



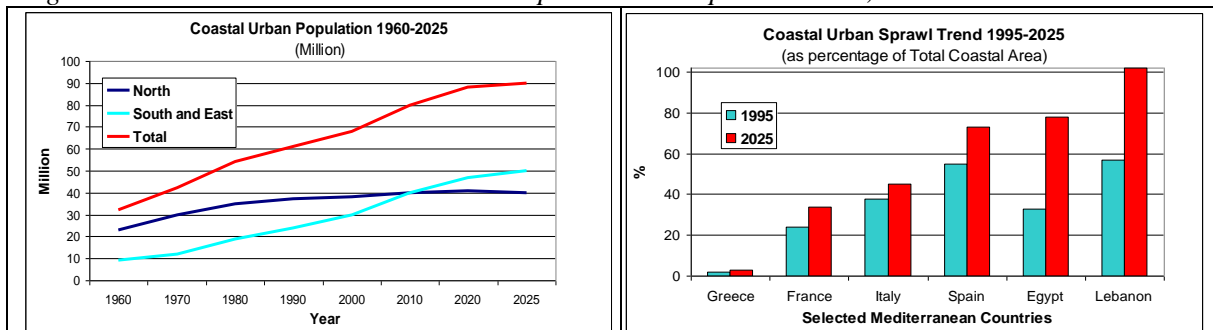
Integrated Coastal Zone Management in Lebanon: The Northern Coast *Policy Brief*¹

June 2009

Background

The Lebanese coastal zone has been subject to a number of converging pressures stemming from population growth, forced migration, poor planning, urban sprawl, encroachment, unregulated expansion, and coastal artificialization resulting in the deterioration of the environmental quality and ecological integrity of the coast. Currently ranging between 40 and 55% according to various sources, the coastal artificialization will be exacerbated by a growing coastal migration and tourism development driven notably by regional investors as well as the setting up of facilities to accommodate potential offshore oil and gas extraction. If kept unchecked, this trend could lead to a total artificialization of the 220 km-long narrow coastal corridor by 2025 that will bear more than 85% of the Lebanese population (Figure 1 is derived from the Blue Plan). Moreover, the coastal human, social, capital, natural, cultural, archeological and medieval assets will growingly be at risk over the century of natural disaster occurrence and climate change effects in terms of increased frequency and intensity of floods, storm surge, heat waves, etc.

Figure 1: Mediterranean Coastal Urban Population and Sprawl Trends, 1995-2025



Source: cited in METAP-World Bank (2009).

Legal and Institutional Shortcomings

Internationally, Lebanon is a signatory of major environment-related international laws including the 1976/1995 UNEP Barcelona Convention, which aim to prevent sea-based and land-based pollution. However, Lebanon has not ratified its latest 2008 Integrated Coastal Zone Management (ICZM) Protocol as yet, the importance of which was highlighted and complemented by the climate change-related dimension of the 2008 launching of the Union for the Mediterranean.

Nationally, the Framework Law for the Protection of the Environment (444/2002) lays out the principles governing the protection of the coast and aquatic environment and of running and stagnant water from all sources of pollution, in accordance with the provisions of regional and international conventions ratified by Lebanon. Moreover, Law 690/2005 entrusts the Ministry of Environment (MoE) with setting coastal and water resource pollution standards and norms. It also stipulates the reorganization of the MoE, the creation of a Council for the Environment with strengthened safeguarding and possibly overriding powers at the central level, and provides for the introduction of

¹ This note was produced by Fadi M. Doumani and is based on the 2009 *Legal and Institutional Assessment in Lebanon Coastal Zone and Environmental Degradation, Remedial and Averted Costs in Northern Lebanon Coastal Zone*. The METAP (2009) report was prepared under the METAP/World Bank *Promoting Awareness and Enabling a Policy Framework for Environment and Development Integration in the Mediterranean with Focus on Integrated Coastal Management* in association with MAP, the Blue Plan, the UNEP/MAP/MEDU, and the European Commission Delegation in Egypt. Funding was also provided by the Finnish Ministry of Foreign Affairs.

new legal and economic instruments such as the Pollution-Pay-Principle. Nevertheless, these laws still lack decrees related to application and enforcement.

