



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

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

STRATEGY FOR INDUSTRIAL DEVELOPMENT

IN THE LEBANON

REPORT BY

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(Special Service Agreement
No. PP71/41/UF LEB-121-A/
Rev.1 (TA/ID))

29 November 1971

This report has not been cleared with the Technical Co-
operation Division of UNIDO, which does not therefore
necessarily share the views expressed.

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وزارة التصميم العام مركز التوثيق الرقم 656/A تاريخ الدخول
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SUMMARY

Existing enterprises in The Lebanon provide a sound base for industrial expansion. Judging from a sample of about thirty medium and large establishments, these are competently managed and have good facilities, aggressive marketing, and effective production control.

A systematic procedure is described for carrying out the planning of an industrial development programme by means of objective appraisal of the growth potential of individual micro-sectors and their compatibility with Lebanese human and physical resources.

This procedure has been used to prepare a preliminary list of suggestions for attractive development opportunities, together with a pattern of activities of the Government which will stimulate this growth.

A programme is presented for the formulation and implementation of a government industrial strategy.

A recommendation is made for the creation of a Ministry of Industry with adequate professional staff to carry out this strategy.

To provide a stimulus for this programme of industrial development, a proposal is offered for UNDP/UNIDO Technical Assistance in the amount of US\$1,625,000 during the period 1972-76.

TABLE OF CONTENTS

	<u>Page</u>
Summary	i
Introduction	1
Chapter One - An overview of Lebanese Industry and its Potential	3
Characteristics of Existing Industry	3
Management - Marketing - Faci- lities - Operations - Unused Capacity	
Opportunities for Growth	4
Government Activities on Be- half of Industry	5
Chapter Two - Selection and Evaluation of Opportunities for Industrial Growth	6
Methodology for Planning Indus- trial Development	7
1. Preliminary Screening to select Promising Opportu- nities	8
2. Critical Evaluation of Micro- Sectors Selected by the Screening Procedure	8
3. Summation of Impact of Pro- posed Industrial Developments	9
4. Incorporation of the Indus- trial Development Projection into the National Economic Plan	9

Table of contents - continued	<u>Page</u>
Chapter Three -- Preliminary Suggestions of Specific Opportunities for Industrial Development	10
I. Explanation of the charts of Suggested Opportunities	11
A. Time Span for Implementation	11
B. New or Existing Industries	11
C. Government Activities which would Stimulate Development	12
D. Activities for Which Private Entrepreneurs are Chiefly Responsible	12
II. Major Programs of Government to Stimulate Industrial Development	13
Industrial Development Policy - Trade Agreements - Industrial Development Bank - Technical Information and Services - Investment Climate	
III. Other Desirable Activities of Government	15
Raw Material imports - equipment imports - Export Information - Export Subsidy - Start-up Subsidies - Joint ventures - Anti-dumping - Import Quality - Lower Costs - Operator skills	
IV. Entrepreneurial Responsibilities	17
Techno-economic feasibility studies Foreign know-how - Market information - Standardization - Local Raw Materials - Special Skills	
V. Tabulation of Development Opportunities	18
TABLE - Suggestions for Potential Industrial Development	19, 19A, 19B, 19C
VI. Status of Major Categories of Industry	20
Ceramics, Chemicals, Construction Materials, Electrical Equipment, Food Products, Iron & Steel, Leather Products, Machinery, Non-ferrous Metal Manufactures, Paper Products, Pharmaceuticals, Petroleum, Plastics, Rubber, Textile Products, Vehicles, Wood Products	

	<u>Page</u>
Chapter Four -- Formulation & Implementation of Government Industrial Development Strategy	27
Development Plan & Program	27
Industrial Development Bank	28
Technical Information and Services	28
Pre-Investment Prospectuses	29
Transfer of Technology	30
Improvement in Manufacturing Practices in Small Enterprises Through a Centralized Marketing Agency	30
Chapter Five -- Government Activities Needed to Promote Industrial Growth	32
Creation of a Ministry of Industry	32
I. Major Functions of Government in Promoting Industrial Growth	33
II. Other Necessary Functions of Government to Assist Industry	34
III. Additional Measures to Stimulate Industrial Growth	35
Study of the Industrial Development	
Program of Singapore -- Improvement in Product Quality of Small Enterprises Through a centralized Marketing	
Agency -- Supply -- Demand Situation for Specialized Personnel -- Surveys of Organizations & Facilities for Technical Contributions to Industrial Development -- Systematic Examination of Preventable Losses of Agricultural Products Between farm and Consumer -- Expansion of Handicraft Industries -- Industrial Estates -- Free Port Facilities for Industry	

	<u>Page</u>
V. Non-Government Agencies which deserve Public Support	38
Chapter Six - Proposed Programme of UNDP/UNIDO Technical Assistance to Promote Industrial Development in The Lebanon	40
I. Technical Information and Services	41
1. Technical Information	41
2. Technical Services	42
3. Techno-Managerial Services	43
II. Planning and Implementation of an Industrial Development Strategy	44
Techno-economic evaluation of opportunities - Formulation of Development Strategy - The investment Prospectuses	
III. Strengthening the Lebanese Standards Institution	46
IV. Fellowships for Up-Grading Skills of Personnel in Individual Enterprises	47
V. Additional Training Programs and Expert Advisers to Assist Implementation of other Recommendations	47
Tabulation of cost of Technical Assistance	50
Chapter Seven - Other Professional Activities	51
List of Contacts	53
Acknowledgements	58

LIST OF ATTENDICES

- I. Methodology for the Systematic Planning of Industrial Development (29 pages).
- II. The Need for an Industrial Development Bank (3 pages)
- III. A Program to Improve the Technological Posture of Small Enterprises by Providing Services of Technical Information and Assistance (9 pages). /
- IV. Techno-Managerial Services for Small Enterprises (7 pages)
- V. Development of New Industries to Utilize Sub-Standard Agricultural Products and to Stimulate Better Grading of Raw Produce (6 pages).
- VI. Investigation of the Applicability to the Lebanon of Some Features of the Singapore Industrial Development Program (3 pages).
- VII. A Project to Stimulate Specification Manufacture of Household Goods by Small Firms Through a Central Marketing Enterprise (3 pages).
- VIII. Investigation of the Supply-Demand Situation for Professional Personnel (6 pages).
- IX. Survey of Organizations, Facilities and Programs to Stimulate Capabilities for Developing Innovative Technology (6 pages).
- X. Quantitative Investigation of Remedial Steps to Reduce Wastage of Agricultural Products between Farm and Consumer (3 pages).
- XI. Stimulation of Handicraft Industries (2 pages).

INTRODUCTION

Definition of Mission: The purpose of this study was defined as follows: "Subscriber will work in close co-operation with Ministry of Industry(i.e., industrial sections of Ministry of National Economy) and Ministry of Planning. He is expected to survey the structure of industry in Lebanon and assess its potential, to advise Government on formulation of industrial development plan and policy for increasing the share of industry in the country's GDP." (UNIDO Special Service Agreement PP 71/41/UP - LEB-121-A/Rev.1 (TA/ID)).

Schedule: I left Washington, D.C., 3 September 1971, was briefed in Vienna 7 September, and began field work in Lebanon 9 September. I plan to complete field work 1 December and to be debriefed in Vienna 7 December.

Administrative Relationships: I received local briefing at UNDP Headquarters in Beirut 9-10 September, and was given very satisfactory office facilities and exceptionally efficient secretarial service throughout my mission. I was provided with transportation to and from the office and frequently at other times for outside visits.

My major liaison with the Government was with the Director General of Planning. He assigned me a private office close to his own and made himself readily available for conference at all times. He provided an excellent part-time counterpart, who frequently used his personal automobile for outside calls on which he accompanied me. I had numerous other contacts in this Ministry, including the Statistical Center.

In the Ministry of National Economy I was received by the Director General of the Department of Industry and had very close relationship with the Bureau of Industrial Development.

The Association of Lebanese Industrialists was especially helpful in providing information, making contacts, and giving me counterpart assistance on a number of calls.

I was received by the Director of UNESOB and had numerous other contacts in that organization, particularly with the industrial section.

My relations with numerous departments of The American University of Beirut were very constructive.

I maintained close contact by conference and reports with the SIS project for short-term "Investment Promotion (industry)" and in this way we avoided overlapping in our respective programs.

Throughout my mission I was accorded cordial reception and wholehearted cooperation on every side.

The methodological principles here described are not new. They have been evolved over many years by my colleagues and me at Arthur D. Little, Inc., in consultation with private firms and with public agencies in many developing countries. They have been summarized in numerous publications. What is novel is their adaptation to the particular problems of the Lebanese economy.

CHAPTER ONE

AN OVERVIEW OF LEBANESE INDUSTRY
AND ITS POTENTIAL

Most of my plant visits, about thirty in all, were made to medium and large establishments. The smallest size of operation which I saw had around 40 employees.

Although time did not permit inspection of smaller enterprises, which would require visits to a considerable number to obtain a representative sample, I was able to observe the operations of quite a few as I passed them in industrial areas and in mid-town locations. They appeared to be conducting their work efficiently and with attention to quality of product.

Characteristics of Existing Industry. Within the limitations of the extent of my study, I was very agreeably surprised by the aggressiveness and quality of these enterprises. Several had shown quite spectacular rates of growth within a decade. A number had just moved into excellent new facilities, and others were planning to do so in the near future.

Management. I found the managers and owner-managers to be competent, intelligent, energetic, self-reliant, progressive, and realistic. Many, particularly among the younger group, had had training in technical fields and/or business administration. They showed good selectivity in their use of outside sources of help. As a class, they represent a very valuable resource to the country for the expansion of the industrial sector.

Many cited the freedom of action afforded by the Lebanese environment as a major reason for being here, although they thought the economic climate might be more favorable elsewhere. They were philosophical about the lack of vigorous policies of the Government for encouraging

industrial development and about bureaucratic frustrations. A small number were giving consideration to moving to other countries for these reasons.

Marketing. The marketing postures were, as I expected to find in Lebanon, aggressive and intelligent. In some cases excellent use was being made of technically trained personnel in the sales activity. The marketing instinct did not, however, dominate the situation to the detriment of sound manufacturing practices in the managers whom I met.

Facilities. The plants were well laid out, within the limitations of their operating areas, and the flow of work was rational. Equipment was quite good and in some cases very modern. Several would qualify as being excellent operations equal to any in the world for their size.

Operations. The organization, scheduling, and supervision of labour appeared to be efficient. In those enterprises with engineering personnel, good use was being made of their skills, and technical service to customers was in some cases of very high effectiveness. Maintenance seemed to be good.

Unused Capacity. Some enterprises were operating at full capacity and were expanding facilities rapidly. Others had lost export volume and if markets were available could easily double or treble the rate of production by adding additional shift crews. Where reduction had been made in scale of operations, the change had been carried out intelligently.

Opportunities for Growth. As other developing countries expand their own manufacturing to supply their internal needs, Lebanese industries will suffer some loss of exports for conventional products. Hence the challenge arises to up-grade technology and sophistication of skills to develop other opportunities.

The textile industry is a good example. It is a favorite in all developing countries because it is labor intensive and supplies a local market. Technology and equipment are readily available for more routine products. The Lebanon is at a disadvantage vis-a-vis lower labor costs in less advanced countries. Therefore to compete successfully it must look to opportunities which offer higher value added through selection of commodities with greater use of specialized skills, such as ready-to-wear garments.

Government Activities in Behalf of Industry

Public policy has formerly been based on leaving the industrial sector to private initiative, with only modest involvement in incentives for growth. The result has been that the agencies concerned with industry are, now that expansion of manufacturing is favored, very inadequately staffed, particularly in regard to technical personnel. The procedures, too, are no longer adequate if the benefits from development, in employment and contribution to the economy, are to be attained.

This subject is treated in more detail in a later section. Suggestions have also been formulated for ways in which the government can stimulate industrial growth.

CHAPTER TWO
SELECTION AND EVALUATION OF OPPORTUNITIES
FOR INDUSTRIAL GROWTH

This chapter, which provides factual background for the recommendations to be made, covers two main topics: (a) systematic procedures for selecting and evaluating opportunities for industrial development, and (b) preliminary suggestions of specific projects for more thorough investigation of potential (Chapter Three).

The sequence of later chapters is: Three "Preliminary Suggestions of Opportunities for Industrial Development"; Four, "Formulation and Implementation of Industrial Development Strategy"; Five, "Government Activities Needed to Promote Industrial Growth"; Six, "Proposals for UNDP/UNITO Technical Assistance for Implementation of the Strategy".

Detailed memoranda on a number of subjects are attached as appendices to supplement the discussion in the body of the report. Most of them were written earlier in my mission.

The methodology described below involves much detailed study and investigation. This is necessary to provide an adequate base for the vitally important government functions of formulating an orderly industrial policy, strategy, and procedures for implementation. Furthermore, the evaluation of development opportunities must be kept up to date by periodic reviews of accumulated information and the findings based thereon.

It is very logical to expect, however, that government agencies will not wish to wait for the completion of this rather lengthy procedure before beginning to take some positive actions. Accordingly, a shorter scheme for preliminary appraisal and selection of the most attractive industrial opportunities, as discussed in Section II of Appendix I, is presented in considerable detail in the Chapter Three.

These initial preliminary appraisals of development opportunities have an additional advantage. They make clearer to planning agencies the general principles of techno-economic evaluation of micro-sectors, and they demonstrate the reasons for the detailed investigations in the full schedule of the operations which are recommended.

METHODOLOGY FOR PLANNING INDUSTRIAL DEVELOPMENT

Because the lack of professional personnel has prevented the formulation of methodology for formulating an industrial development strategy, the situation calls for the initiation of a systematic approach, if the full benefits of economic expansion are to be realized. Accordingly a quite detailed discussion of appropriate methodology is presented in Appendix I; the procedures are summarized in the following paragraphs.

The first requirement for this orderly appraisal of development potential is the preparation of an array of industrial micro-sectors to be considered, arranged under major categories of industry. It should insofar as possible follow the pattern of classification for statistics collected regularly, as, for example, in censuses of manufactures or export-import data, but even in countries with very detailed factual information, the subdivision into micro-sectors is finer than the usual statistical series. This situation arises from the desirability of defining the array so narrowly that maximum homogeneity in economic and technological characteristics is achieved in the micro-sectors. The list should, of course, include both branches of industry already existing and those which represent new opportunities.

The appraisal procedure is then carried out for the entire array of micro-sectors in four sequential steps.

1. Preliminary Screening to Select Promising Opportunities.

The details of procedure are illustrated in Table I of Appendix I. The array of micro-sectors in all major categories is appraised in three stages: (a) evaluation by a simple semi-quantitative scoring system, of general characteristics such as export potential, local market potential, volume of present production, availability of technology, and the profile of the industry; (b) in a similar manner an independent examination of the compatibility with local human and physical resources, such as raw materials, managerial and operational skills, investment capital, and impact on employment; (c) selection, by scanning the two types of appraisal, of those micro-sectors which have both attractive potential and a satisfactory degree of fit to national resources.

2. Critical Evaluation of Micro-Sectors Selected by the Screening Procedure.

The much shorter list of types of industry obtained from the preliminary screening is then examined again in the same manner, but with more rigorous application of criteria, as shown in Table II of Appendix I. The steps are: (a) evaluation of general characteristics such as total demand, value added, profitability, and re-checking of present production volume, availability of technology, and profile of the micro-sectors; (b) more critical comparison with local resources of raw materials, human skills, utilities, utilization of productive capacity, and strategic impact on the economy; (c) cross-comparison of the two sets of scores to give a final selection of micro-sectors which should be considered for implementation. These selections are based on estimates of potential, but then the manner in which each could be brought to fruition must be studied objectively. Some are so promising that they warrant immediate

stimulation of entrepreneurial attention, others require further investigation of feasibility, and still others should be kept in abeyance, at least for the time being.

The final operation should be a quantification of the effect on the economy which would result from implementation of the micro-sectors believed to be ready for implementation. This is best done under the headings of major categories of industry.

3. Summation of Impact of Proposed Industrial Developments. The next step is the preparation of a combined estimate of the benefits to the economy of the implementation of the micro-sectors in all categories of industry. The form in which this may be carried out is illustrated in Table III. of Appendix I. Here the tabulation permits summation of new employment, the number of new enterprises, the capital required for investment, and, although this column was omitted because of page size, the increment to national income from new ventures. The chart also includes an analysis of the activities of government agencies which would stimulate this volume of industrial expansion.

The procedures are illustrated further in "Preliminary Screening of Specific Opportunities for Industrial Development" in Chapter III.

4. Incorporation of the Industrial Development Projections into the National Economic Plan. The final stage in evaluating the industrial development program is to incorporate it into the analysis of the national economic plan, as illustrated in Table IV, Appendix I. This tabulation makes it possible for the framers of national policies to determine whether the anticipated contribution from the industrial sector is large enough, and, if not, to take such action as is necessary to stimulate an increase.

