Return to E Leonard

PD-HAD 250

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: Lebanon

4. DOCUMENT REVISION NUMBER: 0

5. PROJECT NUMBER (7 digits): 268-0300

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7. PROJECT TITLE (Maximum 40 characters): Technical Education Rehabilitation

8. ESTIMATED FY OF PROJECT COMPLETION: FY 79

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 78; B. QUARTER 1 (Enter 1, 2, 3 or 4); C. FINAL FY

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 -)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL	1,500			1,500		
(GRANT)	(1,500)	( )	( )	(1,500)	( )	( )
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1						
OTHER U.S. 2						
HOST COUNTRY						
OTHER DONOR(S)						
TOTALS	1,500			1,500		

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH CODE C. GRANT	PRIMARY TECH CODE D. LOAN	E. 1ST FY 78 F. GRANT	E. 1ST FY 78 G. LOAN	H. 2ND FY ___ I. GRANT	H. 2ND FY ___ J. LOAN	K. 3RD FY ___ L. GRANT	K. 3RD FY ___ M. LOAN
(1) SA	620	690		1,500					
(2)									
(3)									
(4)									
TOTALS				1,500					

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	N. 4TH FY ___ P. LOAN	Q. 5TH FY ___ R. GRANT	Q. 5TH FY ___ S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) SA					1,500	
(2)						
(3)						
(4)						
TOTALS						

12. IN-DEPTH EVALUATION SCHEDULED: MM YY

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE

TITLE

DATE SIGNED: MM DD YY

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-76)

TECHNICAL EDUCATION

Rehabilitation of Technical and Vocational Schools

Lebanon

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Rehabilitation of Technical and Vocational Schools

Part I Project Summary and Recommendations

Approval is sought for a grant of $1,500,000 to replace part of the equipment damaged or stolen from Lebanese technical/vocation schools during the Lebanese Civil War. At the central facilities at Dekwaneh, the GOL estimates that over $20,000,000 in damage and losses occurred with an additional $33,000,000 loss in the outlying schools. U.S. Assistance, in the form of six to ten man weeks of technical advisors and the balance in equipment, would be directed principally to reequipping the mechanical, electrical and electronic departments at the Institute Pedagologique Nationale d'Education Technique (IPNET), the central facility for training technical and vocational teachers and, as the lowest priority, the Institute Hotelier. If there is any residual under the $1.5 M, the balance would equip student laboratories and workshops in the technical/vocational schools under an IBRD education rehabilitation project. IPNET's three departments were select for A.I.D. assistance: 1) because without sufficient teachers trained and supplied there can be no classes for the students; 2) the specific technical focus is oriented toward teacher and student production in the areas most needed for physical and economic reconstruction of Lebanon, and 3) the employment market for these services is even greater now than prewar when demand already exceeded supply.

This project paper is based on collaborative work with the Directorate General of Technical and Vocation Education (the Directorate), in the Ministry of Education and has been reviewed by IBRD informally as part of continuing collaboration. IBRD is also doing a project with Dekwaneh which is described later in this paper.

The Directorate is the sole government entity supervising both public and private technical and vocational institutes and would implement the A.I.D.-supported project. Their request for assistance meets with the full approval of the Ministry of Education, the Ministry of Labor, and of the Council for Development and Reconstruction.

The Directorate already has a list of all missing equipment and has submitted an initial request list to A.I.D. A final list of equipment to be procured under this project with costs and specifications will be drawn up with the assistance of three U.S. advisors who will be sent to Lebanon for two to three weeks. A.I.D. will procure the equipment from DSA/GSA. Based on the successful organization of the schools and of the excellent reputation and acceptance into the market of its past graduates, no additional technical assistance is

viewed as necessary. The Directorate will assume full responsibility for installing and calibrating the equipment and for maintaining its operation and has stated they do not need assistance.[1/]

The project meets all statutory criteria. Reference is made to the completed check list appended to this paper.

1/ The IBRD specialist assigned to this project agrees with the Directorate's statement that before the war Dekwaneh was able to successfully maintain its equipment and that this assumption is also being made by them.

Part 2 Project Background and Detailed Description

A. Background

The Education Sector. The war has changed education priorities in three respects. Firstly, physical damages unevenly affected education and training institutions, the catchment areas of which were changed due to internal migrations; secondly, private schooling became unaffordable to larger segments of the population and; thirdly, the shortage of skilled manpower, which was already a constraint on economic development before the war, was exacerbated by the departure of many Lebanese and foreign workers[1/] and technicians. It is now a major bottleneck for Lebanon's reconstruction. The GOL believes that a substantial part of the Lebanese technicians and workers who have left the country will migrate permanently or accept high paying jobs in oil producing countries, where the demand is great. In addition, some restrictions are currently imposed on the entry into Lebanon of migrant foreigners.

Considerable internal migration of population took place during the war. However, the extent of this migration and its permanent or provisional nature are not known. It is clear, however, that the distribution of public shcools as planned in the early 1970's will have to be revised. This is even more the

1/ Prior to the war 3-400,000 Syrians provided the bulk of Lebanon's semi-skilled labor needs. IBRD does not believe that many will return to Lebanon.

case in view of uneven damages (some schools were completely destroyed or looted while others were untouched) to education and training institutions which occurred due to shelling and looting.

A tentative assessment of rehabilitation needs prepared by the Government indicates that losses are twice as high for furniture and equipment ($30.6 million) as for buildings ($14.5 million). Vocational and technical schools, particularly in large cities, were looted and suffered the worst damages, while many primary and secondary schools all over the country were partially destroyed. Some of them are possibly beyond repair while others could be repaired but would require refurnishing and reequipping. Damage to the private school system is not known. However, it is assumed that because of their location and generally academic and theoretical orientation, private schools have suffered less from looting of furniture and equipment than the public system.

Despite the damage, most public and private schools re-opened in early 1977. Enrollment in public primary schools is at the same level as in 1973, whereas it is 50 percent higher than before the war in public general secondary schools and is expected to increase by 10 percent in 1978. Two factors account for this sharp increase. Firstly, prolonged schooling is an alternative to unemployment, and secondly, private schooling has become too expensive for a larger number of families. In this respect the civil war accelerated a development which had started earlier.

Because of war damages, vocational and technical schools are not in a position to supply the skilled workers and technicians most urgently needed for reconstruction. Enrollments in technical schools have not reached their prewar levels and education is theoretical because of lack of equipment. No training of skilled workers - the most needed category of manpower - is apparently taking place in large technical schools because of lack of instructors and equipment. The re-equipping of selected vocational and training schools to allow them to offer crash vocational training programs and resume their regular courses is therefore the high priority at present.

Technical and Vocational Education

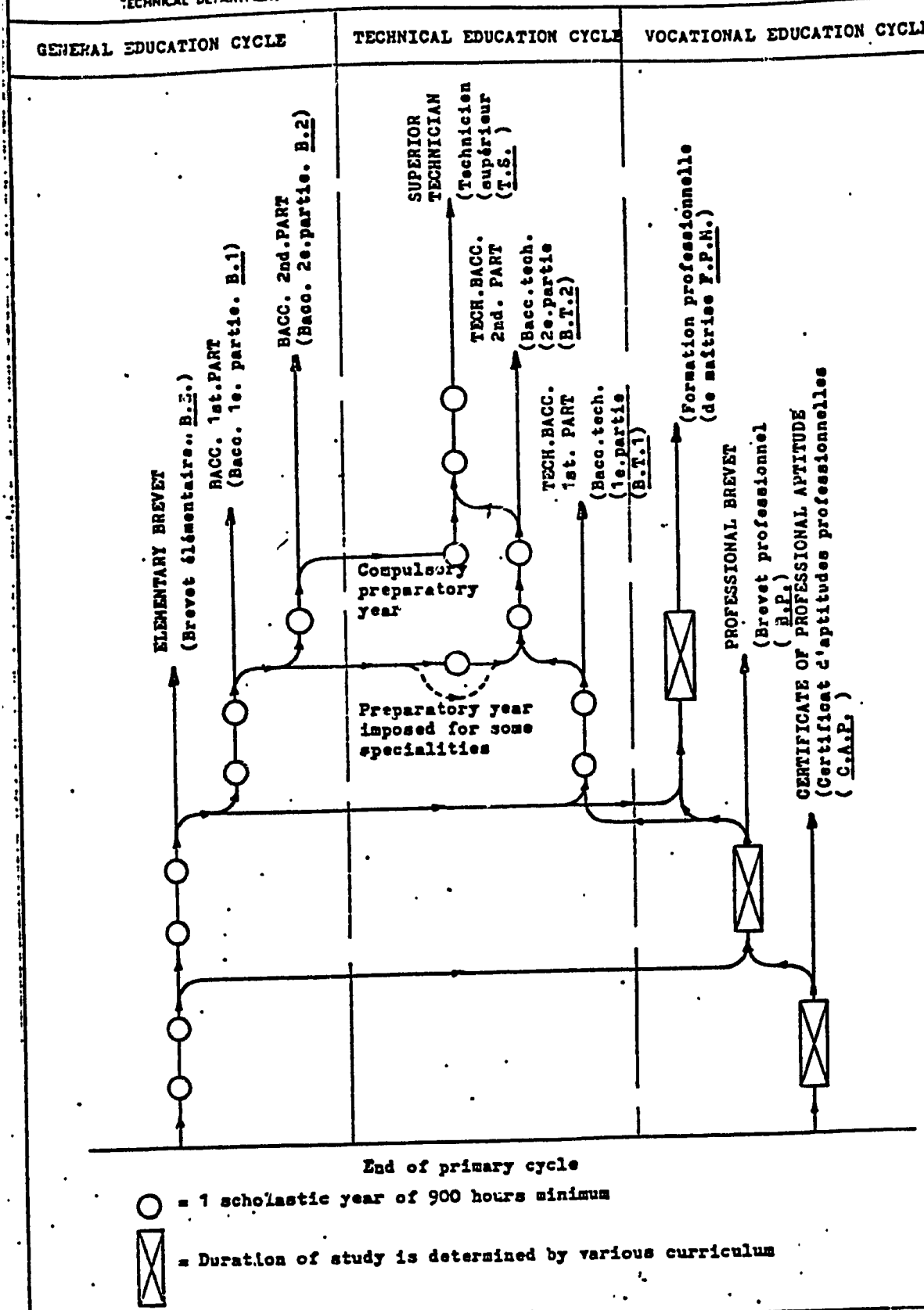
Prior to the crisis, the Directorate General of Technical and Vocational Education in Lebanon was running 19 institutes, technical and vocational schools in which 5354 students were enrolled in various techniques (73 techniques) and at 6 different levels.[1] The main branches were in the industrial, commerical and tourism fields.

