability &
Sustainable Management of
Water and Sanitation for All

2020

As of 2012 only 85% of Haitians have access to improved water sources.



Goal #6:

Ensure Availability & Sustainable Management of Water and Sanitation for All

2025

With the addition of water treatment plants and wells, public access to clean water can be greatly improved.



Goal #6:

Ensure Availability & Sustainable Management of Water and Sanitation for All

2030

This will cut down on waterborne illnesses and greatly improve the quality of life for all Haitians.





CHALLENGES TO DEVELOPMENT IN ST RAPHAEL

- Chronic under-education of the population
- Inaccessibility to basic health care
- Very high rate of unemployment, particularly youth
- Loss of population control
- Inability to create wealth
- Considerable weakening of the local government
- Considerable environmental degradation
- Continuing impoverishment of the population
- Lack of professional or technical expertise
- Almost total dependence on the outside world

LAND OWNERSHIP

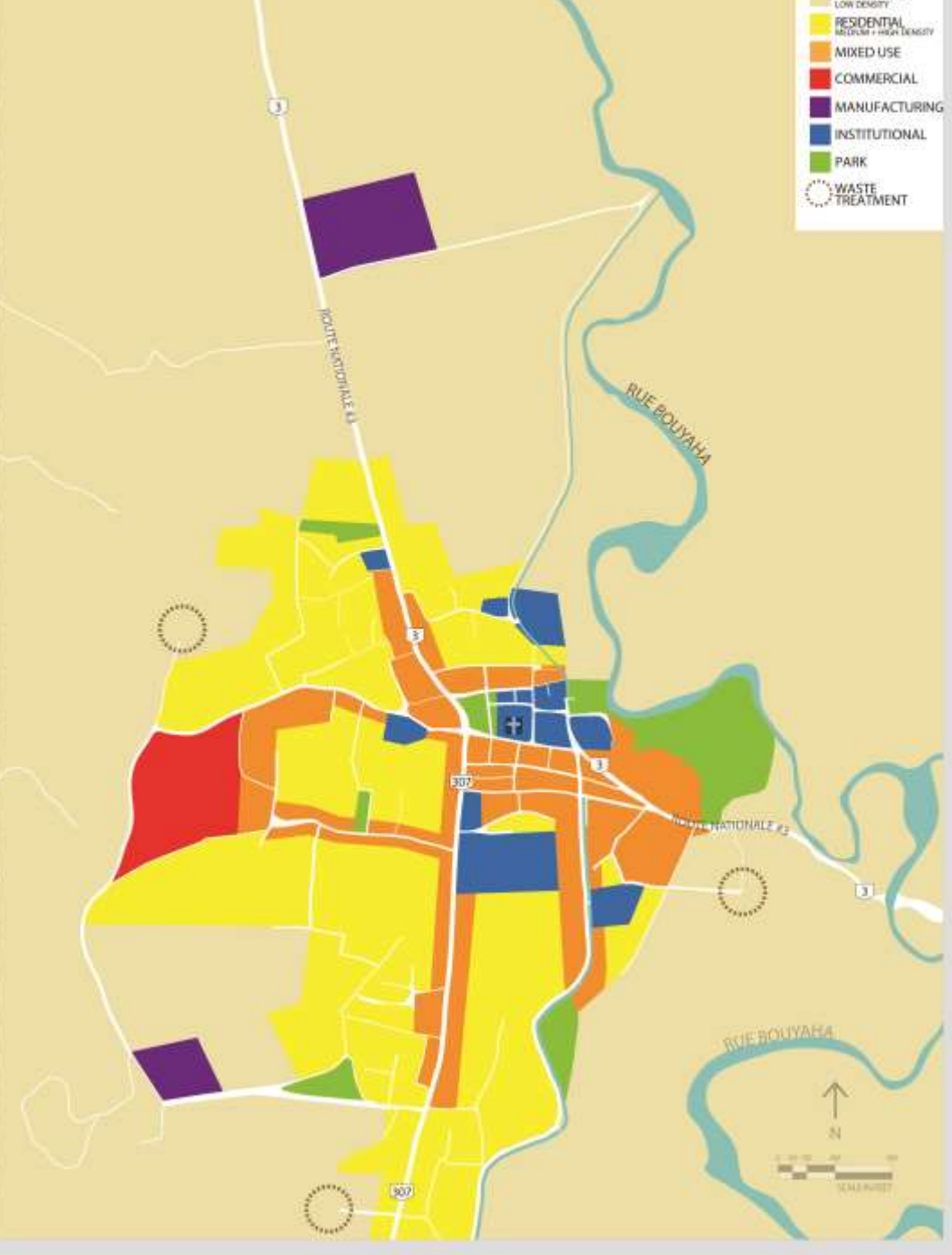
- Less than 5% officially recorded in registers of public lands
- Antiquated system of real estate property registration
- Land transmitted orally from one generation to another
- Uncertainty about land ownership means development plans at a stand-still
- Bank loans hard to obtain
- Countless deeds & land registry files destroyed in the earthquake
- Squatting problem / Land grabbing

LAND OWNERSHIP solutions

- Create a Bureau of Land Management responsible for modernizing/digitizing land ownership
- Government to legalize land documentation
- GIS as a tool to create modern web-based real estate database
- Government to create land ownership database showing state-owned land, corporations, institutions as well as individuals –indicating date of title transfers, taxes paid. Transparency is key