CHAPTER THREE

PRELIMINARY SUGGESTIONS OF SPECIFIC OPPORTUNITIES
FOR INDUSTRIAL DEVELOPMENT

As an introductory step for the comprehensive techno-economic appraisal of industrial development opportunities, a preliminary screening procedure is very desirable. It has the following advantages:

1. It establishes for the government a composite picture of the size and nature of the base on which an industrial development policy is needed.
2. It provides specific examples of micro-sectors of industry which appear to hold promise.
3. It makes clear the need for more thorough techno-economic evaluation to justify efforts to encourage entrepreneurship.
4. It points out the steps the government can take to stimulate industrial development.
5. It defines the need for professional services to entrepreneurs which should be more widely available through quasi-public or private organizations.

The potential opportunities listed below are to be regarded only as preliminary suggestions. In no case was there time for any investigation in depth. They are derived from my personal experience and from very helpful discussions with leading industrialists in several categories of manufacturing; to them I am very grateful. Obviously a thorough techno-economic

appraisal of all these suggestions is called for, in order to set priorities on the basis of much more rigorous evaluation.

I. Explanation of the Charts of Suggested Opportunities.

The suggestions, arranged as micro-sectors under major categories of industry, are analyzed under four main headings: (A) time span for implementation, (B) classification as new industries or expansion of those already in existence, (C) government activities which would stimulate development, and (D) requirements which are largely the responsibility of entrepreneurs. Following the tabulation there is another section of brief comments on specific ideas.

A. Time span for implementation. Estimates are given of the period required under favorable conditions to commercialize the development; up to three years is considered short term, 3 to 6 years is intermediate, and more than 6 years is long term.

B. New or existing industries. There is, of course, a considerably greater risk in establishing an industry new to the country than in expanding existing enterprises into related types of products, and accordingly this factor is included in the tabulation. By way of explanation, it should be borne in mind that I am often basing my scores on "mini-micro-sectors", and in a number of cases there appear to be other opportunities in micro-sectors in which there is already established manufacturing. Furthermore, I feel sure that there are products being made of which I am not aware; for example, I have been given to understand that there is already some production of essential oils, but I believe that there are other types which should be considered. I have sometimes indicated this situation, where I have better knowledge of the facts, by placing checks in both columns.

C. Government Activities which Would Stimulate Development. As my assignment was to advise the government on strategies which could be adopted to encourage industrial development. I have paid particular attention to this subject in my study. I realize thoroughly that there are usually several sides to every question, and I have tried to follow the middle ground in my suggestions. The local difficulty in carrying out public policies for industrial development lies in large measure in the extremely limited, professional personnel in the government agencies concerned with industry, so that many important problems have had to suffer from inadequate attention. This situation is the result of the former hands-off public policy, leaving the expansion of industry entirely to the private sector.

If the government is to play an active role in stimulating the industrial economy, it must make strenuous efforts to counteract this handicap, which might be termed "laissez-too-much-faire". There is a great deal that can be done constructively in cooperation with the industrial community without in any way infringing the prerogatives of private entrepreneurs. Suggestions are summarized below under the headings: Major Contributions of Government to Industrial Development, and Additional Forms of Government Assistance.

D. Activities for Which Private Entrepreneurs Are Chiefly Responsible. In considering the special requirements for establishing a successful new ventures, certain aspects relate so specifically to business feasibility that they must necessarily be the responsibility of the respective entrepreneurs. For completeness these are included in the tabulation, and they are characterized in a later section.

II. Major Programs of Government to Stimulate Industrial Development

In preparing the tabulation of possible government measures to stimulate industrial development, five were voiced so consistently that they are discussed here separately; they should be considered to apply throughout the list of suggestions.

1. Industrial Development Policy. In practically every interview with industrialists, they stated forcefully that there is no policy of this type and that the formulation of a positive development plan would be a great benefit to the nation. Such action is being taken by a great many developing countries and is highly desirable in The Lebanon to unleash the entrepreneurial talents of its resources of competent industrial managers.

2. Trade Agreements. Because the size of the local market in The Lebanon is so small, expansion of industry will be very limited unless increased export of manufactures is brought about. Strenuous efforts should be made to negotiate favorable trade agreements with those nations which are now, or have potential as, important customers for locally made products.

3. Industrial Development Bank. The capital available for "industrial loans", as contrasted with "commercial loans", is severely limited. To remedy the situation, an industrial development bank, of the type being so widely adopted in a great many developing countries and regions, is urgently needed. Some considerations applying to the operation of a development bank have been presented in Appendix II.

4. Technical Information and Services. More and more, developing countries have come to realize that the government has a responsibility to provide a source of technical information and technical services, particularly for small enterprises, to assist the industrial sector in its efforts to grow. The subjects on which these services are most in demand are product specifications, raw materials, processes and equipment. These programs are most productive when centered in an autonomous technological organization with a diversity of professional skills for solving short-term practical problems. A recommendation for the establishment of such an activity in The Lebanon has been made in a separate memorandum (Appendix III).

A desirable extension of the technical service program, after it has been well established is to provide practical help to small enterprises on techno-managerial problems. These, which are discussed in Appendix IV, consist of such topics as accounting, marketing, production scheduling and control, personnel administration, and the like. This direct service to individual enterprises is often coupled with short training courses of a very practical nature.

5. Investment Climate. While the Lebanese Government has expressed a keen interest in furthering industrial development, actually the slow bureaucratic procedures, which in many cases are the result of over-load of work for a limited staff, tend, on the contrary, to place obstacles in the way of new undertakings. As an example, a number of manufacturers do not attempt to recover the export credit on dutiable raw materials because of the cumbersomeness and delay of the paper work. Others complain of the fact that they can not get firm commitments on their tax liabilities until after their facilities have been installed.

III. Other Desirable Activities of Government

Section C of the tabulation contains ten vertical columns for indicating specific functions of government which are needed to promote individual industrial developments. In the table as shown, there are relatively few checks, and those are for the most obvious requirements. There was no time for me to make a thorough enough study of the individual suggestions to determine their major needs for government co-operation. Additional techno-economic assessments will make it possible to specify the types of activities which will be of greatest assistance in establishing sound undertakings.

1. Raw material imports. To encourage development, particularly for the export market, thorough review should be made of schedules of import duties. Changes made need not reduce the total revenue, but they should be in the direction of assessing the logical distribution of impact. As an example, cases have been cited in which the duty on a raw material is higher than that on a fabricated article, a situation that obviously penalizes unfairly the local manufacturer who wishes to integrate his operations backward to raw materials. Another case is the requirement that, to expedite clearance, large quantities have to be imported, thus producing heavy inventories which place a drain on working capital.

2. Equipment Imports. The customs duties on imported equipment are very low and should be maintained at this level. In considering applications for import licenses, however, the authorizing agencies should give greater consideration to the magnitude of unused capacity already installed in the particular micro-sector of industry. New equipment will normally be used to increase throughput or to provide additional capacity, either of which can increase the problems of an industry already plagued by the inefficiencies of excess facilities.

3. Export Information. There is little information on export opportunities made available to industry through government channels. There is a plan to attach commercial or economic officers to embassies in some important customer countries, and this action should be expedited.

4. Export Subsidy. Policies should be extended for encouraging development in industries which depend for success on the economy of scale from export volume.

5. Start-up Subsidies. In some cases an infant industry needs special advantages during its earlier years to survive and grow; where their encouragement is in the national interest, as determined by techno-economic appraisal, direct or indirect subsidy should be considered.

6. Joint Ventures. All feasible measures, including trade agreements should be adopted to encourage joint ventures with foreign interests to expedite the transfer of technology and marketing know-how.

7. Anti-dumping. While legislation has been enacted to protect local industry against dumping, in the opinion of a considerable number of industrialists its enforcement leaves much to be desired. When "dumping" is too narrowly and strictly interpreted, loopholes are created which permit the entry of commodities at prices which are artificially below a truly competitive level.

8. Import Quality. In some instances local industry is handicapped by the importation of competitive products with less than desirable quality and from sources which have not established recognized standing.

9. Power Costs. In some industries, using large amounts of electric power, which would be important contributors to the local raw material supply, economic operation is not possible unless they are accorded much reduced rates.

10. Operator Skills. A number of industrialists believe that the public programs for training operating personnel are inadequate to supply their needs.

IV. Entrepreneurial Responsibilities.

The following paragraphs describe pre-requisites for successful operation which the entrepreneurs themselves must provide.

1. Techno-economic Feasibility Studies. As stated above, all applications for development loans or special incentives should be backed by an independent appraisal of techno-economic feasibility, including a review of the status of unused capacity in the particular micro-sector of industry. This is to the advantage of the entrepreneurs themselves, to protect their investments, as well as in the public interest.

2. Foreign know-how. A great many new ventures will benefit much from acquisition of foreign know-how which can be obtained in some cases from the literature or correspondence with individual sources, but is best imported through direct contacts. These may be effected through good-will of foreign firms, through license arrangements, through joint ventures, or through the agency of international organizations or bi-lateral agreements. An important function of the technical information service mentioned above would be to give advice on possible sources.

3. Market Information. The obtaining of data about market potential, both local and export, is the responsibility of the entrepreneur, but government agencies can often assist.

4. Standardization. It is in the interest of industry, as well as the public, to participate in programs to up-grade the standards for commodities.

5. Local Raw Materials. The stimulation of improved quantity and quality of local raw materials is an activity in which industrialists can play an active part, and many are already doing so in The Lebanon.

6. Special Skills. Enterprises must fill their own requirements for specialized skills, but the points made in paragraph 2 are also applicable here in regard to measures they can take to develop these skills in their employees.

V. Tabulation of Development Opportunities

The following tabulation of industrial development opportunities is to be regarded only as a list of suggestions for further appraisal, and not as recommendations, except where it is so stated specifically. In none of these cases was time available for more than cursory consideration.

In Section C, Government Activities to Stimulate Development, practically all of them would be helpful to the entire array of "mini-micro-sectors", and further study will be necessary to set priorities for those which would be most beneficial. Blank spaces have been checked for only a few of the subjects where the need is particularly urgent. The rest will have to be filled in later after additional investigation.

SUGGESTIONS FOR POTENTIAL INDUSTRIAL DEVELOPMENTS

	A Time Span for Development			B New or Existing Industry		C Government Activities to Promote Development											D Entrepreneurial Responsibilities				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Array of Micro-sectors of Industry arranged by major Category	Short up to 3 years	Intermediate 3 - 6 years	Long term 6 - 10 years	New Industry	Expansion	Raw material Imports	Equipment imports	Export information	Export subsidy	Start-up subsidy	Joint ventures	Anti-dumping	Import Quality	Power Costs	Operator skills	Techno-Economic feasibility	Know-how	Market forecast	Standardization	Local Raw materials	Special skills
<u>Ceramics</u>																					
Bricks	X			X	X																
Cement blocks, hollow	X			X	X																
Ceramic tile	X			X	X																
China dinnerware	X			X	X																
Pottery																					
<u>Chemicals</u>																					
Automobile finishes		X		X	X																
Calcium carbide				X	X																
Caustic soda-chlorine, electrolytic		X		X	X																
Detergents, synthetic				X	X																
Essential oils		X		X	X																
Fertilizers, mixed		X		X	X																
Floral extracts		X		X	X																
Foundry supplies		X		X	X																
Glue, animal		X		X	X																
Soaps, toilet		X		X	X																
Vinyl chloride monomer				X	X																

SUGGESTIONS FOR POTENTIAL INDUSTRIAL DEVELOPMENTS

	A Time Span for Development				3 New Industry	C Government Activities to Promote Development										D Entrepreneurial Responsibilities					
	1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Array of Micro-sectors of Industry Arranged by Major Category	Short up to 3 years	Intermediate 3-6 years	Long term 6-10 years	New Industry	Expansion	Raw material Imports	Equipment Imports	Export Information	Export subsidy	Start-up subsidy	Joint Ventures	Anti-Dumping	Import Quality	Power Costs	Operator Skills	Techno-Economic Feasibility	Know-how	Market Forecast	Standardization	Local Raw materials	Special skills
Iron and Steel	X				X																
Accessories for clothing	X				X											X		X			
Construction supplies	X				X			X										X			
Steel Castings	X				X											X		X			
Steel plate			X		X											X		X			
Steel wire & products	X				X											X		X			
Leather Products		X			X																
Clothing accessories	X				X				X												
Clothing	X				X				X												
Shoes	X				X																
Skins	X				X																
Machinery																					
Agricultural implements	X				X											X		X			
Automobile Accessories	X				X											X		X			
Dies; custom made	X				X											X		X			
Heavy machinery	X				X											X		X			
Implements & tools	X				X											X		X			
Non-ferrous Metals																					
Accessories for clothing	X				X																
Construction supplies	X				X			X													
Castings	X				X																
Household equipment	X				X			X													

VI. Status of Major Categories of Industry

Ceramics. Larger firms in the fields of ceramic bathroom equipment, ceramic tiles, cement and glass products are expanding vigorously, and there are additional opportunities available to them, such as hollow building blocks and a wider range of tiles. Although stone is the traditional building material, more recently supplemented by cement, there should be a market for bricks and hollow tile. The country has good deposits of sand and clays, and utilization of the latter for production of tableware and pottery on an industrial scale is worthy of consideration.

Chemicals. Because the need for chemicals in local manufactures is for relatively small quantities of a wide variety of products, industrial opportunities will probably lie in specialties, such as automobile finishes, detergents, and toilet soaps. There should also be an attractive possibility for producing essential oils and floral extracts from local raw materials. There is an internal market to justify the erection in a few years of an electrolytic caustic soda/chlorine plant of at least 5,000 tons per year capacity, but this development will require much lower electric power costs and large capital investment. The same conditions apply to a calcium carbide operation, for which rigorous techno-economic evaluation will be required, at a still later date; when chlorine and acetylene both become available at competitive prices, they could provide a base for vinyl chloride monomer. The market for mixed fertilizers should expand as farming methods improve; any thought of a nitrogen fixation plant should take into account the fact that world competition sets minimum economic capacity at 1,000 tons per day. There are many small and medium iron foundries which import individually the ingredients for their binders and washes; reasonable prices and faster service could be attained through a local enterprise to import, formulate, and supply these products. The establishment of a glue factory would utilize waste hides, skins and trimmings. might be feasible.

Construction Materials. While establishments supplying various items for building construction are being successful in certain specialties, it was said repeatedly that architect-engineers and contractors are very conservative in accepting new materials or construction methods. This situation can be remedied only by educational and promotional efforts, which could be given a focus by a voluntary association of suppliers. Additional impetus could be given by government agencies in modernizing specifications for building requirements.

Electrical Equipment. There would appear to be opportunities for additional manufacture of miscellaneous items for use in construction and household equipment. Later on there may be justification for production of some electronic parts and assemblies.

Food Products. In this section and in Appendix III, the suggestion is made to establish industries based on open-roll drying of surplus agricultural products, such as bananas, for which the technology has already been developed. This process can be adapted to other products such as apples, citrus fruits, eggs, and various fruits and vegetables. In many cases, it will probably be necessary to use a diluent carrier such as edible starch or other suitable carbohydrate. Here the development of adaptive technology may be required to secure products of desired quality. Banana powder is an excellent choice for a pilot experiment because the product should find rapid demand in combination with powdered de-fatted milk for infant feeding or for relief rations.

Other suggestions are for the production of apple juice, various types of dried fruits and vegetables made by other processes, and the development of a local infant food industry.

Many micro-sectors of the food industry are already well established, for example, alimentary pastes, baked goods, confectionery, conserved fruits, and mineral water. Some of them enjoy an important export trade. The more

aggressive enterprises can be counted on to expand their volumes and range of products.

Iron and Steel. There are good prospects for growth in accessories for ready-made clothing and in building supplies. Plans for expanding the production of steel castings and wire drawing, including fabrication of products made from wire, are good, as well as the manufacture of steel plate. There do not appear to be any new industries for the near future.

Leather Products. Although manufactures in this category are based chiefly on imported hides and skins, this country has the advantage of being a center for foreign trade in these raw materials for a very large geographical area. Leather products offer one of the most promising industries for expansion in fabricated articles incorporating a high degree of skill and know-how and high added value. One dynamic entrepreneur believes he could double his volume and employment every two years if given modest incentives to counteract the efforts of other developing countries to expand their leather industries.

Such clothing and accessories as ladies' handbags and garments are penetrating the markets of Western Europe and the United States. It is said that negotiations are being carried out for the establishment of a large shoe factory in cooperation with a European partner. All in all, this industry is moving ahead rapidly and its encouragements should be an objective of the government.

Machinery. The agricultural implements industry has been covered by other UNIDO experts and hence was not included in my study. In view of the large number of automobiles in the country, the manufacture of accessories should hold some attractive possibilities. There are many medium and small metal-working establishments which make their own dies, a painstaking and costly operation for a limited organization; there could well

be an opportunity for an aggressive entrepreneur to establish an independent firm, divorced from regular production to allay fears of pirating of designs, to handle custom requests for the production of dies for forming metals and plastics, and this could lead to the creation of a tool and die industry to service local customers and trading partners in adjacent areas. There is some production of specialized machinery of fairly heavy construction and a few firms are considering the expansion of this activity into more sophisticated items. The manufacture of small implements and tools should offer good potential.

Non-ferrous Metal Manufactures. The production of building supplies and clothing and household accessories appears to be expanding at a healthy rate. There is said to be considerable room for improvement of non-ferrous castings.

Paper Products. Primary production of pulp and paper appears to be impractical because of lack of raw materials and process water. The manufacture of converted products from imported stock appears to be in healthy condition and is expanding.