One of the main weaknesses of the 2002 Framework Law pertaining to the environment in general and to the coastal zone, in particular, is however that it is still bound by pre-existing laws that remain subject to: (i) misinterpretation and poor compliance —for example, the EIA process developed with the help of METAP is mandatory under Law 444/2002 for locally funded projects but operational decrees were not enacted as yet; (ii) incoherent, overlapping, and sometimes contradictory thematic laws; (iii) obsolescence due to outdated legal texts dating sometimes back to post-1920 French and even pre-1920 Ottoman eras, especially for water; (iv) a reactive legislative system with no retroactive provision to penalize violators; (v) outdated legal and regulatory texts that lack scientific evidence to guide the setting of thresholds; (vi) a critical lack of capacity to enforce laws and decrees, especially in the absence of an environment police force; (vii) binding principles of international law that are not often adapted to the local context nor complied with; and (viii) lack of proper administrative and judicial recourse, especially in the regions, to equitably arbitrate claims. To address these shortcomings, the EC-MoE-University of Balamand-Elard 2004 SELDAS legal and institutional assessment determined ways to strengthen institutional capacity and incorporate environmental concerns across sectoral activities. Also, the ongoing World Bank-UNDP-Ministry of Justice SEEL project is seeking to build environmental judicial capacity.

Institutionally, the main players involved in coastal zone management were determined based on their cross-communality and coordination or overlap by sector or themes. Though far from being comprehensive, the assessment underscored the importance of the intersection of the following six major actors in terms of central and local jurisdiction, funding, planning and implementation, safeguarding and water management:

- The Ministry of Public Works and Transport (MoPWT) is responsible for urban development and has jurisdiction over ports and the maritime public domain where the **coastline setback** in summertime does not exceed 3 meters from private or Mohafaza/municipal land. Through a number of regulations, setbacks are extended to 11 meters for housing, 23 meters for commercial construction, 500 to 1,000 meters for quarry siting, 1,000 meters when the industrial process does not require a nearshore siting, and to various inland width for the public marine domain salt marshes, Tyre Coast Nature Reserve and Byblos coastal archeological site. However, coastal setbacks are poorly enforced, which led to violations along the coastal zone, dating back to the civil war period, that remain unresolved.
- Under the Ministry of Interior and Municipalities tutelage, government tiers (Mohafazat-Casas-municipalities) have jurisdiction over contiguous coastline land, however, the Government exercises both administrative and financial control over them, which gives the former very little power and leverage, particularly regarding their ability to increase tariffs and fees or introduce fiscal instruments. The solid waste management responsibility is still assumed by municipalities, but a new 2006 Council for Development and Reconstruction (CDR)-MoE plan aims to separate solid waste operations into collection and transport, which are entrusted to municipalities, and sorting, recycling, composting, and landfilling, which are entrusted to the central Government.
- The Ministry of Finance (MoF) plays a key role in achieving State objectives by ensuring the timely transfer of budgeted funds to line ministries, agencies, and government tiers. These transfers allow them to assert their respective sovereign prerogatives (attribution) and execute their obligations (public services and utilities). The regularity of transfers has, however, been affected by the burden of increasing debt (debt+arrears/GDP ratio exceeded 185% in 2005). Moreover, the Ministry is responsible for cadastre management, which puts all land transactions under its authority and responsibility.
- The CDR has been the executing agency for most government development projects since 1977 and has also planning prerogatives including recently land use prerogatives that led to the production and endorsement by the Cabinet early 2009 of the 2004 National Physical Master Plan of the Lebanese Territories (NPMPLT), which: (i) defines Lebanon's potential assets; (ii) determines Lebanon's comparative advantages by region; and (iii) establishes Lebanon's position in a rapid globalizing world over the next decades.

