Using Geospatial Techniques to Compare Real Estate Potential of Two Residential Manmade Islands: Reef Island and Amwaj Islands in the Kingdom of Bahrain

Presented by:
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Kingdom of Bahrain
• 665 km$^2$ (257 sq mi); land reclamation, the land area increased to 780 km$^2$ (300 sq mi)

• Archipelago of 33 islands, extensive land reclamation projects increased the number to 84 (as of 2008)

• Desert plain - highest point 134 m (440 ft)

• 2014 population estimated at 1,300,000 – Density 1,626.6/km$^2$
Study Area
Study Area
Study Area: Amwaj Islands

The Amwaj Islands are a group of six man-made islands off the coast of Bahrain.

Offers residential, entertainment and educational opportunities.

waterfront villas, high rise apartments, and garden homes.

Freehold land ownership is permitted by the Kingdom of Bahrain.

Single bedroom apartments start at 100,000 Bahraini Dinars (256K USD)
Amwaj Islands is a development built on a vision of returning waterside living to the people of Bahrain.

Amwaj Islands is a development built on a vision of returning waterside living to the people of Bahrain. Amwaj Islands combines residential, commercial and retail space in a 4sq/km community situated off the coast of Bahrain near Muharraq and just 15 minutes from the capital, Manama.
Study Area: Reef Island

An Island of Bliss in the heart of the City

PRESS RELEASE

THE ICON TOWER

The intricate fusion of Far Eastern design with a contemporary spirit creates a magical exterior where each building is a work of art with unmatched craftsmanship. The Master Planner has shaped the island as an icon for residential developments in Bahrain...

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Study Area: Durat Al Bahrain
Study Area: Durat AL BAHRAIN
Rational of the Study

• First step to prepare a basic approach for Real Estate Agents (in Bahrain) to get used to geospatial techniques to produce Comparative market Analysis

• Demonstrate the added value of such basic techniques by comparing Amwaj Islands vs Reef Island (and Durat Al Bahrain Islands)

• Explore the relation between Manmade Locations and Market trends
High Spatial Resolution (1 m) from Google Landsat 8 OLI (05-April-2014)
## Results

### Water (blue)
- Vegetation (green)
- Developed Area (grey)
- Bare Land (Yellow)

### Sea Surface Temperature (°C)
- Blue ≈ 20 (°C)

### Waterfront Main and Service Roads
- Dural Al Bahrain
- Reef Island
- Amwaj Island
## Results

<table>
<thead>
<tr>
<th>Island</th>
<th>Developed area (Sq. Km)</th>
<th>Bare Land (Sq. Km)</th>
<th>Vegetation (Sq.Km)*</th>
<th>Total Area (Sq. Km)</th>
<th>% of Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amwaj Island</td>
<td>1.9</td>
<td>1.4</td>
<td>0.2</td>
<td>3.3</td>
<td>58%</td>
</tr>
<tr>
<td>Reef Island</td>
<td>0.35</td>
<td>0.33</td>
<td>0.03</td>
<td>0.68</td>
<td>51%</td>
</tr>
<tr>
<td>Durat Al Bahrain</td>
<td>2.18</td>
<td>8.62</td>
<td>0.3</td>
<td>10.8</td>
<td>20%</td>
</tr>
</tbody>
</table>
Results

<table>
<thead>
<tr>
<th></th>
<th>Waterfront (km)</th>
<th>Road Length (Km)</th>
<th>Total Area (Sq. Km)</th>
<th>Waterfront Ratio</th>
<th>Road Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amwaj Island</td>
<td>27.18</td>
<td>30.719</td>
<td>3.3</td>
<td>8.24</td>
<td>9.31</td>
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<tr>
<td>Reef Island</td>
<td>5.597</td>
<td>3.859</td>
<td>0.68</td>
<td>8.23</td>
<td>5.68</td>
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<tr>
<td>Durat Al Bahrain</td>
<td>63.79</td>
<td>27.216</td>
<td>10.8</td>
<td>5.91</td>
<td>2.52</td>
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</tbody>
</table>
## Results

### Travel Distance to Main Destinations (km)

<table>
<thead>
<tr>
<th></th>
<th>KSA Bridge</th>
<th>Airport</th>
<th>Asfar bridge*</th>
<th>BDH</th>
<th>Salmanyah</th>
<th>Education Area</th>
<th>Recreational Area</th>
<th>Shopping Area</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amwaj Islands</td>
<td>41</td>
<td>7</td>
<td>35</td>
<td>31</td>
<td>17</td>
<td>26</td>
<td>45</td>
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<td>12</td>
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<td>17</td>
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</table>
Results

Travel Time to Main Destinations (mn)

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<td>Amwaj Islands</td>
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<tr>
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<td>39</td>
<td>35</td>
<td>39</td>
<td>50</td>
<td>325</td>
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</tbody>
</table>
Results

- **Amwaj Islands**: 600 Sale Density, 100 Rent Density
- **Reef Island**: 250 Sale Density, 100 Rent Density

Legend:
- Blue: Sale Density (unit / Sq. km)
- Red: Rent Density (unit / Sq. km)
Basic geospatial techniques were applied easily to retrieve essential information (% of development, Waterfront Ratio, Road Density, etc)

Free RS data is available and can be applied in such projects

Google Earth was used to calculate TTMD (mn) and TDMM (km)

Amwaj Islands is developed to nearly 58%, Reef Island 51% and Durat Al Bahrain 20%.

Amwaj Islands and Reef Island have similar WFR and RD, 8.2 Km/Sq.km (5.9 for Durat Al.)

Amwaj Islands has the most road density of 9.31 km/sq.km vs 5.68 km/sq. km for Reef Island

Both Amwaj Islands and Durat Al Bahrain preserve low SST compared to Reef Island

Amwaj Islands has a TTMD close to Reef Island (230 mn vs 186 mn) which may explain that even far from Manama (capital) but still has a higher rent density of 600 unit / sq. km (vs 250 in Reef Island)
Acknowledgment

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Thank you for your attention