Assessment of socioeconomic vulnerability to SLR: Case study Damietta, Egypt

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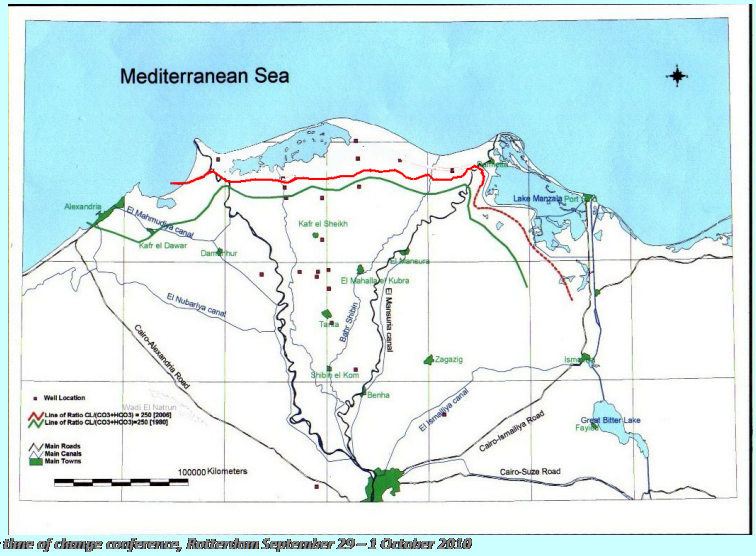
Objective

- This study intends to assess and quantify vulnerability to sea level rise in in Damietta governorate, through which the paper aims at identifying most vulnerable locality of the study area.

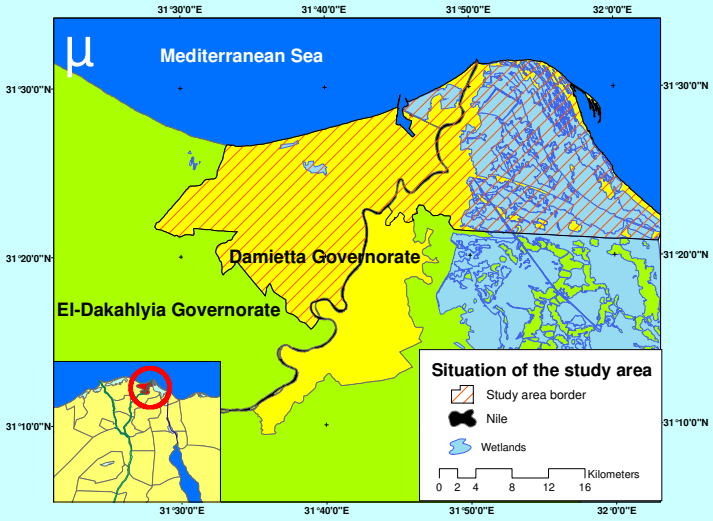
General situation of the study site



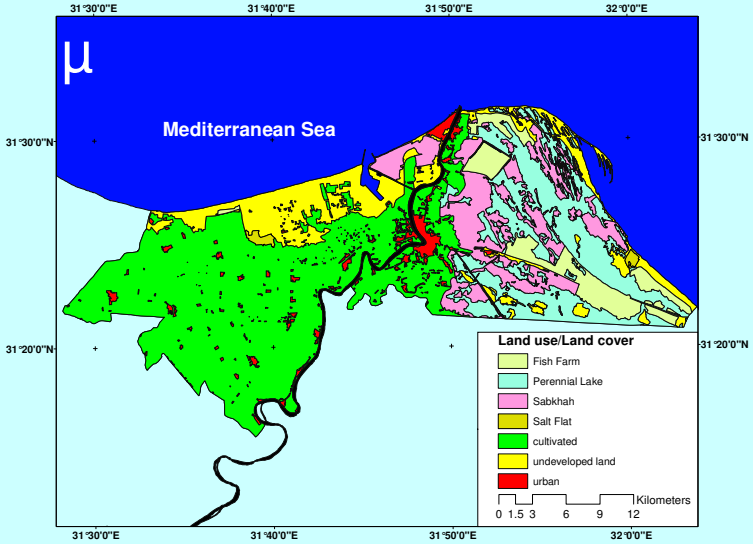
Methodology

1. Establish baseline conditions in the study area
2. Sea Level Rise estimation
3. Review SLR impacts
4. Conduct population projection up to 2050
5. Carryout land use/land cover projection
6. Identify SLR impacts in the study area
7. Develop a vulnerability index for each locality in the study area

