4. CONSTRUCTION

The GDP share from the construction sector peaked at 9.4 percent in 1994 and 1995, up from 4.4 percent in 1973. In 1995, the construction sector contributed US$1.1 billion to the overall GDP.

The construction sector impacts the environment during all stages in the lifetime of buildings: extracting raw materials (quarries, cement production), erecting the buildings (noise, dust, hazardous materials), and using the buildings (disposal of wastewater, energy consumption and emissions). Inadequate construction standards and the lack of sound urban planning regulations (or of enforcement of existing regulations) further aggravate environmental degradation. Buildings are spread throughout the countryside and tend to mushroom linearly along roads and highways. Uncontrolled urbanization spoils the landscape and impacts natural heritage.

4.1 Targeted Description

Between 1996 and 1998, the Central Administration of Statistics (CAS) conducted a census of all buildings and establishments in all six Mohafazas. This census has generated a wealth of new data that are useful in assessing the state of the construction sector and trends.

4.1.1 Buildings

In 1996, there were 518,858 buildings in Lebanon (see Table 4.1). This includes buildings under construction or restoration, buildings earmarked for demolition, as well as improvised buildings. Buildings can be grouped into three major categories: residential, non-residential, and mixed buildings (see Table 4. 1
buildings that are not in use or for which the use has not been determined. As the category indicates, residential buildings include residential units only. Non-residential buildings include non-residential units, while mixed buildings include both residential and non-residential units.

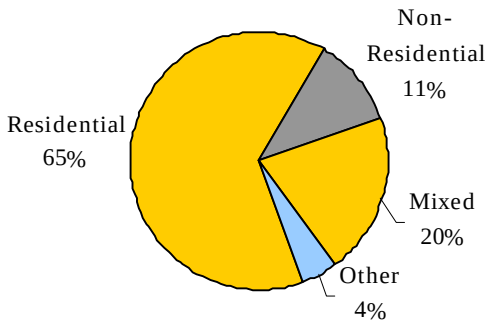
Table 4. 1
Distribution of Buildings by Mohafaza and by Mode of Use

Mohafaza	*Total Buildings*	*Residential*	*Non-Residential*	*Mixed*	*Other*
Beirut	18,810	6,257	2,320	8,616	1,617
Mount Lebanon	168,475	104,963	18,813	37,873	6,826
North Lebanon	107,268	65,388	13,434	23,285	5,161
South Lebanon	69,873	48,389	7,578	10,714	3,192
Nabatiyeh	56,705	42,172	4,405	7,531	2,597
Bekaa	97,727	64,357	11,977	18,049	3,344
TOTAL	**518,858**	**331,526**	**58,527**	**106,068**	**22,737**

Source: CAS Studies, 1996-8

Mixed buildings represent 20 percent of all buildings and may include industrial establishments (see Figure 4.1). Statistics on the number of industrial units in mixed buildings is not available, but presumably high. Non-residential buildings include industrial units and establishments.

Figure 4. 1
Breakdown of Buildings by Mode of Use



Source: CAS Studies, 1996-98

4.1.2 Residential and Non-Residential Units

There are 1.45 million dwelling units of which 73 percent are residential and almost 27 percent are non-residential (see Table 4. 2) . Residential units include primary and secondary residences, and empty units. Non-residential units include establishments, public administrations, and empty / closed units. Section 4.2.6 examines the implication of empty units on the environment, while secondary residences, one form of internal tourism, is discussed in Section 6.2.2. Establishments are discussed next in Section .

Table 4. 2
Distribution of Dwelling Units by Mohafaza and by Category

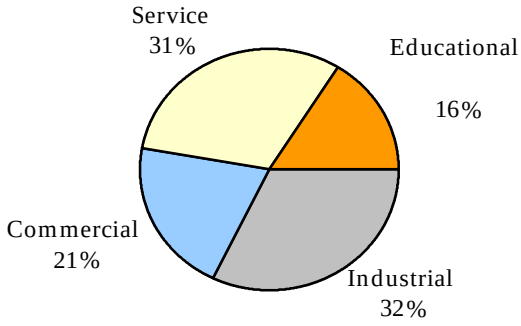
Mohafaza	*Residential Units*	*Non Residential Units*	*Other (mixed or undetermined)*	*SubTotal*
Beirut	115,728	42,703	1,007	159,438
Mount Lebanon	462,804	146,544	1,998	611,346
North Lebanon	177,961	76,417	3,196	257,574
South Lebanon	111,136	40,924	307	152,367
Nabatiyeh	73,018	23,671	146	96,835
Bekaa	121,198	57,239	442	178,879
TOTAL	**1,061,845**	**387,498**	**7,096**	**1,456,439**

