Lebanon - Environment and Solid Waste Management Project : etude d ' impact sur l ' environnement

Document Type: Environmental Assessment

The main objectives of the project are to: 1) eliminate hazardous and unsightly dumping of solid-waste; 2) improve methods of waste collection and disposal; 3) improve cost recovery and modernize municipal accounting systems; 4) improve the quality and marketability of compost, through the introduction of sorting of the waste at the entrance to the compost plant; and 5) increase the involvement of the private sector in solid waste management. The project has four components: 1) collection equipment; 2) landfill civil works; 3) waste disposal facilities; and 4) technical assistance including a coastal zone management plan. This study analyzes the environmental impacts of compost plants at Saida and Zahle and the Ammrousiyeh complex. The study finds that, despite its advantages, the composting plant may have negative impacts including: 1) the change in land use at the selected site from agricultural to a waste disposal site; and 2) the nuisance to the local population, including noise, and air pollution due to increased traffic and plant operations. In the study, it is recommended that the Amrousiyeh complex not be expanded and study results are presented on hospital and industrial wastes.

Keywords: Air pollution; Capital investments; Coastal zone management; Composts; Environmental impact assessment; Hazardous waste disposal; Hospitals; Industrial wastes; Land use; Landfills; Noise pollution; Nongovernmental organizations; Private sector; Solid waste management; Technical assistance; Traffic; Waste disposal; Waste recovery; Wastes

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TEE IORLD BANK/IFC
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RE: LEBANON - Solid Waste/Enviro niental Management Project (FY95)
- Updated Project Information Document
REMARKS:
Please find attached a revised copy of the Project Information Document (hard copy and diskette) dated March 22, 1995, to be retained at the Public Information Center. A copy of the environmental sumiaxy is also attached; the full report has been requested from Lebanon.
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PROM: Douglas , ar ROOI NO.: H10-007 -T1 35838
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LEBANESE REPUBLIC
SOLID WASTEIENVIRONMENTAL MANAGEMENT PROJECT
ENVIRONMENTAL ASSESSMENT SUMMARY
1.00 Backgound
1.01 Lebao a prosperous upper middle-income country in tic mid-70s. bas been devastated by 15 yeas of turmoil as a resuit of violent cvil strife and militay ccuPaon. Tbe civil war had a severe unpact on tbe socio-eonomi conditions in tbe couny. Lebanon's per capia incame, about US$1,900 in 1993, in real terns was only about half of the 1975 level, and mcome inemaliies have bcen acetaed. The total damage to physical assets dunng tbe war period was esfimated by the United Nations at US$25 billion. Damage is both a direct resuilt of dmi war, as well as the accmulated effem of near tot disuption in capital investment ad maintenanc.
1.O Ag4ainst this baccgroun,t Goverment of Lebannas prepared a t-year Nadonal Emergecy Reconstuction Program (NERP) which has receny been extended ta the ten-year Horizon 200C program. The first five years of the Horion 2000 melude the NERP and total approximately US$5 billion (in constant 1992 prices).
The Solid Waste M gent Secor
1.03 Soid wastc collection and disposal servces deteiorated greatly daring the civil war. Refuse collection trucks and coiners, often used as baricades during Ue fighig, were destroyed. ic rmaining equm has eitber lived beyond its effective life or prematurely damaged because of lack of main ce. Thus, refuse collection sevices deteriorated to the point where refuse collection became almost non-exint and solid waste was bapbazardly dumped on the streets, vacant lots and dmc coastlLe, witb fequ intemingling of hospital and hazardous/toxic wastes.
1.04 Although Lebanon's physical feaus somedmes make it difficult to find sites for sanitary

landfiLls with suitably large capacity for refuse disosai, this is sfili the least cost and simplest method of diposal. Composting is aiso considered an appnuiate techmology for the disposal of large vohmes of wame, particularly where there is a potential market for the product, as market stdies (available on file) indicate for agricult armas. Ineinration is mrely a viable option in Libanon due to tie substnal investment cost, high rado of organic matter mi the refuse, and the extremely higb operating costs.

