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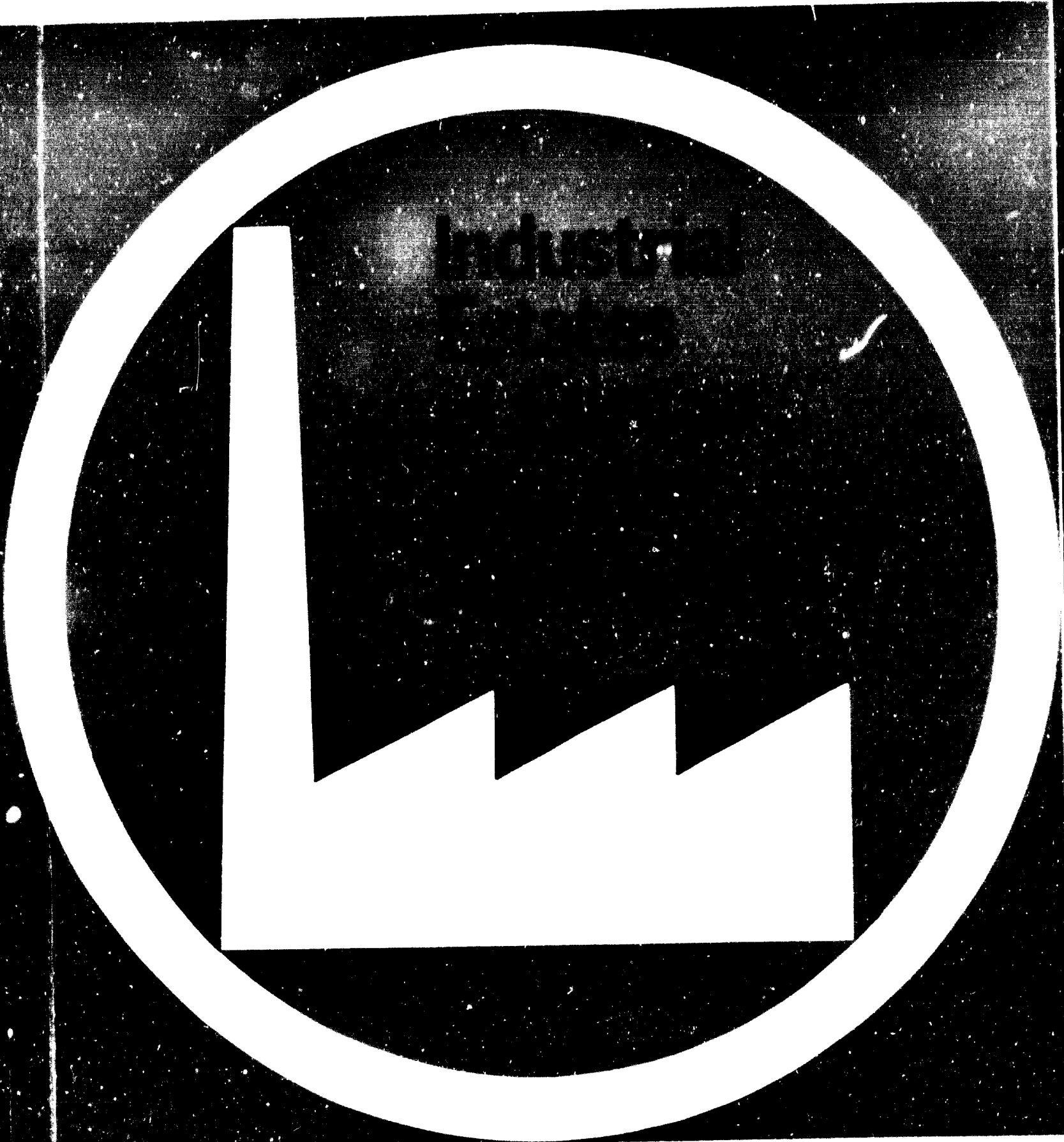
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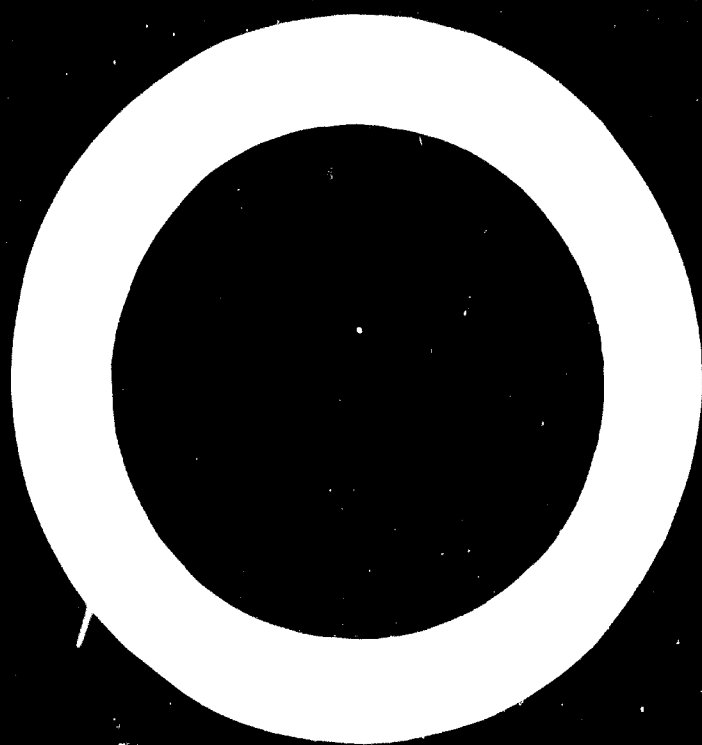
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION





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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

*Industrial Estates in
Europe and the Middle East*



UNITED NATIONS
New York 1968

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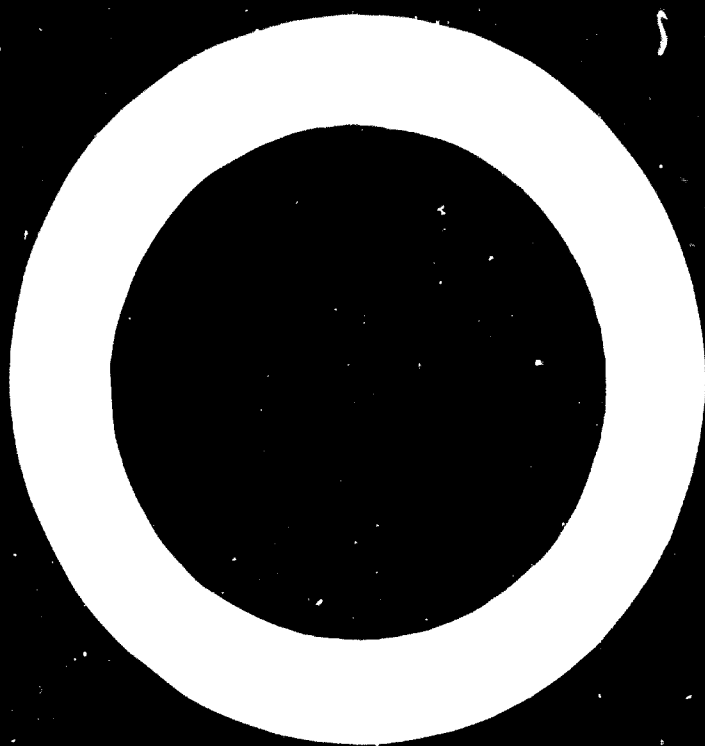
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Preface

THE PRESENT PUBLICATION is the sixth in a series of studies and reports relating to industrial estates to be published by the United Nations. Three of these publications are concerned with general aspects of the subject.¹ The three others, including the present one, discuss industrial estate problems from a regional standpoint.²

The publications concerned with regional aspects contain the reports of United Nations seminars on industrial estates and selected papers submitted to these conferences. The first two seminars related, respectively, to Asia and the Far East (1961) and to Africa (1964). The third and fourth conferences were held during October and November 1966. A Consultative Group on Industrial Estates and Industrial Areas in Certain European and Other Countries in the Process of Industrialization—sponsored jointly by the Centre for Industrial Development (now the United Nations Industrial Development Organization) and the Bureau of Technical Assistance Operations (now the Office of Technical Co-operation)—met in Geneva, Switzerland, from 24 to 29 October 1966. Another Consultative Group, under the same sponsorship, for the Arab Countries of the Middle East met in Beirut, Lebanon, from 31 October to 5 November 1966.

The present publication contains the reports of the two Consultative Groups and six discussion papers and one information paper submitted to the Groups.

The reports of the two Consultative Groups (Parts I and II) contain findings and recommendations on policy aspects, economic and physical planning, organization and management, services and facilities, financing, and regional and international co-operation in the development of industrial estates in the respective countries.

The paper on "Industrial Estate Plans and Projects in Some European and Other Countries" (Part III) contains a general survey and country

¹ See *Establishment of Industrial Estates in Under-developed Countries* (60.II. B. 4); *The Physical Planning of Industrial Estates* (62. II. B. 4); *Industrial Estates: Policies, Plans and Progress — A Comparative Analysis of International Experience* (66. II. B. 16).

² The two other publications are *Industrial Estates in Asia and the Far East* (62. II. B. 5) and *Industrial Estates in Africa* (66. II. B. 2). A report on Industrial Estate Plans and Projects in Latin American Countries is included in a forthcoming publication *Small-scale Industries in Latin America*, to be published by the United Nations in 1969.

data on Belgium, Bulgaria, Cyprus, Denmark, Finland, France, Greece, Ireland, Israel, Italy, Malta, the Netherlands, Spain, Sweden, Switzerland, Turkey and the United Kingdom. The survey was prepared by the Secretariat on the basis of replies from governments to a questionnaire on industrial estates issued in 1964 and up-to-date information sent during 1967 by many of the participants in the Geneva Consultative Group. Data on plans and projects in Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia and Syria, based on information supplied by participants in the Beirut Consultative Group, are included in the report of the Group (Part II).

The paper on "The Role of Industrial Zones, Areas and Nuclei in Development Policies and Programmes, with Special Reference to the Promotion of Small-scale Industries: The Experience of Italy", prepared by Mr. C. Alhaique (Part IV), brings out a number of conclusions and suggestions for developing countries, based on the lessons of the experience of the Mezzogiorno (Southern Italy).

The paper on "The Role of Industrial Estates, Areas and Zones in Providing an Industrial Base in Urban and Regional Development Plans", prepared by Mr. A. A. Solow (Part V), examines the role of industrial estates, areas and zones in urban and regional development planning, and more specifically their role as a tool for planned industrial location and development. The paper concludes that industrial estates, areas and zones can make a significant contribution in providing an industrial base for development and in guiding industrial location, as one of the many co-ordinated elements of urban and regional planning. The paper contains an analysis and recommendations on the provision of industrial land and facilities under a comprehensive urban planning system.

The paper on "Pre Project Planning for Industrial Estates", prepared by Mr. P. Quigley (Part VI), sets out in detail the main tasks to be performed in the pre-project planning of an industrial estate. It provides a frame of reference and a check list for the industrial estate planner and criteria, guidelines and planning ratios for preparing a project proposal. It also contains some considerations on the management and operation of an industrial estate and some criteria for establishing port and airport estates.

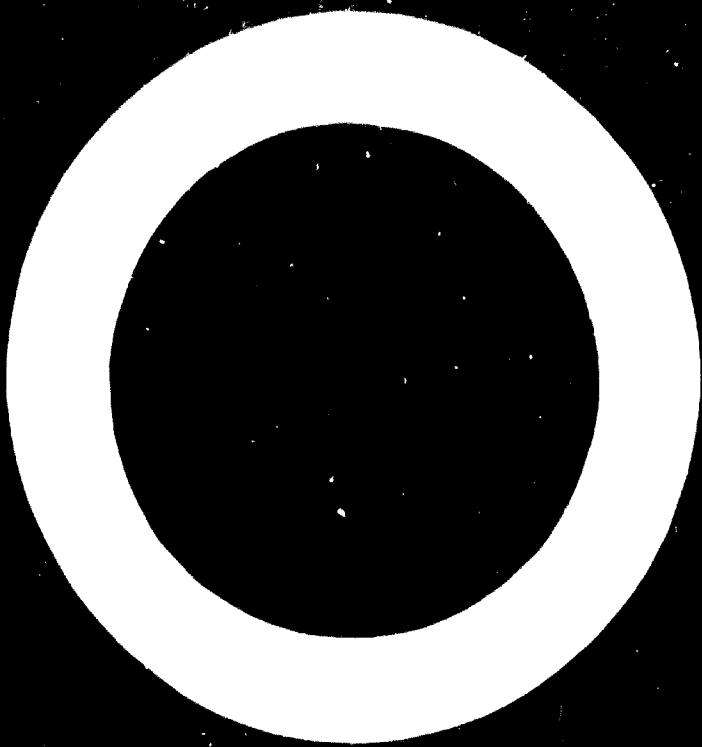
The paper on "Public and Private Financing of Industrial Estate Projects and Stimulation of Private Projects by Government Authorities with Special Reference to India's Experience", prepared by Mr. B. K. Chatterji (Part VII), provides an analysis of financing sources and methods, according to sponsorship, location and type of industrial activity. The paper recommends a system of guarantees and insurance to facilitate private and institutional financing for industrial estate projects and to reduce the burden of government financing.

