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LEBANON ENVIRONMENTAL POLICY ASSESSMENT

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and
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ACRONYMS

ALME	Association Libanaise Pour la Maîtrise de l'Energie
AUB	American University of Beirut
BOT	Build Operate Transfer
CBO	Community Based Organization
CDR	Council for Development and Reconstruction
CIDA	Canadian International Development Agency
COM	Council of Ministers
COTR	Contracting Officer's Technical Representative
CPCWSP	Coastal Pollution Control and Water Supply Project
DANIDA	Danish International Development Agency
DGUP	Directorate General of Urban Planning
EC	European Commission
EIA	Environmental Impact Assessment
EPA	US Environmental Protection Agency
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract
ESF	Environmental Strategy Framework
EU	European Union
FAO	Food and Agriculture Organisation
GATT	General Agreement on Tariffs and Trade
GBA	Greater Beirut Area
GDP	Gross Domestic Product
GEF	Global Environment Facility
GOL	Government of Lebanon
HCUP	Higher Council for Urban Planning
IBRD	International Bank for Reconstruction and Development
IDAL	Investment Development Authority of Lebanon
IMF	International Monetary Fund
IPM	Integrated Pest Management
IPP	Investment Planning Programme
IUCN	International Union for the Conservation of Nature
LAU	Lebanese American University
LIBNOR	Lebanese Institute for Standards and Norms
LIFE	Local Initiative Facility for Urban Environment
METAP	Mediterranean Environmental Technical Assistance Programme
MOA	Ministry of Agriculture
MOE	Ministry of Environment
MOEd	Ministry of Education
MOHER	Ministry of Hydraulic and Electric Resources
MOEP	Ministry of Industry

MOMRA	Ministry of Municipal and Rural Affairs
NAQMN	National Air Quality Monitoring Network
NCMS	National Center for Marine Sciences
NCSR	National Council for Scientific Research
NGO	Non-Governmental Organization
NIMBY	Not In My Back Yard
OECD	Organisation for Economic Cooperation and Development
PM	Prime Minister
PVO	Private Voluntary Organization
SDNP	Sustainable Development Networking Program
SIU	Sector Implementation Unit
SIZ	Schuweifat Industrial Zone
SO	Strategic Objective
SOW	Scope of Work
SpO	Special Objective
STP	Sewage Treatment Plant
SWM	Solid Waste Management
UN	United Nations
UNDP	United Nations Development Programme
UNCED	United Nations Conference on the Environment and Development
UNEP	United Nations Environment Programme
UPP	Unit of Planning and Programming
USAID	United States Agency for International Development
USG	United States Government
WB	World Bank

CHEMICAL COMPOUNDS

CO ₂	Carbon Dioxide
NO _x	Nitrogen Oxide
SO ₂	Sulfur Dioxide
TSP	Total Suspended Particulates

Preface

The authors of this report would like to express their special thanks and gratitude to the representatives of the Government of Lebanon, NGOs, universities, the private sector, UNDP, the World Bank, and USAID who participated enthusiastically and openly in the two workshops that were held during the three weeks the authors were in Lebanon. The authors also thank all those who met with them, often with little or no advance notice, to discuss Lebanon's environmental issues and opportunities. The names of individuals who participated in the workshops and meetings are shown in Appendices B and C. Special thanks are also due to Ms. Maha Al-Azar and the representatives of USAID/Lebanon, MOE, Debbané Frères, the Society for the Protection of Nature, and GreenLine who kindly agreed to assist with registration and other tasks associated with the workshops.

The authors attempted, under serious time constraints (three weeks in Lebanon, including at least one week spent on organizing two participatory workshops), to ensure that the most recent and accurate information formed the basis for this assessment. Had additional time been available, the authors would have sought increased involvement of the private sector, rural NGOs, and government agencies involved in forest, soil, and water management. Nevertheless, any oversights or errors in the report are the responsibility of the authors.

Executive Summary

Purpose of Report

This report presents the findings and recommendations of an assessment conducted for USAID/Lebanon by a consultant team contracted through the Environmental Policy and Institutional Strengthening Indefinite Quantity (EPIQ) contract. The report identifies a range of policy-oriented assistance options, within the scope of USAID/Lebanon's strategy, for strengthening environmental management in Lebanon. In preparing its assessment, the team understood that the Mission would have approximately \$12 million available over a five-year period for SpO3 (improved environmental management), but that, of that total, only \$ 1 to 2 million would be used directly for environmental policy reform and institutional strengthening activities.

Approach and Scope of the Assessment

During the 3 weeks they spent in Lebanon, the consultants reviewed pertinent literature, notably the Mediterranean Environmental Technical Assistance Programme (METAP) environmental assessment and policy options study (METAP, 1995a & b) and the Council for Development and Reconstruction (CDR) coastal zone study (CDR, 1997b). Both studies used participatory approaches and cost-effectiveness analysis to identify high priority environmental issues. Taking as a starting point the issues and options identified by these two studies, the team attempted to determine which are (and are not) being adequately addressed. For this purpose, the consultants met with numerous representatives of government agencies, non-governmental organizations (NGOs), educational institutions, the Parliament, the private sector, USAID and other donors. They also planned and facilitated two participatory workshops to discuss outstanding environmental issues and preliminary team recommendations.

The time and resources available for this assessment were very limited. The team was able to formulate recommendations for USAID/Lebanon consideration. However, it did not design the recommended programs.

Previously-Identified Priority Environmental Issues and Options

The METAP study (METAP, 1995a & b) identified five high priority problems: (1) disposal of hazardous and toxic waste, including industrial and hospital waste; (2) poor urban air quality, arising mostly from traffic; (3) degradation of coastal zones, owing in part to inadequate land use planning; (4) inadequate water resources management; and (5) soil erosion.

Based on the findings of the METAP study, the World Bank formulated a draft Environmental Strategy Framework (World Bank, 1996), which recommended a combination of macro-policies, cross-sectoral management tools, and issue-specific actions for tackling the five high priority areas identified. Actions proposed included: consolidating existing laws and regulations; building institutional capacity for environmental policy development, implementation, and enforcement; encouraging private sector provision of environmental services; using the resources of NGOs for monitoring and enforcement; making information about environmental issues readily available; and focussing GOL financial resources on medium and long term environmental investments.

The coastal zone study (CDR, 1997b) called for: improved inter-ministerial collaboration in permitting, monitoring and enforcing regulations pertaining to construction and related activities in coastal areas and hot spots; developing and implementing environmental guidelines for highways and roads; drafting a coastal zone law with appropriate revisions to existing decrees; and preparing a coastal zone land use plan.

Current Status of Priority Environmental Issues and Options

Environmental awareness and NGO activity is on the rise in Lebanon. This is evidenced, for example, by Greenpeace establishing an office in Beirut and increased “green marketing” by the private sector. Environmental policy making and program development should build on this growing environmental awareness and strengthen the capabilities of emerging local NGOs. However, the degradation of the environment in Lebanon is rooted in several cross-cutting policy and institutional weaknesses, including: weak institutional capabilities for environmental management; widespread lack of monitoring and enforcement of environmental regulations; delay in promulgating an environmental law framework; delay in establishing environmental impact assessment (EIA) requirements and procedures; inadequate government responses in instances in which short-term private interests are at odds with the public good; lack of national or regional land use plans (or planning authorities); and inadequate public participation in decision-making.

Building on the recommendations of the draft ESF and the coastal zone study, and based on interviews with public and private sector representatives and the two participatory workshops, the team identified and evaluated environmental issues and pertinent policy reform and institutional strengthening options in five key sectors/media: (1) wastes and chemicals, (2) land, (3) water, (4) the coastal zone, and (5) air.

In some instances, the team found that high priority issues identified by previous studies are already being addressed, with varying degrees of success. Examples include the following: management of protected areas (ongoing GEF-funded project for the three legally-protected nature reserves); development of national or coastal zone land use plans (studies to be launched soon by the GOL); creation of a National Council for the Environment to promote inter-agency coordination (underway); promulgation of EIA requirements and procedures (underway); institutional

strengthening of the MOE (UNDP-funded Capacity 21 project and EC-funded SIU 3 project); implementation of solid waste disposal plans in Beirut and a few other urban centers (underway); implementation of centralized sewage treatment and disposal plans for urban areas (design stage); and the elimination or reduction of subsidies on electricity consumption. Nevertheless, there remains ample scope for using policy reform and institutional strengthening approaches to address high priority environmental problems.

Policy/Institutional Opportunities for the USAID/Lebanon

Based on the team's assessment of current environmental issues and options, including the extent to which they are already being adequately addressed, six activities are proposed for USAID/Lebanon consideration. Each of these activities satisfies to some extent the following criteria established in conjunction with USAID/Lebanon: (1) interest in activity and commitment to its success; (2) long-lasting significant improvement in environmental quality; (3) catalytic effect; (4) priority issue not currently being (adequately) addressed; (5) support to other elements of USAID program in Lebanon; and (6) support to other ongoing activities by GOL and other donors. The six activities are as follows:¹

1. Develop and implement a landmark, sustained environmental awareness campaign and series of training seminars.

Lack of awareness underlies several of the environmental degradation issues enumerated in Table 1 of this report. A program to deal with this issue effectively therefore presents good prospects for significant environmental improvement across the board in the medium to long term.

2. Promote low-cost, environmentally-sound waste disposal in rural areas.

This program could be implemented through USAID/Lebanon's ongoing program with PVOs in rural community clusters. Lessons learned could then be used to help formulate appropriate policy/institutional reforms at the national level.

3. Encourage industrial pollution control and prevention.

A combination of tools would be developed, including an improved information base, economic incentives, public-private partnerships, and pollution standards. Given the prevailing climate of skepticism about policy reform and institutional strengthening, this activity should be designed for initial implementation at a pilot site, the Shuweifat Industrial Zone, to test approaches, before choosing appropriate

¹ The order of presentation is not significant.

ones and developing them at the national level. This activity would build on and use environmental monitoring capabilities developed at the American University of Beirut (AUB) with USAID support.

4. Develop program for air pollution abatement in urban areas.

Here again, monitoring capabilities in place at AUB (and the Lebanese American University—LAU) would be used to develop information necessary for policy reform and institutional strengthening.

5. Promote integrated water resource management practices.

The pilot approach, tools and monitoring arrangements described briefly under #3 above apply here as well. The pilot site would be the Litani river basin.

6. Design and begin implementing long-term, targeted ecosystem restoration program.

This activity would identify natural resource conservation technologies appropriate for Lebanon, and begin using the selected technologies in priority areas where PVOs implementing USAID's rural development activities are already working.

In addition, USAID/Lebanon could support on a stand-alone basis, with a small commitment of resources, the following activities: technical assistance and training in forest fire prevention and control, perhaps through the Global Bureau's PASA arrangement with the U.S. Forest Service (USFS); assistance in developing one or more greenhouse gas reduction projects for submission to the U.S. Initiative on Joint Implementation (e.g., use of solar energy); training for PVOs/NGOs in safe pesticide use and/or Integrated Pest Management, which draws upon the training which USAID developed in Central America; studying and/or developing economic potential of protected areas (and adjacent areas) included in ongoing GEF projects; and developing an environmental observatory, perhaps focusing initially on the coastal zone.

Recommendations for the USAID/Lebanon

All six activities identified offer excellent opportunities for USAID to help demonstrate the use of policy reform and institutional strengthening vehicles for addressing serious environmental problems. Deciding which activities to pursue requires a close look at USAID's entire environmental program in Lebanon (not just the small resources likely to be available to support policy reform and associated institutional strengthening directly). For example, as suggested above USAID/Lebanon may want to consider (1) providing support to PVOs to implement low-cost rural waste disposal and long-term ecosystem restoration programs, and apply lessons-learned from these activities to help put in place appropriate policy/institutional reforms at the national level (through awareness campaigns, training seminars, etc.) and (2) using AUB's environmental monitoring capabilities to

provide an adequate information base (water quality, air quality, or effluent characteristics) to support appropriate policy reform and institutional strengthening for integrated water resources management, industrial pollution prevention and control, and/or air pollution control.

As already noted, this assessment was done quickly, and with limited resources. Accordingly, further work to examine the appropriateness and feasibility, including stakeholder commitment, is needed before USAID commits itself to the development and implementation of any of the options discussed here.

1. Introduction

This chapter presents the purpose and organization of the report, the methodology used to prepare it, and the USAID strategy for Lebanon.

1.1 Purpose of Report

This report presents the findings and recommendations of an assessment conducted for USAID/Lebanon by a consultant team contracted through the Environmental Policy and Institutional Strengthening Indefinite Quantity (EPIQ) contract. The report identifies a range of policy-oriented assistance options, within the scope of USAID/Lebanon's strategy, for strengthening environmental management in Lebanon.

1.2 Approach and Scope of the Assessment

The report was prepared by a team of two consultants, Joseph Karam, Team Leader and Environmental Economist, and Robert Mowbray, Natural Resource Management specialist. The two consultants arrived in Beirut on October 13, 1997 and left three weeks later (November 4). While there (and indeed prior to their arrival), Messrs. Karam and Mowbray reviewed pertinent literature, notably the METAP environmental assessment and policy options study (METAP, 1995a & b) and the CDR coastal zone study (CDR, 1997b). Both studies were very comprehensive in nature and used participatory approaches and cost-effectiveness analysis to identify high priority environmental issues.

Taking as a starting point the issues and options identified by these two studies, the team attempted to determine which are (and are not) being adequately addressed. For this purpose, the consultants met with numerous representatives of government agencies, NGOs, educational institutions, the Parliament, the private sector, USAID and other donors, and planned and facilitated two participatory workshops to discuss outstanding environmental issues and preliminary team recommendations.²

- Wednesday, October 22: full-day workshop on needs and opportunities for strengthening environmental management in Lebanon; and

² See schedule of interviews and list of workshop participants in Appendices B and C, respectively.

- Friday, October 31, half-day workshop to obtain feedback and comments on preliminary findings of the assessment team and evaluate selected options for environmental policy reform and institutional strengthening.

About 25 representatives from government, NGOs, universities, research institutes, and the private sector participated in each workshop. Most of those who participated in the first workshop returned for the second as well. Mr. Spike Stephenson, the USAID/Lebanon Representative, opened the first workshop with a speech, followed by Mr. Ross Mountain, UNDP Resident Representative in Lebanon, and Dr. Georges Tohmé, President of the National Council for Scientific Research. Mr. Stephenson also participated in the second, half-day workshop. Appendix D provides the list of participants and findings of both workshops.

The team debriefed Mr. Stephenson, and submitted its draft report to him on November 3. Upon its return to Washington, the team met with USAID officials from the ANE and Global Bureaus to discuss the preliminary draft report and recommendations. The team then prepared this final report based on comments received at these two debriefing meetings and other oral and written comments received from USAID officials and EPIQ's home office staff.

This report identifies six activities for USAID/Lebanon consideration as enumerated here. In the team's view, these activities can be implemented in a way which furthers the objective of policy reform and institutional strengthening.³

1. Develop and implement a landmark, sustained environmental awareness campaign and series of training seminars;
2. Promote low-cost, environmentally-sound waste disposal in rural areas;
3. Encourage industrial pollution control and prevention;
4. Develop program for air pollution abatement in urban areas;
5. Promote integrated water resource management practices; and
6. Design and begin implementing a long-term, targeted ecosystem restoration program.

USAID/Lebanon will need to determine which of these activities best complement its environmental program and meet other criteria for inclusion in its portfolio. For those that meet these tests, further work will be necessary to determine feasibility and to develop results frameworks, including baselines, targets, and performance measures.

³ The order of presentation has no significance.

1.3 USAID Strategy for Lebanon

USAID's strategy for the period 1997 to 2002 springs directly from the current economic and political circumstances in Lebanon, and reflects the United States Government's (USG) interest in helping the Government of Lebanon (GOL) and the Lebanese people to recover from the civil war and participate in the Middle East Peace Process. The strategy emphasizes the importance of reconstruction and expansion of economic opportunities (SO1), especially in rural communities, increasing the effectiveness of selected institutions that support democracy (SpO2), in particular Parliament, and improving environmental practices (SpO3). Reforming national policies is sought as a tool to achieve all of the objectives.

Total funding for the strategy is US\$12 million per year over the five-year period; of which, a total of about US\$12 million will be spent to improve environmental practices (SpO2). A large portion of this latter amount will go to improving environmental practices in rural communities under the PVO grants, setting up and strengthening the AUB Core Environmental Laboratory, providing support to agricultural research, and perhaps creating a Water Resources Center at AUB. The authors of this report were told that the amount which would be available for Environmental Policy Reform and Institutional Strengthening Directly Would Be about \$1 to 2 Million over the Five-year Period.

1.4 Organization of Report

This report is organized in nine chapters and five Appendices. Chapter 1 is this introduction. Chapter 2 reviews cross-cutting policy and institutional issues affecting the environment in Lebanon. Chapters 3 through 7 present high priority environmental degradation issues related to wastes and chemicals, land, water, the coastal zone, and air. For each priority environmental degradation issue, we describe the type and sources of degradation, discuss its primary causes, outline who's doing or planning to do what to address the issue, and identify potential policy reform and institutional strengthening responses. Chapter 8 describes six activities which respond to important environmental problems, and which can be implemented in a way that furthers the objective of policy reform and institutional strengthening. Chapter 9 presents the authors' recommendations to USAID/Lebanon.