As a result of the Lebanese crisis a large number of public and private technical schools and training centres suffered severe losses in equipment and building facilities, and, more important in their teaching, training and administrative

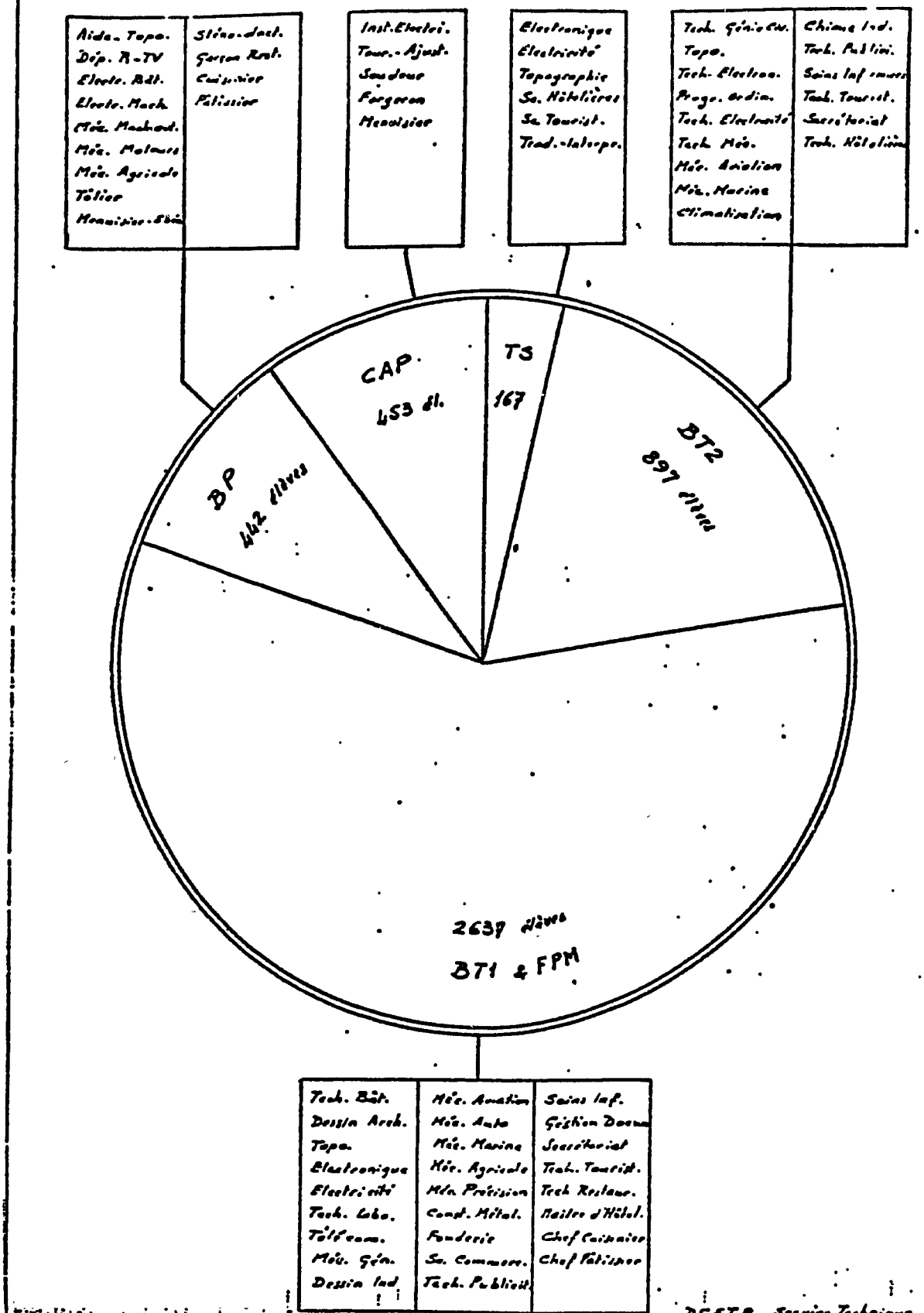
1/ See figures 1,2,3.

MINISTRY OF NATIONAL EDUCATION
General Directorate of Technical and Vocational Education
TECHNICAL DEPARTMENT

TECHNICAL AND VOCATIONAL EDUCATIONAL SYSTEM IN LEBANON.



REPARTITION DES ELEVES DES ECOLES TECH. & PROF. OFFICIELLES (1973-74)



(7)

Fig. 3

Nombre d'élèves par spécialité dans les Ecoles officielles de l'Enseignement Technique & Professionnel

Année 1973 - 1974

Niveau	Nbre Spécial.	Spécialité	Nbre Elèves
T.S.	6	Electromécan.	26
		Electricité	37
		Topographie	24
		Sc. Hôtelières	10
		Sc. Touristiques	64
		Tradut. Interp.	16
B.T.2.	15	Tech. Géme Civ.	125
		Topographie	42
		Tech. Electronique	91
		Progr. ordinateur	48
		Tech. Electricité	175
		Tech. Mécanique	148
		Méc. Aviation	11
		Méc. Marine	28
		Climatisation	18
		Chimie Ind.	53
		Tech. Publicité	13
		Soins Infirm.	44
		Tech. Touristique	47
		Secrétariat	26
		Tech. Hôtellerie	30
BT. 1 & FPM	26	Tech. de Bât.	107
		Dessin d'Arch.	173
		Topographie	31
		Electronique	167
		Electricité Ind.	148
		Tech. Labo.	82
		Télécommuni.	19
		Mécanique Gén.	43
		Dessin Ind.	66
		Méc. Aviation	22
		Méc. Auto	155
		Méc. Marine	38
		Méc. Agricole	43
		Méc. Précision	16
		Const. Métal.	46
		Fonderie	10
		Sciences Comm.	22
		Tech. Publicité	26
		Soins Infirmiers	186
		Gestion Document.	48
		Secrétariat	65
		Tech. Touristique	92
		Tech. Restauration	16
		Maître d'Hôtel	225
		Chef cuisinier	120
		Chef Pâtissier	20
BP	13	Aide-Tape	62
		Dépanneur R.TV	26
		Electr. Bât.	60
		Elect. Machines	25
		Méc. Ajustage	72
		Méc. Moteurs	38
		Méc. Agricole	6
		Tôliers	74
		Menuisier Ebén.	56
		Sténo-dactylo	23
		Garçon Rest.	16
		Cuisinier	18
		Pâtissier	5
CAP	5	Install. électr.	99
		Tourn.-Ajustur	98
		Soudeur	91
		Forgeron	70
		Menuisier	87
Totaux	65		4596

staff. The major loss was suffered by the "Cite Technique" at Dekwaneh which lost all its technical equipment, school furniture, and some of its building facilities. This complex used to house IPNET, two technical institutes (industrial and tourism institutes), three technical schools (arts and craft, hotel and nursery) and the vocational training center for adults. About 2000 students yearly were received in this complex at Dekwaneh. The total material loss at this complex is estimated to be about $20,000,000. The total material damage and loss inflicted on the 19 public schools run by the Directorate General of Technical and Vocational Education during the last war, is estimated to be about $33,000,000.

It has been recognized that the technical education and vocational training systems in Lebanon were not satisfying quantatively and qualitatively the manpower requirements of the country. Some relevant facts and statistics are worth considering in this respect:

a) Less than 4% of students enrolled in higher elementary and secondary schools pre-war were in vocational and technical education.

b) Statistics from just before the war indicate that about 400,000 youngsters left the schools before finishing their

secondary education. Also, about 125,000 left the schools before finishing primary education.

c) A recent study made by the Directorate General of Technical Education (Technical Department) and based on various manpower statistics gathered by Ministry of Planning, has indicated that in 1970 the employed labour force (active population) in Lebanon was estimated to 540,000 persons. Actually the Directorate believes this number exceeds 600,000. The study estimated that about 25% (150,000) of the employed labor force was supposed to have gained some kind of technical and vocational education and training. Taking into consideration normal rate of replacement, growth, retraining needs etc... the study concluded that technical schools and vocational training centers should provide for 27,000 graduates annually distributed as follows:

- 800 High level technicians.
- 4,500 Technicians.
- 21,700 skilled workers.

It is worth mentioning that the total number of graduates from technical and vocational schools and centers (Public and Private) in 1974 did not exceed 3,000.

d) Qualitatively, it has been recognized that, due to recent(prewar) increased rate of industrial growth in Lebanon, improvement of the actual system of technical education and vocational training has become a necessity. More practical training should be considered in the training of semi-skilled and skilled workers, also, specialized programs should be adopted for the preparation of technicians and higher technicians.

The Directorate General of Technical and Vocational Education had already taken necessary steps to account for the above considerations before the war. The new 6 year Development Plan (1975 - 1981) established on 20 Feb 1975 provided for the increase of enrolled students in technical and vocational schools from 5,300 to 11,500 students together with the establishment of new training centers accommodating 6,500 trainees. Reorganization of the whole educational system (preparation and training cycles) together with the revision of educational and training programs was being considered.

The new 6 year development plan also provided for the construction of 9 new schools and training centers and the extension of certain technical schools existing. The total cost of construction and equipment provided in the plan was estimated in 1975 at 21,700,000 dollars.

Because of the extensive damage to the already existing facilities during the war, the GOL has had to temporarily set aside the six year plan in order to focus their finances and those of outside donors on reestablishing the core facilities at Dekwaneh, Zahle and Tripoli.

Other donor assistance for technical and vocational education rehabilitation to date is as follows:

Capital Assistance

IBRD	$6.6M Loan	Technical education and vocational training schools
U.K.	?	aeronautical workshop
France	700k FF	pre-war promise for handicrafts development
Germany	4M DM	6 or 7 machines
		pre-war promise to equip Badroun marine (nautical) center.

Technical Assistance

France	?	5 professors for IPNET
Germany	?	1 professor for Dekwaneh
U.K.	?	1 expert to install aernautical equipment
UNDP	?	Preparation of Technical Education and Vocational Training Programs and Equipment lists related to IBRD project.