HOUSING CHALLENGES

- With 90% of its population unemployed or vastly under-employed, and terribly impoverished since the earthquake, the challenge is enormous
- To date, the government has proposed very few public housing
- Start looking at multi-family housing formulas
- Need for an architecture that responds to people's needs, culture, tradition, climate, economical factors
- Not replicate a gingerbread house today, but its essence



- Proposed zoning districts
- Mixed use districts along national roads
- Manufacturing at outskirts of town
- Introduce new parks



- Establish land ownership
- Propose new property subdivisions
- Introduce new roads along new residential blocks

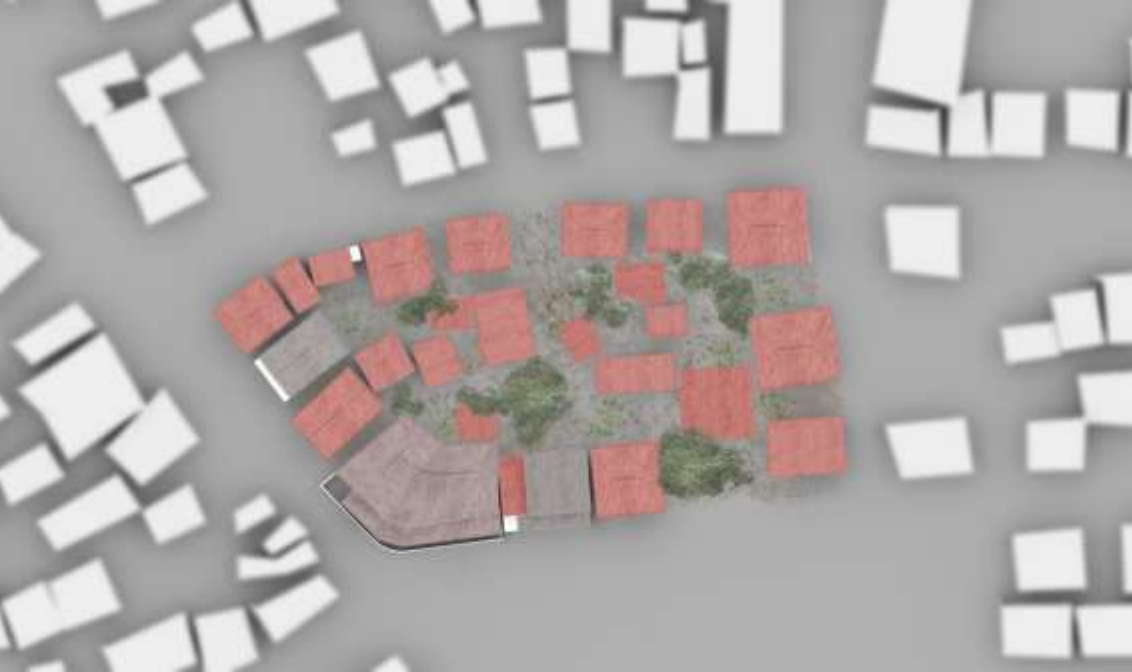
HOUSING



HOUSING



- Houses closely spaced
- No sufficient light and air
- Lacking rear yards
- Lacking personal space (tight living quarters)



Typical city block

- Existing condition vs possible intervention
- Consider higher density, additional streets for vehicular access, every home with a yard



ST RAPHAEL 2030

Existing Housing 2014



Possible Development 2030



EXISTING ROADS



- Primary roads:
national highways
- Secondary roads:
between properties
- Tertiary roads:
unpaved roads or
foot paths

CONCEPT PHASE
PROPOSED ROADS

SAINT-RAPHAËL
A MILLENNIUM EARTH PROJECT CASE STUDY



- As city grows, provide new highway extension to alleviate traffic
- Provide new roads between subdivided properties
- Establish two-way & one-way roads

EXISTING AND PROPOSED ROADS



- New roads along new block subdivisions
- New highways for alternate routes & alleviate traffic
- New secondary two-way roads for easier access to residential areas
- New one-way traffic roads

CONCLUSION

- Architecture & Urbanism are born of inspiration, history, culture, tradition, climate, available materials
- In Haiti, added to the above: social factors, security concerns, cost of materials
- Construction industry will continue to be influenced by available materials
- Create houses that fit the needs of the people of Haiti
- New buildings will continue to evolve based on current trends and construction technologies
- Need for Innovative designs making clever use of local materials to reduce reliance on imported products
- Establishment of industries to provide locally made building materials
- Architecture schools to play a role in shaping the architecture of a place
- Haitian construction industry to incorporate reforestation and agriculture as important aspects of urban planning

Thank You!



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GLOBAL CHANGE**



HIBISCUS

Haiti Initiative for Building Innovative
and Sustainable Communities

ST. RAPHAEL cathedral



ST. RAPHAEL market



ST. RAPHAEL cemetery



ST. RAPHAEL tribunal



ST. RAPHAEL schools



ST. RAPHAEL hotel



ST. RAPHAEL health clinic



ST. RAPHAEL fiscal office



ST. RAPHAEL police station



ST RAPHAEL money transfer office



ST RAPHAEL

a stroll through town



ST RAPHAEL

a stroll through town



ST RAPHAEL

a stroll through town



ST RAPHAEL

a stroll through town



ST RAPHAEL

a stroll through town



ST RAPHAEL housing



ST RAPHAEL housing