The paper on "United Nations Activities in the Field of Industrial Estates", prepared by the Secretariat (Part VIII), describes research projects and seminars and technical co-operation activities carried out by United Nations agencies, and includes an outline of a hypothetical request for

assistance from the United Nations Development Programme (Special Fund sector) and hypothetical terms of reference for technical assistance experts in this field.

The last paper in this publication—"Research Parks in the United States: A Case Study from Colorado"—prepared by Mr. J. E. Stepanek (Part IX), provides an example of the planning and operations of a specialized industrial estate for stimulation of research activities.

The present programme of work of the United Nations Industrial Development Organization envisages the preparation of studies and reports on specialized industrial estates, such as the functional industrial estate and the ancillary industrial estate, and on particular aspects of industrial estate development, such as the provision of common service facilities, physical planning standards, and so on. The United Nations Industrial Development Organization also expects to expand its technical co-operation activities in promoting the establishment of industrial estates and industrial areas in developing countries.



PART I

Report of the United Nations Consultative Group on Industrial Estates and Industrial Areas in Certain European and Other Countries in the Process of Industrialization

Geneva, 24 — 29 October 1966

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INDUSTRIAL ESTATES AND AREAS: CONSULTATIVE GROUP ON SOME EUROPEAN AND OTHER COUNTRIES

INTRODUCTION

Organization and attendance

THE UNITED NATIONS Consultative Group on Industrial Estates and Industrial Areas in Certain European and Other Countries in the Process of Industrialization met in Geneva, Switzerland, from 24 to 29 October 1966. The Consultative Group was sponsored jointly by the Centre for Industrial Development¹ and the Bureau of Technical Assistance Operations of the United Nations Department of Economic and Social Affairs.

The Consultative Group was attended by fifteen participants from ten countries—Bulgaria, Cyprus, Greece, Hungary, Israel, Malta, Poland, Spain, Turkey and Yugoslavia; staff members and consultants of the Centre for Industrial Development; and representatives of the Economic Commission for Europe, the International Labour Organisation, the Food and Agriculture Organization of the United Nations and the European Economic Community. A list of the participants is given in Annex I.

Mr. I. A. Iliuschenko, Director, Steel, Engineering and Housing Division of the Economic Commission for Europe, welcomed the participants in the course of his opening address. Mr. Igor Krestovsky, Chief, Small-scale Industry Section, Policies and Programming Division, Centre for Industrial Development, served as Director of the Consultative Group and conducted the proceedings.

The meetings of the Consultative Group closed on 28 October 1966 with a motion of thanks to the Director, staff and consultants of the Group. The participants visited an industrial zone in Geneva (Fondation des Terrains Industriels Praille-Acacias) on 29 October 1966.

Opening statement

Welcoming the participants, Mr. I. A. Iliuschenko observed that this was the first conference on industrial estates and industrial areas organized by the United Nations primarily for European countries in the process of industrialization. While the Economic Commission for Europe had not

¹ Now the United Nations Industrial Development Organization (UNIDO).

itself worked in the field of small-scale industries and industrial estates, it had about two decades of experience in the planning and programming of industrial development, both for the market economies of western Europe and for the socialist economies of eastern Europe. Mr. Iliuschenko expressed the hope that the deliberations of the Consultative Group would encourage the use of properly planned industrial estates and industrial areas for promoting industrialization and influencing industrial location in the developing countries of the region. The work of the Consultative Group would be useful not only for the countries of the participants, but also for developing countries of Asia and the Far East, Africa, the Middle East and Latin America.

In the course of his introductory remarks, Mr. Krestovsky, Director of the Consultative Group, stated that the purpose of the meeting was to discuss the role of different forms of industrial clustering, especially industrial estates, in the development policies and programmes of the countries of the participants, with special reference to the promotion of small-scale industries, and the planning, organizational and financial problems involved. It was expected that the Group would encourage the use of industrial estates and areas as an instrument to promote industrialization and influence industrial location, would help in setting standards for such projects in the light of regional conditions and needs, and would stimulate international and regional co-operation, including technical assistance, in this field.

Adoption of the agenda

The provisional agenda was adopted. The agenda is given in Annex II.

1. REVIEW OF DEVELOPMENTS IN THE FIELDS OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS IN THE COUNTRIES OF THE PARTICIPANTS

The Group had before it a document prepared by the Secretariat on "Industrial Estate Plans and Projects in Some European and Other Countries", which reviewed the experience in some industrialized European countries—Belgium, Denmark, Finland, France, Italy, the Netherlands, Sweden, Switzerland and the United Kingdom—and in some European and other countries in the process of industrialization—Bulgaria, Cyprus, Greece, Ireland, Israel, Malta, Spain and Turkey. In the course of the discussion the participants from Bulgaria, Cyprus, Greece, Hungary, Israel, Malta, Poland, Spain, Turkey and Yugoslavia described plans and projects in their countries. A review of developments in Ireland and Italy was presented by the consultants who were intimately connected with the programmes in these countries. The officials of the Secretariat of the

European Economic Community outlined the project developed with the technical assistance of the Community in the Bari-Taranto area of southern Italy.

Among the countries of the participants, Cyprus had established an industrial estate at Nicosia and was planning to establish industrial estates at Larnaca, Limassol and Famagusta; an industrial area providing improved sites was in operation at Larnaca. In Greece, plans were made to establish a first industrial area, industrial estate and industrial free zone near Salonika; industrial areas and estates were planned for establishment at a later date at Volos, Patras, Kavalla and Heraklion. In Israel, industrial estates, mainly in the form of flatted factories, had been set up in the following developed urban areas: Tel Aviv, where there were four industrial estates including the largest in the country; Jerusalem, Petah Tiqwa and Givatayim. In the developing regions of Israel, industrial estates were set up in the following new towns: Kiryat Shemona, Zfat, Nazareth, Migdal-Ha'emek, Carmiel, Ashdod, Beit-Shemesh, Shderot, Demona and in ten other small towns. In Malta, there were three industrial estates—at Marsa, Msierah and Mriehel—for industries of all sizes and it was planned to establish one or two more industrial estates exclusively for small-scale industries. In Spain, industrial areas (industrial poles) had been developed in seven centres—Burgos, Huelva, La Coruna, Seville, Valladolid, Vigo and Zaragoza—for large and medium industries. In Turkey an industrial estate for small-scale industries had been set up at Denizli; industrial areas for large and medium industries were being established at Bursa and Manisa, and industrial estates for small-scale industries at Gaziantep, Antalya, Burdur, Isparta, Izmir and some other centres.

In the socialist economies of Bulgaria, Hungary, Poland and Yugoslavia, there were no areas or estates providing inducements to the location and establishment of private industrial concerns. However, the economies and other advantages of industrial clustering were well recognized, and the underlying principles were fully used in planning, zoning, locating and constructing industries, as part of the over-all planned distribution of productive forces, at the national, regional and local levels.

2. THE ROLE OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS IN POLICIES AND PROGRAMMES, WITH SPECIAL REFERENCE TO PROMOTION OF SMALL-SCALE INDUSTRIES

The Group agreed that the subject before it should be considered from a broad vantage point. The discussion would be concerned not only with industrial estates for small-scale industries but also with industrial areas for industries of all types and sizes and other industrial development projects in which the provision of physical facilities and related services

was an essential element. It would consider the role of industrial estates and areas in various policies and programmes, as well as the complementary incentives and measures of promotion which might be necessary to achieve different objectives.

The Group accepted the terminology in the documentation prepared by the Secretariat. It referred to the "industrial estate" to designate a planned clustering of industrial enterprises offering standard factory buildings, erected in advance of demand, and a variety of services and facilities to the occupants; as a rule, the estate would serve principally to promote small-scale industries. The "industrial area" offered only improved sites as an inducement to the establishment of industries of all types and sizes. The "industrial zone" was a part of an urban or suburban centre restricted to industrial use, on which no improvements were made. Both estates and areas should be located in industrial zones; if necessary, they should themselves be sub-zoned for industries of different types.

As regards the distinction between small-scale, medium-sized and large-scale industry, the Group recognized that there could be no generally acceptable numerical definition of each category. Small-scale industries were to be distinguished from handicraft and artisan undertakings and cottage industries, the former being modern manufacturing enterprises using advanced tools and techniques of production and management, while the latter remained attached to traditional processes, equipment and products. A numerical definition of small-scale industry was, however, essential in order to identify that part of the manufacturing sector which was entitled to benefit from measures of promotion and assistance. The values to be assigned to the components of the definition—investment in fixed capital and/or employment—might vary from one country to another. For the purposes of the discussion, a small-scale industry might be considered as a manufacturing enterprise with an investment in fixed capital of not more than the equivalent of \$US 100,000, and employment of not more than 100 workers.

Objectives and policies

The Group agreed that in the countries of the participants as in other developing countries, the primary objective in establishing industrial estates and industrial areas was to stimulate entrepreneurship and promote industrial development. Rational location of industries, whether at the regional or local level, was necessarily involved in any decision to set up an estate or an area, and was therefore a closely related objective.

There was a consensus of opinion that small-scale industries had an important role to play in any programme of industrial development, whether in market-oriented or in centrally planned economies, in developed, or in developing countries. Of particular significance was their

role in mobilizing latent resources, economizing capital, meeting local demands, making possible rapid increases in production and employment, and undertaking certain operations as subcontractors of large-scale enterprises.

Although small-scale industries offered good prospects for economic growth, they had inherent handicaps and weaknesses, especially in developing economies, on account of the inadequacy of technical and managerial skills, lack of efficient equipment and difficulties of marketing and financing. To remedy these deficiencies, it was necessary to take measures to strengthen and assist them at all stages of establishment and operation. The Group was convinced that the industrial estate, which made it possible to integrate all measures of assistance, was one of the most effective tools for the promotion of small-scale industries.

Promotion took two main forms: creation of new small industrial enterprises and modernization of existing ones. The Group recognized the importance of modernization—which might often involve expansion and diversification of production—but expressed the view that it was not always necessary to relocate a small establishment on an industrial estate to achieve this objective.

The industrial estates under discussion were intended to promote small-scale industries rather than handicraft and artisan undertakings. The promotion of the latter required different forms of assistance as regards processes of production, design of products, marketing, training and so on. A variation of the industrial estate—the workshop block with certain common service facilities—could be used for this purpose and the Group felt that consideration might be given to it in some cases, especially for the production of artistic handicraft items for sale in touristic regions. In general, however, there was little scope in the countries of the participants for the establishment of such workshop blocks; common service facilities could be provided independently of workshop blocks in localities with large concentrations of artisans. As regards small jobbing enterprises and service industries such as plumbing, carpentry and mechanical work, scattered locations were in general preferable to concentration on common sites.

Many artisan undertakings were of declining importance in a modernizing economy and the scope for transformation of traditional enterprises into modern small-scale industries operating in the same line of manufacturing was limited. The Group felt, however, that there were opportunities for steering certain artisans—as well as other prospective entrepreneurs—towards promising industrial activities.

Industrial areas were in general devised for attracting large-scale and medium-sized industries. As a rule, these did not require standard factories and special measures of assistance, with the exception, mentioned by some participants, of foreign industries for which the immediate availability of a large factory building and of assistance in hiring and training labour,

making market studies, and carrying out incorporation and other formalities, was sometimes an appreciable inducement. Experience showed that the offer of an improved site on an industrial area was not in itself a sufficient inducement to the establishment of large or medium industries. These had much more rigorous location criteria than small-scale industries, their requirements for raw materials, markets or labour being a predominant consideration; the offer of a site could usually play a secondary role only. Most countries placed great reliance on fiscal and customs benefits to stimulate the establishment of larger industrial enterprises; in an increasing number of countries, these incentives were part of programmes of promotion which included provision of improved sites on industrial areas. The Group felt that while it was difficult to ascertain which of these components of industrial development programmes were predominantly responsible for the success of certain projects, there was abundant evidence of the effectiveness of global programmes including industrial areas. A particularly useful element in such programmes was the construction, by the sponsoring authority of an industrial area, of a factory and sometimes even the provision of equipment on a "turn-key" basis, for known occupants.

The Group recognized the merits of the industrial estate and the industrial area as instruments of industrial decentralization. Inasmuch as policies of decentralization usually aimed not only at decongesting large urban centres but, at the same time, at industrializing relatively less developed and sometimes depressed regions where no spontaneous industrialization process was in evidence, the Group considered that the provision of special or greater inducements in such regions would be justified. For instance, there could be lower rates of rent or sale prices for plots or standard factories, more favourable credit terms, and more generous tax and customs incentives.

A suggestion was made that, in some cases, preferential tax benefits might be reserved exclusively for the occupants of industrial estates and areas. Other participants felt that such concessions would be excessive, and might discourage the establishment of industries in suitable locations in the same region. There was general agreement that the locations selected for industrial estates and areas should offer good prospects for industrial development and that, consequently, locations requiring extraordinary inducements should be avoided.

It was pointed out in this connexion that in some countries, plans for setting up industrial estates or industrial areas in localities without any real "industrial vocation" had been sanctioned as a result of political pressures on public authorities. To avoid this, the machinery for planning industrial estates and areas and the administering agency should be organized so that they would be immune from political interference. It was also noted that competition between municipalities and provinces in attracting industry could have adverse effects on the economy of the region or

the country, and the need for co-ordinating projects within an over-all programme was pointed out.

The steering of industry towards less developed regions should be accompanied and often preceded by other related measures for the development of infra-structure facilities, training and retraining programmes, development of related sectors—agriculture, irrigation, transportation, tourism—and investment in social overheads.