The IBRD loan noted above represents a shift of a $6.6 M outstanding balance from a 1973 general education project into rehabilitating technical education and vocational training facilities. The project will also be through the Directorate General of Technical Education and Vocational Training and complements the AID project.

The IBRD project is an attempt to swing the system away from a "technical" focus, i.e. one heavily theoretical, to one more practical and which provides accelerated training (six months to a year for semi-skilled and skilled labor.) There are two major elements in their approach. First, the current four year accelerated program which becomes a three year program with no less than 50% practical instruction, and sometimes more depending on the department. The second major element is the introduction of accelerated vocational training. To a limited degree this has been handled by the Ministry of Labor. Recently, a law has been submitted to the Parliament which would put this training under the Ministry of Education with the Ministry of Labor advising and facilitating relations with employers and the labor force. UNDP/UNESCO/ILO under UNDP funding will provide approximately 3 expert advisors for three months (starting in early CY 78) to draw up curricula and equipment lists.

IBRD feels the biggest constraint on their project is the availability of teachers and their agreement with the GOL calls

for GOL to ensure that qualified teachers and instructors are appointed in a timely manner. The AID project is central to the resumption of teacher training and is supported by IBRD. IBRD and AID have been coordinating the two projects both in Lebanon, in joint discussions with the Directorate General, and in Washington where exchanges of documents and discussions have occurred and are planned as each entity reaches a new stage in project approval and implementation.

B. Detailed Description

The program goal is the physical and economic rehabilitation of Lebanon. The purpose of this project is the rehabilitation of Lebanon's capacity to train technical and vocational workers in fields critical to the rebuilding of the physical and economic infrastructure of the country. The end-of-project status will be the resumption of teacher training at the teacher training institute (IPNET) at Dekwaneh, with technical courses in electronics, electricity, mechanics, and possibly resumption of teacher training in hotel skills with a combined graduation of 100 teachers by the end of the second year. (Concurrently IBRD will be contributing to the rehabilitation of the principal vocational schools at Dekwaneh, Zahle, and Tripoli, and others as feasible). An A.I.D. grant of $1.5 M will provide three short term advisors with the balance of the $1.5 M going directly for equipment as described below.

Clearly, $1.5 M is a small amount against estimated damages of $53 M. In establishing priorities for utilizing AID grant funding, both AID and the GOL felt that $1.5 M for Dekwaneh would be enough to attack, in a complete fashion, the reequipping of the major teachers' training programs.

This project does not represent a development project per se, but is the result of special, one-time funding for the rehabilitation and reconstruction of Lebanon. As such, AID's role in the development of this project has been one of responsiveness to a government request to aid in the partial

restoration of a teaching system which was highly successful before the war. The GOL's and AID's decision to focus on IPNET came about through the loss of a large number of teachers to oil-rich Arab countries and the private section, the speed at which full operations can resume for all levels of technical and vocational education depends on the number of new teachers who can be produced. AID is not involved in the future expansion of the system (see section on background) which prewar GOL studies showed were indicated by market demand for technical and skilled workers. The provision of three technical experts under this grant is due to the need to have experts on American equipment involved in the equipment selection process, rather than any fundamental need to redesign the courses.

The courses or departments which will be addressed cover the main prewar areas of construction, production and service sectors. The mechanical department includes plumbing, fitting, and welding, agricultural machinery and production machinery repair, and vehicle repair. Electricity includes household and industrial wiring. Electronics is directed more to maintenance and repair of equipment both in the government and private sectors. Techniques hoteliers deals with all levels of service training for restaurants and hotels, e.g. the basis for the tourist industry and for the support of the international commercial community.

Because of AID's interest in the construction aspects of reconstruction it is felt that the priority use of money for this grant should be in the areas of mechanics, and electricity/ electronics. The sheer size of the service sector prewar and most likely, post-war also provides a strong argument to support aiding the Institute Hotelier but at a lower priority than the other areas. The grant agreement will emphasize these priorities.

It is expected that, immediately after the grant is signed, AID will procure the services of three technical advisors in the fields of mechanical, electrical, and electronic higher level technical education. These advisors will spend two weeks in Lebanon working with counterparts in the General Directorate of Technical Education and Vocational Training. Using curriculae and equipment lists provided by the Directorate General, the advisors will review the equipment requests for consistency in relation to course goals and will help revise or draw up equipment specifications suitable for American procurement, based on their knowledge of durability and usefulness of the equipment in an instructional situation. Finally, they will provide estimated costs for the equipment, and, to the extent that the total estimate exceeds availabilities under this grant that will assist in setting priorities to reduce the total to the level of funding available. If the estimates are less than $1.5, the Directorate

General and IBRD/UNDP team will provide cost lists and specifications for equipment for the IBRD vocational education project to be met from the balance, subject to the approval of A.I.D. Upon their return to Washington the three advisors will submit their recommendations to A.I.D. and will each turn in a brief report on their recommended lists and any potential issues. They will also draw up specifications in a form suitable for A.I.D. to use in procuring the equipment.

Following procurement, the equipment will be consigned to the U.S. Embassy in Beirut which will in turn transfer title to the Directorate General. This procedure is recommended by the AID/Beirut commodity specialist as the simplest means of keeping track of port arrivals and of having an exact list for end use checking. End use checks will occur periodically until all equipment is in place and at a final time six months after the last arrival and during classes, to insure that the equipment is functioning and being properly utilized.

Part 3 Project Analysis

A. Technical Analyses including Environmental Assessment

Prior to the war a majority of the equipment at Dekwaneh was of European origin. At the same time the private sector in Lebanon was increasingly using U.S. source equipment because of its greater reliability and because of increased U.S. penetration into the local market. The technical experts at Dekwaneh prefer to use this grant to purchase U. S. equipment. Their feeling is that the equipment is appropriate in the current market for skilled workers and may even increase the potential practical applicability of the students' training as more and more firms, particularly in their post-war reequipping, use U.S. suppliers. The suitability of individual items of equipment, and any specification changes needed to insure durability for classroom use will be established by the three American advisors.

Prior to the war, Dekwaneh had an excellent record of maintaining its own equipment due to the advantage of having trained staff. While maintenance and repair does appear to be a problem in Lebanon as a whole, it does not appear to be a limiting factor for this specific project since the focus of the school is on teaching these same skills.

No negative environmental impacts are envisioned as resulting from this project because no construction or pollution of air or water is involved. (See Annex D.)

B. Financial Analyses and Plan

1. Financial Rate of Return/Viability

This project represents a non-revenue producing project in terms of return to the government entity. Return to the project beneficiaries is treated in the economic analysis section.

2. Recurrent Budget Analysis of Implementing Agency

The budget request of the Directorate General of Technical and Vocational Education for fiscal year (also calendar year) 1978 was:

	$M
Salaries, materials, expenses	6,841,933
(of which maintenance	(21,666)
materials and tools	(141,666)
Capital Investment	2,280,000.

Figure 4 attached provides an historical trend for the budget (3 L.P. = $1). The reader will note that the 1978 request is the same as in the third six-year plan. In the past, the Directorate General has received its budget requests, perhaps because of the excellence and success of the instruction. Under current GOL financial constraints it is possible this figure will be reduced below the request level but highly improbable that salaries, maintenance and materials will be reduced to a level where they will affect this or the IBRD project. Maintenance costs are a particularly small component compared to other equipment projects because the nature of the recipient institution is such that it can do its own maintenance for the most part.

Given the lack of firm data on final 1978 GOL appropriations, a condition precedent to procurement could be established requiring certification by the Directorate General and the Ministry of Finance that sufficient funds will be made available to cover maintenance and materials relating to this equipment for a period of five years, teacher's salaries for IPNET, and salaries for graduate teachers and instructors.

EVOLUTION OF THE BUDGET OF THE DIRECTORATE GENERAL OF TECHNICAL AND VOCATIONAL EDUCATION IN LEBANON (in L.P.)

YEAR	1st PART OF THE BUDGET (I) L.P.	2nd PART OF THE BUDGET (2) L.P.	3rd PART OF THE BUDGET (3) L.P.
I958	I.400.000	I00.000	
I959	I.550.000	75.000	
I960	I.500.000	80.000	
I96I	I.650.000	I20.000	
I962	2.250.000	2.I00.000	
I963	2.800.000	35.000	First 5-year Plan
I964	3.300.000	I.200.000	I3.000.000
I965	5.600.000	I.650.000	
I966	4.800.000	I.075.000	
I967	5.450.000	40.000	
I968	5.500.000	I35.000	2nd 5-year Plan
I969	6.300.000	I0.000	
I970	7.I20.000	I0.000	20.000.000
I97I	8.3I0.000	I0.000	
I972	9.030.000	I0.000	
I973	I0.475.000	I0.000	
I974	II.684.600	I35.000	Third 6 year Plan
I975	I5.238.800(req)	2.490.000req	
I976	I8.I67.600(req)	240.000req	20.000.000 (req.)
I977	I7.068.000(req)	5.000.000req	
I978	20.525.800(req)	6.840.000req	

(I) The first part of the Budget covers general expenses (Teacher's salaries, expandable materials, school's expenses, etc...)

(2) The second part of the Budget covers the cost of short-term equipment investment.

(3) The third part of the Budget covers the long-term development plan investment (New buildings, etc...)

./.

3. Financial Plan/Budget Tables

Technical Assistance	FY 1978
3 U. S. advisor for 1.5 mm	6,750
per diem for 1.5 mm	3,000
Travel	4,500
Miscellaneous	500
Total	14,750
Equipment	1,485,250
IPNET	
(Mechanical)	
(Electronics)	
(Electric)	
(Technique Hotelier)	
Total	1,500,000

C. and D. Social and Economic Analyses

"Lebanon's greatest economic advantage lies not in its material resources, but in its human resources. Both the trade and services sectors, for example, thrive primarily on the efficiency, skill and adaptability of the country's manpower. Long-range investment in the training, development and utilization of human resources is therefore the most necessary and the most profitable investment that Lebanon can make".[1]

1/ Preliminary Assessment of Manpower Resources and Requirements in Lebanon, Economics Research Institute, American University of Beirut.

Pre-war, approximately 125,000 students left school before finishing primary education and 400,000 before finishing secondary education. The background section of this paper details the pre-war plan to expand Lebanon's capability to pick up these drop-outs in the vocational/technical track.