2. Cross-Cutting Policy/Institutional Issues

The degradation of the environment in Lebanon is rooted in several cross-cutting policy and institutional weaknesses, as discussed next. Box 1 provides anecdotal evidence of the relatively recent increase in environmental awareness and NGO activity; future environmental action should build on this increased environmental awareness and strengthen the capabilities of local NGOs.

Box 1 Increased Environmental Awareness And NGO Participation

The environmental "movement" has gained significant momentum in Lebanon over the past few years. Various NGOs have been very active at the national and grass-root levels in promoting environmental concerns. Greenpeace has contributed through its relentless campaign on the need to clean up the toxic waste import legacy of the 1980s. That organization recently opened an office in Beirut. The media (TV, radio, news print) also are playing a key role in spreading the word about environmental abuses and their impacts on human health. Significantly, Miss Lebanon 1998 has vowed to fight for the environment in the coming year.

Green marketing by the private sector is becoming trendy. Byblos Bank ads ("do good and do not throw in the sea"), Sanita ("so that the beauty remains with us"), J & B (pledge to plant trees and buy forest fire fighting equipment). The government's response to pressure from NGOs and local populations, although still very tentative, has already produced some environmental successes, including establishment of three nature reserves and closing the Borj-Hammoud dump site. The current Minister of Environment, himself a president of a local environmental NGO, has been very supportive of environmental NGOs. Many government programs are already being implemented in collaboration with NGOs, although some officials responsible for these programs expressed doubt about the sustainability of NGO programs and the commitment/seriousness of some NGOs.

2.1 Lack of National or Regional Land Use Plans or Planning Authorities

The GOL's sectoral plans (e.g., water supply and sanitation, electricity, telecommunications, and roads and highways) are not guided by any national or regional land use plans. Although CDR is mandated with drafting the overall framework for land use and urban planning (Legislative Decree 5, Article 3), no such framework has been developed. CDR staff are stretched thin preparing tender documents, adjudicating and negotiating contracts, negotiating project financing, and controlling and supervising contractors and government implementing agencies.

The Directorate General of Urban Planning (DGUP) is responsible for preparing master and detailed land use plans for towns and villages, within the overall land use plan (Aménagement du Territoire) (Legislative Decree 69, Article 10). The Higher Council for Urban Planning reviews and comments on proposed master and detailed land use plans for cities and villages. However, the work of DGUP and HCUP is complicated by the lack of an overall land use plan. The GOL appears to be cognizant of this problem and is taking steps to develop a national land use plan (US\$3 million study

to be undertaken by Dar Al-Handasah and French IAURIF) and a coastal zone land use plan (Phase I assessment completed by ECODIT-IAURIF; Phase II expected to begin in 1998).

2.2 Weak Institutional Capabilities for Environmental Management

The Ministry of Environment (MOE) was created by Law 216 (April 3, 1993) to study, propose, and implement national environmental policies. However, a new law is currently being debated by Parliament to reorganize the MOE and clarify its mandate. The MOE has only about 10 full-time professionals and an equal number of consultants, and thus lacks the capacity for environmental planning and management at the national level. MOE staff are young, dedicated engineering and science graduates who need training, guidance and a Comprehensive Vision of the the Ministry's Responsibilities and Their Own Individual Roles to do their jobs properly. The Minister of Environment has injected a new spirit with his drive and commitment. However, a lot remains to be done to build institutional capacity.

Other government agencies also are inadequately staffed for environmental management. No line ministry has an environmental unit. There is overlap in institutional responsibilities and poor coordination between them. The newly created Unit of Planning and Programming (UPP), staffed with consultants paid by a METAP II project, is developing a data base of who's doing what to implement the draft Environmental Strategy Framework (World Bank, 1997b). UPP has started to identify focal points at different line ministries. At the same time, the UNDP-funded Sustainable Development Networking Programme (SDNP) is helping facilitate information exchange among different ministries and improve coordination between different departments in the same ministry (See meeting notes with Mr. Akl, October 16). The new legislation to reorganize the MOE will provide for the creation of a National Council for the Environment to facilitate coordination and cooperation among different agencies concerned with, or impacting on, the environment.

2.3 Delay in Promulgating an Environmental Law Framework

Lebanon already has a large body of sector-specific environmental laws and regulations, some dating back to the 1930s. Generally speaking, these require updating and integration within a well-articulated environmental policy framework. Certain texts, e.g., regarding quarries, have become obsolete and require updating to reflect current scientific and technological knowledge. At times environmental rules have been promulgated rapidly, and without due regard for pre-existing legislation. This has resulted in overlap and inconsistencies. More importantly, laws and regulations typically make inadequate provision for enforcement.

Work on a Code of Environment was started about two years ago under the UNDP-funded Capacity 21 project; this task was recently taken up by the Solid Waste Sector Implementation Unit (SIU 3) staff working at the MOE. The team was told by MOE staff and a member of the

Parliamentary Environment Committee (Mr. Jokhadarian) that the Code of Environment should be forwarded to the Council of Ministers by the end of 1997, and to Parliament before the end of the current session.

Once the Code becomes law, the MOE will need to issue several decrees on matters ranging from air pollution and drinking water standards to EIA requirements and procedures. MOE intends to coordinate closely with other ministries and agencies in preparing and issuing these decrees. This would signal a significant (and welcome) departure from previous practice in which decrees were issued without due consideration.

2.4 Delay in Establishing EIA Requirements and Procedures

With technical and financial support from UNDP's Capacity 21, the MOE has drafted an environmental impact assessment (EIA) decree and procedures but neither have been approved by the Council of Ministers. With technical assistance from the SIU 3, the MOE is now redrafting the EIA requirements and procedures and expects to have them ready for issuance as a decree once the Code of Environment becomes law.

In the absence of national EIA requirements, only projects financed by major international donor agencies, including the World Bank and the European Investment Bank, appear to be subject to an EIA. Examples of such projects include wastewater and drainage in Tripoli, Kesrouan, Saida and Sour, electricity generation (new power plants in Beddawi and Zahrani) and distribution (nationwide), and solid waste management (composting and incineration in Beirut; landfill disposal in Saida and Zahle). It is not clear to what extent EIA recommendations are being implemented. Staff of CDR, MOE and the line ministries are not familiar with EIA procedures and do not have sufficient capacity to monitor implementation of mitigation measures.

No EIA is carried out for projects financed directly by the GOL or for privately financed projects. In particular, major highway and fishing harbor projects are being implemented without regard for environmental considerations. One visible consequence is the loss of agricultural land (olive orchards in the north; citrus groves in the south) as well as soil erosion and degradation of the natural landscape. When building highways and roads in mountains and valleys, for example, contractors simply dump excavated materials down ravines all along the path of the highway or road. Likewise, real estate developers frequently dump excavation materials down mountain slopes and do not consider the impact on the landscape or surrounding buildings in the design and construction of new buildings. Such reckless dumping of excavation materials and construction debris creates enduring eyesores in the natural landscape and exacerbates soil erosion and rainwater runoff problems.

2.5 Widespread Lack of Enforcement of Environmental Regulations

Poor enforcement is a major weakness of the environmental management system. Deficient enforcement is sometimes due to lack of clarity and internal inconsistencies in legal and regulatory texts as discussed earlier. It also results from institutional weaknesses, the power of special interests, and political interference, including the inability or unwillingness of personnel associated with the Ministry of Interior to enforce existing requirements. In other instances, e.g. enforcing the ban on hunting during the first year and controlling use of dynamite for fishing and construction activities in the public domain along the coast, the Lebanese Army has been charged with enforcement. In these cases, strict adherence to legal requirements has generally been observed.

2.6 Short-Term Private Interests vs. The Public Good

The GOL has sponsored the creation of several private real estate companies, and has charged such companies with “reclaiming” land from the sea by filling in the maritime public domain and performing certain environmental services, e.g., building wastewater treatment plants and rehabilitating solid waste dumps, on a portion of this reclaimed land. In “return for such services,” the real estate company has obtained ownership and development rights over the remaining part of the reclaimed land. LINORD and SIDON are examples of such companies. These “sea reclamation” projects are contributing to the loss of (1) sand beaches of significant recreational, tourist, and ecological value and/or (2) public access to the seafront.

Other forms of private participation in government-sponsored investments have helped (or will help) secure funds for important infrastructure projects and tap the resources, efficiency and creativity of the private sector. Build-Operate-Transfer (BOT) schemes appear to be the preferred form of contracting by the GOL for large infrastructure projects. BOT examples include the rehabilitation and management of the Jeita Grotto (BOT contract between a private company and the Ministry of Tourism) and the collection, composting and disposal of municipal solid waste in the Greater Beirut Area (contract with Sukkar Engineering). In the future, the construction and management of free trade and industrial zones (IDAL) and the construction and operation of three toll roads (AL-TOROC) will be done on a BOT basis. For such projects, it will be important to conduct EIAs with full public participation, and to closely monitor and oversee contractors’ activities to ensure that recommended mitigation measures are properly implemented and that the projects represent the best solutions to the problems they address (e.g., toll roads vs. mass transportation vs. car pooling).

2.7 Haphazard Public Participation in Decision-making

Public participation, beyond the promulgation of enabling decrees or decree-laws, is uncommon. Plans are often developed by private consultants behind closed doors and negotiated between a restricted group of major investors and influential politicians. Additionally, private interests are often able to override the decisions of the Higher Council of Urban Planning. Nevertheless, certain private groups, e.g. the Order of Engineers and Architects, NGOs and concerned citizens, are vocal in opposing certain types of projects and manage to influence to some extent the final outcome (e.g., SOLIDERE project re-designed, agricultural road project through Arz Jaj area canceled). The only recent redevelopment project that involved public consultation is Elissar, due to the presence of a strong local pressure group represented by Hizballah.⁴

⁴ Harb el-Kak, 1996.

3. Wastes and Chemicals

Improper disposal of solid, industrial, and hospital waste and sewage, and improper use of agro-chemicals lead to widespread environmental pollution and degradation, with known or suspected detrimental effects on human health, economic productivity, and environmental amenities.

3.1 Improper Solid Waste Disposal

Types and sources of environmental degradation. Over the past five years, with funding from the National Emergency Recovery Program (NERP), CDR has provided equipment (storage bins and trucks) to municipalities nationwide to improve solid waste collection. As a result, solid waste collection has improved dramatically in most cities and villages. However, solid waste disposal continues to be a problem. Outside the Greater Beirut Area (GBA), solid waste is disposed of in uncontrolled landfills, roadside dumps, wadis and ravines, thereby polluting land, fresh water, and the sea. Open air burning of waste contributes to air pollution. Until last summer, solid waste from Greater Beirut was either incinerated at the Amroussieh and Karantina plants, composted at the rehabilitated old plant at Karantina, or dumped at the Borj-Hammoud coastal landfill east of Nahr Beirut (Beirut river). The Borj Hammoud dump site—a mountain of waste and debris occupying an area of at least 150,000 m² of land claimed from the sea and peaking at about 60 m—and the two incinerators were recently closed under strong public pressure. Currently, solid waste from the GBA is sorted to recover recyclables, then compressed and bailed; bails are disposed at a landfill site in Naameh, 20 km south of Beirut.

Generally, hospital waste and hazardous waste are not segregated from municipal solid waste. Recycling of paper waste supports a very active recycled paper industry, with success stories in export to Italy and Syria. Other materials are also recovered from the solid waste stream, including scrapped metal, which is shipped to Syria for recycling, glass, and plastics. Waste recycling is done informally by well-established networks of recyclers, including collectors at dump sites and on the streets, and intermediaries.

Causes of environmental degradation. Responsibility for management of solid waste is shared by municipalities, the Ministry of Municipal and Rural Affairs (MMRA), the Ministry of Environment, and CDR. Most municipalities have been ineffective since the beginning of the civil war; however, the upcoming municipal elections may begin the process of revitalization. Recently, the Minister of Environment has spearheaded efforts to solve the solid waste disposal crisis in Beirut. But persistence of the problem in Beirut and elsewhere is due in considerable measure to inability to design and implement a long-term national solid waste management plan. Although CDR has had a \$55 million loan from the World Bank for "Solid Waste and Environment" on the books since 1995, only \$0.3 M has been spent so far (on a coastal zone study). CDR has faced tremendous challenges in finding landfill sites, due to unfavorable terrain, population density, and the prevalence

of a Lebanese-style "Not-In-My-Back-Yard" (NIMBY) syndrome complicated by religious/clan divisions. Local populations are opposed to siting landfills nearby because they suspect that such landfills will pose significant risks to human health; they have never seen a controlled sanitary landfill. In rural areas, where there have not been elections since 1963, municipalities either do not function at all or are too weak to implement sound solid waste management (SWM) programs. They cannot raise taxes to pay for improved SWM services and, given the current political and economic situation in the country, the Parliament does not appear willing to institute taxes or service fees for such services. There is a pervasive lack of public mobilization/participation in reaching informed decisions about solid waste management. And there are no incentives for solid waste recycling.

Who's doing (or planning to do) what? The MOE has received technical assistance from the EC-funded Sector Implementation Unit 3 (SIU 3) over the last three years. SIU 3 helped devise a solution to the Beirut SWM problem. SIU 3 will cease functioning in March 1998, and will be "replaced" by the EC's IPP program of support to the MMRA on SWM over the next 3 1/2 years. CDR expects to invite tenders to build one or two sanitary landfills (Zahle and Baalbeck) before the end of 1997, and also plans to build other landfills in different parts of the country. Once these have come on line, CDR plans to construct several sorting and composting plants, with funding from the Japanese OECF. Construction of these plants is expected to begin in 2004. CDR recently began a feasibility study of marketing solid waste compost. Also, the USAID-funded PVOs will be implementing solid waste projects in rural communities and clusters.

Policy and institutional options. Judging from the Greater Beirut experience, where one private company (Sukkar Engineering) is charged with collection and management of solid waste, the GOL seems committed to the privatization of the solid waste sector. Following World Bank guidelines, the GOL also does not consider incineration as a viable option. However, questions remain about cost recovery, with Parliament unwilling yet to introduce solid waste service charges. As a result, operating costs of solid waste management in Beirut continue to be financed through World Bank loans (contrary to Bank policy) or other sources of funds. Opportunities exist for promoting local SWM solutions in rural areas through education and awareness raising, public participation, and development of schemes for cost recovery.

3.2 Improper Sewage Disposal

Types and sources of environmental degradation. Direct or indirect (sewers) sewage disposal in open channels, valleys (wadis), at sea, or in boreholes is causing widespread contamination of freshwater resources (70-80 percent of all springs/wells are polluted with fecal coliforms) and the sea. A dozen short outfalls currently discharge raw sewage directly into the sea. There is no sewage treatment plant (STP) in Lebanon today; a few were operational before the war. The combination of sewage and industrial wastes has made the sea unsafe for swimming, severely limiting potential for tourism development.

Causes of environmental degradation. The war caused serious damage to existing sanitation infrastructure and put a halt to building new infrastructure. Urban sprawl has often been accompanied by uncontrolled, illegal sinking of deep wells to dispose of sewage, especially in the coastal zone. The extent to which this practice continues is unknown. Delays in creating regional water and wastewater authorities mean that responsibilities for water resources and wastewater management continue to be fragmented and inconsistent. The ability of the Ministry of Hydraulic and Electric Resources (MOHER) staff to carry out water/wastewater planning and management functions once the SIU 1 (see next paragraph) mission is completed is very uncertain.

Who's doing (or planning to do) what? Lebanon's wastewater program calls for building major sewage treatment plants covering different regions of the country. Nine such STP's, with associated sewer networks and sea outfalls, will be built along the coast, with funding from the World Bank (Coastal Pollution Control and Water Supply Project), the European Investment Bank and other sources. Separate systems are planned for populated mountain areas and the Bekaa, with STPs located inland and discharging treated effluent into rivers or wadis. This program has been developed with technical assistance from the EC-funded SIU 1, which is based at the MOHER, and the World Bank, which sponsored a task force on water and sanitation. At the institutional level, the GOL has approved a policy and strategy framework for water and wastewater reforms, including the creation of five regional water/wastewater authorities to replace the existing 22 water authorities. CDR has also received a \$53.1 million loan from the IBRD towards the cost (\$308 million) of the Coastal Pollution Control and Water Supply Project (CPSWSP) to be implemented by CDR and MOHER.

Policy and institutional options. The CPSWSP project has an important technical assistance component. For example, CDR has recently invited applications for an Institutional Specialist position (three years beginning December 1997) to manage the restructuring of the water/wastewater sector. Strong enforcement and high penalties are urgently needed to stop the illegal disposal of wastewater through deep wells. Other planned activities include the long-term monitoring of coastal and fresh waters. Significant opportunities remain to promote low-cost, community-level sewage treatment and disposal practices.