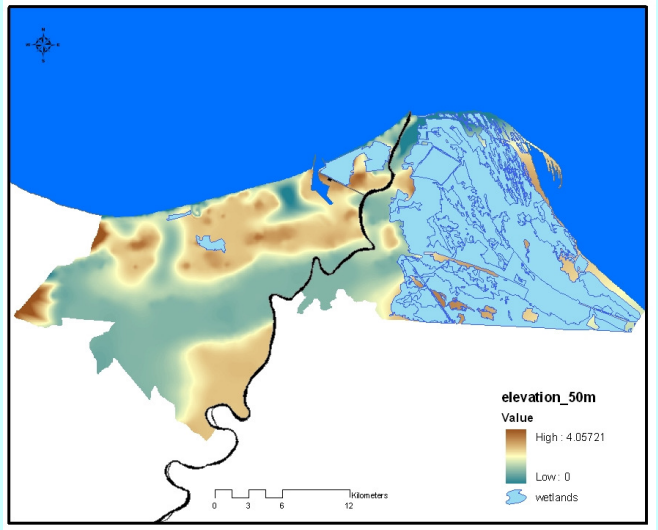
1. Establish baseline conditions: Study area situation



Land use / land cover in the area



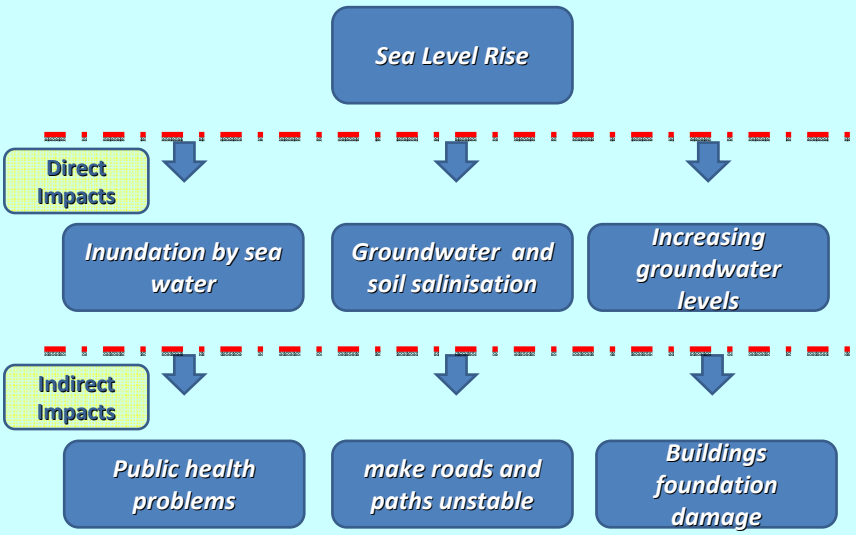
Study area: Elevations



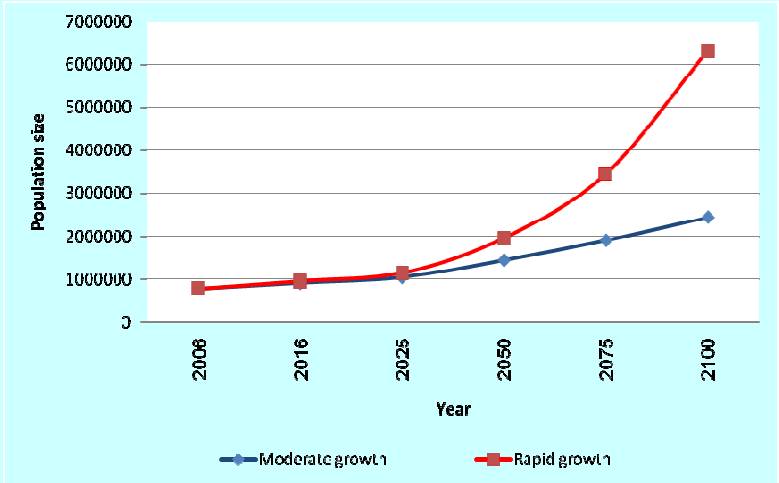
2. Estimating Sea Level Rise in the study area

- ***SLR scenario:*** Global models predict sea levels rising from about 10 to 30 cm by 2050 and 18 to 59 cm by the year 2100
- ***Land subsidence:*** A study by Delft Hydraulics and Coastal Research Institute CoRI revealed that the annual subsidence rate at Gamasa and Ras El Bar areas ranges between 2.5 and 3.0 mm, respectively.
- ***Overall*** for the Nile Delta coastal area ranges between 0.25 and 0.45 cm by 2050

Sea level rise impacts



4. Demographic projections



5. Land use/land cover projection

- This projection is made assuming two scenarios:

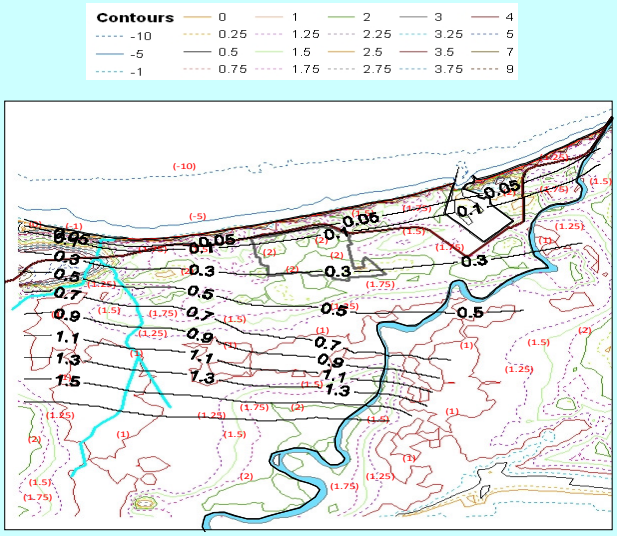
1. Dispersed patterns of development (uniform rates of expansion in all built-up areas)
2. Concentrated patterns of development (expansion of built-up area will be concentrated in urban centres)

This means overall four scenarios (2 population growth scenarios & 2 land use/land cover scenarios)

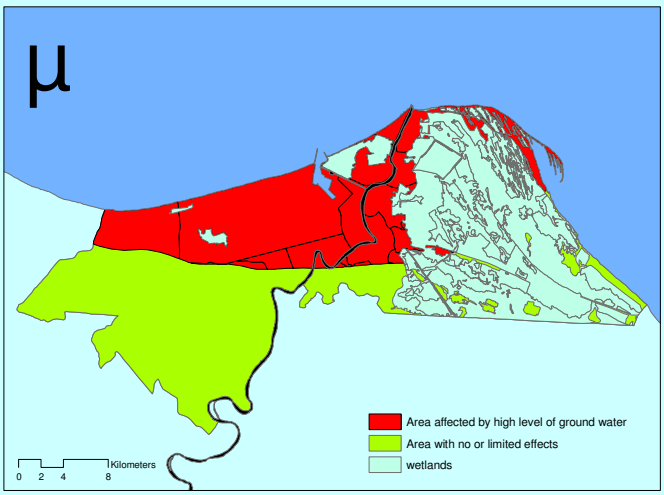
Land use/land cover projection

	Dispersed pattern of development		Concentrated patterns of development	
Year	Built-up area (Km2)	Agricultural land (Km2)	Built-up area (Km2)	Agricultural land (Km2)
2050	48.13	320.38	77.28	278.55
2100	81.62	289.9	29.82	208.94

6. Identify SLR impacts: Inundation and groundwater



Impacts of groundwater in the study area



7. Develop vulnerability index

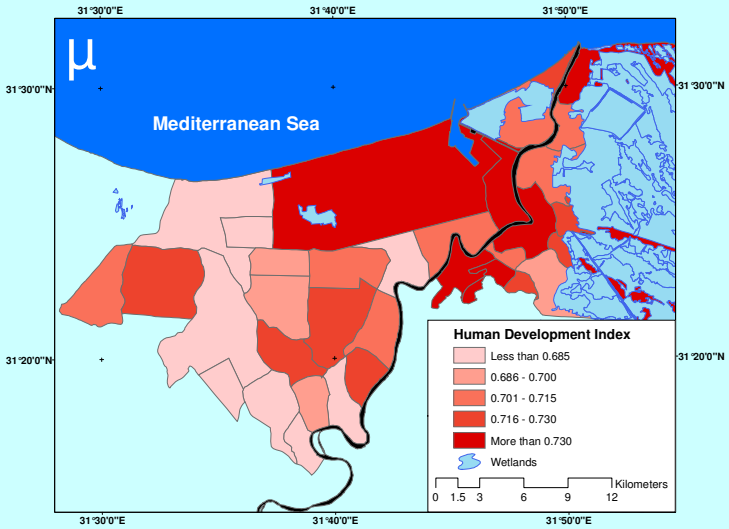
Composite vulnerability index:

- affected area in each locality,
- projected population,
- built-up area in each locality by 2050; and
- Human development index