Since these schools are public, no records of family income have been maintained (such as the indigent classification used where the government pays private schools on a per pupil basis). Admittance at each level is by competitive exam. Graduation "goals" result in fifty/fifty admission policies Muslim/Christian. The initial level begins after primary school and progress through all six levels is possible for the lowest level entrants. The war has exacerbated the situation as unemployment levels make continued public schooling a desirable alternative and because private school fees are now beyond the reach of many middle and lower income families.

Figure 5 attached analyzes the potential financial return to the beneficiaries of the technical and vocational system. A comparison of the liberal arts education graduates' starting salaries (on a monthly basis) provides strong evidence that the labor market demand for technical labor exceeds supply to a much greater degree than the demand exceeds the supply of college graduates. It should

STARTING SALARY IN LEBANON

Holder of BI (General Baccalaureate Ist Part) (II years of general education)	Holder of Technical Baccalaureate Ist Part (BTI) (9 years general education plus 2 years of technical education)
315 - 350 L.P.	Trade sector : 450 - 500 L.P. Hotel Sector : 500 - 600 L.P. Commerce : 400 - 450 L.P.
Holder of B2 (General Baccalaureate 2nd Part) (I2 years of general education)	Holder of Technical Baccalaureate 2nd Part (BT2) (9 years of general education plus 4 years of technical education, or holder of FPM diploma (Formation Professionnelle de Maitrise) (9 years of general education and 3 years of technical education)
400 - 450 L.P.	Trade sector (BT2) : 600 - 700 L.P. Hotel sector (BT2 or FPM) : 600 - 800 L.P. Commerce (BT2) : 550 - 600 L.P.
Holder of a University Bachelor Degree in litterature, history, geography, mathematics, sciences, sociology, etc... (I6 years of general education)	Holder of T.S. Diploma (Technicien Supérieur) -(9 years of general education plus 6 years of technical education) -or (II years of general education plus 4 years of technical education) -or (I2 years of general education plus 3 years of technical education)
600 L.P.	Trade sector : 850 - I 000 L.P. Commerce : 800 - 900 L.P. Tourism : 850 - I 000 L.P.

also be noted that the rate of salary increase of technicians and skilled workers has been estimated to be at least double that of the ordinary educated person.

While a detailed economic return (benefit-cost or cost-effectiveness) is analytically beyond the scope of this project the following return to beneficiaries from the specific A.I.D. grant illustrates the economic benefits:

> Assuming an average differential of 3,000 L.P. ($1,000)* per year between a skilled worker and a generally educated worker with the same number of academic years of study, a real yearly wage increase equal or greater than the discount rate, and a thirty year potential work life, the current added value of technical training to an individual would be $30,000. Break even on the investment of 1,500,000 would require that 50 students graduate. Presuming teacher salaries and expenses of an equal amount ($1,500,000), 100 students would have to graduate for public expenditures to equal the return to individuals. Pre-war IPNET and the highest two technical levels graduated 73 individuals at the T.S. (teacher) and 481 at the B.T. 2 level (instructors) in electronics, electricity, mechanics, and hotel management. On an income basis, a restoration of courses graduating less than half this number would imply an economic rate of return of greater than 100%.

* This figure was based on prewar statistics which were simply inflated equally for post-war inflation. Post-war figures would be likely to show a greater differential due to increased demand for, and decreased supply of, skilled labor.

The economic benefits resulting from having sufficient skilled workers lie in two principal areas: the physical rehabilitation of infrastructure and housing and the service sector, which before the war accounted for 70% of the G.D.P. Insufficient market data, particularly post-war, exists to do even elementary analysis of the impact of skilled labor on private industry and the services sector, however the effect on income and employment given earlier implies that any return of the economy to a pre-war level, where skilled manpower was already deficit, requires building back up the basic supply of skilled workers, particularly ones in demand for reconstruction and for the private sector.

While 10% of the students are female, this project will have neither a positive nor a negative effect on women.

Part 4. Implementation Arrangements

The implementing organization will be the Directorate General of Technical and Vocational Education. Appendix A describes its structure. Both A.I.D. and IBRD have been dealing directly with the Directorate General which will oversee the project. The Directorate General is an independent agency receiving funds from the Ministry of Education for technical training and funds from the Ministry of Labor for vocational education. The Minister of Education and the Minister of Labor are one and the same.

There are only a limited number of implementation actions under this project and they can be broken out as follows:

	Action	Agent
1.	Technical Advisors Selection and Contracting	AID/NE/TECH
2.	Procurement and shipping	AID/SER/COM
3.	Receipt of goods, papers	AID/Beirut
4.	Receipt of goods, physical	Dir Gen
5.	Installation of equipment	Dir Gen
6.	Maintenance of equipment	Dir Gen
7.	End use checks	AID/Beirut

AID/NE/TECH/HRST will identify and contract for the three advisors. The only difficulty foreseen is that, as most advisors of this type hold academic posts, vacation schedules may delay the TDY.

On procurement, because of the origin of the goods, i.e., 100% American, lack of catalogs and lack of familiarity with our market, and because of a five-step, five agency review process for procurement (which does not apparently eliminate pressure from interested sellers) which would take months, the GOL has requested that U.S. technical advisors draw up the specifications to A.I.D. standards for AID/SER/COM procurement that is expected to take place through DSA/GSA.

The main responsibility of the Directorate General will be to provide curricula, course specific equipment lists, and counterparts for the U.S. advisors and to pick up the equipment at the port, install it and maintain it. With reference to the former, A.I.D. technician experience is that the Directorate General is well organized. To date they have provided all information, in written form, in a timely manner. With reference to the equipment, discussions with the Director and with Dekwaneh graduates failed to raise any potential problems in their ability to handle and maintain the equipment. Clearly the nature of their activities and the qualifications of their staff give them a positive edge over other ministries and directorates in dealing with equipment.

The AID/Beirut office, which is quite limited in personnel, has been consulted concerning the consignment of goods and end use checks. Their procurement expert appears to be willing and able to handle the task.

Implementation timing (Probable)

Week of
Nov 7. Nov 14 Nov 21 Nov 28 Dec 5.

Project Comm

NEAC and PAF doc.

Identification of Consultants

Project Approval

Dec 19 Dec 26 Jan 2. Jan 9 Jan 16

Grant Agreement

Host Country Contracts

Technical Advisors in field

Jan 23 Jan 30 Feb 6 Feb Mar

Procurement

April May June

First Equipment Arrives, Installation

Last installation

Evaluation Arrangements

It is recommended that in addition to the end-use checks by AID/Beirut that the Grant Agreement specify that the Directorate General report to A.I.D., six months and twelve months after final equipment arrival, the following:

1. Number of students and teachers affected by the project against a project start baseline, reporting by specialty and degree level.
2. Equipment status: on order, installed functioning, installed non-functioning.

Since this project is not the result of new curriculum design, and since A.I.D.'s monitoring responsibilities should not be extended too far in the future, a report on market acceptability of student graduates has been considered but this paper recommends avoiding long term involvement due to the temporary nature of our involvement in Lebanon.

ANNEX A

AID 1020-28 (1-72)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 78 to FY 79
Total U S Funding 1.5M
Date Prepared: November 8, 1977

Project Title & Number: Technical Education 268-0300

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: The physical and economic reconstruction and rehabilitation of Lebanon.	Measures of Goal Achievement: 1. Increased economic activity 2. Rehabilitation of physical structures 3. Resumption of commerce, industry, tourism.	1. Trade account and national account statistics 2. Donor and GOL reports; bank loans 3. National statistics.	Assumptions for achieving goal targets: 1. The situation in the south is resolved. 2. Peace continues in the north 3. Foreign tourists and business return to Lebanon.
Project Purpose: Rehabilitation of the technical education and vocational training system.	Conditions that will indicate purpose has been achieved: End of project status. 1. Trained teachers and instructors graduated-100 2. Teachers and instructors available for technical courses in electricity, electronics, mechanics, and technique hotelier.	On-site inspection by USAID or IBRD representatives	Assumptions for achieving purpose: 1. No hostile actions directed against Dekwaneh 2. Students desiring to be teachers enroll in the courses.
Outputs: IPNET electrical, electronic and mechanical courses and technique hotelier functioning.	Magnitude of Outputs: Teacher training courses functioning Electrical 1 Electronic 1 Mechanical 1 Technique Hotelier 1	On-site check by USAID or IBRD representatives	Assumptions for achieving outputs: 1. Satisfactory delivery, installation and maintenance of equipment 2. Teachers available.
Inputs: Equipment $1.485M Technical advisors 1.5mm .015M	Implementation Target (Type and Quantity) 1. Equipment procured early 1978 2. Equipment installed by June 1978 3. Advisors draw up specifications by end December 1977.	1. Bills of lading 2. End use check by USAID 3. Satisfactory specifications,	Assumptions for providing inputs: 1. Formal request from GOL 2. GOL contribution delineated 3. Procurement procedure identified.

APPENDIX A

Decree No. 16, 980
ORGANIZATION OF THE DIRECTORATE OF VOCATIONAL AND TECHNICAL EDUCATION

The President of the Lebanese Republic,
In accordance with the Lebanese Constitution,
In accordance with Article I para. 2-c- of the law enacted by Decree No. 15742 dated 11. 3. 64 providing for the organization of the Directorate of Vocational and Technical Education,
Following the Civil Service Council's approval and Consultation of State Counselling Board, based on the proposal of the Minister of National Education, and,
Following the approval of the Council of Ministers at its meeting held on July 15, 1964,
Decrees the following:

Article One: The Directorate of Vocational and Technical Education shall be charged with:

- the administration of the affairs of the official vocational and technical schools, and

- the supervision of private institutions for vocational and technical education and training, and the curricula therein in accordance with the laws and regulations in force.

Article Two: The Directorate of Vocational and Technical Education shall consist of:

- the Technical Department,

- the Administration and Execution Department, and

- the Supervision and Examinations Department.

PART ONE
The Technical Department

Article Three: The Technical Department shall consist of:

- the Planning Bureau,
- the Curricula Bureau, and
- the Study and Survey Bureau.

Article Four: The Planning Bureau shall be entrusted with:

- Furnishing the elements of research to determine both the quality and quantity of technicians needed by the country; and submitting the projects meeting the country's needs,
- Securing the liaison between the Directorate and such quarters as are relevant to vocational and technical education, and
- Securing the functions of Secretariat to the National Council of Vocational and Technical Education, and to the various consultative committees.