3.3 Improper Industrial Waste Disposal

Types and sources of environmental degradation. Despite severe reverses during the war, the recovery in the industrial sector has been striking, driven by the vitality and entrepreneurial spirit of the private sector. Unfortunately, it is suspected that this recovery has come at a high cost to the environment. Industry is a major source of organic and inorganic pollution of land, air, water, and the sea in Lebanon. Industrial solid waste is dumped with municipal solid waste, and industrial effluents are discharged—without prior treatment—into the sewer network or directly into the environment. Key coastal industrial hot spots include: Chekka (sea discharges and air emissions of asbestos, dust and SO₂ from cement products plants); Selaata (sea discharges of phosphates and sulfates and air emissions of fluorides from fertilizer plant); Zouk Mosbeh-Zouk Mkayel (bleaches,

dyes, and other discharges to streams and the sea); and Shuweifat, Ain Anoub, and Bchamoun (sea discharges via the Ghadir stream). In the Bekaa, agro-industries (sugar, wineries, slaughter houses, food canning), plastic plants, and tanneries discharge untreated effluents charged with organic matter and heavy metals into the Litani River. Debate continues, stirred by publicity generated by Greenpeace and Lebanese NGOs, over the fate and long-term impacts of toxic wastes illegally imported, mainly from Italy and Germany, in the 1980s.

Causes of environmental degradation. The major causes of environmental degradation from the industrial sector include: an obsolete industrial classification and permitting system, poor land use planning and industrial zoning, lack of adequate sanitation infrastructure and treatment facilities, location of some industries in residential areas, lack of awareness about the negative impacts of industrial discharges, lack of data on types and levels of pollution, lack of information on and incentives to adopt clean technologies and pollution prevention, lack of cost recovery mechanisms for environmental management services, poor enforcement of permit requirements, unenforceable pollution standards, and lack of funds for investment coupled with a considerable decline in productivity.

Who's doing (or planning to do) what? As discussed in Section 2.4 above, MOE and the Council of Ministers (COM) will need to issue one or more decrees on industrial pollution standards pursuant to the to-be-promulgated Code of Environment. Meanwhile, the Investment Development Authority of Lebanon (IDAL) has prepared an industrial zoning plan, which cancels or reduces existing industrial zones and creates 15 new ones. IDAL has started working on a model industrial park in the Iklim Al-Kharroub area, but the project is on hold due to lack of public funds to support infrastructure. IDAL is now looking for private investors interested in developing and operating the site on a BOT basis. IDAL has also prepared studies to change the classification system for industries and industrial permitting procedures. Based on these studies, the Ministry of Industry plans to establish an authority to oversee all industrial parks and an inter-ministerial committee to grant industrial permits.

Policy and institutional options. Industrial pollution control and prevention has not received much attention from the GOL and donor agencies. The soon-to-be-finalized national study on industrial pollution is not expected to provide meaningful insights to help MOE develop environmental policies for industry. Alternative approaches are needed that combine regulatory, command and control (standards and permits) with non-regulatory tools (economic incentives, technical assistance, public-private partnerships), with special emphasis on pollution prevention, clean technologies, and cost recovery. The best way to explore these policy options is to begin with a pilot assessment of an industrial hot spot. IDAL and the World Bank are interested in such an assessment for the Shuweifat Industrial Zone; in particular, the World Bank would be interested in funding pollution control and prevention activities resulting from such an assessment.

3.4 Improper Disposal of Hospital Waste

Except for a few hospitals equipped with on-site incinerators, most send their waste to a municipal solid waste dump for disposal. Previously, some hospital wastes were incinerated at the Amroussieh and Karantina incinerators. There is general agreement on the urgent need to address the hospital waste problem. CDR has just launched a 10-month comprehensive feasibility study of the collection and treatment of hospital waste in Lebanon. The study will prepare documents for the purchase, construction and operation (perhaps on a BOT basis) of collection equipment and one or more hospital waste management facilities.

3.5 Improper Use of Agrochemicals

Types and sources of environmental degradation. The improper use of agrochemicals has negative impacts on human health, ecosystem health, the balance of trade, and the cost of production of agricultural products. Misuse of pesticides results in long-term pollution of water resources, pesticide residues on foods, and reduced populations of beneficial insects, birds, mammals, and micro-organisms. Overuse of fertilizers also can damage calcareous soils. According to the FAO (FAO 1994, 1995b), pesticide studies and the METAP study (METAP, 1995a), Lebanese farmers (1) use both pesticides and fertilizers over intensively—including the use of spray nozzles which apply droplets larger than the recommended size, (2) do not follow recommendations for the scheduling of pesticide applications, and (3) regularly use banned pesticides such as DDT, Aldrin, carbofuran, and parathion. It is also likely that farmers do not follow recommended safety precautions when applying or storing pesticides. In fact, the FAO study found that farmers use old pesticide containers for water and that pesticide distributors do not properly store their pesticides.

Causes of environmental degradation. The decline of agricultural research and extension services has left farmers dependent upon the recommendations of the distributors of agro-chemicals, who often conceal the commercial and scientific names of pesticides, do not include instructions on labels, and conceal expiration dates. The ban on imports of chemicals whose use is prohibited in their countries of origin is not enforced. At the time of the FAO study (FAO, 1995a), there was no research on or application of integrated pest management (IPM) in Lebanon. Today, few farmers, if any, receive effective training in pesticide application, IPM, or the principles of farm management needed to determine the most cost-effective levels of application of pesticides and fertilizers. Lack of awareness of the impacts of pesticide misuse on human health and agricultural production costs, as well as the potential of IPM, is probably the underlying cause.

Who's doing (or planning to do) what? The team was not able to identify any strong programs to address this problem. FAO sponsored studies on pesticide regulation, disposal of obsolete pesticides, and IPM in 1994 and 1995. But the FAO representative with whom the team met was unaware of any action taken by the GOL to implement the recommendations of these studies. An FAO agricultural research project, being designed now, will provide support for IPM research.

The MOE has a pest management specialist who is beginning to learn about the problem. GreenLine is promoting integrated pest management (IPM) and other local NGOs may be carrying out similar programs, although it is not clear where the technology is coming from. At least one agro-chemical distributor is implementing a program to educate farmers in the use of chemicals. MOE may promulgate a decree in the future on this issue pursuant to the to-be-promulgated Code of Environment. AUB's Core Environmental Laboratory has the capacity to measure pesticide levels in water and soils as well as residues on food.

Policy and institutional options. Lebanon needs more information on the seriousness of this problem and its impacts on human health and agro-ecosystems. Research and extension on IPM is needed as well as training for farmers and distributors on the application and storage of agricultural chemicals. Stronger enforcement and updating of existing laws is needed. The GOL should consider the elimination of subsidies for wheat and sugar beet production, which encourage the overuse of both pesticides and fertilizers (as well as irrigation water). Perhaps USAID could provide some assistance by sponsoring regular workshops for the NGOs implementing the rural development cluster activities and other NGOs working with farmers. Workshops could cover a broad spectrum of rural development activities including IPM and the safe use of pesticides. Agricultural researchers, academics, and pesticide distributors, as well as national or international consultants could be invited to organize such workshops. Perhaps some arrangement could be made to obtain assistance from the program on safe pesticide use developed by the Pan-American Agricultural School at Zamorano, Honduras, with USAID support.

4. Land

Traditional land use practices generally protected the landscape over the centuries. But failure to adopt low cost, appropriate technologies has contributed to degrading the landscape, destroying vegetative cover, accelerating erosion, and is threatening biodiversity. Chaotic urbanization, road and building construction practices that ignore environmental considerations, conversion of the forest to agricultural uses, overgrazing, and failure to adopt soil conservation practices that complement the ancient terraces have combined to create a scarred land which contrasts sharply with the beauty of the pre-war architecture and the patches of forest that have survived the war, the fires, and centuries of human settlement.

4.1 Degradation of Urban Environment

Types and sources of environmental degradation. Urban areas suffer from air and noise pollution, traffic congestion, unsightly construction that violates the landscape, and lack of green space. Also, the architectural and historic heritage is threatened by the gradual demolition of historic buildings and ill-adapted construction near historic sites.

Causes of environmental degradation. The degradation of the urban environment can be traced to bureaucratic and ineffective urban planning, urgent housing needs resulting from displacement of people due to the war, lack of incentives for the preservation of old buildings with architectural value, and lack of awareness of the impact which these urban ills have on human health, the human psyche, and the natural resources upon which our survival depends. The METAP report on environmental policy options noted that there is weak support by government and the general public for planning controls, and that municipalities view master plans as attempts to inhibit private sector growth. Individuals feel that they have a sacred right to dispose of the land they own as they wish.

Who's doing (or planning to do) what? The Beirut Central District is being rebuilt through a creative private sector financing scheme, and there are signs that the result will be an environment much more conducive to human activity than is the present scene of devastation. However, some scholars and citizens are concerned about the loss of the traditional character of downtown Beirut. AL-TOROC is planning three toll roads, to be constructed by the private sector on a BOT basis, which should ease traffic congestion and reduce the incessant blaring of horns. Hopefully, the designers and builders of these roads will be guided by respect for the environment. Urban noise levels are being monitored on a random basis and the results are publicized in the local press accompanied by discussions of the impact on human health and standards used elsewhere. UNDP, through the Local Initiative Facility for Urban Environment (LIFE), is helping city dwellers find local solutions to environmental problems. UNDP is also providing \$100,000 to the Urban Management Program to support the sustainable development efforts of local authorities. Finally,

the Directorate General of Antiquities is taking drastic measures to protect historic sites and monuments, such as putting over 200 old buildings, e.g., in Beirut and Jounieh, on the list of protected sites, thereby protecting them from demolition.

Policy and institutional options. The METAP report on environmental policy options (METAP, 1995b) recommends enforcement of existing laws, development of visionary urban development plans, the creation of a Conservation Development Authority, the introduction of development completion bonds,⁵ the establishment of transferable development rights, the levy of development charges, and subsidies and grants to encourage conservation of buildings and land. But it is not evident that any of these recommendations is being acted on. Individuals with whom we met suggested the construction of an underground public transport system, promotion of car pooling, and construction of a coastal railway as projects which could contribute to the solution of the traffic and noise problem. Few people even mentioned chaotic urban growth as an environmental problem.

Lebanon needs assistance in formulating a regional strategy to develop growth zones in other areas of the country and slow the growth of Beirut and its suburbs. The General Directorate of Urban Planning needs to be strengthened, and its budget should make provision for using consultants as necessary. USAID might contribute by supporting a program which would include activities to increase the awareness of the general public of the impact of uncontrolled urban growth, training activities for engineers and architects on environmentally-sound design and construction techniques, and special awareness activities for parliamentarians and government officials (this, perhaps, as an addition to USAID's ongoing program with the Parliament). The awareness campaign would utilize existing facilities at AUB and provide support for the work of NGOs, the press, and universities.⁶

4.2 Degradation of The Natural Landscape

Types and sources of environmental degradation. Overgrazing and conversion of forests to agriculture are the major long term sources of landscape degradation. More recently, chaotic urbanization, uncontrolled quarrying, road construction, and the dumping of excavation debris, especially in the rush to rebuild and provide housing for growing populations following the war, are rapidly degrading the landscape. Buildings designed with no consideration for their surroundings are replacing green areas. Quarries are exploited with no apparent thought to the restoration of the land, and roads are built with no concern for stabilizing slopes above and below them, or to preserving the natural beauty of the areas through which they pass.

⁵ These are essentially performance bonds posted by developers as a requirement of obtaining building permits. Their purpose is to ensure that projects are completed as designed. This is a major problem in Lebanon where buildings are often left unfinished, or surroundings are not landscaped.

⁶ An awareness program which would address the urban problem, as well as other environmental issues, is suggested by the team. See Section 8.1.

Causes of environmental degradation. Inequitable access to economic opportunity is probably the most important historical cause of landscape degradation. More recently, poor land use planning, lack of enforcement, lack of accountability, the increased demand for construction materials, and lack of appreciation and respect for the natural environment have become major contributors to degradation of the natural environment.

Who's doing (or planning to do) what? Recent efforts to set aside and protect forested areas undertaken with GEF assistance, combined with legislation to prohibit the cutting of trees may be slowing deforestation to some extent. However, the legislation is not fully effective. A recent study (Ministry of Agriculture, 1996) recommended that several areas be added to the protected area system, and a second GEF biodiversity project is being prepared. In addition UNDP is about to begin the implementation of a regional GEF biodiversity project in Lebanon, Syria, and Jordan. Perhaps rural to urban migration and the relative isolation of much of the remaining forest are more important than any government or NGO efforts. The harvesting of pine nuts has been important in saving much of the pine forest. But management of these forests for pine nut production leaves a very unnatural looking forest. MOE, with technical support from UNDP Capacity 21 and SIU 3, is developing EIA requirements for both the public and private sector which should reduce degradation caused by poor building and road construction practices. Most of the people with whom the team met seemed unaware of the degradation caused by poorly designed buildings and poor road construction practices—yet these eyesores are among the first signs of environmental degradation to catch the eye of the visitor. Both MOE and the NGOs are concerned about quarrying impacts and are likely to combine forces to raise public awareness of the problem and sponsor legislation to deal with it. In urban areas the concern which Solidere has shown for preserving archaeological sites and providing green space in the center of Beirut is a positive sign, as is the preservation of the historic waterfront in Byblos and the lack of urban sprawl in the Nahr ed Damour valley.

Policy and institutional options. Increased efforts are needed to develop the economic potential of Lebanon's remaining forested areas. Lebanon could probably benefit from learning more about success stories or promising approaches to biodiversity conservation in other countries—especially efforts which involve local communities in the management of protected natural areas and their buffer zones and NGO/ public sector partnerships. Possibly more could be done to develop non-timber forest products such as pine nuts. Once EIA procedures are in place, both the public and private sectors are likely to need help in preparing EIAs and developing and implementing appropriate mitigation measures for road and building construction. Enforcement is likely to be a problem. Perhaps NGOs and universities could work together with the press on monitoring and reporting on compliance. The awareness activities, including training for engineers and architects, described in the previous section and section 8.1 could also contribute to the solution of this problem.

4.3 Soil Erosion

Types and sources of environmental degradation. By 1978 deforestation, overgrazing, poor agricultural and soil conservation practices, improper road construction, and inappropriate urbanization had left 52 percent of Lebanon's national territory of slightly over one million hectares so eroded that it was classified as rocky, non-cultivated lands, and degraded rangeland. According to an FAO report issued that year, the remaining land was classified as follows: 25 percent, or 260,000 hectares, arable; 7 percent was more or less degraded forest (over 10% cover); 6 percent was sparse forest (less than 10% cover); 7 percent were abandoned lands; and 3 percent urban areas. The information on forests comes from an FAO mapping activity carried out in 1966, and forest cover is likely to be considerably less today. Similarly the urban area has increased significantly since the 1970's. A later FAO report (1980) apparently used a different data source since it indicates that there are 360,000 hectares of arable land in Lebanon, of which 285,000 hectares were being cultivated in 1980. According to the METAP report (METAP, 1995a), slightly over 200,000 hectares were in cultivation by 1995. The decline presumably is largely a result of rural to urban migration during the civil war.

The decline in area under cultivation has been accompanied by lack of maintenance of terraces and increased soil erosion. Apparently there are no data available on the impact of erosion on agricultural productivity or the sedimentation of reservoirs. Mr. Saliba, of Green Plan, mentioned that Green Plan cleans sediments from the small hillside ponds it constructs every five years but added that sedimentation is not a serious problem because so little soil remains in the area above 800 meters elevation where these reservoirs are constructed. At the Litani River Authority, we learned that storage capacity of the Qaraoun reservoir has been reduced somewhat, but that, after 30 years of functioning, sediments have not reached a level where they interfere with the out-take for hydroelectric generation. However, 10 years ago the drain was opened to lower the water level in the reservoir, and sediments were flushed from the drain for several hours.

Causes of environmental degradation. In addition to lack of maintenance of the terraces, other factors that contribute to accelerating soil erosion are inequitable access to economic opportunity; failure to use other, less costly, soil conservation measures; lack of pasture management practices; and lack of enforcement of road construction standards. In some areas, insecure land tenure makes farmers unwilling to invest in soil conservation measures. In addition, to the extent that the law makes all trees the property of the state, private land owners may be less interested in reforestation or caring for existing forests. Also there may not be widespread understanding of the importance of forests in protecting soil and water resources.

Who's doing (or planning to do) what? The World Bank and IFAD are financing a project with Green Plan to prepare terraces on 3,100 ha. and construct retaining walls on these as well as existing terraces. The authors did not spend enough time in Lebanon or find sufficient literature to judge the adequacy of these World Bank-funded activities to control soil erosion. In 1992, a UNDP mission determined that at least 130,000 hectares were in need of reforestation to protect soil and water resources and recommended that UNDP provide \$30 million over five years (1995-2000) to

reforest (plant trees) on 20,000 hectares. NGOs, such as GreenLine and the members of the Reforestation Network, are currently carrying out "reforestation" programs, but these programs promote the planting of individual trees rather than forests, do not appear to be targeted on high priority areas, and do not utilize natural regeneration or other relatively low cost methods of reforestation. School tree nursery programs, such as that being implemented by Green Line, may be good tools for increasing environmental awareness, but they are unlikely to have significant impact on soil and water conservation in the short to medium term. The Ministry of Agriculture, in collaboration with NGOs, is implementing a program, financed by the EU, to establish vegetative cover on 1,000 hectares on each of three pilot sites over a three year period. The UNDP provided \$70,000 to prepare a National Action Plan to Combat Desertification.

