



ENVIRONMENTAL DEGRADATION, REMEDIAL AND AVERTED COST (EDRAC) IN NORTHERN LEBANON COASTAL ZONE

EGM on Environmental Economic Accounting, ESCWA Region

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Cost of Environmental Degradation COED/EDRAC: What's the objective?

- The COED/EDRAC is a quantitative tool that helps derive order of magnitude by: valuing environmental degradation and proposing investments to reduce environmental degradation
- The COED/EDRAC helps optimize the trade-offs between economic development and growth; population well being; and the preservation of the commons
- The COED/EDRAC helps decision-makers make informed and efficient choices to maintain the integrity of the environment and promote conservation based on a common denominator: monetizing or valuing environmental degradation, averted and remedial costs

COED/EDRAC Environmental Categories

- **Water** Degradation (Inadequate Water Supply, Sanitation, Hygiene)
- **Air** Pollution (indoor and outdoor, urban and industrial air pollution and GHG)
- **Land** Degradation Agricultural Soil/Land Degradation
- **Waste** Management (Inadequate Waste Collection to landfilling)
- **Coastal Degradation** (natural resources, urban, tourism, and others)

What is included in a COED/EDRAC? Methodologies & Data Sources

Health Impacts

- *Urban Air Pollution and Indoor Air Pollution:*
 - Dose response functions and Risk Ratios from international studies
- *Inadequate Water-Sanitation-Hygiene:*
 - Household surveys and health statistics (Mortality and morbidity)
 - Averted Behavior

Bottled water consumption: Sales statistics;
Boiling of drinking water (surveys; energy cost);
Filtering of drinking water (Equipment cost)

Methodology

Natural Resources & Land

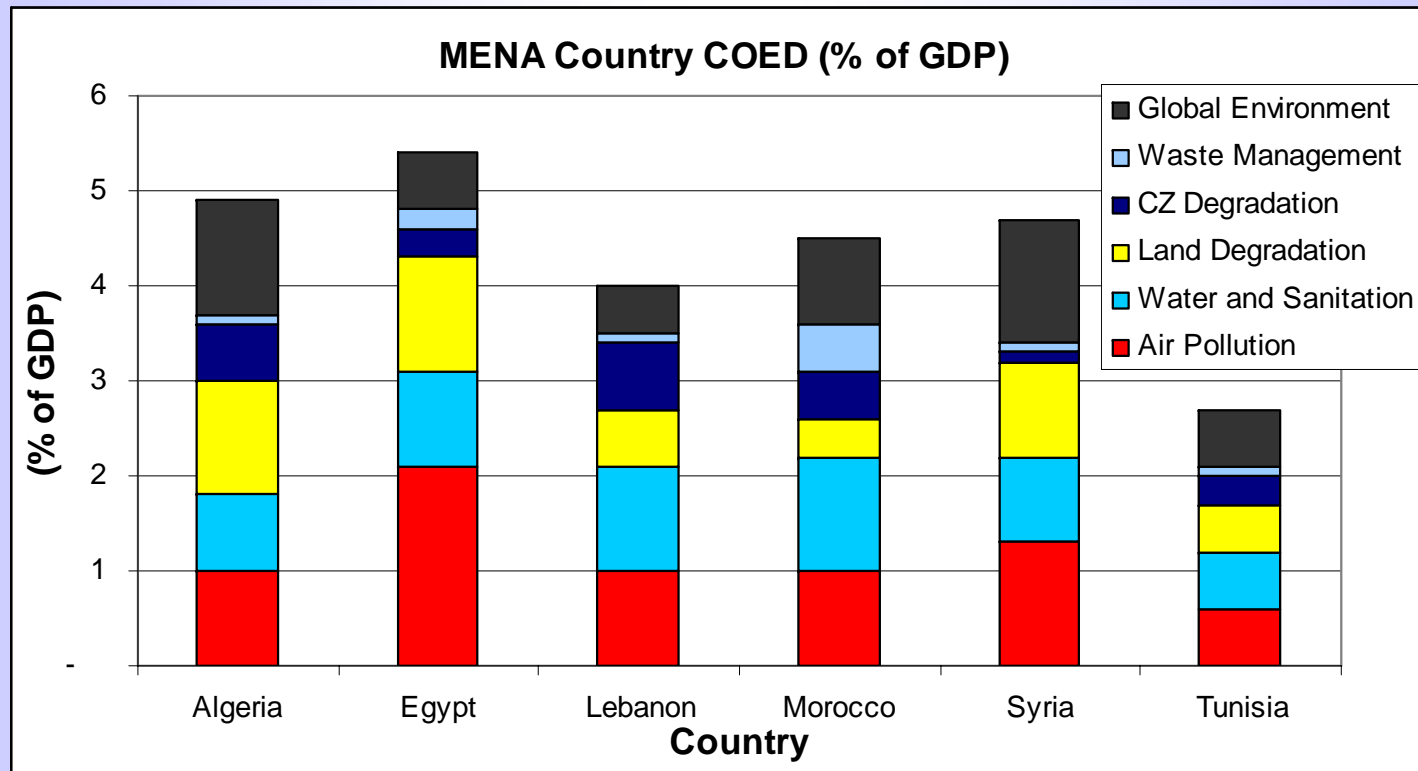
- *Agricultural Land Degradation*
 - Yield effects of salinity (cross-section regression analysis; yield response coefficients)
 - Yield effects of erosion (cross-section regression analysis; results from survey and field tests)
- *Loss in Fishery*
 - Decline in production of specific species
- *Wetland Degradation*
 - Size of drying up wetlands (hectares)
- *Climate Change Vulnerability and Natural Disaster risks*

Scope of COED Studies

- Country COED
- Coastal Zone COED
- Sector Specific COED
- Case specific COED: e.g. Lebanon 2006
Cost of Hostilities including the Jiyeh Oil Spill
(2007)