The selection of appropriate locations for industrial estates and industrial areas in less-developed regions, on the basis of economic and technical criteria, posed difficult problems for governments and public development agencies. The Group was of the view that:

(a) Medium and small towns having a certain minimum development of economic and social infra-structure, such as provincial or district capitals, fairly developed up-country market or distribution centres, highway junctions, centres with concentration of artisans etc. offered possibilities for location of industrial areas and industrial estates; the most advantageous locations should be carefully selected on the basis of regional and area surveys;

(b) Through the development of small-scale and medium-sized industries and light manufacturing activities in the estates, additional employment opportunities and increase in incomes for the region could ensue, but these could be achieved only if the promotion work on the industrial estates was integrated in development programmes applying to a broader geographical area;

(c) Maximum self-supporting development might be expected to take place in locations where the establishment of small-scale and medium-sized industries could be related to that of large development projects, such as power plants, reclamation works, large industries and industrial complexes.

In connexion with regional development policies, the Group discussed the role of the "industrial development pole" in promoting industrialization as compared to that of industrial estates and industrial areas. Experience of industrial development poles had so far been limited to Spain (where seven poles had been established), southern Italy (where one project was being developed) and Turkey (where selection of growth points—akin to poles—was made on the basis of regional planning surveys). While the poles in Spain promoted mainly large and medium-sized industries (a minimum investment in different categories of industries was a requirement for obtaining assistance), the pole in southern Italy (Bari-Taranto) was aimed at developing interrelated large, medium and small industries. There was agreement that the development of industrial poles would be particularly effective if these incorporated industrial areas and industrial estates, together with other infra-structure facilities, incentives and measures of assistance. The Group recommended that plans for industrial poles should provide for the development of small-scale industries,

in order to strengthen the economic base, promote inter-industry relations and diversify employment opportunities. It felt that development poles were not an alternative to industrial estates. The latter could stimulate industrialization on a small scale in localities where prospects for development were good but limited.

The Group recommended that, wherever possible, the features of the industrial estate and the industrial area be combined. Industrial estates might offer not only standard factory buildings but also improved sites, and custom-built factories might be provided, if necessary, by the sponsoring authority. On industrial areas, certain services and facilities, including "turn-key" projects, might be made available.

The Group also recommended that, especially in urban and suburban areas, an industrial estate and an industrial area be located on the same tract of land, within a properly planned industrial zone. This would be justified not only by considerations of urban planning, but would also make it possible to achieve economies in development and building costs, flexibility in land use and effectiveness in administration.

It also would facilitate the establishment of complementary relationships among occupants, in particular of subcontracting between large and small industries. From a physical planning standpoint, it was advisable, however, to group together standard factories and some common service facilities. In practice, therefore, the industrial estate and the industrial area components of such a project would keep their physical identity.

It was pointed out that in many developing countries, overcrowded capital cities and major urban centres were the principal poles of attraction of industry, on account of the existence of "external economies", and in particular of the ready availability of capital, labour, markets, transportation and so on. This resulted in increasing economic and social overheads, shortage of land for industrial use, rising land values and social problems of slums and unhealthy living conditions. It was the policy in the countries of the participants to check further congestion and overcrowding in large urban centres and many countries had undertaken slum clearance and other urban renewal programmes. The Group recommended the incorporation of industrial estate and industrial area projects in such programmes. In planning the expansion of existing cities and towns and the establishment of new towns, industrial estates, areas and zones could be effectively utilized in providing the necessary industrial base for development and growth.

The Group discussed the role of industrial estates and industrial areas in attracting foreign capital, technical know-how and entrepreneurship, in the light of the experiences of Ireland, Israel, Italy, Malta and Spain. In general, the paramount objective in establishing industrial areas and industrial estates was not to attract industry from abroad. However, experience indicated that the availability of suitable industrial sites and often of pre-built or custom-built factory accommodation was a useful

complement to fiscal and financial incentives and to other legislative measures for attracting foreign capital. The industrial estates in Ireland and Malta and the industrial areas in Spain had attracted a considerable number of foreign enterprises.

In several countries of the participants, in particular in Cyprus, Greece, Israel and Malta, the promotion of export-oriented industries was of crucial importance to the economy, in view of the small size of the home market, the need for foreign exchange earnings and the need to provide employment to considerable sections of the population displaced from agriculture and other activities; competition within the European Common Market was also a factor. The Group noted the successful experiences of the Shannon Free Airport Industrial Estate in Ireland and of the industrial estates in Malta in attracting foreign enterprises, in promoting exports of manufactured goods, in providing employment and in giving rise to ancillary industrial activities in near-by areas. It felt that the establishment of free zones featuring industrial estates and industrial areas for export industries was an interesting and promising development. The establishment of such free zones, however, should be considered very carefully, after thorough feasibility studies which should take into account the broader policies of industrialization, export promotion, attraction of foreign capital and enterprises, fiscal and financial incentives, export marketing possibilities and foreign trade relations. The Group observed that while industrial free zones might sometimes be developed with advantage in the neighbourhood of ports and airports, this was not always a necessary condition. The Group noted with interest the features of industrial estates located near a port or airport² and expressed the view that these would be suitable not only for export industries but also for industries processing resources hitherto exported raw or semi-processed, industries processing imported raw materials and assembling imported components, entrepôt activities as well as many industries catering to the domestic market.

The participants from Bulgaria, Hungary and Poland stated that in their countries small-scale industries were either state-owned or co-operative undertakings. There were also handicrafts and small industrial workshops of artisan type, usually operated as private enterprises. In Yugoslavia, small-scale industries were either co-operative or socialist enterprises or private concerns. In all these countries, small manufacturing represented a sizable proportion of the total number of industrial enterprises and of total employment in manufacturing. State-owned small-scale industries, where they existed, were managed by local (district) authorities and organized in district unions. Co-operative small industries were managed by associations of producers organized either at the central or at the local level.

² Part VI, "Pre-Project Planning for Industrial Estates".

In these economies, small-scale industries were confronted with difficulties similar to those prevailing in market-oriented economies, and were in need of technical, managerial, marketing and financial assistance. In some of these countries, it was recognized that the grouping of small enterprises, both in association and on common sites, was necessary to strengthen and assist them. Thus, in Poland, unions and organizations for small-scale industries set up common service facilities such as laboratories, research and information centres, technical assistance centres, building facilities etc. Technical counselling and assistance in procurement of raw materials and marketing of products were also provided by large-scale industries and their unions. In recent years small-scale industries have been increasingly located in the immediate neighbourhood of large industries in order: to ensure a rational distribution between industrial and residential land use within the framework of urban development plans; to achieve economies in building and in the provision of infra-structure; and to facilitate inter-industry exchanges and the provision of technical and other assistance by the large industries to the small ones. It was also recognized that, in these economies, small-scale industries had a role to play in the decentralization of industry and regional development.

The participants from these countries felt that there was scope for the establishment, by co-operative or private groups, of industrial areas and of industrial estates appropriately adapted—principally as regards financing, management and ownership—to the economic and political conditions of these nations. The view was expressed that co-operative industrial estates might be particularly useful if they were set up in conjunction with large industrial projects, the small-scale industries being linked to the large ones by ancillary or auxiliary relationships. It was also considered that there was scope for functional industrial estates which lent themselves particularly well to co-operative organization. These possibilities should be studied by the planning agencies of these countries.

Integration of programmes

The Group agreed that, to be fully effective, an industrial estate programme should be complemented by various measures of promotion including technical and management advisory services, fiscal and financial incentives, infra-structure development, common service facilities, training facilities and so on. As already mentioned, an industrial estate programme should also be integrated or co-ordinated with regional and urban planning programmes.

Appropriate locations for industrial estates and industrial areas should be selected on the basis of area surveys, market surveys and feasibility studies. These studies and surveys would also be required for planning industrial estates and areas, scheduling their development and orienting entrepreneurs towards promising industrial occupations. Intensive and

concentrated efforts and assistance—financial, technical, managerial, marketing—from promotional agencies would be needed for ensuring self-supporting growth of the smaller enterprises.

The Group recognized that only a relatively small percentage of industrial enterprises could be accommodated on industrial estates and areas; most of the development of industry would take place outside of these. One of the major functions of publicly-sponsored and publicly-financed industrial estates and industrial areas, especially of those located in less developed regions, was to have a catalytic effect on the development of industry and other economic activities in a broader area; their demonstration effect was expected to induce the establishment of locally-sponsored, private or co-operative estates and areas.

The Group cautioned against indiscriminate establishment of industrial areas and industrial estates. A network of industrial estates could be justified in a large country, if it were based on adequate regional planning and regional surveys and accompanied by complementary promotional activities. In smaller countries, only a limited number of industrial areas and industrial estates would generally be required. In every country, the location of the first industrial estate should be selected carefully and concentrated efforts should be made to ensure a successful demonstration effect. Other industrial estates should be planned and established gradually, after success had been achieved in the first project.

The Group discussed the relative importance of different types of incentives and promotional measures provided in connexion with the establishment of industrial areas and industrial estates. The provision of advance factory buildings and/or custom-built factories and of tax relief was considered to have been of decisive importance in attracting foreign enterprises to the industrial estates in Malta and Ireland. In Israel, the main factors were the provision of standard factories and liberal financing—through mortgage loans—of factory construction. In general, the Group felt that the provision of standard factory buildings available on lease or on an instalment purchase basis, together with positive measures of assistance and promotion in the form of technical and management advisory services, training facilities, common service facilities, financing of equipment and working capital, market promotion measures, participation in government purchase programmes, assistance in quality control and quality standardization, and so on were more important for the promotion of small-scale industries than tax relief or grants.

The Group was not in favour of attracting industries to industrial areas and industrial estates by refusing permission to establish industries elsewhere, except when such a measure was required by urban zoning laws. While industries might be restricted to properly planned industrial zones and to centres selected for industrialization on the basis of regional planning, they should not necessarily be confined to industrial areas and industrial estates.

3. PLANNING OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS

Feasibility studies

The Group stressed the need for adequate pre-project planning of industrial area and industrial estate projects. Surveys and feasibility studies should be undertaken to analyse and evaluate the economic, engineering and physical factors involved. The location, size, organization and facilities of industrial areas and industrial estates should be determined within the framework of national, regional and urban plans, and in the context of the government's policies and programmes of industrialization in general and small industry development in particular.

The objectives of the surveys should be to determine the most suitable locations; the types of industries to be promoted; the size of areas or estates; the size, number and type of factories and other buildings; the services and facilities to be provided; the costs of the projects; the sources of financing and the phasing of development.

In the case of small countries, the economy as a whole should be studied for selecting proper locations and types of industries for industrial estates. In larger countries, the coverage of a survey should extend to a region, but in every case, national priorities in industrial development and external trading relations should be taken into account in selecting the industries to be promoted.

A feasibility study should be based on an orderly, systematic investigation and analysis of the resources and markets of the area and, for each location, on an analysis of the comparative advantages or disadvantages for each potential industry as related to alternative sources of supply of the products. Such a study would involve:

(a) An assessment of the existing and potential demand for manufactured goods within and outside the area that might be met economically from industrial enterprises to be located in the area;

(b) An assessment of the resources, human and material, available in the area, or that could be imported at a reasonable cost, for setting up manufacturing industries, in particular, an analysis of the labour supply, the quality of labour, training facilities and comparative wage rates;

(c) An appraisal of the existing and prospective infra-structure development of the area—economic and social overheads—and the extent to which it could support industrial development; the analysis should include transportation facilities, markets, communication facilities, supplies and services, capital and entrepreneurship and social services;

(d) A survey of housing and community facilities and workers' transportation;

(e) An analysis of the implications for industrial development of projects and programmes in the field of agriculture, natural resources development, power, irrigation, transport, tourism, education etc.;

(f) Where feasible, a study of the techno-economic aspects of each industry and its size characteristics, having regard to markets and costs;

(g) Recommendations on those industries which are feasible and desirable, and on the types of services and facilities and promotional measures required.

In the view of changes in conditions and prospects for industrial development, in world prices of raw materials and machinery and in market prospects for different products, the studies and surveys should be carried out on a continuing basis. In each country, the agency responsible for industrial development should be charged with the responsibility for conducting such studies. Sometimes a specialized agency such as the recently established Industrial Studies and Development Institutes might be needed. In view of the shortage of skilled personnel and expertise in many developing countries to carry out feasibility studies, the Group felt that requests from Governments to the United Nations for assistance in carrying out studies, training local personnel and building up institutions of this type would often be justified.

Location

The Group felt that a solution to the problem of industry concentration in metropolitan centres and large cities could be found by locating industrial areas and industrial estates in suburban centres and medium towns, where the necessary infra-structure facilities existed or could be provided. In such centres, the location of industrial areas and industrial estates should be properly related to zoning and other urban planning considerations, including the provision of housing, educational and recreational facilities for the population engaged in industrial activities.

The possibility of using local resources and of catering to local markets was one of the factors favouring the establishment of small-scale industries. For this reason, the location of industrial estates in small towns with good prospects of industrial development could often be considered. The Group felt, however, that the first industrial estate for small-scale industries should preferably be located in an urban or suburban area, to ensure rapid success and maximum demonstration effect. Industrial estates for small-scale industries located in smaller cities and towns would require infra-structure development and additional services and facilities, and should be undertaken at a later date.

