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STAFF APPRAISAL REPORT

LEBANESE REPUBLIC

AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

August 14, 1996

Republic of Lebanon

Office of the Minister of State for Administrative Reform

Center for Public Sector Projects and Studies

(C.P.S.P.S.)

Natural Resources, Water and Environment Operations Division
Country Department II
Middle East and North Africa Region

CURRENCY EQUIVALENTS

Currency Unit = Lebanese Pound
US$1 = LL 1,590
LL 1 million = US$628.9
(as of February 1996)

PRINCIPAL ABBREVIATIONS AND ACRONYMS USED

AIDP	Agriculture Infrastructure Development Project
CDR	Council for Development and Reconstruction
DG	Director General
DSC	Directorate of Studies and Coordination
EIMC	Environmental Information and Monitoring Committee
ERR	Economic Rate of Return
GDP	Gross Domestic Product
GIS	Geographic Information System
GOL	Government of Lebanon
GP	Green Plan
GPEC	The Green Plan's Executive Committee
ICB	International Competitive Bidding
IBRD	International Bank for Reconstruction and Development
IFAD	International Fund for Agricultural Development
IMS	Information Management System
IRR	Internal Rate of Return
MOA	Ministry of Agriculture
NAC	National Agriculture Census
NCB	National Competitive Bidding
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
TA	Technical Assistance
TORs	Terms of Reference

GOVERNMENT OF LEBANESE REPUBLIC
FISCAL YEAR

January 1 - December 31

George A. Shammas

LEBANESE REPUBLIC

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Vice President	:	Kemal Derviş
Director	:	Inder Sud
Division Chief	:	Salah Darghouth
Task Team	:	Mohamed N. Ben Ali (Task Manager), Nejdet Al-Salihi, Jean-Francois Barrès

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Loan and Project Summary

Borrower	:	Lebanese Republic
Implementing Agencies	:	The Green Plan (GP) of the Ministry of Agriculture (MOA) and the Council for Development and Reconstruction (CDR)
Beneficiaries	:	Ministry of Agriculture The Green Plan Farmers
Loan Amount	:	US$31 million equivalent
Terms	:	Standard variable interest rate for currency pool loans, with 17 years maturity, including 5 years of grace
Commitment Fee	:	0.75 percent on undisbursed loan balance, beginning sixty days after signing, less any waivers
Project Objectives	:	The main objectives of the project are to: (a) develop land and water resources to increase farmers' incomes and conserve the environment through land terracing and development of about 5,600 ha and storage of runoff water in about 250 small hill-ponds; (b) increase access to rural areas through the construction of about 300 km agricultural roads; and (c) upgrade the institutional capabilities of the Green Plan (GP) and Ministry of Agriculture (MOA), carry out a National Agricultural Census and establish an Information Management System at MOA.
Project Description	:	The Project would finance three major components: (a) a land and water development component which would include, inter alia, mechanical works for the terracing of 3,100 ha of steep-sloped land (IFAD financing), construction of terrace-retaining walls, construction of 250 hill-ponds of about 10,000 m^3 capacity (20 of which to combat forest fires) and the provision of about 1 million fruit tree seedlings to plant about 2500 new and existing terraces; (b) an agricultural roads component which would finance the construction of about 85 km of asphalted roads and 215 km of earthen roads and provide specialized design and works supervision equipment, studies, vehicles, as well as incremental staff and recurrent costs; and (c) an institutional support component which would include improving the implementation capacity of the GP, providing it with a new Environmental Information and Monitoring Committee (EIMC) and conducting a National Agricultural Census, as well as establishing within MOA an Information Management System.

Environment : The Project has been classified as a Category B project for the purpose of O.D. 4.01. Guidelines and environmental assessment checklists have already been prepared. Environmental assessments, to be conducted by the EIMC, would become part of all feasibility studies and would be implemented under the Project to mitigate potential negative effects on the environment of land and water development as well as of agricultural roads.

Poverty : The project is classified under poverty Category "Program of Targeted Interventions" (PTI), because of a specific mechanism, and the use by the GP of existing local committees to help it to focus on needy rural populations, particularly those with small land holdings of less than 0.5 ha..

Benefits : The primary benefits of the project would be incremental agricultural production (58,000 tons of vegetables and 110,00 tons of fruit), the improved management and conservation of land and water resources, savings on the cost of rural transportation and an updated agricultural sector database. In total, about 9,600 farm families or about 75,500 people would benefit directly from the project.

Risks : The uncertainty of achieving the anticipated agricultural benefits on schedule is the first risk that the project may face. This risk would be caused by potential delays in the implementation of agricultural investments by farmers. It would be mitigated during the selection of project beneficiaries by assisting farmers who plan to complete the entire investment within two years or who commit themselves to refund the GP assistance if they do not complete the investments. The past 30 years' experience of the GP shows that this risk is in reality minimal, as most farmers do indeed complete their investment on time. The second risk is related to the maintenance of rural roads. This risk would be overcome by providing funds under the project for the GP to maintain the roads it builds. In the long term, the increasing allocations of road maintenance funds made to the Governorate offices and Deputies of the various regions in Lebanon would ensure the adequate maintenance of agricultural roads.

Project Cost Summary

	Local	Foreign	Total	Local	Foreign	Total	% Foreign Exchange	%Total Base Costs
	(LL Million)			US$ '000)				
A. Land and Water Development	68,441	23,442	91,883	43,045	14,743	57,788	26	73
B. Agricultural Roads	6,720	15,888	22,609	4,227	9,993	14,219	70	18
C. Capacity Building								
1. Green Plan Headquarters	1,259	1,027	2,286	792	646	1,438	45	2
2. Environmental Monitoring	569	638	1,207	358	401	759	53	1
2. Ministry of Agriculture								
Support to Agricultural Census	3,484	2,358	5,843	2,191	1,483	3,675	40	5
Support to MOA's Management Information System	811	639	1,450	510	402	912	44	1
Subtotal Ministry of Agr.	4,295	2,998	7,293	2,701	1,885	4,587	41	6
Subtotal Capacity Building	6,123	4,663	10,786	3,851	2,932	6,783	43	9
Total Baseline Costs	81,285	43,993	125,278	51,123	27,668	78,791	35	100
Physical Contingencies	7,124	3,767	10,891	4,480	2,369	6,849	35	9
Price Contingencies	24,897	5,524	30,421	15,658	3,474	19,132	18	24
Total Project Costs	113,306	53,284	166,590	71,261	33,511	104,772	32	133

Financing Plan

Financier	Local	Foreign	Total
		(US$ Million)	
World Bank	5.8	25.2	31.0
IFAD	7.2	4.8	12.0
Beneficiary farmers	46.4	2.3	48.7
Government	11.9	1.2	13.1
Total	**71.3**	**33.5**	**104.8**

Estimated Disbursements

	IBRD Fiscal Year						
	FY97	FY98	FY99	FY00	FY01	FY02	FY03
				(US$Million)			
Annual	2.0	3.0	4.9	5.6	6.1	6.6	2.8
Cumulative	2.0	5.0	9.9	15.5	21.6	28.2	31.0

Economic Rate of Return: 24 percent

Estimated Completion Date: December 31, 2002

Project Identification No.: LE-PA-34037

LEBANESE REPUBLIC

AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

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I. BACKGROUND

A. The Economy

1.01 Lebanon is a small mountainous country with an area of 10,450 km^2. Its population was estimated in 1994 at about 3.4 million. Administratively, Lebanon comprises six administrative Governorates (Muhafazats): Mount Lebanon, North Lebanon, South Lebanon, Nabatiye, the Bekaa Valley and Beirut (see Map IBRD 27927). The six Muhafazats are sub-divided into 24 Districts (Cazas). Until the mid-seventies, Lebanon was a prosperous middle-income country driven mainly by the service sectors, namely trade, tourism and finance, which contributed more than 70 percent of the Gross Domestic Product (GDP). In 1975, the country plunged into a violent civil war which lasted for nearly 17 years and had a profoundly destructive effect on the Lebanese economy and the foundations of Lebanese society.

B. The Agricultural Sector

1.02 **Agriculture in the Economy.** Agriculture GDP has remained significantly below its pre-war level (20 percent) and is currently accounting for only 10 per cent of total GDP. Nevertheless, the agriculture sector continues to be an important source of income for 20 to 30 percent of the population, particularly in hilly and mountainous areas. Moreover, although its share of GDP has fallen since the mid-1970s as the trade and service sectors have grown, agriculture accounts for a substantial proportion of exports. Approximately 360,000 ha, or slightly more than one-third of Lebanon's total land area of about one million ha, is arable. The most fertile areas are located in the Bekaa valley and along the narrow coastal strip. Of the 215,000 ha of arable land that are presently cropped, 87,000 ha are under irrigation and the rest is rainfed. The remaining 145,000 ha of arable lands are hilly and mountainous and are either in fallow or are too steep to be cultivated without rehabilitation and development. Tree crops, vegetables and livestock make up a significant proportion of agricultural production. In their quest for higher and more stable incomes, farmers have shifted away from annual crops to fruit trees and protected high value crops. The proportion of cropped land under fruit trees has risen from 41 percent of the total cultivated area in 1974 to more than 51 percent in 1990. About 40 percent of tree crops are receiving supplemental irrigation. Major tree crops include olives, grapes, apples, cherries, citrus and bananas. The area devoted to cereals decreased from 30.4 percent in 1974 to 18 percent of the total cultivated area in 1990. Annual crops include cereals, pulses, potatoes, tomatoes, cucurbits and other vegetables.

1.03 **Government Policy and Strategy.** Given the limited arable land resources, the deterioration of the natural resource base and the steadily growing population, the Government has since the early sixties given a high priority to land and water conservation and development as well as to improving access to isolated rural areas. This was manifested through the creation of the Green Plan (para. 1.07) and the provision to land-owners, through cost-sharing arrangements, of incentives to sustainably develop their steep-sloped lands. Public financing of land and water development for private farmers is justified on several accounts: (i) land and water developments dramatically increase farm income and improve living standards so as to reduce poverty in rural areas; (ii) improved rural incomes and standards of living reduce the migration of the rural poor to urban areas and facilitate the return of populations displaced during the war, thus lowering the cost to the Government of urban infrastructure and reducing urban congestion; (iii) land and water development activities significantly reduce soil and water erosion and protect the environment; and (iv) because initial investment costs are very high and the time it takes for

these investments to provide returns is long, poor and small land owners cannot afford to make these investments on their own since needed credit is virtually unobtainable.

C. Agricultural Institutions

1.04 **The Council for Development and Reconstruction (CDR)**. CDR is a financially autonomous public institution created in 1977 for the coordination of reconstruction and development planning in Lebanon. It is attached to the office of the President of the Council of Ministers to whom it is responsible for recommending economic, financial and social policies. It is also entrusted with the channeling of loans and grants from external sources to finance the country's reconstruction and development.

1.05 **The Ministry of Agriculture (MOA)**. The MOA has the statutory responsibility to formulate agricultural policy and to support agricultural development through its central and regional services and satellite agencies. After the end of the civil disturbances, the MOA was restructured and re-engineered under the provisions of a new organizational decree (Chart 1). The decree entrusts MOA with the responsibility for planning, administering and developing the agricultural sector and its related activities. The war-induced absence of permanent systems to collect agricultural statistics and the lack of an updated sectoral information data base are now the major factors constraining MOA's efforts to formulate effective agricultural policies and strategies.

1.06 **The Green Plan (GP)**. The GP is a public authority with considerable management autonomy. Established in 1963 under Decree No. 13785, the GP became active in 1964 as an autonomous authority under the tutelage of the Minister of Agriculture. Its mandate is "to study and execute land rehabilitation and development projects" and its range of activities includes land rehabilitation and development, development of hill ponds and small water reservoirs, water distribution systems and small-scale irrigation schemes and the construction of agricultural roads. All civil works planned and financed through the GP are often designed and always executed by private sector contractors. As shown in Chart 2, the GP is headed by an Executive Committee (GPEC) composed of a President and two members. At its Beirut headquarters, it is organized into three central services: Cabinet/Administrative, Accounting and Technical. In addition to the above three services, the GPEC is supported by a small administrative and advisory unit. From an original staff of about 300 in the late sixties, the GP now employs 40 engineers/agronomists and some 170 technicians and support staff. The GP's effectiveness is presently constrained not only by staff shortages but also by budget resource limitations and a lack of mobility. These have reduced its programs and implementation capacity. However, despite its reduced capacity, the GP is still substantially active. More details on the GP are in Chapter II , Section C.

II. THE PROJECT CONTEXT

2.01 **Relevance to Country Assistance Strategy**. The Country Assistance Strategy (CAS) for Lebanon was last discussed by the Executive Directors on June 30, 1994. The proposed project would be central to achieving the goals of the CAS, which focus on: (i) addressing social needs and environmental concerns; (ii) rehabilitating physical infrastructure; and (iii) helping to rebuild and strengthen public administration. The demand-driven land and water development activities to be financed under the project would respond to farmers' needs and significantly increase rural income, thereby reducing poverty. These same activities would also help reduce soil and water erosion and protect the environment. The rehabilitation and construction of agricultural roads would contribute to the upgrading of physical infrastructure and to improving the access of rural populations to markets and social services. The conduct of a National Agricultural Census and the establishment of a Permanent Statistical System and an Information Management System would strengthen MOA's capacity to formulate sectoral policies

and development strategies, including the promotion of private-sector-led agricultural growth. The project is also consistent with the MENA Rapid Country Water Strategy and the draft "Lebanon Environmental Strategy Framework Paper."

A. General Characteristics

2.02 **Location and Climate**. Due to the participatory and demand-driven nature of the activities to be financed by the proposed project, their location would be distributed throughout Lebanon. They would be focused mainly on hilly, remote and less developed areas. Lebanon is blessed with a mediterranean climate and has relatively adequate water resources. Temperatures are moderate with no significant incidence of frost below 100 m elevation. Annual precipitation ranges from about 1250 mm in central Mount Lebanon to just over 800 mm in the South (Map IBRD 27928), which is roughly the average for Lebanon as a whole.

2.03 **Farm Size and Credit**. According to the last, unpublished 1970 agricultural census, about 46 percent of farm holdings in Lebanon are small (between 0.5-2 ha); they account for about 9 percent of the privately owned lands (POL). Another 28 per cent of holdings are considered to be of average size and have an area of between 2 - 5 ha; they account for about 16 percent of the POL. The remaining 26 percent of holdings have a size of more than 5 ha and account for about 75 per cent of the POL (Annex VI, Table 1). There is no source of institutionalized formal credit for agriculture in the country. Small and medium-sized farmers can generally obtain loans from family members, local money lenders and commercial firms (input suppliers and/or wholesalers) in the form of short-term credit but at very high indirect interest rates. Parliament has recently approved a law authorizing the creation of an Agricultural Bank with a large share of private-sector participation.

B. Major Constraints to Hilly Agriculture Land Development

2.04 Undeveloped hilly agricultural lands often have shallow and eroded soils. After centuries of unsustainable cultivation, they have been practically depleted and are presently utilized to either cultivate annual subsistence cereals or have been converted to marginal pastures. Under both utilizations their soils continue to be eroded. The income these lands generate is no longer sufficient to sustain livelihood. As a result, farmers have either taken other jobs to supplement their farm income or have migrated to urban areas. Several decades ago, a few well-to-do farmers or those with access to remittances from abroad succeeded in changing the production capability of their lands by terracing them and planting them to high-value fruit trees. Land terracing, terrace consolidation, planting and water mobilization in hill-ponds are the techniques most favored by Lebanese farmers for soil and water conservation and for sustainable income-generation. They are, however, expensive and out of reach of most land owners. Through the GP, the Government has devised a way to channel assistance to landowners to conserve, improve the aptitude and develop lands in the mountainous areas of Lebanon (para. 3.02). The results of GP experience during the past three decades is discussed in Section C below.

2.05 The isolation and lack of access to mountainous agricultural areas has had detrimental effects on both the intensity with which lands are cropped and the yields the crops achieve. Because of their relatively high elevation, most of these areas are covered with snow in the winter and are wet and muddy during the spring. Without agricultural roads, farmers have to wait until tracks become passable and are unable to get to their land until late during the cropping season. As a result, they are only able to hastily plough and late-seed a few crops on only part of their land; hence, the low cropping intensity. Late-seeding of most crops on hastily prepared seed-beds affects the performance of crops and significantly reduces their yields. The lack of access roads also makes it difficult for farmers to transport to their farms and use adequate amounts of organic and chemical fertilizers and other crop husbandry products. Inadequate fertilization and crop husbandry practices have been observed to reduce crop yields by more

than 50 percent. Transporting farm products, particularly perishable farm produce, on animal-drawn carts or small trucks over several kilometers takes a long time and causes the produce to bruise and diminish in quality and price. Because their vehicles suffer frequent breakdowns and high O&M costs, transporters charge very high fees. Linking these isolated areas to the local "classified" road network and to villages would enable farmers to improve cropping intensity and practices and achieve higher incomes (para. 3.03). These agricultural roads would also make it easy for them and their families to access social services from their farms.

2.06 In addition to the specific constraints described in paras. 2.03 and 2.05 above, the Lebanese agricultural sector as a whole suffers from the lack of an updated and complete sector information database. Because of the civil war and turmoil that followed the conduct of the field surveys and completion of the data, the full results of the 1970 agricultural census were never released. Much of the information that was collected and analyzed was either destroyed or lost during the war. Presently, the MOA is finding it difficult to formulate policies and a coherent strategy for agricultural development without essential information, an updated sectoral database and adequate staffing. To alleviate this constraint, the conduct of a new National Agricultural Census (the last completed census dates to 1960) and the establishment of a permanent system for agricultural statistics as well as a documentation center would be necessary (para. 3.06). Until public salaries become attractive, MOA staffing needs would continue to be met through the recruitment of consultants from the local budget.

C. Evaluation of the GP's Past Achievements

2.07 **Lessons From Past GP Experience.** Since its inception, the GP has adopted a demand-driven approach to the execution of land rehabilitation and agricultural roads activities. During the past thirty years, the GP has helped terrace about 26,000 ha of sloped privately-owned land (about 0.7 ha per farmer), construct more than 7 million m^2 of terrace retaining-walls, 500 hill ponds (average capacity = 8,000 m^3) and more than 3,000 small concrete basins. The GP has also built more than 1,000 km of agricultural roads. Its activities have benefitted more than 38,000 farmers and about 1,000 villages scattered all over Lebanon. After reaching a peak in 1968, the GP's activities declined and became erratic during the 17 years of war. Since 1991, the GP's ability to respond to farmer and community demands for agricultural roads and land development increased appreciably but remained curtailed by the lack of adequate financial resources. In 1994, 800 ha of land were developed and 40 km of agricultural roads were constructed. The GP estimates that unsatisfied requests for assistance to land terracing and development exceed 40,000 ha, and those for rural roads exceed 2,000 km.

2.08 The review of past activities indicates that, overall, the development implemented by the GP during the last thirty years has been generally successful and in line with its mandate to develop hilly lands and improve access to isolated agricultural areas. The administrative procedures used to implement the GP's work plans are known to the farming population in Lebanon and have evolved with time and are becoming more efficient and more competitive than in the past. It is, therefore, logical for the design of the proposed project to build on the current system and institutions and take into account the lessons learned from the GP's past experience. These lessons include the need to: (i) increase the efficiency of land and water and agricultural roads investments; (ii) introduce greater transparency and competitiveness in the award of land-terracing mechanical-works contracts; (iii) put greater focus on environmental aspects; and (iv) to the extent feasible, focus project resources on poor areas.