- The MoE has primary safeguarding responsibility which extends across line ministries, agencies, and government tiers with restricted resources and enforcement powers that are often challenged. Protected area management responsibilities fall under the MoE attributes but often are difficult to fulfill given the irregularity of the MoF transfers.
- A number of water agencies were consolidated into four regional Water Establishments that were created in 2000 to address the organization and management of the water sector to notably deal with the untreated wastewater discharge in the marine environment. Still, water resource management faces institutional, technical, and capacity-related challenges and despite the introduction of the new 2000 Water Law, there still exist difficulties related to duplication of responsibilities and gaps within various institutions and stakeholders in the water management sector. Moreover, regional water and wastewater establishments are based on jurisdictional boundaries rather than watersheds, which consequently, do not facilitate the implementation of integrated water resource management.
- Other line ministries, agencies, academia and NGOs also play a certain role in coastal management. IDAL, the Government of Lebanon's arm seeking to attract foreign investments to notably buy prime coastal properties has however some bearing on coastal land governance.

Integrated Coastal Zone Management Process

Under the 2004 UNEP/MAP/Blue Plan Coastal Area Management Program (CAMP), a draft legal framework for ICZM was developed and it defined coastal area spatial boundaries and set up its institutional management to improve the maritime public domain governance. The main points of the draft law are: the National Council of the Environment, whose set up under Law 444/2002 is still pending, is entrusted policy and ICZM tasks to be performed in close coordination with line ministries, municipalities and other stakeholders (revolving 5 year-planning, policy-design, policy implementation, management and enforcement) as well as discretionary powers (protected area designation, economic activity restriction and a 200 meter setback area that bans construction from the coastline inward) in the coastal zone territorial waters (12 nautical miles) and up to a 250 meter altitude above the sea level inland which also includes rivers and their tributaries. The draft law was neither debated by stakeholders nor Parliament and needs to be fine tuned to address some shortcoming such as: specifying jurisdiction over the 1995 UNCLOS III contiguous zone and exclusive economic zone (total maritime area of 19,516 km²) which are important maritime areas with a lot of potential although the ICZM Protocol maritime boundaries are restricted to territorial waters; addressing the climate change effects in terms of sea level rise and coastal erosion, etc.; harmonizing the law with the NPMPLT; seeking community participation in the development of the coastal plan; and setting up mechanisms to arbitrate competing uses and economic activity along the coast, for example, tourism, fisheries, industries, agriculture, and estate development, among others.

At the government level, there is a firm commitment through the NPMPLT implementation process to focus efforts on safeguarding the coast and funding for the development of a coastal action plan is being sought by CDR. Nevertheless, key questions related to ICZM remain unanswered in Lebanon since 2005:

- In terms of institutional set up, the vertical integration (across line ministries and agencies), horizontal integration (government tiers) and public participation, which require efficient flow and communication structures between various relevant stakeholders, did only partially occur.
- Regarding the ICZM framework, the stakeholder pressures were identified but a discussion forum, a sustainable strategy and appropriate instruments are either experimental or missing;
- Most aspects of the ICZM approach to planning and managing the coast are **either sought or tentatively trying to be implemented**: statutory coastal management plan; Strategic Environmental Assessments were tested; stakeholders are pursuing a dialogue; mobilization and participation are sought, etc.; and
- Efficient adaptive and integrative processes are not embedded at all levels of governance, which is not allowing a sustainable management of the coast: financial commitments are not in place; end users are receiving poor quality information; monitoring and evaluation are poorly integrated in the process; and except for the coast of Jyieh-Damour south of Beirut, where a setback and public access were respected thanks to CAMP achievements, no tangible results showed positive outcomes so far.

Northern Coastal Scope and Pressure

The analysis, which builds on the EC-funded SMAP III TA-University of Balamand work in northern Lebanon (2006-09), covers the coastal corridor from Arida in the north to Thoum in the Mohafaza (Governorate) of Northern Lebanon, that is, 27 municipal cadastres comprising a total population of 421,844 inhabitants in 2005. Hence, 50% of the population of the Mohafazat of Akkar and Northern Lebanon lives on 13% of the Mohafazat land near the coast, with an average density of 5,250 inhabitants per km². Collectively, the population of two cities (Tripoli and neighboring El Mina) and two towns (Minieh and Batroun) represents 73% of the coastal population, with a density of 7,855 inhabitants per km². Yet, Akkar is one of the poorest Mohafaza in Lebanon with more than 20% of its population living in absolute poverty (US\$ 876 per capita in 2005 for absolute poverty threshold).