Policy and institutional options. The METAP report (METAP, 1995b) recommends that Green Plan be given responsibility for developing and implementing a program to repair damaged terraces, and notes that it is not clear whose responsibility it is to maintain them. The report indicates that the cost of repairing terraces is about \$7,000 per hectare, and that repairing all of the degraded terraces in Lebanon would cost \$250 million, a sum that neither the MOA nor the farmers could raise. Government officials, NGOs, farmers, and others need to become aware that there are a variety of relatively low-cost alternatives to terraces with rock walls and tree planting programs to combat soil erosion and enhance soil fertility, and that priorities should be established for programs with these objectives. A program to demonstrate low-cost technologies for the conservation of soil, water, and biological resources is briefly described in Section 8.6 of this report, and in Section 8.5 a program that combines such activities with others in the Litani River Basin is described.

4.4 Loss of Biodiversity

Types and sources of environmental degradation. Deforestation via conversion to agriculture, illegal harvesting, and forest fires; overgrazing and illegal grazing; harvesting of aromatic, wild and medicinal plants; inadequate coastal zone management (including waste water, garbage, and industrial waste dumping; sand dumping and removal; fuel spills; urbanization; and drainage of wetlands) are rapidly destroying the habitat for Lebanon's biodiversity and permanently foreclosing options for future economic development. The improper use of agrochemicals, unmanaged hunting, and pollution of streams, rivers, and sea water is altering ecosystems in ways which we have only begun to understand.

Causes of environmental degradation. The causes of biodiversity loss are similar to those listed above for soil erosion. Additional factors are lack of development of the economic potential of natural areas and biological resources, lack of awareness, lack of information on biodiversity and its economic value, and lack of institutional capacity. Several of the reports on the state of Lebanon's environment, most notably the Environmental Strategy Framework Paper, acknowledge that loss of biodiversity is irreversible, but apparently the authors do not appreciate the potential value of biodiversity. They do not include loss of biodiversity in their list of problems which must be addressed urgently.

Who's doing (or planning to do) what? UNEP and the MOA have published a nine volume study on the Biological Diversity of Lebanon. The UNDP is financing (\$2.5 million) a Global Environmental Facility (GEF) project being implemented by IUCN in collaboration with the MOE, local NGOs, and scientific institutions which is developing three natural areas—Jabal Barouk, Horsch Eden, and the Palm Islands. UNDP has also provided \$150,000 for a GEF activity to assist the MOE in carrying out a biodiversity inventory and preparing an action plan. A GEF project, to be financed by the French, to protect wetlands and coastal areas at Tyre and Ammiq is expected to start soon. A \$10 million regional (Jordan, Lebanon, Syria) GEF project to conserve selected terrestrial plant species through on-site conservation efforts is being developed.

Policy and institutional options. USAID could contribute to the conservation of biodiversity by including the subject in the awareness program described in Section 8.1 of this report and/or by including buffer zones of protected areas among the priorities for the ecosystem restoration program described in Section 8.6. Other possibilities include working with the ongoing GEF project to (1) develop economic activities for local residents associated with at least one of the protected areas or (2) study the economic value of one or more of the protected areas.

5. Water

5.1 Loss of Water due to Excessive Runoff

Types and sources of environmental degradation. A total of 17 perennial streams—including the Litani river, which drains the southern Bekaa plain and crosses Mount Lebanon before discharging into the Mediterranean—and 23 seasonal streams discharge about 2,000 million m³ of freshwater annually into the Mediterranean sea and carry an additional 500 million m³ of water across the borders to neighboring countries. The longest coastal river (58 km) is Nahr el Kebir, which forms the northern border with Syria. Rivers in the north are better supplied and continue to flow late in the summer due to snow melt. Stream flow peaks in March, and declines rapidly during the dry season. In August and September it is about 15% of the average flow as compared to 230% in March. Once permanent, most coastal rivers nowadays completely dry up during the summer; e.g., Nahr Beirut and Nahr el Kalb, where water is diverted for industrial and residential uses.

Because of Lebanon's topography and geology, there are numerous freshwater springs offshore (e.g., Batroun and Jounieh Bay). Most of these are clearly visible in spring. Some trickle throughout the year. The National Council for Scientific Research has commissioned a study of these offshore freshwater springs using aerial infrared photography.

Approximately half of the annual precipitation is lost to evaporation and surface flows to the sea. Additional quantities of water are lost to infiltration to ground water flowing to the sea (10% of total precipitation) and as surface flow to neighboring countries (8% of the total). Reports available to the team do not assess the importance of these losses, but the METAP report predicts that Lebanon will experience water shortages by 2010. The report places a large share of the blame on wasteful use of irrigation water and does not discuss the potential of improving water supply by managing watersheds. While data are not available, it appears that deforestation and soil erosion are likely to be major causes of rapid runoff of surface waters.

Distribution of precipitation, in time and space, is also a problem. Most precipitation, even snow melt, is available before the growing season begins and most of it falls on Mount Lebanon, far from the important agricultural areas which use the most irrigation water.

Causes of environmental degradation. Excessive runoff is due almost entirely to destruction of the natural vegetative cover for agriculture, grazing (most often over grazing), and urbanization. Data are not available to indicate how much, if any, of the annual losses to runoff and infiltration is due to poor land use practices, but studies do indicate that 50 percent of the land area is severely degraded. It is likely that this degradation has contributed to excessive runoff. The causes of deforestation, soil erosion, and loss of biodiversity are discussed above (see Chapter 4) and are also to blame for excessive runoff. Chaotic urbanization also contributes by destroying natural vegetative

cover and decreasing the moisture storage capacity of the soil but, more importantly, by preventing precipitation from infiltrating into the soil, covered as it is by cement and asphalt.

The METAP report mentions that the water which does not escape is not used efficiently due to low prices for irrigation water which results in overuse and the use of inefficient technologies. The report also mentions that irrigation is resulting in the salinization of soils.

Who's doing (or planning to do) what? Since there is little or no recognition that excessive runoff may be a problem, the team found no evidence that anyone is doing anything about it. Of course, protected area management, reforestation, and soil conservation programs are all likely to contribute to improving the moisture storage capacity of soils. However, none of these programs appear to be targeted at protecting water resources. None of the people the authors met mentioned protection of water sources as a priority. Perhaps the restructuring of the 22 small water boards into five regional water and wastewater authorities will lead to greater recognition of the importance of watershed management and an increased understanding of the strategies available to insure a continued supply of water.

Policy and institutional options. Lebanon urgently needs a water resource inventory to form the basis for development plans. Since there appear to be no data on the impact of destruction of natural vegetative cover on the availability of water for human consumption, irrigation, or hydroelectric generation, it might be useful for one or more universities to collaborate with appropriate government agencies to carry out hydrologic studies for one or more critical river basins, such as the Litani, to determine how land use is affecting water yield. A public awareness campaign to make the general public, as well as government officials, aware of the relationship between vegetation and water yield might also be appropriate. One or more small projects with NGOs to restore vegetative cover in small watersheds that are the source of water for rural communities might stimulate a broader national program to protect water supplies.

5.2 Pollution of Freshwater Resources

Types and sources of environmental degradation. According to a recent study,⁷ 23 out of 34 springs and boreholes used for public water supply at altitudes of 300 meters or less are contaminated with fecal coliform. Also, sketchy data suggest pollution of coastal aquifers and rivers with organics, heavy metals, and pesticides. Contaminated springs and boreholes account for about 85 percent of the combined yield of all tapped freshwater sources in the coastal zone (382,900 m³/day compared to a total of 452,210 m³/day). The three largest sources (all springs)—Jeita, Ras el Ain, and Nabaa Abou Halqa—are all contaminated. Also, Lake Qaraoun (Litani) is reportedly heavily polluted with organics, pesticides, and heavy metals. According to Mr. Ruwayhib of NCSR, the Litani River Authority had to secretly empty the lake on one occasion due to severe pollution

⁷ Humphreys, 1995.

with heavy metals. Also, the hydropower turbines occasionally cannot function due to excessive algae growth.

Primary sources of contamination are uncontrolled disposal of domestic and industrial wastewater into the ground, runoff from animal farms and agricultural fields where pesticides and fertilizers are applied in excessive doses (in particular in the Akkar, Kasmieh, and Bekaa plains), a sharp increase in aquaculture production (from 10 tonnes of trout per year about 10 years ago to 500 tonnes last year), and uncontrolled, direct access by humans and animals to water sources. Another major source of pollution is saltwater intrusion due to excessive pumping of ground water near the coast, with chlorine levels in wells near Beirut rising from 200 ppm in 1968 to 4,000 ppm in 1985.⁸

Causes of environmental degradation. As discussed earlier, delays in creating regional water and wastewater authorities have meant that responsibility for water resources and wastewater management continue to be fragmented and inconsistent. MOE and the future regional water and wastewater authorities will be responsible for preserving the quality of water resources. Currently, however, no one institution has this role. In the case of the Litani river, for example, the Litani River Authority is charged with managing Qaraoun Lake and producing hydropower and water for drinking and irrigation, but has no authority to require industries and communities upstream to control their discharges into the river. Two years ago, a commission, with representation from the Authority, the MOE, MOHER, Parliament, etc., was created to study the pollution of the Litani river. But it is not clear what decisions it took, if any. Other causes of degradation include lack of incentives for careful water use and conservation (subsidized irrigation water encourages wasteful use), and lack of information on the extent and impacts of water pollution, especially in the Litani river and Bekaa and coastal aquifers. Moreover, the causes of improper waste disposal and chemical usage discussed in Chapter 3 also contribute to freshwater pollution.

Who's doing (or planning to do) what? The Coastal Pollution Control and Water Supply Project will reduce pollution of water resources and help strengthen institutional capabilities for water resource management. The EC-funded Sector Implementation Unit 1 (SIU 1) has helped the MOHER develop and implement its water resource and sanitation program. It will be replaced by the EC-funded Investment Planning Programme (IPP).

Policy and institutional options. Policy opportunities include water pricing reforms, adoption of the polluter-pays principle, providing appropriate incentives for improved agricultural and irrigation practices, rigorous licensing of wells for ground water, educational programs on water conservation, and measuring water supply and monitoring the quality of water resources. The Litani river basin provides an excellent opportunity to test these different approaches to integrated water resource planning and management. Also, the to-be-established water and wastewater authorities will need institutional strengthening and capacity building support.

⁸ Khair, et al, 1994.

5.3 Depletion of Underground Aquifers

Types and sources of environmental degradation. Excessive pumping from underground aquifers is a problem in Lebanon, but it does not appear to be fully appreciated. The METAP and coastal zone studies note that salt water intrusion may be a problem in Beirut as well as several other coastal areas. Mr. Saliba, of Green Plan, observed that pumping for irrigation and potable water in the Bekaa is lowering the water table significantly. But Mr. Awaida of the Litani River Authority, did not think that there is no problem with ground water supplies in the Bekaa. In other areas of the world, excessive pumping of ground water so lowered the water table that large areas of land began to sink, and ground water became so depleted that the continued productivity of important agricultural areas was jeopardized.

Causes of environmental degradation. Lack of information and unclear lines of governmental authority are important causes of depletion of ground water supplies. Salt water intrusion in coastal areas is due largely to pumping of potable water because municipal supplies became undependable during the civil war. Irrigation for intensive agricultural production also contributes to the problem. In the Bekaa, lowering of the water table is due mostly to use of water for irrigation. But the uncertainty of municipal potable water supplies during the civil war is also a contributing factor.

Who's doing (or planning to do) what? Since there is little agreement that there is a problem, little is being done. The restructuring of the water authorities referred to in Section 5.1, as well as the strengthening of MOHER and MOE, might facilitate the sound management of both surface and ground water resources.

Policy and institutional options. Empirical data on the quality and quantity of water are needed urgently. The METAP study suggests that a water resource strategy be developed to address the following issues:

(1) *Supply*

- distribution;
- water supply networks;
- storage;
- forecasting;
- forward planning; and
- transboundary transfer of water resources.

(2) *Demand Management*

- reform of property/water rights;
- rehabilitation/redesign of irrigation schemes (already underway as part of rehabilitation programme);

- charging systems (agricultural, industrial, and domestic users); and
- metering.

The study also recommends that until more is known about the aquifers in Lebanon, further water development should be limited to surface waters. USAID might be able to contribute to management of Lebanon's ground water supplies by bringing people familiar with the management of groundwater in the Southwestern United States, as area which has faced similar problems, to Lebanon to consult with Lebanese water authorities. The fruit growers of Hermosillo, Mexico, who cooperatively manage their ground water resources, might also be useful contacts. USAID could probably also provide additional expertise on water management.

6. Coastal Zone

This chapter draws upon a recent regional environmental assessment report on the coastal zone (CDR, 1997b). Lebanon's coastal zone, which extends over about 162,000 hectares of coastal plains and mountains (16 percent of Lebanon's surface area), is inhabited by an estimated 2.51 million people (approximately two-thirds of the total population), and contributes about 73 percent of Lebanon's GDP. Along the shoreline there are four commercial ports and over 15 fishing harbors, dozens of sea pipelines for petroleum imports, three fuel power plants, and various industries. The coastal zone is rich in cultural/archaeological heritage and natural landscapes and contains key drinking water sources. Its beaches and valleys offer excellent getaway destinations for urbanites as well as the potential for international tourism development.

6.1 Pollution of Coastal Waters

Types and sources of environmental degradation. Coastal waters are polluted as a result of direct sewage and industrial effluent discharges into the sea as well as solid waste dumping on the shoreline (Beirut, Tripoli, Saida). Other sources of pollution include illegal discharges of ballast waters from ships and accidental oil spills. According to the National Center for Marine Sciences (NCMS), coastal waters in several areas are unfit for bathing due to high bacteriological contamination. Also, trace levels of heavy metals and pesticides have been detected in fish species; such levels could become dangerous in the future if current trends continue. Although there are significant discharges of nitrates and phosphates into the sea through sewers and rivers, Lebanon's coastal waters are relatively poor in nutrients, and have not experienced any eutrophication problems or toxic algae blooms so far.

Causes of environmental degradation. See causes of environmental degradation from waste disposal and chemical use (Chapter 3). With regard to accidental oil spills, the war-time proliferation of sea petroleum pipelines along the coast has increased the risk. However, the severity of this problem is expected to decrease slightly once petroleum storage facilities between Dora and Antelias are relocated to 275,000 m² of land to be claimed from the sea by LINORD's "sea reclamation" project between Nahr Beirut and Antelias, provided appropriate safeguards are followed when pumping petroleum onshore and adequate contingency plans and emergency response capabilities are put in place.

Who's doing (or planning to do) what? Construction of the planned sewage treatment plants (STPs) along the coast will reduce pollution in the Mediterranean, especially if secondary treatment plans are built. Also, closure of the Borj-Hammoud dump site (Beirut) and the Tripoli dump site (protected by a sea dike since last summer) will eliminate the release of solid waste and debris into the sea. CDR and the World Bank plan to carry out a long-term monitoring study of coastal waters.

The National Center for Marine Sciences, which recently relocated from Jounieh to Batroun, should play an important role in this study.

Policy and institutional options. The NCMS needs institutional strengthening to be able to conduct marine coastal research and provide much needed baseline indicators, including data on stabilization and accretion of coastal sands, quality of bathing waters, quantity of fish landings, presence of tar balls on beaches due to oil spills and ballast water, levels of heavy metals in whelks, contaminant levels in seabird eggs, and status and presence of bio-indicators such as zosteria, sea-urchins, and groupers.

6.2 Reduced Public Access to the Coastline

Types and sources of environmental degradation. Public access to the beach has been eroding as beaches are privatized. This problem predates, but was exacerbated by, the civil war. During the war, numerous illegal structures were built along the coast, including in the maritime public domain, making access to the coast impossible in those areas. According to the Ministry of Transport, about 240 hectares of land or water were illegally occupied as of January 20, 1995. A recent study estimated that approximately 27 km of the coastline (about 10 percent) are occupied by illegal private sea resorts, dikes, and sea reclamation projects. And the problem is growing. The Metn-Nord, LINORD, ELISSAR, and SIDON projects would close off approximately 12 km more. And other potential tourism projects could privatize several other stretches of prime beach front and coastline in Tripoli, Amsheet, Byblos, Damour, Jiyeh, Saida, and Sour.