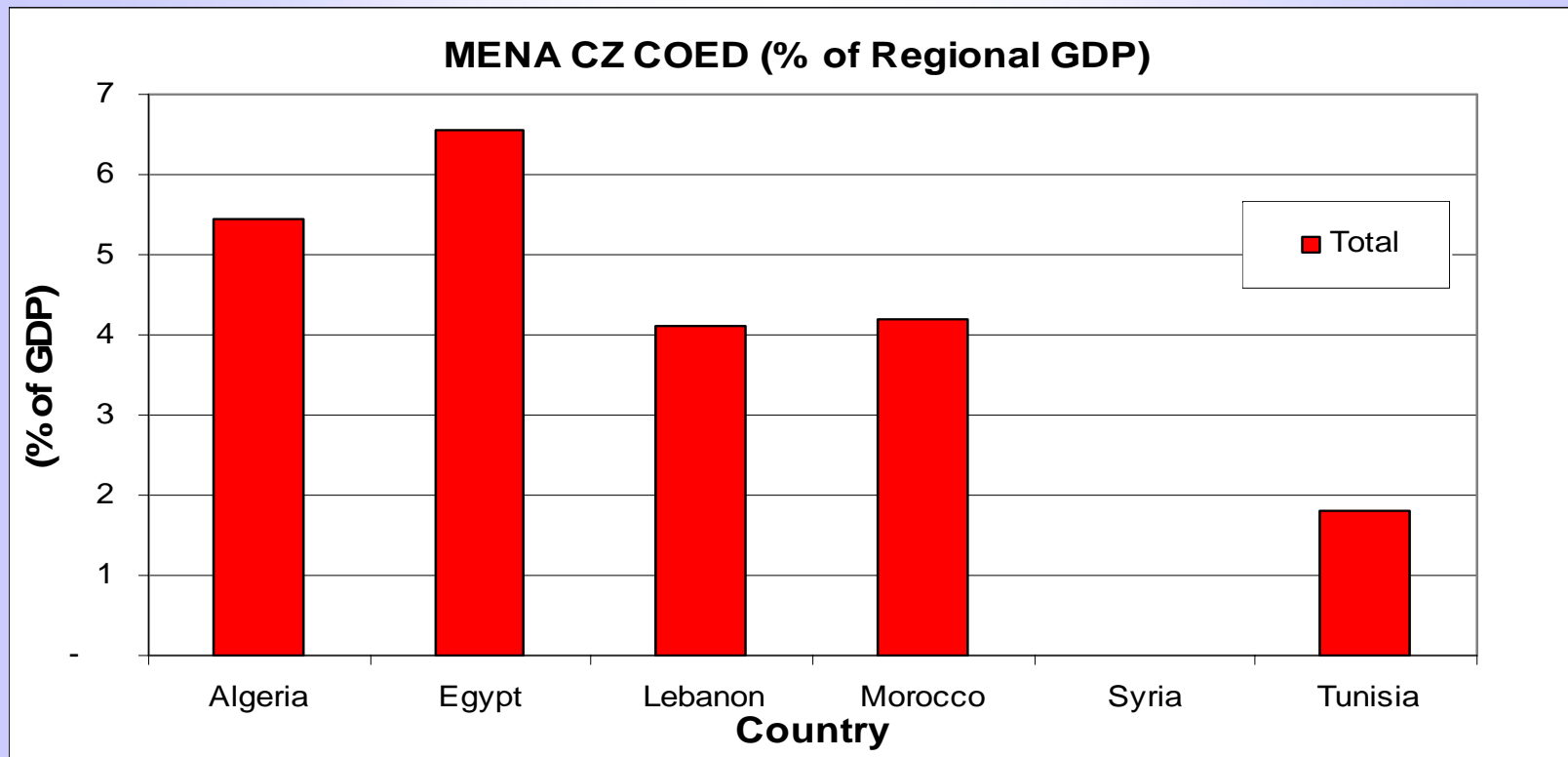
Cross-Country COED Results

Average Annual COED (percentage of GDP)



Cross-Country CCZED Results

Average Annual CCZED (percentage of GDP)



Note: Difficult to harmonize by category.

Analysis of Results and Data

- Variations in COED estimates seem to be larger within (e.g., Coastal Zones) than across countries (implications for regional environmental management)
- Data constraints most serious for natural resource related issues
- COED results need to be complemented by setting up a Forum for stakeholder dialogue that will help reach a consensual arbitrage for environmental preservation and conservation

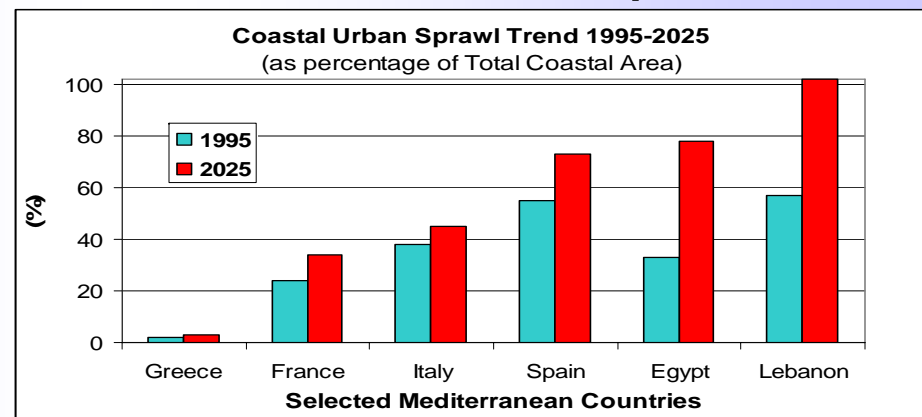
Lebanon Coast Case: Background

The Lebanese Coast is characterized by:

- Drivers: growth-trade-globalization nexus, poverty, urbanization, population, tourism, etc.
- Competing uses along the narrow corridor: urbanization; tourism; industrialization; fisheries, multimodal transport corridor, conservation, etc.
- Pressures: urban sprawl and artificialization; mass tourism; industrial, urban and energy emissions and discharges; overfishing; water pollution and agricultural runoffs; ecosystem service fragilization, etc.

Background

- Potential climate change vulnerability and natural disaster risks
- Unresolved Public Maritime Domain violation
- Artificialization reached $\pm 45\%$ of the total coast with a $+2\%$ growth pa (MoE)
- Internal migration to the coast
- Potential offshore gas extraction will require coastal infrastructure



Background

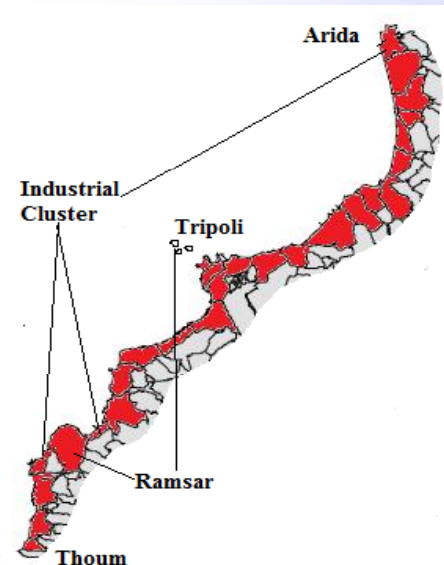
There is however a number of opportunities to improve the coastal management:

- The land use planning (Schema Directeur) was approved in 2009
- The CDR is about to launch a CZ Action Plan
- Lebanon is bound by Regional Laws which are not fully complied with: Barcelona Convention and the ICZM Protocol, Horizon 2020, Union for the Mediterranean, etc.

Objective and Study Scope

Gauge the political economy of improving the management of the northern coastal zone by:

- Valuing the coastal environmental degradation, remedial and averted cost
- Help Decision-Makers to make Efficient and Informed Choices



SMAP III
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University
of
Balamand

Drivers and Pressures

Coastal Population: 413,000 to 567,000

Density: 1,080-7,855 population/km²

Northern Population 1997-2030: +41%

GDP net growth: +6% (04) +2% (05-11)