1.05 Refuse collection and diposal have always been tUi besponsibty of tbe municipal * authorities. The senrice is funded, along withl other municipal services, from r e fic gible reves of the milies. These consist of: (i) a municipal tax equivalento 11 perct of the imputed rena value of property, and the proceeds from land sales and construction permits,

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all of which are coUlected direcdy by the municipulities; and (il) a share of certa revenues, such as a 10 perenMt surcharge on telephonœ, electricity and water biUs, and duties on imports, liquo and fuel, coliected by the Cetal Goverment and distribued to the muicipalities on the basis of populaton and fie size of the previous budget, Beiut being limited to 60 pere of the total under the existing fornula. In the past, municipalities were capable of providng adequate refuse collection services, altough fxe developma of sound disosai systems bad only just started when de cvil wu boke out With time, the resource base of the muncipalides was eoded because: (1) the Lebanese Pound has slid to about one--ousnt of ils value ln 1975; (iu) Lebanon, until July 1994, pracetd absolute ret control; leaving-revenes from the municipal tax frozen in tenus of Lebanese Pounds; rcctly, however, renta values bave ceased between 15- and 80- fold, according tu te age of therpt; (iii) tere has bee a drop mi tfie revemnes from ele,ricity water and tephones; however, the revenues from surcharges on test services ae expected to hicreas substamntdiy as te major servie bottenecks are removed with the help of the NERP. and follow-n projects; and (iv) because of Central Governmnt budgetary constacints, tbe share of the hcipais bas not been paid from fte Municipal Fuid althcugh transfers are expectei to resume hi te lnot too distant fure. Pending resumpton of rasfers from the Municipal Fund, the micipaliies have to rely in part on ad-hoc advaes from the Central Govermment to muet piority needs. Govemme bas recently laumched a su* (funded by the Bank) for te development of a long-en strategy for soid-waste managemnt, anchored on the achievement offul cost recovery à dm sector tugh tdeintoucion c direct user charges.

Envfronmen M

1.06 Orne of the results of the civi war ln Lebamnn wase detroratn cf public sevices, par-ticdarly waer supply, waste water disposai solid nas colectionL powier supply, and publc tanusporL 'het deterioration of solid wase services bas created a severe risk to public litaIh and te environment due to: poUution of water sources and distribution systems; discharge of waste directly into tdm sea and into irigation canals; scattred piles of haphazardly dumped solid wae throughout the country; mixlng of hospital wase with domestie waste; and air polluion caused by burnmg of solid-waste. The situaton bas been furtber exacerbated by the lack of a country-wide land use system which has led to haphazaid expansion of dweDings on tie sea coast, on fertile agniculral land and on sensitve naura ecosysts; poilution of surface waters and underground aquifers causei by mcontrroled pumpmg to previde the nesv communities wiuth running water pouring of sewage into disused wells; widespread sio desucdon of the cultural heritage; and degradation of marie and coatl aicas.

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1.07 Tfe coastal zone bas been pariculy affected by these impacts, and is suffering severe environental degradaion. The destruction of the Central Business District (CBD) of Beinit and the separaion of o es during 15 years of strife, led tu the dvelopment of major commerci and indusial centers along tir sea coast* wbich thmslves triggercd the constnction of large bousing setiements for employes. fle sea coast from Tripoli m the North to Tyre ini tih South bas become one streh of densely populated urban settements, haphazardly built and lacking i ser . Raw, unted sewage poms ito tie seu along te

coastline; solid waste i dumped on tr show and is washed away to neighboring countries; hurmfui gases are spewed into Ihc air by ropriatey equipped power stations, cement plans and caher industries built near te sea for case of ou-loading and off-loading; and, finally, te heavy trfflc, using fuel of doubftbl cleanlness, contribues to ti severe ampberic pollution.
1.08 lebanon is in tie process of prepaming a comehensive national famework for enviroumental protection. Recendy, there bave been several initiatives towards str en the recently crateid Ministy of Enviroument (MOE) to enable it to carry out its role of sedng, monitoring and enforcing envirnmenal stdards Assistance is being provided by tbe Meditannan Envionment Technical Assistance Program (MEAP) for tie preparation of a national e n lstraty, which will e ffiy te priorities for action and tie pohcy, instional and investment tools for their hnlemcnta This will contiue to the definition of tir MOE long-ten progr and provide inputs to establih the broad insional famework for eiomenl Tie United Nadons Dwelopment Pgmme (UNDP) is providipg a complementary progrm of technical assistce and raing ta MOE for the rview and consolidation of enviroetlaws and regularions, iuional development, capaciby building for ennm assment, and creation of public awarenss and partcipation mecbanisms. Although te enfoeiet of nvim regulad is feasible under dti uistng legal framwork, it is ejxpectei tiat actions will be accelerated when the revised framework k approvei by Parisament later in 1995. MOE bas recntly movedt into new p_mises, which wll permit an expansion of staff [rom the present level of approxinately 20 people to the planne level of about 150 people.
1.09 Tie Council for Development and Recontron (CDR), wbich has the overali responsibility for planning and coordination of investment programs, also needs s ning in its evironnentl review functions. ln view of tie need t integrate considerations at the earliest stage of the planning process, CDR will use the services of the European Union (EU) funded Program Management Unit (PMU) to provide a senor emvironment expert to train CDR staff and to coordinate environmental review activities. The expert, who wil be in post by March 31, 1995, wIil also coordinate the inclusion of enviroumentul mitigation and monitoring actions into the consution and operation of disposai sites.