Causes of environmental degradation. As noted, the reduced public access problem intensified considerably during the war as developers seized the opportunity to make a profit by building in the maritime public domain. Effectively, they received the land for free. Conversely, "legal" privatization of the beach has resulted from a pernicious application of Legislative Decree 4810 (1966) on conditional use of the maritime public domain, which allows for granting coastal tourism and industrial projects exceptional authorization to use the maritime public domain, provided these projects are declared of public utility and do not interrupt the continuity of the coastline. According to Article 1-6 of Legislative Decree 4810, owners of seafront properties may use (lease) the adjoining maritime public domain to an extent double the area of their property and within the limits of their lot frontage. Although Legislative Decree 4810 unequivocally provides for the right of public access to the maritime public domain, permits granted (under Article 1-6) for conditional use have led to the *de facto* privatization of the coast. Other causes include lack of awareness of the importance of the beach as a leisure and tourist destination and slow and unorganized response from NGOs. Also, due to poor planning, key municipalities such as in Beirut and Tripoli resorted to seaside dumping of solid waste; and reclamation of solid waste dump sites later provided a rationale to claim more land from the sea (LINORD, SIDON, SOLIDERE).

Who's doing (or planning to do) what? The CDR study on the coastal zone proposed that Decree 4810 be revised, especially the provisions of Article 1-6. With regard to the waterfront

violations, Council of Ministers Decree 7919 of February 2, 1996 submitted on an urgent basis draft legislation to Parliament aimed at settling violations that have occurred in the maritime public domain prior to January 1, 1995. The proposal would offer violators an opportunity to regularize their situation for a fee. The draft law prescribes a formula to calculate the settlement fee and calls on the Minister of Transport to draft procedures and criteria for preparation and review of settlement applications submitted by violators. This is an extremely controversial decree, and Parliament has not yet taken any action on it.

Policy and institutional options. Support could be provided to the GOL in addressing the policy and institutional issues raised by the coastal zone study. This could include help in developing a coastal zone land use plan and revising the decree on conditional use of the maritime public domain and the various coastal zoning decrees. Also, more work is needed to raise the awareness of citizens of the importance of the beach for them and for future generations. Finally, creating an Observatory of the Coastal Zone could help inform the debate for protection and sustainable management of the coast. The mission of such an Observatory would be to monitor development activities in the coastal zone, track specific environmental indicators, such as public access to specific beaches, coastal pollution levels, etc., and make information available to GOL agencies and the public.

6.3 Loss of Beaches

Types and sources of environmental degradation. As discussed in the previous section, the beaches of Lebanon are being lost to urbanization and sea reclamation projects (LINORD, ELISSAR, etc.). The other major cause of beach loss is the erosion of sandy beaches due to a deficiency in sediment (e.g., Jounieh beaches). Some experts have speculated that this could be due in part to the construction of the Aswan High Dam in Upper Egypt. Given the prevailing off-shore currents in the Eastern Mediterranean, sediments were previously carried northeast from the Nile Delta to the beaches of Gaza, Israel, and Lebanon. However, since no monitoring of the coastline has been carried out in Lebanon, it is difficult to ascertain the extent to which the Dam is contributing to beach erosion in Lebanon. Apart from this possible source of sediment loss, three kinds of extracting activities could cause or exacerbate coastal erosion in Lebanon: sediment dredging offshore, sand extraction on beaches, and gravel quarrying in river beds. Also, improper building of jetties and marinas has led to the erosion of adjacent sand beaches.

During the summer of 1996, large scale dredging—authorized by the GOL—was carried out offshore south of Beirut to provide 3.5 million m³ of fill material for the North-Metn project. More dredging is expected in the future to provide fill material for the new reclamation projects (LINORD, SIDON, etc.). Sediment extraction on beaches for the supply of sand to the construction industry was widespread in Lebanon during the war. Sand extraction has led to severe coastal erosion and sand beach loss or degradation at Akkar (43,000 m³ of sand lost), Abde (53,400 m³, coastal road eroded), Beirut (54,000 m³), Qasmiyeh (92,000 m³), Jieh (67,000 m³), Remaileh (42,900 m³, section of railway disappeared), and south of Tyre. Gravel quarrying in river beds is still carried out in

Lebanon, e.g., inferior part of Nahr ed Damour. Upstream extraction of sediment will cause the gradual disappearance of sandspits and infralittoral sandbars at river mouths and their adjacent shores, thus leading to further beach erosion.

Causes of environmental degradation. A combination of greed, lack of awareness, and lack of public mobilization enabled the extraction of sediments from beaches—sometimes with a permit from the GOL—during and right after the war. More recently, increased awareness and public mobilization since the end of the war seems to have succeeded in putting an end to such practices. Lack of information on the dynamics of sediment transport off the coast of Lebanon prevents proper planning of future coastal projects (“sea reclamation” projects, ports and harbors) and large-scale offshore dredging of sediments, which could lead to further coastal erosion and loss of marine and coastal habitats.

Who’s doing (or planning to do) what? The GOL is studying the potential for extracting sediments offshore to reduce pressures on quarries inland. A portion of the extracted sediments also would be used to rehabilitate degraded beaches. NGOs are conducting awareness campaigns to protect the remaining beaches and coast, but lack the resources necessary to mobilize the public. Last summer, operation Big Blue, which was sponsored by the President of Lebanon and focussed on cleaning up beaches, drew attention to the importance of protecting the remaining sand beaches of Lebanon. The GEF Protected Areas project is developing a management plan and putting in place a park system for the Nakhl Island reserve, where sea turtles came to nest this past summer for the first time in several decades.

Policy and institutional options. The return of the sea turtles—a threatened species—to nest on the sand beaches of Nakhl Island and Tabarja (30 km north of Beirut) provides a significant boost to the effort to protect the remaining sand beaches of Lebanon on ecological grounds. NGOs need to be more aware of this event and develop their capabilities to monitor developments on the beach. Technical and policy support, including EIAs and an assessment of costs and benefits, may be needed before the GOL decides to conduct a sustained campaign of sediment extraction from the sea floor.

7. Air

7.1 Air Pollution

Types and sources of environmental degradation. A recent study⁹ found ambient sulfur dioxide (SO₂) concentrations near the Jiyeh and Zouk power plants and the Chekka cement plant to be higher than the annual average standard of 75µg/m³ in Lebanon or 80µg/m³ in the United States. Areas likely to experience the worst air quality due to the combined effects of fuel consumption and temperature inversions are Beirut and Zouk. Other hot spots for air pollution from non-energy sources include the Chekka-Selaata and Sibline areas. In both of these areas, pollutants included particulate matter and asbestos fiber from quarries and cement and asbestos plants and fluorides from fertilizer plants. Again, in both areas there is strong anecdotal evidence of respiratory diseases, although no epidemiological studies have been done.

Industry, energy and transportation contribute almost equally to emissions of CO₂ and Total Suspended Particulates (TSP), while industry and energy are the primary sources of SO₂ emissions and transportation is the primary source of NO_x and lead emissions. Traffic emissions have a big impact on Lebanon's air quality, especially in the Greater Beirut Area. Vehicle emissions, particularly in urban areas, are likely to be causing elevated lead and ozone concentrations, especially during still hot days, when pollutants are trapped due to air temperature inversions and photosynthesized.

Causes of environmental degradation. Data continue to be lacking regarding the extent of air pollution and the severity of its health impacts. Urban air pollution from transport is caused by the high level of vehicle ownership (215 vehicles per 1,000 inhabitants according to the METAP report), the age structure and condition of the vehicle fleet, low engine efficiency and the absence of emissions inspections, the continued use of leaded gasoline, the dominance of private cars over public transport and public resistance to car pooling. Good quality public transportation continues to be lacking, although noticeable improvements have occurred in recent years, thanks to the private sector. Although the GOL prepared detailed plans for a regional subway for the Metropolitan Region of Beirut, there is no indication that such a system will be built in the foreseeable future. In fact, the planned toll roads (see next paragraph) may obviate the need for such a system.

According to the Association Libanaise Pour la Maitrise de l'Energie (ALME), Lebanon's energy intensity was about 4.5 Mtoe per US\$1,000 of GDP in 1995, or about 2.2 times the developing country average, suggesting major inefficiencies in energy production and use. Electricity subsidies, estimated at about \$100 million in 1995 in the METAP report, have been significantly reduced, with sharp resultant increases in the price of electricity. As a result, many households are currently shifting back to the use of gas and fuel oil (mazout) heaters instead of the

⁹ Chaaban and Ayoub, 1996.

old electric heaters. Gas and fuel oil continue to be relatively cheap, thanks to low taxes on fuel imports, which may help explain why there is little demand for solar water heaters in Lebanon. Also, there are no financial incentives for people to install solar heaters or to take energy conservation measures.

Who's doing (or planning to do) what? With technical support from SIU 3, the MOE has prepared a strategy for reducing air pollution from transport, focusing on phasing out leaded gasoline and preventing the introduction of diesel fuel private vehicles. Large private firms, such as cement plants, are coming under increased public and MOE pressure to install air pollution control equipment. There is some uncertainty about the GOL's plans to reduce SO₂ emissions from the Zouk, Hreiche, and Jiyeh power plants by installing wet scrubbers; Electricité du Liban is exploring new options such as scrapping the existing plants altogether and replacing them with new, more efficient, and cleaner ones. The two new combined cycle power plants in Beddawi and Zahrani will not emit significant amount of SO₂ once they shift from burning fuel to natural gas after the first few years of operation. AUB's Dr. Iman Nuweyhid and the Foundation for Human Environment are conducting two separate studies to measure the concentration of lead in the blood of children. The upcoming EC-funded Investment Planning Programme (IPP) for the environment will assess requirements for a National Air Quality Monitoring Network and will assist in operationalizing the Network, which will consist of at least two fixed air quality monitoring stations. The GEF climate change enabling activity based at MOE will build capacity for Lebanon to fulfill its commitments to the UN Framework Convention on Climate Change, especially with respect to CO₂ emissions, and will respond to the objectives of the Convention on a continuing basis. Finally, the three planned toll roads (Arab highway, Northern coastal highway, and Beirut beltway) are expected to reduce traffic congestion and urban air pollution.

Policy and institutional options. Policy and institutional options include increasing the price of gasoline¹⁰, providing a price incentive for unleaded gasoline, eliminating the use of leaded gasoline and limiting car imports to those with catalytic converters, instituting periodic car emissions inspections, encouraging car pooling, improving the public transport system, improving traffic management, restricting the use of private cars at times of poor air quality, monitoring air quality in hot spots and establishing an air quality monitoring and information body, educating the public about air quality and health, removing energy subsidies and promoting energy conservation, and establishing air quality standards and enforceable emission limits.

¹⁰ Although this was tried before, and failed.

7.2 Global Climate Change

The underlying causes of emissions of global climate change gases were discussed in the previous section. This section focuses on a specific option to assist in developing greenhouse gas reduction projects.

USAID could consider providing assistance to the GOL, universities, and NGOs to prepare one or more projects, such as a solar energy project, for funding through global climate change joint implementation programs. The U.S. and most European countries have joint programs. A properly designed program would mitigate Lebanese environmental problems while making a contribution to the reduction of greenhouse gas emissions. A small investment by USAID in the design of such a project, or projects, could leverage much larger levels of funding through joint implementation programs, increase the awareness of Lebanese organizations of the existence of these funding sources, and increase the financial viability of the projects. The first step in joint implementation assistance would be to investigate, through USAID's representation on the U.S. Initiative on Joint Implementation's (USIJI) Secretariat, (1) the success that projects approved by USIJI have had in marketing carbon rights and (2) the funding mechanisms used by other joint implementation programs.

8. Opportunities for Policy Reform and Institutional Strengthening

Table 1 provides a summary of pertinent environmental issues related to waste disposal and chemical use, land, water, the coastal zone, and air, and policy/institutional options for addressing them. As already indicated, this report updates and builds on the recommendations of the METAP studies (METAP, 1995a&b), the draft Environmental Strategy Framework (World Bank, 1996), and the coastal zone study (CDR, 1997b). The discussion of issues and options follows closely the five priority areas identified by the METAP and CDR studies.

Based on the team's assessment of the importance of current environmental issues and the extent to which the important ones are (or are not) being adequately addressed, a *preliminary list* of 10 programs were identified which appeared to be good opportunities for USAID/Lebanon to support policy and institutional approaches to the remediation of high priority environmental concerns:

1. Develop and implement a long-term, landmark environmental awareness campaign targeted at the youth of Lebanon, (perhaps including a mascot);
2. Test and demonstrate low-cost, environmentally-sound waste disposal techniques in rural areas through pilot activities in community clusters;
3. Test and demonstrate policy and institutional approaches for industrial pollution control and prevention through a pilot activity in the Shuweifat Industrial Zone;
4. Develop air pollution standards based on actual data and cost-benefit analyses;
5. Conduct a series of environmental planning and management training seminars targeted at national and municipal decision-makers, government contractors, academics, media staff, etc.;
6. Test and demonstrate sustainable water resource management practices through a pilot activity in the Litani river basin;
7. Promote ecotourism through a pilot activity in the Yammouneh area;
8. Encourage the use of solar heaters in rural areas;
9. Provide technical assistance and training in forest fire prevention and control through the U.S. Forest Service;

10. Design and begin implementing a long-term targeted ecosystem restoration program with strong participation from local NGOs and municipalities.

During the second workshop, the team presented this list and led a discussion of Table 1. Workshop participants considered these candidate programs in three small groups, and selected the three most viable based on the following criteria:

1. Interest in activity and commitment to its success;
2. Long-lasting significant improvement in environmental quality
3. Catalytic effect;
4. Priority issue not currently being adequately addressed;
5. Support to other elements of USAID program in Lebanon (*not considered by the groups due to lack of sufficient information*);
6. Support to other ongoing activities of the GOL and other donors.

The team encouraged participants in each group to add one opportunity to the list if they felt strongly about it. Only one working group did so, but that opportunity was not identified among the top three priorities by the group. Also, the workshop participants suggested combining Opportunities 1 and 5 and Opportunities 9 and 10, which brought the number of candidate opportunities down to eight.

Three out of the eight (post-combination) programs were selected by two of the three working groups: waste disposal in rural areas, water resources management, and long-term reforestation (later renamed ecosystem restoration). Three others were selected by one working group: long-term awareness campaign and training seminars, industrial pollution control and prevention, and air pollution control.

Should the USAID/Lebanon select one or more of these six programs for further consideration and development, this chapter includes some preliminary thoughts on objectives, intermediate results, and related indicators. The team also summarizes the background and rationale for each program, suggests possible activities to reach the objectives, and identifies some key assumptions and possible implementing parties. *The activities listed under each program are illustrative only. During the actual results package design process, the full range of activities will need to be developed with special emphasis on those activities that are necessary to ensure that lessons-learned/demonstrated in pilot activities feed into a policy development process.* The team assumed a budget of \$1 to \$2 million for each program. While viable programs can be designed to fit within this range (or indeed for even less), several of them would have more significant impact if additional funds were available. For example, programs that complement ongoing USAID-funded activities (AUB, LAU, and PVOs) can reinforce those activities and at the same time draw upon the larger resources available through those activities to impact on policy reform and institutional strengthening.

In addition, in Chapters 3 through 7, the team suggested several activities, not necessarily included in the following discussion, that USAID could support on a stand-alone basis with small commitment of resources; these activities include:

1. Technical assistance and training in forest fire prevention and control through the Global Bureau's PASA arrangement with the U.S. Forest Service (USFS);
2. Assistance in developing one or more greenhouse gas reduction projects for submission to the U.S. Initiative on Joint Implementation (e.g., use of solar energy);
3. Training for PVOs/NGOs in safe pesticide use and/or Integrated Pest Management, which draws upon the training which USAID developed in Central America;
4. Studying and/or developing economic potential of protected natural areas (and adjacent areas) included in ongoing GEF projects; and
5. Developing an environmental observatory, perhaps focusing initially on the coastal zone.

8.1 Long-term Awareness Campaign and Training Seminars

Objective

Increase environmental awareness and public participation in decision-making

Indicators

Environmental symbol created and widely recognized by the public
Active participation in targeted seminars leading to action on priority issues

Intermediate Results

- 0.0.1 NGOs implementing long-term public awareness campaign
- 0.0.2 Policy dialogue and sharing of ideas and experiences among key decision-makers and professionals
- 0.0.3 Universities addressing environmental issues in engineering and architectural curricula
- 0.0.4 Parliamentarians better informed on environmental issues

Indicators

1. Multi-media awareness campaign implemented by NGOs

2. At least one participatory training seminar per quarter on a high priority topic with back-at-work action plan
3. Environmental issues introduced in engineering and architectural courses at major universities
4. Members of the Parliamentary committee on the environment attend at least four half-day workshops per year

Background and Rationale

Lebanon suffers from a broad spectrum of environmental ills that have been exacerbated by civil war and subsequently by the rush to rebuild and resume economic growth. While a growing segment of the population appears to be aware of some of the problems, and the press gives reasonably good coverage of environmental concerns, especially urban concerns, most environmentalists are not satisfied with the pace of action to halt and reverse degradation. The MOE and MOEd are in the process of incorporating environmental concerns into the school curriculum at all levels, but this will not be enough. Their efforts need to be complemented by a broad and sustained campaign to make the general public aware of the most serious environmental problems that Lebanon faces. This campaign must make people aware of the causes of, and solutions to, these problems as well as their impact on public health and economic development. In addition to the general campaign, targeted training and awareness seminars must be directed at the people who can make a difference—the press, engineers and architects, industrialists, bankers, hospital administrators and other health care workers, hunters, land use planners, academics and academic administrators, urban planners, government officials, politicians, etc.