D. Cost-Sharing Arrangements

2.09 Present cost-sharing arrangements set the lifetime assistance allocation at an aggregate ceiling of LL 10 million per person and take into consideration only part of the investment required to rehabilitate and develop lands. The costs eligible for GP assistance include land terracing, terrace retaining-walls, soil ripping, rock removal, hill-pond construction and localized irrigation systems. They amount to about LL 13 million per ha (US$8,175). Costs eligible for GP assistance do not include those for soil preparation, basic fertilization, seedlings, planting costs, replacement of failed trees and crop establishment expenses during a period of four years. These are financed by beneficiary farmers. When all costs are added, the total investment per hectare reaches about LL 26 million (US$16,350) in North Bekaa or double the amount deemed eligible for assistance by the GP. Farmers' share in the costs of land rehabilitation and development amounts to 13 percent of eligible costs when the area developed amounts to 0.5 ha; it is 35 percent for a 1 ha area; 67 percent for a 2 ha area and reaches 78 percent for a 3 ha area. However, when the total costs are taken into account, farmers share of the cost increases to 57 percent for 0.5 ha, 68 percent for 1 ha, 84 percent for 2 ha and 89 percent for 3 ha. During negotiations, GOL gave assurances that the GP would maintain cost-sharing arrangements at their present level. If a change becomes necessary, new arrangements would have to be satisfactory to the Bank [para. 8.01 (a)].

2.10 Land terracing, water conservation and use and orchard establishment are, in the long term, capable of generating substantial incomes even in the poorest areas. The analysis of the financial returns of these activities in each of the five Lebanese regions indicates that their IRRs vary between a low of 18 percent for North Lebanon to a high of 50 percent in South Bekaa. With these lucrative returns, it would seem that Government cost-sharing would not be necessary. However, when all the costs of investing in land and water developments are added up and analyzed, it becomes clear that farmers would not be able to make this type of investment on their own. The estimated initial investment to establish and operate (first four years) a one-hectare mixed-crop farm varies between a low of about LP 26 million (US$15,700) in North Bekaa to a high of LP 51 million (US$32,000) in South Lebanon. Present average farm incomes in Lebanon are not known; however, estimates made during the preparation of the proposed project indicate that a one-hectare wheat-farm has an average income of about LL 67,000 (US$42.0), which is insignificant.

2.11 The minimum initial investment in a one hectare fruit-farm in North Lebanon is about LL 26 million (where some of the poorest areas of Lebanon exist). It is equivalent to 373 times the average annual income of a one-hectare wheat-farm in this area. With the existing low incomes of farmers, the high initial investment costs and the six years it takes for orchards to break even with operating expenses, farmers are unable to muster the necessary financial resources to invest in land terracing and development. Without Government assistance, only the rich would be able to undertake this type of activity. Without Government assistance, rural farmers would not only be incapable of developing their lands, but would also have their land resource base and their present meager incomes deteriorate as a result of erosion. To insure their livelihood, they would most likely abandon their farm land and migrate to urban areas, causing great expenses to the Government in social infrastructure. In an attempt to deal with this potential out-migration, conserve the environment and improve life in the rural mountainous areas, the Government has committed itself to share the costs of sustainable development of land and water resources. Past experience has indicated that farmers benefitting from the GP's assistance have been able to mobilize their share of development cost through personal savings and informal financing channels.

2.12 **Environmental Aspects.** The GP's past activities (terraces, rural roads and fruit tree distribution) have generally achieved positive environmental impact. However, in some cases, the lack of sufficiently detailed environmental surveys, particularly for agricultural roads, may have resulted in effects that are not fully consistent with the objectives of natural resources conservation. These possible effects remain undocumented mainly because of the lack of adequate monitoring of the GP's activities and

their effect on the environment. In order to avoid potential harm to the environment as a result of future activities to be financed by the proposed project, during negotiation GOL gave assurances that an Environmental Information and Monitoring Committee (EIMC) would be created [para. 8.01 (b)] within the GP. Its role would be to assess, during the study and design stages of project activities, potential detrimental effects on the natural resource base and various eco-systems and to propose mitigating measures to be undertaken before or during the implementation of these activities (Annex 5).

E. Design Considerations

2.13 The objective of improving farmers' income from agriculture in the mountainous areas of Lebanon can best be achieved through the development of their land and water resources. To achieve this goal several alternatives are available. Agriculture intensification through better cultural practices and a higher level of inputs (fertilizers, pesticides and better crop varieties) was the alternative most used in the past. The results have often been significant in the short term; however, their long-term benefit was not sustainable, mainly because the annual crops grown do not make the best use of resources and often were the causes of erosion and pollution. A second alternative, which has been adopted almost exclusively by wealthy landholders and was proven sustainable, has been to change the aptitude of the land and improve its capacity to support higher value and/or permanent crops. By terracing steep hilly lands, conserving their soils, planting them with fruit trees in lieu of erosion-conducive annual crops and storing potentially erosive runoff water for summer supplemental irrigation, well-to-do farmers have been able to create employment for their families and neighbors, developed and protected natural resources from erosion, and substantially increased their income. One of the objectives of the GP was to make the adoption of this second natural resources development alternative affordable to smallholders.

2.14 The Project has been designed under a program approach. Under this approach, regular activities of the GP that respond to a set of agreed criteria [para.8.01 (c) and (d)] would be financed by the Project. With regard to land and water development activities, a sample of farmers' requests for assistance was appraised (Annex II) and was found to be responsive to the agreed criteria except for the environmental assessment which remains to be completed. The GP has issued instructions and forms to be included in all the feasibility study packages to ensure that the agreed criteria are taken into account in the selection of activities that would benefit from GP assistance. Disbursements for land and water development would be contingent on the full responsiveness of the planned activities to the agreed selection criteria, as ascertained during the review of the GP's annual work program. With regard to agricultural roads, the program (70 km) to be implemented during the first two years of the project was evaluated and was found to be responsive to the agreed selection criteria (Annex III). The required environmental assessment of agricultural roads has been completed. This involved consultations with farmers, the GP, NGOs, local community leaders and Government authorities. Detailed designs for the two-year road program have been completed and agreement on the expropriation of the land on which these roads would pass has either been obtained or is underway. The project components relating to institutional capacity building have been well defined and evaluated in detail (paras. 3.05 and 3.06).

2.15 **Stakeholders Participation.** Rapid Rural Appraisals and a workshop were conducted during project preparation and pre-appraisal. Their results indicate that in order to have an impact on poverty, project activities should, to the extent feasible and within the existing social equilibrium, give greater priority to the poorest farmers and the most depressed rural areas. According to current GP policy, project financial resources would, in principle, be divided equally among the four regions of Lebanon (North Lebanon, Mount Lebanon, South Lebanon and the Bekaa). However, it was agreed that the GP may allocate up to 20 percent more resources to regions where farmers' demand for assistance are high. During negotiations it was further agreed that within regions, the GP's regional offices would target needy villages and communities and that within targeted villages and communities, the Green Plan would work with local committees to prioritize the poor and target project assistance to those most in need. The

participation and involvement of populations through elected representatives (municipalities, cooperatives, village associations, etc.) would be used by the GP's regional offices to increase their capacity to identify and target needful families. Representatives of populations would, for example, help to: (i) differentiate between farmers who rely on farming to make a living from those who have additional sources of income; and (ii) determine which potential beneficiaries of the project are the poorest [para. 8.01 (e)]. However, project activities would benefit the Lebanese farming population at large and would not be focused exclusively on the poor.

III. THE PROJECT

A. Project Objectives

3.01 The main objectives of the project are to: (i) develop land and water resources on about 5,600 ha for the purposes of increasing farmers' incomes and protecting the environment through land terracing and harvesting of runoff water in small hill-ponds; (ii) increase access to and from isolated rural areas through the construction of about 300 km of agricultural roads; and (iii) strengthen the institutional and implementation capabilities of the GP and the Directorate of Studies and Coordination (DSC) within the Ministry of Agriculture (MOA) by upgrading their human and material capabilities, financing the conduct of a National Agricultural Census (NAC) and establishing an Information Management System to provide the data necessary for strategy and policy formulation.

B. Project Description

Land and Water Development (base cost US$57.8 million; 73 percent of base cost)

3.02 The aim of this component is to help farmers achieve the sustainable development of their land holdings that are presently under extensive agricultural production or that are not cultivated because past practices have caused them to erode and degrade (para. 2.04). Under this component, the project would finance: (i) mechanized works for land terracing on about 3,100 ha; (ii) the construction of terrace retaining walls to stabilize existing terraces and/or consolidate newly terraced lands; (iii) the construction of 250 hill-ponds (10,000 m^3 average capacity) and 50 small concrete reservoirs (100 to 300 m^3 average capacity) to harvest runoff water for supplemental irrigation of crops in the summer. At least 20 ponds would be constructed in collaboration with the MOA's Directorate of Rural Development and Natural Resources (in charge of Forestry) to provide water for fighting forest fires. Once lands are terraced and stabilized, they would be planted to high-return crops such as vegetables, protected vegetables and banana trees or to other high-value fruit trees. Therefore, in addition to financing the land terracing and water conservation infrastructure described above, the Project would also finance an orchard establishment activity through the procurement of about one million fruit tree seedlings to plant 2,500 ha; these would be purchased by farmers under the same cost-sharing arrangements described in para. 2.09 above. The Project would also finance costs associated with the execution of the land and water development component, which would include: (i) topographic and office equipment, computers and software to allow GP staff to supervise the land terracing and hill-pond construction works; (ii) 4WD vehicles; (iii) local staff training; (iv) incremental staff salaries and allowances, as well as (v) office supplies; and (vi) vehicle operation and maintenance costs (Working paper No. 4, Table 1).

Agricultural Roads (base cost US$14.2 million; 18 percent of base cost)

3.03 In order to improve access to agricultural areas and make it easy for rural populations to move to and from isolated mountainous areas (see para. 2.05), the project would finance the construction of 85

km of asphalted roads and 215 km of earth roads. Agricultural roads are generally constructed on existing tracks made by animal-drawn vehicles or by farm tractors and small trucks. The GP has so far been able to carry out design studies on 180 km of roads of which 110 km are at the detailed design stage. The execution of the agricultural roads component would follow a program approach, characterized by a well-defined two-year work program (Annex III) evaluated at appraisal and a flexible program (230 km) to be studied and evaluated according to agreed criteria (Annex I, para. 3) during project implementation. To allow for the conduct of activities associated with the construction of agricultural roads, the project would finance: (i) laboratory analysis, feasibility studies and detailed designs for 300 km of roads; (ii) one set each of topographical, geo-technical and office equipment in addition to computer software for road design and construction supervision by GP staff; (iii) one replacement and 8 new 4WD vehicles; (iv) 4 person-months of technical assistance in road design; (v) local and international staff training and; (vi) recurrent costs for incremental staff salaries and incentives, road maintenance, vehicle operating costs and office supplies (Working Paper No. 4, Table 2).

Institutional Support (base cost US$6.8 million; 9 percent base cost)

3.04 The institutional support to be provided by the project would target the GP, which would be in charge of implementing the land and water development and agricultural roads components, and the Directorate of Studies and Coordination (DSC) of the Ministry of Agriculture, which would be in charge of the field execution of the agricultural census and the establishment of an information management system.

3.05 **The Green Plan**. Project support to the GP would encompass the following two sub-components:

(a) **Environmental Information and Monitoring (base cost US$0.8 million; 1 percent of base cost)** The major objective of this component would be to create within GP, through EIMC, the institutional capability to undertake simple environmental reviews, assess the potential implications of the GP's core activities on critical ecosystems and design measures to mitigate their potential negative effect on the environment (Working Paper No. 6). The EIMC would also monitor project progress and maintain records on project monitoring indicators [paras. 2.12 and 8.01(b)]. To establish the proposed EIMC, the Project would finance specialized equipment, including computers, vehicles, etc. (Working Paper No. 4, Table 3) as well as vehicle operation and maintenance costs.

(b) **Implementation Capacity Building (base cost US$1.4; 2 percent of base cost)**. Under this subcomponent, project support targets the GP's central offices[1]. This would allow for a faster turnover in the verification of farmers' requests for assistance in land and water development, in the review of designs of agricultural roads and in the preparation of tender documents. The Project would finance office equipment, 4WD vehicles, consultant services, the organization of farmers information campaigns, etc. (Working Paper No. 4, Table 4).

3.06 **Ministry of Agriculture**. Project support to the Ministry of Agriculture would encompass the following two sub-components:

(a) **National Agricultural Census (base cost US$3.7 million; 5 percent of base cost)**. In order to enable the Directorate of Studies and Coordination (DSC) of the Ministry of

1/ Support to the GP's regional offices has been included in the cost of the land and water and agricultural roads development components.

Agriculture to update the agricultural sector information database (para. 2. 06) and create a permanent system for agricultural statistics, the project would finance the implementation of a national agricultural census (NAC) and the rehabilitation and upgrading of the existing statistical services of MOA as well as policy/strategy formulation, marketing and comparative advantage studies. More specifically, the project would finance, inter alia, specialized equipment, such as stereoscopes, aerial photographs, computers as well as survey and GIS equipment, 4WD vehicles, 43 person-months of international technical assistance and 45 person-months of local consultants and recurrent costs to cover incremental staff salaries and staff travel allowances (Working paper No. 4, Table 5).

(b) **Information Management System (base cost US$0.9 million; 1 percent of base cost).** The objective of the Information Management System (IMS) sub-component is to physically gather all the available information in one accessible location, classify this information to make it easily retrievable and preserve some documentation onto more compact forms of documents. For this purpose the project would finance, inter alia, the procurement of 5 units of audio-visual equipment, computers and printers, one vehicle, the construction of a documentation center at Ghazir or the rehabilitation/completion of an existing center in Beirut, technical assistance, and training and staff incentives (Working Paper No. 4, Table 6).

C. Project Cost and Financing

Project Cost

3.07 Total project costs, including physical and price contingencies, are estimated at US$104.8 million, of which 32 per cent or about US$33.5 million are in foreign currency.

3.08 Details of cost estimates are presented in Working Paper No. 4 and are summarized in Table 3.1 below.

Table 3.1 - Project Cost Summary

	Local	Foreign	Total	Local	Foreign	Total	% Foreign Exchange	%Total Base Costs
	(LL Million)			(US$ '000)				
A. Land and Water Development	68,441	23,442	91,883	43,045	14,743	57,788	26	73
B. Agricultural Roads	6,720	15,888	22,609	4,227	9,993	14,219	70	18
C. Capacity Building								
1. Green Plan Headquarters	1,259	1,027	2,286	792	646	1,438	45	2
2. Environmental Monitoring	569	638	1,207	358	401	759	53	1
2. Ministry of Agriculture								
Support to Agricultural Census	3,484	2,358	5,843	2,191	1,483	3,675	40	5
Support to MOA's Management Information System	811	639	1,450	510	402	912	44	1
Subtotal Ministry of Agr.	4,295	2,998	7,293	2,701	1,885	4,587	41	6
Subtotal Capacity Building	6,123	4,663	10,786	3,851	2,932	6,783	43	9
Total Baseline Costs	81,285	43,993	125,278	51,123	27,668	78,791	35	100
Physical Contingencies	7,124	3,767	10,891	4,480	2,369	6,849	35	9
Price Contingencies	24,897	5,524	30,421	15,658	3,474	19,132	18	24
Total Project Costs	113,306	53,284	166,590	71,261	33,511	104,772	32	133

Financing Plan

3.09 The proposed Bank loan of US$31 million would meet about 93 percent of the foreign costs. The International Fund for Agricultural Development (IFAD) has been approached by the Government and has agreed to provide US$12 million, or 11 percent of project costs for the parallel financing of terrace-retaining wall construction. Total financing by project beneficiaries would amount to about US$48.7 million or 46.5 percent of total project cost. The remaining US$13.1 million or 12.5 percent of project cost would be financed by the Government.

Table 3.2: Financing Plan
(US$ million)

Financier	Local	Foreign	Total
World Bank	5.8	25.2	31.0
IFAD	7.2	4.8	12.0
Beneficiary farmers	46.4	2.3	48.7
Government	11.9	1.2	13.1
Total	**71.3**	**33.5**	**104.8**

D. Procurement

3.10 Procurement responsibilities would be vested in the GP and the CDR. The GP would be responsible for all procurement, including ICB, relevant to the land and water development and agricultural roads components, as well as its own institutional strengthening sub-component. The CDR would be in charge of all procurements relevant to the sub-component of MOA's DSC. The GP has had extensive experience with implementing small works packages for agricultural roads as well as land and water development activities that would be financed by the proposed project. The DSC, however, has not had such extensive experience with procurement and would need the support of the CDR and the institutional strengthening planned under the project. All goods and works to be financed from the proceeds of the Bank's loan would be procured in accordance with the Bank's Guidelines for Procurement under Bank Loans and IDA Credits. The procedures to be adopted are detailed in Annex I, Appendix 3.

E. Disbursements

3.11 The proposed Bank loan of US$31 million would be disbursed against the categories and at the rates indicated in Table 3.3 below. Disbursement would be made against full documentation, except for payment against contracts of less than US$150,000 equivalent for goods, US$100,000 for works, US$50,000 for mechanized works for land and water development, US$100,000 equivalent for services with consulting firms and US$50,000 equivalent for services with individual consultants (including training and studies), which would be reimbursed against statement of expenditures (SOEs). Documentation related to SOEs would be retained by the GP and the CDR, each for the activities for which it has implementation responsibility. Given the long interruption in lending to Lebanon, there is no disbursement profile for the country. The implementation period for the project is estimated at six years. The proposed disbursement profile closely follows the disbursement for the on-going Irrigation Rehabilitation and Modernization Project. Because project funds will be disbursed through two Special Accounts (one for the GP and one for the CDR), a disbursement plan for GP and another for the CDR have been formulated; they are shown in Annex I, Appendix 4. An estimated disbursements plan for the Bank loan is summarized in Table 3.4 below.

Table 3.3: Disbursement Plan

Category	US$ million equivalent	Percentage of Expenditures to be Financed
1. Civil Works	19.8	80%
2. Goods	5.7	80%
3. Consultants, Training, Studies	4.8	100%
4. Unallocated	0.7	
Total	**31.0**	

3.12 **Special Account**. To facilitate disbursements against eligible expenditures, the Borrower would establish two Special Accounts in the Central Bank. The first is to be operated by the GP and the second by the CDR; both accounts would be operated under terms and conditions satisfactory to the Bank. The Bank would, upon request, make authorized allocations of US$2.5 million into the Special Account of the GP and US$0.3 million into the Special Account of the CDR. Initially, the allocations would be limited to US$1.5 million and US$0.2 million for the GP and the CDR respectively. The full authorized allocation could be claimed when disbursements reach US$4 million and US$.05 million for the GP and the CDR respectively. The GP and the CDR would submit replenishment applications for the Special Account on a monthly basis, or when about 20 percent of the initial deposit has been utilized, whichever comes first. The replenishment applications would be supported by the necessary documentation, bank statement of the Special Account and a reconciliation bank statement of the Special Account against Bank records.