Source: CAS Studies, 1996-98

4.1.3 Establishments

In 1996-7, there were 198,436 establishments in Lebanon. These include services other than shops (e.g., transport, insurance, water and electricity, hotels and restaurants, health care, and postal services), industries, educational and cultural establishments, as well as shops and other commercial outlets. Combined, they cover a total floor area of 26.8 million m^2, broken down in Figure 4. 2. Industries occupy the largest share of the built up area. The average size of an establishment is 135 m^2, and ranges from 79 m^2 (Nabatiyeh) to 164 m^2 (Mount Lebanon).

Figure 4. 2
Total Floor Area by Type of Establishment



Source: CAS Studies, 1996-8

4.1.4 Building permits

All building permit applications are processed through the Order of Engineers (in Beirut or Tripoli) and must be approved by either the Director General of Urban Planning and / or municipalities. A close examination reveals that less than half the permit applications processed by the Order of Engineers during the period 1994-1997 were actually approved (see Table 4.3). The rate of approval of building permit applications was higher in 1997 compared to 1994. This can be attributed to the lower number of permit applications (11,406 in 1997 compared to 34,941 in 1995) and to the administrative improvements at the DGUP.

On average, about 10 million square meters of surface area were approved for construction each year between 1994 and 1997. The actual built-up area is smaller because many project proponents must wait for funds to become available or abandon the construction project altogether. It is therefore difficult to estimate how much approved space is actually built-up.

Table 4. 3
Surface Area of Permit Applications (Thousand m^2)

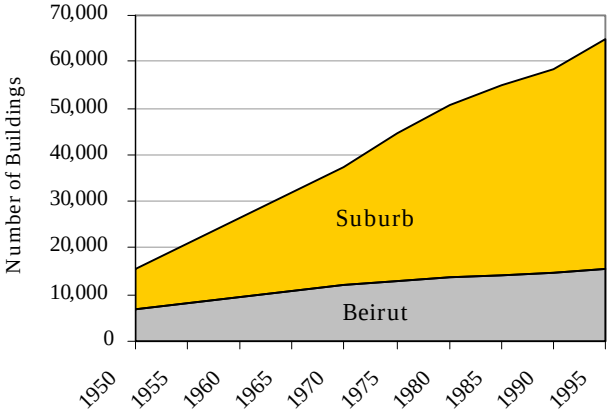
Year	*Permit Applications Processed (Order)*	*Permit Applications Approved (DGUP- municipalities)*	*Rate of Approval*
1994	21,792	6,418	29.45 %
1995	34,941	10,018	28.67 %
1996	19,677	9,887	50.25 %
1997	11,406	10,723	94.01 %
Total	87,816	37,046	42.19 %

Source: Huybrechts, 2001

4.1.5 Evolution of construction over time

The building industry has oscillated over the past decades. The sector experienced the highest level of activity during two time periods: the first was before the war (early 1970s) and the second was after the war (mid 1990s). Interestingly, the construction boom of 1992-97 is not more important than the one experienced before the war (Bibas et al., 1998). During the first years after the onset of the conflict in 1975, mass population movements stimulated the building sector. It is only well into the eighties, and following deepening economic crisis and 10 years of conflict, that the vitality of the construction sector slowed down to reach just two percent growth (1986-90). Evidently, Beirut city does not provide many opportunities for the building sector as most of its surface area (20 km²) is already built up. In contrast, the northern and southern suburbs of the capital experienced a significant increase in building activity as evidenced in Figure 4. 3.

Figure 4. 3
Evolution of Number of Buildings in Beirut and Suburbs (1950-95)



Source: Bibas et al., 1998

Year of Construction	*Beirut*		*Suburbs*	
	Number	% *	Number	% *
< 1950	7,048	40	8,535	15
1951-70	*4,814*	28	16,847	30
1971-75	*1,228*	7	6,082	11
1976-80	*649*	4	5,683	10
1981-1985	*613*	4	3,636	6
1986-90	*400*	2	2,916	5
1991-95	*690*	4	5,770	10
Undetermined	2,026	12	6,674	12
Total	**17,468**	**100**	**56,143**	**100**

* Percentage of total number of buildings

Lebanon offers a unique architectural heritage which is threatened by new urban developments. Typological features include distinct construction materials (red tiles, stone facades, arches, etc.) and architectural volumes. All major cities still offer some coherent groups of urban homogeneity including Beirut, Tripoli, Saida, and Zahle. Several small to medium sized villages still offer a unique architectural heritage. Noteworthy are the villages of Khanchara, Hasroun, Douma and Baskinta, to name but a few. Appendix E provides an analytic chronology of events which led to the destruction of numerous old buildings in Beirut.

