Kingston & St. Andrew EbA Profiles

Name: Luke Buchanan
EbA - Ecosystem based adaptation

• Use of biodiversity and ecosystem services to help people adapt to the effects of climate change.

• Ecosystem services:
  – provide potable water, food, medicine etc
  – regulating services which control our climate, disease vectors, crop pests, pollinators
  – cultural services that influence our beliefs, traditions

• Main impacts of Climate Change in cities:
  – Heat waves, droughts, storms etc
  – Flooding (coastal and inland)
  – Water scarcity
  – Increase and spread of tropical diseases

• The aim of this project activity is to reduce the vulnerability of urban communities through ecosystem-based adaptation options
## Datasets

<table>
<thead>
<tr>
<th>DATA</th>
<th>SOURCE</th>
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</thead>
<tbody>
<tr>
<td>POPULATION &amp; DERIVATIVES</td>
<td>STATIN</td>
</tr>
<tr>
<td>BUILDING LOCATIONS</td>
<td>MGI</td>
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<tr>
<td>WATER QUALITY</td>
<td>WRA</td>
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<tr>
<td>FACTORY LOCATIONS</td>
<td>MGI-JAMNAV</td>
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<tr>
<td>POVERTY</td>
<td>PIOJ</td>
</tr>
<tr>
<td>EMPLOYMENT</td>
<td>MIN LABOUR</td>
</tr>
<tr>
<td>POIs</td>
<td>MGI</td>
</tr>
<tr>
<td>ROADS</td>
<td>MGI-JAMNAV</td>
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<td>NWC</td>
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<tr>
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<td>WRA</td>
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<td>NWC</td>
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<td>GULLIES</td>
<td>NWA</td>
</tr>
<tr>
<td>GULLY FEEDER AREA</td>
<td>MGI</td>
</tr>
<tr>
<td>FLOODS</td>
<td>MGI</td>
</tr>
<tr>
<td>COASTAL TYPOLOGIES</td>
<td>MGI</td>
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City Growth

Population Change

Building Change – 2001-2016

COMMENTARY:
Pattern of growth has been to the west of Kingston. Increased pattern of high density developments (residential and commercial), with greater intensity of activities. Kingston has shown depopulation in certain communities within the metropolitan area, but some efforts and regentrification and redevelopments have slowed declines in other areas, including growth in some. Pattern of encroachment on surrounding hills of city.
# CITY GROWTH METRICS

<p>| | |</p>
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<tbody>
<tr>
<td><strong>POPULATION 2001</strong></td>
<td>648,878</td>
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<tr>
<td><strong>POPULATION 2011</strong></td>
<td>661,473</td>
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</table>
| **GREATEST % INCREASE IN POPULATION** | • ARCADIA  
• RED HILLS  
• FOREST HILLS |
| **GREATEST % DECREASE IN POPULATION** | • UNIVERSITY  
• RAE TOWN  
• KINTYRE |
| **BUILDINGS – 2001** | 89,300           |
| **BUILDINGS - 2016** | 93,145           |
| **GREATEST % INCREASE IN BUILDINGS** | • DALLAS  
• MARYLAND  
• GOLDEN SPRING |
Water Quality Impacts

Nitrates and Factories

Factory locations – all categories

High nitrate concentrations in groundwater

Nitrates and Sewage Lines

Sewer lines

COMMENTARY:
High groundwater pollution in areas with dense populations, high industrial activities and little or no sewerage service. Of note, regulations more tightly govern industrial effluent discharge. Use of treated wastewater effluent is also being proposed to provide artificial recharge and flushing of the aquifer. Most of urban area sits on quaternary alluvium aquifer.
WATER QUALITY: COMMUNITY METRICS

<table>
<thead>
<tr>
<th>Communities with Highest Nitrate Concentrations</th>
<th>Riverton</th>
<th>Ferry</th>
<th>New Haven</th>
<th>Cooreville Gardens</th>
<th>Seaview Gardens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities with Highest Population Density: Distance to Sewage Line Ratio</td>
<td>Rockfort</td>
<td>Beverly Hills</td>
<td>Bull Bay</td>
<td>Hope Pastures</td>
<td>August Town</td>
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Uneven distribution of vulnerable people, with correlation between poverty and employment levels; there is also a relationship with educational attainment.
Vulnerable Places

**POI Count**

**POI Diversity**

**COMMENTARY:**
POI concentrations mainly in CBDs, OBDs and along critical corridors. CBDs have greatest concentrations of wide ranges of POI categories. Industrial (and educational areas) have high numbers but low category diversities.
## VULNERABLE PEOPLE AND PLACES

### METRICS

| Communities with Highest Poverty         | • Majesty Gardens  
|                                         | • Southside  
|                                         | • Rose Town  
|                                         | • Denham Town  
|                                         | • REMA  
| Communities with Highest Unemployment   | • Delacree Park  
|                                         | • Penwood  
|                                         | • Tivoli Gardens  
|                                         | • Grants Pen  
|                                         | • Jones Town  
| Communities with Highest POI Count       | • HWT  
|                                         | • New Kingston  
|                                         | • University  
|                                         | • Cross Roads  
|                                         | • Central Downtown  
| Communities with Highest POI Category Diversity | • HWT  
|                                         | • New Kingston  
|                                         | • Liguanea  
|                                         | • Cross Roads  
|                                         | • Constant Spring  |
INFRASTRUCTURE

TRANSPORT

WATER SUPPLY

COMMENTARY:
Major transportation corridors and critical facilities lie along coastal zone, including only major artery to eastern Jamaica. KSA has fairly diverse sources of water, including piped water from outside the city, though some of these are from surface water systems prone to drought impacts. This is augmented by water from different well sources, and supported by a network of community storage tanks and two large reservoirs. There are challenges, however, with the efficiency of the delivery of water city-wide, with leakage and theft.
**DRAINAGE AND FLOODING**

**GULLY NETWORK**

Gully catchment area

**FLOODS**

Historical floods

**COMMENTARY:**

Gully networks are channelized from natural drainage lines for the KSA. Most historical floods in the city are the result of blocked drains, or where an event exceeded the capacity of the drainage network to remove the water. In some cases, areas are affected by upstream runoff, which may have higher amounts and velocities owing to increased development. Downstream drainage have not been upgraded to handle increased flows. Localized cleanup efforts are common, but do not address systemic issues.
Coastal City

Coastline Types

COMMENTARY:
Coastline has three main types – natural mangroves, gravelly beaches, and engineered coastlines (reclaimed structures for airport runway, port berths, city waterfront and revetment works). Coastal flooding extents vary according to city topography, with furthest inland extents to the west, extending over 8km inland in some places.

Coastal Flooding

Coastal flooding extent – 0-5 to 10m
# FLOODING METRICS

## Communities Most Vulnerable to Coastal Flooding (by Area)
- Seaview Gardens
- Southside
- New Haven
- Riverton
- Cooreville Gardens

## Communities with Most Overall Flood Occurrences (1834-2019)
- Central Downtown
- New Haven
- Harbour View
- Port Royal
- Constant Spring

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**Floods, by Decade**

![Floods by Decade Graph]