Table 3.4: Estimated Disbursement Schedule
(US$ million)

	IBRD Fiscal Year						
	FY97	**FY98**	**FY99**	**FY00**	**FY01**	**FY02**	**FY03**
Annual	2.0	3.0	4.9	5.6	6.1	6.6	2.8
Cumulative	2.0	5.0	9.9	15.5	21.6	28.2	31.0

3.13 The GP and the CDR would keep separate accounts for project expenditures in accordance with accounting principles and practices acceptable to the Bank. The GP would have ultimate responsibility for budgeting and accounting for the land and water development component (para. 3.02), the agricultural roads component (para. 3.03) and institutional strengthening sub-components [para. 3.05 (a) and (b)]. The CDR would have responsibility for budgeting and accounting and would coordinate project activities executed by the MOA's DSC [para. 3.06 (a) and (b)]. Both the GP and CDR would prepare reimbursement requests for their respective components and forward them to the Bank, as well as ensure that up-to-date information on expenditure and disbursements would be available to the Bank supervision missions. Assurances have been obtained at negotiations from the GP and the CDR that they would (i) have their project records, project accounts and project financial statements for each fiscal year audited in accordance with appropriate auditing principles by independent auditors acceptable to the Bank; (ii) furnish to the Bank no later than nine month after the end of each year certified copies of its financial statements for such year and the reports of such audits [para. 8.01(f) and (g))].

F. Environmental Impact

3.14 In consonance with O.D. 4.01, the project has been classified under Environmental Category "B". The safeguards designed into the project, particularly the creation of the Environmental

Information and Monitoring Committee and the inclusion of environmental considerations as a criteria for selecting activities to be supported by the project, would insure that the integrity of natural ecosystems and the environment are preserved. Environmental impact assessments would become an integral part of all the feasibility studies the GP conducts for land and water developments as well as for agricultural roads. The impact of the project on the environment is expected to be positive. Guidelines and environmental assessment checklists have already been prepared. More specifically, it is anticipated that the project would help ensure that environmental assessments to be conducted by the EIMC would become part of all feasibility studies and would be implemented as part of the project to mitigate potential negative effects on the environment of land and water development as well as agricultural roads (Working paper No. 5).

G. Women's Role in the Project

..15 Women would have an active role in project implementation and would benefit from its assistance. The Government of Lebanon and the agencies involved in the project do not have regulations that would preclude women from fully participating or benefiting from the proposed project. In all the three institutions involved in the project, women occupy posts of responsibility and have participated in the design of the project. As civil service employees, women would be able to actively participate in the management and implementation of the project. As potential beneficiaries, women have under Lebanese laws the same rights of land ownership as men. As in the past, the GP would continue to provide its cost-sharing assistance to beneficiaries regardless of their gender. Under Lebanese law, women are able to own and operate businesses and would, therefore, be eligible to bid and receive award of contracts financed by the project.

IV. ORGANIZATION AND MANAGEMENT

A. Institutional Arrangements

4.01 The project would be implemented by two agencies, the Green Plan and the Council for Development and Reconstruction (Annex I). The GP would play the role of the project management unit and be responsible for implementing the land and water development component (para. 3.02), the agricultural roads component (para. 3.03) and the subcomponents related to the creation of the Environmental Information and Monitoring Committee [para. 3.05 (a)] and its own institutional strengthening subcomponent [para. 3.05 (b)]. The CDR would play the role of a second project management unit and be responsible for the implementation of the institutional support subcomponents of the Ministry of Agriculture. These subcomponents include the conduct of the national agricultural census [para. 3.06 (a)] and the establishment of an information management system and documentation center [para. 3.06 (b)]. To allow for proper staffing and the smooth implementation of the added activities brought on by the project, the GP and the DSC of MOA would recruit additional contractual staff and where feasible, give additional allowances to performing staff (as indicated in the detailed cost tables for each activity). Implementation arrangements, responsibilities and schedule are detailed in Annex I.

Bank Supervision Missions

4.02 Review missions would normally be held twice a year, except for the first year when an additional project-launch mission would be undertaken immediately after project effectiveness. Supervision missions would normally take place when semi-annual reports have been produced by the Borrower's agencies (after March and September of each year). Staffing of project-launch and supervision missions during the first year of the project would include the Task Manager (Agriculturist), a Civil/

Irrigation Engineer, a Soil and Water Conservation Specialist, a Statistician, an Economist and a Monitoring and Evaluation Specialist and would require a total input of about 20 staff-weeks. Further details are available in Annex I.

B. Monitoring and Evaluation (M&E)

4.03 The M&E of project achievements would be the responsibility of the GP and the CDR (see Annex I, Section C). The CDR M&E report would be based on information gathered and reports submitted by the DSC. Project M&E activities would have the two-fold objective of generating information on progress of implementation and on the achievement of project developmental objectives. Key monitoring indicators are detailed in Annex IV.

V. AGRICULTURAL PRODUCTION

5.01 The activities to be financed under the proposed project would influence agricultural production in several ways. Land terracing and water harvesting in hill-ponds would be expected to bring about increases in: (i) cropping intensity from an average of 30 percent to about 100 percent (Annex VI, Table 3), arising from land capability upgrading and improved suitability to high value crops and/or multiple cropping; (ii) crop yields from an average of 30 to 45 t/ha for tomato, 13 to 18 t/ha for cherries and 23 to 30 t/ha for apples (Annex VI, Table 4), resulting from better plant growth environments (deeper soils, less rocks) and supplemental irrigation with water conserved in hill-ponds. Agricultural roads would also bring about increases in: (i) cropping intensity, because early access to farm land and timely crop establishment would allow farmers to plant most of their landholdings; (ii) crop yields, due to timely crop husbandry practices and adequate use of production inputs, particularly fertilizers (Annex VI); and (iii) savings in transportation costs as a result of diminished vehicle operation and maintenance costs. The Agricultural census would allow the Ministry of Agriculture to formulate sector policies based on reliable information and more attuned to prevailing sector conditions. Changes in cropping patterns and yields between the without-project and with-project situations have been captured in crop and one-hectare farm models and are summarized in Annex VI and detailed in Working Paper No. 3.

VI. MARKETING, PRICES AND INCOME

A. Marketing and Prices

6.01 No major marketing problems are foreseen for the expected incremental production of the project. The expected agricultural production would reach its peak during year 13 of the project and would amount annually to about 14,000 t of green-podded almonds, 47,000 t of apples, 29,000 t of cherries, 11,000 t of olives, 10,000 t of apricots and about 65,000 t of vegetables. Wheat production would decline by about 2,600 t annually. Import statistics indicate that many types of agricultural produce including tomatoes are being imported for processing within Lebanon. Much of the anticipated incremental production would be easily absorbed within the domestic market, which is expected to require more high-value agricultural produce as a result of the gradual increase in per capita income and the growth of the population. A substantial share of the almond, apple and cherry incremental production is expected to be exported to the Asian, East European and Gulf market. With few exceptions (wheat, tobacco and sugar beets), prices are market responsive and it could be argued that production is, to a large extent, determined by market forces and reflects Lebanon's competitive edge. This is particularly the case for most fruit and vegetable crops grown in the project area. At present, prices of agricultural output do

not differ considerably from their respective world market levels. On the input side, there are no subsidies on fertilizers, pesticides or farm machinery. The local prices of fertilizers are slightly above world market prices. The list of farmgate prices for agricultural outputs and inputs is given in the financial and economic Working Paper No. 5.

B. Incomes

6.02 Levels of farm income vary considerably with farm size, agro-ecological region and production technologies used by farmers. On the basis of crop models designed to approximate the real costs of production and crop returns, one-hectare farm models were prepared for each of the five regions of Lebanon in order to estimate the farm-level benefits that would accrue as a result of the project. An analysis of these farm models indicates that incomes, in all farm sizes, can be expected to increase significantly. In areas where land and water development would take place, present incomes for all types of farms are quite depressed. This is due to the fact that most of the land is currently either in fallow and out of production (70 percent) or is cropped to subsistence wheat (30 percent), whose income after labor costs is insignificant. With the project, the production capability of lands would be significantly upgraded and the income they would generate at full development would become similar to that of rich lands of the Bekaa plain or the costal areas of Lebanon. During the first five years after investing in land and water developments and even with the GP's assistance, farm income would be negative. Farm income would start to cover annual production costs beginning in year six of the project. However, at full development (year 13), income after labor cost would become relatively high. In North Lebanon, income of a one-hectare wheat farm is expected to increase from LP 67,000 (US$42.0) to LP 6.3 million (US$3,980.0) when it is planted with fruit trees. In Mount Lebanon the expected increase would reach LP 14.7 million (US$9,245.0), and in South Lebanon the increase would reach LP 9.0 million (US$5,660.0). Financial Internal Rates of Return (IRR) have been calculated for one-hectare fruit farms in the five regions of Lebanon; they are 20.3 percent for North Lebanon, 30.4 percent for Mount Lebanon, 59.3 percent for South Lebanon, 21.2 percent for Bekaa North and 36.2 percent for Bekaa South. Incomes of farms to which access would be improved by the roads built under the project would increase significantly as a result of increased yields and improved cropping intensification (details are in Working Paper No.3).

VII. BENEFITS, ECONOMIC JUSTIFICATION AND RISKS

A. Benefits and Beneficiaries

7.01 The primary benefits of the project would be the incremental agricultural production, the improved management and conservation of land and water resources, savings on transportation costs and an updated agricultural sector database. The incremental agricultural production would result from the sustainable development of land and water resources in mountainous areas and increased agricultural productivity of lands to which access was improved by the construction of agricultural roads. The improved management and conservation of land and water resources would be brought about by the terracing and consolidation of eroded steep-lands, the storage of runoff water in small hill-ponds and a better interaction between development objectives and environmental concerns. The savings in transportation costs would materialize as a result of reduced vehicle and maintenance costs. The updated agricultural sector database would result from the conduct of a national agricultural census and the establishment of a permanent sector data updating system.

7.02 Overall project incremental production at full development would be substantial and would include about 65,000 metric tons of vegetables and 111,000 metric tons of fruit. Because the area devoted to rainfed wheat would be planted to higher-value fruit tree crops, the production of wheat grain would

be reduced by about 2,600 metric tons per year. About 1,300 families would benefit from the agricultural roads and 8,300 farm families would benefit from the land and water development activities. In total, about 9,600 farm families or about 75,500 people would profit directly from the project (Annex VI, Table 2). Poor farmers with small land holdings of less than 0.5 ha would be targeted by the GP through local committees. The project would reduce the isolation of rural villages through rural road development, and thereby reduce one of the motives for rural-urban migration. Other benefits, highlighted by the communities consulted during the participatory process, are better access to work sites, improved health conditions (by improving travelling conditions for emergency cases), improved comfort of transportation, and easier access to schools. The need for link roads is most strongly expressed by villages where farmers still rely on small paths, which only allow animal transit to market their produce or to purchase products from the towns. Construction or rehabilitation of rural roads would also lead to a reduction of transport costs, and to savings in transportation and travelling time.

7.03 **Environmental benefits and impact.** The project would contribute to environmental protection through reduced soil erosion and improved water conservation as a result of land terracing and hill-ponds construction. The farming systems proposed are less destructive than the present systems and should result in reduced erosion and general land and water degradation. Some increase in the use of artificial fertilizers and pesticides is envisaged. However, overall usage rates would be low and would be applied more efficiently following improved extension advice. To assure protection of the environment, surveys to be conducted by the EIMC and check lists covering environmental aspects would become an integral part of feasibility studies of all GP activities (para. 3.05).

B. Economic Analysis and Justification

7.04 The project is consistent with the Country Assistance Strategy for Lebanon and is explicitly mentioned among the objectives and instruments of the CAS. The project would support the Government policy for development of rural infrastructure currently implemented by the GP. Through the project, public sector investment would assist private farmers in developing land that is potentially suitable for agriculture but is currently left idle, or cultivated with very low intensity, due to slope, rockiness and/or lack of rural roads. Public sector involvement in cost sharing of land terracing and water storage on private land is justified by the targeting of poor and remote rural areas with few economic development alternatives and by the long-term impact of those infrastructures on the preservation of the natural environment.

7.05 **Design Alternatives**. The financial profitability of the proposed crops and investments has been assessed for five agro-ecological zones. Detailed crop and farm budgets (Working Paper No. 3) have been calculated utilizing FARMOD on the basis of the full land reclamation and development costs, including Green Plan share of the financing. Although land terracing costs are highly variable depending on local conditions such as land rockiness and slope, financial rates of return are only moderately sensitive to variations in the cost of land development. This is due to the fact that land reclamation costs are relatively modest in comparison with on-farm negative cash flows that farmers must face in the early years of establishment and maintenance of perennial crops. Stone wall terraces have been selected as the most appropriate solution for mountainous and rocky areas (slope above 20 percent), while cheaper earth embankments would be acceptable for areas with slopes under 20 percent. Regarding water storage, earth hill-ponds costing on average US$1 per m^3 of storage, have been selected as the most economical alternative in mountainous areas.

7.06 **Economic Analysis**. An economic analysis has been carried for individual roads [results are in Annex III (b)] to be constructed during the first two years of the project and for the whole project (Annex III (b)], taking into account incremental agricultural production benefits to be derived from land reclamation and rural roads construction and savings in vehicle operating cost resulting from the rural

roads. On-farm cost and benefit streams are based on aggregated crop budgets and activity models used in the financial analysis and on the phasing of land reclamation and rural roads. The project's net benefits are calculated by deducting the without project net benefits, which have been assumed to remain constant over time.

7.07 The project cost streams are based on economic project costs, excluding taxes and price contingencies. Civil works have been costed at likely contract prices, and imported equipment has been costed at CIF prices. Considering that there are no restrictions on the trade of goods and services, that the Lebanese Pound is freely convertible, and that domestic markets are generally free from price distortions, no conversion factor has been applied to the project investment cost streams, and the economic analysis has been carried out taking into account the prevailing exchange rate of US$ 1 = LL1,590 as of February 1996. Further details on the methodology and assumptions of the economic analyses are available in Working paper No. 3. The main fiscal impact of the project will result from incremental maintenance costs of agricultural roads. These costs would amount to about US$460 thousand per year at full development. All other operation and maintenance costs of land terracing and irrigation infrastructure will be supported entirely by the farmers.

7.08 The overall rate of return of the project, calculated over a 30-year period, is about 24 percent. The project is expected to generate a net present value of about US$119 million discounted at the opportunity cost of capital of 12 percent. Considering that only agricultural production benefits and savings on transport costs from the roads have been taken into account in the analysis, this suggests that the project is economically viable. The project would also bring other social, environmental and institutional benefits which cannot be readily quantified.

C. Project Risks and Sensitivity Analysis

7.09 **Project Risks and Sensitivity Analysis.** The project could face two major risks. The first is at the individual farmer level and is related to the uncertainty of achieving anticipated agricultural benefits in a timely manner. This would be caused by potential delays in the completion of agricultural investments by farmers, poor maintenance of orchards and possible fluctuations in product prices. As in the past, this risk would be mitigated during the selection of project beneficiaries by giving first priority to farmers who plan to complete the entire investment within two years of completion of works for which GP assistance was obtained. Before receiving the GP's assistance, farmers would commit themselves in writing to complete the investment within two years. Failing that, they would reimburse to the treasury the financial assistance they received from the GP. In addition, the past 30 years' experience on which the present project is built show that, in reality, this risk is minimal and that most farmers complete their investments on time and maintain their orchards properly. The risk of fluctuation in product prices cannot be mitigated entirely. The second potential risk is related to the maintenance of agricultural rural roads, which used to be a problem during the period of civil strife. During negotiations, it was agreed that local budgetary resources would be made available by the Borrower to maintain the roads built by the GP [para. 8.01 (h)]. In the long-term, the significant allocation of funds made to the Muhafazats offices (Governors offices) and Deputies of the various regions of Lebanon for the specific purpose of roads maintenance would ensure the adequate maintenance of agricultural roads. The sensitivity analysis indicates that the economic analysis is relatively sensitive to assumptions made on on-farm benefits. The ERR would be reduced to 12 percent by a decrease of 26 percent in farm benefits. However, because the assumptions made on crop yields are quite conservative, the probability that the accrued benefits would be lower than those assumed is considered low. On the other hand, the economic results of the project are quite resistant to variations in project cost; investment cost would have to increase by 36 percent to reduce the ERR to 12 percent.

VIII. AGREEMENTS REACHED

8.01 The following agreements have been reached at negotiations:

(a) the GP would maintain cost-sharing arrangements at a level satisfactory to the Bank (para. 2.09);

(b) the GP has created an Environmental Information and Monitoring Committee (EIMC) to carry out environmental assessments and monitor project activities (para. 2.12);

(c) the GP would select land and water development activities according to agreed criteria (Annex I, para. 3);

(d) the GP would select agricultural roads on the basis of agreed criteria (Annex I, para. 3);

(e) within regions, the GP's regional offices would target needy villages and communities, and within targeted villages and communities, the GP would work with local community leaders to target their neediest residents (para. 2.15);

(f) for all expenses made on the basis of SOEs, GOL would (i) maintain records and accounts reflecting such expenditures; (ii) ensure that all records evidencing such expenditures are retained until at least one year after the Bank has received the last audit report; (iii) have each fiscal-year's records and accounts audited by independent auditors acceptable to Bank; and (iv) furnish to the Bank the audit reports (para. 3.13);

(g) the GP and the CDR would: (i) have their project records, accounts and financial statements for each fiscal year audited and (ii) furnish to the Bank certified copies of its financial statements for such year and the reports of such audits (para. 3.13);

(h) funds from the local budget would be utilized by the Borrower to maintain the roads built by the GP (para. 7.09);

(i) the GP would submit semi-annual reports in March and September of each year as well as an action program for land and water development and agricultural roads each year (Annex I, para. 2);

(j) in September of each project year and starting in 1997, the DSC would prepare an annual action program for the agriculture census and IMS activities planned for the following calendar year (Annex I, para. 6);

(k) the CDR would establish a committee to coordinate the implementation of the institutional support to the DSC (Annex I, para. 7);

(l) the MOA would maintain the recently created Agricultural Census Steering Committee (Annex I, para. 7);

(m) the GP would consult and coordinate its project activities with MOA's Directorate of Rural Development and Natural Resources, the Ministry of Environment (MOE) and NGOs (Annex I, para. 7); and

(n) the GP and the CDR would each submit: (i) a detailed progress report for the mid-term review by December 31, 1999; and (ii) an Implementation Completion Report not later than six months after the project completion date (Annex I, para. 10).

8.02 With the above assurances from the Government, the proposed project would be suitable for a Bank loan of US$31 million equivalent.

THE LEBANESE REPUBLIC
AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Implementation Arrangements and Schedule

A. Institutional Arrangements

1. The project would be implemented by two agencies, the Green Plan and the Council for Development and Reconstruction. The GP would be responsible for implementing the land and water development component (SAR para. 3.02), the agricultural roads component (SAR para. 3.03) and the subcomponents related to the creation of the Environmental Information and Monitoring Committee [SAR para. 3.05 (a)] and its own institutional strengthening subcomponent [SAR para. 3.05 (b)]. The CDR would be responsible for the implementation of the institutional support subcomponents of the Ministry of Agriculture. These subcomponents include the conduct of the national agricultural census [SAR para. 3.06 (a)] and the establishment of an information management system and documentation center [SAR para. 3.06 (b)]. The GP and CDR would be in charge, each with regard to the components under its responsibility, of developing annual work plans, clearing annual work plans with the Bank, procurement, disbursement of project funds, keeping project accounts and reporting on the progress of their components. To allow for proper staffing and the smooth implementation of the added load of activities brought on by the project, it was agreed that the GP and the DSC of MOA would recruit additional contractual staff and give salary incentives to deserving staff (as indicated in the detailed cost tables for each activity).