4.2 Pressures on the Environment

Buildings consume space and natural resources. They require cement and other building materials, some of which are extracted from quarries (aggregate, sand). Building materials are hauled long distances exerting pressure on the road network. During construction, workers are exposed to a wide range of pollutants (particulates) and noise. Nearby residents also are subjected to extensive noise and air pollution. Building tenants consume water and generate wastewater and solid waste. Buildings also consume energy and release carbon dioxide and radon. Ultimately, if and when buildings are demolished, rubble and debris are hauled away and disposed at sea or in abandoned quarries. Table 4. 4 summarizes the key environmental impacts associated with the construction sector.

Table 4. 4
Environmental Impacts of Construction

Environmental Impacts	Description	Potential Impacts on		
		Air	*Water*	*Soils and land cover*
Extracting raw materials	*Sand and gravel*	Particulate emissions	Water courses near quarries are altered	Landscape degradation
Manufacturing building material	*Cement production*	Particulate emissions, CO, SO_x and NO_x	-	Deposition of dust
Constructing buildings	*Transporting materials*	NO_x and CO_2 emissions	-	Taking up new areas of land
	Buildings sites	Noise, particulate emissions	-	-
Using buildings	*Energy consumption*	CO_2 emissions	-	-
	Water consumption	-	Wastewater discharges containing detergents and organic matter	-
	Wear and tear of materials	Asbestos fibers, indoor radon emissions	-	-
Demolishing buildings		Noise, particulate emissions	-	Demolition waste to be landfilled or reused for sea reclamation

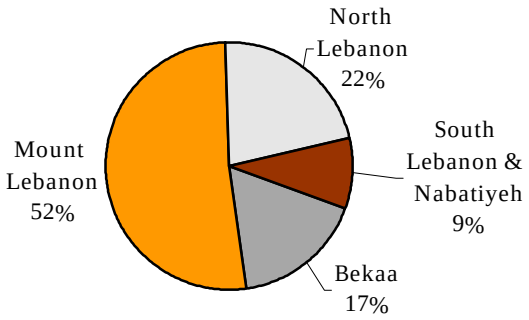
Source: Adapted from *The Environment in France.* French Institute for the Environment (IFEN, 1999)

4.2.1 Material extraction

Extracting sand and gravel has been a source of conflict between ecologists and developers for over a decade. The proliferation of quarries (old and new) has prompted countless protests by NGOs and conservation groups and calls for halting illegal quarrying activities. In 1995, the GoL commissioned Dar Al Handasah to conduct a national assessment of the quarry sector. According to this study, there were 710 quarries in 1996 (equivalent to one quarry for every 14.7 km^2) including abandoned and active quarries: 464 limestone quarries and 246 sand quarries. Forty-six percent of all quarries were unlicensed (at the time of the survey) and 71 percent did not respect the most basic standards and performance criteria (e.g., very steep quarry
An estimated 70 percent of the quarries were structurally unstable and 60 percent were downright dangerous (CDR / Dar Al-Handasah, 1996).

Fifty two percent of all quarries were in Mount Lebanon (see Figure 4. 4). The combined excavation volume in 1995 was estimated at 24.4 Million m^3. More than 30 percent of the aggregates originated from unlicensed quarries. Mount Lebanon was by far the largest producer of aggregates (45.6 percent) and North Lebanon hosted the largest number of unlicensed quarries, producing almost 61 percent of the total volume of aggregates originating from unlicensed quarries.

Figure 4. 4
Distribution of Quarries per Mohafaza (1996)



Source: CDR / Dar Al-Handasah, 1996

Quarries exert significant pressures on the environment. They disrupt the natural landscape and may cause structural damage to nearby houses from blasting, and generate nuisance to nearby populations through noise and dust. Quarrying also damages or destroys natural habitats and vegetation. Moreover, quarrying has altered or destroyed underground geologic formations (caves, abysses). This has affected the natural hydrogeology at many sites (e.g., springs dry up). Finally quarrying is also threatening sensitive ecosystems near natural heritage sites. For example, the quarries of Ain Dara are located within the tentative boundaries of the Al Shouf Cedar Nature Reserve, and large quarries (now closed) have irreversibly spoiled the valley of Nahr Ibrahim, a candidate site for inclusion on the World Heritage List.