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2.00 Project Description
2.01 Project Objectives. The main objectives of the project are to: (i) eliminate hamadous and unsightly dumping of soLid-waste; (ihl improve meftods of waste collection and diposal; (iii) improve cost recovery and modenize municipal accounting sysoems; (iv) improve dis quality and marketbility of compost, tbrough the introducton of sorting of the was at the entance to ibe compo plant; (v) increase ds mvolvement of dis private sector in solid waste management; (vi) stengthen CDR and MMRA and dmh prncip municipalies; and (vii) create instruent for the more orderly planning and oevdapnt of ths Lebanese coastal zowne. Basically, the project would complete dhe rebabilitadon of the country's municipal solid-waste collecton and disposal systems as envisaged under the NERP and introduce a separtle system for bospital waste.
2.02 Major Project Conponeats. fe project has four main components: (i) coBection equipment; (il) landfill civil works; (iii) waste disposai facilities; (iv) tecnial assistance ncluding a coastal zowe management plan.
2.03 Collection Equipment Component
(a) Containes: These will be 5,200 in number, distriuted acrss the country in accordance with th estimated popuLation desiies. Of this totl 1,600 will be in galvanized steel of 1100 liters with covers for use in urban centers along the caasdine. Tbe remaumng 3,600 conners will be in painted steel of 1500 liter capaCrity.
(b) Comuator Tmcks: flic compactor uck will bc scalardized at 10 cubie meters capacity, as thdse are suited to di narrow stes of the major cities and winding, steep hills typically found in Lebanon. The project will fine 180 new comnpactor tucks, and distribution will be in accordance with estmated population.

(c) Specal FM Where ncssury, provision has been made in the project for dis p of speial equip nent. These include street sweeping and washing equipment for Beirut and uiler ucks for the prpose of transportig large quantities of waste from transfer stations that wil be built in cazas where it is practically impossible to find land for a sanitary landfill.

2.04 Landfill Civil Works Component:

(a) Saty LandMflls: The 15 Landfllls are being selected in accordance with approved site selection criteria. that include criteria. Of the 13 landfills being fmnanced under dis ERRP. thd land bas been acquirsd for 6 Cazas; dis rest are

still in t.'e selection and evaluation process. Sites for landfills to be fumnced under the proposed project will be selected on thm basis of environmental assessments agreed by the executing agency -and the Bank. Tie landf ils will be Iocated at suitable distances fmm uronta developments. The area will be sufficient to meet the needs of the Caza for 20 years. Each sanitary landfiil will be enclosed with a suitable fence to prevent encroachment by scavengers and stray animals. A guardhouse and weighbridge will be located at the entrance tu each site, enabling access to be controlled ant the source of waste and its weight to be recorded. A suitable garage on site will house all the oquipment belonging to tht Caza and will provide rout maintenance srvices. An administtion building will house the staff in charge of operadng and maintaining both the landfill and the mobile equipment. Each site will be provided with the necssaRy earth-moving and compacting equipment. This wiil vary in quantity and size depending on the size of the landilfil and the volume of incoming waste. Genemaly, each site will be provided with a mechanical shovel, a water tanker and a sbee's-foot type eath compactor.

(b) Closure and Rebabilitation o! Old Uncontolled Dwups: Upon constuction of the 15 mnw lmxdfills, thi old uncontrolied dumps in each of these cazas will be closed uni rebabilitaed. T reailitaton will be caied out in accordance with internatonafly accep stadards, and the design concepts will bk reviewed by the Bank.