The Group noted that many countries where urban land values were continuously increasing were constantly faced with the problem of finding suitable land for location of industries. In several countries, governments

and municipal authorities had powers of acquiring land by expropriation but the process involved complex and lengthy legal and administrative procedures. The availability of land in suitable locations was often a more important problem than the cost of land. In order to avoid land speculation and a spurt in land prices, governmental or municipal authorities should acquire sufficient land well in advance of the final decision to set up industrial areas or industrial estates. Where no provision for land use control existed, it would also be necessary to acquire additional land on the fringes of an industrial area or estate to prevent the growth of slums and other unhealthy developments. In this connexion, the Group suggested that governmental authorities consider using the system of the industrial land bank described in one of the documents submitted to the Consultative Group,³ under which an industrial or urban planning agency continuously acquires, reserves, subdivides, sells or leases land in various locations for industrial use, to ensure that suitable land is available in a growing and changing urban area.

Types of industrial estates

The Group was of the view that non-specialized industrial estates for all types of small-scale and light manufacturing industries were generally the most suitable for promotion of industrial development. Zoning laws and regulations provided for the exclusion of obnoxious and noise-creating industries, and heavy industries were zoned separately.

There had been very limited experience in the participating countries in regard to specialized industrial estates. In Israel and Turkey a few functional industrial estates had been set up. The Group suggested that the opportunity of establishing functional, ancillary and other specialized estates be studied by governments. In establishing such estates, particular attention should be paid to the distribution of production functions among the occupants, to the organization of marketing and to the provision of common service facilities.

The Group took note of Israel's experience in the construction of flatted factories in developed urban centres. In general, the Group favoured industrial estates with single-storied factory buildings on account of their lower cost, greater operational convenience, and possibilities of expansion. Flatted factory buildings for light manufacturing activities and service industries were appropriate only in those metropolitan and urban areas where there was extreme scarcity of land. It was noted that in Israel four-storied factories were the most common in industrial estates in existing cities and that construction cost per square metre of a flatted factory was double that of a single-storied factory. The Group felt that a study of flatted factories in Israel and other countries would be useful as,

³ Part V, "The Role of Industrial Estates, Areas and Zones in Providing an Industrial Base in Urban and Regional Development Plans".

in most of the countries of the participants, increasing scarcity of land was the result of urbanization, and recourse to flatted factories might need to be considered.

Physical planning

The Group recognized that the physical planning of an industrial estate should take place, wherever possible, within the framework of a plan for the wider environment—the town or region. As already stated, such a plan would in its turn take account of physical and economic planning at the national level.

In the absence of a town or regional plan it would be necessary to make a detailed study of the area around the estate. Such a study would cover existing industry, housing, labour supply, transport facilities and services. Services would range from power, water and sewerage to industrial requirements such as hardware supply, maintenance workshops and foundries.

The approach to physical planning set out in the discussion paper submitted to the Group⁴ was generally acceptable. The discussion focused on some subjects of special interest to the majority of the participants and on some topics which could be the subject of further useful study.

Size of industrial estates and industrial areas

A number of considerations were involved in determining the appropriate size for an industrial estate. The objectives in setting up the estate, the type of estate required, the type of industries to be promoted, the location of the estate, the number of factories to be accommodated, the cost of land and its development, the scale of industrial operations envisaged, the prospective employment, the relation to transportation facilities for goods and for workers, the required space for trucking and parking, the physical planning and engineering standards suitable for the particular environment and the particular type of industries, the economies of scale in the provision of services and utilities—all these interrelated factors influenced the size of an industrial estate. The feasibility studies would provide information on a number of these considerations. From the point of view of physical planning, the major considerations were achievement of economies in infra-structure development, compliance with zoning and other urban planning regulations and a sound relationship between living and working conditions.

The Group felt that it was difficult to apply any general rules to the establishment of upper and lower size limits to industrial estates in view

⁴ Part VI, "Pre-Project Planning for Industrial Estates".

of the wide variety of situations and of types of estates. In the experience of some participants, an area of twenty hectares (50 acres) was a minimum for economic operation and management of estates for small to medium industry, with rented factories and common service facilities. The upper limit on size would depend primarily on town-planning considerations, chiefly housing and transportation; 60 hectares (150 acres) had been indicated by one town-planning expert as desirable maximum for small to medium industry. In many countries, however, there were very small industrial estates, usually set up in small to medium towns. The justification for such estates was that even a modicum of industrial development was desirable, that little additional expenditure on infra-structure needed to be provided and that only a few—if any—common service facilities were required. In India, for instance, out of 121 industrial estates for small-scale industries, three-fourths were less than 30 acres (12 hectares) in size; one-fourth ranged in size from 30 to 100 acres (12 to 40 hectares).

In view of the many competing claims for land use—from industry, agriculture, housing, tourism and so on—it was often difficult to allocate ideal sites for industrial estate development. The scarcity of level ground was a frequent occurrence. The ideal, for best economy of construction and best flexibility of layout (including flexibility for expansion of individual factories) would have a site slope not greater than five per cent.

Some participants illustrated layouts for estates on sites with slopes up to 8 or 10 per cent, a figure which was regarded as an absolute maximum. This maximum could only be accepted where the factory units were small and had access from one side only. On the steeper slopes of 15 or even 19 per cent, two-storey units entered at two different levels, were used. Such arrangements were of interest because, even where level ground was available for much of the site, it was likely that part of it would have steep slopes. In such cases it would be sound planning to develop the level ground for larger, and the sloping ground for smaller factory units.

Car parking and transportation facilities

Car parking and transportation facilities were related problems, the study of which emphasized the desirability of treating industrial estate development in the context of an over-all urban or regional plan. Provision for car-parking should be based on future, rather than present, needs as an upwards trend in car ownership was common to all countries. Unless this trend were accounted for, factories with a physical life of, say forty years could become obsolete—as regards layout—in twenty years.

In view of the difficulty of accurately forecasting the growth in the need for parking-space, there should be, wherever possible, flexibility in the estate plan by leaving open space (possibly simply landscaped) which could later be developed either for factories or for car-parks as experience indicated.

Where the estate was beyond walking or cycling distance from housing, transport would be needed for the workers. The Group discussed the question of who should provide the transport, and it was generally agreed that wherever public transport was the responsibility of the municipality, the municipality should extend its services to cater for the estate. Acceptance of this responsibility could best be obtained before the estate site was finally selected. In other cases, the factory owners might subsidize bus fares, thus sharing any special transport costs with the workers. But ideally, sound planning should ensure that the journey to work was within the normal and acceptable pattern so that no special costs would need to be borne by factories or workers.

Housing

The Group recognized that an ideal relationship between housing and industrial areas could be achieved where a new town was being built. Typically there would be a town centre surrounded by the residential areas, and outside the residential areas and separated from them by a green belt would be the industrial development. This green belt should not be so wide as to inhibit walking or cycling to work (say, not more than fifteen minutes' walk). The location of the industrial areas would be determined after taking into account different factors, including the direction of the prevailing wind. The areas should be served by main roads by-passing the town.

The more common situation was where housing already existed and where the objective was to provide employment opportunities to people living in the town. It was pointed out that, if housing and general social infra-structure had to be provided specially as part of the industrial estate project, the cost would be several times that of the estate alone. It was unlikely that there would be any serious difficulty in this regard in the case of small estates—say up to 20 acres (8 hectares)—which would be planned in the vicinity of existing housing.

Large estates, however, would inevitably create new housing demands. If the solution was to build dwellings near the estate, the new housing project should be on a scale sufficient to provide needed social amenities including shops, schools, churches and recreational areas. If the solution was to build houses away from the estate, transportation problems and costs would arise for the factories, the workers, the municipality or the state. The need for integrating estate planning with over-all urban planning was again emphasized in this connexion.

Landscaping

Planting of trees and provision of green areas within the estate or area should be part of each plan. Good landscaping would add to the

attractiveness of the project for new enterprises and would make working conditions more pleasant for all employees.

Advance factories

Factories ready for immediate occupation were a major attraction to national entrepreneurs as well as to foreign investors. In some countries the demand for advance factories was ascertained by the promotional agency through surveys, through preliminary contacts and by inviting applications from prospective entrepreneurs before taking up construction. Other relevant considerations included:

- (a) An estimate of the rate of annual demand.⁵
- (b) The time taken to build a factory.
- (c) The cost of building, including interest rates on capital.
- (d) The purpose of the estate.

For most practical purposes, a factory could be regarded as ready for immediate occupation when it could be completed in one or two months (e. g. when only internal partitioning, wiring and decoration remained to be done). In general, it was felt to be better to risk having one or two factories unoccupied for a time than to have none to offer when needed.

Design of standard factories

There was agreement that no rules could be established for areas of factory units, as these should be chosen to match the types of industry to be accommodated. Standard factory sizes were 12,500 and 25,000 square

⁵ There are certain relationships between total population and employment in manufacturing in a given town and the floor space per worker. The latter varies with the type of industry — for instance, in building carpentry it may be of 22 square metres per worker, in dressmaking or knitwork it may be of 10 square metres per worker and, in a locality with mixed industry, the average may be around 16 square metres per worker. If it is assumed that, in a town where employment is based mainly on industry, employment in manufacturing amounts to 15 per cent of the total population of the town; thus the need for industrial floor space per inhabitant will be 15 per cent of 16 square metres, that is, 2.4 square metres per inhabitant.

If the number of inhabitants remains constant, no increase in industrial floor area will be needed. Where the population is increasing, the increase in floor area may be planned on the basis of 2.4 square metres per additional inhabitant. For instance, if the population of a town increases by 1,000 inhabitants per year, the increase in industrial floor space to be constructed in that year would be about 2,400 square metres.

The magnitude of the average floor space per inhabitant is variable. It depends on the ratio of industrial employment to total employment and on the type of industry located in the town. Thus, there is a variable relationship between industrial floor space and local population, but there is no relationship between these and the time period.

The increase in industrial floor area per year depends on the population growth per year, and this growth depends on many factors. For example, it could be very high during a given period because of sudden immigration to a town, but this would not be a constant time factor.

feet (1,161 and 2,322 square metres) in Malta, 5,000 and 18,750 square feet (465 and 1,742 square metres) in Ireland, 2,500, 5,000, 7,500, 10,000 and 20,000 square feet (232, 465, 697, 929 and 1,858 square metres) in Israel. Whatever the initial area selected, provision should be made for expansion by (normally) at least 100 per cent. The expanded factory should not exceed 50 per cent of the area of the plot. The minimum working height of factories for small to medium industry of 12'6" (3.81 metres), specified in the discussion paper, was generally accepted where fork-lift trucks would be used; in light industries such as textiles, plastics and others, a lower clear height of 11'6" (3.5 metres) could be accepted.

Roof spans (and consequently the width between columns) for light to medium industries should lie desirably between 50 and 100 feet (15 and 30 metres). For small factories and workshops this could be reduced considerably. Israeli experience had indicated that a column spacing of 6 metres (19'6") could be readily incorporated into most workshop layouts.

The choice between terraced and isolated factories depended mainly on the rate at which factories would be occupied (where this was high, terraces were indicated) and on the likely expansion requirements (while expansion could be provided for in both types, somewhat better provision could be made in isolated factories) as well as on the size of individual units (the smaller these were, the more suited to terraces).

The use of flatted factories was regarded as confined to existing cities, where it might be justified by high land costs. A study carried out by the National Productivity Committee in Israel showed that 25 per cent of operations suited to such buildings needed the ground floor. This indicated a maximum of four floors for flatted factories. Flatted factories in Israel had a bearing capacity of 1,000 kilogrammes per square metre on the ground floor, and 750 kilogrammes per square metre on other floors.

Standardization of components was highly desirable, not only because it could save costs directly but also because it opened possibilities of pre-fabrication. The Group considered that no one estate was likely to have a building programme sufficiently large to justify the establishment on it of a factory for the pre-fabrication of building components or for the manufacture of building materials. Such factories should be built on a regional basis and should supply housing as well as industrial needs. Certain materials (e. g. concrete blocks) could, however, be manufactured on the site.

It was noted that Israel was experimenting successfully with new components, including pre-fabricated wall panels containing a 4-centimetre-thick layer of polystyrene between two cement layers, or alternatively 7.5 centimetres of concrete with an equal thickness of heat-proof porous cement. Asbestos-cement roofs with separate ceilings provided as an optional addition at extra cost were also used. Another roof type was a concrete slab, white-washed on top; this reflected 75 per cent of the sun-heat. Research studies related to factory buildings were carried out in

that country by the National Productivity Committee and by the Technion, the Israel Institute of Technology at Haifa.

Phasing of development

The Group drew attention to the special importance of the first phase of construction for the future development of an industrial estate. During this period, which might extend over four or five years, a relatively large number of standard factories were to be erected; as a rule, the construction of the administrative building and of common service workshops and laboratories would be spread over this period. At later stages, the rate of construction would decline. Care should then be taken to avoid disturbance of the first area by builders' traffic.

Planning ratios

The Group discussed a number of planning ratios and generally endorsed those given in the discussion paper. Additional comments were that the proportion of roads to total area should not exceed 15 per cent in estates for medium industry, and 30 per cent in estates for small industry; that for small to medium industrial estates, 50 employees per acre (124 per hectare) seemed to be a reasonable figure for initial planning. In Israel a proportion of 40 employees per acre (100 per hectare) was used; in Malta, there was an average of 43 per acre (106 per hectare) on existing estates, with a potential of 60 per acre (148 per hectare). It was also suggested that for initial assessment of power requirements, one kilowatt per 100 to 200 square feet (9 to 18 square metres) of factory building was sufficient.