Description

The activity would probably be implemented by a group of NGOs, or a group of NGOs and universities, supported as necessary by national and international technical assistance in policy analysis, communications, and environmental specialties such as coastal zone management, urban planning, land use planning, air pollution, water pollution, natural area management, tourism, fire prevention, road construction, and architecture. Perhaps the activity could be kicked off by a nationwide contest to identify a Lebanese environmental mascot similar to Smoky the Bear and Woodsy Owl.

The activity might include the following tasks:

1. Launch a national campaign to identify an appropriate environmental symbol for Lebanon—such as a sea turtle as a sign that it is not too late;
2. Identify priority environmental issues and target audiences for each issue;

3. Identify information needs to develop convincing arguments to take corrective action for each issue;
4. Acquire necessary information;
5. Prepare plans to insure that appropriate information reaches target audiences utilizing the media, seminars, workshops, conferences, etc.;

Organize targeted seminars on high priority environmental issues;

1. Prepare and distribute educational materials;
2. Assist implementing group to prepare a fund raising plan to insure that the activity continues and expands its campaign to address emerging priorities;
3. Launch multi-media campaign; and
4. Evaluate results and make annual adjustments as appropriate.

Assumptions

1. With assistance, local NGOs can develop the capacity to design and carry out a sustained public awareness campaign.
2. NGOs will be willing to collaborate with one another and with universities to carry out campaign.
3. NGOs will be able to identify funding sources to continue awareness campaign.
4. Target audiences will participate in training program and seminars.
5. Both the public and the private sector will be willing to take action to improve environmental management.

Implementation

NGOs and universities assisted as necessary by international and national consultants
The private sector should be invited to participate actively
Coordination with appropriate GOL agencies, especially MOE and MOEd, is important
Wide consultation with representatives of all target groups

8.2 Waste Disposal in Rural Areas

Objective

Promote low-cost, environmentally-sound waste management technologies in rural areas

Indicator

Low-cost technologies adopted by at least five rural municipalities or communities

Low-cost technologies for rural areas adopted by GOL

Intermediate Results

- 0.0.1 Neighboring rural communities collaborating in jointly developed solid waste management plan
- 0.0.2 NGOs and local committees working together on sewage disposal solutions
- 0.0.3 GOL and national NGOs implementing low-cost, environmentally-sound waste management technologies in rural areas

Indicators

1. Joint solid waste collection and disposal plan developed and implemented by at least one cluster of rural communities
2. Low-cost sewage collection and treatment technologies installed and operational in at least two rural communities
3. Manual for implementing low-cost waste technologies developed, approved and distributed by GOL and NGOs

Background and Rationale

As discussed in Chapter 3, municipalities in rural areas are too weak to implement environmentally-sustainable SWM or sewage disposal. Local, grass-root level NGOs have been quite successful in implementing health and education interventions, and would be well-positioned to work on improving waste management practices, provided they receive proper technical assistance and training support. Due to the continued difficulties in finding large landfill sites (Lebanese-style NIMBY syndrome), solid waste continues to be dumped or burned alongside rural roads and in ravines, leading to land, water, and air pollution. Rural communities served with public water supplies suffer from poor sanitation and need to implement low-cost sewage treatment systems, rather than connect to a larger sanitation system. The former are more affordable, can be put in place relatively quickly, and are more environmentally and financially sustainable.

Description

This activity might include the following tasks:

1. Select one cluster of rural communities for improved SWM practices and one rural community for improved sewage disposal practices, building on the work already done by PVOs in various rural community clusters nationwide;
2. Conduct feasibility studies for improved SWM and sewage disposal practices, with strong participation and input from local inhabitants, NGOs, academic and research institutions; in the process special emphasis should be placed on adaptability to local resources and financial sustainability;
3. Conduct environmental assessment of recommended projects in accordance with USAID CFR 216 requirements;
4. Establish management plan and organizational structure for project operation and long-term financing at the local level;
5. Prepare conceptual and detailed engineering designs and plans;
6. Implement projects as planned;
7. Train project operators and supply them with operating manuals in Arabic;
8. Monitor operations over the duration of the activity;
9. Prepare lessons learned document and marketing plan for dissemination to other rural communities in Lebanon;
10. Organize field trips and leadership conference to showcase the successes achieved and encourage other rural communities to adopt similar approaches and government agencies to support them.

Assumptions

1. CDR will not build landfills that can receive solid waste from all rural communities in the next five years.
2. PVOs will provide logistical and follow-up support to this activity.

Implementation

Local NGOs/PVOs

AUB, LAU and research institutes

US and local consultants with expertise in such areas as participation, low-cost technologies and environmental assessment)

Local contractors

8.3 Industrial Pollution Control and Prevention

Objective

Promote industrial pollution prevention and control nationwide

Indicator

National industrial pollution prevention and control policies developed and adopted by GOL and industry

Intermediate Results

- 0.01 Industries and GOL collaborating in plan to monitor and reduce pollution in Shuweifate Industrial Zone (SIZ)
- 0.02 GOL, donors, industries, and local banks funding the implementation of SIZ action plan
- 0.03 Lessons learned from SIZ applied nationwide to promote environmentally-sound industrial development

Indicators

- 1. Pollution prevention and control audits of representative SIZ industries carried out, leading to information on industrial practices, pollution loads, and opportunities for pollution prevention and control
- 2. Concerted action plan approved by association of SIZ industries and GOL (MOInd, IDAL, MOE)
- 3. Select components of SIZ action plan implemented
- 4. Appropriate mix of command & control and economic incentive policies developed and debated in participatory workshops

Background and Rationale

Industrial pollution is widespread in Lebanon, within and outside designated industrial areas. Industry is a major source of organic and inorganic pollution of land, air, water, and sea. The major causes of environmental degradation from the industrial sector include lack of adequate sanitation infrastructure and treatment facilities, lack of awareness about the negative impacts of industrial discharges, lack of information on and incentives to adopt clean technologies and pollution prevention, lack of cost recovery mechanisms for environmental management services, poor enforcement of permit requirements, and unenforceable pollution standards. Alternative approaches are needed to promote industrial pollution prevention and control. These approaches should combine regulatory, command and control tools, such as standards and permits, with economic incentives, technical assistance and public-private partnerships. In the team's view, the best way to explore these policy options is to begin with a pilot assessment of an industrial hot spot; IDAL and the World Bank are interested and would support such an assessment for the Shuweifat Industrial Zone.

Description

This activity might include the following tasks:

1. Prepare a focused issues and options paper on industrial pollution prevention and control in Lebanon; the paper would *inter alia* review the literature on industrial pollution and incentives and barriers to environmentally-sound industrial practices;
2. Conduct industrial pollution prevention and control audits of representative plants;
3. Develop industrial profile of the Shuweifat Industrial Zone (SIZ), including a description of pollution types and loads and quantities of wastes;
4. Identify and evaluate technical and policy options for industrial pollution prevention and control at the SIZ;
5. Recommend preferred technical and policy options, with emphasis on cost recovery, public-private partnership, polluter-pays principle, incentives for pollution prevention and clean technologies;
6. Prepare industrial pollution prevention and control plan for the SIZ;
7. Conduct environmental assessment of the proposed industrial pollution prevention and control plan in accordance with USAID's CFR 216;
8. Help locate funds to finance different components of the SIZ industrial pollution prevention and control plan;

9. Work with MOE to draft a national strategy for encouraging industrial pollution prevention and control, drawing on the lessons learned from the SIZ activity; and
10. Organize participatory workshops with SIZ industries and industry associations, GOL agencies (IDAL, MOI, MOE, MOHER, LIBNOR), and other concerned parties (banks, universities, NGOs) to support and inform various activity components.

Assumption

IDAL and SIZ industries are interested in this project and committed to its success.

Implementation

US and local consultants with expertise in industrial pollution prevention and control and policy development as required
AUB and LAU laboratory facilities and professors

8.4 Air Pollution Control

Objective

Reduce air pollution levels in urban areas and human exposure to high pollution levels

Indicator

Leaded gasoline phased out completely
National strategy for urban air pollution abatement and response developed and approved by the GOL

Intermediate Results

1. Long-term campaign implemented to monitor air pollution and lead-in-blood levels in urban hot spots
2. Increased public awareness of the extent and severity of air pollution in urban hot spots, in particular impacts of exposure to airborne lead on IQs
3. Policies implemented to reduce urban air pollution and take appropriate measures when pollution exceeds threshold levels

Indicators

1. Catalogue of baseline data on air pollution and lead-in-blood levels in urban hot spots
2. Multi-media awareness campaign leading to a political decision to ban or phase out leaded gasoline
3. Appropriate mix of policies developed and debated in participatory workshops leading to approval of national strategy

Background and Rationale

Although information is sketchy, urban air pollution is suspected of reaching dangerous levels in the Greater Beirut Area, especially under temperature inversion conditions. The lack of data on the extent of air pollution and the severity of its health impacts helps explain the absence of car emissions inspections, the continued use of leaded gasoline, and the dominance of private cars over public transport. With technical support from SIU 3, the MOE has just finished preparing a strategy for reducing air emissions from transport, focusing on phasing out leaded gasoline and preventing the introduction of diesel fuel private vehicles. AUB (Dr. Iman Nuweyhid) and the Foundation for Human Environment plan to conduct separate studies to measure the concentration of lead in the blood of children. Results are expected in six months to one year. The EC-funded IPP/Environment, which may be established within the next six months, plans to assess requirements for a National Air Quality Monitoring Network (NAQMN) and to implement the NAQMN, to be composed of at least two fixed air quality monitoring stations.

Description

This activity might include the following tasks:

1. Review existing documentation and ongoing studies of air pollution and lead-in-blood levels and identify needs and opportunities for additional monitoring data;
2. Examine capabilities for air pollution monitoring at AUB, LAU, and MOE (to be funded by the EU);
3. Prepare air pollution and lead-in-blood monitoring plan for urban hot spots;
4. Implement air pollution and lead-in-blood monitoring plan in urban hot spots;
5. Prepare catalogue of air pollution and lead-in-blood levels in urban hot spots, including comparison to other cities and to acceptable standards;

6. Study the costs and benefits of alternative options to reduce air pollution levels in urban hot spots;
7. Draft national strategy for air pollution abatement in urban areas; and
8. Organize public awareness workshops and campaigns to educate GOL agencies (MOE, MOI, LIBNOR), NGOs, and other concerned parties about the extent and severity of air pollution in the Greater Beirut Area and other urban hot spots, the costs and benefits of reducing pollution to acceptable levels, and the draft national strategy for air pollution abatement.

Assumptions

1. There is synergy, but no overlap, with other ongoing or planned activities ; See Background and Rationale above.
2. There are no barriers to conducting a city-wide air monitoring campaign.

Implementation

AUB and LAU laboratory facilities and professors
MOE, with equipment provided under IPP/Environment
US and local consultants with expertise in such areas as air pollution control and assessment of costs and benefits

8.5 Water Resources Management

Objective

Improve water quality and increase useable water resources in Lebanon, using the Litani river as a model

Indicator

1. Action plan for integrated water resources management in the Litani river basin approved by key parties
2. Selected actions implemented by the GOL, municipalities, industry, and farmers
3. National policy guide for integrated water resources management approved

Intermediate Results

1. Key parties collaborating in program to monitor and reduce pollution levels in the Litani river basin
2. Private and public sector collaborating in program to encourage wise use of freshwater resources

Indicators

1. Information base on the quantity and quality of water in the Litani river basin
2. Participatory workshops conducted on integrated water resources management in the Litani river basin and nationwide
3. Water conservation policies developed, and implemented by select water consumers

Background and Rationale

The Litani River, the largest river in Lebanon, flows into the man-made Qaraoun Lake and ultimately discharges into the Mediterranean Sea. It receives surface and waste water from the entire eastern half of the country (east of the Mount Lebanon mountain range). The upper catchment includes major cities, industrial zones, and agricultural areas that currently discharge untreated effluent into the river. Watersheds are not managed and are generally barren of any vegetation which would reduce erosion and stabilize stream flow. Green Plan officials report that uncontrolled drilling for water in parts of the river basin has resulted in depletion of aquifers and lowering of the water table. The Litani River is of significant concern and requires a level of attention similar to that currently received by the coastal zone. A pilot program by USAID to (1) identify and prioritize problems impacting upon the quantity and quality of water available for irrigation, human consumption, and industrial uses; (2) prepare an action plan; and (3) implement pilot activities identified in the action plan, would be likely to attract additional investments by the private sector and other donors. Activities carried out in the Litani basin could also influence the adoption of appropriate policies for the management of other river basins and help strengthen the to be established water and wastewater authorities.

Description

The activity could include the following tasks:

1. Assess the water quality of the Litani river, identifying point and non-point pollution sources, loads and discharge into Qaraoun Lake;
2. Assess the watershed of the Litani River, identifying areas which are particularly prone to erosion and/or rapid runoff of rain or melting snow;

3. Assess the water table in the Litani basin, identifying areas where the water table is being lowered due to excessive extraction;
4. Conduct a study of the river and lake hydrology and actual and planned uses of the river and the lake to assess long-term water availability, seasonal water balance, and water quality to identify current and future critical conditions;
5. Conduct modeling studies to evaluate existing water quality and quantity and potential future changes based on different scenarios and strategic decisions taken concerning water quality improvement and protection;
6. Conduct economic cost-benefit analyses of improved water quality and increased quantity of useable water based on the strategies and scenario options for water usage;
7. Develop a comprehensive action plan and investment program to improve water quality and increase usable water resources including policy recommendations and improved monitoring; the plan should include pilot activities to be carried out during the last four years of the project;
8. Implement pilot activities;
9. Evaluate pilot activities after two years; and
10. Hold workshops for stakeholders, appropriate GOL agencies, and donors to review and evaluate findings and take corrective action.

Assumptions

1. Ongoing programs of the Litani River Authority, Green Plan, universities and NGOs don't address the problem.
2. Public sector agencies responsible for land and water management in the Litani basin are willing to collaborate with one another and NGOs.
3. Industries and landowners are willing to take necessary actions to improve the management of the basin.
4. The GOL is willing to apply lessons learned to the development of a nationwide river basin management program, probably through the water authorities.

Implementation

NGOs, CBOs, universities, and the private sector assisted by international and national consultants as necessary; implementing organizations would coordinate with appropriate government ministries, especially MOE, MOHER (Litani River Authority), MOA, and MMRA

8.6 Long-term Targeted Ecosystem Restoration

Objective

Promote more sustainable management of forest, soil, water, and biological resources

Indicator

More cost-effective conservation technologies adopted by GOL and NGOs
Number of hectares under more sustainable management

Intermediate Results

1. GOL, NGOs, targeted communities, and USAID develop plans to conserve and restore ecosystems
2. PVOs implementing selected ecosystem restoration and conservation technologies in targeted areas
3. GOL and national NGOs implementing low-cost natural resource conservation technologies in targeted areas

Indicators

1. Targeted ecosystem restoration plan developed and accepted by key parties
2. Each USAID-financed PVO implementing at least two new restoration/conservation technologies in a national priority area to protect a water source or a protected area
3. Low-cost natural resource conservation technologies introduced by GOL or national NGOs in at least five additional areas targeted in the plan

Background and Rationale

Inappropriate agricultural practices and deforestation have resulted in the degradation of over 50 percent of Lebanon's national territory. Deforestation has been caused by chaotic urban expansion,

conversion to agricultural uses, harvesting for timber and fuel, quarrying, and forest fires. A UNDP study recommended that 130,000 hectares be reforested at an estimated cost of \$195 million. The METAP report (METAP, 1995b) estimates that \$250 million is needed to repair damaged terraces. In addition, the report indicates that additional areas are in need of terracing, and the problems of overgrazing and forest fires need to be addressed. If Lebanon's vital forest, soil, water, and biological resources are to be conserved, low cost technologies must be used, conservation priorities must be established, and subsidies must be reduced or eliminated. Low cost technologies are available. For reforestation, the promotion of natural regeneration, direct seeding, or the planting of patches or lines of seed trees can be substituted for large reforestation projects. In addition, many of the ongoing tree planting projects are planting scattered trees in a non-targeted manner which has little, if any, impact on the conservation of soil, water, or biodiversity. For soil conservation, several alternatives to terraces are available, including hillside ditches, vegetative or physical barriers, agro-forestry systems, leguminous cover crops, green manure, minimal tillage, and crop rotations.

Description

The activity would identify appropriate natural resource conservation technologies for Lebanon, select the areas most in need of conservation, and begin using the selected technologies in priority areas where PVOs implementing USAID's rural development activities are already working. A few local NGOs already engaged in reforestation, soil conservation, or similar activities might also be invited to participate. The activity also might provide technical assistance and training in forest fire prevention and control through the U.S. Forest Service. Emphasis should be placed on low cost methods of reforestation, principally natural regeneration. Soil conservation activities should be undertaken in priority areas where terraces do not exist or where the effectiveness of terraces can be enhanced through the use of complementary soil conservation techniques, especially fertility enhancing practices.