2.05 Waste Disposai Facilities Component:

(a) Çgm-ost Plants: Two compost plants will be constrcted; with one in Saida (200 tons per day), and ont ii Zalie (200 tons per day). Before tie waste ents the process cycle, large, hard lumps of debris wiil b separated and sorted out. Then, as the waste is conveyeed towards a ddomo g drm, recyclable materials - glass, plastics, paper, cloth, and bones - will be mamnully separated and dropped from speciml chutes to a compacting and balng unit for sale to mmmfmcturing industries. Ferrous metals will be separated magneticlly. The homogenized compost wiil be mecbaicmily acrated and tuued, thon deposited hi widrows untii maturation. Tbis will result in the production of homogeneous. high-quality compost which can bk marketed primarily to the fming commm'ity.

(b) Amrousiyeh Complex: The original design of the incinerator at Amrousiyeh bad made provision for a third fiunace of 10 tons per hour incineration capacity. Experionce with tie exting finaces has not been satisfactory becuse of the high moistim content of the.waste. Fuel oil is now used to improve combustion and the air onissions consist of black smoke and other coaminas related to

incomplete oxidadon of the combustion gases. The Environmental Assessment (EA) report, now under preparation, has made preliminary recommendations that the incinerator capacity should not bW expanded, and (bat a compost plant, similar to that described above (see (a) Compost Plants) be constructed. The alternative project concept, which has been adopted for this project, consists of a compost plant and use of the existing incinerator. TIe incinerator will be modemized to

improve the combustion process by (i) improvod califoric value in the waste foed by selective collection of a minimum of 120 tones (metric) per day of waste from higher income neighborhoods, (i) high calorifie value sorted wastes from the compost plant, and (fif) improved mechanical ant control equipment. Tir objective is to meet the European Union Directive on Municipal Waste Incineratibn Plants (891429/BEC - QJ L203, 15 July 1989).

(c) Incinertor for Hospital Waste: An appropriately desi incinerator will be constructed for the disposal of hospital waste from hospitals throughout Lebanon. Its precise location antd capacity will be determind by feasibility and environmental studies to bc undeerta during project implenenttion Appropri transport will be procured to tasport hospital wasto te <he incinerator.

2.06 Technical Assistance Cmponent

(a) Coastal Zone Management (CMIG Plan This component alis na creatig the iîstnmrnts and building <ho institutional capacities for tie physical planning and monitoring of te coastal zone developnt, in order to improve environmental cornlitions and provent fuiler degradation. Its outputs would include: (i) preparing a regional enviroumemal assesmen which will identfy tie cumulative pressures and impacts of tie coastal zone development under different investme scenarios; (il) establishing a GIS system for physical planning and monitoring of tle coastal zone development for use by CDR, MMRA and t municipalities; (iii) preparing a coastal zone management plan to be approved and legally binng on all future developments on the coast; and (iv) initiating tho imple ion of emergency actions to-protect andior rehabilitate coastal resources. The coastal zone management plan wiil include: a) a stratgy for the allocadon of cotal and marine resources, defining armas to be conserved and protete and poLicies for zoning and deveopment of economic activities in the coast; b) a regulatory needs assessment and preparation of draft guidelines, rules and regulations for control of activities on <de coast; and c) mechanisms for recurrent funding to support CZM activities and encourage publiclprivate partnership.

(b) E muie Services: The designs of compactor trucks, containers, and landfills bave been completd, or are in tie proce f being completed, under the ERRP.

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Engineering services will bk needed for assistance to CDR in bid evaluation, and supervision of construction. Full engineering services will be provided for the (i) design and consruction supervision of the two compost plants in Saida and Zahle; (il) design and construction of the Amrousiyeh Complex, and (iii) design and constuction supervision for tir collection and incineration of hospital waste.

(c) Institutional Technical Assi andaining: As CDR, MOE and MMRA are newly establislrd institutions, their staff requires training in- the development and impementatien of their responsibilities. MOE is already receiving techuical assistance fro UNDP for institutional development over te mid to long term. In the short tern CDR will receive immediate strengtheing to review and manage environmental assessment for the project components of landfills, hospital waste incinerator and tihe Amusiyeh Complex. As due implentig agency, CDR will be responsible for dtese enviromental assessments (EAs), and the Banik will review all EA reports. The tenms of reference for a senior enviromental specialist are presented in Arnex 2. Tir project will provide supplementary assistce to MMRA, by recruiting tbree ieional experts who will cadh serve for two years, providing technical assistance and on-the-job training of MMRA staff on soULd waste and municipal management. Finally, tbe project would provide for the tainig of technical staff from MMRA and the municipalities.