Handbook on physical planning of industrial estates

The Group commended the work of the United Nations in the field of physical planning of industrial estates and suggested that the different studies which were now scattered in various United Nations publications⁶ be included in a handbook. The studies might be expanded to take into

⁶ (1962) *The Physical Planning of Industrial Estates* (62. II. B. 4); T. S. Vedagiri (1962) "Physical Planning of Industrial Estates", in *Industrial Estates in Asia and the Far East* (62. II. B. 5); D. Mills (1966) "Planning, Design and Construction of Industrial Estates with Particular Reference to Africa", in *Industrial Estates in Africa* (66. II. B. 2); P. Quigley (1968) "Pre-Project Planning for Industrial Estates", published in the present volume (Part VI).

account design, planning factors and experience in some more countries. The handbook might need to be revised and updated from time to time to allow for changes in construction materials and techniques.

4. ORGANIZATION AND MANAGEMENT

Sponsorship and organizational arrangements

There was agreement that as industrial estates are promotional devices and as, in developing countries, private, institutional and community organizations usually lack the means and experience to organize and finance industrial activities, the initiative and responsibility for setting up the first industrial estates should be taken by the government or by a government-supported agency. The government's role as an initiator and catalyst was particularly important for the promotion of small-scale industries and for the development of a country's less-developed regions.

In most of the countries of the participants, governments or government supported agencies played a major role in sponsoring and establishing industrial estates. In Cyprus and Malta, this responsibility was assumed by the Ministries of Industry and Commerce. In Israel, the Ministry of Commerce and Industry financed and the Ministry of Housing planned and built industrial estates in the new towns and developing areas while in existing cities, this was done by private companies financed by the Government and municipalities; the programme for the whole country was co-ordinated under a master plan prepared by the central Government. In Greece, the Hellenic Industrial Estates Development Corporation, wholly owned by the Hellenic Industrial Development Bank, a semi-public institution, was responsible for establishing and managing industrial estates and industrial areas. In Ireland, a Government company established and operated the first major industrial estate; there were also two industrial estates set up by private companies and two more industrial estates were being planned by the Government. In southern Italy, industrial areas were sponsored by consortia of local bodies, chambers of commerce and industry and industrialists, with support from the Government under a comprehensive programme of development of infra-structure, grants, loans and incentives. The industrial poles (industrial areas) in Spain were established by law; applications were approved by the Delegate Committee for Economic Affairs of the Government, in consultation with the Ministry of Industry, the Ministry of Finance and other ministries concerned, under the policy formulated by the Commission for the Plan of Economic and Social Development; the industrial areas were managed in co-operation with the Provincial Syndicate Economic Councils. In Turkey, industrial areas and industrial estates projects were sponsored by provincial administrations, municipalities, co-operative societies and chambers of

provide an option to the occupant for outright purchase or purchase on an instalment-payment basis.

In most of the countries under consideration, improved sites were leased on a long-term basis and not sold. Long-term lease rather than sale of land was preferable from the point of view of long-term control over land use. Practices differed regarding factory buildings. In Israel, factory buildings were sold outright in existing developed cities and provided on a lease-purchase basis in new development areas; in both cases mortgage financing on a liberal basis was made available. In Ireland the industrial estate authority preferred to lease on a 25-year basis, with option to the occupant to buy after 5 years; outright sale was also provided for if the occupant preferred such an arrangement. The experience in both Ireland and Malta had been that foreign enterprises preferred long-term lease.

Some amount of rent subsidization for an initial period was provided in the industrial estates in Ireland, Israel and Malta. The Group was of the view that while initial rent subsidization was an incentive to rapid occupancy, especially for small-scale industries, such subsidization should not extend beyond a period of five years, after which economic rent should be charged. Lease agreements should also provide for rent-revision break-points.

The Group stressed the importance of maintaining the corporate character of the industrial area or estate by means of provisions in the lease agreement for control by the industrial estate authority over the use of the land and buildings and over the resale of the factory building. It was important, in particular, that buildings be used for manufacturing and not for commercial purposes such as warehousing.

Managerial control

Managerial control by the sponsoring authority should normally extend only to the administration of the estate or area and not to the operation of individual enterprises. The enforcement of restrictive covenants in lease agreements and of rules and regulations, including selective admission policies, was, however, a legitimate and necessary function of the sponsoring authority. Moreover, in the case of industrial estates for the promotion of small-scale industries, controls might extend over the equipment of relocated existing enterprises, if modernization was a condition of admission, and over the resale of factories and so on.

Without interfering with the operation of individual enterprises, the industrial estate management could have a healthy influence on ensuring co-operation between enterprises in the estate. Such co-operation could best be achieved through an association of tenants, who might be represented in the management of the estate, at least in an advisory capacity. The operations of an advisory service, a training centre, a common service

facility centre, a financing institution or an agency for supply of machinery or hire-purchase or a marketing organization—whether managed by the industrial estate authority or by another government or public agency—would have an influence on improvement and modernization of industrial enterprises and on co-operation and co-ordination between the enterprises.

The degree of managerial control would necessarily be greater in a specialized industrial estate than in a non-specialized industrial estate. The management of a co-operative industrial estate or a functional industrial estate or an ancillary industrial estate would necessarily regulate to some degree the production programmes of industrial enterprises. The Group felt that in these types of estates, it was even more important for occupants of the estate to share in the management than in general-purpose industrial estates.

5. SERVICES AND FACILITIES

The Group emphasized that the industrial estate should serve as a focal point for promotion of industrialization, and not merely provide factory sites and buildings. The planned grouping of industries in industrial areas and industrial estates offered economies of agglomeration and provided opportunities for the provision of various services and facilities, to stimulate entrepreneurship, to facilitate the operation of the enterprises, to enable their healthy expansion and to increase productivity.

The type and nature of services and facilities to be provided, the agency to provide the services and the basis on which these would be offered depended on the objectives of each estate, its location, its composition and the complementary programmes of other public or private agencies.

On this subject the Group considered only specialized services and amenities since those connected with the physical planning of the estate, such as provision of utilities and transportation had already been examined.

General amenities

The provision of amenities, such as catering facilities, fire protection, police protection, first aid centre, hospital, health centre, recreational facilities etc. would depend on the size and location of the industrial estate. Every estate should have fire prevention facilities and a first aid centre. Whether there should be a fire station or a hospital would depend on the size of the estate and the availability of municipal or other facilities near at hand. Again, the need for a canteen would depend upon the availability of catering facilities nearby and the eating habits of the

workers and other employees on the industrial estate. In a large estate, the provision of all these facilities would generally be justified by economies of scale and operation.

The organization of these services would again depend on the institutional arrangements in the country. Police and fire protection and health services would generally be provided by the municipality or the government. Canteen facilities could be organized by the industrial estate management directly or by contracting with a private caterer or co-operatively by the enterprises or workers on an industrial estate. Regarding recreational facilities, the general view was that while some facilities, for instance, indoor games, might be provided for recreation during lunch hour and other breaks, the provision of other facilities, such as playgrounds, would depend upon the location of housing facilities. If the workers' housing was far away from the industrial estate the workers might prefer to have the facilities near their homes. There was general agreement that industrial estate managements—like enlightened managements of large enterprises—should co-ordinate and ensure the availability of these amenities, but need not necessarily provide them all.

Training

The availability of trained workers was as important for attracting entrepreneurship, including foreign enterprise, as for achieving high productivity and good quality of products. One of the main services that the industrial estate management could render was to facilitate the supply of trained workers by close co-operation and co-ordination with trade schools, vocational training centres, polytechnics, regional training centres and other training facilities.

There might be some need on an industrial estate for specialized training, on-the-job training and training in productivity methods and management techniques. Sometimes training of this type should be organized by the industrial estate management itself, with the co-operation of the occupants and training institutions in the locality or the region. The technical and management advisory service and common service facility centres in the industrial estate might organize on the estate part-time courses on specialized subjects and on productivity and management techniques, such as blue-print reading, preventive maintenance, cost accounting, marketing techniques and work study, provided there was sufficient demand for such services. In this connexion, the Group noted that analytical methods of operator training, recently developed in the United Kingdom, were particularly quick and efficient and suggested that these might be studied with advantage.

The enterprises on the estate should assist in organizing apprenticeship training, in accordance with the apprenticeship training system in the country or region, and in co-operation with the estate authority.

Advisory services

An advisory service and an information centre with a library were the most important promotional facilities of an industrial estate, but full development of these facilities was possible only on the large estates. On small estates, technical assistance could be provided by the estate manager—who should be a qualified industrial engineer—and by visiting teams of extension workers.

Advisory services included guidance and assistance to the entrepreneurs on selection of industrial activity, government procedures, production processes and techniques, selection of machinery, layout, marketing channels, accounting methods etc. The Group noted that in Ireland and Malta, where no extension centres were set up on the industrial estates, individual enterprises could engage private consulting firms, the costs being subsidized by the government for certain certified purposes. It felt that while this arrangement had much to commend itself, most developing countries were in need of permanent, government-sponsored extension service institutions. The Group recommended that the advisory centres on industrial estates be set up and managed by these institutions. The centres should assist not only the occupants of the estates but also industries located elsewhere, including those established on small estates without extension centres of their own. The Group noted that technical co-operation for the establishment and operation of such institutions could be provided by the United Nations and recommended that, if need be, governments avail themselves of such assistance.

Common service facilities

Two types of services were distinguished: those which must be provided, irrespective of size (such as fire-fighting and refuse disposal); and those which might be provided in order to make the estate more effective (such as a common service foundry, a central maintenance shop and a central canteen).

Generally, the bigger the estate, the more economic would be the provision of both types of services. The Group discussed the size of estate necessary to justify the services in the second category. It agreed that no general rule could be stated as the answer would depend on several factors peculiar to a given estate and a given location: for example, the nature of the industry on the estate; whether the services would be used also by industry outside the estate; and the availability of services outside the estate but near enough to be used by estate industries.

It was stressed that only those services for which there was sufficient demand, and which were not available on a commercial basis, should be provided by the industrial estate authority. It was a basic principle that an industrial estate should not compete with its occupants or with

industrialists located in the neighbouring area. It was recognized that some services needed from the beginning would be unlikely to attract private investment and that, even if such services were provided by private investment, the need for profitable operation might often lead to excessive price levels. Such services should be provided initially by the industrial estate authority as a promotional measure for small-scale industries. If need be, they might be turned over to private or co-operative ownership and management in the course of time.

As regards the provision of services on a co-operative basis between industries, it was agreed that success depended much on the particular area and environment. In some countries industrialists were well disposed towards co-operation; in others, the sense of individual entrepreneurship was so strong as to make successful co-operation extremely unlikely. It was felt that, of the different forms of co-operative association, the most likely to succeed was the loose association whose members contributed fees to a central or professional agency.

The Group considered that, on most industrial estates for small-scale industries, a tool room with heat-treatment equipment and with drawing and design office and a testing laboratory, preferably associated with the issue of standards and quality certification marking, would be useful common service facilities. The tool room facilities could also be used for repair and maintenance of the plants of small-scale units. The tool room and the laboratory could serve the majority of the occupants and industrialists located outside of the estate and would seldom meet private competition, at any rate in the early stages of establishment of the estate. In regions where several small industrial estates were located, a central tool room service could be provided on one of the estates or on the premises of an industrial extension centre. An advisory service on or near an estate would be another important common facility. A tool lease shop could be set up on most estates.

In some publications, compressed air had been mentioned as a service which could be provided from a central unit, but the Group felt that small compressor units in individual factories would be a better proposition.

A non-ferrous foundry was not favoured as a common service facility since it could be set up at small cost by those individual enterprises which required it for their regular production. The establishment of a modern ferrous foundry as a common facility would be justified only if small-scale enterprises in such industries as machine tools, sewing machines and electric motors set up on the estate or in the neighbourhood required special castings that could not be provided by commercial undertakings.

Training, while a necessary service to industry, was not regarded by the Group as a facility to be provided by the industrial estate authority. Because of the concentration of industry on the estate, it would frequently be a good location for a training centre which was part of a national or regional scheme; training could readily be supplemented by operational

experience and the estate environment would be suitable. But the training service would not be confined to the estate. It was noted that training centres having a production function were not usually successful. However, for the promotion of small-scale industries, a training-cum-common service facility centre in specialized trades, such as mechanical work, would be justified, if there were sufficient demand.

Other services

Other services might include a show room for exhibiting the products of the enterprises, legal advice, insurance, accounting and auditing service. Commercial banks or public industrial banks could be offered space in large industrial estates. The organization of sales and supplies co-operatives of small-scale enterprises to undertake purchases of raw materials, stores and supplies for the occupant enterprises and marketing of their products could be undertaken, where effective co-operation was possible and effective leadership could be provided.

Charging for services

The Group was generally not in favour of providing too many services free of cost, as it felt that this would be detrimental to the growth of self-reliant enterprises. In developing countries, promotional measures, such as information and technical advice and training, should be provided free of cost to small-scale industries, since they were educational in nature, and since, in the countries of the participants, public education was generally free of charge. Certain services, which directly benefited an industrial enterprise, such as work study or methods improvement or improved layout, could be initially provided free or at subsidized rates to educate entrepreneurs and to improve the productivity of the economy. Services provided in a common service facility workshop, e. g. electroplating, and manufacture of dies, were part of the operational costs of the entrepreneurs and should be charged, preferably at cost; after an initial period, they might be provided at commercial rates.