The activity could include the following tasks:

1. Awareness and commitment: A committee of stakeholders might be formed to review and refine the proposal, beginning at least 9 months before the start of the planting season.
2. Technical assistance: USAID could make appropriate arrangements to provide both national and international technical assistance for the planning and implementation of the project in pilot areas. This step could precede step 1, and the contractor could be made responsible for organizing workshops and other activities needed to achieve commitment from the committee of stakeholders.
3. Design: The technical assistance provider could work with the stakeholders committee to identify (a) the most appropriate technologies for initial introduction and (b) priority areas in the communities in which USAID-supported PVOs are working. A few national NGOs could also be included. This component should be completed at least 6 months before the planting season.

4. Establishment of demonstration center/plant propagation center/nursery. A site typical of the area would be selected, and appropriate conservation measures would be taken. Plants for use in the installation of vegetative barriers or as green manures and cover crops would be established to provide planting materials for farmers. A nursery would be established as a demonstration and to provide trees for agro-forestry and silvo-pastoral systems as well as other situations where natural regeneration might not be appropriate. This component should be started about 5 months before the planting season and should be completed early in the planting season.
5. Initiation of extension and applied research activities: A variety of extension techniques could be used to convince farmers to test the new technologies and to assist them in the adoption process. The TA provider might provide training in extension methodology and/or work with stakeholders to develop appropriate extension materials and an extension program. This should begin about 3 months before planting season and continue throughout the activity.
6. Formation of farmer groups and identification of leaders: This should begin about 2 months before planting season and continue throughout the first year.
7. Reforestation of priority areas: By the end of the first year, each NGO will have selected areas to be reforested using a variety of reforestation technologies with emphasis on natural regeneration. Reforestation activities will begin in the second year and continue throughout the project.
8. Adoption of new technologies: The area on which new technologies are applied expands throughout the project. Individual farms should have conservation measures installed on two hectares by the end of the third year.
9. Adoption of appropriate ecosystem restoration technologies as national policy by MOA, MOE, and NGOs: During the second and third years, field days and workshops will be held to demonstrate the technologies introduced by the project to government officials, researchers, academics, and national NGOs. By the fourth year, national NGOs and the MOA will be using some of the new technologies.

Assumptions

1. The public sector and NGOs are willing to collaborate in an ecosystem restoration program which targets priority biodiversity, water, and land resources.
2. Low cost technologies for ecosystem restoration are available and appropriate to the Lebanese cultural, economic, political and biological context.

Implementation

PVOs implementing USAID's program in rural community clusters

National NGOs

AUB, assisted by international and national consultants

MOA, MOE, Green Plan, the EU-funded vegetative cover protection project, and other donors will be invited to field days and other activities designed to share the lessons learned from the project

9. Recommendations for USAID/Lebanon

Table 2 presents a summary comparative evaluation of the six candidate policy reform and institutional strengthening options. The criteria for evaluation are presented. Each opportunity can be implemented with a budget of \$1 to \$2 million over the five-year period, although useful work could be started with less (and additional resources would increase impact). The long-term awareness campaign and targeted seminars activity provides an excellent opportunity for USAID to establish a landmark program with significant environmental improvement across the board in the medium to long term. If successful, the environment mascot introduced under this USAID-sponsored activity would carry the environmental flag for generations of Lebanese to come.

The water resources management and industrial pollution prevention/control activities have the potential for increasing usable water resources and improving the quality of the resources. The industrial pollution activity could catalyze significant reductions in pollution from industrial practices, using a combination of an improved information base, economic incentives, public-private partnerships, and pollution standards. Giving the prevailing climate of skepticism about policy reform and institutional strengthening options, both activities would need to be designed initially around pilot areas, i.e. Litani river basin and the Shuweifat Industrial Zone, respectively, to test and demonstrate possible approaches, before choosing appropriate ones and developing them at the national level. Both activities would build on and use environmental monitoring capabilities developed at the American University of Beirut with USAID support. In both cases, little is currently being done by the GOL or other donors, and USAID involvement has the potential for significant environmental benefits.

USAID/Lebanon could also help implement low-cost waste disposal activities in rural areas and a long-term ecosystem restoration project through its ongoing program with PVOs in rural community clusters. Lessons learned from these pilots could prove very useful in developing appropriate policy/institutional reforms at the national level. Monitoring capabilities developed at AUB and LAU could be used to track air pollution levels to support policy reform and institutional strengthening. This could complement the work of the European Commission's SIU 3 which recently provided support to the MOE in developing policies to phase out leaded gasoline and plans to provide MOE with air pollution control equipment and related technical assistance. The EC is also funding an ongoing three-year, 1.5 million ECU program (similar to, although not identical with, the team's proposed ecosystem restoration activity) to protect vegetative cover.

All six activities identified in Table 2 offer excellent opportunities for the USAID to demonstrate environmental policy reform and institutional strengthening approaches to remediation of important environmental problems. In the process of choosing one or several activities from the table, USAID should consider its overall environmental program in Lebanon. For example, USAID/Lebanon may want to consider (1) providing support to PVOs in implementing low-cost rural waste disposal and long-term ecosystem restoration activities, and applying lessons learned from these activities to help put in place appropriate policy/institutional reforms at the national level—perhaps *inter alia* through awareness

campaigns, training seminars, etc. and (2) using AUB's environmental monitoring capabilities—developed with assistance from USAID/Lebanon—to provide an adequate information base on water quality, air quality, or effluent characteristics to support appropriate policy reform and institutional strengthening for integrated water resources management, industrial pollution prevention and control, or air pollution control.

Once USAID/Lebanon determines which of the activities proposed for its consideration, it will need to undertake more detailed feasibility and design work. These steps were not part of the scope of work for this preliminary assessment.

Table 1
Summary of Environmental Issues and Policy/Institutional Opportunities

ENVIRONMENTAL DEGRADATION ISSUES			
TYPES	SOURCES	CAUSES	POLICY/INSTITUTIONAL OPPORTUNITIES
WASTES AND CHEMICALS			
<ul style="list-style-type: none"> ▪ Degradation of landscape ▪ Pollution of water and land ▪ Air pollution 	<p>Improper solid waste disposal: scattered dumping at sea and inland, open air burning</p> <p>Informal, suboptimal recycling of paper, scrap metals and other materials</p>	<p>Inability to design and implement a feasible national SWM plan</p> <p>Political influences</p> <p>Weakness of municipalities and lack of SW taxes or service fees</p> <p>Ad hoc crisis management (closing of Normandy & creation of Borj-Hammoud)</p> <p>Lebanese-style NIMBY syndrome</p> <p>Lack of awareness and accountability</p> <p>Ill-defined responsibility</p>	<p>Strengthen capabilities of municipalities</p> <p>Develop long-term SWM plan, with special provisions for rural areas</p> <p>Establish cost recovery mechanisms</p> <p>Promote public-private partnerships</p> <p>Encourage recycling</p>
<ul style="list-style-type: none"> ▪ Widespread contamination of surface, ground and coastal waters 	<p>Improper sewage disposal: direct discharge in valleys, at sea, in wells and pits</p>	<p>Inadequacy of sanitation facilities</p> <p>Lack of government controls</p> <p>Delays in creating regional w/ww authorities</p> <p>Uncertainty about operation of future w/ww plants</p>	<p>Create and build the capabilities of w/ww authorities</p> <p>Establish cost recovery mechanisms</p> <p>Implement long-term monitoring program (coastal waters, freshwater)</p> <p>Promote low-cost sanitation systems, especially in rural areas</p>
<ul style="list-style-type: none"> ▪ Widespread water and soil contamination ▪ Risk of malfunction of planned sewage treatment plants 	<p>Improper disposal of industrial and agro-industrial waste: direct discharge w/out pretreatment, mixed disposal with domestic waste, legacy of toxic waste imports</p>	<p>Lack of incentives for pollution prevention and use of clean technologies</p> <p>Lack of disposal facilities</p> <p>Lack of government controls (e.g., standards)</p> <p>Lack of awareness</p>	<p>Encourage voluntary industrial pollution prevention and control</p> <p>Develop, implement and enforce realistic, phased-in standards</p> <p>Establish integrated waste disposal facilities</p> <p>Implement polluter-pays principle</p>

ENVIRONMENTAL DEGRADATION ISSUES			
TYPES	SOURCES	CAUSES	POLICY/INSTITUTIONAL OPPORTUNITIES
<ul style="list-style-type: none"> ▪ High risk of human exposure to disease-causing organisms 	<p>Improper disposal of hospital waste: mixed disposal with domestic waste</p>	<p>Lack of treatment facilities Lack of awareness Insufficient government controls</p>	<p>Develop national plan for hospital waste management, including collection procedures, treatment facilities, cost recovery, and training of personnel</p>
<ul style="list-style-type: none"> ▪ Long-term pollution of water resources ▪ Pesticide residues in food ▪ Ecosystem degradation from agrochemicals 	<p>Improper use of agrochemicals: excessive use, incl. of banned pesticides, dumping of packages and disposal of outdated pesticides</p>	<p>Lack of awareness of farmers Decline of agricultural extension services Poor labeling and users' instructions Lack of adequate import controls Lack of training in pesticide use and Integrated Pest Management (IPM)</p>	<p>Establish and enforce pesticide regulations Expand extension services through public-private partnerships Implement recommendations of pesticides study (MOA/FAO) Promote IPM Provide training in safe pesticide use</p>
LAND			
<ul style="list-style-type: none"> ▪ Degradation of urban environment 	<p>Air and noise pollution Traffic congestion Unightly construction Lack of green space Loss of architectural heritage</p>	<p>Urgent housing needs in wartime Poor urban planning Inadequate urban planning institutional framework Lack of awareness Lack of incentives for preservation of historic buildings, etc.</p>	<p>Strengthen institutional capabilities for urban planning Train engineers/architects and municipal professionals Develop noise abatement strategy Provide incentives for conservation of historic buildings, etc.</p>
<ul style="list-style-type: none"> ▪ Degradation of natural landscape 	<p>Deforestation Chaotic urbanization Uncontrolled quarrying Dumping of excavation debris (construction of roads, buildings) Telecommunications antennae</p>	<p>Poverty Poor land use planning Lack of appreciation and respect for the natural environment Increased demand for construction materials Lack of accountability Lack of enforcement of existing regulations</p>	<p>Develop national land use plan Establish and develop protected areas and buffer zones Increase public awareness Enforce existing regulations Provide for restoration of quarries and for landscaping of slopes above and below roads</p>

ENVIRONMENTAL DEGRADATION ISSUES

TYPES	SOURCES	CAUSES	POLICY/INSTITUTIONAL OPPORTUNITIES
<ul style="list-style-type: none"> ▪ Soil erosion 	Deforestation Overgrazing Poor agricultural practices Improper road construction Fires	Poverty, greed Insufficient soil conservation measures (e.g., terraces) Poor extension services Lack of pasture management/good animal husbandry practices Lack of enforcement of road construction standards Over-reliance on expensive terracing and tree planting programs	Strengthen NGOs to implement, w/ MOA assistance, long-term targeted ecosystem restoration program Provide technical assistance and training in forest fire prevention and control Promote alternative soil conservation practices as well as repair of degraded terraces
<ul style="list-style-type: none"> ▪ Loss of biodiversity 	Deforestation Improper use of agrochemicals Unmanaged hunting Urbanization Drainage of wetlands Pollution of the sea	Poverty Lack of awareness Lack of institutional capacity Lack of development of economic potential of biologic resources Lack of enforcement	Educate public on importance of biodiversity Develop and implement sustainable hunting law and regulations Promote ecotourism Identify, declare & manage more natural areas Develop economic potential of biologic resources with the participation of local communities
WATER			
<ul style="list-style-type: none"> ▪ Depletion of surface and ground water resources 	Excessive use of water for irrigation and domestic use Insufficient recharge of aquifers due to excessive runoff	Increased demand for water Poor agricultural practices Low price for irrigation water Lack of controls on water wells Lack of watershed management	Improve irrigation practices Educate and train farmers about water conservation techniques Improve information base on quantity and quality of water resources

ENVIRONMENTAL DEGRADATION ISSUES			
TYPES	SOURCES	CAUSES	POLICY/INSTITUTIONAL OPPORTUNITIES
COASTAL ZONE			
<ul style="list-style-type: none"> ▪ Pollution of freshwater resources 	Improper use of agro-chemicals Improper waste disposal Saltwater intrusion Sedimentation	Ill-defined responsibility for protecting water resources Lack of enforcement of regulations	Promote sustainable water resource management practices (quantity & quality) Eliminate water subsidies Create and strengthen the capabilities of w/ww authorities Introduce watershed management
<ul style="list-style-type: none"> ▪ Pollution of coastal waters and beaches 	Illegal dumping of waste at sea Illegal dumping of ballast waters Accidental oil spills	Lack of sanitation facilities Lack of controls on offshore dumping Lack of emergency response capabilities in case of oil spills	Monitor coastal waters to ensure adequacy of planned STPs Calculate & publicize economic losses due to pollution See "...Opportunities" under "Wastes & Chemicals" above
<ul style="list-style-type: none"> ▪ Reduced public access to sea shore 	Privatization of sea shore Sea reclamation Illegal dumping of solid waste at sea	Prevalence of private interests Past degradation of the coast Poor solid waste planning Lack of community participation	Conduct awareness campaigns Strengthen the role of NGOS Revise existing coastal zoning Create Observatory of Coastal Zone Develop coastal zone land use plan Monitor ongoing sea reclamation projects; ban new ones
<ul style="list-style-type: none"> ▪ Loss of beaches 	Coastal erosion (due to sand mining from the beach or quarrying upstream) Sea reclamation	Lack of information on the causes of coastal erosion Lack of awareness Greed Lack of accountability Lack of long-term planning	Protect remaining beaches Educate the public about the economic, ecological (turtles), and amenity values of the beach Make beach rehabilitation projects subject to FIAs

5

ENVIRONMENTAL DEGRADATION ISSUES

TYPES	SOURCES	CAUSES	POLICY/INSTITUTIONAL OPPORTUNITIES
AIR			
<ul style="list-style-type: none"> ▪ Air pollution 	Emissions from: <ul style="list-style-type: none"> ▪ power plants burning sulfur-rich fuel ▪ cars, especially lead and ozone ▪ industrial plants (e.g., cement and asbestos factories) 	Lack of information on air quality Lack of awareness Lack of enforceable standards Absence of incentives for energy conservation Inadequate public transportation systems	Monitor air quality in hot spots Develop air pollution standards Provide incentives for energy conservation Promote public transportation Improve the road network Eliminate the use of leaded gasoline Institute periodic car inspections Limit car imports to those w/catalytic converters Promote car pooling

Table 2
Summary Evaluation of Policy Reform and Institutional Strengthening Opportunities

	Interest in activity and commitment to its success	Long-lasting significant improvement in environmental quality	Catalytic effect	Priority issue not currently being (adequately) addressed	Support to other elements of USAID program in Lebanon	Support to other ongoing activities
Long-term awareness campaign and training seminars	Cross-cutting measure that can contribute to development of public support for and political will behind the full range of environmental and development policies needed. All parties appear committed to its success			Current campaigns are traditional or short-lived; won't create "hero" character for youth and aren't targeted enough	Build upon, support, and utilize ongoing work with rural community clusters, AUB, and Parliament	Complement MOE and MOEd plans to introduce environment in school curricula
Low-cost waste disposal in rural areas	NGOs, village councils, and municipalities key to success	Definite immediate improvement in pilot clusters	Strong potential for replication in all rural areas through national policy reform	Current focus seems to be on "expensive," centralized facilities in urban and semi-urban areas	Build on PVO work in community clusters; draw policy and institutional lessons for replication	Could influence GOL plans for waste mgmt. in Lebanon; oppt'y to reduce cost & improve cost recovery
Industrial pollution control and prevention	Strong interest in implementing project recommendations by IDAL and WB	Reduction in water, air, and noise pollution	Strong potential for replication in all 30+ industrial areas through contribution to development of national policy	Real oppt'y to test market-based incentives, involve private sector (industries, banks)	Use AUB Core Lab facilities to sample and analyze water, air, and waste	Enable future Ghadir STP to work properly; support IDAL's efforts to restructure industry and MOE's plans to develop standards
Air pollution control	Academic and research institutes ready to support analytic work	Oppt'y to show significant results quickly (leaded gasoline phase out, etc.)	Create momentum for urgently needed action to control pollution levels and stimulate adoption of appropriate policies	Apparent political reticence to address issue head on	Use AUB Core Lab and air monitoring equipment to analyze air samples	Planned studies of lead levels in blood

SB

	Interest in activity and commitment to its success	Long-lasting significant improvement in environmental quality	Catalytic effect	Priority issue not currently being (adequately) addressed	Support to other elements of USAID program in Lebanon	Support to other ongoing activities
Integrated water resources management	Litani River Authority interested	Increased quantity & improved quality of surface and ground water in the Litani river basin and adoption of national watershed policies	Oppt'y to develop integrated approach to water resources mgmt. in Lebanon. Concerted action plan key to mobilizing funding for pollution control	No institution addressing this problem today; not clear what, if anything, came out of GOL commission set up to study problem two years ago	Utilize AUB Core Environmental lab and perhaps future Water Resources Center; build upon PVO work in communities located in the Litani river basin	Contribute to institutional strengthening of water and wastewater authorities to be created

	Interest in activity and commitment to its success	Long-lasting significant improvement in environmental quality	Catalytic effect	Priority issue not currently being (adequately) addressed	Support to other elements of USAID program in Lebanon	Support to other ongoing activities
Long-term targeted ecosystem restoration	NGOs, such as the Grassroots Reforestation Network, MOA, MOE, CDR, EC	Adoption by GOL and NGOs of more cost effective technologies and establishment of national priorities for ecosystem restoration Increased land productivity, decreased soil erosion, and increased quantity and improved quality of water yields from targeted watersheds. Enhanced economic and ecological value of selected natural areas	Improve the effectiveness of ongoing efforts to reforest, conserve soils, and protect natural areas; contribute to the development of a national plan that sets priorities for ecosystem restoration	Protection of soil, water, and biological resources now being addressed in a haphazard manner with the exception of a small (1.5 million ECU) program sponsored by the EU	Build upon and enhance USAID's ongoing activities with rural community clusters	Collaborate with the ongoing EU activity and improve the focus and cost-effectiveness of ongoing NGO and Green Plan activities; enhance community participation and promote collaboration among international and national NGOs, bilateral donors, and GOL agencies

Appendix A
Scope of Work

Appendix A

Scope of Work

The Government of Lebanon (GOL), together with its donors, must plan and implement a broad range of policies to effectively address deeply imbedded institutional and technical issues covering a wide range of environmental areas, including: degradation of natural resources, air pollution, and waste management (water and solid). A wide range of policy and institutional changes are required to overcome inappropriate economic policies, weak institutional settings, unenforceable laws and regulations, outdated technologies, and insufficient capital resources for the environment. Improving environmental management and protection in Lebanon entails a strategic focus on systemic, policy, regulatory and institutional constraints. Redirection of GOL, and donor resources toward overcoming these constraints is the key to most expeditiously and effectively improving environmental conditions.