The Green Plan

2. The GP would have full responsibility for the implementation of the land and water development and agricultural roads components. For both of these demand-driven activities, the GP would continue to deal with potential beneficiaries' requests for assistance on the basis of existing procedures (appendix 1). It would be responsible for overall planning, evaluation and monitoring of all the project activities for which it is responsible. It would also be in charge of conducting technical, socio-economic and environmental feasibility studies and designs either by its own staff or through the use of consultants. When requests for assistance are received from farmers or from rural communities, the GP's regional offices would conduct the necessary preliminary studies and include the request in the waiting list. Each project year starting in 1997, the GP's regional offices would formulate action programs detailing the required budget and the activities they plan to implement during the following year. These action programs would be consolidated, verified and approved by the GP's Executive Committee. The GP would submit semi-annual reports in March and September of each year to report on project progress and inform on its annual programs for land and water development and agricultural roads. The GP would submit in the semi-annual report (due in September) of each project year, starting in 1997, the consolidated action program for land and water development of the following calendar year to the Bank for review and clearance [para. 8.01 (i)]. Disbursement for the 1997 land and water development activities would be approved with the clearance, at project effectiveness, of the 1997 action program. Disbursement for subsequent years would be approved when annual action programs for land and water development are cleared by the Bank in september of each year, starting in September, 1997. For agricultural roads, and since the first two-year program has already been appraised, disbursement for this program can proceed as soon as the project becomes effective. Disbursement for subsequent years would be approved when annual action programs for agricultural roads are cleared by the Bank in March of each year, starting in 1998. The GP would submit, in its semi-annual report of March of each project year, starting in 1998,

the consolidated action program agricultural roads for the following calendar year to the Bank for review and clearance [para. 8.01 (i)].

3. The selection of activities to be financed by the project and the identification of farmers and communities that would receive the GP's cost-sharing assistance would be done according to current GP procedures and a set of agreed criteria. A new pilot procedure would be tested at various locations to improve the targeting of project benefits towards the poor; this pilot procedure is described in para. 4 below. Assurances have been obtained at negotiations that the GP would select land and water development activities and agricultural roads on the basis of criteria acceptable to the Bank. For land and water development, the criteria are: (i) land terracing and development not to take place in areas where the slope is above 40 percent and rockiness exceeds 60 per cent of soil cover; (ii) beneficiaries of GP assistance to commit themselves to finance and complete remaining development investments within two years of works implemented through GP assistance; (iii) GP not to assist in land and water development in areas intended for urbanization or industrial development; (iv) GP not to assist in land development on national forests and protected bio-diversity areas or in areas within 500 meters of these forests and protected areas; (v) a minimum Internal Rate of Return (IRR) of 12 per cent [para. 8.01 (c)]. For agricultural roads, these criteria would include: (i) the beneficiary population would participate in sharing the cost of the roads by voluntarily giving, without compensation, the land on which the road would be constructed; (ii) road design and alignment to take into account, inter alia, the mitigation indicated in the environmental assessment summary checklist of the road feasibility study; (iii) a minimum Economic Rate of Return (ERR) of 12 per cent; and (iv) responsibility for road maintenance would be assumed by the Borrower and local budget allocations secured before roads are constructed [para. 8.01 (d)]. In undertaking the required environmental reviews, and in addition to conducting its own flora and wildlife studies for specific agricultural roads, the EIMC would make use of available information (from UNDP and UNEP Projects) that describes the distribution, status and significance of natural and agricultural biodiversity in Lebanon.

4. According to current GP policy, project financial resources would, in principle, be divided equally among the four regions of Lebanon (North Lebanon, Mount Lebanon, South Lebanon and the Bekaa). However, it was agreed that the GP executive committee may allocate up to 20 percent more resources to regions where farmers' demand for assistance are high. It was further agreed that within regions, the GP's regional offices would target needful villages and communities, and that within targeted villages and communities, the Green Plan would work with local committees to prioritize the poor and target project assistance to those most in need. The participation and involvement of populations through elected representatives (municipalities, cooperatives, village associations, etc.) would be used by the GP's regional offices to increase their capacity to identify and target needful families. Representatives of populations would, for example help to: (i) differentiate between farmers who rely on farming to make a living from those who have additional sources of income; and (ii) determine which potential beneficiaries of the project are the poorest. However, project activities would benefit the Lebanese farming population at large and would not be focused exclusively on the poor.

The Council for Development and Reconstruction (CDR)

5. As indicated above, the CDR would have full responsibility for the implementation of the components aimed at strengthening the Directorate of studies and Coordination of the MOA [SAR para. 3.06 (a) and (b)]. The CDR would have responsibility for contracting the technical assistance necessary for the execution of the national agricultural census by the DSC. The CDR is in the process of negotiating a contract with the Food and Agriculture Organization (FAO) of the United Nations to provide assistance to the DSC in the execution of the planning and preparatory phase of the agricultural census. MOA has

expressed a preference for the FAO, which may be awarded a new contract under the AIDP financing, to provide TA to DSC for the implementation of phases 2 and 3 of the census. In addition, the CDR would provide advice and support to the GP (as requested by the GP) in the preparation, evaluation and execution of procurement through ICB procedures. The CDR has the capacity to undertake these functions through its existing Program Management Unit (PMU) established under the Bank-financed Emergency Reconstruction and Rehabilitation Project. In case the PMU ceases to exist, the CDR would put in place alternative implementation arrangements that are satisfactory to the Bank. Tender process and contracting for the construction and equipment of the Ghazir center would be undertaken by the CDR. For ease of operation, procurement of items with a value of less than US$10,000 equivalent would be implemented directly by the DSC under delegation from the CDR.

The Directorate of Studies and Coordination (DSC)

6. The DSC of the Ministry of Agriculture would be responsible for the field execution of the National Agricultural Census and the establishment of a permanent system for agricultural statistics including the creation of the Information Management System (IMS) and documentation center at Ghazir. The DSC would require a significant amount of Technical Assistance (TA) for the implementation of the Census. This TA would be procured by the CDR for the DSC under one package. The permanent system for agricultural statistics would evolve from upgrading the capacity of the existing statistical service within the DSC. Information gathering for the census would be undertaken by enumerators hired by the DSC; they would be supervised by existing MOA staff and by incremental contractual staff to be recruited under the project. The processing of the census data and cross-tabulations would be executed on computer systems purchased under the project. The analysis of the data and publication of the census results would be the responsibility of the Ministry of Agriculture. The DSC would also be responsible for the execution of the IMS and the operation of the documentation center at Ghazir. Detailed designs for the Ghazir center are already under preparation by architects working for MOA. In September of each project year starting in 1997, the DSC would prepare an annual action program for the agriculture census and IMS activities planned for the following calendar year. This annual action program would then be submitted for review and clearance by the Bank, through the CDR [para. 8.01 (l)].

Coordination Arrangements

7. A Project Coordination Committee (PCC) would be established. The CDR would establish a committee to coordinate the implementation of the subcomponents related to the provision of institutional support to the DSC [para. 8.01 (m)]. It would meet twice a year in March and September to review project progress and to sanction the annual action plans and progress reports prepared by the DSC and the consultant providing the technical assistance to the execution of the agricultural census. The PCC would be headed by a representative of the CDR and would include a member of the DSC of MOA. In addition, there is an imperative need to ensure that a consensus exists among the concerned agencies and users of agricultural statistics, including the private sector and academia, on the methodology and goals to be achieved by the proposed national agricultural census. For this purpose, the MOA would maintain the recently created Agricultural Census Steering Committee, which would be responsible for reviewing and approving the statement of objectives and methodology of the proposed census as well as for the supervision of the data analysis and publication of the census results [para. 8.01 (n)]. The committee is headed by the Director General of Statistics (in the Office of the president of the Council Of Ministers) and its executive secretariat is assured by the Director General of MOA. In order to coordinate land and water development activities and agricultural roads and optimize environmental benefits, the GP would coordinate its project activities with MOA's Directorate of Rural Development and Natural Resources, the Ministry Of Environment (MOE) and NGOs [para. 8.01 (m)]. This committee

would be headed by the Chief of the GP's Environmental Information and Monitoring Committee (EIMC) and include representatives from MOA, the MOE and NGOs such as the Muawadh Foundation.

B. Implementation and Supervision Plan

8. The project would be implemented over a six-year period. An implementation schedule is given in Appendix 2. The 70 km-program of agricultural roads already defined would be implemented during the first two years of the project (SAR - Annex III). For land and water development and rehabilitation activities, farmer and community requests for which studies have been completed by the end of March of each year would be implemented during the spring and summer of that year. For agricultural roads and during the first year of the project, studies, designs and tender documents would be completed for the agricultural roads to be implemented in year 3 of the project and their bidding procedure would be completed in year 2 of the project. In years 2 and 3 of the project, designs and bidding process would be completed for the year-4-program of roads. The IMS of the DSC and the agricultural census would be completed in years 3 and 5 respectively. Phase one of the census (development of methodology, planning and staff training), under financing from the on-going Bank-financed Irrigation Rehabilitation and Modernization Project, would start during the second half of 1996. Phase two (methodology, recruitment of staff, conduct of census) and phase three (data inputting, analysis and publication of results) of the census would be financed under the AIDP and would take a total of 4 years to complete.

Borrower Contribution

9. The GP and the CDR would be responsible for coordinating the arrangements for review missions by the Bank and other co-financiers and for providing the information required by missions. At least one member of the GP's executive committee and the Director of the DSC would accompany review mission to the field and participate in project reviews. Semi-annual progress reports would be submitted at the end of March and September of each project-year by the GP for its activities and by the MOA's DSC (through the CDR). These reports would focus on : (i) the status of physical progress in agricultural roads, land and water development and institutional support activities, including the conduct of the agricultural census etc.; (ii) the status of award of contracts for civil works and procurement of goods; (iii) progress in the conduct of studies, designs and tendering of works and activities to be implemented during the coming semester; (iv) the status of technical assistance, studies and training; (v) brief summary of information on various key project monitoring indicators; (vi) the annual work program and budgetary requirement for local funds; (vii) the status of the Bank disbursement, including pending withdrawal applications and project expected disbursement for the following semester; (viii) a summary of actions taken in response to issues raised during the previous supervision mission; and (ix) the status of other issues, such as legal covenants, accounts and audit and project staffing.

Bank Supervision Missions

10. Review missions would normally be held twice a year, except for the first year when an additional project-launch mission would be undertaken immediately after project effectiveness. Supervision missions would normally take place when semi-annual reports have been produced by the Borrower's agencies (after March and September of each year). Staffing of project-launch and supervision missions during the first year of the project would include the Task Manager (Agriculturist), a Civil Engineer, a Soil and Water Conservation Specialist, a Statistician, an Economist and a Monitoring and Evaluation Specialist and would require a total input of about 20 staff-weeks (sws) for the first year. For subsequent supervisions, the inputs of a Civil/Roads Engineer, an Agriculturist and a Statistician would be required. Supervision missions would also make use of local and international expertise made available

to the project by the technical assistance component. A mid-term review of all project activities would be conducted jointly by the GP, the CDR, the DSC , the Bank and IFAD. In preparation for the mid-term review, the GP and the CDR, assisted by the DSC, would prepare a detailed report for submission to the World Bank by December 31, 1999; the mid-term review would take place in March, 2000. In addition to the above, an Implementation Completion Report (ICR) would be prepared by the GP and the CDR and submitted to the Bank no later than six months after the project completion date. Assurances have been obtained at negotiations that the GP and the CDR would each submit: (i) a detailed progress report for the mid-term review by December 31, 1999; and (ii) an Implementation Completion Report not later than six months after the project completion date [para. 8.1 (n)].

C. Monitoring and Evaluation (M&E)

11. The M&E of project achievements would be the responsibility of the GP and the CDR (the CDR M&E report would be based on information gathered and reports submitted by the DSC). Project M&E activities would have the two-fold objective of generating information on progress of implementation and on the achievement of project developmental objectives. For the GP-executed activities, implementation progress would be assessed on the basis of achievement per region of the annual work program targets in terms of number of km of roads constructed, number of hectares terraced, number of m^2 of retaining stone wall constructed, etc. Periodic surveys would be carried out to monitor the use of terraced and developed lands, production performance and farm incomes. For the DSC-executed activities, implementation progress would be assessed on the basis of the completion of various phases of the NAC and the establishment of the IMS and documentation center at Ghazir. A set of monitoring indicators are listed in Annex 3. The GP and the CDR would include in their respective semi-annual and annual progress reports information on key target indicators and analyze project constraints giving proposals for their resolution.

THE LEBANESE REPUBLIC

AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJET

Green Plan Current Procedures

1. Since its inception, the Green Plan has adopted a demand-driven approach to the conduct of its activities. The GP focussed specifically on the development of privately-owned lands and on improving access to isolated rural areas. To implement its mandate, it enters into a partnership with farmers, to share with them the cost of land development and natural resources conservation activities.

2. The procedure used by the GP to serve the rural communities is relatively simple. For land terracing and water resources conservation, requests for assistance are made by individual farmers by completing a standard form provided by the GP. When the budgetary resources are likely to become available, the development proposal is reviewed by the GP's regional staff (between January and March of each year) and if approved goes to GP headquarters, where it is verified and signed by the GP's executive committee members. The approved and signed request is then reviewed, as are all requests for assistance submitted to the GP, by a resident auditor (controleur financier) from the Ministry of Finance (MOF). Before the works start (usually in May of each year), farmers are informed of their share of the financing and are requested to deposit the calculated amount at the treasury. After receiving the treasury deposit slip, the GP proceeds with hiring contractors (for mechanical works such as earth moving and ripping) or allowing farmers themselves to initiate the manual works (such as terrace retaining wall construction, concrete reservoir construction and tree planting). Mechanical works for land terracing are awarded to private contractors through advertised tenders indicating the price the GP would pay for the earth moving works under various conditions. Interested contractors come to GP headquarters and are given through mutual agreement a contract for works in a given region. After completion of the works contractors are paid directly by the GP.

3. With respect to agricultural roads, farmer groups (20 to 30 farmers per km of road, i.e. about 30 ha of agricultural land) or communitie organize themselves and make a written request to the GP for an agricultural road. In their request, farmers inform the GP that they donate the land on which the road would be constructed. With the request in hand, the GP's regional office conducts a preliminary study and alignment of the road and verifies with local authorities, communities and with the farmer group itself the needs, commitment and feasibility of the road. Once this is confirmed, the proposed road is included in the waiting list. When funds become available, proposed roads are entered in the work program on a first-come, first-served basis. Their feasibility and design study is given to private consulting firms and the GP starts the process of voluntary expropriation of the lands on which the road would pass. When all farmers agree to give up their share of the land for the road, a presidential decree is issued for the expropriation. The road designs are verified by the GP staff, who prepare bid documents and advertize and tender the works on a competitive system. Past experience indicates that after the road is constructed, beneficiary communities who have supposedly committed themselves to its maintenance, are usually unable to honor their commitments. Until recently, the GP was not mandated or funded to maintain the agricultural roads it builds. As a result, many of the roads built in the past are in urgent need of repair. The Ministry of Public Works (MPW) has the responsibility and would maintain all the agricultural roads that would either connect two existing secondary roads or lead to a village. For the remaining "non-classified" agricultural roads, the GP needs to receive before negotiations, a clear mandate from the

concerned Ministries for their maintenance. The financial costs of road maintenance have been included in the project.

4. **Present Cost-Sharing Arrangements.** Under present cost-sharing arrangements, farmers participate by sharing with the GP the costs of land development and conservation (land terracing, retaining walls construction) and water resources mobilization and conservation (hill ponds, concrete reservoirs, localized irrigation systems). For agricultural roads, farmers participate by donating free of charge the land required for the road. Under these arrangements, all farmers who can produce the required proof of ownership (or a seven-year lease of titled land) of the land they wish to develop, are eligible to receive a grant from the Government through the GP. The main features of present cost-sharing arrangements between Government (Green Plan) and beneficiary farmers are as follows:

(a) **A one-time aggregate ceiling amount per farmer of LL10 million** (US$6,289). This total amount can be drawn upon in one or several installments and applies throughout the farmer's entire lifetime; and
(b) **Farmer's contribution** is related to the total cost estimate of the development work he wants to undertake.

Cost-Sharing Levels at Various Development Costs

Size of Area Developed	Farmer Contribution (% of Cost)	
	"Eligible Cost"[a/]	Real Costs[b/]
0.5 ha	13.0%	57%
1.5 ha	35.0%	68%
2.0 ha	67.5%	84%
3.0 ha	78.0%	89%

a/ Cover only the cost of land terracing, retaining walls, soil ripping, rock removal, hill-pond construction and localized irrigation system; total cost about LL 13 million per ha (US$8,175.0).
b/ Covers in addition to a/ the cost of soil preparation, basic fertilization, planting, seedlings, replacement of trees, crop establishment cost, etc.; approximate total of LL 26 million per ha (US$16,350.0).

REPUBLIC OF LEBANON
AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Project Implementation Responsibilities and Tentative Schedule

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
I. Project Processing						
World Bank loan approval				X		Sept. 1996
IFAD loan approval					X	April 1997
Follow Up on Loans/Project documents signature by Government	X	X	X			Oct. 1996 (WB) May 1996 (IFAD)
Submission of Loans documents for Council of Ministers and Parliamentary approvals	X		S			Nov. 1996 (WB) June 1997 (IFAD)
Securing project investment counterpart funds for DSC (by CDR) and GP (by GP) activities	X	X				Jan. 1997
Securing project recurrent counterpart funds for land and water development and Ag. roads and other GP activities (GP annual budget)		X				January of each project year
Securing project recurrent counterpart funds for agricultural census and other DSC activities (MOA annual budget)			X			January of each project year
Parliamentary approval	X	S	S			Feb. 97 (WB Loan) Oct. 97 (IFAD)
Declaration of project effectiveness				X	X	Immediately after ratification by Parliament.
Project launch	X	X	X	X	X	March 1997
II. Project Implementation						
A. Land and Water Development and Agricultural Roads Components:						
Screening farmers and community requests for assistance		X				January to June each year
Formation of land and water and agriculture roads annual work programs		X				September of each year
Formulation of annual work program for agrl. census and Inf. Mgmt. System activities			X			September of each year

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
Review and clearance of annual work programs				C	C	Sept. of each year
Preparation of component-specific semi-annual project reports		X	X			March and September each year
Procurement: Responsibility for contracts for land and water development activities (including procurement of seedlings) and agricultural roads		X		C	C	For all prior review contracts
Preparation of terms of reference, technical specifications and tender documents for technical and feasibility studies to be executed by consultants for agricultural roads		X		C	C	February to June each project year
Conduct of investment feasibility study, environmental impact assessment and approval land and water development assistance and agricultural roads construction		X		C	C	February to June each project year
Preparation of pre-qualification documents (if applicable		X		C		As necessary
Review and clearance of GP's annual invitations to small contractors to submit bids for ranking them towards award of contracts for mechanical services to construct land terraces and hill-ponds				C		February of each year
Review and clearance of ranking of contractors for terracing and hill-ponds				C		As required
Review recommendation for contract award for any single contract for terracing and hill-ponds mechanical works with a value of more than LL 80 million (US$50,000 equivalent)				C		As required
Conduct semi-annual post-review of award of small contracts with a value of more than US$12,500 equivalent for terracing and hill-ponds works and US$75,000 for agrl. roads				C		April and October of each project year
Review and clearance of bidding documents for all road tenders with a value of more thanUS$100,000 equivalent				C		one month before scheduled bid advertizing
Advertise and issue bidding documents		X				60 days before bid opening
Open and evaluate submitted bids and recommend award of contracts		X				Within 30 days of bid opening

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
Review and clearance of bidding evaluation and no-objection to award of all road contracts with a value of more than US$100,000 equivalent				C		Two weeks before contract award
Award contracts		X				After receipt of WB no-objection
Follow up with contractor, supervise and monitor execution of contracts and act on legal issues with contractors		X				As required
Accept delivery of works and authorize payment		X				At completion of works
Execution of payment to contractors		X				As required
Send SOEs and withdrawal applications to World Bank to replenish Special Account		X				As required
Monitor and evaluate project's land and water activities and their development impact, including farmers' compliance with timely completion of development investments		X				Continuous process, annual evaluation every following year in March
Monitor and evaluate agricultural roads activities and their impact on agricultural production and farmers' income		X				Continuous process
Ensure maintenance of roads built		X				April to August each year
Prepare, advertize, evaluate tenders and award contracts for all ICB procurement for the land and water and agrl. roads components	S	X		C		
B. Institutional Support to:						
MOA's Directorate of Studies and coordination for formulating the methodology and terms of reference for the conduct of the National Agricultural Census			X[1]			January 1997
Review of terms of reference for TA to undertake National Agricultural Census			X[1]			March 1977

1/ Drafted by technical assistance and reviewed and cleared by the National Agricultural Census Technical Committee (NACTC) which is headed by the Director of Statistics Department of the Council of Ministers Office and includes members from the MOA, CDR, MOF-Land Cadastral Office, private sector and a representative from one Lebanese university.