Where services were provided free or at subsidized rates, only deserving enterprises, keen to improve and to take steps to help themselves should be allowed to benefit from them. By concentrating assistance on selected enterprises, the limited resources of the public agency could be deployed to achieve maximum results for the economy.

6. FINANCING OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS

Because of the promotional nature of industrial estates for small-scale industries and of their heavy investment and operational costs, it was unlikely that private and institutional sources of financing would be

available for their establishment. Financing would generally be provided by public or government-supported institutions.

In Cyprus, Greece, Ireland and Malta, the bulk of the finance for infra-structure development and construction of buildings came from government sources. In southern Italy, almost 100 per cent of the infra-structure investment was available as a grant, and 85 to 100 per cent of the cost of buildings was offered as a loan by government agencies. In Israel, most of the financing was provided by the central Government, but a part was contributed by municipalities and private building companies. In Turkey, efforts were being made to supplement government loans with funds from municipalities and co-operative societies of artisans, and from institutional sources (the Halk Bank, which held the savings of artisan co-operative societies and the Sumer Bank, which held the Workmen's Insurance Fund).

In view of the limitations of government budgetary procedures and other organizational reasons stressed earlier,⁷ autonomous agencies, such as a development corporation or a development bank, would be better able to provide continuous financing and, in due course, to tap other institutional sources of financing, including private investment through issue of debentures or bonds. This was a further reason for entrusting the organization, establishment and financing of industrial areas and industrial estates to autonomous agencies.

After the successful establishment of the first demonstration industrial estates by the central government or by a public agency financed by the central government, associations or co-operatives of entrepreneurs and chambers of commerce and industry should be encouraged and assisted to establish industrial estates in co-operation with municipalities, local governments and urban planning authorities, through private and institutional financing and through issue of municipal revenue bonds or loans from insurance funds which could be provided under government or central bank guarantees. Under such a system, the central government agency would have to assure itself of the feasibility of projects and would provide guidance in feasibility studies, selection of locations and planning and construction of industrial estates.

The financing of machinery and equipment of enterprises admitted to an industrial area or industrial estate should be provided by institutional channels—commercial banks, development banks, and, where they exist, hire-purchase corporations—and not directly by the government or the industrial estate authority. The same was true of the financing of working capital. Because of their handicaps, small-scale industries should, however, be able to borrow on liberal conditions and terms. It was emphasized that the availability of standard factory buildings for rent represented a considerable saving in fixed capital and that a small enterprise in an industrial

⁷ See Section 4 above, pp. 22-7.

estate should provide a sizable part of the remaining capital, if its structure and operation were to be sound and economical.

The Group noted that external financing had been available for some industrial estate projects. The International Development Association (IDA), an affiliate of the International Bank for Reconstruction and Development (World Bank), had financed some industrial estate projects in Pakistan. Funds from government agencies of the Federal Republic of Germany and of the United Kingdom had been available for certain industrial estate projects in African countries. The Group recommended that, to the maximum extent possible, the technical assistance work of the United Nations Industrial Development Organization (UNIDO) and the United Nations Development Programme (UNDP) in the field of industrial estates be co-ordinated with the work of international financing agencies.

7. INTERNATIONAL AND REGIONAL CO-OPERATION IN THE DEVELOPMENT OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS

The Group noted with appreciation the work carried out by the United Nations Centre for Industrial Development (now United Nations Industrial Development Organization) and by the United Nations Development Programme through studies, seminars and technical co-operation activities. Among the participating countries, Cyprus, Greece, Malta and Turkey had received technical assistance in their industrial estate programmes. The Group recommended that governments increasingly avail themselves of the facilities offered under United Nations programmes, including the recently established Special Industrial Services (SIS) programme under which assistance could be provided speedily for projects confronted with difficulties in financing, construction, management and operation. Other needs of participants were primarily in the field of training. Training was particularly required for officials of industrial estate and industrial area authorities, managers of industrial estates, industrial engineers, civil engineers, extension officers and other persons involved in the planning, organization and management of industrial estates. The Group noted with interest a project to organize, under the fellowship programme of UNDP, group training courses on industrial estates for participants from various regions. It had no doubt that such courses, if organized, would be of considerable benefit for officials from the countries represented at the Consultative Group.

There was also need for further studies on specialized industrial estates, including functional and ancillary estates, and on industrial free zones for export industries. As noted earlier, the preparation of a handbook on the physical planning of industrial estates would be a welcome project.

Regarding regional co-operation, the Group recommended that study visits should be organized for the benefit of other countries, to those countries which had already established successful industrial estates, for instance, Israel and Malta; and that countries which had already established industrial estates or had projects under way, in particular Cyprus, Greece, Israel, Malta, Spain and Turkey, should organize group seminars or consultations, preferably in connexion with study visits, with the assistance of UNIDO staff, advisors and consultants on problems of common interest.

The Group reiterated the earlier recommendation for closer co-ordination and co-operation between the technical assistance activities of the United Nations and the financing activities of international financial agencies.

ANNEX I

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ANNEX II

AGENDA

1. *Opening addresses*
2. *Adoption of the agenda*
3. *Review of developments in the fields of industrial estates and industrial areas in the countries of the participants*
4. *The role of industrial estates and industrial areas in development policies and programmes, with special reference to promotion of small-scale industries*
5. *Planning of industrial estates and industrial areas*
 - (a) *Pre-project planning*
Feasibility studies, location, type and size, phasing of development, integration with other schemes of economic development
 - (b) *Physical planning and engineering aspects*
Site selection, land utilization and layout, plot and factory sizes, building design, physical utilities and services, economies in construction
6. *Organization and management*
Sponsorship and organizational arrangements, admission policies, sales and lease policies, management, share of tenants in management, co-operative arrangement between occupants
7. *Services and facilities*
Common service facilities, technical counselling and guidance, management counselling, training, information services etc.
8. *Financing of industrial estates and industrial areas*
Sources and forms of financing of the projects, sources and forms of financial assistance to the occupants
9. *International and regional co-operation in the development of industrial estates and industrial areas*

ANNEX III

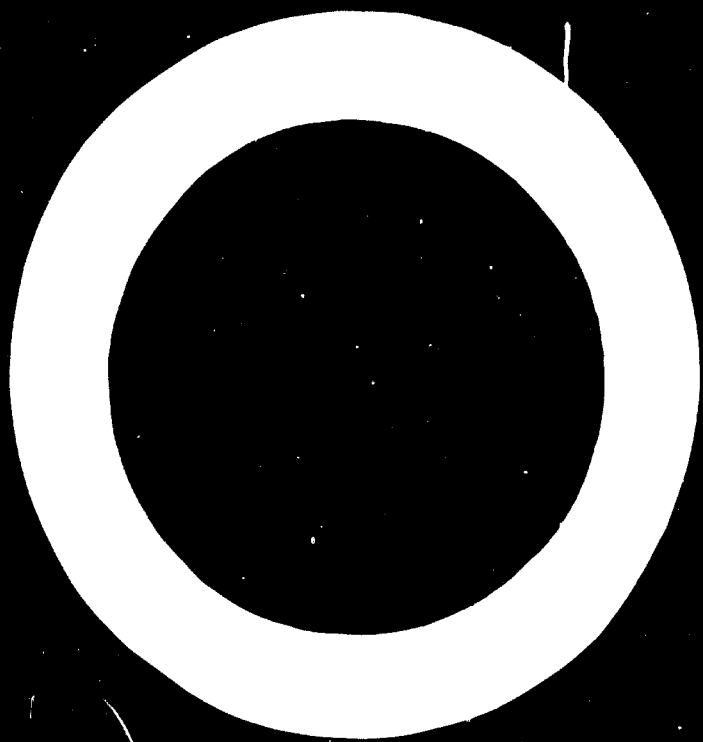
LIST OF DOCUMENTS

Working Papers

<i>Agenda item</i>	<i>Paper</i>	<i>Symbol</i>
	Provisional agenda	CID/IE. 1/1
	Annotated provisional agenda and proposed questions for discussion	CID/IE. 1/1/Add. 1
3	Industrial estate plans and projects in some European and other countries, by the Centre for Industrial Development	CID/IE. 1/2
4	The role of industrial zones, areas and nuclei in development policies and programmes with special reference to the promotion of small-scale industries: The experience of Italy, by C. Alhaique	CID/IE. 1/3
	The role of industrial estates, areas and zones in providing an industrial base in urban and regional development plans, by A. Solow	CID/IE. 1/4
	The role of industrial estates in policies and programmes for the development of small-scale industries, by P. C. Alexander	CID/IE. 1/5
5	Types of industrial estates, by P. C. Alexander	CID/IE. 1/6
	Pre-project planning for industrial estates, by P. Quigley	CID/IE. 1/7
7	Services and facilities for small-scale industries in industrial estates, by A. D. Bohra	CID/IE. 1/8
8	Public and private financing of industrial estate projects and stimulation of private projects by the government authorities, with special reference to India's experience, by B. K. Chatterji	CID/IE. 1/9
9	United Nations activities in the field of industrial estates, by the Centre for Industrial Development	CID/IE. 1/10

Background Papers

	<i>Sales or document number</i>
Establishment of industrial estates in under-developed countries	60. II. B. 4
The physical planning of industrial estates	62. II. B. 4
Industrial estates in Asia and the Far East	62. II. B. 5
Industrial estates in Africa	66. II. B. 2
Industrial estates: policies, plans and progress—A comparative analysis of international experience	CID/VI/14 66. II. B. 16
Research parks in the United States: A case study from Colorado, by J. Stepanek	CID/IE/BP. 2
Problems of procedure, administration and relationship to be considered in establishing the United Nations Organization for Industrial Development	A/AC. 126/10



PART II

*Report of the United Nations Consultative
Group on Industrial Estates and Industrial
Areas in Arab Countries of the Middle East*

Beirut, 31 October — 5 November 1966

CONTENTS

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REPORT OF THE UNITED NATIONS CONSULTATIVE GROUP ON INDUSTRIAL ESTATES AND INDUSTRIAL AREAS IN ARAB COUNTRIES OF THE MIDDLE EAST¹

INTRODUCTION

Organization and attendance

THE UNITED NATIONS Consultative Group on Industrial Estates and Industrial Areas in Arab Countries of the Middle East met in Beirut, Lebanon, from 31 October to 5 November 1966. The Consultative Group was sponsored jointly by the Centre for Industrial Development (CID)¹ and the Bureau of Technical Assistance Operations of the United Nations Department of Economic and Social Affairs.

The Consultative Group conference was attended by eleven participants from six countries—Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia and Syria; staff members and consultants of the United Nations Centre for Industrial Development and of the United Nations Economic and Social Office in Beirut; and representatives of the International Labour Organisation and the Food and Agriculture Organization of the United Nations. A list of the participants is given in Annex I.

Mr. J.-P. Martin, Director, United Nations Economic and Social Office in Beirut, welcomed the participants and opened the sessions; Mr. Igor Krestovsky, Chief, Small-scale Industry Section, Policies and Programming Division, Centre for Industrial Development, served as Director of the Consultative Group and conducted the proceedings.

The meetings of the Consultative Group closed on 5 November 1966, with a motion of thanks to the Director, staff and consultants of the Group and to the Director and staff of the United Nations Economic and Social Office in Beirut. The participants visited industries in the free zone of the Beirut port on 5 November 1966.

Opening statements

Welcoming the participants, Mr. J.-P. Martin, Director, United Nations Economic and Social Office in Beirut, referred to the United Nations Development Decade and stressed that its emphasis on industrial

¹ Now the United Nations Industrial Development Organization (UNIDO).

development was of particular significance for the economies of the Middle East. He expressed the hope that the deliberations of the Consultative Group would provide guidance regarding the potential use of industrial estates and industrial areas for promoting industrialization and influencing industrial location in the region. As a result of the meeting, the United Nations Economic and Social Office in Beirut should find itself increasingly able to assist the countries in the region in their industrialization efforts, both through research work and through the provision of advisory services to governments.

In the course of his introductory remarks, Mr. Krestovsky, Director of the Consultative Group, mentioned that this was the fourth regional conference on industrial estates to be convened by the United Nations. Previous seminars and consultative groups had brought together participants from Asia and the Far East, Africa, and certain European and other countries in the process of industrialization. In view of the fact that so far only limited experience had been gained in Arab countries of the Middle East in the field of industrial estates and industrial areas, the purpose of the Consultative Group was, to a large extent, to inform the participants of developments in other regions, to elicit their views on what, in this experience, was applicable in their own countries, and to stimulate interest in establishing estates and areas. The documentation submitted to the Consultative Group included, in addition to discussion papers, all the relevant United Nations publications issued so far.² Thus, the Group had before it comprehensive information on the subject and could avail itself of the experience of CID staff and consultants who had been involved in research on, and in planning, operation and management of, industrial estates. Another purpose was to inform governments of the types of assistance which could be obtained from the United Nations under its technical co-operation programmes, and to encourage the formulation of requests. Finally, it was expected that the meeting would lead to recommendations on regional co-operation in the field of industrial estates and industrial areas.

Adoption of the agenda

The provisional agenda was adopted; it is given in Annex II.

1. REVIEW OF DEVELOPMENTS IN THE FIELDS OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS IN THE COUNTRIES OF THE PARTICIPANTS

The participants from Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia and Syria made statements on relevant policies and programmes in their countries.

² The list of documents is given in Annex III.