Professional speleologists have repeatedly observed and reported that grottos and karstic formations have collapsed due to quarrying and blasting. Their accounts are based on underground exploration and provide the most reliable evidence of the impact of quarrying on the subterranean environment.

Box 4. 1
Cost of Implementing Environmental Policies in a Medium Sized Quarry

Dar Al Handasah estimated the cost of implementing (1) noise reduction, (2) dust suppression and (3) site rehabilitation of an active medium-sized quarry producing 40,000 tonnes / year. They assumed that the selling price of quality aggregates is US$6.0 / m^3, and that the achieved net profit margin is 40 percent of selling price. It was then estimated that the additional costs to quarry operators for implementing policy measures that will suppress dust, reduce noise and vibrations, in addition to rehabilitating the quarry site is equal to US$0.71 / m^3. Further assuming that the selling price of aggregates will not rise as a result of such policy measures, the net profit achieved by quarry operators will equal to 1.69US$ / m^3, down from 2.4 US$ / m^3. It was concluded that this expected rate of net profit is significant enough not to shift the cost of implementing environmental policies forward to the consumer.

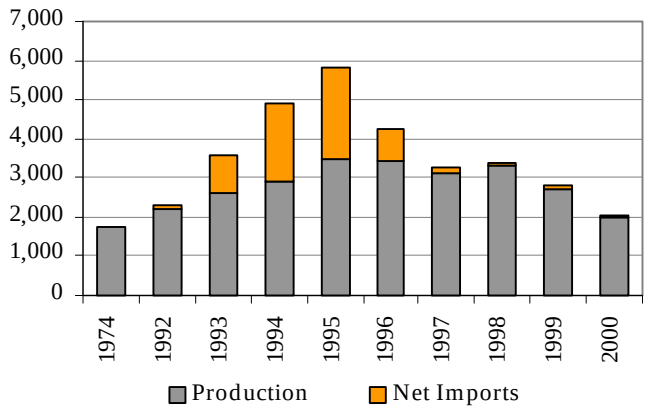
Source: CDR / Dar Al Handasah, 1996

4.2.2 Cement production

The demand for cement peaked during 1995, in response to large-scale reconstruction projects after the war (buildings and infrastructure). Between 1993 and 1996, Lebanon relied on local production as well as imports (mostly from Syria) to satisfy demand, as illustrated in Figure 4. 5. Compared to other countries in the region, Lebanon had in 1995 the highest per capita consumption of cement (see Table 4.5) . Since then, cement consumption has declined and imports have stopped. Despite a notable recession in the construction industry, the construction of roads (see Section 5.3.2) and bridges has kept the annual demand for cement and aggregates above the two million tonnes mark.

including reduced production and layoffs.

Figure 4. 5



Source: Compain et al., 1997 and CAS Bulletins, 1996-2001

Cement consumption is one of the indicators frequently used in Lebanon to show the level of the economic activity. While recession was setting-in during 1996-7, cement factories were concurrently investing to increase output capacity. It is believed that cement consumption in 2000 is significantly less than total capacity. Local cement factories are presumably gearing up for increasing production at the earliest signs of economic recovery. Unless adequately planned, this will revitalize the quarrying sector leading to more environmental degradation.

Table 4. 5
Cement Industry Statistics for Select Countries

Country	*Number of cement production plants*	*Total Production Capacity (million tonnes)*	*Total consumption in 1995 (million tonnes)*	*Per capita consumption in 1995 (kg/person)*	*Average price (US$ per tonne)*
Cyprus	6	1.6	1.0	1330	60
Egypt	10	18.7	18.5	313	52
Jordan	2	4.0	2.7	620	48
Lebanon	**4**	**3.5**	**5.8**	**1,650**	**62**
Saudi Arabia	8	15.2	16.7	900	53
Syria	8	3.2	6.5	455	52

Note: Lebanon data corrected by CERMOC to reflect actual consumption and using a population of 3.5 million
Source: Flemings, 1996

4.2.3 Urban encroachment

Poorly planned construction is encroaching on potentially sensitive and diverse eco-systems. Urban encroachment is most severe in the coastal zone and in the Bekaa valley. While the extent of urban development and encroachment on agricultural lands in the coastal zone has been documented, there is very little tangible information to assess the state and pattern of urban encroachment in the fertile Bekaa valley.