Petroleum. I did not pay any attention to this industry because other detailed studies of increasing refinery capacity are in progress. There is some discussion of the possibility of a petro-chemical operation, but I am inclined to think that examination in depth will indicate the desirability of location close to raw material sources.

Pharmaceuticals. There is large importation of pharmaceuticals and proprietary products of all types. The situation should offer good opportunities for expansion of local manufactures, a movement which would be in the public interest because it would enable the government to exercise

stricter supervision over the merits of products offered for sale. There is relatively little development in veterinary products because of lack of demand, but educational efforts in the agricultural sector should expand this market to create an incentive for local producers.

Plastics. There are expanding opportunities for the production of clothing accessories, construction auxiliaries, and household items such as tableware.

Rubber. There should be a good market for replacement automobile tires; I understand that negotiations are being held in regard to the establishment of a tire factory.

Textile Products. Traditional spinning and weaving operations face a discouraging future because of the establishment of these industries in many developing countries with lower wage rates. The opportunities for local industry lie in manufacturing which involves higher skills and higher added value, particularly in woven and knit fabrics and their conversion into ready-to-wear clothing, especially for men and boys. Hand-crafted fabrics and products using local design should be encouraged. High-styled ladies' wear could emphasize Lebanese traditional patterns.

Vehicles. With tongue in cheek, I offer the idea of manufacture of traffic signals to curb reckless drivers, and of taximeters to reduce haggling over fares. Both moves could greatly please visitors from abroad.

Wood Products. Larger enterprises producing composite building board and furniture enjoy expanding markets. There do not appear to be other major directions of growth for the wood industries.

VII. Suggestions for New By-Product Industries Based on Surplus Agricultural Commodities.

The agro-industries offer many attractive opportunities for industrial expansion in most developing countries. In The Lebanon, however, the situation is restricted by limited agricultural production. It is therefore essential to make optimum use of those products which are available.

The most promising idea is to develop by-product industries, as discussed in more detail in Appendix IV. There it is recommended that the simplest process for surplus products, so-called open roll drying, be adapted to local conditions, rather than more exotic processes which could be used. This equipment is cheap and flexible, the quality of product is satisfactory, and the minimum economic size of plant is smaller.

This idea is coupled with the suggestion that greater selectivity be used in grading products for direct sale, which would create better market acceptance for raw products, particularly in more sophisticated distribution centers. There would thus be created a centralized supply of below-standard culls which would form the raw material for the drying operation.

It is recommended that, with the active participation of an entrepreneur, a small commercial unit be installed to produce banana powder. The technology has been developed for application on this scale but I do not know whether it is now being used commercially. The product should find a limited market in the obvious uses of flavoring for ice cream and baked goods, but the big opportunity would be in combination with dried non-fat milk as a baby food and for relief rations.

The process can be extended to drying potatoes, apples, other fruits and vegetables, and eggs, which are in surplus supply. The technology would probably have to be worked out for these products, and in some cases it would be necessary to use a diluent carrier such as an edible carbohydrate. Aggressive market development would be necessary for some of these products. If the initial banana drying unit were located strategically near sources of supply of other raw materials, its operation would be made more economical by extending the campaign to other vegetables and fruits with different crop seasons.

There have been several studies of this general nature carried out previously, some by UNIDO experts and their reports were made available to me. Since my criteria were somewhat different, in that they included greater emphasis on technology in combination with business feasibility. I have not compared my list in detail with theirs, but preferred to develop suggestions independently.

CHAPTER FOUR

FORMULATION AND IMPLEMENTATION OF GOVERNMENT

INDUSTRIAL DEVELOPMENT STRATEGY

The courses of action necessary to formulate and implement government plans, policies, and procedures to encourage industrial growth cover a wide range of subjects. It is therefore advisable to prepare a list of priorities and to construct a time-table in order to approach the various topics systematically. This time-table will necessarily show a staggered schedule for individual activities, because a number of them can be attacked concurrently.

The formulation of a development plan and program is, of course, an initial step, but this should be a continuing activity with progressive refinement as the goals become more concretely defined.

The five major functions, described in Section II of Chapter Three, should receive attention first, because they are basic to the entire program. They are : continuing improvement in development policy, extension of the pattern of trade agreements, establishment of an industrial development bank, provision of technical information and service, and improvement of the investment climate. The requirements of individual micro-sectors of industry for other forms of government assistance will become apparent as specific development projects receive direct attention.

Development Plan and Program

The techno-economic assessments of individual opportunities for development, described in Chapter Two and illustrated in Chapter Three, do not themselves constitute industrial development strategy. Instead, they provide the requisite raw materials for the formulation of a government plan and program. In the Lebanese tradition, this public strategy has as its objective the stimulation, but not the replacement, of private initiative.

The establishment^{of}/policy and program is necessarily an evolutionary process, subject to modification in the light of experience. It sets goals for the amount and directions of growth. It provides guidelines for priorities in the degree of encouragement to be afforded various industries, in accordance with estimation of their respective contributions to the welfare of the country. It initiates activities to stimulate new undertakings by the private sector. It gives impetus for increases in employment and national income.

A proposal to provide UNDP/UNIDO technical assistance for both techno-economic evaluations and formulation of public strategy is presented in Chapter Six.

Industrial Development Bank

Because of the shortage of capital for industrial financing, as distinguished from commercial loans, a new institution of quasi-public character is needed to provide funds for the establishment of new ventures and for increases in existing operations. Comments on the functioning of such an organism are given in Appendix II.

Technical Information and Services

The creation of a publicly sponsored program to provide free technical information and services is urgently needed. Its primary purpose would be to assist small enterprises, but it would be available to larger ones as well. The value of such services is clearly demonstrated by experience in Canada, The Netherlands, and Singapore, for example; valuable background on technical information has been accumulated in Brazil, and on technical services in Argentina. A survey of these active programs would assist the development of services most suitable for the Lebanese economy.

Technical information and services are best provided by an autonomous institution with a range of specialized skills and know-how. The Industry Institute in Beirut could serve effectively as an agency for this purpose. The nature of these services is described in Appendix III.

A desirable extension of the technical information and services is to provide help to small enterprises on techno-managerial problems, as described in Appendix IV. This would be a second phase of the total program to up-grade the performance of this important sector of the economy.

A proposal to provide UNDP/UNIDO technical assistance for this complete program is presented in Chapter Six.

Technical services could also be expanded for small enterprises to include techno-economic justification for applications for loans from the Development Bank, in those cases in which new equipment beyond the cash resources of the owners is required to make the operations efficient. In these small firms, the total capital requirements will not be so great that a large amount of professional effort would be needed for the appraisals.

Pre-Investment Prospectuses

To encourage new industrial developments in a free economy, it is often very helpful to prepare a pre-investment prospectus. When the interest of one or more entrepreneurs has been aroused in a particular project, the summary of techno-economic parameters can be made quite specific to suit the individual case. When such immediate interest is lacking, the prospectus would have a more general and promotional character.

This activity is closely related to the comprehensive program of techno-economic evaluation of industrial opportunities. It is therefore included as a phase of the UNDP/FAO proposal for technical assistance.

Transfer of Technology

In many cases the installation of a new venture will require the use of foreign know-how. Information about the sources and channels for obtaining this assistance will often be a part of the pre-investment prospectus.

Further, to ensure rapid and effective adaptation and application of the general information, direct assistance in the transfer may be highly desirable. If the particular case is judged to be urgent from the point of view of the national interest - as, for instance, in the development of new by-product industries to use surplus agricultural commodities - this assistance might be supplied to some degree by those responsible for techno-economic evaluations.

Improvement in Manufacturing Practices in Small Industry Through a Centralized Marketing Agency

The notable success of Sears-Roebuck in securing local sources of commodities for its marketing operations in Mexico and other Latin American countries deserves consideration in The Lebanon. This company was able to stimulate suppliers from small industry by providing

the services of a team of experts in product design, quality control, production, and business management, as described in Appendix VI. About 15 years ago some interest was expressed by an officer of the company in establishing a similar operation in The Lebanon.

It would therefore be worth while to explore this possibility with Sears-Roebuck, because of their extensive know-how and experience. If this does not prove fruitful, an effort should be made to interest some other entrepreneur, but emphasis should be placed on the concept of stimulating local suppliers of merchandise and of minimizing importation.

CHAPTER FIVE

GOVERNMENT ACTIVITIES NEEDED TO PROMOTE

INDUSTRIAL GROWTH

The present resources of the government for the stimulation of industrial development are extremely limited. The largest group, in the Department of Industry of the Ministry of National Economy, is chiefly engaged in administrative work concerned with applications for approval of licenses. A two-man Bureau of Industrial Development reports to the Minister of National Economy. There is a small group of professionals in the Ministry of Planning for studying the status of industry, and a larger group in the Center for Statistics which is also engaged in data collecting on many other activities.

This is a very meager cadre for handling the problems of industry. The present contribution of the industrial sector to national income is about 13 percent, with roughly the same percentage of total gainful employment. Comparison of these data with other sectors and their relative share of government attention shows that even at present the interests of industry are served on a very inadequate basis.

If serious efforts of the government are to be directed to the stimulation of industrial growth, major changes must be made. The establishment of a Ministry of Industry would provide a focus for expanding the activities through a greatly increased professional staff.

Creation of a Ministry of Industry

The present Ministry of National Economy has two major concerns, commerce and industry, plus some miscellaneous functions. If this Ministry were subdivided into a Ministry of Commerce and a Ministry of Industry, to provide a focus for their respective and sometimes conflicting spheres of interest, together with redistribution of the mis-

cellaneous functions, a number of advantages would accrue. The health of the total economy with greater orientation toward the goals of increased national income and employment would be strengthened through the growth of the industrial sector.

This change would exalt the prestige of industry to its rightful place as a contributor to national welfare. It would encourage the recruitment of an adequate professional staff in proportion to its importance; other ministries representing smaller shares of the economy, now have very much larger establishments. It would require a new assessment of the responsibilities of government on behalf of industry which would promote proper definition of objectives and means of attaining them. It would provide a high-level forum for considering the interests of commerce and of industry where they show differences.

To establish closer ties with the problems of industry, the formation of one or more advisory groups of industrialists would be a helpful move. This procedure would stimulate orderly analysis of specific questions by the industrialists, thus providing a basis for helpful dialogue.

I. Major Functions of Government in Promoting Industrial Growth

In Chapters Two and Three the analysis of industrial opportunities involved consideration of government activities which would stimulate industrial development. It is worth while to examine these again as functions to be performed by a new Ministry of Industry. The discussion will be subdivided into three sections: (a) Major Functions; (b) ^{Other} Necessary Functions; (c) Functions for Other Agencies which can be stimulated by Government.

The major activities of government most needed for the healthy growth of Lebanese industry are five in number, to sum up the opinions of industrialists with whom I talked. My own conclusions from this survey coin-

cide with their views. They are:

- (1) formulation of an industrial development policy;
- (2) negotiation of trade agreements with major importers of Lebanese products;
- (3) establishment of an Industrial Development Bank;
- (4) sponsoring a program to provide technical information and services; and
- (5) creation of a favorable investment climate in which government industry cooperate as partners rather than as adversaries.

Because these topics were treated in detail ⁱⁿ Chapter Three, it is unnecessary to go into them further here except to indicate the role that the Ministry of Industry would play. It would have direct responsibility for the industrial development policy. It would work with the Ministry of Foreign Affairs to promote favorable trade agreements. It would take the lead in promoting the establishment of the Industrial Development Bank. It would sponsor and give financial support to the program of technical information and service. It would establish policies and procedures to encourage a spirit of cooperation in its direct contacts with representatives of industry.

II. Other Necessary Functions of Government to Assist Industry

Here again the ten functions have been described in Chapter Three and are listed as column headings in the tabulation of suggested opportunities:

- (1) Raw material import duties and conditions
- (2) Equipment imports
- (3) Export information
- (4) Export subsidy
- (5) Start-up subsidy

- (6) Joint ventures
- (7) Anti-dumping enforcement
- (8) Supervision of quality of imported commodities
- (9) Power costs
- (10) Program for developing operator skills.

For most of these activities the Ministry of Industry would need to conduct an objective review of existing policies and procedures to determine changes that are needed to stimulate new industrial ventures. In the case of export information, the cooperation of the Ministry of Foreign Affairs should be enlisted to promote the flow of trade intelligence from embassies or other sources in countries which are important customers for Lebanese products. In regard to power costs, the agencies responsible for distribution of electrical energy would necessarily be involved. For expansion of the program for training skilled workers, the cooperation of still other sectors of government should be solicited.

III. Additional Measures to Stimulate Industrial Growth

A number of other activities have been proposed, in separate memoranda, which will aid industrial development. For most of these some other organization will be primarily responsible, but the Ministry should encourage the implementation of the programmes. In some instances technical assistance from UNIDO, as proposed in Chapter Six, will be a valuable stimulant.

1. Study of the Industrial Development Program of Singapore (Appendix VI). Singapore has one of the most comprehensive and effective organizations for promoting industrial development which I have seen anywhere in the world. The size and character of the country are comparable in many ways with The Lebanon. In my opinion there would be much to be gained by sending an interdisciplinary study group (national planning, marketing, engineering technology, and business management are desirable skills to include) to make a detailed review of the policies, organization and programme in Singapore to consider those measures which might be adapted to the local situation.

2. Improvement in Product Quality of Small Enterprises Through a Centralized Marketing Agency (Appendix VII). The success of Sears-Roebuck in developing local production of a major part of its retail merchandise, first in Mexico and then in other Latin American locations, bears witness to the value of this mechanism for up-grading the quality of products of small enterprises. It is recommended that the possibility be explored of establishing a similar operation in The Lebanon.

3. Supply - Demand Situation for Specialized Personnel. Trained manpower is one of the most precious assets of a developing country. Quantitative techniques are available for analyzing the manner in which their talents are deployed. Procedures have been developed for estimating the private and public requirements for additional specialized personnel. Both types of surveys should be used in the Lebanon (Appendix VIII).

4. Surveys of Organizations and Facilities for Technical Contributions to Industrial Development (Appendix IX). It is a great resource to have systematic information about the organizations and physical facilities available for the development and transfer of technology. Procedures to collect these types of data should be used in the Lebanon.

5. Systematic Examination of Preventable Losses of Agricultural Products Between Farm and Consumer (Appendix X). There are many sources of waste in the channels of use of agricultural produce: mechanical, pests, and spoilage. Quantitative studies to identify and quantify the causes of the losses, and investigation of practical means of reducing them, would be of value in The Lebanon to safeguard the available supply of these materials.

6. Expansion of Handicraft Industries (Appendix XI). Advances in these "cottage industries" are already being made in The Lebanon. Attention is called in the cited memorandum to the progress in The Philippines, a program that is less well known than that in India.

7. Industrial Estates. Time did not permit me to become familiar with current thinking in government and industrial circles about industrial estates. I have seen some very successful projects of this type and believe they might be effective in The Lebanon, particularly for building up the industrial sector in depressed areas. On the other hand, I have seen quite a few concepts which never became implemented, chiefly because they were regarded as commercial real estate development projects, rather than as publicly supported efforts to create new employment in improved facilities for small industry.

8. Free Port Facilities for Industry. Here again I did not investigate the situation, because there have been recent studies and recommendations by others. The advantages in creating employment and increasing export potential by in-transit conversion of raw materials are obvious. (See, for example, "Port Organization and Operation," United Nations, New York, 1969, a monograph which I assisted in writing under the auspices of the UN Transportation Section.

V. Non-Government Agencies Which Deserve Public Support

A Ministry of Industry should seek to identify and assist those independent agencies which help to stimulate industrial development. In The Lebanon there are three which particularly deserve not only public recognition but also financial support to increase their effectiveness.

1. Association of Lebanese Industrialists. This organization is operating with a very small staff, but it is particularly valuable as a link between Government and private industry.

2. Industry Institute. Technological institutes of this type are recognized in the developing world as one of the most effective agencies for the development and transfer of appropriate technology. Formerly the Government made substantial contributions, but these have dwindled to a trickle.

3. Lebanese Standards Institution. While the program of this organization is being expanded, much more needs to be done to promote its effectiveness. This activity is particularly important as a means of creating improved acceptance of Lebanese products in export markets. By the fact that Dr. Amin Sharif, now on leave from his duties as Principal Scientific Officer of the National Council for Scientific Research, is heading up a UNIDO regional program on standardization, an additional focus is provided for stimulating this program.

CHAPTER SIX

PROPOSED PROGRAMME OF UNDP/UNIDO TECHNICAL ASSISTANCE TO PROMOTE INDUSTRIAL DEVELOPMENT IN THE
LEBANON

To add strength and impetus to efforts of the Government to expand the industrial economy, I recommend a board program of UNDP/UNIDO Technical Assistance during the period 1972-1976. The proposal, described in detail below, contemplates a total UNDP contribution of U.S.\$1,605,000. for this purpose during these five years.

Four major projects are included:

1. Establishment of a technical information and service program at the Industry Institute;
2. Engagement of an international consulting organization to carry out in close cooperation with a group of local organisms:
 - (a) intensive techno-economic appraisals of industrial development opportunities, and, concurrently, to assist the Ministry of Industry in the formulation of an industrial development strategy;
 - (b) preparation as needed of pre-investment prospectuses to promote the participation of entrepreneurs;
3. Assistance in strengthening the Lebanese Standards Institution;
4. Training programs for 30 staff personnel from individual enterprises to up-grade their skills by working abroad in industry.