Urbanization: 74%; air, solid/liquid waste

Modal Transport: roads, ports and airport

Industrialization: cement, fertilizers & plastic

Trade: Tripoli port serving the hinterland

Tourism: 42 beaches, resorts and hotels

Fisheries: unsustainable practices

Extraction: salt marshes: a dying activity

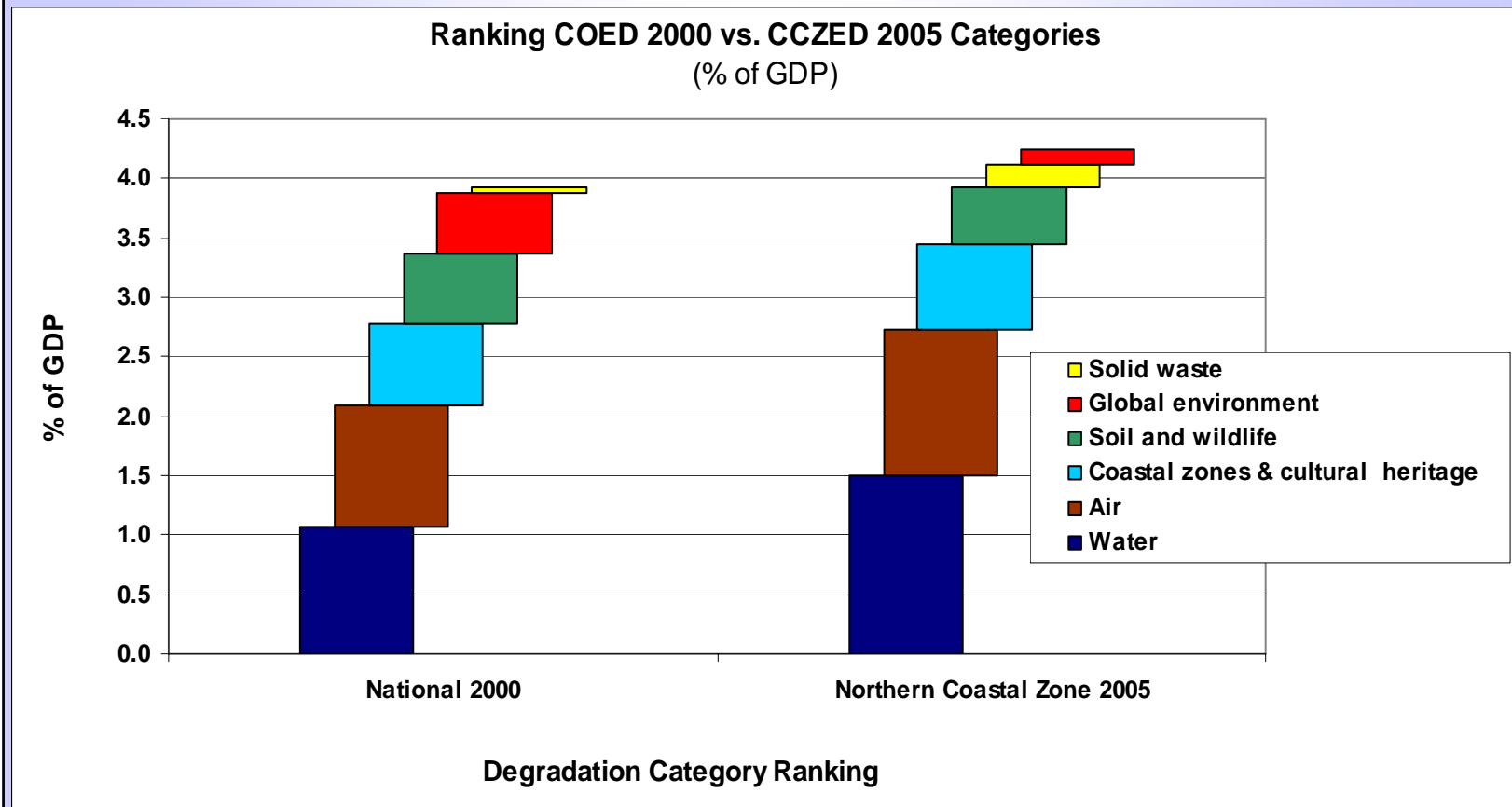
Agriculture: land erosion, water quality

Watersheds: municipal effluents; runoff

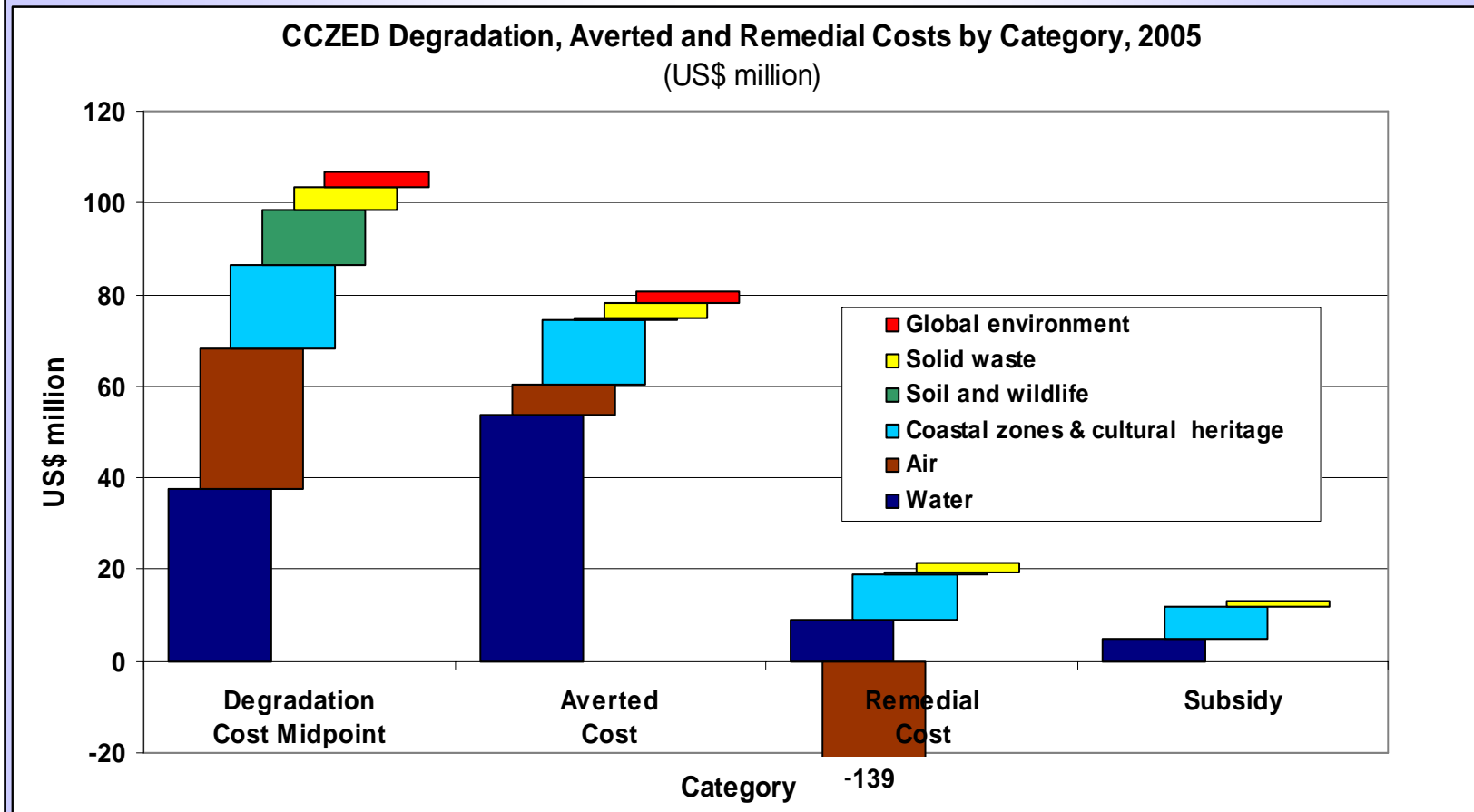
Mountain: deforestation; terrace collapse