3.00 Environmental Aset

3.0l Enviroumental Revlew Proceu: While the proposed project is expected to have positive enviroomental impacts by elimination of indiscriminate dumping of soL;d wastes at

roadsides, at open seashore dumps, on vacant land and at uncontrolled dump sites, tie posslbility that some of its components could have negative impacts if mismanaged caused it to bk subject to a category A environmental assessment according to World bank Operational Directive 4.01. The impacts of these components and mitigation measures to be undertaken are described below.
Compait flts at Saida and Zahle
3.02 Project Justification and Benerits: Composting plants were found to be the bet techiological and economic solutions to solid waste disposal problems fore the Cazas of Saida and Zahle for the following reasons:
(a) the existence of close-by agricultmual lands makes it econonically and technically beficial for compost to bk used for soil improvement;

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(b)- the high proportion of humid (wet) organic matter (52% - 68%) enhances efficient compost production and makes incineration technicaily and economical not feasible;
(c) landill volume requirements are greatly reduced (although the need for a landfdl is not eliminated);
(d) the environment is sfeguarde through the avoidance of nuisances such as odors, watcr table pollution, insect propagation; epidemi nisks and aesthetic appearance; and
(e) mic sordng of recuperable mat namely plastic, metal, aluminum cans ad glass encourages the esublishment of recycling industries.
3.03 Pntential Environmenl Impacts: Despite its advantages, die establishment of a composting plant may bave negative impacts on tbe surroundings, including:
(a) tdm change in land use at the selected site frm agricultnrl to a waste disposai site; and
(b) the nuisance to the local population, inclding noise from plant operations and truck traffie, genetion of odors a the plant, dust and litter due to trudc trafflc and deterioration in roads due to beavy truck traf.
It is important to note tiat there are negligible effects of the composting plants on surface waters, grundwater, geological conditions at the site, fauna and flora, climate, tourist atractions and archeological sites. Ibis is mainly due to the appteness of the site locations.
3.04 Mitigation Measures. Mitigation meaures te mmimize te above menioned negative impacts were developed and a management plan for the application of these measures has been established. These meares are based on past experience both i Lebanon md abroad. Accordingly, all non constructed areas will be covered with lawn, and the whole compost plant will be surunded by tees. Ail circulation areas wiil have a high quality grade and sub-grade capable of withsg the traffic of heav trucks and will be paved witb wasbable anti-sliding material. The storage, fermentation and matration areas wiil be covered. These arcas wiil be equied with fie extinguishers, fire hydrants and a basin for water storage. nie noise pollution will be minimized by implementing strict regulations for noise control of equipment, for speed limitation of trucls arriving and departfing, and by establishing fied openiand closing hours for the operation of the pla. The odor and litter probem will be rduced by placing a reception facility below gund level. As for the wastewater generated from the daily use of water, it will bk trated mi a septic tank of appropriate capacity. The composting plants

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will b complemented by adjacent sanitary landfilIs, bult according to international standards, capable of handling all the non-recyclable sorted refuse from the plants. It should bc noted that inportant measures would bc undertaken to ensure tht tie opertion of the compost plant meets te standards and objectives it was originally designed for, essentially the trnsformation of dis municipal waste into a useful product that can be marketcd and used in agriculture. lTis goal c- bk aclieved by (i) ensuring a high quality compost that is suitable for use in the nearby agricultural lands; (ii) underaking a successful marketig campaign to increase people's

knowledge and awareness and to eliminate their reticence towards using a product generated from waste; and (iii) ensuring a good coordination between the various agencies concerned by the project, namely the Ministry of the Environment, the Ministry of Agriculture, the Green Plan, te municipalities involved, and other non-govermmental organizations.