Iraq

Iraq had carried out a planned programme of industrialization during the last ten years. During the current five-year plan, 1966—1970, total invested capital in plant and equipment was estimated at 200 million Iraqi dinars (\$US 560 million). Industrial development was principally concentrated in the outskirts of the main cities—Baghdad, Kirkuk, Basrah and Mosul—where there were good power, water and sewerage facilities, and where skilled labour was available. In addition, in accordance with the Government's policy of decentralization, a number of industrial projects were being promoted in towns in rural areas, such as Iskandaria, Kut and Samara. As a measure of urban planning, industrial zones were mapped out in both types of locations. Zoning was carried out with the co-operation of all departments concerned—public works, industry, agriculture and rural affairs. By the end of the current five-year plan, seven such zones would be in existence in different parts of the country.

In the zones, well developed plots set aside for future projects might be allocated to private industries of all types and sizes. While the zones did not provide the full range of services and facilities of industrial estates and areas, they were a basis for such a development, should a decision to promote it be taken by the Government.

Jordan

The establishment of "industrial districts" had been considered by the Government of Jordan for a number of years. In view of favourable prospects for industrial development, the availability of power and water and on the grounds of national security considerations, Amman, Zarka and Jericho were judged to be the best locations for industrial estates. Feasibility studies had indicated that there was scope for the establishment of food processing, textile, woodworking, clay product industries, bus body construction, jobbing machine shops, foundries, refrigeration assembly, and stove-making industries on the estates.

Kuwait

In the wake of the production of oil in Kuwait in 1946, various business undertakings sprang up. At first there were commercial enterprises, building concerns and service industries; at a later date, small-scale industries manufacturing furniture, doors, windows and other metallic products, construction materials, cement and metallic pipes, foodstuffs etc. were set up. To support and expand these activities and to regulate urban growth, the Government allocated a tract of land, four square kilometres

in area, at Shuwaikh, adjacent to the Kuwait harbour. The tract was rapidly occupied, mostly by commercial undertakings erecting buildings for storage and warehousing and was recently extended to an area of twenty square kilometres. Roads, electricity, water, sewerage, telephones, infirmaries and police stations were gradually being installed in the area. Plots were leased for a period of fifty years at the nominal rate of four to five fils (less than two US cents) per square metre. While the area was not confined to industrial activities, plots were increasingly occupied by small-scale industries. This trend was encouraged by the Government, whose policy was to promote and facilitate private investment. The Government regulated development through licensing under the Industrial Law of 1965, imposed rules for allotment of land in the industrial area, undertook feasibility studies and provided some technical assistance.

In 1963, an area for medium-sized and large-scale industries was established in the port of Shuaiba, on a tract of about ten square kilometres. The area was planned on the basis of extensive studies which indicated that the most suitable industries would be those using or transforming petroleum. A modern new port with a capacity of about 900,000 tons of imports-exports per annum was being completed; a power station and a water distillation plant were in operation. Industries included a chemical fertilizer plant in operation since August 1966 and a large refinery, to be completed in July 1967. Industrial projects under construction included a gas fractionation and distribution centre, petrochemical plants, a sea food packing and fish meal factory, and other undertakings.

Lebanon

In Lebanon, industry was overwhelmingly concentrated in and around **Beirut** and the Government intended to regulate its development through urban zoning. At the same time, by extending infra-structure facilities throughout the country, it was hoped to stimulate the development of industry in other regions. An important objective was to promote export-oriented activities and to encourage the establishment of small-scale industries. Thus far, there were no plans or projects for setting up industrial estates or areas. A few clothing factories were established in the free zone of the Port of Beirut, most of which was occupied by *entrepôts* and commercial firms.

Saudi Arabia

In Saudi Arabia, three industrial estates for small-scale and medium-sized industries were being planned at Riyadh, Jeddah and Dammam, on the outskirts of the towns. Land had been acquired and master plans prepared

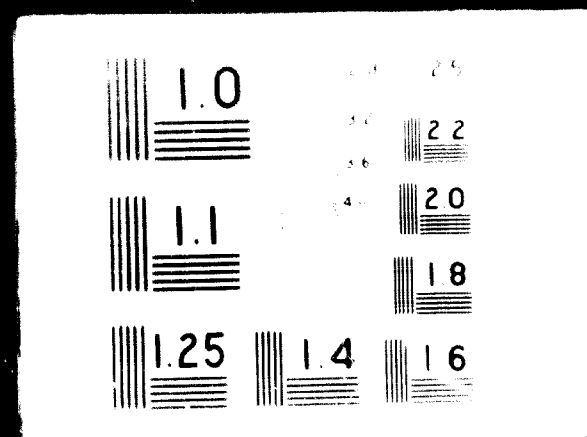


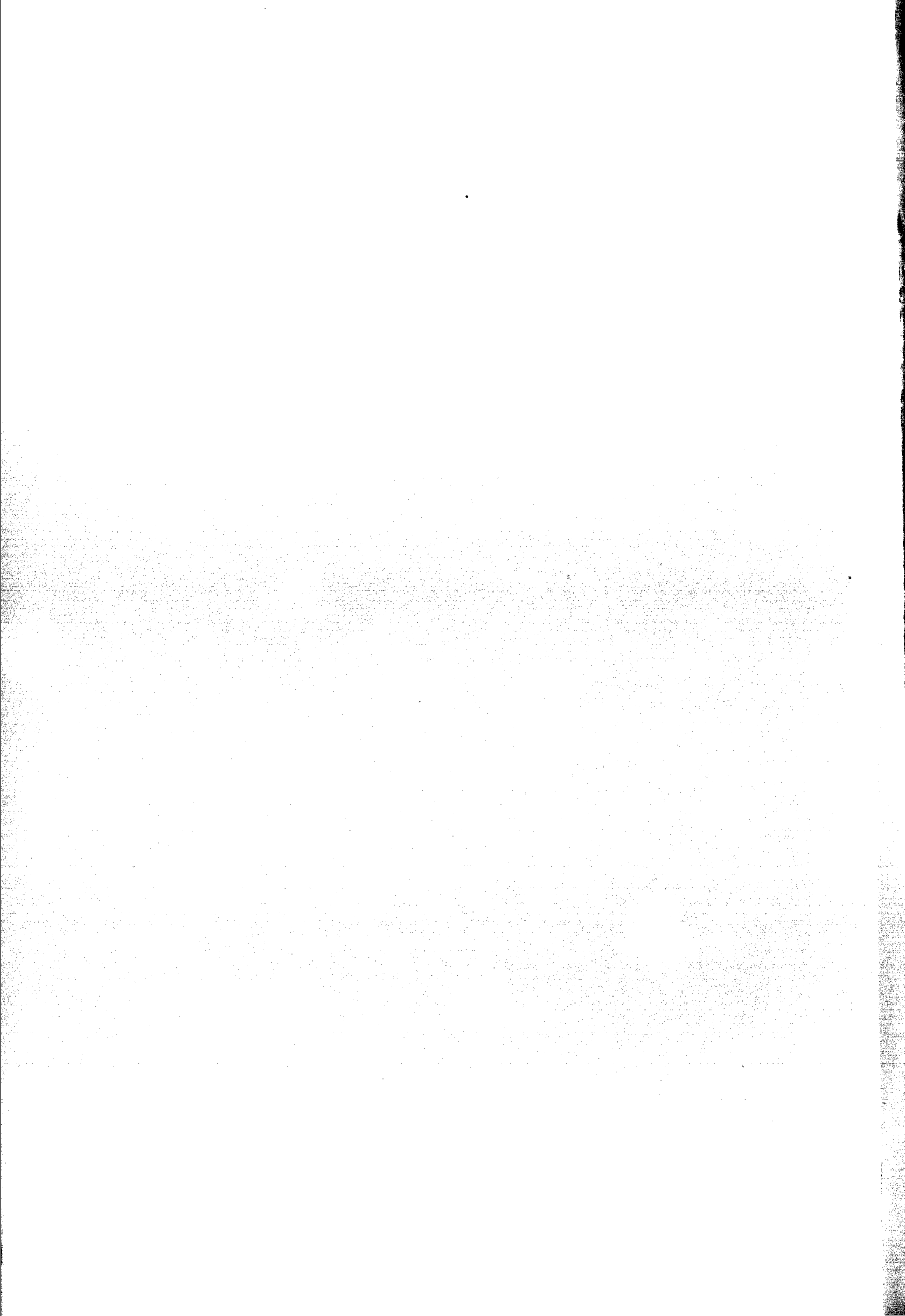
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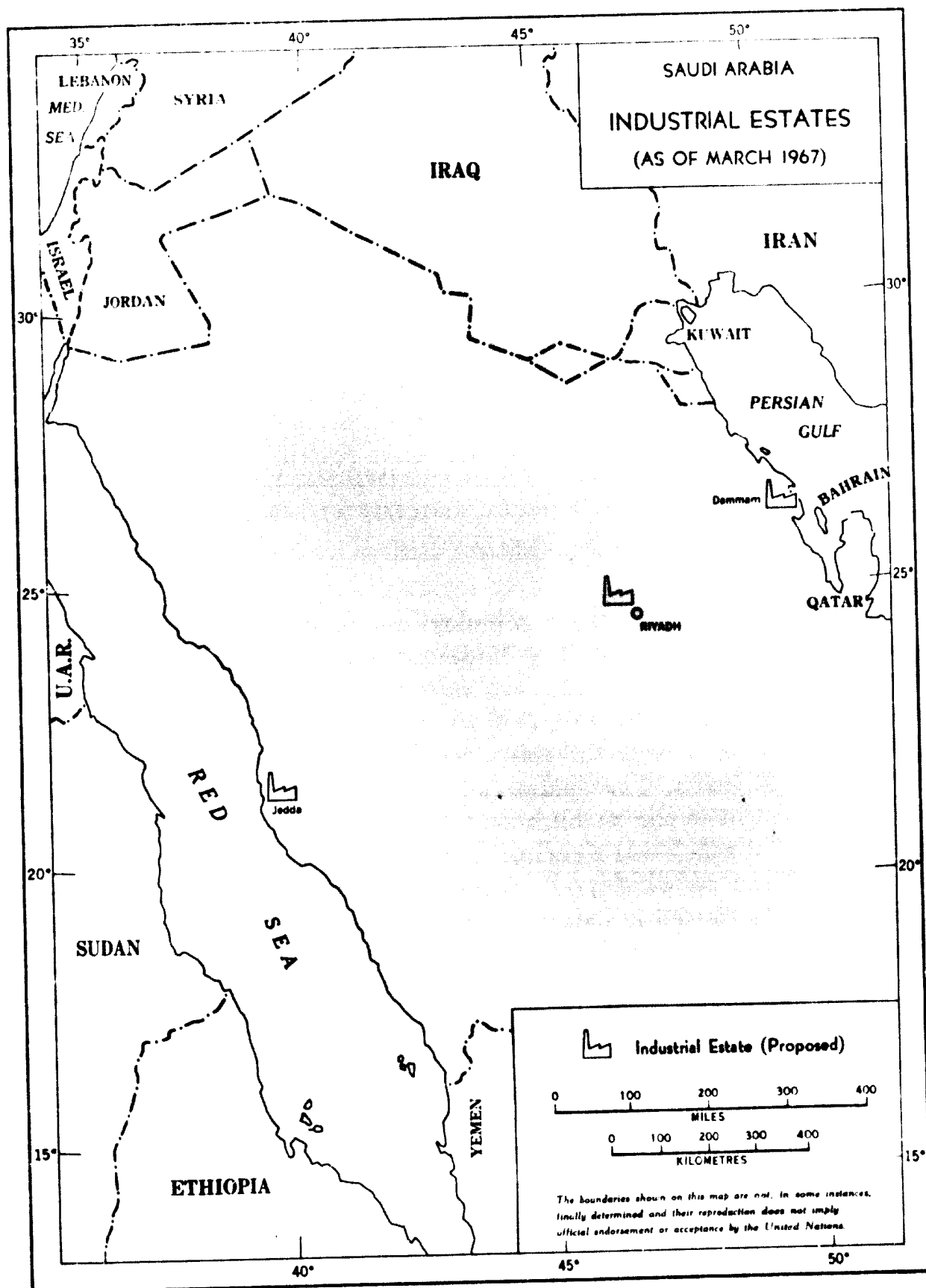
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for the Jedda and Riyadh projects and steps were being taken to acquire land at Dammam. The area of each estate was about forty hectares.

The estates would feature standard factories including "nursery" blocks, an administration building, workshops, fire station, canteen, dispensary, police station and bank. Costs were estimated at 7.5 million riyals (\$US 1.7 million) at Jedda, 7 million (\$US 1.5 million) at Riyadh, and



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6 million (\$US 1.3 million) at Dammam. Assistance in planning, constructing and managing the estates was provided by experts of the Industrial Studies and Development Centre, Riyadh, a project assisted by UNDP (Special Fund).

Syria

In Syria, master plans for zoning and land use control had been prepared for each major city, in particular for Damascus and Aleppo which were the major industrial centres in the country. The allocation of land within the zones and the provision of utilities for industry were the responsibility of the municipalities. Municipal town planning was co-ordinated by the Ministry of Municipal and Rural Affairs and industrial development was regulated by the Ministry of Industry. No plans or projects for industrial estates and areas had yet been formulated.