The Regional Environmental Assessment Report on the coastal zone (CDR/ECODIT-IAURIF, 1997) identified four land use categories that combine agricultural activity with scattered low density housing (SLDH). Agricultural activity ranges from intensive production, to fruit trees and heterogeneous agricultural production. In the past, these areas were presumably exclusively agricultural but were gradually urbanized due to the encroachment of low-density housing. Combined, these four categories cover approximately 1,500 hectares of the coastal fringe at a depth of 2,000 meters (3.5 percent).

In the Bekaa, the situation is potentially alarming. It is believed that fertile land is being lost to construction at an alarming rate.[1] A significant number of scattered buildings mark the landscape stretching from Kefraya to Baalbeck, with the highest concentration observed between Chtoura and Zahle (urban extensions have almost connected these two cities). Farmers and administrators in the Bekaa argue that the dwindling supply of arable land should be preserved by moving construction to nearby mountain areas. The construction of housing units in remote areas in the Bekaa (often without building permit) is widespread, forcing more government spending to provide access roads, water networks and electricity.

Box 4. 2
Why Preserve Urban Agriculture?

Urban agriculture appears to be an attractive option for managing urban transformations in space and time. Obviously, the demand for real estate is insufficient to consume all agricultural surfaces in the coastal zone over the next century. Hence, agricultural areas in and around cities will remain for the foreseeable future. It is therefore important to consider urban agriculture as an integral part of the urban economy and landscape. Urban agriculture is also a means to manage transformations of open spaces located within cities and in peripheries. It is one of the most cost effective means to manage open spaces in cities, less expensive than managing parks or vacant buildings. Urban development on agricultural lands affects agricultural activity and real estate. For example, when buildings spring up in agricultural communities, the price of land usually increases markedly, forcing agricultural activity to be more intensive and economically rewarding. To survive, urban agriculture in Lebanon usually relies on high value cash crops (e.g., strawberries) and intensive agricultural farming practices (greenhouses and tunnels).

4.2.4 Construction activity

Construction sites are frequently a source of nuisance to residents living nearby, especially during prolonged construction activities (up to months or years). Construction sites cause additional traffic (pickups and trucks), emit particulates and cause extensive

[1] Based on article from the Daily Star, dated 3/3/2001

noise pollution from vehicles, machineries and equipment. The highest sound levels are associated with trucks, pile drivers, and rock drills (up to 100 dBA 15 meters away). Table 4.6 presents estimated average noise levels for each construction phase. Clearly, early phases of construction (ground cleaning, excavation and erection) emit more particulates than later phases (finishing).

Table 4. 6
Estimated Average Noise Levels for Each Construction Phase

Phase	*Noise level (dBA)*	
	15 meters	30 meters
Ground cleaning	83	77
Excavation	85	79
Foundation	86	80
Erection	82	76
Finishing	83	77

Source: CDR / TEAM, 2000

4.2.5 Building services at Caza level

The CAS census provides valuable statistics on building services, such as the number of buildings connected to water supply and wastewater networks and the presence of power generators and private water wells (see Table 4.7). These data are valuable because it reflects specific sources of pressure. Building services at the *Caza* level are shown in Map 4.1. The environmental implication of these building services are discussed further in the corresponding sections of the report, specifically: water supply in Section 8.2.2, power generators in Section 7.1.5, and wastewater networks Section 1.3.2.

Table 4. 7
Building Services at Mohafaza Level

Mohafaza	*Number of Buildings*[2]	*% of Buildings connected to*		*% of buildings equipped with*	
		Wastewater network	Water supply network	Private well(s)	Power generator(s)
Beirut	17,468	93.4	92.9	15.6	13.8
Mount Lebanon	150,121	45.2	87.0	8.8	11.6
North Lebanon	97,940	35.9	65.5	9.9	7.6
South Lebanon	63,803	25.9	83.3	9.2	7.9
Nabatiyeh	52,010	18.7	90.0	0.7	4.8
Bekaa	86,956	29.5	68.1	11.6	9.1
Total/Average	**468,298**	**36.6**	**79.0**	**9.0**	**9.1**

Source: CAS Studies, 1996-8

4.2.6 Unfinished Buildings and Empty units

In the period 1996 to 1997, seven percent of all buildings were unfinished (see Table 4. 8). The highest share of unfinished buildings is located in Mount Lebanon (38.5 percent), followed by the Bekaa (21 percent). In addition, 2.5 percent of all buildings were earmarked for demolition and are presumably also empty.