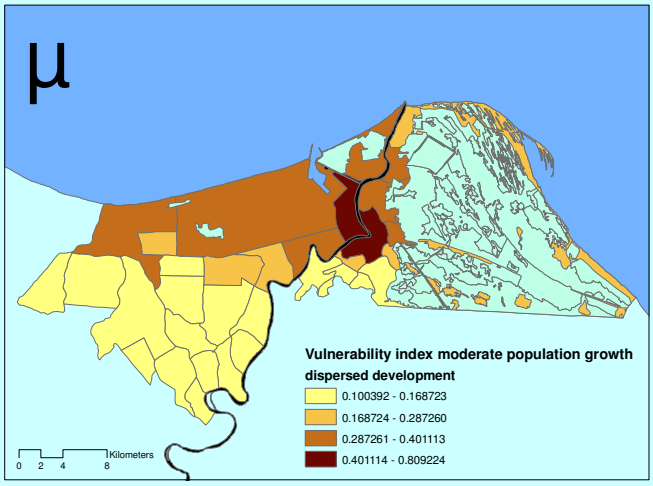
The index was calculated according an equal weighing scheme :

- Vulnerability index= (0.25* affected area index) + (0.25* built-up area index) + (0.25 * projected population size) + (0.25 *(1 - HDI))

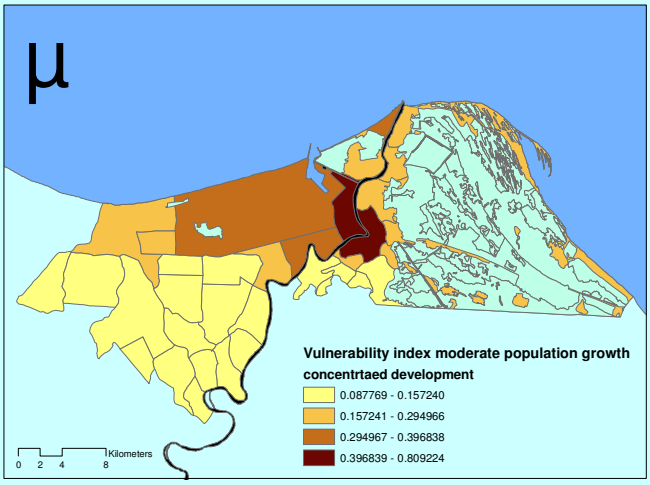
HDI in various localities



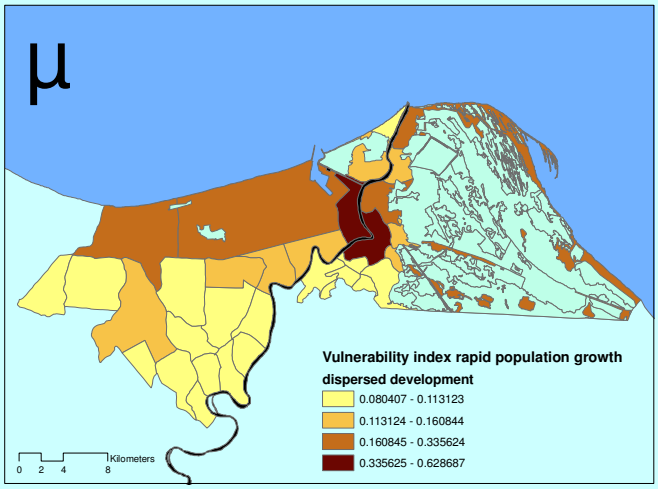
Vulnerability index: moderate growth and dispersed development



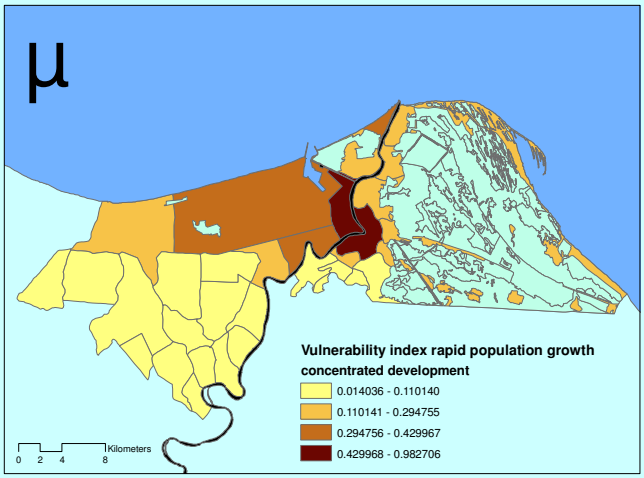
Vulnerability index: moderate growth and concentrated development



Vulnerability index: rapid growth and dispersed development



Vulnerability index: moderate growth and concentrated development



Next steps

- Assessing socioeconomic vulnerability at each locality through field surveys
- Economic valuation of SLR impacts
- Economic assessment of potential adaptation options

Thank you