A number of interest groups and rent seekers compete for the use of coastal resources along the 80 kilometer stretch of the northern coast, their interest lying in the areas of both spatial exploitation and resource extraction. Key spheres of local, national and regional interests include urbanization, tourism, and private and public recreation. The area also includes two fossil fuel power plants and represents a relatively important industrial cluster of villages —Mouheiteh for heavy duty plastic pipes, Chekka for cement, and Selaata for export-oriented fertilizers bound mainly for Europe. Also rich in natural resources, Lebanon's northern coast presents opportunities for harvesting and extraction (fishing, sponge harvesting, and salt extraction); trade and oil outlets (for example, the ports of Tripoli and Selaata); natural assets (the *Ramsar* Palm Islands Nature Reserve and Ras es Shakaa); cultural assets (salt marshes in Cheikh Zennad, Hreicheh, Anfeh and Kfar Abida); and archeological and medieval assets (mainly Akkar, Tripoli, Anfeh, Hamat, and Kfar Abida).

As a result, residents, coastal and upstream municipalities, utilities companies, production and service industries, and the agriculture sector bear direct and indirect responsibility for resource appropriation, misuse, or abuse. Such competing interests have moreover given further rise to negative externalities and turned the seaward area into an open dump, subject to air and marine pollution, land misuse, raw sewage discharge, untreated industrial effluent loads (e.g., heavy metal-contaminated gypsum), agricultural runoffs, ground water salinization, and landfill seepage. Offshore oil and gas prospection are also being conducted with promising results, which could contribute to additional marine (offshore platforms, extraction and gasline network) and coastal (outlet, storage and distribution) pressure should safeguards are not put in place for the full supply chain.

Benefit-Cost Analyses to Improve Policy Response

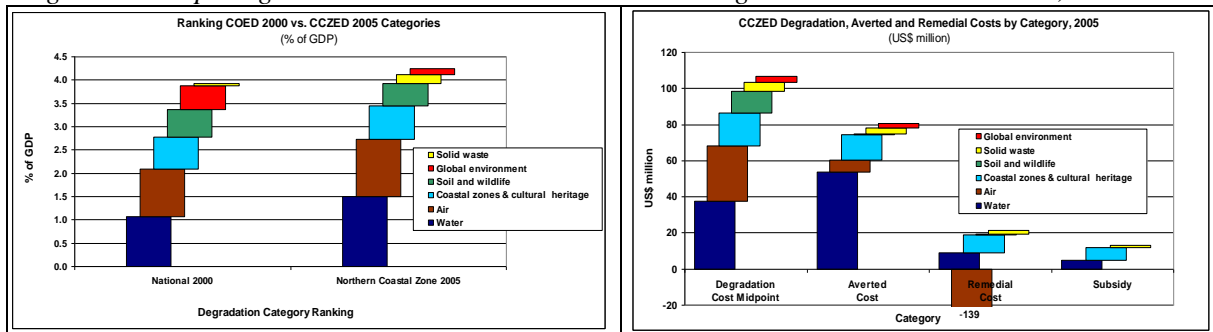
Environmental benefit-cost analyses were performed to rank the relative net social benefits that would accrue along the northern coastal Casas' municipal cadastre should effective investments are implemented. The results are meant to help policymakers make informed, efficient and equitable choices to maintain the integrity of the environment and promote conservation based on a common denominator: monetizing the environmental damage and remedial interventions. These results, which should be considered as preliminary order of magnitudes, could nevertheless help optimize the trade-offs between economic development and growth, well being, and the preservation of the commons, especially the coastal zone. Moreover, these results provide policymakers with an instrument for integrating environment into economic development decisions and comparing damage costs as a percentage of Gross Domestic Product (GDP).