Article Five: The Curricula Bureau shall be entrusted with:

- Conducting the necessary studies on the curricula in force, and suggesting the appropriate amendments in accordance with the scientific, industrial, and vocational development.
- Drafting curricula for new courses,
- Preparing all the necessary technical and pedagogical documents for application of the curricula in force, and
- Coordinating the works of production in the official vocational and technical schools, with the educational and curricular targets.

Article Six: The Study and Survey Bureau shall be entrusted with:

- Preparing lists of books, educational equipment and means, and all school requirements, and determining the specifications pertaining thereto.

- Compiling the technical studies in connection with school buildings for vocational and technical education in order to standardize the designs of the new buildings and to improve the use of the existing ones,

- Estimating the costs of establishing and operating the vocational and technical schools, and

- Laying out programs of execution of new projects.

- Preparing studies leading to definition of number of posts of the Educational staff every year in the Budget, and definition of the number and types of the field of specialization of each post.

PART TWO
Administration and Execution Department

Article Seven: The Administration and Execution Department shall consist of:

- The Administrative Bureau.

- The Buildings and Procurement Bureau, and

- The Vocational Guidance Bureau.

Article Eight: The Administrative Bureau shall consist of:

- The Administrative Affairs Division, and

- The Legal Affairs Division (Contentieux)

Article Nine: The Administrative Affairs Division shall be entrusted with:

- Carrying out such functions as the laws and regulations in force assign to the administrative office including the correspondence and secretarial works,

- Preparing the annual draft budget and its preamble,

- Dealing with accountancy works,

- Attending to personnel formalities,

- Controlling the accountancy of materials,

- Establishing contacts with the Alumni Associations.

Article Ten: The Legal Affairs Division (Contentieux) shall be entrusted with:

- Drafting laws, decrees, decisions, and agreements, and ascertaining their legality.

- Carrying out the necessary procedures of expropriation for new schools.

- Attending to insuring the students against accidents and,

- Drafting statutes for schools.

Article Eleven: The Buildings and Procurement Bureau shall be entrusted with:

- Concluding sale, purchase and work contracts, in favor of the Directorate, in accordance with the laws and regulations in force,

- Operating the central stores and warehouses, and supervising the operations of school stores and warehouses,

- Securing receipt of works and purchased materials,

- Supervising production works, both technically and economically in the schools, and

- Carrying out works pertaining to the maintenance of school buildings, playgrounds, and gardens, making the necessary improvements therein, and securing the liaison with the competent official authorities in this regard.

Article Twelve: The Vocational Guidance Bureau shall be entrusted with:

- Devising methods of experiment for vocational guidance, and coordinating the works of vocational counsellors attached to the teaching staff,

- Organizing lectures for students and the public,

- Operating libraries attached to vocational and technical schools,

- Organizing summer training for students in local and foreign industries,

- Keeping personal files for the students,

- Attending to securing jobs for the graduates.

PART THREE
Supervision and Examinations Department

Article Thirteen: The Supervision and Examinations Department shall consist of:

- The Bureau of Educational Supervision,

- The Examinations Bureau, and

- The Statistics and Analysis Bureau.

Article Fourteen: The Bureau of Educational Supervision shall be entrusted with:

- Setting out, for the technical educational supervisors attached to the teaching staff, work programs comprising all matters related to supervising the private institutes for vocational education and training, to the application of curricula in the public schools, and to advising the members of the teaching staff,

- Making, in cooperation with the Teacher Training Institute for Vocational and Technical Education, periodical reports on the activities of the teaching staff and on their need for preparation and training, and

- Investigating applications prior to opening private schools for vocational and technical training to ensure the fulfillment of conditions stipulated in Laws and Regulations in force at the Institutions submitting such applications.

- Keeping files of private institutions for technical training and vocational education and maintaining all relevant documents including reports on such institutions from various authorities.

International Bank for Reconstruction and Development

FOR OFFICIAL USE ONLY

FOR EXECUTIVE DIRECTORS' MEETING

"UNCLASSIFIED
NOT US SECURITY CLASSIFICATION
NOT FOR DISSEMINATION
OUTSIDE GOVT. CHANNELS"

For consideration on July 5, 1977

From: The President

R77-185
June 22, 1977

LEBANON: Proposed Change of Project Description and Reallocation of Proceeds of Loan 877-LE (First Education Project)

1. The Government of Lebanon has requested that it be allowed to use the entire $6.6 million of the above loan, on which no disbursements have yet been made owing to the 1975-76 civil war, to finance rehabilitation of its vocational and technical education system through re-equipping three and possibly five technical and vocational training schools. This would allow Lebanon to produce skilled manpower most urgently needed for reconstruction in the shortest possible time. The proposed action would amount to a complete reorientation of the purposes of the original loan, which was to have been devoted to primary and lower secondary school construction and teacher training; however, in the special emergency situation prevailing in Lebanon I believe this action would be justified.

2. Historical. The project, for which a Loan was approved by the Executive Directors in January 1973, was intended to be the first phase of the Government's plan aimed at providing equal education opportunities to all population groups through upgrading and rationalizing the public education system in Lebanon. It provided for more appropriate accommodations and instructional equipment for the training of primary and lower secondary school teachers and for the replacement of small uneconomical primary and lower secondary schools located in unsatisfactory rented premises, by 63 new and economically sized schools to be built in the poorer rural areas.

3. For the purpose of project implementation, a Project Unit was established within the Conseil Executif des Grands Projets, an autonomous office under the supervision of the Ministry of Public Works. Difficulties in staffing this Unit delayed effectiveness and implementation of the project by twelve months. However, these problems were overcome and bids for the construction of the 63 schools had been recommended for approval in August 1975.

Distribution:

Executive Directors and Alternates
President
Senior Vice President, Operations
President's Council
Vice Presidents, IFC
Directors and Department Heads, Bank and IFC

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As a result of worsening situation, construction did not start and no disbursements were made. A second education project was appraised in 1975 before the hostilities. This project was intended to assist the Government in implementing the entire second phase (1976-79) of its plan for upgrading primary and lower secondary education and in carrying out vocational training and upgrading programs for adults and out-of-school youths. Negotiations for a $17.3 million loan to finance this project could not take place because of the war.

4. The education and training needs, which the first and second Bank loans would have met, remain. They are even more pronounced today than before the war. The work on curricula and on teacher training development for the project schools could be resumed by the Lebanese Center for Education Research and Development, which is fully staffed. Nevertheless, the first and proposed second project should not and cannot be executed as planned.

5. The Education Sector. The war has changed education priorities in three respects. Firstly, physical damages affected unevenly education and training institutions, the catchment areas of which were changed due to internal migrations; secondly, private schooling became unaffordable to larger segments of the population and; thirdly, the shortage of skilled manpower, which was already a constraint for economic development before the war, was exacerbated by the departure of many Lebanese and foreign workers and technicians, and is now a major bottleneck for Lebanon's reconstruction. It is likely that a substantial part of the Lebanese workers who have left the country will migrate permanently or accept high paying jobs in oil producing countries, where the demand is great. In addition, some restrictions are currently imposed on the entry in Lebanon of foreigners.

6. Considerable internal migration of population took place during the war. However, the extent of this migration and its permanent or provisional nature are not known. But it is clear that the distribution of public schools as planned in the early 1970's will have to be revised. This is even more the case in view of uneven damages to education and training institutions which occurred due to shelling and looting. A tentative assessment of rehabilitation needs prepared by the Government indicates that losses are twice as high for furniture and equipment ($30.6 million) as for buildings ($14.5 million). Vocational and technical schools, particularly in large cities, were looted and suffered the worst damages, while many primary and secondary schools all over the country were partially destroyed. Some of them are possibly beyond repair while others could be repaired but would require refurnishing and reequipping. Damage to the private school system is not known. However, it is assumed that because of its location and generally academic and theoretical orientation it has suffered less from looting of furniture and equipment than the public system.

7. Despite the damage, most public and private schools re-opened in early 1977. Enrollment in public primary schools is at the same level as

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in 1973, whereas it is 50 percent higher than before the war in public general secondary schools and is expected to increase by 10 percent in 1978. Two factors account for this sharp increase. Firstly, prolonged schooling is an alternative to unemployment, and secondly, private schooling has become too expensive for a larger number of families. In this respect the civil war accelerated a development which had started earlier.

8. Because of war damages, vocational and technical schools are not in a position to supply skilled workers and technicians most urgently needed for reconstruction. Enrollments in technical schools have not reached their prewar levels and education is theoretical because of lack of equipment. No training of skilled workers - the most needed category of manpower - is apparently taking place in large technical schools because of lack of instructors and equipment.

9. The re-equipping of selected vocational and training schools to allow them to offer crash vocational training programs and resume their regular courses is therefore the highest priority at present. A program for upgrading general public education along the lines already proposed under the two prewar projects should be considered as a second priority.

10. Proposed Amendments to Loan 877-LE. The amount of $6.6 million still undisbursed under Loan 877-LE would be reallocated from the items initially to be financed under the loan to the most urgently needed equipment for three vocational and technical schools located in the country's major economic centers, Beirut (Dekouaneh school), Tripoli and Zahle and possibly two other smaller institutions to be selected in agreement with the Bank. In addition, the proposed project institutions suffered damage to buildings and furniture tentatively estimated at $1.5 million; the Government has agreed to make adequate repairs to and refurnish the project institutions within one year of approval of the amended loan (Section 7 agreement amending Loan Agreement).

11. Rehabilitation of the three proposed project institutions would allow them to enroll more students than before the war, provided facilities were used extensively through appropriate multiple shifting. The three institutions would have a maximum capacity of 3,300 full-time students. Annual output would amount to 1,500 skilled workers and 360 technicians. The Government has agreed to devote two thirds of the project institutions' capacity to organize vocational training courses on a multiple shift basis to train skilled workers until the accumulated needs for skilled labor have been met (Section 9 agreement amending Loan Agreement).

12. The amortization schedule of Loan 877-LE provided for payment starting April 1, 1978, and extending through October 1, 1997. Since disbursements under the revised project would be completed only by June 1979, it is proposed to defer the first payment on the loan until April 1, 1980, while leaving the date of the last payment unchanged.

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13. Organization and Administration. The proposed project institutions are under the jurisdiction of the Ministry of Education which is responsible for technical education. The Ministry of Labor is responsible for vocational training. Both ministries have already agreed on the modalities for sharing the use of Dekouaneh school's facilities. Similar agreements would be reached between the two Ministries for the shared use of the four other proposed project institutions (Section 9 agreement amending Loan Agreement).