The purpose of this environmental policy assessment is to identify strategic opportunities for targeted environmental policy reform that USAID/Lebanon could undertake, without duplicating the activities of other donors, and with potential to complement and add value to the Mission's own activities as well as those of others.

The assessment is to be conducted in a broadly participatory manner and set the stage so that, as USAID proceeds to develop and implement a policy based environmental program, it has started the process of stakeholder involvement and consensus building from the outset.

Tasks and Products

Task 1. Preparation and Review of Background Materials

Prior to its departure to Lebanon, the Team will consult with appropriate USAID and World Bank staff to discuss donor environmental efforts in Lebanon and conduct a rapid review of key environmental background documents on the state of the environment in Lebanon (e.g., USAID/Lebanon Country Development Strategy, World Bank's Environmental Strategy Framework Paper, etc.). A considerable level of analytical work has already been undertaken in support of the development of a Lebanon Environmental Action Plan and the development of major donor projects, and it is important that this work inform the current policy assessment.

Task 2. Planning Meeting

Shortly after its arrival in Lebanon, the Team will conduct a planning meeting in Beirut with USAID and key Lebanese counterparts (if available, including selected NGOs and selected private sector counterparts). This initial step will assure that the participatory approach which is to

characterize this assessment begins at the outset. The purpose of this meeting is to discuss roles, responsibilities and the overall scope of work for the environmental policy assessment, and develop a detailed work plan and schedule for it.

Task 3. Review of Environmental Issues, Institutional Capacity and Activities of Other Donors in Lebanon

The Team will review the GOL's National Environmental Action Plan, National Emergency Recovery Program, current environmental policy legislation, and other key official documents covering environmental issues and concerns (e.g., policies or plans of sectoral agencies with environmental interests). The Team will also review existing documents concerning environmental legislation and laws, environmental impact analysis, water resources, urban environmental infrastructure, and integrated resource management, etc.

The team will gather information concerning ongoing or planned environmentally related activities sponsored by other donors, including the World Bank, IUCN, CIDA, UNDP, etc., with particular attention to policy reform activities. This will help inform Task 6.

Task 4. Policy Analysis

Building on the foundation provided by the background materials, the Team will prepare an update on the current status of policy, regulatory, and institutional constraints to improved management and protection of Lebanon's environment. This includes identifying: a) current policy level constraints and targets of opportunity for policy change; and b) needs for technical assistance, technology transfer, and institutional strengthening to support implementation and dissemination of environmental policy initiatives by Lebanese institutions. The assessment will take into account that while the current USAID environmental activities have specific geographic foci, USAID will work at the national, regional, and local levels, applying lessons learned across locations. Therefore regulatory, policy and institutional issues should be identified across project locations, and be applicable to other parts of Lebanon.

Another deliverable of this task will be a section on opportunities for and constraints to implementing regulatory, policy and institutional reform, which will be included in the final report. The final report will also include abstracts of key documents and a comprehensive bibliography, and identification of organizations and institutions (with key individuals) which have the capacity to develop information and data on environmental issues. This latter information will be used by GOL, and USAID as a possible resource to enhance GOL, and USAID policy development and dialogue.

Task 5. Assess Needs for Building Institutional Capacity for Environmental Management and Protection

Based on its review of documents, constraints analysis, and discussions, the Team will develop a brief listing and description of targets of opportunities to increase institutional capacity

to manage and protect natural resources through public, private, and NGO/PVO partnerships. This analysis will be included in the final report.

Task 6. Exploration and Identification of Policy Options for Environmental Management

Based on the above analysis of policy, regulatory, and institutional constraints to improved management and protection of Lebanon's environment, the Team will prepare an illustrative listing of responses to environmental issues and constraints. There should be a gathering of key actors (private and public sector) to react to this listing, suggest priorities, and identify near and medium term actions needed. Based on this interaction, the Team should develop their conclusions and recommendations.

The development of priorities and a policy agenda for managing and protecting the environment should consider the likely medium-term economic and demographic trends in Lebanon. Significant attention is being devoted to economic reconstruction, which should lead to a more open, market-based economy that promotes free trade and expanded foreign investment. This could provide opportunities to integrate clean production practices into new manufacturing enterprises. It might also suggest ways in which Lebanese industry can manufacture products that: a) protect water, air, and soil from pollution; b) conserve water, energy, or other resources; and c) educate the public and provide tools and equipment for environmental cleanup, recycling or other environmental activities.

The final assessment will include a matrix that identifies regulatory, policy and institutional constraints and suggests options for reform. The matrix will provide a basis for prioritizing environmental issues as a result of the assessment process (e.g., consultations with GOL, and USAID environmental staff, private sector, other donors, and the workshop discussed above.). It will present key regulatory, policy or institutional reform activities of the other donors, to indicate where there are gaps and where USAID has a comparative advantage. It will also array the policies from the perspective of USAID's manageable interests and country strategy.

The assessment will include short descriptions of the potential economic and environmental impacts of the proposed policy reforms, including win-win situations, and economic incentives for industry and consumer compliance with a high probability of success. The deliverable of this task will be a series of individual options for specific medium-term and long-term reforms, which may be included as an appendix in the final report.

Appendix B
Work Schedule

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Appendix B Work Schedule

September 30	0900 - 1100	Meetings - David McCauley and Theresa Soo Chan Sing, IRG/EPIQ
October 1	1700 - 1730	Meeting - Sherif Arif, World Bank
October 2	1400 - 1530	Meeting - Pirie Gall, Ben Stoner, Michael Colby, Judith Barry, Mona Grieser
October 3	1000 - 1130 1200 - 1300	Meeting - Jean Francois Barrès, World Bank Meeting - David McCauley, IRG/EPIQ
October 6-10		Preparations for travel to Lebanon - travel clearance, travel arrangements, communications, review of documents.
October 8	1330 - 1545	Meetings - Theresa Soo Chan Sing, Doug Clark and others at IRG
October 12-13		Travel to Lebanon
October 14*	0845 - 1000	Meeting - Spike Stephenson, Ghassan Jamous, USAID/ Lebanon
	1300 - 1330	Meeting - Ms. Alia El Hussein, MOE - Capacity 21, IUCN National Coordinator - Ms. Sawsan Mehdi, MOE - Protected Areas
	1330 - 1415	Meeting - Mr. Mounir Bu Ghanem, MOE-Advisor, Capacity 21 Coordinator - Mr. Hussam Bechnak, MOE - Technical Advisor - Ms. Sawsan Mehdi, MOE - Protected Areas
	1420 - 1455	Meeting - Ms. Nancy Khoury, MOE - International Relations & Ms. Lamia Chamas, MOE - Indicators
	1515 - 1545	Meeting - Mr. Adel Yacoub, MOE - agronomist/pesticide specialist
	1900 - 2100	Dinner meeting - Mr. Arab Hoballah, UNEP - Blue Plan
October 15		Arrangements for Workshop - Draft and send invitation and tentative program, obtain fax numbers, identify workshop site, review background materials, schedule meetings

- Begin development of draft report outline and work schedule
- 1900 - 2200 Dinner meeting - Mr. Sati' Arnaout, Consultant to MOE (EC) and MMRA (World Bank)
- October 16***
- 0830 - 1045 Meeting - Mr. Faisal Abu-Izzedin, MOE - GEF Protected Areas Project
- 1000 - 1005 Meeting - Minister of Environment
- 1100 - 1200 Meeting - Dr. Naji S. Chamieh, MOE - Project Manager, Planning and Programming Unit, World Bank, METAP
- 1200 - 1300 Meeting - Mr. Georges AKL, UNDP, Program Manager Sustainable Development National Program
Ms. Hala Fakhoury, METAP Coordinator
- 1300 - 1315 Meeting - Ms. Nancy Khoury, MOE - International Relations
Ms. Lamia Chamas, MOE - Indicators
- 1500 -1700 Meeting - Dr. Nadim Cortas, Associate Dean, Faculty of Medicine & Medical Center, American University of Beirut, CORE Laboratory
- October 17***
- 0900 - 1000 Meeting - Ms. Rima Yaktine, CDR - Irrigation
- 1100 - 1200 Meeting - Dr. Wafa Sharaf el Dine, CDR - Coastal Resources
- 1500 - 1700 Meeting - Dr. Lamia Mansour, UNDP- Environmental Coordinator
- 1945 - 2005 Phone conversation with David McCauley and Theresa Soo Chan Sing, IRG
- October 18**
- 0830 - 1500 Field Trip - Jabal Barouk protected area and Bekaa
- 1530 - 1800 Continue work on schedule and meeting reports
- October 20***
- 0900 - 1045 Meeting - Dr. Georges Tohme, Chairman of the Board, NCSR
- 1130 -1315 Meeting - Mr. (Alex) Nyarko-Badohu Kwami Dzifanu, Charge de Programme, FAO
- 1330 - 1515 Lunch meeting - Mr. Sati' Arnaout, Consultant to MOE (EC) and MMRA (World Bank)
- 1600 Purchase materials for workshop

	2000 - 2115	Meeting - Ms. Nora Bazzy, Regional Coordinator, Middle East and Caucasus, Mercy Corps International
October 21		Workshop planning
October 22	0830 - 1700	Workshop
October 23*	1600 - 1730	Meeting notes, brainstorming Meeting - Mr. Fawaz Mourad, Director, Envirotech Mr. Edgard Chehab, Project Manager, Envirotech
October 24*	0900 -1045	Meeting - Mr. Ghassan Tannous, Research & Information Department, IDAL Mr. Noel Khoury, Consultant Engineer, IDAL
	1245 - 1500	Meeting - Dr. Georges S. Nicolas, Director, Center for Research and Development, Lebanese American University Dr. Gebran Karam, Assistant Professor of Civil Engineering, LAU
	1530 - 1830	Visit Biblos and return to Beirut
October 25		Meeting notes, printer repair
October 26		Field trip - Schouf
October 27*	0920 - 1030	Meeting - Mr. Ghattas Tannous, Ministry of Agriculture
	1200 - 1220	Meeting - Mr. Mounir Bu Ghanem, MOE - Capacity 21 Coordinator and Advisor to the Minister Mr. Hussam Bechnak, MOE - Capacity 21 Technical Coordinator
	1230 - 1310	Meeting - Dr. Naji S. Chamieh, MOE - Project Manager, Unit of Planning and Programming, World Bank, METAP
	1310 - 1325	Meeting - Ms. Nancy Khoury, MOE - International Relations Ms. Lamia Chamas, MOE - Indicators

1400 - 1630 Meeting - Spike Stephenson, Ghassan Jamous,
USAID/Lebanon
Workshop planning, revise report outline, meeting
notes

October 28*

0900 - 1030 Meeting - Mr. Andre Saliba, Greenplan
1230 - 1330 Meeting - Mr. Jokhadarian, Member of Parliament
and member of Committee on Tourism, the
Environment, Agriculture, and Municipalities
1800 - 1920 Meeting - Ms. Hala Achour, Mr. Adnan G. Melki,
Dr. Ali H. Darwish, Mr. Zein Moussa and Ms.
Mirvet Abou-Khalil Green Line, a scientific
organization for conservation
Workshop planning and organization, meeting notes

October 29*

0940 - 1030 Mr. Kamel Aweida, World Bank Advisor, Litani
River Authority
1100 - 1230 Mr. Michel Khouzami, expert on environment and
rural development for European Union project to
assist in the protection on Lebanon's vegetative
cover
Work on report outline and meeting notes

October 30 Preparation for workshop and report writing

October 31

0800 - 1400 Workshop
1400 - 1900 Report writing

November 1 Report writing

November 2 Report writing

November 3 Report writing and printing
1600 - 1715 Debrief USAID/Lebanon and prepare for travel

November 4 Travel to Washington

November 5 Complete travel

November 7

1400 - 1545 Debrief IRG and distribute draft report to USAID
ANE and Global Bureaus

November 18 Receive comments on draft report

November 19 - 21 Revise and distribute report

November 24 Debrief USAID ANE and Global Bureaus

* When time permitted phone calls were made to arrange appointments, invite participants to the 10/22 workshop, obtain phone and fax numbers, inform USAID/Lebanon of progress, etc.

Appendix C
Workshop Participants

Appendix C

First Workshop Participants

Dr. Nadim Cortas, Core Environmental Laboratory, AUB
Dr. Gebran Karam, Center for Sponsored Research and Development, LAU
Mr. Rami Abou-Salman, Capacity 21 Private Sector Specialist
Ms. Andrea Mounla, Society for the Protection of Nature
Ms. Carole Debbane, Debbane Frères
Ms. Hala Fakhoury, International programs coordinator, MOE
Ms. Hiam Kredieh, Window to Environment
Ms. Sana Saliba, USAID/Lebanon
Dr. Wafa Charafeddine, land use planning and environment, CDR
Mr. Fadi Yarak, Rene Moawad Foundation
Mr. Hussam Bechnak, Capacity 21 Technical Coordinator, MOE
Mr. Milad Jarjoui, Faculté des Sciences, Fanar
Mr. Samir Aboujaoudé, Green Plan
Ms. Bassima Khatib, Lebanese Environment Forum
Ms. Hala Achour, Greenline
Ms. Lamia Chamas, environmental indicators, MOE
Dr. George Nicolas, Center for Sponsored Research and Development, LAU
Mr. Fadi Riachi, Foundation for Human Environment
Mr. George Akl, SDN Program Coordinator, MOE
Mr. Georges Ruwahyib, NCSR
Mr. Ghassan Tannous, IDAL
Ms. Lamia Mansour, Sustainable Development Advisor, UNDP
Ms. Rima Yactine, agriculture, CDR

Mr. Joseph Karam, Team Leader
Mr. Robert Mowbray, Natural Resource Management Specialist

Second Workshop Participants

Dr. Nadim Cortas, Core Environmental Laboratory, AUB
Mr. Ali Darwish, GreeLine
Mr. Mazen Sleiman, solid waste specialist, CDR
Mr. Rami Abou-Salman, Capacity 21 Private Sector Specialist
Ms. Andrea Mounla, Society for the Protection of Nature
Ms. Hiam Kredieh, Window to Environment
Ms. Sana Saliba, USAID/Lebanon
Dr. Hratch Kouypoumjian, Director, NCMS
Dr. Naji Chamieh, Unit of Planning and Programming, MOE
Mr. Fadi Yarak, Rene Moawad Foundation
Mr. Hussam Bechnak, Capacity 21 Technical Coordinator
Mr. Milad Jarjoui, Faculté des Sciences, Fanar
Ms. Bassima Khatib, Lebanese Environment Forum
Ms. Hala Achour, Greenline
Ms. Lamia Chamas, environmental indicators, MOE
Ms. Zahr Bu Ghanem, Green Plan
Dr. Gebran Karam, Center for Sponsored Research and Development, LAU
Mr. Fadi Riachi, Foundation for Human Environment
Mr. Georges Ruwahyib, NCSR
Mr. Ghassan Tannous, IDAL
Mr. Walid Nasr, Unity of Planning and Programming, MOE
Ms. Rima Yactine, agriculture, CDR

Mr. Spike Stephenson, USAID/Lebanon Representative
Mr. Joseph Karam, Team Leader
Mr. Robert Mowbray, Natural Resource Management Specialist

Appendix D
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Appendix D Bibliography

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