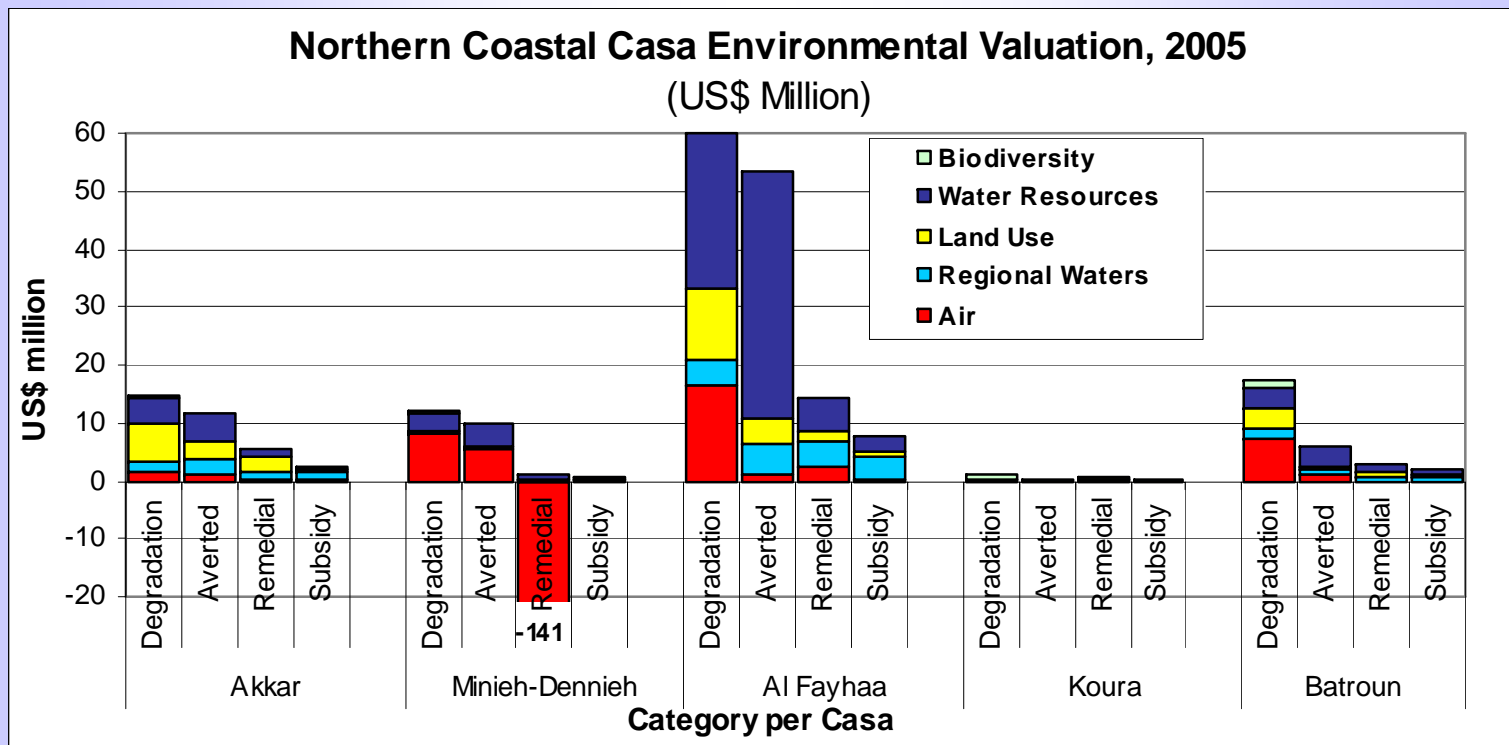
Aggregate Results: % of GDP



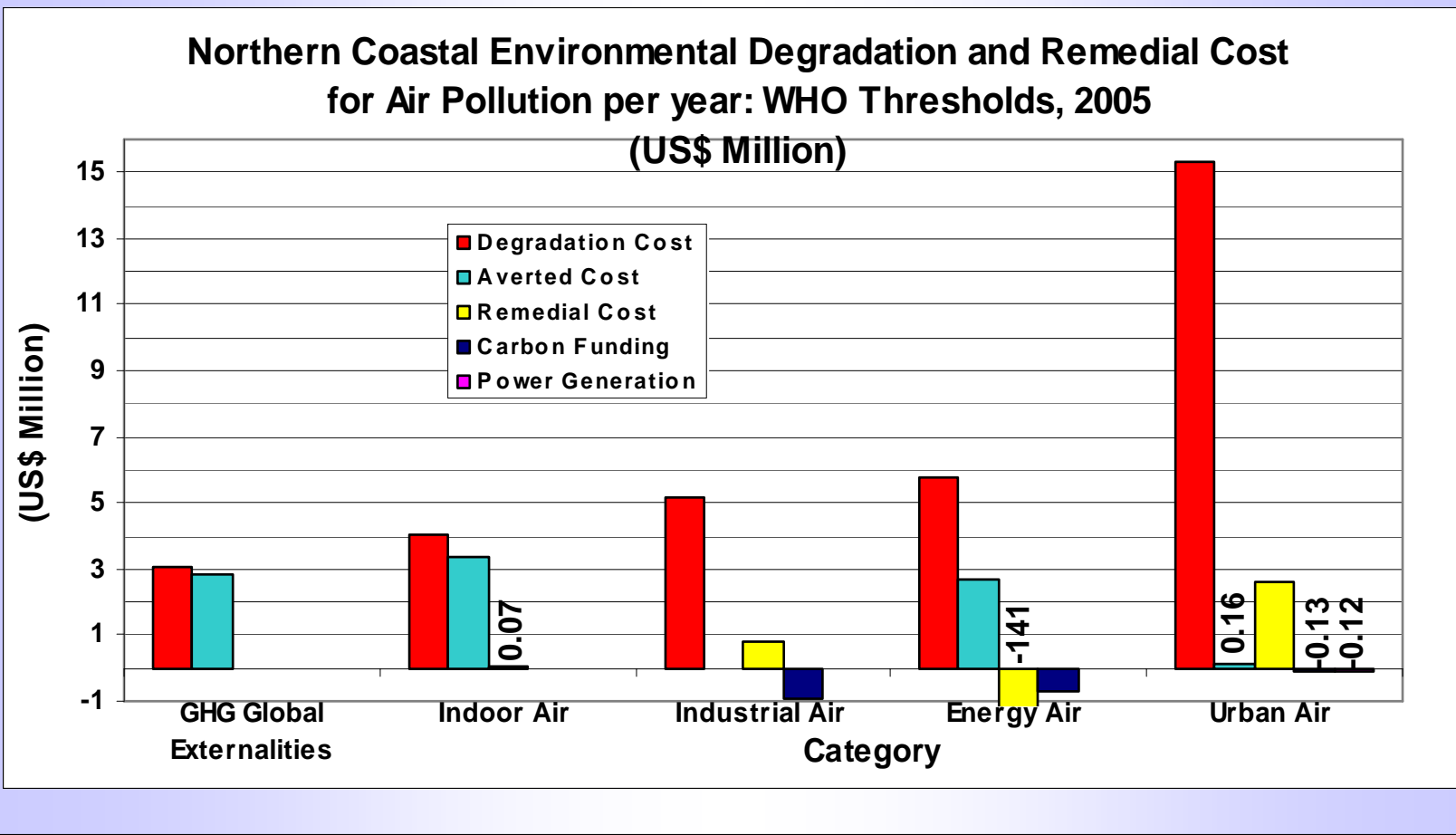
Aggregate Results: Real Terms



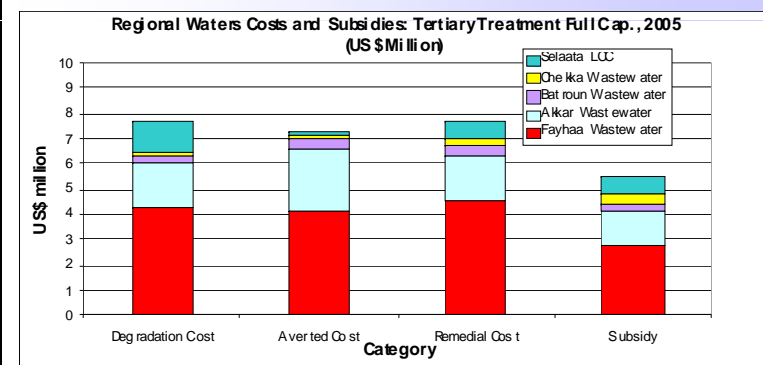
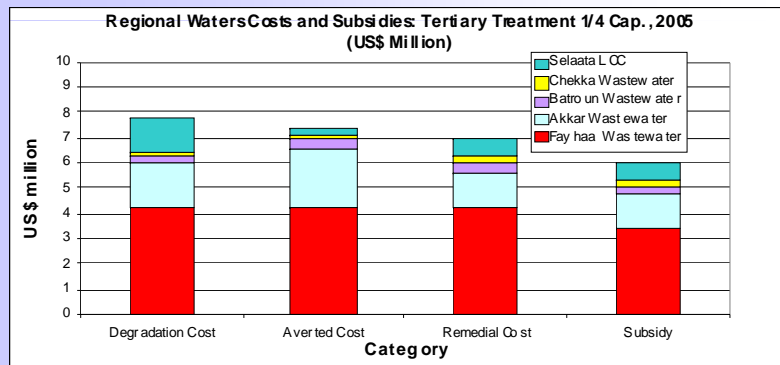
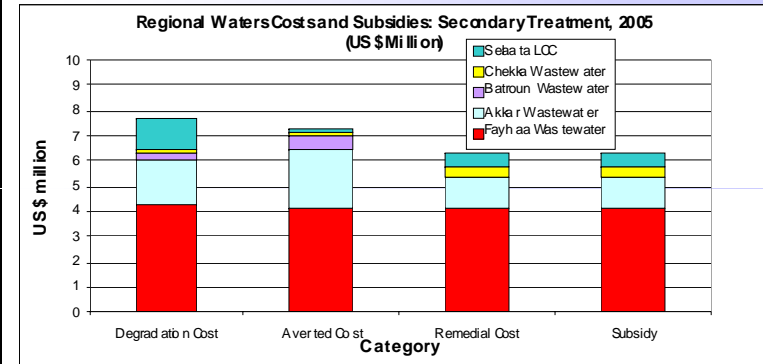
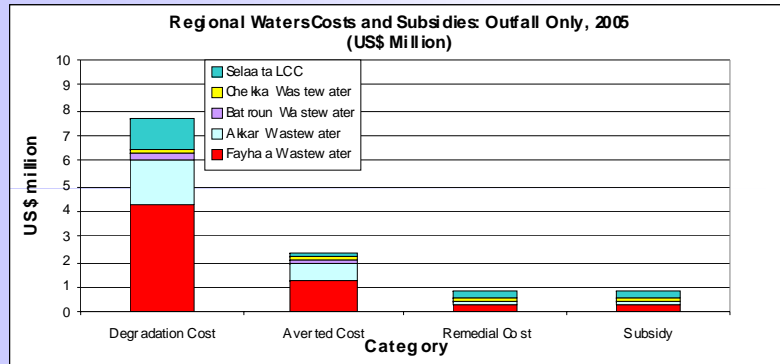
Aggregate Results by Casa



