Vulnerability to climate change and natural disasters of Tunis, Alexandria and Casablanca

Asmita Tiwari, The World Bank, November 2009
Main urban and climate issues

• MENA coastal cities home to over 60m, 100m by 2030, or 1/3 of all urban pop.
• Coastal cities are among the largest and most productive urban agglomerations
• MENA is second most affected region by SLR, high water stress already present
• Increasing temperatures (2C), decreasing precipitation and runoff expected by 2030
Alexandria, Tunis, Casablanca

- 2-year study to a) assess vulnerability to climate change and natural disasters; and b) prepare adaptation action plans, by December 2010

- Study co-financed by NTF-PSI, TFESSD for CC, by GFDRR for the natural disasters component, and by two Regional Country Departments
Study Methodology

- **Phase I - Vulnerability Assessment**
  - SLR, flooding, water resources, ambient temperature and seismic risk assessment

- **Phase II - Adaptation and Preparedness Plans**
  - Urban Planning, Physical investments for housing and infrastructure upgrading, Institutional Preparedness and cost/benefit analysis

- Collaboration / consultation with national/local authorities
Assessment 1. SLR, Coastal Erosion and Storm Surges

- Uncertainty as to amount of future SLR
- Manifest signs in all cities of SLR, erosion
- Loss of beach-front threatening economy, neighborhoods
- Increasing episodes of storm surges
Assessment 2: Urban Flooding

- Increasing frequency, intensity of urban floods in all cities
- Huge losses to urban economies
- Drainage systems overwhelmed
- Lethal combination with storm surges
Assessment 3: Water scarcity

- Decreasing rainfall causing watersheds to reduce provision
- Increasing urban consumer demand
- Water-tables threatened by salinization, SLR
- Nile flow at risk of profound mid-term changes
Assessment 4: Ambient temperature

- Increasing ambient temperatures causing intense heat island
- Worsening air pollution and ground ozone formation
- Elevated impacts on public health via heat waves mortality
Assessment 5: Earthquakes, Tsunamis

- Devastating episodes during this decade in Morocco, Tunisia
- All cities located in earthquake-prone areas
- Record of past tsunamis: Casablanca and Alexandria
- Probabilistic risk assessment required
Adaptation 1: Urban Planning

- All cities populations to expand by 2030:
  - Tunis by 40%,
  - Casablanca by 60%
  - Alexandria by 70%

- Areas at high risk will be identified, avoided

- Adaptation actions to be proposed for other areas
Adaptation 1: Urban Planning

- Area of cities:
  * Greater Tunis Region – 300,000 Ha
  * Greater Casablanca Region – Waliya- 122,000 Ha
  * Alexandria – 230,000 Ha
Adaptation 2: Infrastructure

- Design of coastal marine defenses
- Harbor structures and logistics platforms
- Waste water treatment, power plants
- Drainage systems and pumping stations
- Built environment retrofitting
Adaptation 3: Preparedness

- Early warning systems
- Civil protection readiness
- Emergency response and evacuation plans
- Public information and awareness
- Institutional coordination
Early responses: Alexandria

- Main risk: SLR, coastal erosion, and storm surges (submersion)
- Construction of coastal corniche (25 km) has worsened problems
- Pressure from real-estate sector to build over urban lakes and wetlands
Early responses: Tunis

- Main risk - SLR, coastal erosion, and storm surges (submersion)
- Maritime defenses being studied and built, still insufficient
- Urban drainage systems being upgraded
- Very large urban redevelopment plans threaten additional urban load
Early responses: Casablanca

- Main risk - Flooding due to urban runoff
- Urban drainage systems being improved upstream and within city
- Significant investments in reducing water leakages
- Coastal zone threatened by urban development with few controls
Study Status

MILESTONES
- June 2009: Marseille Research Symposium cities participation
- Inception Report done
- February 2010: vulnerability assessments
- March 2010 – Local workshops
- Dec. 2010: action plans completed- Regional workshop

FOLLOW-UP
- Mediterranean network on CCC
- Possible financing of urban investments in participating cities
- Replication of approach in other MENA coastal cities
Study Website
http://www.egis-bceominternational.com/pbm

The main purpose of this web-based project portal is to facilitate the exchange of information between the various project stakeholders and ensure a permanent access to the latest information related to the project.

This project, financed by the World Bank and other partners, aims to:
- assess the climate change and natural disaster vulnerabilities of 4 urban areas in North Africa: Alexandria (Egypt), Tunis (Tunisia), Casablanca and Bouregreg Valley (Morocco)
- formulate action plans to improve their adaptation to climate change and preparedness to natural disasters.