14. The Government confirmed that vocational instructors and technical teachers are available to meet the most pressing rehabilitation needs. Their number should be increased subsequently and the Government agreed to resume, within one year of approval of the proposed amendment to the loan agreement, the training at Dekouaneh of teachers and instructors for technical education and vocational training (Section 9 agreement amending Loan Agreement).

15. The proposed amended project would be implemented by the Ministry of Education through its Directorate for Technical Education and Vocational Training while its Center for Education Research and Development would be responsible for the preparation, with UNESCO assistance, of a general education project for possible future Bank assistance. The Ministry of Education is preparing education and training programs for the proposed project institutions in collaboration with the Ministry of Labor. These programs would be submitted to the Bank for its review and approval not later than September 15, 1977 (Section 9 Agreement amending Loan Agreement). An equipment procurement expert would assist the Directorate for Technical Education and Vocational Training in accelerating physical implementation of the amended project (Section 5 Agreement amending Loan Agreement).

16. Procurement and Disbursement. Tentative lists of equipment have already been prepared for the Dekouaneh school. These lists, which would be used with appropriate adjustments for the other proposed project institutions, are being reviewed, with technical assistance provided by UNESCO and ILO, to ascertain that equipment will reflect the most urgent needs for conducting the proposed training programs. The equipment lists would be presented for the Bank's review and approval prior to procurement. They would identify all items or categories of items costing more than $10,000. Items would be grouped to the extent possible to form sizeable packages to permit bulk procurement. Items, which can only be grouped in packages amounting to less than $50,000 or which must be compatible with other equipment already procured or which would be of such specialized nature that international competitive bidding would not be practical, would be included in a miscellaneous category not exceeding an aggregate amount of $1.3 million. Equipment contracts, except for the items included in the miscellaneous category, would be awarded on the basis of international competitive bidding in accordance with Bank's guidelines. Local manufacturers of equipment would be allowed a margin of preference equal to the existing rate of customs duty applicable to competing imports or 15 percent of CIF price, whichever is lower. Contracts for the items in the miscellaneous category would be awarded under normal government procurement procedures which are satisfactory to the Bank and which would

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include price quotations from at least three manufacturers or suppliers. Nearly all equipment is expected to be obtained from foreign manufacturers. The amended loan would finance 100 percent of foreign exchange cost of equipment.

17. Educational Planning. As mentioned in paragraph 9 the Government's second priority in the education sector would be the upgrading of general public education along the lines already proposed under the two pre-war projects but taking account of post-war circumstances. It was agreed during negotiations for the amended loan agreement that the project unit would in cooperation with the appropriate ministries and with assistance of the UNESCO team, prepare a comprehensive project which would assist in meeting Lebanon's long-term needs in education (Section 8 agreement amending Loan Agreement). The considerable amount of work which had been carried out prior to the war for curriculum development, design of prototype school, specifications of education material and site plans would result in accelerated preparation of a new project addressing the new priorities in the education sector.

Recommendation

18. I recommend that the Executive Directors approve the proposed changes in the Project substantially in the form set forth in the attached draft Agreement amending the Loan Agreement.

Robert S. McNamara

June 22, 1977

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H 6

WP #L-158-A
Legal Department
DRAFT
June 16, 1977

LOAN NUMBER 877 LE
(Amendment)

AGREEMENT AMENDING

LOAN AGREEMENT

(Education Project)

between

REPUBLIC OF LEBANON

and

INTERNATIONAL BANK FOR RECONSTRUCTION
AND DEVELOPMENT

Dated , 1977

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AGREEMENT AMENDING
LOAN AGREEMENT

AGREEMENT, dated , 1977, between REPUBLIC OF LEBANON (hereinafter called the Borrower) and INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (hereinafter called the Bank).

WHEREAS (A) by a loan agreement (Education Project) dated January 24, 1973, between the Borrower and the Bank (hereinafter called the 1973 Agreement), the Bank made a loan (hereinafter called the Loan) to the Borrower in an amount in various currencies equivalent to six million six hundred thousand dollars ($6,600,000) on the terms and conditions set forth in the 1973 Agreement; and

(B) the Borrower has requested the Bank that the 1973 Agreement be amended to permit the Borrower to apply the proceeds of the Loan to assist in the financing of the rehabilitation of its Technical Education and Vocational Training system;

WHEREAS the Bank has agreed, on the basis inter alia of the foregoing, that the proceeds of the Loan be disbursed on account of expenditures in respect of the education rehabilitation project described in Section 13 of this Agreement amending Schedule 2 of the 1973 Agreement (hereinafter called the Project) upon the terms and conditions set forth in the 1973 Agreement, as such terms and conditions are hereby amended;

NOW THEREFORE the parties hereto hereby agree as follows:

HS X

Section 1. Section 1.02 of the 1973 Agreement is hereby replaced by the following:

"Section 1.02. Wherever used in this Agreement, unless the context otherwise requires, the several terms defined in the General Conditions have the respective meanings therein set forth and the following additional terms have the following meanings:

(a) "Technical Education" means training principally at the secondary level, with emphasis upon mathematic science and including an approximately equal proportion of technical theory and practice, designed to produce industrial and commercial middle level manpower; and

(b) "Vocational Training" means training in manipulative skills through programs of one year or less, and designed to produce semi-skilled and skilled labor."

Section 2. Section 2.02 of the 1973 Agreement is hereby amended to read as follows:

"Section 2.02. The amount of the Loan may be withdrawn from the Loan Account in accordance with the provisions of Schedule 1 to this Agreement, as such Schedule shall be amended from time to time, for expenditures made (or, if the Bank shall so agree, to be made) in respect of the reasonable cost of goods required for the Project described in Schedule

2 to this Agreement and to be financed out of the proceeds of the Loan."

Section 3. Section 2.03 of the 1973 Agreement is hereby amended to read as follows:

"Section 2.03. The Closing Date shall be June 30, 1979 or such later date as the Bank shall establish. The Bank shall promptly notify the Borrower of such later date as the Bank shall establish."

Section 4. Section 3.01 of the 1973 Agreement is hereby amended to read as follows:

"Section 3.01. The Borrower shall carry out the Project, with due diligence and efficiency and in conformity with appropriate administrative, financial, engineering and educational practices, and shall provide, promptly as needed, the funds, facilities, services and other resources required for the purpose."

Section 5. Section 3.02 of the 1973 Agreement is hereby amended to read as follows:

"Section 3.02. The Borrower shall (i) carry out the Project through its Ministry of Education's General Directorate for Technical and Vocational Training, which shall have such responsibilities and functions for the purposes of the Project as are set forth in Schedule 5 to this Agreement; and

(ii) utilize within said Directorate in consultation with the Bank and for such periods of time as shall be necessary for carrying out the Project, the services of a qualified and experienced Project Equipment and Procurement Specialist."

Section 6. Section 3.03 of the 1973 Agreement is hereby replaced by the following provision:

"Section 3.03. In order to assist the Borrower in carrying out the Project, the Borrower shall employ qualified and experienced specialists."

Section 7. Sections 3.04 and 3.05 of the 1973 Agreement are hereby replaced by the following provisions:

"Section 3.04. The Borrower shall not later than July 1, 1978 or such other date as the Bank may agree, make or cause to be made all necessary repairs to the facilities, and provide all necessary furniture, at the institutions included in the Project.

"Section 3.05. Except as the Bank shall otherwise agree, contracts for the purchase of goods to be financed out of the proceeds of the Loan shall be procured in accordance with the provisions of Schedule 4 to this Agreement."

Section 8. (a) Section 3.09 of the 1973 Agreement is hereby deleted.

(b) The words "and services" in Section 3.07, the words "construction and" in paragraph (a) of Section 3.08, and paragraph (b) of Section 3.08 are hereby deleted, and paragraph (c) of the latter Section hereby becomes paragraph (b) thereof.

Section 9. Sections 4.05 and 4.06 of the 1973 Agreement are hereby replaced by the following provisions:

"Section 4.05. (a) The Borrower shall, not later than July 1, 1978 or such other date as the Bank may agree, resume training at Dekouaneh of teachers and instructors for Technical Education and Vocational Training.

"(b) The Borrower shall ensure that qualified teachers and instructors in adequate numbers are appointed in a timely manner to implement the Technical Education and Vocational Training programs at the institutions included in the Project.

"Section 4.06. (a) The Borrower shall make all necessary arrangements for the coordination of the responsibilities and activities of its Ministry of Education and Ministry of Labor in respect of Technical Education and Vocational Training, including the sharing of facilities and staff, to be provided at the institutions included in the Project.

"(b) Without limitation to the provisions of paragraph (a) of this Section, the Borrower shall cause said Ministries to coordinate their activities in the preparation of Technical

Education and Vocational Training programs and related worksheets, shall submit said programs and worksheets to the Bank not later than September 15, 1977, or such other date as the Bank may agree, for the Bank's approval and shall promptly thereafter effectively implement such programs at the institutions included in the Project.

"(c) Until the needs for Vocational Training have, in the opinion of the Borrower and the Bank, been sufficiently met, the Borrower shall ensure that about two-thirds of the capacity of said institutions be utilized for Vocational Training."

Section 10. The following provision is added to Article IV of the 1973 Agreement:

"Section 4.07. The Borrower shall cause its Ministry of Education's Center for Educational Research and Development, or such other entity within said Ministry as shall be satisfactory to the Borrower and the Bank, promptly to prepare a comprehensive project which would assist in meeting the Borrower's long-term needs in education."

Section 11. Sections 8.01 and 8.02 of the 1973 Agreement are hereby deleted and Section 8.03 thereof is renumbered as Section 8.01.

Section 12. The text of Schedule 1 to the 1973 Loan Agreement is hereby replaced by the following:

"SCHEDULE 1

Withdrawal of the Proceeds of the Loan

1. Amounts of the Loan totalling the equivalent of $6,600,000, may be withdrawn in respect of 100% of foreign expenditures and 100% of local expenditures ex-factory for the acquisition of items of equipment required for the Project.

2. For the purposes of this Schedule:

(a) the term "foreign expenditures" means expenditures in the currency of any country other than the Borrower and for goods and services supplied from the territory of any country other than the Borrower; and

(b) the term "local expenditures" means expenditures in the currency of the Borrower and for goods or services supplied from the territory of the Borrower.