CCZED Results: Air



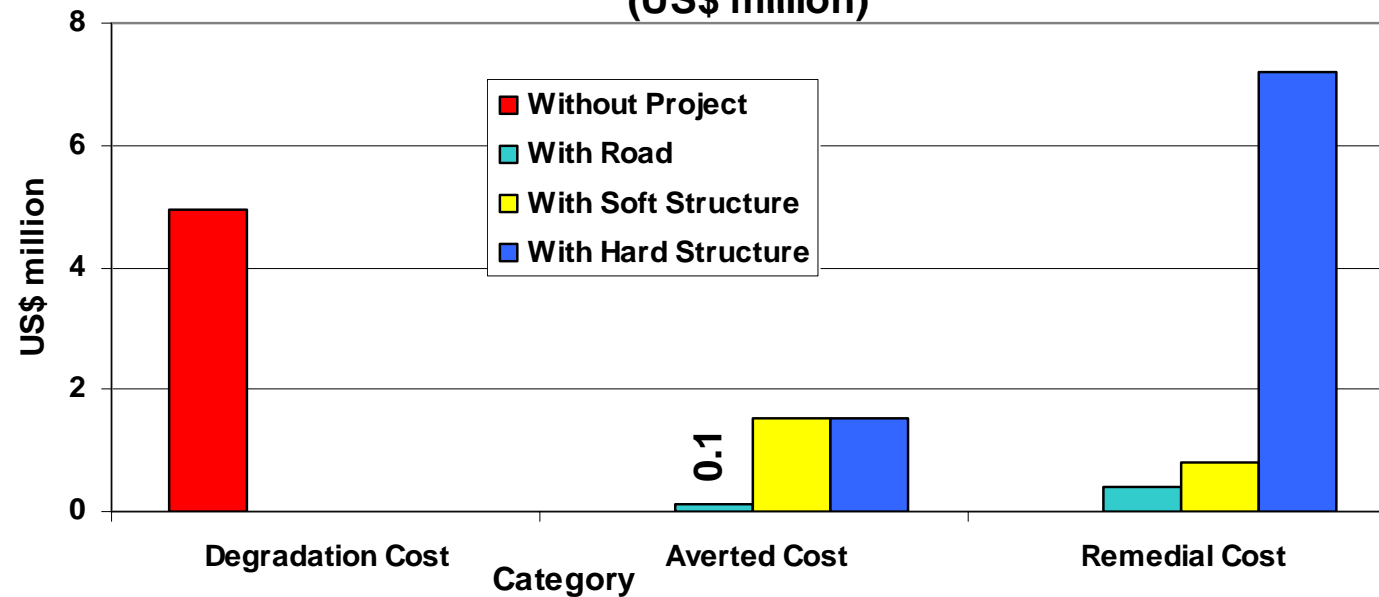
CCZED Results: Regional Waters



CCZED Results: Landward



**With/Without Coastal Erosion Project per year in 2005
(US\$ million)**



CCZED Results: Landward