In addition, several of the other recommended projects need support to accelerate their implementation through training fellowships and foreign experts, as discussed in a later section.

I. Technical Information and Services

This program should be started in the near future if concurrence of the Government is forthcoming. Details of the background and proposed course of action are presented in Appendices III and IV.

The essential components for this program are a central technical library and a diversified professional staff with practical backgrounds, and a project leader to coordinate all activities. As in most other developing countries, these are usually found in a technological institute, which should preferably be autonomous and dedicated to giving practical assistance to industry. The Industry Institute in Lebanon meets these requirements adequately; to the best of my knowledge it is the only local organization which is now available as the agency to provide these services.

1. Technical Information. Under the general direction of the head of the entire activity, a combined program of information on raw materials, product quality, processes, and equipment would be made available on request to any enterprise, but with emphasis on smaller organizations. The answers would be provided through the know-how of the diversified technical staff and through the library. The internal costs should be borne by the Government.

A training program should be carried out in several foreign countries which have had considerable success in providing this service :

A selected staff member of the project of the Industry Institute would study the programs of the National Research Council (Ottawa) and BC Research (Vancouver) in Canada, TNO in the Netherlands, and hopefully, INT in Rio de Janeiro, Brazil.

Actual operations in Beirut would be assisted by advisory experts from Brazil, Canada, and The Netherlands, spread over a period of roughly one year.

Total UNWPP/UNIDO Technical Assistance is estimated at US\$75,000. The counterpart contribution would be the services of the Institute technical staff and the facilities of its extensive library and reproduction equipment.

2. Technical Services. Assistance to individual enterprises in solving their short-term problems is best rendered by "industrial liaison officers", whose activities should be closely coupled with the technical information system. They visit these establishments, diagnose difficulties, propose solutions, or refer the problems to colleagues who have specific experience in the particular field of industry.

Initiation of this activity should also be preceded by a training trip abroad to Ottawa and Vancouver, Canada, TNO at Delft, and preferably to INTI in Buenos Aires and to Singapore. Further assistance over a period of two years or so in adapting foreign experience to local requirements would be provided by missions of selected experts from the institutions which have been named.

Estimated cost of UNIDO Technical Assistance is: training trips \$40,000, visiting experts \$70,000, and additional analytical and testing equipment for the Institute, to carry out the necessary quality determinations on raw materials and products, amounting to \$105,000. The counterpart contribution would be the institute professional staff members and the use of general facilities, including present analytical and testing equipment.

3. Techno-Managerial Services. In addition to technical services, small enterprises are often in urgent need of practical assistance on such problems as simplified cost-accounting; market forecasting, market development, and sales techniques; plant lay-out; process control; production scheduling and operator training. While a veteran engineering technologist may be able to provide some of this advice, it is much more desirable to rely on specialists in these aspects of management.

A program to provide this service should go hand-in-hand with technical information and technical service. Also these should have been established on a firm basis before techno-managerial help is undertaken.

The best sources of background with which I am acquainted are in INTI in Buenos Aires and in Singapore. There are other good examples, such as the Smaller Enterprise Agency in Japan for business information, but they are usually on too elaborate a scale for ready adaptation in The Lebanon.

Accordingly, this phase of the total project is suggested for initiation roughly two years after technical service has been started and it is contemplated that technical assistance would be continued for three years. It is also to be expected that techno-managerial services will lead to a demonstrated need for short, practical training courses on managerial subjects for members of small enterprises.

Technical Assistance from UNDP/UNIDO would consist of foreign training projects for local personnel \$20,000; a fluctuating team of international experts) headed by a leader with specialists in industrial management, business controls, marketing, industrial engineering, and production management) and supplemented by short time experts; cost of main team \$210,000, short term experts \$30,000, total \$240,000. Counterpart would be the services of the new local staff and general facilities of the Industry Institute.

II. Planning and Implementation of an Industrial Development Strategy.

In order to accelerate industrial development, it is recommended that an international consulting organization be engaged to carry out two interlocking and complementary phases, namely:

- a. Comprehensive techno-economic evaluation of development opportunities, together with advisory assistance to the Ministry of Industry on the formulation and implementation of an industrial development strategy.
- b. Translating selected techno-economic evaluations into the form of pre-investment prospectuses, to be used for arousing the interest of local entrepreneurs or for attracting foreign cooperation.

No single Lebanese organization has a staff of adequate size and competence to serve as a counterpart. Instead it will be necessary to draw on the resources of several of them, coordinated through a project leader.

For this purpose I recommend the selection of Mr. Marwan Nasr, Executive Secretary of the Association of Lebanese Industrialists. In my opinion he has all the qualifications for establishing general policies and programs with the consulting firm, which will be responsible for much of the detailed work, and drawing upon other local organizations for counterpart staff. Sources of staff suggested, without reference to the new Ministry of Industry which may be created, are the Ministry of Planning, the Ministry of National Economy (especially the Bureau of Industrial Development), the Industry Institute, professional personnel volunteered by individual enterprises, and university faculty members, and local consultants. It is probable that quite enthusiastic cooperation can be obtained from the younger group of managers in the industrial community. The Government would have to provide funds for salaries of some of the personnel. In many cases these individuals would serve on a part-time basis.

The details of a contract with a consulting firm are necessarily somewhat indefinite, because they would have to be directly negotiated. In this connection it is well to cite the recommendation of "Manual on the Use of Consultants in Developing Countries", United Nations, New York, 1968", that competitive bidding is undesirable and that a contract should be awarded on the basis of proven experience and performance, not on price.

UNDP/UNIDO Technical Assistance is estimated at \$550,000, spread over five years, split into \$250,000 for techno-economic appraisals and assistance in formulation of strategy; and \$300,000 for pre-investment prospectuses and promotional activities to enlist the interest of entrepreneurs. The schedule of estimated expenditures during the five-year period is shown in the final tabulation in this chapter.

III. Strengthening the Lebanese Standards Institution

The standardization program is now located in new quarters in the Industry Institute, where it has the use of the other facilities of that organization. Although activity has been in progress for many years, it still needs expansion and particularly the recognition of its importance at high levels of the Government.

Standardization of high quality export commodities is particularly important to secure acceptance in foreign markets. Here the products meet the competition of the best being produced in either highly developed or other developing countries. To be second best to any competitor means that one becomes only a marginal supplier rather than a prime supplier.

Although the proposed budget for UNIDO technical assistance to the Lebanese Standards Institution is small in comparison with the two preceding projects, its importance is great. The program is fortunate in having as general overseer Dr. Amin Sharif, in his temporary capacity as regional adviser on standardization.

To improve the background of the senior personnel of the Institution, two foreign training fellowships of six months each are proposed, one in standardization and the other in quality control systems. The total cost is estimated at \$5,000.

To emphasize the importance of the program in the eyes of the Government, it is recommended that three high level advisers, each serving for six months on a staggered schedule, should be appointed. Working in close cooperation with Dr. Amin Sharif, one of their chief functions would be to promote better recognition of the importance of the program in government and industrial circles. The cost is estimated at \$45,000.

The combined cost of the training fellowships and the expert advisers, plus US\$15,000 for equipment, would be US\$65,000 to be spent in the first two years or so of the five-year program.

IV. FELLOWSHIPS FOR UP-GRADING SKILLS OF PERSONNEL IN INDIVIDUAL ENTERPRISES

A comment frequently heard from industrialists is the need to increase the practical skills of some of their specialized employees. As a part of UNDP/UNIDO Technical Assistance it is recommended that US\$100,000 be allotted to three-to-six-month training courses for this purpose, to provide an average of six fellowships a year over the five-year period. Insofar as possible these should consist of work in a host organization in an industrialized country. Assistance in arranging for such practical experience could be given by the international consulting organization selected for Project II.

V. Additional Training Programmes and Expert Advisors to Assist Implementation of Other Recommendations.

It is highly desirable that UNDP/UNIDO Technical Assistance be provided to stimulate and assist some of the other recommendations in this report.

It is not practical to specify exact schedules or emphasis at this time, because these will have to be arranged with the Government and other cooperating organizations. Accordingly, the subjects are listed below, not necessarily in order of priority, together with suggestions for the type of Technical Assistance. In the summary schedule of all UNDP/UNIDO support given in the final table, the amounts are simply spread as a group over the five-year period.

UNDP/UNIDO TECHNICAL ASSISTANCE

ON MISCELLANEOUS PROJECTS

(Thousands of U.S. dollars)

<u>Project</u>	<u>Training Programs</u>	<u>Experts</u>	<u>Sub-Total</u>
Organization of Development Bank	15	45	60
Study of Singapore industrial development program	15	15	30
Central marketing agency to stimulate small enterprises (Sears-Roebuck)	10	10	20
Supply - demand situation for specialized personnel	10	30	40
Survey of development organizations and facilities	20	15	35
Reduction of preventable losses of agricultural products	20	15	35
Free port program	10	30	40
	<hr/>		
Sub-totals	100	160	260
Contingency: technical assistance for other projects; equipment which may be needed to implement projects.			65
	<hr/>		
Grand Total			325

SUMMARY OF UNDP/UNIDO

TECHNICAL ASSISTANCE FOR COMPREHENSIVE

INDUSTRIAL DEVELOPMENT PROGRAMME

(Thousands of U.S. Dollars).

Projects	1972	1973	1974	1975	1976	Totals
I. <u>Technical Information and Service.</u>						
1. Technical information						
Training programs	5	5				10
Experts	15	15				30
Equipment, library	10	10	5	5	5	35
Sub-totals	30	30	5	5	5	75
2. Technical Service						
Training programs	10	25	5			40
Experts	15	30	15	10		70
Equipment, library	25	45	20	10	5	105
Sub-totals	50	100	40	20	5	215
3. Techno-managerial Service						
Training programs		10	10			20
Experts		25	75	90	50	240
Library, miscel.	10	10	5	5	5	35
Sub-totals	10	45	90	95	55	295
II. Planning & Implementation of strategy						250
1. Techno-economic appraisals for formulating of strategy	60	120	40	20	10	250
2. Pre-investment prospectuses and promotion	20	60	100	60	60	300
Sub-totals	80	180	140	80	70	550
III. Strengthening Lebanese Standard Institution						
Training programs	2	3				5
Experts	15	30				45
Equipment	10	5				15
Sub-totals	27	38				65
IV. Training Programs for Personnel from Individual Enterprises						
	15	25	25	20	15	100
V. Other Projects Listed in the Preceding Tabulation						
	25	75	100	75	50	325
Grand totals	237	493	400	295	200	1625

CHAPTER SEVEN

OTHER PROFESSIONAL ACTIVITIES

Six technical lectures were presented to various groups during my stay in Lebanon. These were prepared and delivered outside regular office hours, as they were not part of my mission, except for the two presented at UNESOB, which had to be scheduled for morning sessions.

Copies of the lecture manuscripts were distributed to the respective audiences. Additional copies were given to other interested individuals. Separate sets are also being prepared for transmittal to individuals who receive my mission report.

The lectures on management of development projects are particularly timely, because several other groups are in process of preparing material on this general subject. Accordingly, copies of the three lectures have been sent to: Dr. Louay Katkhouda, Industrial Institutions Section, UNIDO, Vienna; Dr. Paul Trussell, Executive Secretary, WAITRO, Vancouver, Canada; Dr. F.N. Woodward, UNDP, Djakarta, Indonesia; Dr. N.K. Rao, Ford Foundation, New York; Mr. Earl Young, National Academy of Sciences, Washington, D.C.; and Dr. James Blackledge, Denver, Consultant to U.S.A.I.D.

"Productivity in Industry - An Essential Factor in Economic Development", UNESOB Workshop on Social Development Planning, September 28, 1971, 2000 words.

"The Management of Development Projects", a series of three lectures under the joint auspices of the Faculties of Arts and Sciences, Agriculture, and Engineering of the American University of Beirut and the National Council of Scientific Research.

- A. "The Selection, Definition and Programming of Projects", November 12, 1971, 4500 words;
- B. "The Execution and Control of Project Activities", November 15, 1971, 4000 words;
- C. "Interdisciplinary Teams and Financial Control," November 17, 1971, 5000 words.

"Cost-Benefit Analysis of Marketing Programs With Special Reference to Export Trade,"

Graduate course in Marketing Management, Department of Business Administration, American University of Beirut, and

UNESOB Seminar on Export Expansion, both on November 25, 1971, 4500 words.

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ACKNOWLEDGEMENTS

This mission has been carried out in an atmosphere of complete harmony and cooperation. Not a single mischance marred the very pleasant circumstances of the assignment.

At the Ministry of Planning, Moustafa N. Nsouli was most cordial and helpful in every way. My esteemed counterpart, Boutros Labaki, performed his role with great distinction.

At the Ministry of National Economy, my relations with Assem Atallah and Samir Klat were exceptionally productive.

At the Association of Lebanese Industrialists, Marwan Nasr was a fountainhead of wise council, and Nabil Ladki was very helpful with many suggestions and contacts.

My many new friends at The American University of Beirut were stimulating, and Raja Tannous, Professor of Food Technology, gave very freely of his time to assist me in developing these relationships.

At UNDP I am greatly indebted to the entire staff for full cooperation and great courtesy. Mr. Hashim Jawad, by sympathetic encouragement of my studies, provided a strong stimulus. Mr. Mohamed el Halfawy was, as always, a fertile source of wise guidance and encouragement. I extend special thanks to Sonia Kermanikian for executive secretarial assistance par excellence.

My many contacts with UNESOB personnel were very productive, particularly those with Salah Jowhari.

To all the others listed among my contacts I extend my best thanks for their warm cooperation.

Lawrence W. Bass

APPENDIX I

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 13 October 1971

METHODOLOGY FOR THE SYSTEMATIC PLANNING OF INDUSTRIAL DEVELOPMENT

The procedures recommended in this memorandum represent a logical approach to the selection and appraisal of development opportunities. They should replace the haphazard choices often made on the basis of personal preferences by those responsible for decision. They are practical in nature and have been thoroughly proved by experience in many actual cases of corporate planning for individual enterprises in highly developed countries. More recently they have been applied in developing countries for analyzing and evaluating the most promising areas for industrial expansion.

These techniques offer the following advantages for national planning over the traditional custom of relying on individual intuitive selections:

1. They are based on consideration of a comprehensive array of all micro-sectors of the industrial economy, instead of an arbitrary choice of a partial list.
2. These arrays of micro-sectors should include not only types of industry already represented but also new industries which may have potential.
3. The nature of the semi-quantitative evaluations encourages a multi-disciplinary analysis to counteract the bias of individual opinions which may fail to take into account all the major techno-economic factors.

4. They require comparisons of the advantages of different micro-sectors, in order to select the most encouraging opportunities, instead of concentrating on possibilities one by one without taking the whole array into consideration.

The system involves a series of progressive steps which are discussed in detail in sequence in the following sections. These steps are:

Preliminary screening by quasi-quantitative analysis of an array of industrial micro-sectors, collected under major categories of industry, to select a shorter list of those judged to have best potential;

Condensed procedure to make preliminary selections for further study on a short-range basis, leaving for later work completion of the entire tabulation;

More detailed analysis of the preferred micro-sectors by additional criteria to evaluate their cost-benefit attractiveness;

Analysis of measures to promote implementation;

Estimation of impact on the industrial economy if planned objectives for the array of micro-sectors are attained;

Tabulation of projections for development of major categories of industry for the planning period to summarize the industrial development plan;

Incorporation of projections of industrial growth in a tabulation of major national accounts to determine the adequacy of the planned rate of development.

I. Preliminary screening of industrial micro-sectors to select preferred candidates.

This first phase of the planning procedure comprises the selection of a preferred list of industrial micro-sectors from a comprehensive list collected under major categories of industry. It involves (1) the preparation of the arrays of micro-sectors; (2) analysis of each micro-sector by a simple scoring scheme to describe its general characteristics and to diagnose degree of fit to local capabilities and resources; (3) comparison for each item in the list of general attractiveness with local compatibility to permit logical selection of those micro-sectors judged to have greatest potential for successful development.

The evaluation scheme is illustrated by Table I.

1. Selection of all feasible micro-sectors in each major industrial category, such as food processing industries, for inclusion in the array for evaluation: These micro-sectors should be sufficiently differentiated so that each shows optimum homogeneity in techno-economic characteristics. Because available statistics in most developing countries are not sufficiently broken down in detail, the array will go further than the official classifications. The list should, as mentioned above, include not only industries already in existence, but also new industries that should be considered.
2. Carrying out a preliminary screening procedure on the array in each major category to select a shorter list of those which appear to hold most promise: This quasi-quantitative screening should employ a simple scoring system as described below, and it is performed in two parts: (a) considering the general characteristics of each micro-sector, and, (b) making an estimate of "degree of fit" to local resources.

(a) General characteristics: each micro-sector should be given a score of high, medium, or low which in the opinion of the team of evaluators best represents their joint appraisals, within the arbitrary definitions which they may assign.

(i) Export potential, based on interpretation of available data on foreign trade, scored H for more than 10 percent growth per year for the forecasting period (5 years), M for 3-10 percent per year, and L for less than 3 percent.