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
Prepare technical specification for goods and TORs for services			X			March 1977
Advertise and evaluate tenders	X		S			August 1977
Review and give no-objection to all final tender documents, bid evaluations and recommendations for awarding contracts for all ICB contracts and for contracts with a value of US$150,000 for works and goods and US$50,000 for individual consultants and US$100,000 for consulting firms				C		June 1977 and later on as required
Award all contracts for this component after WB clearance and follow up with contractors	X			C		September 1977
Accept delivery of works, goods and services and authorize payment			X			As required
Execute payment	X					As required
Send SOEs and withdrawal applications to World Bank to replenish Special Account	X		S			As required
Recruitment of technical assistants (FAO) to continue with the conduct of the National Agricultural Census (NAC)	X		S			January 1977
Award new contract to FAO or extend existing contract with FAO[2] to continue provision of technical assistance for the conduct of the agricultural census	X		S	C		March 1977
Monitor and evaluate progress of NAC			X[3]			Through 1997, 1998, 1999
Allocating incentives to national staff at the DSC and to technical committee members from the local budget			X			1977, 1988, 1999
Procurement of eligible small items (less than US$10,000 equivalent) through local shopping			X			As required
Analyze and edit results of National Agricultural Census			X[4]			1988 and 1999

2/ Existing contract with FAO is financed under the World Bank/IFAD-financed Irrigation Rehabilitation Project.

3/ By the National Agricultural Census Technical Committee.

4/ By the Directorate of Studies and Coordination through FAO as a contractor for technical assistance to undertake the agricultural census.

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
Ensure publication of results of agricultural census and maintain and upgrade agricultural sector database			X			1999
C. Institutional Support to the Green Plan to Implement Project Activities						
Formulation of terms of reference for all technical assistance required by the GP		X				June 1977
Review and no-objection to TORs				C		July 1977
Pre-qualification, recruitment and award of contracts for technical assistance with contracts of less than US$30,000 equivalent per contract		X				As necessary
Pre-qualification, recruitment and award of contracts for technical assistance with contracts of more than US$30,000 equivalent per contract		X		C		As necessary
Formulation of technical specification for all specialized equipment		X		C		January 1977
Procurement of equipment and vehicles under ICB	S	X		C		September 1977
Award of ICB contracts, follow up with contractors and take legal action as required	S	X		C		Sept. 1977 and as necessary thereafter
Accept delivery of equipment and authorize payment	S	X				As necessary
Allocating incentives to national GP staff from the local budget		X				Throughout project life
D. Project Coordination, Disbursement, Accounts and Reporting						
Chairing and secretariat of PCC for MOA component	X		S			March and Sept. of each year
Reviewing annual work programs and progress for agricultural census and IMS component	X		S	C		March and Sept. of each year
Management of project special accounts	X	X				Throughout project life
Withdrawal of project proceeds	X	X				As required
Maintaining project accounts	X	X				Throughout project life

Project Actions	Implementation Agencies					Target Dates
	CDR	GP	MOA	WB	IFAD	Start/Completion
Audit reports	X	X				September of each project year starting in Sept. 1998
Preparation of Project ICR	X	X	X			December 2002

X Preparation/Responsibility
S Support
C Clearance
CDR Council for Development and Reconstruction
GP Green Plan
MOA Ministry of Agriculture, Directorate of Studies and Coordination (DSC)
WB World Bank
ICR Project Implementation Completion Report

THE LEBANESE REPUBLIC
AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJET

Procurement

1. Procurement responsibilities would be vested in the GP and the CDR. The GP would be responsible for all procurement, including ICB, relevent to the land and water development, agricultural roads and its own institutional strengthening sub-component. The CDR would be in charge of all procurements relevant to the sub-component of MOA's DSC. The GP has had extensive experience with implementing small works packages for agricultural roads as well as land and water development activities that would be financed by the proposed project. The DSC, however, has not had such extensive experience with procurement and would need the support of the CDR and the institutional strengthening planned under the project. All goods and works to be financed from the proceeds of the Bank's loan would be procured in accordance with the Bank's Guidelines for Procurement under IBRD Loans and IDA Credits. The procedures to be adopted are given below and procurement arrangements are summarized in the attached table.

2. **Civil Works.** Several procurement arrangements are envisaged: (i) Civil works contracts for agricultural roads would generally be of a small size, and even when packaging was possible,would have a maximum contract size of about US$0.5 million. These contracts would be scattered throughout the five regions of Lebanon and would not attract the interest of international contractors. The rural roads component and the documentation center building, estimated to cost US$0.35 million, would be implemented according to National Competitive Bidding (NCB) procedures, acceptable to the Bank, using standard bidding documents modelled after the Bank's Standard Bidding Documents for smaller works. (ii) Implementation of the land and water conservation and development component, which consists of small and scattered parcels of land terracing and hill reservoir construction, would not be susceptible to normal contracting procedures. The current contracting procedures for these works (referred to as mechanical works) is to parcel out annual work loads to small individual contractors in each area. The cost of each parcel is based on unit rates set up by the GP and finally negotiated with a short list of contractors. The GP would introduce the necessary modifications to its current direct contracting practices for mechanical works in land terracing and hill-ponds by small local contractors, to make the process acceptable to the Bank. To make the process more competitive and transparent, GP would, for works implemented under the project, advertize annually and invite contractors to submit bids. The annual advertisements would include scope of work in each region and area, volume of works and base unit rates proposed by GP. Contractors would return their bids specifying percentage increase or decrease to the base rates they would be prepared to accept, equipment available to them, volume of works they would be prepared to undertake and areas they would be prepared to work in. Based on the submitted bids, the GP would select the lowest evaluated bidders for each region and area and draw up a priority list of contractors to award works to. (iii) Construction of stone terrace-retaining walls and concrete basins would be implemented by local communities with GP supervision. (iv) Where no suitable arrangements for NCB procedures for civil works(land terracing and hill ponds) are possible, construction may be undertaken by beneficiaries under Green Plan's supervision and cost sharing arrangements in accordance with procedures acceptable to the Bank up to an aggregate amount not exceeding US$1.2 million equivalent.

3. **Equipment and Vehicles.** All equipment and materials estimated to cost more than US$0.15 million equivalent per contract, mainly equipment for surveying, office equipment, computers, audio visual

equipment, GIS equipment, and vehicles (with the exception of the first four vehicles needed to expedite project start-up) would all be procured under ICB procedures. For purposes of economy and efficiency in procurement, the requirements of the project would, where feasible, be packaged into contracts greater than US$0.15 million in value. Lebanese manufacturers competing under ICB would receive a preference in bid evaluation in accordance with Appendix 2 of the IBRD Procurement Guidelines. International shopping (IS) with at least three quotations from at least two eligible source countries would be used for contracts estimated to cost less than US$0.15 million equivalent each, up to an aggregate amount of US$0.6 million equivalent. National shopping (NS) would be used for the procurement of off-the-shelf items costing less than US$50,000 per contract and for the four vehicles required for project start-up, up to an aggregate amount of US$0.30 million equivalent. Direct contracting (DC) would be allowed for items of a proprietary nature or items required to ensure compatibility with existing equipment up to an aggregate amount of US$0.10 million equivalent. Seedlings and irrigation equipment would be purchased directly by farmers under GP technical supervision and cost sharing arrangements.

4. **Technical Assistance and Training.** Engaging consultants to support project implementation agencies and to conduct studies, engineering and supervision work would be in accordance with World Bank Guidelines for the Use of Consultants by World Bank Borrowers and by the World Bank as an executing agency (August 1981), using the Bank's Standardized Letter of Invitation (LOI) and sample forms of Contract for Consultants' Services. The project would provide for a total of about 120 person-months of consulting services of which about 65 person-months would be of local consultants. Training services would be obtained mainly through local universities and training institutions or through specialized UN agencies.

5. **Procurement Review.** All contracts for goods awarded through ICB and all consultant appointments above US$ 50,000 for individual consultants and US$100,000 for firms would be subject to prior Bank review. Civil works for rural roads components would be subject to prior review for single contracts with a value above US$100,000. Single contracts for mechanized works for land and water development with a value of more than US$50,000 are subject to prior review. All other contracts would be subject to selective ex-post review by the Bank. It is estimated that these limits would result in prior review of about 50 percent of total contract value. This relatively low coverage by prior review is justified by the high number of repetitive contracts for land and water conservation and for rural roads, as well as a high intensity of post review covering about 40 percent of contract value.

6. **Procurement Arrangements for CDR Implemented Components on Behalf of Ministry of Agriculture.** Procurement by the CDR would be undertaken according to Bank guidelines and be consistent with the procedure to be followed by the GP where applicable.

Summary of Proposed Procurement arrangements

Procurement Category	Procurement Method [1/] ICB	NCB	OTHER	N.B.F.[2/]	TOTAL
Civil Works		25.0 (20.0)	3.3 [5/] (0.4)	12.0[4/]	40.3 (20.4)
Orchard Establishment			4.9[6/] (3.9)		4.9 (3.9)
Additional Investment by Farmers				44.8	44.8
Equipment and Vehicles	1.6 (1.3)[1/]		1.0[7/] (0.8)		2.6 (2.1)
Technical Assistance (Consultant Services)			1.1[3/] (1.1)		1.1 (1.1)
Training			0.7[3/] (0.7)		0.7 (0.7)
Studies, Engineering and Supervision			2.8[3/] (2.8)		2.8 (2.8)
Incremental Operating				7.6[8/]	7.6
TOTAL	**1.6** **(1.3)**	**25.0** **(20.0)**	**13.8** **(9.7)**	**64.4**	**104.8** **(31.0)**

Note: Totals may not add up due to rounding.

1/ Figures in parentheses represent amounts financed by the Bank.
2/ Non-Bank financed (Government, Farmers and IFAD).
3/ Consultants and TA Services recruited in accordance to Bank's Consultant Guidelines.
4/ Financed by IFAD for the construction of terrace-retaining walls.
5/ For construction of small concrete basins by the local communities under G.P. supervision and according to procedures acceptable to the Bank.
6/ Seedlings and irrigation equipment purchased by farmers under GP technical supervision and cost sharing arrangements.
7/ International shopping, national shopping and direct contracting (I.S. = US$0.60 million. N.S. = US$0.30 million, D.C. = US$0.10 million).
8/ Project Recurrent Costs

THE LEBANESE REPUBLIC
AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Disbursements

1. The proposed Bank loan of US$31.0 million would be disbursed against the categories and at the rates indicated in table below. Disbursement would be made against full documentation, except for payment against contracts of less than US$150,000 equivalent for goods, US$100,000 equivalent for works, US$50,000 for mechanized works for land and water development, US$100,000 equivalent for services with consulting firms and US$50,000 for services with individual consultants (including training and studies), which would be reimbursed against statement of expenditures (SOEs). Documentation related to SOEs would be retained by the GP and the CDR, each for the activities for whichit has implementation responsibility. Assurances would be obtained that, for all expenses made on the basis of SOEs, the Government of Lebanon (GOL) would: (i) maintain or cause to be maintained records and accounts reflecting such expenditures; (ii) ensure that all records evidencing such expenditures are retained until at least one year after IBRD has received the last audit report; (iii) have the records and accounts of the SOEs, including those for the Special Account for each fiscal year, audited by independent auditors acceptable to IBRD; and (iv) furnish to IBRD the audit reports, including a separate opinion on the SOEs, no later than six months after the end of each fiscal year.

2. Given the long interruption in lending to Lebanon, there is no disbursement profile for the country. The implementation period for the project is estimated at six years. The estimate is based on the implementation capacity of the CDR and the execution capabilities of the project-supported Green Plan and Directorate of Studies and Coordination of MOA. Project implementation would use institutions and procedures (with minor modifications) already in place. It is anticipated that disbursements would be completed by June 30, 2003, about six months after scheduled project completion. The disbursement profile closely follows the disbursement for the on-going Irrigation Rehabilitation and Modernization Project. Because project funds will be disbursed through two Special Accounts (one for the GP and one for the CDR), a disbursement plan for GP and another for the CDR have been formulated and are shown below along with a global disbursement plan.

Proposed Disbursement Plan for the GP

Category	US$ million equivalent	Percentage of Expenditures to be Financed
1. Civil Works/Buildings		
(a) Land and Water Development (except terrace retaining wall construction)	9.5	80%
(b) Agricultural Roads	10.0	80%
(c) Buildings	-	
2. Goods (including seedlings)	5.0	80%
3. Consultants' Services, Training, Studies	3.0	100%
4. Unallocated	0.7	
Total	**28.2**	

Proposed Disbursement for the CDR

Category	US$ million equivalent	Percentage of Expenditures to be Financed
1. Civil Works		
(a) Building	0.35	80%
2. Goods	0.70	80%
3. Consultants' Services, Training, Studies	1.75	100%
4. Unallocated	-	
Total	**2.80**	

Proposed Disbursement Plan for the Whole Project

Category	US$ million equivalent	Percentage of Expenditures to be Financed
1. Civil Works/Buildings		
(a) Land and Water Development (except terrace retaining wall construction)	9.50	80%
(b) Agricultural Roads	10.00	80%
(c) Buildings	0.35	80%
2. Goods (including seedlings)	5.70	80%
3. Consultants' Services, Training, Studies	4.75	100%
4. Unallocated	0.70	
Total	**31.00**	

3. **Special Account**. To facilitate disbursement against eligible expenditures, the Government would establish two Special Accounts in the Central Bank. The first to be operated by the Green Plan and the second by the CDR; both accounts would be operated under terms and conditions satisfactory to the Bank. The Bank would make authorized allocations of US$2.5 million in the special account of the GP and US$0.3 million in the Special Account of the CDR. Initially, the allocations would be limited to US$1.5 million for the GP and US$0.2 million for the CDR. The full authorized allocation could be claimed when disbursements reach US$4 million and US$0.5 million for the GP and the CDR respectively. The GP and the CDR would submit replenishment applications for the special account on a monthly basis, or when about 20 percent of the initial deposit has been utilized, whichever comes first. The replenishment applications would be supported by the necessary documentation, bank statement of the special account and a reconciliation bank statement of the special account against Bank records.

Estimated Disbursement Schedule for the Bank Loan
(US$ million)

IBRD Fiscal Year

	IBRD Fiscal Year						
	FY97	**FY98**	**FY99**	**FY00**	**FY01**	**FY02**	**FY03**
Annual	2.0	3.0	4.9	5.6	6.1	6.6	2.8
Cumulative	2.0	5.0	9.9	15.5	21.6	28.2	31.0

LEBANESE REPUBLIC
AGRICULTURAL INFRASTRUCTURE DEVELOPMENT PROJECT

Appraised Sample Land Development Works

Region (Area)	Request No.	Date	Name	Total Area M²	Develp. Area M²	Irr./ Rainfed	Elevation above sea level	Type of Crops suitable	Land Develp. M²	Stone Wall	Concr. Storage Tank	Total Amount of GP Support (LL)	Beneficiary Contribution (LL)	Expected IRR	Comments
South Lebanon															
Bareeh Sour	(1) 492		Mhd. Ezzidin Ali Ezzidin	10,199	5,000	Irrigated		Vegetab.	5,000 500 2,300,000			2,500,000	350,000	20.0	Derocking, terracing, levelling, ripping
	(2) 448		Khalid Kamil Najdi	20,619	5,000	Rainfed	400	Almonds	5,000 500 2,500,000	200m³ 5,000 1,000,000		4,000,000	650,000	20.2	Soil transport and rehabilitation walls (200 m³)
Burj Shamali Sour	(3) 545	9/14/94	Khalid Fadhil Khidra	30,061	6,000	Irrigated	150	Vegetabl.	5,000 500 3,000,000	200 5,000 1,000,000		4,000,000	650,000	20.0	Land rehabilitation walls
Bareeh Sour	(4)	4/19/94	Abbas Muhamad Ezzidin	10,199	5,000	Irrigated		Vegetab.	5,000 500 2,500,000			2,500,000	350,000	20.0	Develop. terracing, levelling, ripping, rented
	(5) (6) (7) (8)			9,256 9,256 9,256 9,256	6,000 2,400 2,314 2,312			Olives,	6,000 2,400 2,314 2,312	400 160	5x7x2			14.1	Terracing + walls terracing, walls
Marjayoun	3650	10/18/95	Hasan Ali Allam	15,000	10,000	Rainfed	1,200	Almonds	10,000 300 3,000,000			3,000,000	450,000	20.2	
Marjayoun	3643	10/18/95	Mansoull Mahdi Akow	10,000	10,000	Rainfed	1,200	Almonds	10,000 300 3,00,000			3,000,000	450,000	20.2	
Marjayoun	3644	10/18/95	Tarik Mahdi Akow	10,000	10,000	Rainfed	1,200	Olives	10,000 300 3,000,000			3,000,000	450,000	14.1	
Al Qalda Sour	3645	10/26/95	Ahlam Ali Shibli	9,256	2,314	Rainfed	100	Almonds	2,314 750 1,700,000	60 5,000 300,000		2,000,000	250,000	20.2	Women beneficiary
Al Qalda Saida	3647	10/26/95	Ali Khalil Shibli	9,256	2,324	Rainfed	100	Olives	2,314 750 1,700,000	460 5000 2,300,000		4,000,000	650,000	14.1	
Al Qalda Sour	3646	10/26/95	Raufa Al Abid Assad Fadhl Allah	9,256	2,304	Rainfed	75	Olives,	2,314 750 1,700,000	60 5,000 300 000		2,000,000	250,000	20.0	Women beneficiary