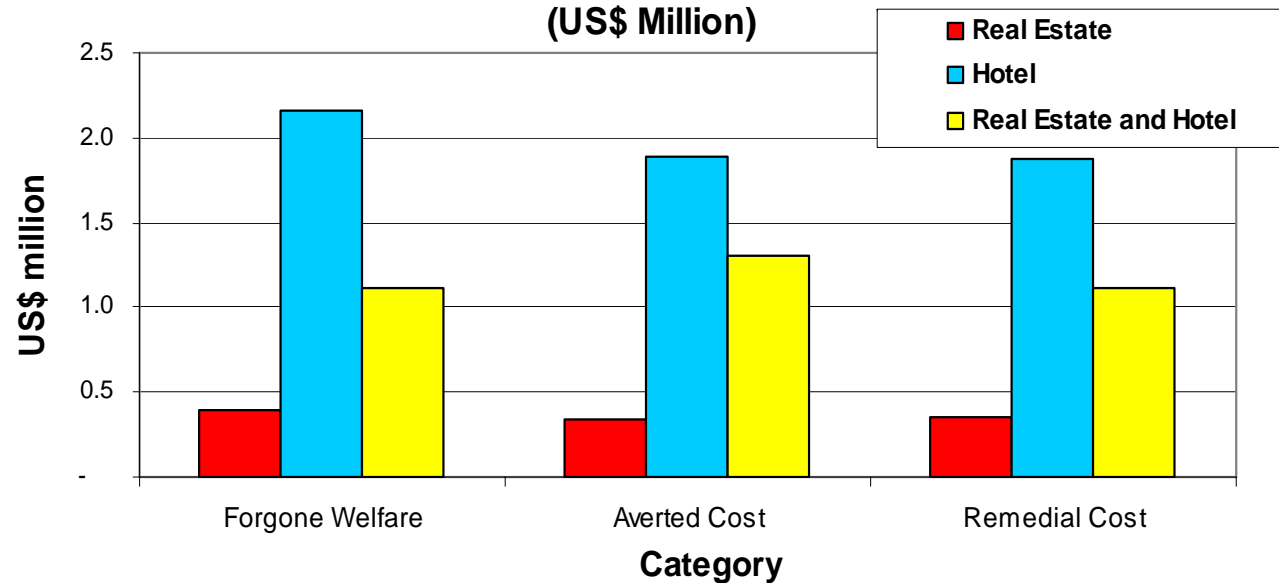


Akkar Coast

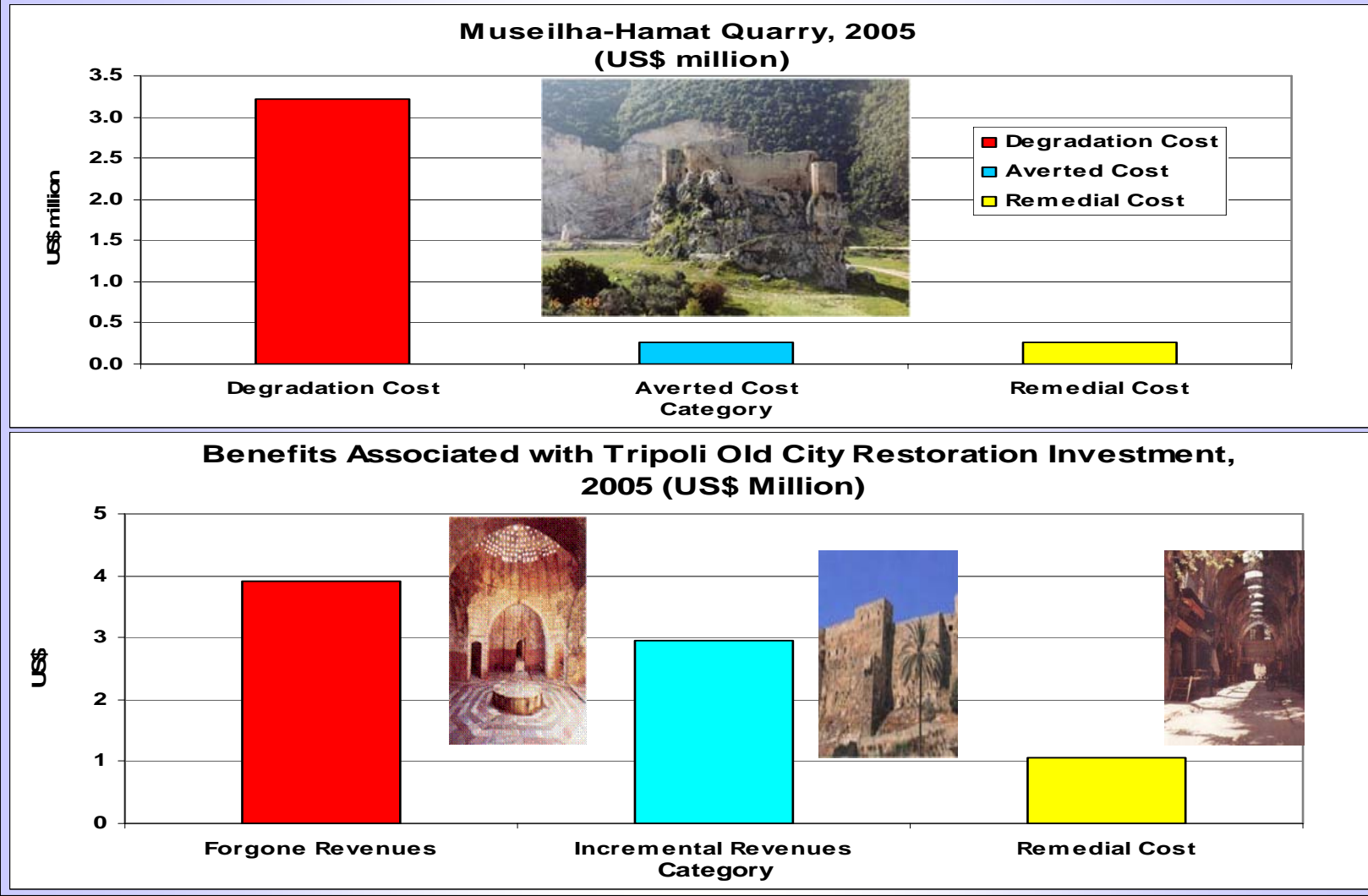
Lido di Dante Coast



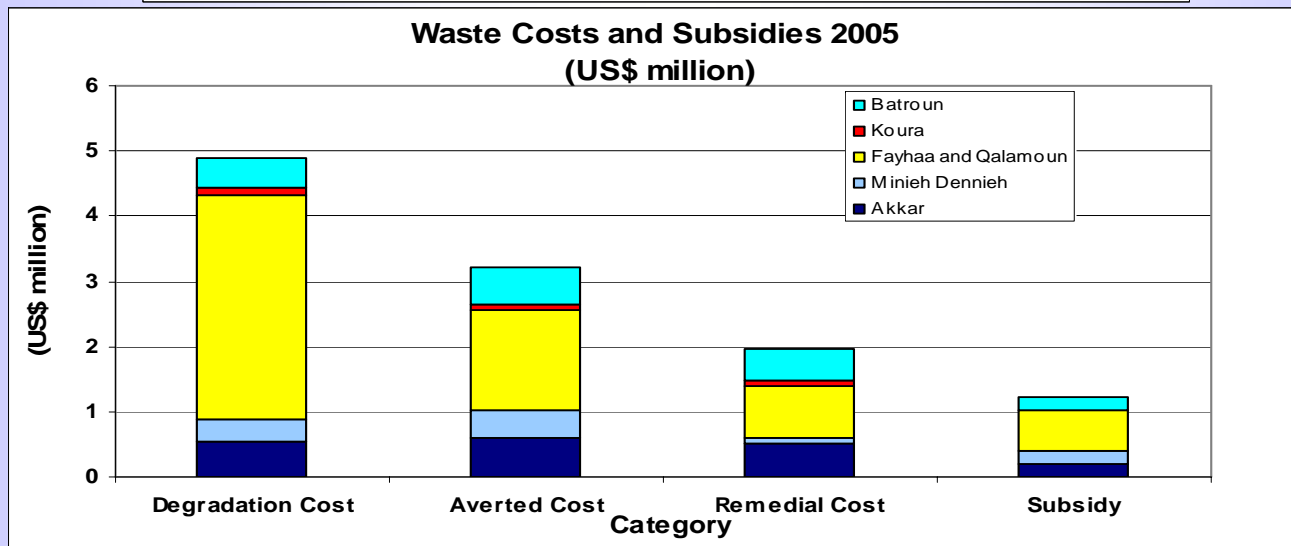
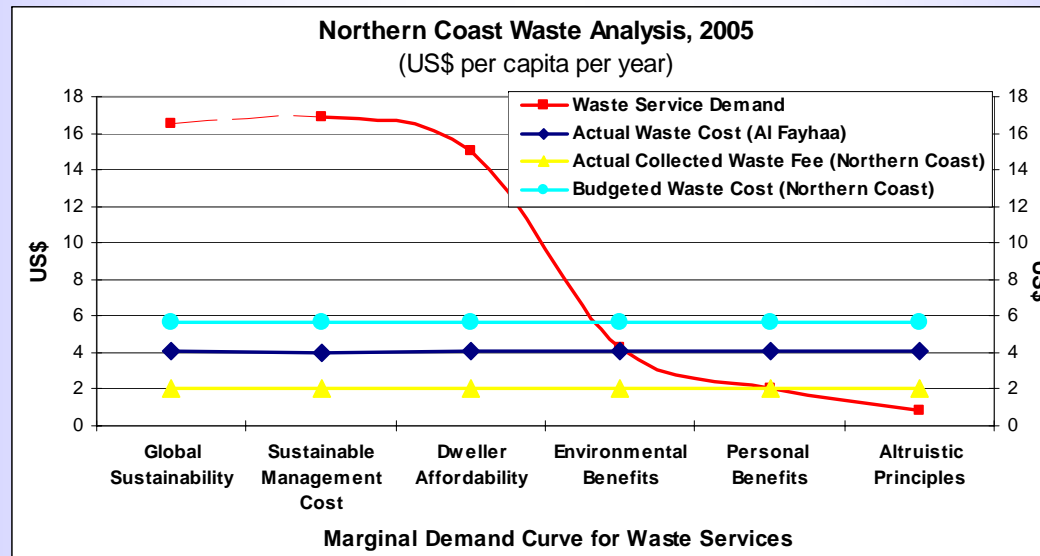
**Conservation vs. Ribbon Development, 2005
(US\$ Million)**