(ii) Local market potential, based on estimates of present production plus imports where these represent an opportunity for import substitution. Where the micro-sectors are not yet in existence, the estimate of local market would be based on a reasonable share of the volume of imports. Scoring may use ranges parallel to those used for export potential, namely: H is more than 10 percent per year increase, M is 3-10 percent, and L less than 3 percent.

(Total demand may be shown in a third column, representing a combination of export and local market potential. This is probably an unnecessary redundancy because the joint potential is easily apparent by inspection from the first and second columns; no great improvement in perspective would be gained because the scoring is only semi-quantitative).

TABLE I

SCREENING OF DEVELOPMENT OPPORTUNITIES
IN THE FOOD PROCESSING INDUSTRIES

Scoring: H = High M = Medium L = Low
For details of scores consult the text

General Characteristics					Array of Micro-Sectors in the Food Processing Industries	Local Compatibility					
Export Potential	Local Market Potential	Local Production	Technology Availability	Industrial Profile	The micro-sectors listed should be as numerous as feasible to secure optimum technoeconomic homogeneity within each unit.	Raw materials	Human Resources	Capital Requirements	Employment	Creation	
						Apple juice, preserved Apples, dried Bakery products, sweet Bananas, dried Beer Beverages, alcoholic, distilled Beverages, non-alcoholic Biscuits Bread Butter Butter oil Candy, except chocolate Cereals, prepared Cheese, bakers' Cheese, ripened Chocolate products Citrus juices, preserved Condiments Dishes, Lebanese, preserved EGGS, frozen, industrial use Ensilage cattle food Essential oils, citrus, onion Feed, animal, mixed Foods, infant Fish, fresh Fish, preserved Flour Food packaging	(array continued) Fruit, dried or preserved Jams and jellies Joghurt Juice, tomato, preserved Juices, fruit preserved Leban Malt Margarin Meats, dressed, beef Meats, dressed, other Meat products Milk, pasteurized Milk products, other Nuts, packaged Olives, preserved Onions, dried Pastes, alimentary Pickles Poultry, dressed Refrigerated storage Seaweed, dried Soups, canned Sugar, beet Sugar refining Vegetables, dried or preserved Vegetable oils Vinegar, cider or wine Water, mineral Wines				

- iii) Local production is an interesting figure to include in the initial screening because it reveals how strongly the micro-sector is already established in the national economy. Arbitrary scoring might be set at H is more than LL. 10 million per year, M at 1-10 million, and L at less than 1 million.
- iv) Technology availability is a measure of the ease with which know-how may be acquired, because this is an important consideration in deciding whether new enterprises can be brought into being rapidly. H can be used as the score for those micro-sectors which use technology that is well established or closely related to that of industries already in operation, such as in many branches of food processing; M indicates that the technology can be acquired but requires considerable modification to meet local needs; L describes the situation in which technology is highly specialized and probably would involve a license arrangement or joint venture with a foreign partner.
- v) Industrial profile is a measure of the structure of the branch of the industry within the country. An arbitrary scoring system is necessary as, for example, using H to indicate that it is a new micro-sector with no competition to face, K an open situation in which there are other companies operating in the field but without undue hazard to a new well-managed enterprise, while L describes the situation in which the business is dominated by strong competitors who would make entry by a newcomer less attractive.

- b) Relationship to local resources: a micro-sector may appear to have very attractive potential from its general characteristics, but when examined from the point of view of suitability for the particular economy it may show a low degree of fit. Some examples of this situation are: high dependence on importation of starting materials under conditions that may not remain favorable; a requirement for unavailable local managerial and operational skills; a necessity for a very large capital investment for a plant of minimum economic size which, because of the small volume of the local market, would have to meet the challenge of world competition in order to remain viable; or, from the point of view of national interest, new enterprises/^{which}would not create a sufficient number of new jobs, even allowing for satellite secondary industries and services.

It is therefore necessary to conduct an independent screening of these relationships to national capabilities and resources. Suggestions are made under each heading for the type of scoring that might be appropriate.

- (i) Raw materials considerations in a country with limited natural and renewable resources must be seriously weighted. H indicates that starting or intermediate products would be obtainable locally, at least for an important part, or from dependable imports at competitive prices; M denotes a situation less favorable but still acceptable; L is the classification of very high reliance on imports under conditions which tend to reduce cost-benefits.

- (ii) Available human resources should also be analyzed in relation to the potential for new ventures. H denotes a supply of managerial and worker skills that are comparable with those now in use; M implies that these skills need to be developed but present a reasonable expectation; L indicates an unusual demand for new skills which would be very difficult to acquire.
- (iii) Capital requirements must also be taken into account. H denotes an investment for a viable enterprise in plant and working capital of, for example, less than LL. 1,000,000, M a capital requirement of LL 1 to 5 million, and L of more than LL 5 million.
- (iv) In regard to employment creation, the scoring system to be used might comprise: H those micro-sectors considered to be labor intensive, with a capital/turnover ratio of less than 0.6; M is the intermediate range with capital/turnover ratio of 0.6 to 1.0; and L those in which the capital ratio is greater than 1.0. Insofar as possible, the multiplier effect of certain industries should be taken into account to allow for satellite operations resulting from a new manufacture of basic commodities or products.
2. Screening by coordinated application of criteria of both general characteristics of micro-sectors of industry and of degree of fit to local resources: This involves judgment to select those types of industry in each major category which offer the most promising opportunities for expansion or development. Because the choices should be

made in broad perspective, it is preferable to use the consensus of a small group of individuals with diverse backgrounds to ensure suitable weighting of techno-economic factors.

The selections from the array can easily be made in the case of many micro-sectors by visual inspection. The choices will be most obvious when a given type of industry shows both promising general characteristics and a high degree of fit to local capabilities. But encouraging opportunities with less appeal must not be overlooked. For example, the advantage of stimulating a branch of industry with excellent general characteristics but a negligible local resource base should not be disregarded. Conversely, a branch which shows a very good fit to internal capabilities but only a mediocre general outlook may still be a promising candidate because it will increase employment and industrial production or offer some other benefit from the national point of view. The opportunity to assist the development of industry in economically depressed regions may be an important factor in the choice.

The result of this analysis will be a much shorter list of micro-sectors for more detailed evaluation in Step III. Depending on the size and ability of the staff to handle further activities, the array for further study may be reduced to 10-20 percent of the original comprehensive tabulation.

II. Shortened Procedure for Initial Application of the Methodology

The procedures described above involve a large amount of detailed work to compile the necessary information and to institute a program which will provide factual data now lacking. Hand in hand with progressive improvement in the tabulations, there should be an immediate activity to use curtailed criteria in an effort to produce in a short time a preliminary list of selected micro-sectors for investigation, so that the merits of the system will be apparent more rapidly. At the same time this condensed study will provide a pilot test for selection of criteria to be applied later on.

In the present project the principles are being applied with reduced intensity to develop a list of micro-sectors for immediate investigation. In regard to general characteristics, reliance is being placed chiefly on potential for export and for supplying the local market, on one hand, and on raw material and capital investment, on the other, to determine suitability for the economy. Market demand is being estimated from many comprehensive reports issued previously, re-enforced by opinions of informed individuals. Local capabilities are being projected from general knowledge of the background of industry in the country.

Revision of the arrays of micro-sectors should be a continuing activity of the planning agency. The list itself may require expansion or contraction to meet the needs of the situation; these alterations should be made in such a way as to cause least distortion in the other branches of industry for which existing data have already been correlated. The criteria for appraising opportunities and the definitions of the scoring systems may need adjustments. Evaluations previously made for individual micro-sectors should be reviewed periodically to reflect changes in the

internal techno-economic climate or in other countries. The longer the lists have been in use, and the more conscientiously they have been revised, the more valuable they become as a tool for analyzing development opportunities.

III. Critical Evaluation of Selected Micro-Sectors

After the most promising opportunities have been selected by Step I, or by the shorter procedure in Step II, there is then the requirement for scrutinizing them in greater detail to confirm their favorable nature. The criteria used may be more incisive and the scoring procedure may be sharpened by using finer gradations. In any case, the evaluation process should be so selective that the revised list, which may be considerably reduced in length, contains only those items which meet general acceptance among the evaluators as offering attractive promise if efforts are made to promote their development.

Table II illustrates the criteria that may be suitable for this more intensive examination of development opportunities, and their scoring is described in the following discussion.

TABLE II

CRITICAL ANALYSIS OF MICRO-SECTORS SELECTED BY
THE SCREENING PROCEDURE

Scoring: H = High M = Medium L = Low
For details of scores consult the text

General Characteristics						Array of Selected Micro-sectors	Local Compatibility					
Total Demand	Value added	Profitability	Local Production	Technology Availability	Industrial Profile	For each major category of Industry, the micro-sectors judged to be most promising in the screening process are subjected to more critical examination.	Raw materials	Human Resources	Utilities	Utilization of capacity	Investment	Strategic Impact
							a.					
						b.						
						c.						
						d.						
						e.						
						f.						
						g.						
						h.						
						i.						
						j.						

1. The application of criteria for more vigorous assessment of industrial development opportunities is again divided into two parts: (a) more thorough scoring of general characteristics of the selected micro-sectors and (b) more critical examination of degree of fit to local capabilities.

a. The criteria suggested for the screening procedure of Step I were: export potential, local market potential, local production, technology availability, and industrial profile. For the further examination of the selected micro-sectors a broader list of criteria is desirable, such as revised estimate of total demand, value added, profitability, strategic impact, and revisions in estimates based on more ^{thorough study} than in Step I of local production, technology availability, and industrial profile.

i. Total demand estimates should be sharpened by more thorough examination of available data or informed opinions. A score of H indicates a total demand of more than LL. 10 million per year, M 5-10 million, and L less than 5 million.

ii. Value added figures should be projected from data or reliable opinions. A score of H designates a micro-sector in which value added is greater than 50 percent of sales revenue, M for 25-50 percent, and L less than 25 percent.

- iii. Profitability is obviously a major concern of entrepreneurs who are considering new ventures. From the point of view of national interest, if a continuing subsidy will probably be necessary for many years, careful examination of total cost - benefit should be made, although allowances for social benefits will interfere with the strict logic of the conclusions. Profitability may be estimated from local experience in related types of operations as reflected by published information, opinions of the financial community, ^{or} on the judgement of well-informed industrialists. A score of H may be assigned to micro-sectors with anticipated profits after taxes of more than 15 percent, M 5-15 percent, and L less than 5 percent.
- iv. Revised estimates of local production may be advisable. The assignment of scores may follow the same pattern as in Step I.
- v. A more detailed review of the availability of required technology should be conducted, and the scoring procedure from Step I should be satisfactory.
- vi. Further investigation of the industrial profile is desirable, and micro-sectors may be rated by the same scheme used in Step I.

- b. Because the procedures in this Step III are for the purpose of making important decisions regarding the micro-sectors to be recommended for development, the suitability of the industry for local conditions requires very careful consideration. In Step I the suggested criteria were raw materials, human resources, capital requirements, employment creation, and strategic impact. For the present purpose, more critical examination by the following list of subjects is suggested: revised raw material requirements; further review of necessary managerial and operational skills; supply of utilities; estimated utilization of present and new productive capacity; revised estimates of capital investment; and more incisive analysis of the potential strategic impact.
- i. The availability of the required raw materials should be re-examined. The scoring scheme of Step I is suitable for this use.
 - ii. Human resources, with respect to a supply of managerial and operating skills, should be studied in more detail. Again, the scoring system of Step I may be applied.
 - iii. The requirements for utilities (electric power, water, fuel for boilers) should be examined for each micro-sector, particularly with respect to their cost when this represents a major factor in the expense of operation. A suggested scoring scheme is H when the use of utilities is low and does not exceed, at existing rates, more than 2 percent of total manufacturing cost; M might apply to industries in the range 2-5 percent, and L for more than 5 percent.

- iv. In a number of micro-sectors the utilization of production capacity is now at a low level. In considering new industrial developments it is important to project the extent to which the capacity of a new factory would be used, and it would be particularly advantageous if the operation could be carried out in the plants/^{of} enterprises which at this time have overcapacity. A score of H may be used when a facility would be operated at 85 percent of capacity, M for 70-85 percent, and L for less than 70 percent.
- v. The estimation of investment required for plant and working capital of an installation of minimum economic size, or for a larger size if feasible, should be carried out in more detail. The scoring scheme of Step I should be satisfactory for use here.

(In this connection, an important aspect of public policy for industrial development is the average capital required to install facilities for one new job in an array of different sectors of industry. This will vary widely among various types of manufacturing, and there is probably enough information available to calculate such figures. To obtain maximum employment from limited capital resources, it is obviously advantageous to emphasize those micro-sectors with low investment per employee).

vi. Strategic impact on the national economy has to be based for the most part on more or less subjective opinions of informed individuals. A score of H should be assigned to enterprises which offer a large volume of employment, greatly improved utilization of starting materials, an important stimulus for satellite industries or, an opportunity to increase employment in depressed regions; M is for moderate employment, somewhat better utilization of raw materials, some beneficial effect on other industries, or a less positive opportunity for regional employment; L is the score for enterprises which make only modest contributions to the economy in these respects.

2. Benefits and risks for each proposed micro-sector are then assessed by inspection of the scores assigned under the various criteria. The same comments made in Step I apply also here, but the examination should be more rigorous.

Evaluation of the selected array will separate the individual micro-sectors into various classes, for example:

(1) Opportunities so obviously attractive that they should appeal at once to private entrepreneurs. These collectively constitute the final preferred list of industries which are promising for implementation. To estimate the collective contribution to the economy,

a projection should be made of the potential size of new ventures (even though they be undertaken by firms already in existence), the capital investment required, the employment created, and the nature of the promotional efforts that must be exerted to arouse the interest of industrialists. These subjects are discussed further in Step IV.

- (2) Situations which appear to be very attractive but require additional confirmation of feasibility through discussions with industrialists or investment bankers.
- (3) Micro-sectors which have apparent potential but require further investigation before firm opinions can be formed. The types of studies that need to be carried out may be investigations of export or local market size, review of necessary technology and the channels through which it could be obtained, analysis of managerial and operational skills and procedures for developing this expertise, and capital investment requirements. Individual cases may warrant still other kinds of supplementary work.
- (4) Micro-sectors which are of doubtful promise and do not justify further consideration at this time.

Many countries have found it helpful to classify development opportunities into three classes in order to implement planning. Class A consists of those micro-sectors which are considered most important to the economy, and the list may be as large as several hundred items; these branches of industry receive most favorable consideration for special incentives, such as development loans; tax concessions; relaxation of restrictions on imported raw materials, components, and equipment; or more favorable terms for joint ventures with foreign partners. Class B contains those types of manufactures which the government wishes to encourage, but with a lower priority than class A, with reduced incentives. Class C is assigned to all remaining sectors, which are left entirely to the choice of private entrepreneurs without any special incentives; in some cases there are regulations to prohibit types of industry which are felt to be not in the national interest.

IV. Summation of Development Impact for Major Categories of Industry

In order to estimate the benefits to the economy from the industrial development plan, the potential impact of different micro-sectors should be quantified. This is most easily done by major categories of industry as illustrated in Table III. The tabulation of the total projection for all manufacturing industries is discussed in Step V, and the role of the industrial sector in the national economy is the subject of Step VI.

As shown in the tabulation, this projection involves two separate steps, discussed below in detail: (1) an estimation of new jobs to be created in each micro-sector during the five year planning period, of the number of new establishments that might be justified (counting as a new establishment any new type of operation adopted in existing factories) and the magnitude of new capital investment to support the expansion (2) an analysis of the entrepreneurial incentives that appear to be required to implement the plan.

1. Estimation of new industrial activity to be stimulated:
If the government adopts an aggressive policy to encourage industrial development, it must use systematic procedures for planning the impact of the policy. As will be discussed in Section 2, it must also consider the measures of public administration which can help to stimulate the planned rate of growth.

In this section will be presented general ideas for planning the rate of growth in employment, number of establishments, and capital invested in industry.

- a. Increase in employment opportunities:
This is one of the major objectives in development planning. A logical approach should be made for each micro-sector to project the number of new jobs that would be created to attain the desired level of employment. For this purpose there should also be incorporated, as discussed in Step V, the estimated increase in employment expected in established types of manufacturing.

The preparation of this tabulation is an evolutionary process. The first assumption by planners may be unrealistic as to magnitude and timing, because there is always a time lag before the impact of new or expanded operations becomes visible in the form of new jobs. It is therefore essential that the planning agency take steps to obtain the advice of the industrial community on the feasibility of its projection.

- b. Increase in the number of establishments in each micro-sector: In similar fashion, attempts must be made to estimate the number of firms in the private sector which will begin production. In some cases only one enterprise will be justified. In others, particularly where operations are of regional character, there may be a place for several new undertakings. Possible overcrowding in a given field should be considered because the situation would lead to high production costs resulting from several plants operating at low capacity, a condition that is encountered in many countries.
- c. Estimation of investment capital required for industrial expansion where figures are available for different micro-sectors regarding the average cost of facilities for each new job opportunity; the number of new employment opportunities multiplied by this factor gives the total of new capital that must be provided. When such data have not been calculated, a more laborious type of estimation must be used, and the conclusions should be checked with representatives of industry.