Region (Area)	Request No.	Date	Name	Total Area M²	Develp. Area M²	Irr./ Rainfed	Elevation above sea level	Type of Crops suitable	Land Develp. M²	Stone Wall	Concr. Storage Tank	Total Amount of GP Support (LL)	Beneficiary Contribution (LL)	Expected IRR	Comments
Al Qalda Sour (contd.)	3841	10/26/95	Hala Ali Shibli	9,256	2,314	Rainfed	75	Vegetabl.	2,314 750 1,700,000	60 5,000 300,000		2,000,000	250,000	20.0	Women beneficiary
Mount Lebanon															
Ain Al Ghaiba Jubail	(1) 120	4/12/95	Ali Md. Burro	3,000	2,500	Rainfed	950	Cherries	2,500 400 1,000,000	140 5,000 7,000,000	5.2x5x2 52 m³ 30,000 1,550,000	4,000,000	650,000	15.8	
Al Ghabat Jubail	(2) 399	8/15/95	Isam Assaf Al Rai	10,000	10,000	Rainfed	1,400	Apples	10,000 400 1,000,000			4,000,000	650,000	28.0	
Ameya-Jubail	(3) 407	6/27/94	Tanios Rafael Al Haj	6 holdings total 5,341	4,200	Rainfed	900	Cherries	6 holdings 650-800 4,200 400,000 1,680,000	464 3,000 2,320,000	6x5.4x2 30,000 1,920,000	4,000,000	650,000	15.8	6 holdings 830 m³-990 m³
Kherwan Beqfaya	(4) 574	10/10/95	Madlin Petros Al Haj	3 holdings 1860	1,500	Irrigated	1,450	Apple	1,500 300 5,25,000	302 5,000 1,510,000	6x5.4x2 64 m³ 30,000 1,920,000	4,000,000	65,000	28.0	3 holdings 720 + 722 +213 m³ Rented
Kherwan Beqfaya	(5) 4703	12/31/95	Fayiz Rahul Makarzal	855		Irrigated		Cherries			334 m³ 30,000 10,000,000	10,000,000	1,550	16.7	Rainfed

Region (Area)	Request No.	Date	Name	Total Area M²	Develp. Area M²	Irr/ Rainfed	Elevation above sea level	Type of Crops suitable	Land Develp. M²	Stone Wall	Concr. Storage Tank	Total Amount of GP Support (L.L.)	Beneficiary Contribution (L.L.)	Expected IRR	Comments
North Lebanon															
Habsheet-Akkar	(1) 4102	11/11/95	Mohamad Khidir Mohamad	5000	4000	Rainfed	500	Olives		480 5,000 2,400,000		2,400,000	460,000	14 1	
Al Nafesa-Akkar	(2) 4105	11/11/95	Hana Tanos Awad	7,604 1,389 8,993 2 holdings	2,000 + 4,000	Rainfed	200	Almonds	2,400 75,000 1,800,000			1,800,000	220,000	20 2	2 holdings
Al Natisa-Akkar	(3) 791	4/ /94	Jorjis Wadi Al-Asmar	1,400	1,000	Rainfed	200	Almonds	1,000 500 50,000			500,000	50,000	20 2	
Al Natisa-Akkar	(4) 921	6/8/94	Karim Salim Al Asmar	4,326	1,500	Rainfed	200	Almonds	1,500 500 7,500,000			7,500,000	75,000	20 2	40 holdings
Al Natisa-Akkar	(5) 920	6/8/94	Saad Salim Al Asmar	4,326	1,500	Rainfed	200	Vegetabl.	1,500 500 750,000			750,000	75,000	20 0	40 holdings
Aroubia-Akkar	3610	18/10/95	Faris Hasan Yazbik	4,141	4,141	Irrigated	1,400	Apples	11,600 350 4,000,000			4,000,000	650,000	31 0	
Bekaa															
Hawsh Al Rafika	3797	10/26/95	Faris Hasan Yazbik	4,141	4,141	Irrigated	900	Vegetab.	4,141 150 600,000			600,000	60,000	20 0	
Alqaa Halabeh (North)	1443	7/24/95	Hassan Ahmad Jaffar	20,000	13,500	Rainfed	600	Almonds	13,580 300 4,000,000			4,000,000	650,000	20 2	
Alqaa-Halabeh	1442	7/24/95	Khalil Mahdi Jaffar	15,000	13,500	Rainfed	600	Cherries	13,500 300 4,000,000			4,000,000	650,000	15 0	
Al Nabi Sheet Halabeh			Mohamed Ali Shakir	27,690	6,900 + 2,700 9,600	Irrigated	1,100	Cherries	9,600 250 2,400,000			2,400,000	2,400,000	15.0	

George A. Shammas

THE LEBANESE REPUBLIC

AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

(a) First Two-Year Program of Rural Roads

District (Gaza)	Name	Length (km)	Type	Total Cost (US$)	Cost/km	Decree	ERR	Feasibility
NORTH LEBANON								
Akkar	Kafar Halda Kfour Al Arab	3.5	Earth	84,000	24,000	2 months	38	Yes
Batroum	Tanourine Wadi El Jred	2.245	Earth	8,756	3,900	2 months	25	Yes
El Koura	Amioum Dar Bechtar	1.43	Earth	68,262	47,736	2 months	43	Yes
Bacharre	Bacharre Bekfraya	4.093	Earth	15,963	3,900	2 months	37	Yes
Total Earth		**11.268**		**176,981**	**15,707**			
El Koura	Afesdik Batrame	3.194	Asphalt	161,285	50,496		34	Yes
Zghorta	Karamsadeh Namatoura	3	Asphalt	176,265	58,875	Yes	37	Yes
Bacharre	Bacharre Marlicha	1.236	Asphalt	82,122	66,442	1 month	37	No (environ.)
Total Asphalt		**7.43**		**419,672**	**56,483**			
Total North Lebanon		**18.698**		**596,653**	**31,909**			
MOUNT LEBANON								
Kesrwan	Mazraat Kafarzebianne	2.897	Earth	268,074	92,535	3 months	27	Yes
El Chouf	Majdel El Maouch	2.815	Earth	133,479	47,417	3 months	29	Yes
El Chouf	El Werhanie Ein Zehalta	3.932	Earth	162,373	41,295	3 months	19	Yes
Jbail	Bechtelas	1.289	Earth	35,000	27,153	Yes	51	Yes
Jbail	Gharzous Deir Arbaain	1.967	Earth	127,611	64,876	2 months	31	Yes
Jbail	El Moncef Deir Mar Mama	1.229	Earth	59,976	48,801	2 months	30	Yes
Total Earth		**14.129**		**786,513**	**55,667**			
Jbail	Ehmeyel Wardyat	2.67	Asphalt	214,552	80,357	2 months	19	Yes
Baabda	Qsaiba Ras El Mata	3.715	Asphalt	315,511	84,929	Yes	29	Yes
Total Asphalt		**6.385**		**530,063**	**83,017**			
Total Mount Lebanon		**20.514**		**1,316,576**	**64,179**			

District (Gaza)	Name	Length (km)	Type	Total Cost (US$)	Cost/km	Decree	ERR	Feasibility
SOUTH LEBANON								
Saida	El Zraiah El Wata	3.953	Earth	82,583	20,891	3 months	40	Yes
Saida	Kfarmilki-Kfarhatta	1.167	Earth	14,221	12,186	1 month	47	Yes
Sour	Aybit Reklieh Ain Beall	2.391	Earth	33,833	14,150	1 month	40	Yes
Nabatieh	Sir El Gharbeih	2.743	Earth	84,312	30,737	Ready	54	Yes
Nabatieh	Ansar El Mereysseh	7.378	Earth	241,414	32,721	1 month	20	Yes
Jezzine	Roum Karem El Zeitoun	2.326	Earth	32,000	13,758	2 months	34	Yes
Zezzine	El Midan El Houranieh	1.868	Earth	87,644	46,919	Ready	26	Yes
Marjayoun	El Maissat El Wazzani	2.42	Earth	68,765	28,415	1 month	24	Yes
Marjayoun	El Sawanee Touline Kalawi	7.672	Earth	233,780	30,472	2 months	25	Yes
Hasnbaya	Hasbaya El Katch	6.123	Earth	130,400	21,297	3 months	36	Yes
Total Earth		**38.041**		**1,008,952**	**23,067**			
Total South Lebanon		**38.041**		**1,008,952**	**23,067**			
BEKAA								
Hermel	Wadi El Nayra Jebabe El Houmour	6.664	Earth	72,689	10,908	2 months	34	No (environ.)
Hermel	Marjheen Aamiri	13.00	Earth	200,000	15,385	3 months	34	Yes
Baalbek	Boudey El Tell	1.496	Earth	40,000	26,738		25	Yes
Baalbek	Shmestar El Mazraa	1.965	Earth	60,000	30,534	Ready	37	Yes
Zahle	Wadi Arrayach Behina Bir Hachim	5.736	Earth	98,435	17,161	2 months	20	Yes
West Bekaa	Lebbaya	6.00	Earth	126,500	21,083	1 month	35	Yes
West Bekaa	Job Janin Lala	4.5	Earth	109,166	24,259	6 months	27	Yes
Rachaya	El Mouheydasse	2.912	Earth	14,403	4,946	3 months	29	Yes
Total Earth		42.273		721,193	15,875			
Rachaya	Yanta Kfarouk	4.6	Asphalt	149,960	32,600	1 month	25	
Total Asphalt		**4.6**		**149,960**	**32,600**			
Total Bekaa		**50.564**		**879,642**	**17,397**			
Total Lebanon Earth Roads		**105.711**		**2,693,639**	**25,481**			
Total Lebanon Asphalt Roads		**18.415**		**1,099,695**	**59,717**			
TOTAL LEBANON		**124.126**		**3,793,334**	**30,560**			

(b) Economic Analysis - Economic Rate of Return
(LL '000)

	Existing Technology 1-30	1	2	3	4	5	6	7	10	30
Benefits										
Total Benefit Cherries exist./rainfed	2,371,500	2,371,500	2,371,500	2,400,736	2,465,054	2,562,669	2,706,573	2,875,450	3,264,244	3,315,000
Total Benefit Cherries new/rainfed	0	0	0	0	156,825	460,274	969,584	1,736,521	5,419,186	9,825,200
Total Benefit Cherries exist/ irrig.	3,333,720	3,333,720	3,333,720	3,362,721	3,474,190	3,619,561	3,820,874	4,056,672	4,564,877	4,615,920
Total Benefit cherries new/irrig.	0	0	0	0	108,390	364,912	814,730	1,593,330	7,543,831	22,689,600
Total Benefit Apricot existing/rainfed	1,705,860	1,723,969	1,748,718	1,799,121	1,869,746	1,963,308	2,075,433	2,162,205	2,360,387	2,389,250
Total Benefit Apricot new/rainfed	0	0	0	0	18,496	179,410	706,028	1,560,948	5,693,128	8,088,250
Total Benefit Almond existing/rainfed	4,678,200	4,678,200	4,745,244	4,903,918	5,159,801	5,521,468	5,946,082	6,403,845	7,017,300	7,017,300
Total Benefit Almond new/rainfed	0	0	0	0	114,756	539,366	2,257,514	5,301,748	18,364,656	24,022,360
Total Benefit Olives exist./rainfed	2,661,750	2,661,750	2,661,750	2,783,473	2,902,494	3,185,823	3,531,481	3,836,677	4,791,150	4,791,150
Total Benefit Olives new/rainfed	0	0	0	0	0	283,781	547,461	1,362,739	4,506,613	20,420,400
Total Benefit Apples exist./irrigated	9,689,900	9,689,900	9,689,900	9,770,403	10,001,179	10,390,278	10,879,336	11,445,540	12,639,000	12,639,000
Total Benefit Apples new/irrigated	0	0	0	0	640,844	2,798,252	6,874,518	12,443,053	33,330,294	40,245,000
Total Benefit Tomatoes irrigated	4,426,800	3,408,320	8,088,357	14,144,528	21,074,779	28,573,083	36,673,750	36,673,750	36,673,750	36,673,750
Total Benefit Tomatoes greenhouses	0	2,006,369	5,149,682	9,678,025	15,496,860	21,799,204	28,086,828	30,246,019	31,500,000	31,500,000
Total Benefit Potatoes irrigated	2,961,200	511,624	1,262,006	2,321,068	3,685,400	5,226,868	6,789,253	7,324,753	8,032,500	8,032,500
Total Benefit Wheat rainfed	1,628,878	80,325	142,769	250,348	373,009	505,724	631,400	631,400	631,400	631,400
Total Net Benefit	33,447,888	30,446,677	39,171,844	61,614,340	67,539,824	87,373,849	112,469,866	128,753,882	186,311,416	236,664,678
Costs										
Feeder Roads										
Cost in LL'000		3,047,450	3,883,250	4,997,200	5,051,200	4,189,500	3,246,100	851,000	1,320,100	1,320,100
Green Plan Institutional Support										
Cost in LL'000		864,550	566,800	325,850	256,850	256,850	242,000	618,550	256,850	242,000
Environmental Monitoring										
Cost in LL'000		275,700	321,700	278,500	121,350	111,800	124,400	182,050	67,800	53,000
Agricultural Production										
Invest. Cost Cherries exist./rainfed	0	0	0	0	0	0	0	0	0	0
Invest. Cost Cherries new/rainfed	0	424,728	869,789	988,436	1,227,481	1,388,275	1,411,083	551,748	0	0
Invest. Cost Cherries exist./irrigated	0	0	0	0	0	0	0	0	0	0
Invest. Cost Cherries new/irrigated	0	831,982	1,278,401	1,812,378	2,260,375	2,539,019	2,564,146	859,795	0	0
Invest. Cost Apricot exist./rainfed	0	0	0	0	0	0	0	0	0	0
Invest. Cost Apricot new/rainfed	0	272,129	425,513	609,932	769,974	867,410	878,205	326,038	0	0
Invest. Cost Almond exist./rainfed	0	0	0	0	0	0	0	0	0	0
Invest. Cost Almond new/rainfed	0	1,086,028	1,659,423	2,381,843	2,963,082	3,332,732	3,353,863	1,146,478	0	0
Invest. Cost Olives existing/rainfed	0	0	0	0	0	0	0	0	0	0
Invest. Cost Olives new/rainfed	0	1,157,827	1,843,478	2,675,015	3,411,916	3,865,839	3,809,894	1,800,871	0	0
Invest. Cost Apples exist./irrigated	0	0	0	0	0	0	0	0	0	0
Invest. Cost Apples new/irrigated	0	1,233,112	1,903,781	2,689,957	3,346,287	3,754,801	3,773,225	1,257,411	0	0
Total Cost Tomatoes irrigated	3,443,418	2,503,871	5,925,626	10,391,064	15,482,289	20,990,785	26,207,183	26,207,183	26,207,183	26,207,183
Total Cost Tomatoes Greenhouses	0	6,923,379	11,152,948	16,623,878	21,746,384	26,787,638	30,202,596	19,832,781	20,142,800	20,142,800
Total Cost Potatoes irrigated	2,325,124	452,057	1,090,332	1,890,088	3,073,785	4,278,325	5,467,944	5,732,917	6,033,936	6,113,507
Total Cost Wheat Rainfed	1,878,131	62,774	148,564	280,510	388,150	526,252	657,030	657,030	657,030	882,946
Total Investment Cost/ Total Perennial	7,646,673	14,947,987	26,096,036	40,401,080	54,868,863	68,332,176	78,445,271	68,171,348	83,840,784	83,346,236
0	7,646,673	14,947,987	26,096,036	40,401,080	54,868,863	68,332,176	78,445,271	58,171,248	53,040,750	53,346,236
Operating Cost										
Oper. Cost Cherries exist./rainfed	1,053,511	1,070,438	1,078,873	1,108,922	1,164,803	1,224,486	1,294,077	1,354,487	1,482,337	1,503,216
Oper. Cost Cherries new/rainfed	0	168,895	323,084	564,327	865,102	1,274,361	1,700,280	1,915,908	3,052,143	4,132,481
Oper. Cost Cherries exist./irrigated	1,650,565	1,657,126	1,654,348	1,657,983	1,689,056	1,717,239	1,756,560	1,807,228	1,824,247	1,945,514
Oper. Cost Cherries new/irrigated	0	341,220	764,196	1,352,746	2,066,381	2,943,020	3,830,851	4,189,794	6,035,504	9,184,277
Oper. Cost Apricot exist./rainfed	706,037	716,110	720,570	739,807	755,358	785,268	815,175	829,868	890,081	845,836
Oper. Cost Apricot new/rainfed	0	121,079	253,673	475,010	694,043	1,054,158	1,410,477	1,703,047	2,672,694	3,450,563
Oper. Cost Almond exist./rainfed	1,457,022	1,472,338	1,471,111	1,502,983	1,517,884	1,554,409	1,590,894	1,606,912	1,708,689	1,725,273
Oper. Cost Almond new/rainfed	0	380,304	776,426	1,438,133	2,146,993	3,066,721	4,038,448	4,471,514	6,674,384	7,470,719
Oper. Cost Olives existing/rainfed	1,145,313	1,161,929	1,171,559	1,214,112	1,250,967	1,320,652	1,378,841	1,431,079	1,566,586	1,560,292
Oper. Cost Olives new/rainfed	0	376,280	625,736	1,217,412	1,657,811	2,384,563	2,616,815	2,867,422	3,618,170	5,963,464
Oper. Cost Apples exist./irrigated	2,733,669	2,787,626	2,869,210	3,030,985	3,213,802	3,517,450	3,818,650	4,090,197	4,708,684	4,879,855
Oper. Cost Apples new/irrigated	0	636,354	1,377,238	2,439,853	3,774,783	5,778,746	7,985,420	9,368,101	14,639,786	18,373,006
Total Operating Costs Perrenial Crops	8,746,127	10,888,706	13,086,066	16,730,253	20,838,962	26,611,073	32,437,368	36,896,862	48,944,464	58,864,298
Total Cost	16,392,800 17,056,008	29,549,892	43,633,952	62,454,482	80,814,474	99,398,398	114,378,739	96,846,360	103,580,964	113,872,833
Net Benefit (minus net benefit of existing technology)	17,866,008	-16,159,022	-21,617,314	-27,896,159	-30,329,858	-28,479,737	-18,918,882	18,882,293	64,876,443	104,826,429

		IRR	34%
Delay in benefits	0 year	NPV (LL '000)	189,906,174
Increase in Investment Cost (%)	0	NPV $	119,437,845

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AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

KEY MONITORING INDICATORS

The following indicators will be used to monitor project implementation progress and the achievement of its development objectives.