[2] The number of buildings that were surveyed represent 90.3 percent of the total number of buildings

Table 4. 8
Geographic Distribution of Buildings in Lebanon (1996)

Mohafaza	*Under Construction*		*For Demolition*	
	Number	% of Total	Number	% of Total
Beirut	588	1.6	636	4.9
Mount Lebanon	13,916	38.5	4,608	35.2
North Lebanon	6,009	16.6	2,683	20.5
South Lebanon	4,617	12.8	1,129	8.6
Nabatiyeh	3,432	9.5	1,115	8.5
Bekaa	7,571	21.0	2,909	22.2
Total	36,133	100.0	13,080	100.0

Source: CAS Studies, 1996-8

In addition to the stock of unfinished buildings, there is an astounding number of empty dwelling units, both among residential and non-residential units. In 1996-1997, 17.2 percent of all residential units and 26.4 percent of all non-residential units were empty (Table 4. 9), representing an estimated **32.2 million m²** of floor area (32.2 km²)![3] This implies that an awful lot of land is built up generating zero utility. The high incidence of empty units can be attributed to several factors:

- New buildings stand idle several years before being sold or rented;
- Buildings are poorly constructed (quality of building materials);
- Buildings are located in areas where there is little demand for them; and
- Many buildings were never designed to be fully functional, but rather to serve speculative building markets.

Table 4. 9
Number and Distribution of Empty Units

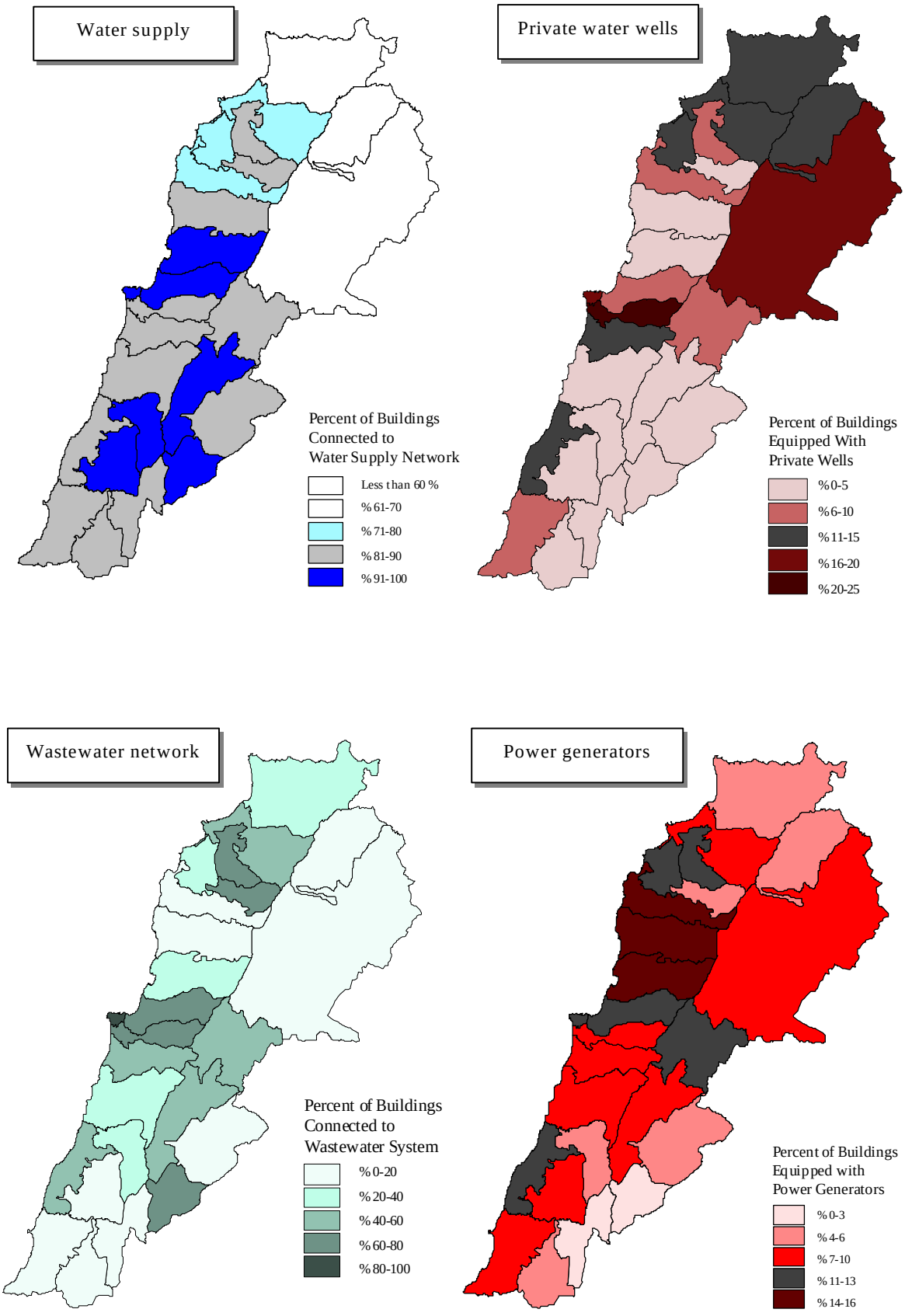
Mohafaza	*Residential Units*			*Non-Residential Units*		
	Total	*Empty*	*%*	*Total*	*Empty*	*%*
Beirut	116,238	13,868	7.6	43,213	6,797	6.6
Mount Lebanon	463,583	96,697	52.9	147,323	38,813	37.6
North Lebanon	179,278	22,920	12.5	77,734	18,220	17.6
South Lebanon	111,342	19,323	10.6	41,130	15,007	14.5
Nabatiyeh	73,085	12,393	6.8	23,738	8,306	8.0
Bekaa	121,305	17,597	9.6	57,346	16,135	15.6
TOTAL	**1,064,831**	**182,798**	**100**	**390,484**	**103,278**	**100**