Far from being exhaustive, the analyses cover six environmental categories (Figure 2). For each category and each of the four coastal Casas (Districts), four sets of results were derived from the analyses: environmental degradation cost in 2005 as a base year; annualized averted environmental cost associated with when possible various investment scenarios; annualized effective remedial cost scenarios; and when possible, annualized subsidy associated with the remedial cost scenarios.

Although urban sprawl is not really captured by these valuations, the coastal environmental degradation aggregated cost stands at US\$ 107 million, equivalent to 4.2% of the GDP of the northern coast in 2005 with a confidence interval ranging between 3.2 and 5.3%. The cost estimates are slightly greater than the ones derived from Lebanon's cost of environmental degradation (COED) in 2000, equivalent to 3.9% of the GDP (Figure 2). Within the environmental categories, the ranking remains

basically the same except for *Solid Waste* that ranks 5th in 2005 --with a substantial relative increase due to better data-- and *Global Environment* that is relegated to the last rank. Ranked by coastal Casa, the Tripoli federation of municipalities (57%) bears the brunt of the relative coastal environmental degradation followed by Batroun (16%), Akkar (14%), Minieh-Dennieh (11%) and Koura (2%).

Figure 2: Comparing National to Coastal Environmental Degradation and Remediation, 2000-05



Note: Water degradation (midpoint of 2 valuation methods used) is lower than averted (only upper-bound method used) cost. Source: derived from METAP-World Bank (2009).

Water ranks first in terms of environmental degradation cost or US\$ 37.9 million (35.5% and 992 DALY lost) in 2005. The water and sanitation sector provides poor services to both the business community and dwellers, and is increasing the distortionary effects that translate into competitiveness losses and dweller additional time and expenses —2.2% of household income equivalent to an average expenditure of US\$ 130 per capita per year to cover 2 to 4 water supply sources or 1/4th of the water network tariff. Remedial costs are very efficient should the trust between the utilities and the consumer is restored. Indeed, since early 2008, greater Tripoli water services have dramatically improved after the end of Ondeo’s private management operator 4-year contract.

Air pollution ranks second in terms of environmental degradation cost or US\$ 33.8 million (28.9% and 2,472 DALY lost) in 2005 when using WHO thresholds. This figure drops by almost half when Lebanese thresholds are used. Yet, acid damages stemming from Selaata’s fertilizer plant were not valued. A number of rapid interventions could drastically reduce the environmental burden of air pollution as it is spread along the coast with each Casa experiencing at least one form of air pollution. For example, indoor air pollution affecting mainly the poor in Akkar could be dramatically reduced in a very cost-effective manner, but would require some form of a social safety net to help switch the poor to cleaner fuels. Although the electricity sector is highly inefficient and subsidized with industries relying more and more on self-generation, a move to switch the Deir Ammar power plant from fuel oil to gas would generate a huge benefit, not only in terms of reducing air pollutants and GHG emissions, but also owing to the price differential between the fuels should a fair price deal is struck with a supplier (annualized US\$ -141 million) that could use the GASYLE and Arab Gas existing pipelines for gas delivery. In urban areas, a number of cost-effective interventions are feasible but a marginal abatement cost still remains to be derived. Finally, industrial production growth and therefore pollution outpaces all abatement measures including the ones industries are trying to achieve through carbon trading.

Coastal zones and cultural heritage degradation costs reach US\$ 18 million (16.9%) in 2005. Remedial costs include setting up 4 coastal wastewater secondary treatment plants, washing and dewatering the fertilizer gypsum slurry to be used to reconstitute the quarries, the build up of an offshore defensive soft structure (artificial reef to reclaim the lost coast through artificial nourishment) to preserve Akkar coastal rapid erosion (an average 50 meters since 1963), determining the trade-off that helps preserve the Akkar pristine coast, the tourism lost opportunity in Tripoli cultural heritage, and the introduction of a fisherman cooperative in El Mina to curtail the auctioneer oligopoly power. Most investments are beneficial with the most challenging issues being: the difficulty in introducing wastewater tariffs (possibly US\$ 40 per capita per year) to only cover operations and maintenance when the bulk of water consumption is not supplied by the water network; potential wastewater tertiary treatment running at 1/4th of its capacity during summertime is cost effective and should be considered at least for Tripoli’s wastewater treatment plant; Tripoli’s dewatered sludge incinerator yearly operations and maintenance costs –not accounting for capital cost amortization– will exceed

the possible dewatered sludge disposal in landfills by 1.5 folds; and the trade-off for coastal conservation is easily defeated by long-term real estate and hotel development profits, which calls for the introduction of a regulatory instrument, i.e., a reassertion of NPMPLT Akkar *non aedificandi* coastal zoning with 100-200 meter setback as suggested by the ICZM Protocol and draft ICZM law.