Activity	Project Year												Total	
	1997		1998		1999		2000		2001		2002			
	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.
I. IMPLEMENTATION PROGRESS INDICATORS														
A. Land & Water Development														
1. Land Terracing (ha)	300		410		535		610		660		625		3140	
2. Terrace-Wall Construction (ha)	210		265		345		380		445		440		2085	
3. Hill Pond Construction (units)	29		43		48		55		43		32		250	
4. Concrete Bassins (units)	0		8		8		10		13		11		50	
5. Localized Irrig. Equip. (ha)	50		50		100		100		150		150		600	
6. Seedlings ('000 units)	100		130		160		180		200		200		970	
B. Agricultural Roads														
1. Earth Roads (km)	20		26		40		40		44		44		214	
2. Asphalted Roads (km)	10		14		20		20		16		6		86	
C. Institutional Support - GP														
1.Created Environmental Info. and Monitoring Committee becomes Operational			1										1	
2. Procurement of vehicles	10		2		2		0		0		0		14	

Activity	Project Year												Total	
	1997		1998		1999		2000		2001		2002			
	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.
3. Procurement of equipment (units)	x		x		x		x							
4. Consultant services (m/month)	5		3		3		0		0		0		11	
5. Training (m/month)	3		1		1		1		0		0		6	
6. Studies (m/month)	2		2		2		2		2		2		12	
D. Institutional Suppt. MOA														
1. Construction of Documentation Center at Ghazir (m^3)	900		0		0		0		0		0		900	
2. Procurement of census and Documentation Equipment	x		x		0		0		0		0			
3. Vehicles	7		0		0		0		0		0		7	
4. Technical Assistance (m/month)	31		29		15		0		0		0		75	
5. Training (m/month)	10		4		1		1		0		0		16	
6. Studies (lump sum US$ million)	0.1		0.1		0.1		0.1		0.1				0.5	
II. ACHIEVEMENT OF PROJECT OBJECTIVES (To be monitored through periodic surveys conducted by the EIMC)														
1. Baseline survey to assess crop yields and cropping intensity in areas to be served by roads	1		1		1		1		1		1		6	
2. Percentage of terraced land that was actually developed (within 2 years of terracing)	-		-		300		410		535		610			
3. Survey of crop yield: - Annual and seasonal crop - Fruit trees [at various ages of trees (5 years-10 years) not planted by project]					1 1		1		1		1 1		4 2	

Activity	Project Year												Total	
	1997		1998		1999		2000		2001		2002			
	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.	Plan.	Act.
4. Results of survey to determine number of project beneficiaries in poor categories			1		1		1		1		1		5	
5. Ex-Post assessment of roads environmental impact (EIMC)			1		1		1		1		1		5	
6. Survey to assess effect of road on agricultural development (yields + cropping intensity)					1		1		1		1		4	
7. Formulation of policy and strategy by MOA			1		1						1		2	
8. Publication of agricultural census results									1				1	
9. Documentation center being utilized														

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AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Environmental Analysis, Monitoring and Plan of Action

1. The two project components that would have an impact on the environment are the land/water development and conservation component, and the agricultural roads component. It is clear that land and water development and conservation activities such as land terracing, terrace consolidation, harvesting of runoff water in small hill-ponds for irrigation and forest-fire fighting purposes and the use of efficient localized irrigation systems would help conserve soil and water resources and have a positive effect on the environment. It is also clear that when access to rural areas is improved, populations and, to a certain extent the environment, are expected to benefit from these roads. However, the activities under both of these project components may also have temporary or permanent detrimental effects on the environment. While the positive effects are welcome and expected, the project should guard against causing direct or indirect harm to the environment. The objective of this annex is to briefly analyze the environmental aspects associated with the implementation of land and water development/conservation and agricultural roads components proposed under the project and indicate the actions that would be taken to avoid and/or to mitigate potential harmful effects to the environment.

2 The proposed project would not introduce radically new concepts to land, water and agricultural roads development activities in Lebanon, but would support a time-slice of the on-going government programs in these fields. Before doing so, however, it is necessary to evaluate the results and learn the lessons of past experiences. Land and water development and conservation as well as agricultural roads construction activities have been implemented by the Green Plan Authority (GP) since its creation in 1964. Since its inception, the Green Plan has adopted a demand-driven approach to the execution of its activities. During the past thirty years, the GP has helped terrace about 26,000 ha of steep privately-owned land, construct more than 7 million m^2 of terrace retaining-walls, 500 hill ponds (average capacity 8,000 m^3) and more than 3,000 small concrete basins. The GP has also built more than 1,000 km of agricultural roads. Its global activities benefitted more than 38,000 farmers and about 1,000 villages scattered all over Lebanon.

3. In its project preparation report, the FAO/CP indicates that The GP's past activities have so far achieved global positive environmental impact. However, because of the lack of sufficiently detailed environmental surveys and monitoring, it is not known whether some GP executed activities may have had detrimental effects on the environment. In the FAO/CP report, particular mention is made of some potential risks to the environment. These include inter alia the lack of awareness and analysis of environmental issues in the studies and designs of agricultural roads and land development activities commissioned or executed by the GP; lack of terrace retaining walls in some areas, risk of encroachment on protected forest areas, loss of biodiversity, disturbance of archeological sites, encroachment of urbanization on land terraced by the GP, potential mis-use of chemicals and fertilizers.

4. Under the proposed project a number of actions and safeguards would be put in place to avoid or mitigate potentially detrimental environmental impacts. The first, is the creation within the Green Plan of an Environmental Information and Monitoring Committee (EIMC) whose role (working paper No.5) would be to, inter alia, systematically include environmental assessments in all studies and designs for

land and water development and agricultural roads construction. The EIMC would also formulate mitigating measures which would be implemented by the GP or its contractors during the course of project implementation. The table below lists the major potential impacts and the mitigating measures that would be undertaken by the Project.

Potential Impact and Environmental Mitigation

Potential Impact	Mitigation Measures
Lack of environmental awareness	Creation of the Environmental Information and Monitoring Committee (EIMC) to carry out environmental assessments on all agricultural roads as well as land and water developments. Financing of environmental awareness campaigns through the media.
Lack of terrace retaining walls	Future land and water development studies by GP staff to clearly indicate when retaining walls are needed, subsequent GP assistance would be conditional on the agreement of beneficiaries to complete retaining walls.
Encroachment on protected forest areas	No GP assistance for land and water development within 500 meters of protected or national forest areas would be made available to investors. Agricultural road alignments would be changed to avoid passing through protected areas.
Loss of biodiversity	EIMU to ascertain through specific studies that areas rich in biodiversity would not be disturbed; assistance would be withheld for land and water developments, and road alignments would be modified.
Disturbance of archeological sites	Project assisted works not to be undertaken where studies show presence of significant archeological sites. Contracts for land and water development and road construction would require project contractors to stop work, inform the GP and archeological authorities if works reveal any archeological sites.
Encroachment of urbanization on lands developed by the project	Project beneficiaries to sign written commitment to keep developed land under agricultural production until initial investments are recovered or after GP assistance is re-reimburse.
Potential mis-use of chemicals.	Ministry of Agriculture is being supported by Bank-financed Irrigation Modernization Project to formulate guidelines for the use of pesticides. Recommendations on the use of fertilizers can be obtained by farmers from private sector suppliers or from regional offices of the MOA or the GP.

5. Other potential detrimental impacts on the environment would be identified by the environmental information and monitoring committee which would also develop appropriate mitigation. The EIMC would have responsibility for clearing all studies for land and water development and agricultural roads and would be under the direct authority of the GP's Executive committee. Conditionalities would be included in the project legal documents in order to limit project interventions to those that are environmental friendly. Assurances would be obtained at negotiations that the Government of Lebanon would select land and water development activities and agricultural roads on the basis of criteria acceptable to IBRD.

6. Overall, the impact of the project is expected to be positive. The safeguards designed into the project, particularly the creation of the environmental monitoring committee and the inclusion of environmental consideration as a criteria for selecting activities to be supported by the project, would insure that the integrity of natural ecosystems and the environment are preserved. Terms of reference, guidelines and environmental assessment checklists have been produced and are detailed in working paper No.5. More specifically, the project would: (i) reduce soil erosion through the construction of new land terraces and the rehabilitation of existing ones; (ii) harvest and store potentially-erosive runoff water in small hill-ponds and promoting the use of efficient irrigation methods; (iii) help in controlling forest fires by constructing inside forested areas and in collaboration with MOA's Directorate of Forestry 20 water-storage ponds; (iv) improve the socio-economic environment in rural areas by contributing to job creation, improved incomes and better access to rural areas; and (v) contribute to the formulation of informed sector policies, including those related to the management of natural resources, by conducting an agricultural census and establishing a permanent statistical system for the agricultural sector in Lebanon.

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AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Cropping Patterns and Yields

Table 1. Farm Size Distribution and Fragmentation

Table 1a. Farm Size Distribution

Farm Holding Size in Hectares	Number of Holding	% of No. of Holdings	Area - ha	% of Area
0.5 - 2	44,053	46.2	57,400	8.8
2 - 5	26,809	28.1	106,124	16.3
5 - 10	13,213	13.8	104,949	16.2
10 - 20	5,691	6.0	79,509	12.2
20 - 50			101,893	15.7
50 - 100	5,605	5.9	81,754	12.6
100 +			117,864	18.2
Total Distribution	95,371	100.0	649,491	100.0

Source: Ministry of Agriculture, 1070 Agricultural Census, Unpublished Results

Table 1b. Land Fragmentation Per Farm Size

	Number of Parcels Per Holding			
Farm Size	1 - 4	5 -9	10 - 24	25 +
Hectares		Percent of Holdings		
0.5 - 2	64	31	5	-
2 - 5	40	42	18	-
5 - 10	27	43	26	3
10 - 20	28	38	30	4
20 - 50	20	42	30	8
50 - 100	22	33	32	13
100 - 200	42	15	39	4
200 +	32	23	32	13
Total	49	36	14	1

Source: Ministry of Agriculture, 1070 Agricultural Census, Unpublished Results

AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Table 2. Areas to be Developed and Estimated Beneficiaries per Region

Areas to be Served by Agricultural Roads							
	Km of Roads	Areas served per km of Roads (ha)	Total Area served by Roads (ha)	Average farm size (ha)	No. of Beneficiary Farm Holders	Average Size of Household	Total No. of Beneficiaries
North Lebanon	75.0	25.0	1,875.0	5.5	341.0	10.0	3,410.0
Mouth Lebanon	57.0	15.0	855.0	2.0	428.0	6.0	2,568.0
South Lebanon	90.0	20.0	1,800.0	8.5	212.0	6.0	1,272.0
Bekaa North	39.0	30.0	1,170.0	4.5	260.0	10.0	2,600.0
Bekaa South	39.0	-	780.0	9.0	87.0	6.0	528.0
Total	**300.0**	-	**6,480.0**	-	**1,328.0**	-	**10,378.0**
Areas to be Terraced and Planted with Fruit Trees							
	Terraced Area (ha)	Area Planted to Fruit Trees (ha)	Total Area Developed (ha)	Average Size Developed (ha)	No. of Benefiting Farming Households	Average Size of Household	Total Nol of Beneficiaries
North Lebanon	785.0	500.0	1,285.0	0.68	1,890.0	10.0	18,900.0
Mount Lebanon	455.0	500.0	955.0	0.68	1,404.0	6.0	8,424.0
South Lebanon	890.0	500.0	1,390.0	0.68	2,044	6.0	12,264.0
Bekaa North	500.0	500.0	1,000.0	0.68	1,471.0	10.0	14,710.0
Bekaa South	510.0	500.0	1,010.0	0.68	1,485.0	6.0	8,810.0
Total	3,140.0	2,500.0	5,640.0	-	8,294.0	-	63,208.0
GENERAL TOTAL					9,622.0		75,586.0

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AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJECT

Table 3. Current and Future with Project Cropping Patterns, Yields and Projectionsin Areas to be Terraced and/or replanted as Fruit Trees

Region/Major Crops	Current				With Project (Year 12 - Full Development)				Incremental ton
	Area (ha)	% of Total Area	Yield ton/ha	Total Production ton	Area (ha)	% of Total Area	Yield ton/ha	Total Production ton	
Northern Lebanon									
Wheat (RF)	385.5	30.0	1.2	163.0	-	-	1.7	-	-163.0
Fallow	899.5	70.0	-	-	-	-	-	-	-
Apple (new-irrig.)	-	-	-	-	257.0	20.0	30.0	7,710.0	7,710.0
Cherry (new-Irrig.)	-	-	-	-	128.5	10.0	20.0	2,570.0	2,570.0
Olive (new-RF)	-	-	-	-	642.5	50.0	5.5	3,434.0	3,534.0
Almond (new-RF)	-	-	-	-	257.0	20.0	12.0	3,084.0	3,084.0
Sub-Total/Cropping Intensity	**1,285.0**	**0.3**	-	-	**1,285.0**	**100.0**	-	-	-
Mount Lebanon									
Wheat (RF)	287.0	30.0	1.2	344.0	-	-	-	-	-344.4
Vegetables (irrig.)[1]	-	-	-	-	191.0	20.0	45.0	8,595.0	8,595.0
Fallow	668.0	70.0	-	-	-	-	-	-	-
Apple (new-irrig.)	-	-	-	-	477.5	50 0	30.0	14,325.0	14,325.0
Cherry (new-irrig.)	-	-	-	-	286.5	30.0	20.0	5,720.0	5,720.0
Sub-Total/Cropping Intensity	**955.0**	**30.0**	-	-	**955.0**	**100.0**	-	-	-
South Lebanon									
Wheat (RF)	695.0	50.0	1.2	834.0	-	-	-	-	-834.0

1/ Average between field tomato and green house tomato.

Table 3 (continued)

Region/Major Crops	Current				With Project (Year 12 - Full Development)				Incremental ton
	Area (ha)	% of Total Area	Yield ton/ha	Total Production ton	Area (ha)	% of Total Area	Yield ton/ha	Total Production ton	
Vegetable (irrig.)	-	-	-	-	556.0	40.0	45.0	25,020.0	25,020.0
Fallow	695.0	50.0	-	-	-	-	-	-	-
Olive (new-RF)	-	-	-	-	556.0	40.0	5.5	3,058.0	3,058.0
Almond (new-RF)	-	-	-	-	278.0	20.0	12.0	3,336.0	3,336.0
Sub-Total/Cropping Intensity	**1,390.0**	**50.0**	-	-	**1,390.0**	**100.0**	-	-	-
Bekaa North									
Wheat (RF)	300.0	30.0	1.2	360.0	-	-	-	-	-360.0
Fallow	700.0	70.0	-	-	-	-	-	-	-
Apricot (new-RF)	-	-	-	-	300.0	30.0	25.0	7,500.0	7,500.0
Cherry (new-RF)	-	-	-	-	500.0	50.0	13.0	6,500.0	6,500.0
Almond (new-RF)	-	-	-	-	200.0	20.0	12.0	2,400.0	2,400.0
Sub-Total/Cropping Intensity	**1,000.0**	**30.0**	-	-	**1,000.0**	**100.0**	-	-	-
Bekaa South									
Wheat (RF)	505.0	50.0	1.2	606.0	-	-	-	-	-606.0
Fallow	505.0	50.0	-	-	-	-	-	-	-
Vegetable (irrig.)	-	-	-	-	303.0	30.0	45.0	13,635.0	13,635.0
Apple (new-irrig.)	-	-	-	-	303.0	30.0	30.0	9,090.0	9,090.0
Olive (new-RF)	-	-	-	-	202.0	20.0	5.5	1,111.0	1,111.0
Cherry (new-Irrig.)	-	-	-	-	202.0	20.0	20.0	4,040.0	4,040.0
Sub-Total/Cropping Intensity	**1,010.0**	**50.0**	-	-	-	**100.0**	-	-	-

LEBANESE REPUBLIC

Agriculture Infrastructure Development Project

Current and Futre with Project Croping Patterns, Yields and Productions
Areas to be Served by Agricultural Roads

Region/Major Crops	Current				With Project (Year 12 - Full Development)				
	Area (ha)	% of Total Area	Yield Ton/ha	Total Production Ton	Area (ha)	% of Total Area	Yield ton/ha	Total Production Ton	Intermental Production
North Lebanon									
Wheat (RF)	562.5	30.0	1.2	675.0	375.0	20.0	1.7	638.0	-37.0
Almond (exist-RF)	75.0	4.0	10.0	750.0	75.0	4.0	12.0	900.0	150.0
Apple (exist-irrig.)	75.0	4.0	23.0	1,725.0	75.0	4.0	30.0	2,350.0	525.0
Cherry (exist-RF)	37.5	2.0	9.3	349.0	37.5	2.0	13.0	488.0	139.0
Olive (exist-RF)	187.5	10.0	2.5	469.0	187.0	10.0	4.5	842.0	373.0
Fallow	937.5	50.0	-	-	375.0	20.0	-	-	-
Almond (new-RF)	-	-	-	-	187.0	10.0	12.0	2,244.0	2,244.0
Apple (new-irrig.)	-	-	-	-	187.0	10.0	30.0	5,610.0	5,610.0
Cherry (new-irrig.)	-	-	-	-	187.5	10.0	20.0	3,750.0	3,750.0
Olive (new-RF)	-	-	-	-	187.5	10.0	5.5	1,031.0	1,031.0
Sub-Total/Cropping Intensity	**1,875**	**50.0**	-	-	**1,875.0**	**80.0**	-	-	-

Table 4 (Continued)

Region/Major Crops	Current				With Project (Year 12 - Full Development)				
	Area (ha)	% of Total Area	Yield Ton/ha	Total Production Ton	Area (ha)	% of Total Area	Yield ton/ha	Total Production Ton	Intermental Production
Mount Lebanon									
Vegetables (irrig.)[1]	42.8	5.0	30.0	1,284.0	85.5	10.0	45.0	3,848.0	2,564.0
Potato (irrig.)	42.8	5.0	20.0	856.0	85.5	10.0	30.0	2,565.0	1,709.0
Apple (exist-irrig.)	213.7	25.0	23.0	4,915.0	213.7	25.0	30.0	6,411.0	1,496.0
Cherry (exist-irrig.)	128.2	15.0	13.0	1,667.0	128.2	15.0	18.0	2,308.0	641.0
Fallow	427.5	50.0	-	-	170.0	20.0	-	-	-
Apple (new-irrig.)	-	-	-	-	78.0	9.0	30.0	2,340.0	2,340.0
Cherry (new-irrig.)	-	-	-	-	94.1	11.0	20.0	1,882.0	1,882.0
Sub-Total Cropping Intensity	**855.0**	**50.0**	-	-	**855.0**	**80.0**	-	-	-
South Lebanon									
Wheat (RF)	720.0	40.0	1.2	864.0	360.0	20.0	1.7	612.0	-252
Vegetables (irrig.)	90.0	5.0	30.0	2,700.0	180.0	10.0	45.0	8,100.0	5,400.0
Potato (irrig.)	90.0	5.0	20.0	1,800.0	180.0	10.0	30.0	5,400.0	3,600.0
Almond (exist-RF)	126.0	7.0	10.0	1,260.0	126.0	7.0	12.0	1,512.0	252.0
Olive (exist-RF)	234.0	13.0	2.5	585.0	234.0	13.0	4.5	1,053.0	468.0
Fallow	540.0	30.0	-	-	360.0	20.0	-	-	-
Almond (new-RF)	-	-	-	-	180.0	10.0	12.0	2,160.0	2,160.0
Olive (new-RF)	-	-	-	-	180.0	10.0	5.5	990.0	990.0
Sub-Total/Cropping Intensity	**1,800.0**	**70.0**	-	-	**1,800.0**	**80.0**	-	-	-

1/ Including tomatos, Green house tomatos and cucurbits and field cucurbits.