3. Notwithstanding the provisions of paragraph 1 above, no withdrawals shall be made in respect of:

(a) expenditures for equipment under paragraph 1 hereof, until the Borrower and the Bank shall have agreed on a list of such equipment; and

(b) payments made for expenditures prior to the date of this Agreement.

4. The disbursement percentages have been calculated in compliance with the policy of the Bank that no proceeds of the Loan shall be disbursed on account of payments for taxes levied by, or in the territory of, the Borrower on goods or services, or on the importation, manufacture, procurement or supply thereof; to that end, if the amount of any such taxes levied on or in respect of any item to be financed out of the proceeds of the Loan decreases or increases, the Bank may, by notice to the Borrower, increase or decrease the disbursement percentage then applicable to such item as required to be consistent with the aforementioned policy of the Bank.

5. If the Bank shall have reasonably determined that the procurement of any item is inconsistent with the procedures set forth or referred to in this Agreement, no expenditures for such item shall be financed out of the proceeds of the Loan and the Bank may, without in any way restricting or limiting any other right, power or remedy of the Bank under the Loan Agreement, by notice to the Borrower, cancel such amount of the Loan as, in the Bank's reasonable opinion, represents the amount of such expenditures which would otherwise have been eligible for financing out of the proceeds of the Loan."

Section 13. The text of Schedule 2 to the 1973 Agreement is hereby replaced by the following:

"SCHEDULE 2

Description of the Project

The Project is part of the Borrower's development program for the rehabilitation of its Technical Education and Vocational Training system and consists of the reconstruction of facilities and the provision of urgently needed furniture and equipment for:

(a) the following three institutions which shall, except as the Bank may otherwise agree, allow the continuous enrollment of the following numbers of students:

Schools	Enrollments
Dekouaneh (Beirut)	1,800
Tripoli	900
Zahle	600

(b) such other institutions as shall be selected by agreement between the Borrower and the Bank.

The Project is expected to be completed by December 31, 1978."

Section 14. The Amortization Schedule set forth in Schedule 3 to the 1973 Agreement is hereby amended as follows:

"SCHEDULE 3

Amortization Schedule

Date Payment Due	Payment of Principal (expressed in dollars)*
April 1, 1979	85,000
October 1, 1979	85,000

Date Payment Due	Payment of Principal (expressed in dollars)
April 1, 1980	90,000
October 1, 1980	95,000
April 1, 1981	95,000
October 1, 1981	100,000
April 1, 1982	105,000
October 1, 1982	105,000
April 1, 1983	110,000
October 1, 1983	115,000
April 1, 1984	120,000
October 1, 1984	125,000
April 1, 1985	130,000
October 1, 1985	130,000
April 1, 1986	135,000
October 1, 1986	140,000
April 1, 1987	145,000
October 1, 1987	155,000
April 1, 1988	160,000
October 1, 1988	165,000
April 1, 1989	170,000
October 1, 1989	175,000
April 1, 1990	180,000
October 1, 1990	190,000
April 1, 1991	195,000
October 1, 1991	205,000
April 1, 1992	210,000
October 1, 1992	220,000
April 1, 1993	225,000
October 1, 1993	235,000
April 1, 1994	245,000
October 1, 1994	250,000
April 1, 1995	260,000
October 1, 1995	270,000
April 1, 1996	280,000
October 1, 1996	290,000
April 1, 1997	300,000
October 1, 1997	310,000

* To the extent that any portion of the Loan is repayable in a currency other than dollars (see General Conditions, Section 4.02), the figures in this column represent dollar equivalents determined as for purposes of withdrawal.

Section 15. The text of Schedule 4 to the 1973 Agreement is hereby replaced by the following:

"SCHEDULE 4

Procurement

A. International Competitive Bidding

1. Except as provided in Part B hereof, contracts for the purchase of goods shall be procured in accordance with procedures consistent with those set forth in the "Guidelines for Procurement under World Bank Loans and IDA Credits" published by the Bank in March 1977 (hereinafter called the Guidelines) including the pertinent provisions of the General Introduction thereto, on the basis of international competitive bidding as described in Part A of the Guidelines.

2. Items of equipment shall be grouped so as to permit such bulk procurement as shall be consistent with appropriate technical standards and procurement practices.

B. Other Procurement Procedures

With respect to contracts for items of equipment which, in the opinion of the Borrower and the Bank, (i) cannot be grouped in bulk contracts costing the equivalent of $50,000 or more, (ii) must be compatible with existing equipment, or (iii) are of such a highly specialized nature that international competitive bidding would not be practicable, the Borrower may award such contracts

in accordance with its own procurement procedures provided such procedures are satisfactory to the Bank. Prior to awarding such contracts, the Borrower shall to the extent feasible obtain price quotations from not less than three manufacturers or suppliers. The aggregate amount of contracts awarded pursuant to the provisions of this Part B shall not exceed $1,300,000 equivalent.

C. Evaluation and Comparison of Bids for Goods; Preference for Domestic Manufacturers

1. For the purpose of evaluation and comparison of bids for the supply of goods except those to be procured in accordance with local procedures: (i) bidders shall be required to state in their bid the c.i.f. (port of entry) price for imported goods, or the ex-factory price for domestically manufactured goods; (ii) customs duties and other import taxes on imported goods, and sales and similar taxes on domestically supplied goods, shall be excluded; and (iii) the cost to the Borrower of inland freight and other expenditures incidental to the delivery of goods to the place of their use or installation shall be included.

2. Goods manufactured in Lebanon may be granted a margin of preference in accordance with, and subject to, the following provisions:

(a) All bidding documents for the procurement of goods shall clearly indicate any preference which will be granted, the

information required to establish the eligibility of a bid for such preference and the following methods and stages that will be followed in the evaluation and comparison of bids.

(b) After evaluation, responsive bids will be classified in one of the following three groups:

(1) Group A: bids offering goods manufactured in Lebanon if the bidder shall have established to the satisfaction of the Borrower and the Bank that the manufacturing cost of such goods includes a value added in Lebanon equal to at least 20% of the ex-factory bid price of such goods.

(2) Group B: all other bids offering goods manufactured in Lebanon.

(3) Group C: bids offering any other goods.

(c) All evaluated bids in each group shall be first compared among themselves, excluding any customs duties and other import taxes on goods to be imported and any sales or similar taxes on goods to be supplied domestically, to determine the lowest evaluated bid of each group. Such lowest evaluated bids shall then be compared with each other, and if, as a result of this comparison, a bid from group A or group B is the lowest, it shall be selected for the award.

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(d) If, as a result of the comparison under paragraph (c) above, the lowest bid is a bid from group C, all group C bids shall be further compared with the lowest evaluated bid from group A after adding to the c.i.f. bid price of the imported goods offered in each group C bid, for the purpose of this further comparison only, an amount equal to: (i) the amount of customs duties and other import taxes which a non-exempt importer would have to pay for the importation of the goods offered in such group C bid; or (ii) 15% of the c.i.f. bid price of such goods if said customs duties and taxes exceed 15% of such price. If the group A bid in such further comparison is the lowest, it shall be selected for the award; if not, the bid from group C which as a result of the comparison under paragraph (c) is the lowest evaluated bid shall be selected.

D. Review of Procurement Decisions by the Bank

1. The Borrower shall, prior to the procurement of any equipment to be financed by the proceeds of the Loan, furnish to the Bank lists of such equipment for the Bank's approval. Such lists shall identify all items or categories of items costing the equivalent of $10,000 or more.

2. Review of invitations to bid and of proposed awards and final contracts:

With respect to all contracts for equipment estimated to cost the equivalent of $100,000 or more:

(a) Before bids are invited, the Borrower shall furnish to the Bank, for its comments, the text of the invitations to bid and the specifications and other bidding documents, together with a description of the advertising procedures to be followed for the bidding, and shall make such modifications in the said documents or procedures as the Bank shall reasonably request. Any further modification to the bidding documents shall be transmitted to the Bank before it is issued to the prospective bidders.

(b) After bids have been received and evaluated, the Borrower shall, before a final decision on the award is made, inform the Bank of the name of the bidder to which it intends to award the contract and shall furnish to the Bank, in sufficient time for its review, a detailed report on the evaluation and comparison of the bids received, and such other information as the Bank shall reasonably request. The Bank shall, if it determines that the intended award would be inconsistent with the Guidelines or this Schedule, promptly inform the Borrower and state the reasons for such determination.

(c) The terms and conditions of the contract shall not, without the Bank's concurrence, materially differ from those on which bids were asked.

(d) Two conformed copies of the contract shall be furnished to the Bank promptly after its execution and prior to the submission to the Bank of the first application for withdrawal of funds from the Loan Account in respect of such contract.

3. With respect to each contract to be financed out of the proceeds of the Loan and not governed by the preceding paragraph, the Borrower shall furnish to the Bank, promptly after its execution and prior to the submission to the Bank of the first application for withdrawal of funds from the Loan Account in respect of such contract, two conformed copies of such contract, together with the analysis of the respective bids, recommendations for award and such other information as the Bank shall reasonably request. The Bank shall, if it determines that the award of the contract was not consistent with the Guidelines or this Schedule, promptly inform the Borrower and state the reasons for such determination."

Section 16. The text of Schedule 5 to the 1973 Agreement is hereby replaced by the following:

"SCHEDULE 5

Description of Responsibilities and Functions in the Execution of the Project

The Directorate General for Technical and Vocational Training of the Borrower's Ministry of Education shall have such responsibilities and functions as may be necessary to the proper execution and supervision of the Project and, in particular, shall perform or ensure the performance of the following duties:

(a) coordination of all activities under the Project with the appropriate government agencies and with national, bilateral and multilateral agencies involved in the Project or in other related education programs;

(b) completion of all necessary repairs to, and the provision of, all furniture required for the institutions included in the Project in accordance with Section 3.03 of this agreement;

(c) preparation of educational programs and worksheets for the institutions included in the Project;

(d) preparation of master lists of equipment required for the Project;

(e) preparation of bidding documents, the evaluation of bids and making recommendations for the award of contracts for the procurement of equipment;

(f) preparation of a comprehensive implementation schedule for setting down the planned timetable of coordinated activities and responsibilities on which the carrying out of all aspects of the Project will be based;

(g) maintenance of records, including financial records of the execution of the Project, and the preparation of interim evaluation and quarterly progress reports to the Bank; and

(h) the preparation for submission to the Bank of applications for withdrawals from the Loan Account."