2. Determination of incentives necessary to attain the planned rate of growth: It is usually only moderately productive of industrial growth for a planning agency merely to list the investment opportunities it can foresee, unless the entrepreneurial spirit is very high in the country. Instead, a more active promotional role must be played, in which the needed incentives are studied, in cooperation with enlightened industrial leaders, to establish a program which will encourage new ventures. Their character will vary for different micro-sectors. Some of the more important incentives are mentioned in the following sections.
 - a. Adequate data on export market potential is often required to substantiate the views of government planners regarding opportunities. Economic or commercial attachés in embassies in important customer countries can be of much assistance in filling these needs. Special marketing research projects will be warranted in some cases.
 - b. Similarly, better data on the local market may be needed for enterprises directed toward this goal. While entrepreneurs should be expected to conduct some surveys themselves, the government can set a good example by sponsoring pilot research projects.
 - c. A beneficial activity is the preparation of pre-investment prospectuses for those micro-sectors which are felt to be particularly desirable. While these studies are not in the depth required by a sophisticated entrepreneur before making an investment, they have been found by experience in many countries to be of great assistance in stimulating economic growth.

- d. In many countries financial agencies have good resources for "commercial loans" for a few months to a year, but very limited funds for intermediate and long-term loans, at reduced rates, to encourage new industrial ventures. For this reason they frequently establish development banks as autonomous bodies with capital from public and/or private sources. A necessary precaution to make sure that funds are channeled into productive enterprises is to require that each loan application is backed by an independent techno-economic feasibility report. Successful institutions diversify their portfolios in such a manner as to maintain a revolving pattern of investments.
- e. Tax relaxation is an effective tool for encouraging those types of enterprises which the government believes to be especially valuable to the economy.
- f. Some desirable micro-sectors face severe competition from abroad and may require a subsidy, at least until they have matured, to remain viable.
- g. Other micro-sectors which are highly dependent on imported raw materials, intermediates, or components cannot flourish unless they can obtain these with reduced customs duties.
- h. The situation is similar for micro-sectors that must import operating equipment.
- i. In some branches of industry it is highly desirable to acquire technology and know-how through joint ventures. The regulations governing such partnership ventures should be reviewed to eliminate provisions that discourage foreign interest.

V. Projection of Total Impact of the Industrial Development Plan

In order to evaluate the adequacy of measures to expand industrial production, systematic analysis must be made of the effect of the planned increases. For this purpose it is advantageous to study each major category of industry individually, as illustrated in Table IV, and then to combine the data to obtain an estimate for all manufacturing industries. The final figures, when compared with the normal expectation of growth from existing trends, show the expected impact of the plan.

The general nature of this analysis should be obvious from the figure. A few additional comments are made below on specific points.

The value of production should be adjusted to constant monetary units to counteract the effect of inflation.

The following list of major industrial categories is offered only as a suggestion, subject to any modification considered desirable by the planning agency: ceramics, chemicals, electrical equipment, electronic products, food products, glass manufactures, household durables, leather products, machinery, mineral products, paper products, petroleum products, pharmaceuticals, plastics, rubber products, textile manufacturing, tools and implements, transportation equipment, wood products, products not elsewhere classified. It may be advisable to include utilities - electricity and water - in the list.

TABLE IV

TABLE IV
TOTAL IMPACT OF THE INDUSTRIAL DEVELOPMENT PLAN

Array of Major Categories of Industry	Projection of Normal Trend										Objectives of Plan										Percent Increase in employment over normal trend
	Value of Production					Industrial Employment					Value of Production					Industrial Employment					
	1		2		3	1		2		3	1		2		3	1		2		3	
a.																					
b.																					
c.																					
d.																					
e.																					
f.																					
g.																					
h.																					
Total for all Major Categories	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	

In some instances these categories may include micro-sectors which would ordinarily be in some other national account. In Table I, for example, several micro-sectors are shown which are often classified as agricultural industries. To show the complete structure of the food processing industry, however, they have been added to the list.

The suggested break-down of major industrial categories is somewhat more detailed than in many census classifications in order to emphasize some branches of manufacture which have good growth potential.

The tabulation shown as an illustration stresses the creation of employment opportunities. It is understood that other characteristics may be treated in the same manner.

VI. Incorporation of the Industrial Development Program into the National Economic Plan

The methodology presented in this paper is a process of synthesis. I much prefer this procedure of funneling facts into the formulation of a general policy instead of the opposite approach of setting an arbitrary policy and then forcing the facts into alignment with it. In my opinion the former leads to a more realistic foundation for planning.

This final step in the initial planning process is illustrated in Table V. Here the proposed rate of expansion of industry is placed in perspective with the other components of the national economy.

A general policy should be established to set objectives for the role the industrial component is expected to play in attaining the desired increase in national income and employment. This goal should take into account the estimated growth from normal trend projections in order to make visible the magnitude of the task of stimulating the requisite additional manufacturing activity.

An objective of growth of industrial production and employment at a rate of up to 10 percent per year during the planning period is often adopted by developing countries. This is not necessarily unrealistic if the government exerts a vigorous continuing effort to stimulate expansion of manufacturing. If a favorable climate for new enterprises is not created, however, the end result will certainly fall considerably short of this rate. Further, because of the time lag in getting new industrial projects into operation, an even higher rate will be required in the later years of the planning period to compensate for the slow start in the earlier years.

The tabulation of Chart V therefore places before the policy makers the data necessary to frame a strategy for encouraging industrial growth. If the contribution of manufacturing enterprises resulting from Steps I to V does not show the desired level of increase in income production and employment, what higher goals can be set and what incentives must be offered to entrepreneurs to attain them? The planners of industrial development must then go back to the micro-sectors of Step I to determine which are subject to additional expansion if a suitable investment climate is provided by the government.

APPENDIX II

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Beirut, 30 October 1971

THE NEED FOR AN INDUSTRIAL DEVELOPMENT BANK

A great many developing countries have established development banks to provide long-term financing, at favorable interest rates, for industrial expansion. These offer loans for public as well as private enterprises, and may also make agricultural development loans; the latter, however, are usually taken care of by separate institutions, because the objectives and practices require different policies. In addition, there are regional development banks, such as the African, Asian, and Inter-American Development Banks, which provide funds for large national projects, and, finally, the World Bank.

In discussions with many representatives of the Lebanese industrial and financial communities, there was unanimity in the opinion that an industrial development bank is much needed here. Although these are said to be adequate funds for commercial loans, maturing within the course of months or at most a year, the available supply of capital for long-term loans is very small. The subject has been under discussion in Lebanon for over a decade, but no action has yet been taken.

Experience with Development Banks in Other Countries

In highly industrialized countries the mechanisms for long-term industrial financing have been well-established. In developing countries the theory is that a development bank will provide a revolving fund with changing portfolio, resulting from investments in new ventures as older loans are repaid.

In practice many of these banks reach a more or less static pattern of commitments. Some ventures they have financed turn out to be unsuccessful, with the result that they cannot recover their funds. The successful loans provide good returns, but the banks do not wish to dispose of these assets because this would affect unfavourably their balance sheets. The result is a frozen situation with no revolving capital available for supporting new undertakings.

Techno-economic Evaluations as a Requisite for Development Loans

This historical picture shows the need for more rigorous examinations of all prospective loans. A policy that is finding increasing favour is to require that each loan application be backed by an independent techno-economic evaluation before it can be considered. Such appraisals should be made at the client's expense and would probably not exceed five percent of the total of the loan; this charge may be incorporated in the loan if desired. The evaluation should include both technological and economic aspects. To secure this dual type of investigation, technological institutes such as the Industry Institute in Beirut, are often used when they have the necessary skills. These appraisals should include the consideration of unused capacity in the respective industries.

This policy of requiring techno-economic evaluation is being followed to increasing extent in Latin American countries. Technological institutes are being used for the purpose part of the time in Columbia and Mexico. In other countries, where such institutions are now in the course of developing their competence to supply these services, consultants are sometimes but not always called upon.

Recommendation

In view of the wide-spread opinion that the channels for long-term industrial loans in in The Lebanon are inadequate, and in view of the success of well organized industrial development banks in other developing countries, I recommend the establishment of such an institution in this country.

Preferably it should have considerable autonomy, with adequate representation of government interest in the Board of Directors. The other members should be leading figures in the private financial and industrial communities.

To ensure a minimum of unsuccessful commitments, the policy should be followed of requiring independent techno-economic appraisals of each loan application.

The capital requirements for such an institution are a matter of local concern. Part of the funds should come from the government, perhaps through a soft loan from IBRD or a similar agency, the balance from public-spirited private sources.

APPENDIX III

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Beirut, 18 October 1971

A PROGRAM TO IMPROVE THE TECHNOLOGICAL POSTURE OF SMALL ENTERPRISES BY PROVIDING SERVICES OF TECHNICAL INFORMATION AND ASSISTANCE

The need to provide technical assistance to improve the competitive position of medium and small industry is a major concern of all countries, both those that are developing and those that are highly developed. It is of highest importance in developing countries because most of their enterprises are small, because they represent a major part of the industrial economy, and because their managers are rarely acquainted with sources of such help.

The situation of larger enterprises is less urgent as a national problem, because most of them already have a range of internal specialized skills. Furthermore, they are in better position to diagnose their problems and to select appropriate channels of outside assistance.

Technical information and assistance to small industry are being provided in some fashion in many developing countries. The services, however, are often disjointed, inadequate, and little used by private and public enterprises. Nevertheless there is a gradual trend toward greater reliance for specialized help on technological institutes, government agencies, universities, and international organizations. The aim of this paper is to recommend an effective program of this character for the benefit of the Lebanese industrial community.

The Needs of Small Industry for Technical Information
and Assistance

The first contact many small enterprises have with sources of technical help is when they seek information about product specifications, raw materials, equipment, or process details. Their needs are for immediate practical help, not theory. While enthusiasts for complex computer-tabulation systems for information storage and retrieval advocate their use in developing countries for answering technical inquiries, I am firmly of the opinion that these are at the present time an unnecessary and very expensive luxury for this purpose. The value of computers in addition to their normal use for accounting and for complicated computations, lies in the organization of voluminous scientific literature in rapidly advancing fields of investigation, which is very different from handling the much simpler problems of small industry.

From actual tests of information requirements which I have made with colleagues in developing countries, three conclusions can be drawn:

- (1) The big majority of the technical inquiries to an institution (over 80 percent) can be answered readily by experienced technologists from their own know-how or from standard reference books in their own offices; not more than one in six questions requires the use of a large library, and in these cases the request is answerable from published standards which can be made available without extensive search.
- (2) The average amount of time required by a skilled professional to answer an individual question is surprisingly small, amounting to less than two hours according to another case study.
- (3) Finally, in the course of time many of the questions from different enterprises will be found to be identical, so that a well organized file of answers to specific inquiries will enable the staff to answer new problems from these records with little effort.

The second step in providing technical help to small enterprises is usually termed technical service, or, more colloquially, "troubleshooting". This activity involves one or two short visits to a plant to observe the operating problem and to suggest practical remedies. Here again an experienced technologist can normally handle the question adequately from his know-how with the expenditure of only a few hours of time.

Exposure of a small enterprise manager to the advantages of securing help from practical experts will eventually lead him to ask for assistance from them on more difficult problems, such as quality control, the selection of new equipment or processes, the improvement of products, or, as his business expands in size, the development of new products or processes, market research, or techno-economic evaluation. These questions require a greater expenditure of time by technologists, and the enterprise manager should expect to pay reasonable fees for the services, just as he would for engineering design and construction, legal, medical, accounting, or other specialized advice, because they are for his particular benefit. On the other hand, it is not feasible to assess charges for minor items of technical information or assistance, as will be discussed below and therefore these services should be supported at public expense because they play an important part in upgrading the nation's industries.

Organizational Requirements for a Technical Assistance Program

After detailed study of the requirementsⁱⁿ/many developing countries I have come to firm conclusions as to the most effective way to provide technical assistance to small enterprises.

The two essentials are the organization of the technical service function as a separate activity and to locate it in an institution with a diversified staff of technologists with expertise in a range of industries. These conditions are best met by a technological institute, such as the Industry Institute in Lebanon. While universities and government laboratories are often suggested for the purpose, extensive experience convinces me that they do not in general provide the proper environment, except when universities organize a separate technological activity to serve industry.

The reason for setting up the technical service function as a separate activity is to provide it with the autonomy and self-reliance necessary to render rapid and effective assistance to small industry. A technological institute which meets my criteria of excellence must be largely self-supporting on fees from clients for longer range work. While these institutes do provide a certain amount of free technical service to local industry, they cannot afford to do it on a large scale if they are to balance their budgets. The technical service function should have its own budget, provided from public funds, and should pay for the work done on its behalf by the technologists on the institute staff.

The qualifications of the head of technical service activities are a vital factor in the success of the operation. He should be an experienced technologist, preferably with practical background in more than one industry, a good manager, ability to make a favorable impression on industrialists, and a sense of the public relations activities necessary to expand the program. He should be of sufficient stature to be given

responsibility and authority to manage the operation with only policy guidance from the director of the parent technological institute. It will be advantageous to him to use an advisory committee of managers of small enterprises.

The program can be started on the basis of a part-time manager, until the operation has grown in size. He should arrange for part-time service of a librarian to handle inquiries that require a search of the literature. He should have secretarial assistance to maintain a file of memoranda on the inquiries handled. He will rely on the technical staff of the central institute to provide information to answer specific problems and he therefore needs to establish procedures and accounting methods acceptable to the director for this purpose. He must be given authority to insist on prompt replies to inquiries, and he must establish procedures for the method of reporting the answers to clients.

As the service expands, the manager will find it requires his full time, and eventually he may need one or more technical assistants. A valuable extension is to appoint technologists to concentrate on personal calls on individual enterprises to explain the system in order to encourage the submission of inquiries, and where advisable to deliver the technical information on previous inquiries and to assess its adequacy for implementation. These men are often called "industrial liaison officers" and should be able to make two, three or more calls a day where industry is concentrated in a small area.

In countries in which there are more than one industrial centers, local representatives may be appointed to provide more effective contacts. Their activities should be controlled and closely coordinated by the central manager.

The program can be initiated on a six-month trial basis at a cost of perhaps LL. 50,000. The budget for the next two or three years should be in the range of LL. 100,000 - 200,000, depending on how rapidly the demand increases. This experience will permit a more accurate forecast of the expenses for the future. In any case, the benefits to the economy, if the program is well conceived and executed, will more than justify the funds devoted to its support.

Operation of the Program

It is good practice to start the operation on a trial basis to develop background for expansion.

The part-time manager should first set up a tentative policy and outline of procedures. He will then need to encourage some trial questions by direct contacts with small enterprises. For this purpose he should prepare a preliminary circular describing the services and conditions regarding these inquiries. It should be possible to generate 20-30 problems in the course of a few weeks to establish a basis for refining the operation.

Some of the questions will require assistance from the institute library which he can obtain on a voluntary basis initially. Others he may be able to handle personally from his own know-how. Still others will require the help of technical specialists on the institute staff, and at this stage, because the demand will be low, it may not be necessary to defray the cost of their time.

From these sample inquiries, the manager can formulate more specific policies and procedures, which should of course be discussed with the director of the technological institute. This should include the accounting details for services from the library and especially the technical staff; these are best based on a standard cost per professional man-hour. The bookkeeping cross-charges will of course be handled by the institute accounting department.

The manager will quickly develop, if he does not already have it, an understanding of which technical staff members in different branches of technology cooperate most thoroughly and handle the inquiries most effectively. In all cases, the response to the client should be prompt. In some instances the report will be given orally by telephone, by either the manager or technologist, or in others in written form. In all cases there should be a memorandum in the central file giving the name of the client, a summary of the inquiry, a summary of the reply, and a statement of technical man-hours expended. Some canny clients who establish good working relationships with individual technologists may by-pass the formalities and go directly to these sources of help. There too there should be a brief memorandum in the central file, even though it should

be only a short telephone call; the total number of inquiries handled in the system is an invaluable record of its success. The manager should provide suitable forms for use by the technical staff for reporting and recording their actions.

Some inquiries will involve analysis or tests by the institute staff, for which the standard fees should be charged. The client should of course be given notice in advance of this expense.

As soon as the system has been established, there should be appropriate promotional efforts through notices in trade publications and the daily press, announcements at meetings of industrialists, mention in government publications, and talks given by the manager before various bodies. An annual report summarizing all services rendered during the year should also be publicized.

In this discussion emphasis throughout has been on small enterprises. The services should be available also on the same basis to large firms, and experience shows that initial inquiries are most likely to come from them.

As a last word, the system must be protected against abuse. All inquiries should be carefully screened by the manager to eliminate those which would require an amount of technical effort beyond that contemplated as suitable for small enterprises. The client should be courteously told that this question is of such nature that it should be undertaken by him as a regular project with the technological institute or some other organization. The general policy of the

service program may include a statement that no inquiry will be handled which requires more than 15 (or some similar figure) hours of professional effort.

Combination of Managerial Assistance with Technical Assistance

A very desirable addition to the technical assistance program is advice on short range managerial problems, such as the need for production and marketing control and scheduling, cost accounting, work organization, employee relations, budgeting, etc. While an experienced technologist may be able to offer sound advice, it is advantageous to be able to call on the personnel of a management development organization. At least two technological institutes in developing countries already have incorporated this function in their structures. The implementation of managerial recommendations is likely to require more time than the service organization contemplates, and imposition of fees may be required to keep within budgetary limitations.