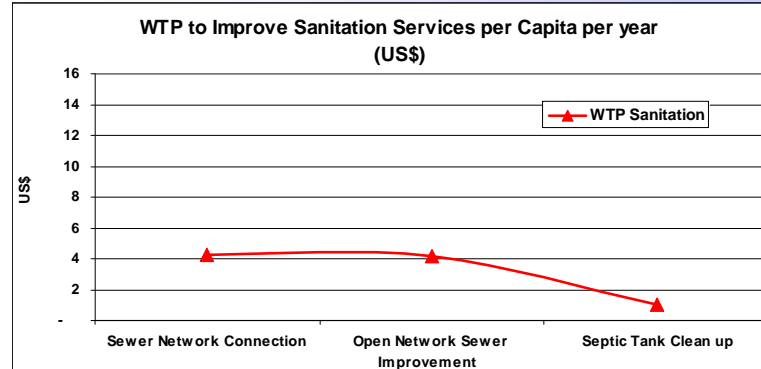
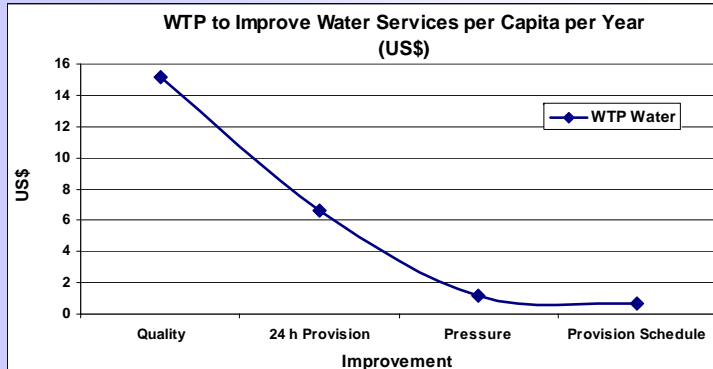
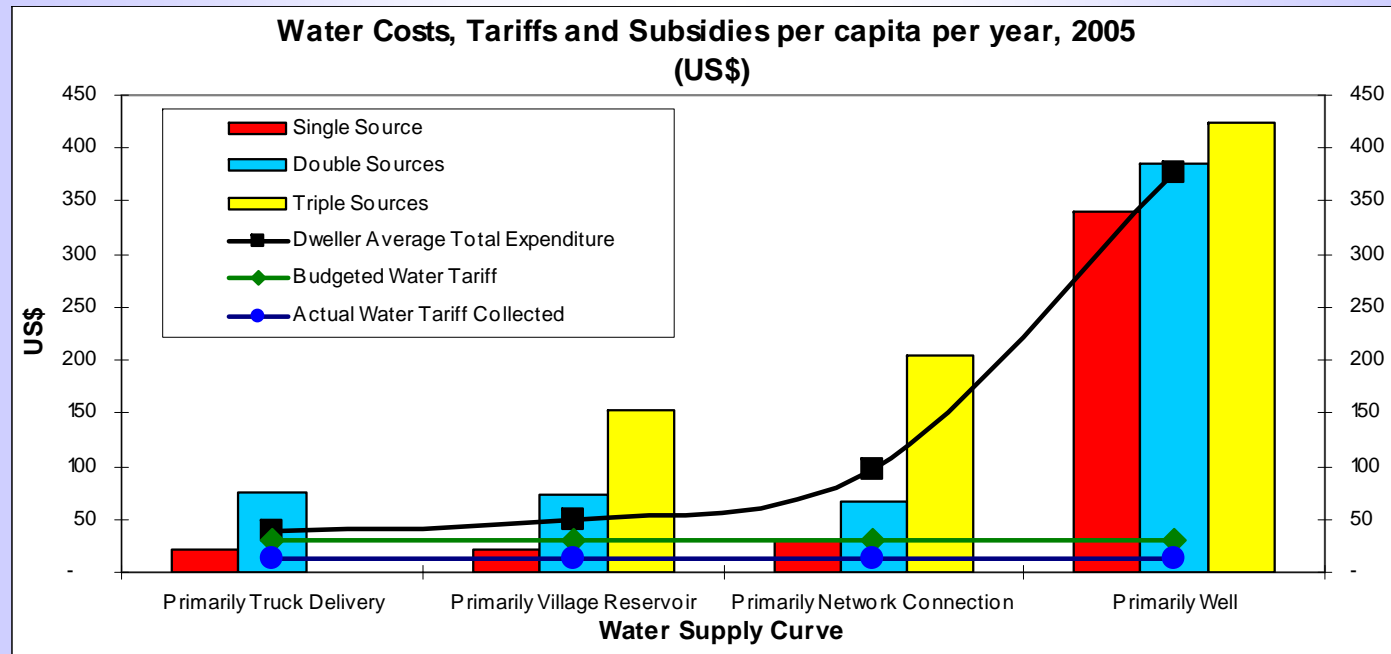
CCZED Results: Landward