Source: CAS Studies, 1996-8

Although empty units stand idle, they nevertheless cause all the impacts associated with the extraction of sand and gravel, the production of cement, the transport of these materials to construction sites, and construction activities. They also mark the landscape, as empty units and buildings often appear unfinished (sidewalks not paved, trees not planted, shutters closed).

[3] This was calculated using an average floor space of empty non-residential units equal to 135m² (based on average area of establishments see Section) and using 100m² for residential units.

Map 4.1
Building Services at Caza Level (1996-1997)



Source: Based on CAS Studies 1996-98

4.2.7 Waterfront real estate developments

In the coming 15 to 20 years, construction activities in Lebanon will be increasingly characterized by waterfront developments built on land reclaimed by filling the sea (CDR/ECODIT-IAURIF, 1997). Also, whether and how previous violations of the maritime public domain will be settled will shape future waterfront developments and the right of public access to the beach.

Established by decree, waterfront real estate companies enjoy special rights to reclaim land from the sea and develop it; at the same time, they are responsible for building or providing land to build environmental infrastructure projects such as wastewater treatment plants. Several sea reclamation projects have or are currently being implemented. First among those projects is the development and reconstruction of the Beirut Central District (BCD), which includes a significant (60 hectares) sea reclamation component. A private real estate company, SOLIDERE, was set up by law in December 1991 (Law 91-117) for the BCD project. SOLIDERE has provided a legal basis and justification for all other sea reclamation projects, in particular ELISSAR, and METN-NORD.[4] Other projects may follow too (e.g., in Tripoli). Such reclamation projects suggest the following (CDR/ECODIT-IAURIF, 1997):

- If implemented as currently planned, SOLIDERE, METN-NORD, would fill about 515 hectares of sea over about 10 km of coastline. Adding landfill areas for the airport extension runway (about 57 hectares), fishing ports and ELISSAR project would bring this surface area to over 600 hectares; and
- More than half of the total land to be reclaimed would be open for residential and commercial development (265 hectares in the four projects alone), with a total projected built-up area exceeding 7 million square meters.

4.2.8 Disposal of construction and demolition waste

Many construction sites dump their waste near curbside MSW containers which are then transported to the Bsalim landfill site (see Section 14.2.6 on disposal of bulky waste in GBA). More commonly however and especially in rural area, construction waste ends up in ravines and alongside roads. This practice produces long tracks of inert waste

Box 4. 3
Using Abandoned Quarries as Repositories for Construction Waste

Construction waste is usually inert. Quarries are potential repositories for the disposal of inert materials including construction and demolition waste. There are more than 500 abandoned quarries in Lebanon, evenly distributed throughout the country. Using inert waste as fill material could be a step towards restoring abandoned quarries and reduce transportation costs as wells as mitigate impacts associated with the inadequate disposal of construction and demolition waste. Of course, an environmental assessment should be conducted prior to the implementation of such a project. Moreover, landowners may find it lucrative as a tipping fee would be charged on incoming waste on a tonnage basis.

[4] LINORD, an ambitious residential and commercial development project in the northern suburbs of Beirut, has been scrapped. However, it is unclear whether the LINORD project has been cancelled (i.e., decree annulled) or shelved (i.e., decree suspended and investments postponed indefinitely).