Recommendation

I recommend that a program of technical information and service for small industry be established with government support. The Industry Institute in Beirut is the most promising base for this operation.

I have devoted a great deal of effort in various developing countries to formulation of this plan. Any serious deviation from the principles discussed above is likely to detract from its effectiveness.

APPENDIX IV

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Beirut, 30 October 1971

TECHNO-MANAGERIAL SERVICES FOR SMALL ENTERPRISES

Development of improved business practices combined with techno-managerial services on immediate operating problems are essential to the well-being of small enterprises in developing countries. These forms of help are usually directly intertwined with strictly technical advice, and therefore it is highly desirable that the two forms of service be offered through a single organization.

In the aggregate, the small enterprises represent a major part of a developing nation's industrial production, employment, and income. Some of them will become the big firms of the future. The improvement of operations of all of them is therefore a vital factor in economic development.

The advantage of providing both managerial and technical services through the coordinated program of a single organization is forcefully demonstrated by the experience of Singapore and Argentina. The activities in these two countries are summarized below. Other examples in which these benefits could have been obtained are also cited, in Japan, Thailand and Venezuela.

This coordinated approach has also the merit of widening the horizons of the professional personnel who participate in the services. Often they will work together in helping an individual enterprise with its problems. Thus there will be developed an increasing cadre of personnel in the country with broad background in techno-economics and practical business management.

The way to providing managerial services is often paved by requests for technical help. The solution of a technological problem frequently calls for improvement in management practices, such as production control and scheduling, improvement in marketing programs to enjoy the benefits of expanded volume, better accounting practices, more effective employee relations, and the like.

Singapore. As pointed out in another memorandum, Singapore has one of the most comprehensive and best coordinated programs which I have seen for stimulating industrial development. It is carried out under the overall guidance of an autonomous board, with an efficient central techno-economic staff.

Direct assistance to small enterprises is provided by a separate department which carries out field services and provides general information on management practices. In 1965 its offices were housed in quarters adjacent to the technological services, which made cross-fertilization convenient.

In addition, a coordinated program of practical management training was being provided by a local management development organization. At the time of my visit in 1965 there was excellent mutual cooperation.

Argentina. The major agency for providing technical help to industry is INTI (National Institute for Technological Investigations), an autonomous organization similar to the Industry Institute in Lebanon, but much larger. It is supported by a unique mechanism through which it receives funds collected automatically as a small percentage of all development loans made through the development bank mechanism.

INTI has a large central technical staff whose activities are supplemented by more than twenty "industry centers" engaged in development work for individual industries. The latter are supported mainly by contributions from industrial associations and partly, particularly during the early stages, by funds from the INTI budget. Some of these centres are located in other cities.

To come to the specific point, a management development program is organized as a separate department of INTI. The head, Mr. Tjebbes, is a Vice-President of INTI. Short practical training courses in different aspects of management are given in the classical pattern. In addition, Tjebbes has made a good start in providing managerial field services to small enterprises, coupled insofar as possible with technical assistance from the central staff and to some extent from the industry centers. The concept is excellent, but execution has faltered because of lack of financial support and some degree of inertia on the part of the technical administration.

Japan. Very comprehensive separate programs of technical service and managerial assistance have been set up under the Small Enterprise Agency of MITI (Ministry of International Trade and Industry).

These activities of the central agency are small in size compared with the total of numerous programmes conducted by political sub-divisions, which are coordinated to some degree by the national bodies. The summary of information presented here is based on my visit in 1965, but I have heard of no basic changes since that date.

On the technical side, a number of national laboratories (10-15?) are supported by the Ministry. In addition, there are about 70 laboratories financed and controlled by the prefectures (states) and some of the larger municipalities. Their programs reflect the pattern of industry in the area which they serve. One very interesting feature is the provision of facilities in some of them in which employees of individual enterprises can work on pertinent problems with the assistance of the institute staff. Official testing, the client paying the fees, is also done to certify to the quality of products for which export licenses are sought. (In Iran, the Institute of Standards and Industrial Research, ISIRI, was established in 1896 for the purpose of certifying the quality of some commodities, particularly those for export markets.) The programs benefit from the advice of many local industrial associations.

On the management side, in addition to the activities of the central agency, there are over 50 managerial centers in various prefectures and large municipalities. They provide periodic summaries of business information to small enterprises and also offer, with fees for more demanding inquiries, field service to handle problems. They give short courses for management development.

A major weakness is the lack of coordination between the two types of services. Also, curiously enough, the fees charged revert to the

central government and not to the organizations themselves, thus removing an incentive for expanding the programs (this may not be a universal policy in all prefectures, but was true in several which I visited).

Another weakness is that some national and local organizations are isolated in other Ministries, for example food and forest products, thus hindering the desirable cross-fertilization among disciplines.

Many of these organizations, including the local ones, existed before World War II, but were greatly handicapped by lack of financial support. As an instrument of national policy, to encourage industrial development, they have become increasingly important in the post-war years.

The technical and managerial services have had great effect on the change in the image of Japanese manufactures in other countries. Formerly Japanese products were thought of as artistic, ephemeral commodities, but today they are in many cases of extremely high technological quality. To accomplish this, the government developed a long list of items which required quality certification before export licenses were issued.

Thailand. A very successful management development program is in action, in which the graduation certificate of a student is conditional upon the successful completion of a project in his own enterprise, the subject being approved by his employer and his faculty advisor. At the time of my last visit in 1969, no liaison had been effected with the technological institute established in Bangkok several years ago.

Venezuela. In most Latin American countries it is the feeling that the numerous "productivity centers" established in the 1950's were not unqualified successes, and they have been discontinued. The program in Venezuela, which I visited briefly in 1971, is still very active. However according to comments of a former colleague, who has been on the staff, it has been effective. There is apparently no liaison with a technological institute.

Situation in The Lebanon

Successful executive development courses have been offered at A.U.B. They are used by large firms, however, and do not appear to reach small industry.

Although I have made many inquiries, I have not heard of any corresponding activities in behalf of small enterprises.

RECOMMENDATION

I recommend that programs of techno-management training and managerial service for small industries be established in The Lebanon. In my opinion, it would be most effective if organized as an extension of the Industry Institute, following the general pattern of the activities in Argentina, described above. Small fees may be charged for some courses and services, but by and large the program would have to be subsidized.

APPENDIX V

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 25 October 1971

DEVELOPMENT OF NEW INDUSTRIES TO UTILIZE SUB-STANDARD AGRICULTURAL PRODUCTS AND TO STIMULATE BETTER GRADING OF RAW PRODUCE

In most developing countries there is ignorance of or reluctance to accept the necessity for selective grading of agricultural raw products, particularly for more sophisticated export markets.

This situation exists also in Lebanon. I have been told of a number of incidents in which prospective foreign importers have been discouraged because they were sent samples showing unacceptable variation in quality, and even a difference in varieties. Still worse are occasional sharp practices such as submitting samples which are not representative, or "window-dressed" packages in which choice specimens are placed in the top layers; these are self-defeating, because the buyer loses confidence in the integrity of the potential supplier.

This memorandum is addressed to one means of stimulating better grading of raw farm products by developing secondary outlets for sub-standard material through new by-product industries.

There are, of course, longer range programs which can affect an improvement in the general level of quality of agriculture products:

- (1) educational efforts of the agricultural extension service;
- (2) a system of agricultural development loans to encourage improved farm practices;
- (3) selective purchasing of produce by wholesalers or processors;
- (4) agricultural development programs by wholesalers or processors to secure better supplies of raw materials;
- (5) promotion of

farm cooperatives to encourage use of better varieties, improved farming practices, and more effective marketing channels; (6) more aggressive services by vendors of agricultural supplies to introduce new methods and products. All these activities should be encouraged by public policies. Another means is to increase the use of awards and prizes by contests at agricultural fairs and exhibits.

Suggestions for By-Product Agro-Industries

The possibility of stimulating industries to make economic use of lower quality produce should receive priority attention. In the following sections a considerable number of ideas are suggested. A few of these appear to deserve immediate consideration for implementation. Most of the others are at present only possibilities, not probabilities. There is insufficient time for me to participate in their thorough techno-economic evaluation, but they are listed here to encourage further investigation of their potential.

In some cases there is said to be too limited agricultural production in Lebanon to permit such operations to become viable. In a separate memorandum I am proposing quantitative investigation of means of reducing avoidable wastage of farm produce between standing crops and the consumer. This might lead in some border-line cases to increasing the volume of raw materials to an extent that will justify by-product industries. These will, of course, be longer range objectives.

Dried Banana Powder

About 1935 a semi-commercial plant was operated in the United States to produce good quality powdered banana by means of an atmospheric drum drier process. Bananas were converted to a slurry which was fed on to a large steam-heated cylinder and the dried film was scraped off at the end of the revolution by a doctor blade. Cylinder and blade were chrome-plated to prevent corrosion. I witnessed several experimental runs and had no reason to question the claims that the process was economically feasible.

Strenuous efforts were made to create a market of sufficient size, under the direction of a noted authority/^{on} nutrition. Aside from the obvious uses in ice cream and sweet bakery goods, an attempt was made to introduce it into white bread to improve the nutritional quality; the results were discouraging because only a low percentage could be employed without undesirable reduction in oven-spring. The enterprise was finally abandoned.

I have heard that in recent years there has been revived interest in powdered banana, particularly in Latin American countries which are producers of this fruit. If there is definite interest in the idea, I can suggest sources of definite information.

I believe this concept should be considered for The Lebanon if there is sufficient supply of bananas. A small drying unit would not be very expensive, the technology is simple and pre-pilot drier which is installed at the Industry Institute could be used to work out details of process and to make samples for market testing. An immediate important use would be for physical admixture with defatted dried milk to improve nutritional value and flavor.

I recommend against consideration of three other available processes for producing powdered banana, viz. vacuum roller, spray drier, and "freeze drier". They require more expensive equipment, larger through-put for economic size, and more complicated technology.

If a commercial unit were to be installed for drying bananas, its off-season producing capacity could be utilized for drying other fruits and vegetables with different crop cycles, provided that there are supplies within economic transport range.

Dried Apples

There is said to be a problem in marketing surplus production of some varieties of apples. Processes for drying sliced apples by kilns or tunnels have been used for years. Sun-drying is also a possibility unless atmospheric moisture is too high. Market potential for this product should be studied.

Atmospheric roller drying is also a possibility, although I suspect that a carbohydrate carrier might have to be added. This was the essence of the invention of R.S. Fleming fifty years ago which led to the commercial production of powdered citrus juices in the United States by spray-drying. Investigation of roller drying could be made through a development project at the Industry Institute, using its experimental unit. If apple powder can be produced, it could also be used with de-fatted skim milk powder, either as an alternative to or in combination with powdered banana.

Essential Oils and Floral Extracts

There appear to be opportunities to create an industry by extracting the oils from herbs or flowers. The quality of local peppermint, for example, is said to be excellent. The technology for producing

these oils is well known and readily available. A comprehensive survey of world markets should be made for those commodities which could be produced from present or potential Lebanese raw materials.

Infant Foods

The concept of enriching defatted milk powder with banana or apple powder has already been mentioned. In addition, the potential markets for a line of strained canned vegetables and fruits should be analyzed. If roller drying equipment is installed, some of the products could be made in powdered form.

Other Apple Products

The following ideas should be considered only as suggestions, because there has not been time to make even preliminary studies of feasibility. They should be screened by techno-economic evaluation before they are discussed with potential entrepreneurs.

To assist in utilizing surplus off-grade apples, juicing could be considered for new industries such as preserved apple juice, apple champagne, fermented and distilled products, cider vinegar, and combinations of apple juice with other fruit juices and/or flavors. In some industrialized countries new applications of the jelling property of apple pectin are found in apple jellies with other flavoring materials, such as mint. Apple pulp can be used in the form of preserved infant foods, and perhaps as jams, especially when other flavors are added. Preserved "apple sauce", i.e. stewed apples, is very popular in the United States. Pectin recovery from the pomace produced by juicing may be a possibility.

Citrus By-Products

Cull citrus fruits are suitable for the preparation of preserved juices, and eventually for quick-frozen products. The skins can be candied as confections, used in marmalade, or dried for use as a component of cattle feed. Essential oils (orange, lemon, tangerine) should be considered as a new industry. Recovery of citric acid may be longer-range possibility.

Onion Products

Dried onions should be improved in quality by better grading of raw material and control of process. The extraction of onion oil may be a possibility.

Preserved Vegetable Products

Carrots, beans, tomatoes and other vegetables in surplus supply may be canned, dried, or processed to yield "strained vegetables" for infant feeding.

Recommendation

The suggestions for new products listed above, as well as ideas from other sources, should be given preliminary study to set priorities for those which should be investigated in depth. Those that seem to hold most promise for short-range development are: dried bananas, dried apples, preserved apple juice, essential oils and floral extracts, infant foods, dried onions, and canned vegetables.

Additional innovative concepts could be stimulated by offering rewards for successful ideas, as was done during the Napoleonic Wars, with the result that sterile processing of foods was developed by N icholas Appert.

APPENDIX VI

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 17 October 1971

INVESTIGATION OF THE APPLICABILITY TO THE LEBANON OF SOME FEATURES OF THE SINGAPORE INDUSTRIAL DEVELOPMENT PROGRAM

I had an opportunity to study the industrial development program of Singapore late in 1965 and I consider it one of the best organized, most comprehensive, and dynamic I have seen anywhere in the world, including the highly industrialized countries. I have not visited Singapore again since that date, but I understand, from colleagues who have, that the program is progressing in a highly gratifying manner.

The situation of Singapore offers many similarities to that of The Lebanon. Singapore has a population of roughly the same size, small geographical area, limited natural resources, and intelligent, industrious, and quite well educated people. Facing a loss to the economy of reduced entrepôt functions and the income from a large British naval base, the government felt obliged to take steps to provide employment for the rapidly increasing labor force. Industrial development appeared to offer the best opportunities and accordingly an autonomous agency was created over a decade ago to undertake this task.

Scope of the Singapore Industrial Development Program. The center of this autonomous program is a large planning agency with a competent professional staff which makes thorough techno-economic evaluations of the general economy. They also analyze the merits of requests for authorization to establish new enterprises and of all applications for development loans.

A major activity has been the installation of two large industrial estates, one for heavy industry, the other for light industry. An excellent infrastructure of facilities has been provided for each. They are located at some distance from the center of the city. To encourage decentralization of population from overcrowded districts, attractive housing, shopping, and schools have been erected.

An aggressive program of export promotion has been established. This consists of marketing information, "trade fairs", central exhibits of local products, and expert advice on industrial design.

Technical information and assistance is provided by a comprehensive technological institute, which cooperates closely with institutions of specialized education. The scope of the work includes analysis and testing, standardization, technical assistance, product and process improvement, and development of new products and processes.

A separate but coordinated organization deals with the problems of small enterprises. It offers assistance on technical and managerial problems.

Practical courses in management development are offered by a cooperative scheme with the local management association.

There is also a good program for training apprentice workers in special skills.

The merit of this comprehensive structure is that all activities are coordinated through a competent central agency.

Recommendation: I recommend that a small survey team of experts be sent by the Government to Singapore for a period of several weeks to make a comprehensive study of this development program. Desirable skills for this purpose are: economic planning, engineering technology, marketing, and public legislation.

This team should be joined in the final stages of their study by a senior government official to review their findings and to make additional high-level contacts.

I am convinced that this survey will reveal many valuable policies and procedures which can be adopted or modified to suit Lebanese requirements.

APPENDIX VI

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 17 October 1971

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APPENDIX VII

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 16 October 1971

A PROJECT TO STIMULATE SPECIFICATION MANUFACTURE OF HOUSEHOLD GOODS BY SMALL FIRMS THROUGH A CENTRAL MARKETING ENTERPRISE

The objective of this project is to encourage the establishment of an aggressive marketing enterprise for household goods which will rely for a major part of its commodities on small local firms which will be assisted in the manufacture of specification products by the expertise of this central organization. This concept is based on the performance of Sears-Roebuck in successfully demonstrating the practicality of this type of operation in Latin America.

Background: In the late 1940's Sears-Roebuck, one of the most skilled retail merchandizing organizations in the world, embarked on a project to install in Mexico a large general store of the type that had proved so successful in the United States. The original concept was that the merchandise would consist of 80 percent imported goods and 20 percent of local manufacture. Specified quality is the keystone of the operation, and efficient purchasing and marketing management has always resulted in low prices to the consuming public. By systematically encouraging Mexican enterprises to undertake production of their requirements, the proportion of imports was greatly reduced over expectations and by the middle 1950's 80 percent of the products sold were manufactured locally.

This impressive program was initiated by sending a team of production and business management experts to Mexico. They selected firms of small and medium size which wished to cooperate. They assisted them in organizing production operations and quality control to yield items meeting the rigorous standards of the merchandising organization. They aided them in installing sound business practices. They provided financial assistance under favorable terms where necessary.

The benefits to the local producers were marked. They enjoyed the advantage of a steady customer for a major part of their output at attractive profit. The efficiency of their operations was considerably increased. The effect on competitive industry not directly involved in the scheme was to raise the standards of industry as a whole.

