

## Coastlines and Sea Level Rise



Eric Meidell  
Nathaniel Witmer

## Reiteration of Main Points

- Every country in the world will be affected directly or as a result of the consequences of sea level rise
- Sea level could rise as much as 1 meter over next century
- The effects of rising sea level are:
  - Inundation of coastal land
  - Worldwide agricultural losses
  - Salinization of aquifer
  - Depletion of coastal forests
  - 150 million environmental refugees by 2050
- \$300 billion US predicted economic loss for 1 meter rise

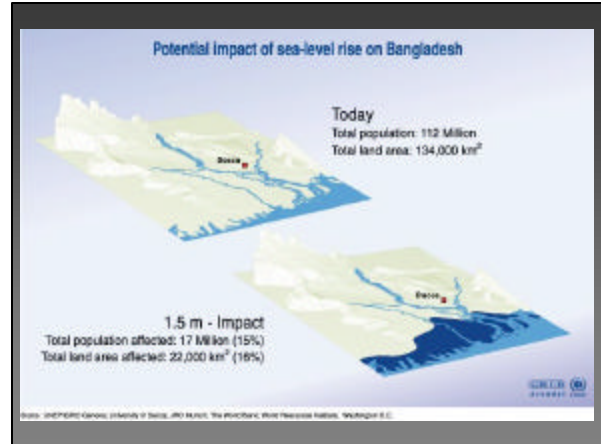
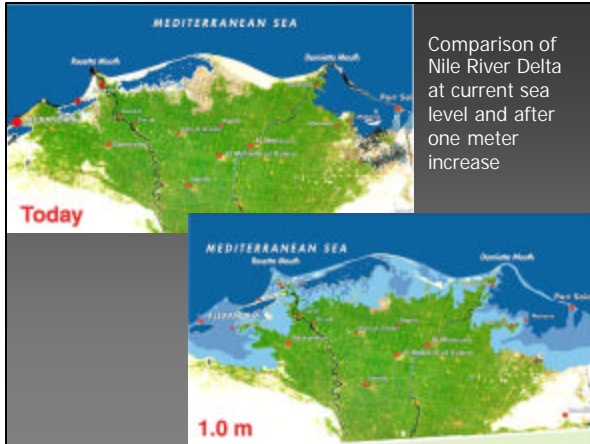
## Clarification and Additional Information

- Many coastal zones will suffer greater harm from intensified storm surges
- Higher sea level along with intensified storm surges will significantly increase coastal erosion
- Entire low-lying islands may be eliminated or rendered uninhabitable
  - 1 million people have already fled islands in the Pacific and Indian oceans
  - Entire island ecosystems may be eradicated

## Clarifications and Additional Information Cont'd

Areas at great risk to 1 meter rise:

- Egypt
  - 6 million people displaced
  - 12-15% agricultural land loss
- Bangladesh
  - 13 million people displaced
  - 16% national rice crop reduction
- China
  - 72 million people displaced
  - Tens of thousands of hectares of agricultural land loss



## Adaptive Actions

- Retreat
  - Relocation of at risk population
  - Allows coastal zone and ecosystem to advance landward
  - Costs: lost property and resettlement expenses
- Accommodation
  - Alternative use of land adjusting to higher sea level
  - Includes raising buildings on pilings, alternative agriculture
  - Costs: damage from storms and modification of infrastructure
- Protection
  - Construction of barriers such as sea walls, dikes and dunes
  - May have adverse environmental impacts
  - Costs: erecting defensive structures

## Potential Issues

- Developed countries may want to distance themselves from coastal problems of poorer nations
  - But developed nations contribute much of the GHG emissions, should contribute to solution
- Landlocked countries may consider themselves immune to the coming problems
  - Agricultural losses and environmental refugees will have global impact
- Some nations may be dubious of true imminence of sea level rise
  - Now is the time for preventative action before serious catastrophes arise

## International Cooperation

- Sea level rise can be largely attributed to the green house gas emissions of developed countries
- All contributing countries should share the economic burden of adaptive costs
- An international fund should be created with contributions proportional to the per capita GHG emissions of each country
- Reductions of contributions and/or carbon credits may be allowed to countries that provide adaptive technology (i.e. dikes, pumping stations) to countries in need

## Sources

- Strategies for adaptation of sea level
  - <http://www.epa.gov/GAR/gar/sealevelrising.pdf/content/ResourcesCo-ntentByResourceID/20090101.htm>
- Potential impacts of climate change
  - <http://www.usace.army.mil/sea-level-rise/>
- Potential Impacts of Sea-Level Rise on Populations and Agriculture
  - <http://www.usace.army.mil/sea-level-rise/>
- Alternative Treaties
  - <http://ghgintl.org/treaties/at-02.htm>
- Science Museum
  - <http://www.sciencemuseum.org.uk/exhibits/climatechange/cipd/232.asp>