Soil and wildlife with an environmental degradation of US\$ 12.2 million (11.5%) in 2005 cover two coastal quarries (one of which is to be reconstituted with the washed and de-watered gypsum), the salinization of agricultural land and the loss of biodiversity. Whereas, most remedial costs could marginally reduce the loss of biodiversity, the re-engineering of the quarry could recover the Museilha castle area lost aesthetics in Hamat; and the build up of hill lakes and irrigation schemes will help decommission coastal wells by setting up a coastal buffer to prevent seawater intrusion while relatively increasing crop yield.

Solid waste with US\$ 4.9 million (4.6%) in environmental degradation in 2005 remains the most challenging problem in Lebanon as the opportunity cost of coastal land, high coastal density and the NIMBY syndrome prevent a sustainable management of solid waste. Based on the new 2006 CDR-MoE plan and calculated with the help of the 2005 METAP management software, a US\$ 2.1 million investment (US\$ 16.5 against US\$ 2 actually paid per capita per year along the northern coast) could dramatically reduce the degradation associated with coastal solid waste mismanagement.

Global environment costs are based on Stern (2007) and reach US\$ 3.1 million (2.9%) in 2005. A number of potential carbon funding (US\$ -1.9 million) cover the power plant energy switch as well as landfill and wastewater treatment plant methane capturing to generate electricity.

The Way Forward

The mismanagement of the coastal zone illustrates the magnitude of the tragedy of the commons (US\$ 107 million in 2005), which is being down played in Lebanon. A number of immediate actions are imperatively needed: ratification of the Barcelona Convention ICZM Protocol that would cancel out the need to fine tune and approve the 2004 CAMP ICZM draft law by Parliament; a harmonization of the ICZM with NPMPLT implementation process where regional development authorities are to be set up under the NPMPLT should house ICZM units; building managerial, technical and quantitative capacity of ICZM units; implementation of ICZM plans should include a number of activities and interventions that set clearly defined and monitored spatial and temporal outcomes to firstly preserve the remaining pristine areas and secondly reverse infringements on the maritime public domain; activation of all pending MoE application and enforcement decrees; improvement of utilities services and rebuilding the trust between service providers and consumers before adjusting or introducing new tariffs (e.g., domestic water and wastewater, irrigation water, electricity, solid waste); moderate coastal stakeholders' competing interests in a forum that will become a clearing house to prioritize investments, promote conservation of pristine areas, set up code of conduct, etc.

Yet, the present valuation results should be viewed as a preliminary effort toward developing tools to support the decision-making process in the coastal zone. More significantly, there is an important opportunity to implement some key interventions, which could not only reap significant social, economic and local environmental gains, but also be considered adaptive and mitigative responses to climate change future effects, such as:

- **Water:** enhancing water services, improving irrigation efficiency, reducing unaccounted for water, adjusting tariffs to promote conservation, and increasing enforcement to reduce well pumping and reduce coastal salt intrusion (also benefits soil and crop yield).
- **Air:** switching to cleaner fuels, promoting efficient processes and capturing carbon emissions.
- **Coastal zone and cultural heritage:** ending the discharge of industrial and municipal effluents that are increasing the acidification of the sea and affecting ecosystem services; building smart coastal defense structures that could reclaim the lost coast through artificial nourishment, prevent further sandy beach subsidence, and partially withstand a rise in sea levels.
- **Soil and wildlife:** each of the above and below-mentioned interventions will have some bearing on biodiversity and ecosystems.
- **Solid waste:** sorting, recycling, composting and sanitary landfilling to capture carbon emissions.