The advantage to the consumer was quality merchandise at lower prices. The competition also improved the performance of other retailers.

The experience of Sears Roebuck in Mexico City was so successful that similar stores were established in other countries of Latin America.

Egyptian Study of the Concept in 1954. While I was familiar in a general way with Sears Roebuck's Mexican operation, I had the good fortune to learn the details from an executive of the company, of Middle Eastern origin and background, who came to Cairo for several weeks in 1954 as a U.S.A.I.D Expert on retail merchandizing. I spent considerable time with him investigating the local situation.

We found that a few of the large "department stores" in Cairo had already made a start in this direction by establishing small subsidiaries (in a few cases contract production by independent manufacturers) to make such items as ready-to-wear clothing, decorative electric light fixtures, and small bathroom hardware. We located a number of small firms which could have been developed into competent suppliers in a number of different lines.

In short, the opportunity had practical potential, but the business climate at the time was such that the concept was not pursued further. Interestingly enough, the expert felt that Beirut then offered many advantages for an operation of this kind.

Consideration of Alternatives to a New Merchandizing Enterprise

It is of course feasible to encourage large general merchandizers already in operation to undertake the development of local suppliers. Inertia would probably make this a rather slow process. Further, they are unlikely to have the skills and patience to stimulate constructively the productive capability of potential manufacturers.

I have been told that some industrialists are interested in providing marketing organizations to serve as outlets for small manufacturers or household producers. An example is found in the successful Maison des Artisans, sponsored by a government agency. To me it is doubtful, however, that any such move would provide the strong impetus of a vigorous new marketer, or would have the leverage to enforce efficient production of standardized items.

Recommendation. I recommend that an approach be made to Sears-Roebuck/^{to} explore their possible interest in establishing a merchandizing organization in Lebanon. They might do this as a company operation, as a joint venture with Lebanese interests, or as a consultant or adviser to a local group. I believe their cooperation is of paramount importance because of their extensive experience and know-how.

APPENDIX VIII

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 19 October 1971

Investigation of the Supply-Demand Situation for Professional Personnel

In 1941 quantitative methodology was developed by Andrew Fraser and the writer for analyzing the professional and economic status of the membership of the American Chemical Society, using a completely pre-coded questionnaire sent to each individual member without follow-up; a gratifying response of over 75 percent was obtained. In 1944 the survey was repeated to determine the effect of wartime re-adjustment on the structure of employment.

In 1946 a similar investigation was carried out by us for the constituent societies of Engineers Joint Council, with a membership of about 100,000. Because chemical engineers were included in all three studies, this gave a run of the period 1926-1946, the longest span of quantitative data for any professional group.

The methodology is now the basis for the National Register of Specialized Personnel in the United States. The information is updated periodically and coverage has been expanded to include the social sciences as well as the natural sciences and engineering.

Surveys of the status of professional personnel have been made in some developing countries, but the only one that was properly designed, so far as I am aware, was one carried out in Colombia about 1966-67, with advisory assistance of the U.S. Division of Labor Statistics and the Manpower Committee of the U.S. National Academy of Sciences. Publication of the results of the Colombia study was regrettably slow.

The estimation of demand for professional personnel requires a different technique, such as that developed by the Employment Committee of the U.S. Engineers Joint Council. The results are much less reliable than surveys of the individuals themselves, but the data are none the less helpful in setting educational policies and providing placement services.

Surveys of Professional and Economic Status

The completely pre-coded questionnaire developed by Bass and Fraser, which was returned without identification of the individual preparing it, covered the following points:

Professional Maturity: Based on the year of first college degree (actual median age about 23 in the United States). For non-graduates the respondent was asked to estimate the year in which he first attained professional status.

Education: In addition to age at graduation, the respondent was asked to specify his major field and the highest degree awarded. In The Lebanon it would be interesting to learn how many had been trained abroad.

Geographical Location: This question is important in the United States, but might be disregarded in The Lebanon.

Type of Employment: Government service, educational institution, private industry, self-employed.

Field of Employment: An array of major fields of natural and social sciences and engineering.

Employment Status: An array of levels of responsibility.

Nature of Employment: An array of specialized activities such as analysis and testing, design, research and development, production, marketing, etc.

Flexibility of Employment: Number of different employers worked for during a stated period of years.

Salary: Regular salary from employment per month or year, exclusive of fringe benefits and other income.

Total Income: Data for income during the year from all sources, without further break-down.

Historical Perspective: Respondents were asked in certain questions to give data for a selection of previous years in order to establish trends.

Correlation Analysis: The tabulations were programmed to provide information on salary over a period of years as related to other aspects of employment.

Value of Results

The data supplied information regarding the pattern of deployment of professional personnel according to type, field, status, and nature of employment.

An extremely useful feature was reliable information about rates of remuneration which had never been available before. It was clearly apparent that at that time salaries in universities and in government were much below those in industry for equivalent positions. This has provided leverage for needed adjustments and for several years the levels have been in reasonable equilibrium. It was also apparent to individuals, although they could not be identified from the anonymous questionnaires, that they were being paid below a reasonable norm for their occupational status and they could therefore reach appropriate decisions to attempt to remedy the situation.

Estimation of Employment Opportunities

Some idea about employment opportunities can be obtained from trends projected from data on professional and economic status. These estimates are not reliable, in some cases, however, because of rapidly changing conditions which they fail to reflect.

In any case, it is desirable to gather the information directly from a representative sample of prospective employers. This is not as successful a procedure as one could wish, but I know of no better way.

The concept has been tried in some developing countries, but unfortunately discontinued after discouraging results the first year. Success depends on repetition, because the sample of employers gradually becomes acquainted with the technique and more willing to take seriously the requests for estimates.

Recommendation

I recommend that the statistical section in the Ministry of Planning conduct a survey of professional and economic status of the character described above, taking into consideration the following points:

- a. To secure professional endorsement, it would be well to plan and carry it out in collaboration with one or more professional organizations.
- b. Some effort will be necessary to develop a comprehensive list of potential respondents, and for this purpose it may be necessary to do considerable promotion to get the names of individuals.
- c. Unless there is strong reason to the contrary, the questionnaires should be anonymous to encourage an adequate number of responses.
- d. I believe it would be wise to limit the survey to the natural sciences and engineering for the initial study if the universe is large enough to provide cells of size to be statistically significant.

- e. The questions should be much simplified from the questionnaires used in the United States.

There are apparently no copies in Lebanon of the reports I have mentioned. I have copies in the United States and can mail them immediately on my return home in mid-December. I can also obtain information about the survey made in Colombia, but this will take longer.

I recommend also that steps be taken to start a survey of employment opportunities. Here again I can mail some pertinent information on my return to the United States.

APPENDIX IX

الجمهورية اللبنانية
مكتب وزير الدولة لشؤون التنمية الإدارية
مركز مشاريع ودراسات القطاع العام
Lawrence W. Bass
UNIDO Senior Consultant on
Industrial Development

Beirut, October 27, 1971

SURVEY OF ORGANIZATIONS, FACILITIES AND PROGRAMS TO STIMULATE CAPABILITIES FOR DEVELOPING INNOVA- TIVE TECHNOLOGY

One of the most valuable assets of a country for industrial development is its resources of skilled personnel for research and development projects, the organizations with which they are connected, and the specialized equipment and facilities which are available to them. A survey of professional and economic status of specialized personnel, as recommended in another memorandum, will yield gross data on the numbers and backgrounds of individuals engaged in these activities. The present memorandum is devoted to the infrastructure in which they operate.

Information on Research and Development Organizations

One of the most valuable compilations for measuring the growth of applied research and development is the publication "Industrial Research Laboratories of the United States", which was started by the U.S. National Research Council in 1920; new editions appear at intervals of about every five years. In 1920 the list included less than 300 laboratories, but the current issue shows several thousand. Each entry gives the name of the organization, the name of the research director, the size of the staff and the disciplines represented, and the major areas of investigation. Other information sometimes included covers the year when organized research was started and the size of the technical library.

Similar publications are issued for government research organizations. Some compilations, usually in selected fields, have been made of academic research programs, and some lists of postgraduate thesis subjects are also available.

More recently these types of information have been published in countries of Western Europe, and some developing countries are beginning to follow the pattern.

Lists of Specialized Equipment and Facilities

In the United States lists of equipment and facilities in different laboratories in various specialized fields began to be issued many years ago. This information is especially valuable in developing countries, many of which, for example Brazil, are beginning to adopt the scheme. The importance of the knowledge is illustrated by the example of an experimental roller drier at the Industry Institute referred to in another memorandum on by-product agro-industries.

Because of the importance of technical literature, programs to compile systematic information about the availability of journals and reference books has been begun in some developing countries, in Brazil for instance.

Discussion Groups of Technical Managers

It is very advantageous for managers of technical activities to have an opportunity to discuss informally their common administrative problems. This can be done without the risk of disclosing confidential information about specific research projects, a fear sometimes expressed by conservative industrialists.

The first organization of this type was to the best of my knowledge a membership association established in the United States in 1923 for regular monthly luncheon and dinner meetings of a group of research directors from large firms. It is still in operation with a roster of about 30 elected members. Since 1938 a number of other organizations of similar character have sprung up, some of them with membership concentrated in a large industrial center, and one devoted to promotion of interaction among representatives of government, industrial, and university research.

This movement is now becoming very active in Western Europe. Its extension to developing countries is being promoted by an organization sponsored by UNIDO: WAITRO (World Association of Industrial and Technical Research Organizations). Some organizations of national character are being formed, notably in Brazil.

Training Courses in Technical Management

The first university course of this type of which I have knowledge was organized at New York University in the United States in 1938. Since then several other education institutions have established similar courses.

Usually many of the lectures are given by industrial research executives. The programs of the American Management Association, and more recently of its European offspring in Brussels, have included many workshops on the subject. A number of individual professors in schools of business administration are interested in the problems of research management and assign post graduate thesis problems in this area to their students.

This interest in "research on research" has spread to Western Europe, and a number of training courses and workshops have been organized in various countries.

The first formal training course in the management of technical programs in a developing country was given in the U.A.R. in 1964. It was sponsored by the Ford Foundation in cooperation with the Egyptian National Institute for Management Development, and conducted by a four-man team from Arthur D. Little, I.c., of which I was the leader. Some local specialists also gave lectures in their respective disciplines. I organized the program, wrote a 35,000 word syllabus, selected much supplementary material for distribution to participants, coordinated the presentations, and supervised the activities of small working groups which selected and programmed specific industrial projects. The three-week course was attended by 38 Egyptian technical directors from government, industry, and universities. They were all housed in a hotel throughout the sessions. They received diplomas in a final meeting.

Recommendations

I recommend that all these activities be started in The Lebanon. They do not necessarily require action by government agencies, but should be undertaken by any organizations or individuals who are interested. Specific comments on the local situation are made under each heading.

Information on Research and Development Organizations: This project might be undertaken jointly by the National Council for Scientific Research, the Association of Lebanese Industrialists, and representatives of a university and a government laboratory. It could be started as soon as someone takes the initiative.

Lists of Specialized Equipment and Facilities: The same comments apply here.

Discussion Groups of Technical Managers: Any organization of this type, because of the small volume of industrial research per se, would probably need to include representatives of government and universities, technical heads of larger companies, and technically oriented managers of small industrial firms. A nucleus of four or five members would be sufficient for a start, although a larger group is desirable. What is needed is a recognized leader of the technical community who has the interest, enthusiasm, and perseverance to or-

ganize the activity. Associations of this kind sometimes grow out of a small group of numbers meeting periodically in private homes.

Training Courses in Technical Management. Again, the organization of this activity depends on the interest and enthusiasms of an individual. The activity could be sponsored at A.U.B. by the Department of Business Administration or one of the technical departments, the Association of Lebanese Industrialists, the Lebanese Management Association, the Ministry of National Economy, the Ministry of Planning, or the National Center of Scientific Research.

There might be more than one course to suit the needs of the educational community, government representatives, industrial technical managers, and managers of small enterprises. On the other hand, a single course could be designed of broad enough scope to satisfy all different interests to a reasonable degree.

Published information is available to provide background material for a course, for example, the UNIDO Manual on the Administration of Industrial Research Institutes in Developing Countries (the subject matter is applicable to all technical activities, not just to technological institutes) and other UNIDO publications. Additional suggestions of course content are being prepared by UNIDO, MAITRO, and other organizations. I am now outlining subject matter for a four-session course on "Management of Development Projects", including as major topics: (1) selection and definition of projects, (2) programming project activities, (3) carrying out and controlling projects and (4) the management of inter-disciplinary project teams.

APPENDIX X

Lawrence W. Bass
UNIDO Senior Consultant
on Industrial Development

Beirut, 27 October 1971

QUANTITATIVE INVESTIGATION OF REMEDIAL STEPS TO REDUCE WASTAGE OF AGRICULTURAL PRODUCTS BETWEEN FARM AND CONSUMER

There is considerable loss in many countries in agricultural produce between standing crops in the field and the amount that finally reaches the consuming public. This wastage results from inefficient mechanical operations, and from spoilage and damage by pests. In India it has been estimated that the loss of grain - a relatively stable product - is about 15 percent. For perishable fruits and vegetables, it is claimed that the wastage between the market gardening area and the central city which it served amounted to 35 percent. Obviously there would be a great nutritional and economic gain if major sources of loss could be partly corrected. In highly developed countries handling and processing losses approach a minimum.

The sources of loss can be identified and quantified by a procedure which process engineers call a "materials balance". This involves a step-by-step measurement of the net weight of material as it is harvested, collected, stored, transported, processed (if processing is involved), and distributed. To determine net weight, because variations in water content must be eliminated to reach a meaningful materials balance, a convenient chemical analysis is useful, such as butterfat testing for milk products, fat content for oil seeds, sugar content

of sweet produce, or nitrogen content of legumes. If the means for analytical determinations are lacking, dry weights may be used, although the results will be less accurate.

The benefits from such a program reach all sectors of the economy. Farmers are encouraged to improve their practices and thus earn more. Middlemen, wholesalers, retailers, and exporters enjoy the advantage of a supply of greater uniformity and lowered spoilage. Processors have a better source of raw materials. And consumers benefit from an improved standard of quality at lower prices because of greater efficiency in the entire chain of transactions.

This subject is pertinent to industrial development as a means of increasing supplies of raw materials for agro by-product industries, and of improving uniformity and quality of raw produce for export and local markets. In a separate memorandum suggestions are made for potential by-product industries.

The procedure involves segregating an adequate experimental sample and following the changes in net weight as the material passes through successive operations. At each step the appropriate sources of loss should be listed and the magnitude of their effect estimated. Practical methods of reducing wastage should be evaluated, and this evaluation should include cost-benefit ratios.

The concept of mass balances to increase efficiency has long been used to control the extraction of cane sugar and beet sugar from the raw materials. It has been applied to the wood industries, for example, in following operations from estimates of lumber in standing trees, through logging, to sawmill operations. The scheme is in common use in modern food processing plants, such as milk products plants, canning plants, etc., and the most progressive organizations extend the materials balance concept to assist farmers to improve their agricultural practices. One large quick lunch company with many retail branches kept track of the number of sandwiches to be produced from a given weight of dressed chickens, beef, and ham.

Recommendation

I recommend that some research organization in Lebanon concerned with agricultural products be encouraged to conduct one or more pilot studies to demonstrate the benefits to be obtained from such investigations. The idea should be explored with such institutions as the Green Plan and the School of Agriculture at A.U.B.

The investigations should be carried out by an interdisciplinary team consisting for example, of an agricultural economist, an agricultural engineer, a food technologist, a specialist in food marketing, and a specialist in operations research methodology.

If financial support for the investigation is needed, funds might be obtained from an international agency, through a bilateral agreement, or from a philanthropic organization. A convincing program would have to be submitted with the request.

APPENDIX VI

Lawrence W. Bess
UNIDO Senior Consultant
on Industrial Development

Beirut, 29 October 1971

STIMULATION OF HANDICRAFT INDUSTRIES

A very effective approach to assist the development of handicraft industries has been made by the Ministry of Social Affairs to stimulate handicraft production and marketing. The Maison des Artisans is an excellent example of this activity.

The purpose of this memorandum is to call attention to the very comprehensive and aggressive program that has been established in the Philippines. A new agency was set up over a decade ago to encourage what they term "cottage industries", namely, hand-crafted pottery, decorative textiles, costume jewelry, small decorative metalware, objects of woven coarse fibers, and the like. The central office has a staff of experts to provide advice, improving designs, quality, techniques, and marketing procedures. Branch offices have been set up in various localities and experts are sent out from the central organization to assist in expanding the program.

I visited the central office and one branch office in 1965, and consider the operation to be one of the most comprehensive and successful programs I have seen in any developing country. It brings to mind the

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- 2 -

impetus given to the production of silver jewelry in Taxco, Mexico, which I have also seen at first hand; in this case, the initial stimulus came many years ago from the enthusiasm and organizing ability of one man, who encouraged improvement in household and small enterprise production of better design and workmanship, and also worked out an effective marketing channel.

RECOMMENDATION

I recommend that the concerned department in the Ministry of Social Affairs write to The Cottage Industry Agency in Manila, The Philippines for full information about this activity, if they are not already acquainted with it. At the time of my visit they had available some excellent brochures and reports which told the story in full.

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