Table 4 (Continued)

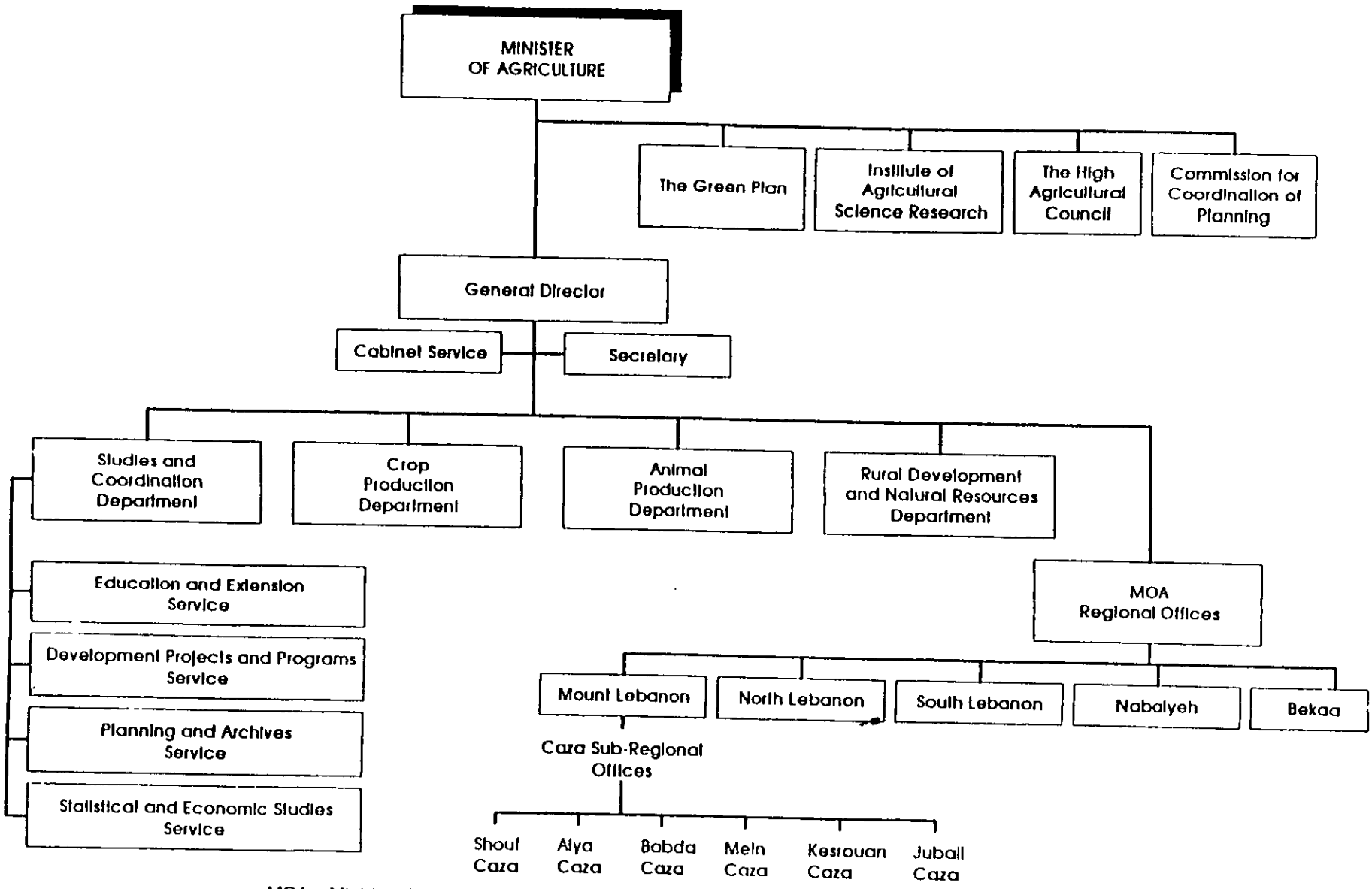
Region/Major Crops	Current				With Project (Year 12 - Full Development)				
	Area (ha)	% of Total Area	Yield Ton/ha	Total Production Ton	Area (ha)	% of Total Area	Yield ton/ha	Total Production Ton	Intermental Production
Bekka South									
Wheat (RF)	351.0	30.0	1.2	421.0	351.0	30.0	1.7	596.7	175.0
Almond (Exist-RF)	70.2	6.0	10.0	702.0	70.2	6.0	12.0	842.0	140.0
Apricot (exist-RF)	105.0	9.0	18.0	1,895.0	105.3	9.0	25.0	2,633.0	738.0
Cherry (exist-RF)	175.5	15.0	9.3	1,632.0	175.0	15.0	13.0	2,275.0	643.0
Fallow	468.0	40.0	-	-	234.0	20.0	-	-	-
Almond (new-RF)	-	-	-	-	58.5	5.0	12.0	702.0	702.0
Apricot (new-RF)	-	-	-	-	58.5	5.0	25.0	1,463.0	1,463.0
Cherry (new-RF)	-	-	-	-	117.0	10.0	13.0	1,521.0	1,521.0
Sub-Total/Cropping Intensity	**1,170**	**60.0**	-	-	**1,170.0**	**80.0**	-	-	-
Bekaa South									
Wheat (RF)	163.0	21.0	1.2	197.0	-	-	-	-	-197.0
Vegetables (irrig.)	78.0	10.0	30.0	2,340.0	117.0	15.0	45.0	5,265.0	2,975.0
Potato (irrig.)	78.0	10.0	20.0	1,560.0	117.0	15.0	30.0	3,510.0	1,950.0
Apple (exist-irrig.)	132.6	17.0	23.0	3,050.0	132.6	17.0	30.0	3,978.0	928.0
Cherry (exist-irrig.)	85.8	11.0	13.0	1,115.0	85.8	11.0	18.0	1,544.0	429.0
Olive (exist-RF)	85.8	11.0	2.5	215.0	85.8	11.0	4.5	386.0	171.0
Fallow	156.0	20.0	-	-	156.0	20.0	-	-	-
Apple (new-irrig.)	-	-	-	-	39.0	5.0	30.0	1,170.0	1,170.0
Cherry (new-irrig.)	-	-	-	-	46.8	6.0	20.0	936.0	936.0
Sub-Total/Cropping Intensity	**780.0**	**67.0**	-	-	**780.0**	**80.0**	-	-	-
Total					**6,480.0**				

THE LEBANESE REPUBLIC
AGRICULTURE INFRASTRUCTURE DEVELOPMENT PROJET

List of Working Papers Available in Project File

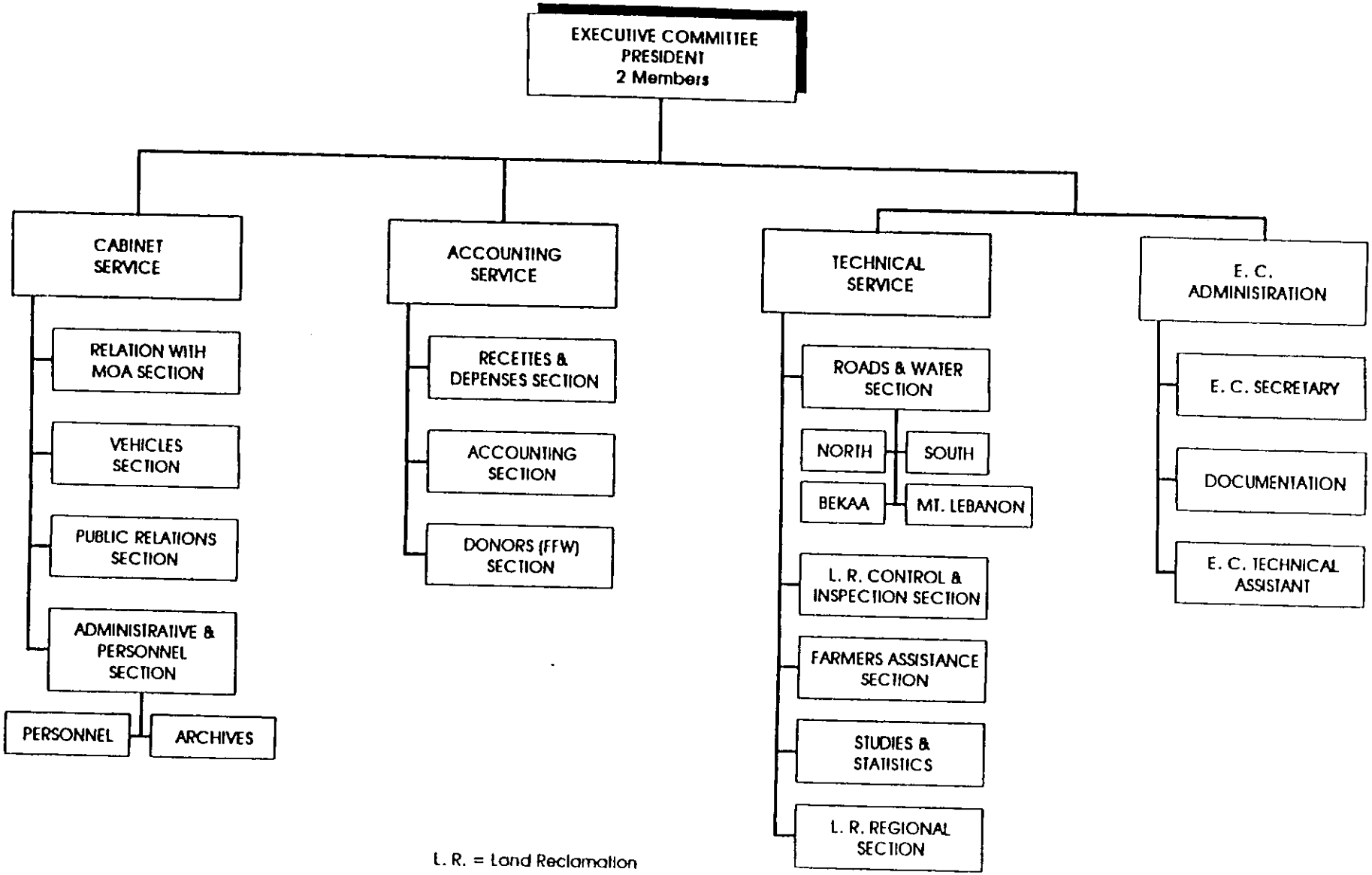
Working Paper No. 1	:	Land and Water Development
Working paper No. 2	:	Agricultural Roads
Working Paper No. 3	:	Economic Analysis, Agricultural Production - Crop and Farm Models
Working Paper No. 4	:	Project COSTABs
Working Paper No. 5	:	Environmental Analysis, Guidelines and Environmental Assessment Summary Checklists
Working Paper No. 6	:	Participatory Approach to Project Design and Selection of Beneficiaries
Working Paper No. 7	:	Rapport de Mission - Renforcement des Capacité Institutionnelles - Recensement Agricole et Systeme Permanent de Statistiques Courantes

Chart 1. Ministry of Agriculture Organization

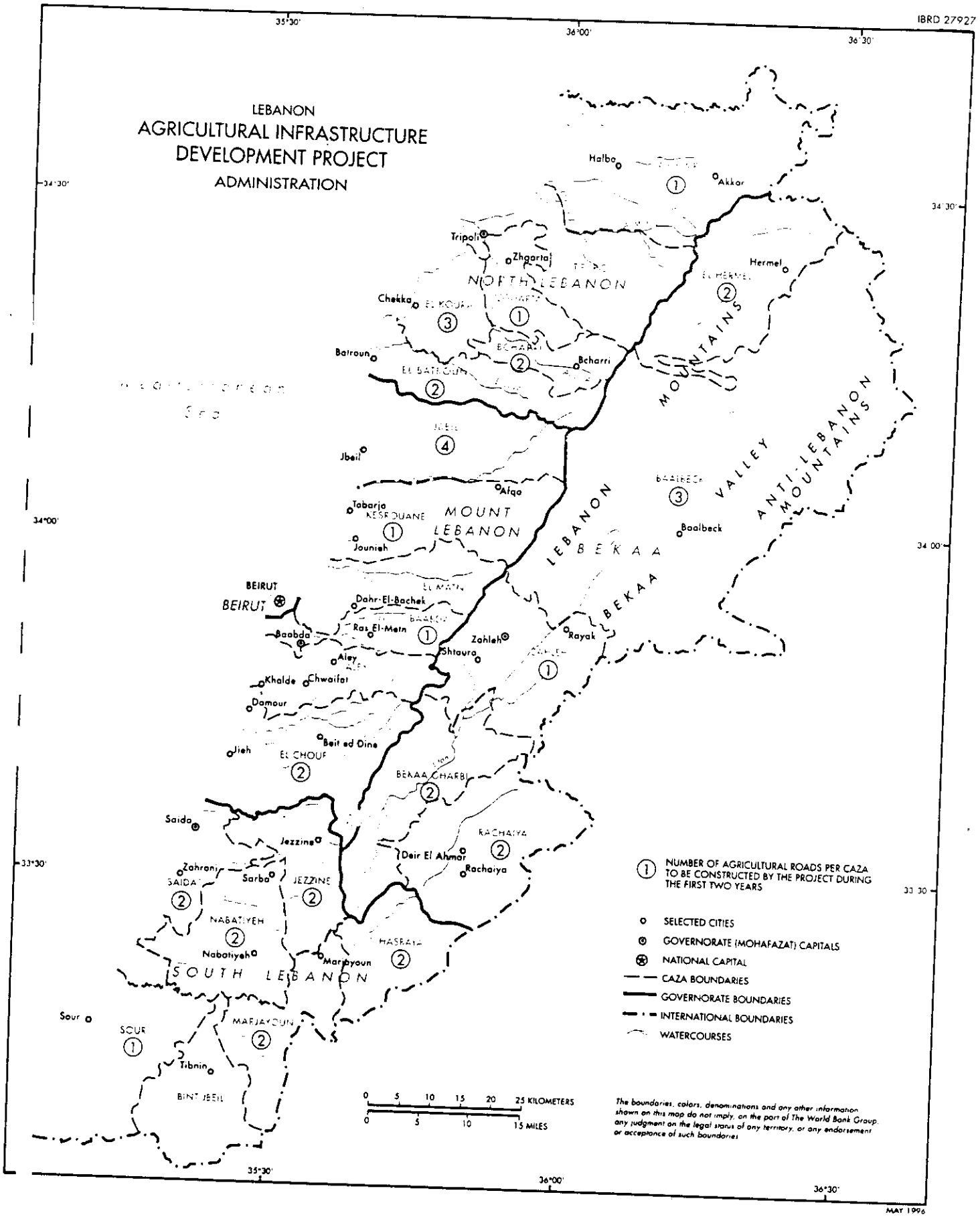


MOA = Ministry of Agriculture

Chart 2. Green Plan Organization

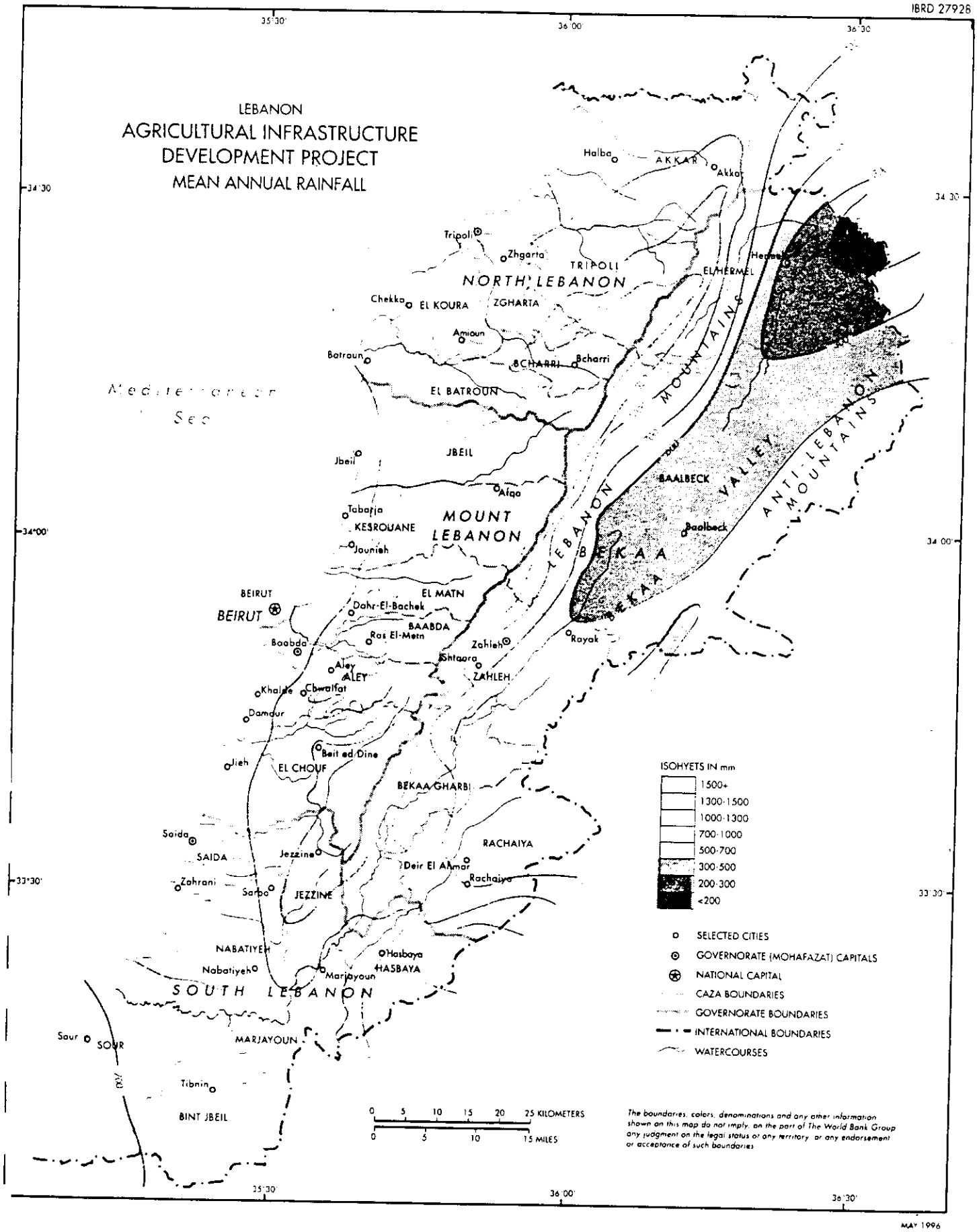


L. R. = Land Reclamation


IBRD 27927
LEBANON
AGRICULTURAL INFRASTRUCTURE DEVELOPMENT PROJECT
ADMINISTRATION
35°30'
36°00'
36°30'
34°30'
34°00'
33°30'
Halba
Akkar
Tripoli
Zhgarta
NORTH LEBANON
Hermel
EL HERMEL
MOUNTAINS
Chekka
EL KOURA
Batroun
EL BATROUN
Bcharri
BCHARRI
Mediterranean Sea
JBEIL
Jbeil
Afqa
Tabarja
KESROUANE
MOUNT LEBANON
Jounieh
BAALBECK
VALLEY
ANTI-LEBANON MOUNTAINS
LEBANON
BEKAA
Baalbeck
BEIRUT
Dahr-El-Bachek
Ras El-Metn
BAABDA
Baabda
Aley
Zahleh
Shtaura
Rayak
Khalde
Chwaifat
Damour
Beit ed Dine
Jieh
EL CHOUF
BEKAA CHARBI
Saida
Jezzine
Deir El Ahmar
RACHAIYA
Rachaiya
Zahrani
SAIDA
Sarba
JEZZINE
NABATIYEH
Nabatiyeh
Marjayoun
HASBAYA
SOUTH LEBANON
Sour
SOUR
MARJAYOUN
Tibnin
BINT JBEIL
NUMBER OF AGRICULTURAL ROADS PER CAZA TO BE CONSTRUCTED BY THE PROJECT DURING THE FIRST TWO YEARS
SELECTED CITIES
GOVERNORATE (MOHAFAZAT) CAPITALS
NATIONAL CAPITAL
CAZA BOUNDARIES
GOVERNORATE BOUNDARIES
INTERNATIONAL BOUNDARIES
WATERCOURSES
0 5 10 15 20 25 KILOMETERS
0 5 10 15 MILES
The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.
MAY 1996

IBRD 27926

LEBANON
AGRICULTURAL INFRASTRUCTURE DEVELOPMENT PROJECT
MEAN ANNUAL RAINFALL



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MAY 1996

الجمهورية اللبنانية
مكتب وزير الدولة لشؤون التنمية الإدارية
مركز مشاريع ودراسات القطاع العام

Republic of Lebanon
Office of the Minister of State for Administrative Reform
Center for Public Sector Projects and Studies
(C.P.S.P.S.)