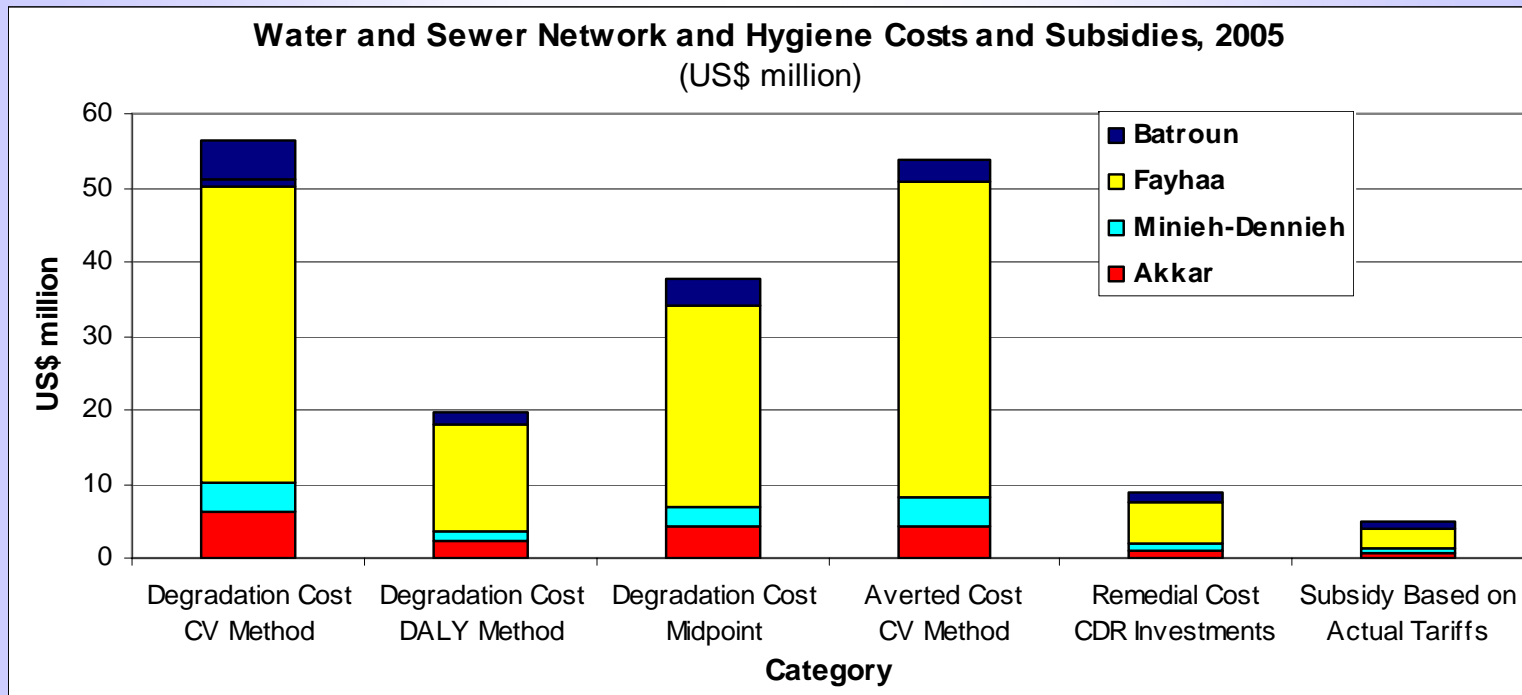
CCZED Results: Landward



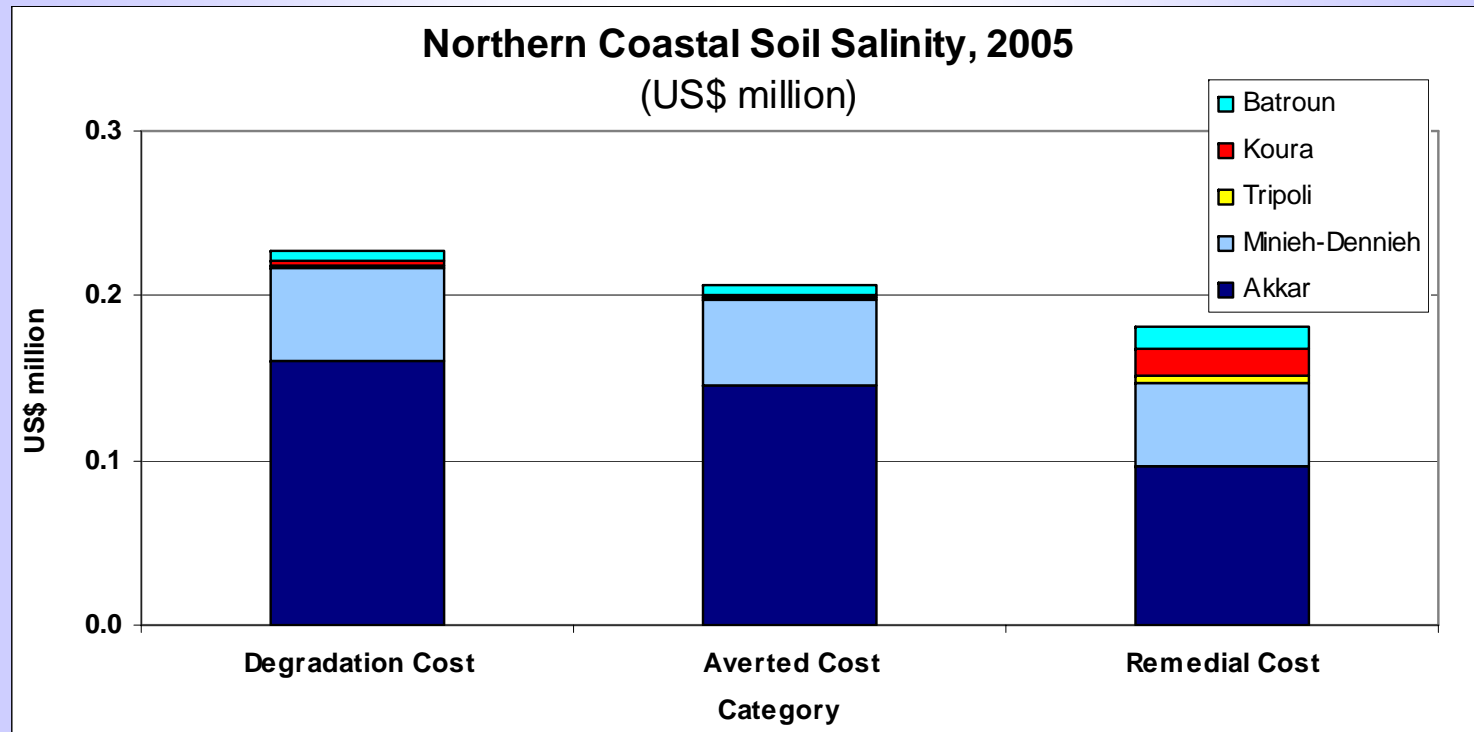
CCZED Results: Water Resources



CCZED Results: Water Resources



CCZED Results: Soil Salinity



CCZED Results: Policy Implication

There is an important opportunity to implement some key interventions, which could not only reap significant economic gains, but also be considered climate change adaptive response

Air: switching to cleaner fuel for energy and capturing carbon emissions.

- Regional waters: ending the discharge of industrial and municipal effluents that are increasing the acidification of the sea: win-win
- Coastal erosion: sea-level rise adaptation
- Positive effects on ecosystem services

Policy and Institutional Implication

Results will feed into the CEA

Ratifying the ICZM Protocol and harmonization with the Schema Directeur:

- Institutions, decentralization and governance in conjunction with the Scema Directeur implementation
- Instruments (Cadastre tool for sustainable planning, PPP, green taxes, conservatoire du littoral, perequazione urbanistica, incentives)
- Climate change vulnerability & natural disaster risk (adaptation, resilience and mitigation)