Amrousiyeh Complex

3.05 Environnental Impacts. Increasing the capacity of the existing Amrouusiyeh incinerator is not an environmeitally sustainable solution for waste disposal in the region of westen Beirut. As the organic (putrescible) materials represent 50-68 % (wet weight bsis) of te waste with a high water content (62-81%), the exisdtg incinerator oven requins addition of fuel oil to assist in combustion. Emission stack testing shows that dicre is stili iomplete combustion, and black smoke, particulate matter and odors are coimnon occurrenes. The Amrousiyeh incinerator would not, therefore, be expanded.

3.06 Mitigation Measure. The proposed alternative for the icinerator expansion is the constuction of a compost plant at ftie existing site ani modernization of the existing ovens at the incinerator, so as to meet Europcan Union stadards. Inefficient incineration of te wasbes wili be resolved by selective collection of wastes from neighborhoods with bigher calorific value wastes, by use of the high calorific value sorted waste generated by the compost plant and\or by use of compost from the composting plant. This solution is an integrated solution that encourages reduction, reuse and recycling of waste materials and also makes efficient use of the existing facilities at the site. The mitigation asures to b implementd for the composting plant wil be simiar to those described above for the composting plants at Saida and Zable.

3.07 General Site Selection Criteria for Landfrils. hie selection of sites for landfils hi Lebanon is a difficult process due to te lack of suitable sites in the rugged mountainous terrain, due to the disruption of effective municipal l[ad use planning procedures during the civil war and due to opposition to landfill sites from those in their vicinity. Mhe "not in my backyard' attitude tw accepting landfills appears to bW widespread among landowners and the public in Lebanon. A general set of criteria have been developed te: a) assist in the selection of rational sites for landflls and b) defme basic design prhciples for landfllls. The criteria emphasize

* avoidance of sensitive environiental features, while taking into account the need for landfills located-close to aU population centers to minnmize transport disces, and are summarized in Annex 4. An environmental assesament (EA) report recommendi ong e or several

environmmnlly acceptable sites will be prepared for each caza by CDR, and tie EA report will bk reviewed by the Batic. The EAs will systematically analyze three main environmental aspects: (i) justification of site selection; (il) results of the public consultation process; (iii) site specific design criteria for envirormental mitigation and protection.

3.08 Hospital Wges. Inventories of hospital waste were carried out for the cazas of Saida and Zahle, and for western Beirut. These surveys are a first attempt to describe the types and quantities of hospital wastes generated in Lcbanon. MTe survey results indicated that hospital wastes represent a minor proportion of the overall waste production: less than 1% of daily wn generation. The hospitals wastes consit of mnainly domestic wasles (from the kitchens, offices, general maintenance services) but infectious wastes (consisting of human tissue, blood and laboratory wastes) can represent up to 50%, as is common in westn Europe. Presently both. these types of hospital wastes are co-mingled in collection and disposal with Oie oher municipal wastes. The only exception occurs at two hospitals in western Beiut which are equipped with special incinerators. Under Oi project, a feasibility study and environmental assessment for the location and sizing of a central hospital wastes incinerator will be carried out and fumding provided for the incinerator and the nccessary collection vehicles.

3.09 Isdustrial Wastes. Inventories of industrial waste were carried out for the cazas of Saida anid Zhle, and for wester Beinat. The inventories were compiled based on systematie inerviews with owners and managers of local industrines. Industries surveyed include siaughter houses, rendering plants, chicken and livestock production, tanneries, dye ant textile miLs, foot transformation industries, vehicle repair garages ant furnitre plants. These surveys are a frt attempt to descrbe dte types and quantities of industial wastes generated in Lcbanon, and the results presented in the EAs show that: 1) the quantities are probably underestimated; ii) existing disposal practices are basically haphazard, for example disposal in rivers, on roadside in

uncontrolled dumps, miture with all other plant wastes or buming of used tires. Furtiter work will be undertaken te develop a pla, to be financed by the ERRP, so as to separately collect and to separately dispose of the various categories of industrial wastes.

3.10 Costal Zone Management Plan. The first step in the preparation of the coastal zone management (CZM) plan wilb te a ful assessment of the key coasIl resources under eat by development presm . A regional environmental asscssment (REA) will provide a diagnostic of tbe present situation, and forecast the state of the coastal zone and its resources by the year 2010 under various investment scenarios. It will identify the main sources of environment degradation, critical areas and emergency actions, in a study corridor 16 kmn wide. This REA will be used for the preparation of land-use policies which can kead to environmentally susainable pattes. mhe consultant will commence work early in 1995.

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