Section 17. (a) This Agreement shall come into force and effect on the date upon which the Bank dispatches to the Borrower notice of its acceptance of:

(i) evidence that the execution and delivery of this Agreement on behalf of the Borrower have been duly authorized or ratified by all necessary governmental action; and

(ii) an opinion or opinions satisfactory to the Bank of counsel acceptable to the Bank showing that this Agreement has been duly authorized or ratified by, and executed and delivered on behalf of, the Borrower and that the 1973 Agreement as amended by this Agreement constitutes a valid and binding obligation of the Borrower in accordance with its terms as so amended.

(b) If this Agreement shall not have come into force and effect by *, this Agreement and all obligations of the parties hereunder shall terminate, unless the Bank, after consideration of the reasons for the delay, establishes a later date for the purposes of this Section. The Bank shall

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* A date approximately 60 days after the date of signature of this Agreement will be inserted here.

promptly notify the Borrower of such date. If this Agreement shall terminate under the provisions of this Section, the 1973 Agreement shall continue in full force and effect, as if this Agreement had not been executed.

IN WITNESS WHEREOF, the parties hereto, acting through their representatives thereunto duly authorized, have caused this Agreement to be signed in their respective names and delivered in the District of Columbia, United States of America, as of the day and year first above written.

REPUBLIC OF LEBANON

By

Authorized Representative

INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT

By

THRESHOLD DECISION BASED ON
INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Lebanon

Project Title: Technical Education

Funding (Fiscal Year and Amount): FY 78 $1,500,000

Life of Project: $1,500,000

IEE Prepared By: E. Leonard E. Leonard Date: 11/21/78

Environmental Action Recommended: Negative Determination
(Environmental Assessment, Negative Determination, etc.)

Bureau for Near East Decision:
(Approval/Disapproval of Environmental Action Recommended in the IEE.)

APPROVED: [signature]

DISAPPROVED: _____

DATE: 11/22/77

Clearances:
NE/GC: [signature] Date: 11/23/77

NE/TECH: [illegible] Date: [illegible]

66.

INITIAL ENVIRONMENT EXAMINATION
NARRATIVE DISCUSSION

1. Project Location: Lebanon

2. Project Title: Technical Education

3. Funding (Fiscal Year and Amount): FY 78 $1,500,000

4. Life of Project: $1,500,000

5. IEE Prepared By: E. Leonard Date: 11/21/78

6. Action Recommended: Negative Determination

7. Discussion of Major Environmental Relationships of Project Relevant to Attached Impact Identification and Evaluation Form:

This project will replace equipment stolen or damaged during the war. There are no land use, water or air impacts, since no construction is involved and no noxious effluents will be released into the air and water. No cultural changes are foreseen since the school was an accepted part of the school system pre-war.

No employment pattern changes are foreseen, however, increased employment resulting from an increase of students being trained is envisaged, although total levels will not increase beyond the pre-war level of students.

An illustrative list of equipment is attached.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas	Impact Identification and Evaluation[1/]
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
5. Other factors	
_____	_____
_____	_____
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	
_____	_____
_____	_____

1/ N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

C. ATMOSPHERIC

1. Air additives	N
2. Air pollution	N
3. Noise pollution	N
4. Other factors	

D. NATURAL RESOURCES

1. Diversion, altered use of water	N
2. Irreversible, inefficient commitments	N
3. Other factors	

E. CULTURAL

1. Altering physical symbols	N
2. Dilution of cultural traditions	N
3. Other factors	

F. SOCIOECONOMIC

1. Changes in economic/employment patterns	N[1]
2. Changes in population	N
3. Changes in cultural patterns	N
4. Other factors	

[1] No change in patterns. Increased employment in same areas as pre-war.

G. HEALTH

1. Changing a natural environment N
2. Eliminating an ecosystem element N
3. Other factors

H. GENERAL

1. International impacts N
2. Controversial impacts N
3. Other factors

I. OTHER POSSIBLE IMPACTS (not listed above)

Prepared By: E. Leonard Date: 11/21/78

Project Location: Lebanon

Project Title: Technical Education

(Note: All equipment powered by 110V, 50 H_z. (Hertz)

1.1. Universal traction/compression/flexion testing machine

20-ton capacity
hydraulic controls with a device for measuring stress and protraction and a tracer diagram

2. Universal traction testing machine

5-ton capacity with a device for analysis and pulsator for testing fatigue

3. Drop-test machine and pendulum (Charpy) for testing resistance to shocks

30 kgm capacity direct-reading instrument

4. Machine for measuring hardness -- Brinell, Vickers, and Rockwell

3,000 kgm pressure (Brinell Loudness) direct-reading dial complete with two measuring points (2 x 3)

5. Torsional testing machine

50 kgm capacity permitting determination of module slippage

6. Rotating flexion machine for testing material fatigue on test-tube ( ) (iso R373)

7. Machine for testing metal wear; circular disk type with a force of contact on the order of 200 kg (f)

8. Apparatus for measuring supersonics; to measure thickness and for detecting defects in metal. Portable with luminous and sound signals

9. Radiographic metal apparatus to control the lines of solder and defects

10. Installation of vibration testing including a complete ensemble of a double-entry oscilloscope, a low-frequency generator and two electrodynamic pick-ups

11. Dynamic equilibration machine with unbalanced wheels -- type utilized in powered automobiles for tourist cars

12. Equipment for a small mechanical workshop including: shaping machine, grinding machine, plane, lathe, universal milling machine, standard drilling machine, and electric saw

2.1 Disk chain saw - cut diameter - 40 mm
cut length - 150 mm
with safety and sprinkling devices

2. Four polishing and pre-polishing stations with plate polishers having sprinkling and lighting devices; 225 mm and 275 mm diameters of friction and rotation speeds of 250 and 1400 + mm

3. Enclosed press - enclosure area 25-25 mm, with adjustment switch and pressure guage (manometer)

4. Metallographic microscope No. 8 biocular, achromatic lens, observation in reflected light, 5 object-glass lense, total magnification from 25 to 600 adjustable stages with 3 altnat stationary axes, colored filters

5. Improved microscope having a polaroid photographic arrangement and projector on a screen 8.5 x 10.5 cm and a very sensitive plate layer (for demonstration and research)

6. Atlas of Metallography - Steel, pure metals and current alloys.

7. Set of metallographic specimens with captions and diagrams

8. Supply of materials and products for test-tube methods in sufficient quantities for 30 students for 2 years

9. Electro-erosion cutting machine for test-tubes -- cutting by sparks between electrodes in a petroleum bath following an adjustable guage, with safety stopping device.

10. Electrolytic polisher or vibro-polisher, giving an automatic ar uniform polishing

11. Darkroom (photographic) equipment: for development, printing and enlargement of pictures taken by the microscope

12. Two-wheel pulley (bow drill) with sprinkler. for pre polishing rough-outs and samples.

13. Hand dryer - simple type -- cold and hot air

14. Photographic equipment - good make, adaptable to microscope no. 5, with accessories.

3.1 Projector - (cross-section) Enlargement to 100 times. revolving screen with graduated diameter of 300 mm; adjustable table with micrometer-screw and all necessary accesso

2. Optical divider - height of centers approx. 130 mm; 5-second precision; centering point with an inclinable rod from 0 - 9 degrees; divider 1200 x 300 mm with all necessary accessorie

3. Control bench for gears - for circular gears with parallel axles, including a bench with two base boards to mount the pinions and a device for varying the distance between the axles of the gears from 50 to 250 mm with all the necessary accessories

4. Universal measuring machine - to measure length and angles with great precision. Provided with a rigid stand and a table with micrometer-screw with a capacity of 150 mm maximum load for an adjustable microscope in height and an optical system for enlargements. Capacity for support between points 150 mm mimimum.

5. Automatic collimating lens - for angular measurements and to verify the plane of the surface plates, the alignment, the parallelism and the perpendicularity of the surface.

6. Precision surface plate in granit - dimension 800 x 500 x 150 mm plane ± 5 microns with a support in mechanical solder with accessories in granit: 1000 mm ruler; parallel face ruler 150 x 25 x 12 to 500 x 100 x 50 mm; angle-irons and support in "V".

7. Equipment for measuring the condition of the surface - providing an electronic device giving the value in numbers of irregula ities in the cross-section and a recording of the form.

8. Set of standard glass plans with parallel faces to control the pieces of precision granules: standard fragments, points of comparator 2 x 4 glasses with dimensions : Ø 45mm thickness 15 mm ± 0.1 M to Ø 60 mm thickness 20 mm ± 0.2M.

9. Set of small precesion material including: one spirit level, standard surface, cylindrical control, magnifying glass measure, micrometer filtration, sliding feet, micrometer interior, micrometer plate, comparator dial plate, drawn guage (plugs and rings)

4.1 Electrode salt bath oven in graphite -- approx. 50 kw for treatments between 150° and 1350°C; ceramic oven-- dimensions 250 x 150 x depth 400 mm. Necessary salts with transformers and automatic ventilator, electrical equipment including pyrometrical for heat and hardening isotherm.

2. Electric salt bath oven with a resistence of 20 kw for treatment up to 850°C: tempering or hardening stages, useful dimensions: 200 mm depth 400 mm with automatic regulator and electrical equipment including pyrometrical with necessary salts.

3. Electric ventilated oven approx. 5 kw - for treatments between 0 and 500°C: very rapid tempering and annealing, treatment of light alloying. Useful dimensions: 400 x 40 depth 500 mm. Electrical/pyrometrical equipment with pro tractor and ventilation motor.

4. Tubular electric oven for 1300°C temperature equipped with a rheostat for regulation and torque plate - rhodium plate.

5. Portable pyrometer (Chromel-Alumel) for temperature up to 700°C mounted on a straight stick; rhodium plate for temperature up to 1400°C mounted on a straight stick, for oven and salt bath.

6. Set of 10 helmets with visors in plexiglass
   5 pairs of leather gloves
   2 mercury thermometers with precision up to 300°C

7. Electric precision scale.

8. Documentation: instruction pamphlets, magazines, catalog standards, security handbook concerning thermal treatment

9. Sets of round bars in different types of steel and light alloys, 15 meters of each of 25 to 30 mm in diameter serv as samples and material for thermal treatment.