4.3 Key Policies and Actions

Alleviating the principle environmental pressures associated with construction requires institutional mobilization on two levels: urban planning regulations and building codes. Whereas urban planning regulations mainly deals with the delineation of lands for development (urban and non-urban) and protection (nature reserves, protected sites, etc.), building codes define construction parameters such as lot coverage, floor area ratio, maximum allowable height, as well as building materials (tiles, stone, etc.).

4.3.1 Reorganization of the General Directorate of Urban Planning

The General Directorate of Urban Planning (DGUP) belongs to the Ministry of Public Works and Transport. Decree 10490 (21 June 1997) reorganizes the DGUP into two departments which together include 10 technical divisions, in addition to the administration (*Diw*) and 20 regional urban planning divisions and sections across the country (see Section 12.3.2 for an in-depth organizational description of the DGUP). Decree 10490 also sets the cooperation framework between the Directorate and municipalities. In part
(Caza level) will carry out all technical studies related to municipal public works including the preparation of terms of references and tender documents. They will also supervise construction works that are commissioned by municipalities. It is worth noting that municipalities fall under the auspices of the Ministry of Interior and Municipalities, which controls the Independent Municipal Fund (IMF). This control has generally been seen as limiting the maneuverability and actions of Municipalities.

4.3.2 Building standards

ected by urban masterplans (see Section 13.1.2 on extent of zoning). While the shorefront and highway zones are subject to specific zoning and building requirements, the majority of land outside these two categories remain unplanned. Because the maximum allowable height in unplanned areas is currently defined by the number *upper* floors (rather that the total number of floors or the maximum height in meters), buildings can reach up to five or six floors including three to four floors below road level. Building laws in unplanned areas are therefore directly responsible for the uncontrolled spread of buildings in rural areas, green spaces, and mountain slopes and has played a major role in the deterioration of the natural landscape in Lebanon.

The DGUP is c
construction in unplanned areas (Table 4.10). Clearly, the proposed building specifications are more stringent than actual specification and would, if approved by parliament, greatly alleviate the pressures on the environment from haphazard construction. Unlike actual specifications, the proposed specifications set a maximum allowable height in meters (rather than floors). In theory, if and when these specifications are approved by parliament, they will apply in unplanned areas so long as urban masterplans are inexistent, after which urban masterplans will replace them.

Independently of looming legislative progress in the building and zoning sectors, the MoE has developed environmental guidelines for the construction of residential buildings in sensitive areas, including river basins, and secluded high mountain areas (Decision 90 / 1, dated 19 / 11 / 2000).

Table 4. 10
Existing and Proposed Specification for Buildings in Unplanned Zones

Item	*Actual*	*Proposed* [a]
Lot Coverage	40 percent	20 percent
Floor Area Ratio (FAR)	0.8 FAR	0.4 FAR
Maximum Allowable Height	Up to three upper floors	7 meters total

[a] *Pers comm*, Abdel Ahad J, Director General of DGUP, September 2001

4.3.3 Energy efficient buildings

The Global Environmental Facility (GEF) has recently approved a US$500,000 project on energy efficient buildings in Lebanon. This two-year project, the first of its kind in Lebanon and managed by the UNDP, will promote energy efficient buildings and

for Urban Planning, the principle project partner, will host the project team. The project also will include feasibility studies for introducing specific construction materials, the marketability of products or technologies (within the public and private sectors and among architects and engineers), as well as incentives for compliance. Awareness campaigns and training modules (especially on how to monitor compliance) will further promote the implementation of construction guidelines.

4.4 Outlook

Real estate in South Lebanon is undergoing drastic changes after 22 years of occupation and insecurity. How real estate will evolve is a function of a several factors

(see Section 11.5.2), the provision of basic infrastructure, economic recovery and legislation. For example, in an effort to revitalize the industrial sector in South Lebanon, the GoL is exempting all industries that are established in the liberated zones from income taxes during the first 6 years of their operation (Decree 3361, dated 7/7/2000). This tax haven applies until 7/7/2005 (five years from the date of the decree).

Since the Israeli withdrawal in May 2000, there has been an unprecedented rush to rebuild South Lebanon, often with little regard for natural resources and the environment. The most alarming development is an apparent predisposition by municipal authorities and politicians to exempt local inhabitants and landowners from acquiring building

support local inhabitants and lure potential investors back to the region, the repercussions are potentially disastrous. While it is important to alleviate the economic burdens of reconstruction on local inhabitants, it is equally important to enforce existing permitting procedures for the construction sector. And whereas building permit fees are dispensable, building codes and regulations are not.