2. THE ROLE OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS IN DEVELOPMENT POLICIES AND PROGRAMMES, WITH SPECIAL REFERENCE TO THE PROMOTION OF SMALL-SCALE INDUSTRIES

The Group accepted the terminology employed in the documentation prepared by the Secretariat. The "industrial estate" referred to a planned clustering of industrial enterprises offering standard factory buildings erected in advance of demand, and a variety of services and facilities to the occupants; as a rule, the estate would serve principally to promote small-scale industries. The "industrial area" offered only improved sites as an inducement to the establishment of industries of all types and sizes. The "industrial zone" was a part of an urban or suburban centre restricted to industrial use, on which no improvements were made. Both estates and areas should be located in industrial zones; if necessary, they should themselves be sub-zoned for industries of different types. The Group proposed that the following expressions be used in Arabic: Industrial estate:

المجمع الصناعي (al mujamaa assinaā); industrial area: المنطقة الصناعية

(al mantaka assinaā); industrial zone: منطقتان الصناعيات (mantakat assinaat).

The Group observed that, in the developing countries, industrial estates and industrial areas were increasingly used, in conjunction with other measures, to attract industry and to regulate its location. Industrial estates had proved to be an effective instrument for stimulating local entrepreneurship; they facilitated the establishment of new small-scale in-

dustries and could induce the modernization, expansion and diversification of existing ones. Industrial areas contributed to attracting large-scale and medium-sized industries, both national and foreign. Estates and areas helped in planning and regulating the growth of urban areas by ensuring a proper use of land in compliance with zoning regulations. They could also be a useful component of urban renewal programmes, especially slum clearance, since they made it possible not only to resettle displaced industries but to modernize them at the same time. One of their most important roles was to contribute to industrial decentralization programmes by steering industries away from congested urban centres towards relatively less developed regions. They could be associated with major programmes of installation of infra-structure in rural areas, since the availability of roads, power, water and other utilities was one of the prerequisites for industrialization. In a sense, they were themselves projects for the development of infra-structure and could provide a basis not only for the establishment of industry, but also for the modernization of agriculture, artisan undertakings and service industries, the provision of light and water in residential dwellings and other improvements in small towns in rural areas. They could provide an industrial base in new towns, major reclamation, irrigation and electrification projects and could diversify industrial activities around large schemes such as steel mills, oil refineries and petrochemical plants. They were effective in promoting inter-industry relations, in particular subcontracting between large and small industries. They could be linked to projects for the creation or expansion of ports and airports.

Industrial estates and industrial areas were flexible instruments which could be adapted to serve different industrialization policies and meet a variety of local conditions and needs. Industrial estates could be specialized, admission being restricted to industries engaged in similar or complementary lines of business, e. g. food-processing, leather or wood working; they could be organized on a "functional" basis to manufacture certain products, such as bicycles, scooters and small appliances, the production of parts and components being allocated among the occupants. Industrial estates and industrial areas could be reserved to export industries, and, if need be, could be organized as industrial-free zones. In all specialized projects of these types, appreciable economies could be achieved in the operation of common service facilities and industrial extension centres, as well as in procurement of raw materials, marketing of products, and so on. Specialized estates lent themselves particularly well to co-operative arrangements among the occupants.

In all countries of the region, industrialization was a major objective of government policies. In some of these countries, natural conditions precluded any appreciable development of agriculture, and progress depended essentially on the establishment and growth of manufacturing.

Due to the smallness of markets, the relative scarcity of basic raw materials and especially the need to ensure the participation of indigenous entrepreneurship in industrial development, there was much scope, in all countries, for the promotion of small-scale industry, side by side with that of larger undertakings. The Group expressed its conviction that industrial estates were an extremely effective instrument of development and recommended that active consideration be given by ministries of industry, planning boards and other competent agencies to their establishment in those countries which, so far, had no plans or projects in this field.

The Group cautioned that the provision of physical facilities on industrial estates—improved sites, standard factories, common service workshops etc.—important as it was, did not offer a complete solution to the problem of development of small-scale industry. Entrepreneurs had to be steered towards those industrial occupations which offered the best prospects of success and which met the needs of the locality, region or country; they should therefore receive orientation on the basis of carefully prepared industrial feasibility studies. They should be informed of all the technical and economic aspects of the proposed industrial operation—type of products, size of plant, type and cost of machinery, production processes, prospective markets, capital requirements, anticipated profitability, and so on. They should be assisted in all formalities leading to the incorporation of their enterprises. Financing at liberal conditions should be available to supplement their own, usually scant, resources. Once established, they would need counselling to solve their technical, managerial and marketing problems, and information on industrial and labour laws, fiscal benefits and obligations etc. Much of this information and advice could be provided by the management and extension service of the estate, the latter being an essential component of such projects. But the organization, financing and management of the estate itself, the financing facilities for the occupants, the incentive legislation, the organization of labour and management training, the organization and financing of extension services, whether in the estates or outside them, and the stimulation of small industry development in all regions of the country should be part of a broader programme of development of this sector, which, for obvious reasons, could be drawn up and implemented only by the Government. Thus, industrial estates would be effective only if they integrated all or most measures of promotion of, and assistance to, small-scale industries, and if, in turn, industrial estate projects were part of broader development programmes.

Similarly, industrial area projects were effective in attracting large-scale and medium-sized industries only if they offered, besides improved sites, a variety of services including, for instance, feasibility and market studies, recruitment and training of labour, and even construction of factories and installation of equipment on a "turn-key" basis. Other important complementary measures were fiscal and customs concessions, accelerated

depreciation allowances and other incentives, and certain measures of protection.

In several countries of the region, in particular in Jordan, Lebanon and Syria, the promotion of export-oriented industries and activities was of crucial importance to the economy in view of the small size of the home market, the need for foreign exchange earnings and the need to provide employment to considerable sections of the population through industrialization. The Group recognized that the device of the free zone could be used for the development not only of commercial undertakings, but of export industries as well. The establishment of such industries could be strongly stimulated by creating estates and areas within free zones. The Group felt that, while the promotion of export industries through attraction of foreign capital and other incentives should be taken into consideration in admission and occupancy policies of industrial areas and industrial estates, there was limited scope for establishing industrial areas or industrial estates exclusively for export industries. There was a consensus of opinion that in view of the importance of inter-Arab trade and of the steps being taken towards establishing an Arab Common Market, the establishment of industrial free zones should be considered on the basis of inter-Arab regional planning and with a view to benefiting several neighbouring countries.

The Group recommended that, in localities where there were prospects for the establishment of industries of all types and sizes, and where consideration was given to setting up industrial estates and industrial areas, these be located, as far as possible, on the same tract of land so as to achieve economies of agglomeration and of scale in installation of infrastructure, construction and management, and to facilitate the establishment of subcontracting between large and small industries. Also, it recommended that flexible land use policies be adopted on industrial estates, small industries being offered either standard factories or improved sites, or, when necessary, custom built factories.

It was noted that the problems of industrial promotion were somewhat different in the countries of the region having high per capita incomes arising out of revenues from oil, from those in other countries which suffered from scarcity of capital for industrial development. As already mentioned, in some of the former countries, achieving diversification of the economy through industrialization had a high priority, and capital for industrial projects, including construction of industrial areas and industrial estates, was readily available. In the latter countries, however, scarce financial resources had to be allocated among many equally urgent programmes in various fields of economic development, and government support of industrialization projects was frequently inadequate. The Group felt that industrial development was of such importance to the economies of countries of the region as to require a greater involvement of govern-

ments in programmes in this field, in particular in projects for the establishment of industrial estates and areas. A reallocation of resources for that purpose would be fully justified.

3. PLANNING OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS

Feasibility studies

The Group stressed the importance of undertaking industrial feasibility studies before planning any project for the establishment of an industrial area or an industrial estate. This was necessary to determine the location, type and size of areas and estates, the infra-structure facilities required, and the phasing of development. In the case of industrial estates for small-scale industries, it was essential for planning the number, type and size of standard factory buildings and of common service facilities.

The results of feasibility studies indicating areas of industrial activity having prospects of success in different regions would be of considerable help in promoting entrepreneurship. Existing entrepreneurs needed help and guidance in expanding or diversifying their activities. Potential entrepreneurs should receive orientation on the types of industries to be set up.

In most countries of the region, over-all plans of industrial development allocating resources at the national level had been drawn up. There was a need for detailed techno-economic studies to be undertaken at the sectoral and plant levels. Studies at the sectoral level would generally be carried out for a region or for large urban centres and would facilitate the selection and location of individual projects. At the plant level, large industrial undertakings were usually able to prepare project reports either by their own technical staffs or through engineering consultant firms. More often than not, small entrepreneurs were not capable of planning their establishments and could not afford consultant services. Experience had shown, however, that many types of small-scale industries could be set up on the basis of standard studies, sometimes called "industry fact sheets" or "model schemes".

The need for such studies had led in recent years, to the creation of special institutions (usually called Industrial Studies and Development Centres), in various developing countries, including one in the region. Studies could also be undertaken by industrial development corporations and banks. The preparation of model schemes could be part of the functions of these institutions or of industrial extension centres.

The shortage of suitable personnel was a major problem in organizing feasibility study programmes. The Group recommended the early establishment of adequate training programmes in this field. It noted that technical assistance could be provided by the United Nations for the establishment

of industrial study agencies, for undertaking studies or for organizing training programmes, and recommended that, where necessary, governments avail themselves of this assistance.

Location

As already mentioned, the selection of locations for industrial areas and industrial estates should be based on feasibility studies which would take into account not only economic and physical criteria, but also national and regional planning considerations.

It was the general view that, at the present time, the objective of industrial development had a higher priority in most countries of the region than that of decongestion of urban areas and regional development. For that reason, it was desirable that, in the immediate future, industrial estates and areas should be set up in or near large urban centres where external economies and other pre-requisites for industrialization existed. In any event, the scope for areas and estates was relatively limited, and the first projects should be set up where maximum success could be achieved. The sites of the industrial estates and areas should be properly related to zoning and other urban planning requirements, including the provision of space for expansion, and to the needs for housing, educational and recreational facilities for the population engaged in industrial activities. Wherever master plans for urban and suburban areas existed or were under preparation, industrial zones, industrial areas and industrial estates should be fully integrated in them.

The Group was of the view that, even in urban centres, industrial estates should be provided with standard factories of different sizes and common service facilities. It did not feel that even in the most favourable locations, entrepreneurial initiatives for the establishment of small-scale industries would be sufficiently stimulated by the offer of improved sites. The provision of standard factories, especially when offered on lease, was a means of palliating the shortage of private savings and of credit for small industries, and the availability of common services was a means of reducing production costs through an improvement of productivity and of the quality of the goods.

Subsequently, industrial estates and areas might be planned to serve the objectives of regional development. They should be integrated with other development programmes, such as power stations, irrigation schemes, new agricultural settlements or large industrial complexes, so as to benefit from low infra-structure costs, and to take advantage of the demand generated by other projects. If other industrial feasibility criteria were met, existing medium or small towns serving as marketing centres would offer good possibilities for their establishment, provided that local leaders and local governments actively supported industrialization.

Types of industrial estates

The Group was of the view that, at this stage of industrialization of the region, there was little scope for the establishment of specialized industrial estates. Estates for all types of small-scale and light manufacturing industries would generally be the most suitable. Obnoxious and noise-creating industries would evidently be excluded by zoning laws and regulations.

In view of the importance of the artisan sector in most countries of the region, consideration might be given to the establishment of workshop blocks with a few common facilities in areas of concentration of certain trades. On industrial estates, the availability of nursery sheds or nursery factories would facilitate the transformation of artisan undertakings into modern small manufacturing industries.

Physical planning

The Group had before it a paper on "Pre-Project Planning for Industrial Estates"³ which dealt with the main considerations which should guide physical planning. It expressed general agreement with the conclusions and recommendations contained in the report.

As mentioned earlier, location and site selection depended to a large extent on industrial feasibility studies at the local or regional level and on the over-all economic development programmes of the government. From a physical planning standpoint, site selection should take into consideration: distance from the site to the town; access to the main paved road; prospects of urban expansion in the neighbouring area; level of the ground—a slight slope might facilitate drainage; availability of electric power and water within a reasonable distance; satisfactory purchase price of land; town planning and zoning regulations ensuring use of land for industrial development; and availability of public transportation at low cost for commuting workers.

The prospects of an estate's or area's growth should be considered at the initial planning stage. Land for future development should be acquired at the same time as the basic area, since land values would rise as the estate developed, a factor which might seriously affect the economy of the project at a later stage.

A good layout should be based on the prospective industrial composition of the estate, the logical phased development of the site, the types and sizes of service facilities, the grouping of standard factories, and the potential movement of people and vehicles. A simple rectangle was considered to be the most suitable shape for a small industrial estate. It per-

³ See Part VI, "Pre-Project Planning for Industrial Estates".

mitted a minimal length of internal roads, pipelines and drainage network while providing the maximum flexibility in layout of factory plots. The development plan should be capable of meeting the changing demands of industry as the estate grew and developed. For that reason, the layout of areas for further development should be considered as provisional. The optimum size of an industrial estate for small-scale industry was considered to be between 20 and 60 hectares (50 and 150 acres).

There was a consensus of opinion that the rate of expansion of widely different industries in an industrial estate could not be accurately predicted. Mechanization and modern management techniques made it possible to increase production without substantially increasing the factory area. In particular, shift working was likely to be introduced in the future in order to utilize fully machinery and equipment. As a general policy, it was recommended that industrial estates be planned so that the initial covered area might eventually be expanded by 100 per cent. Industries requiring a plant with a potential capacity for expansion in excess of that contemplated by the building programme could be accommodated either in a standard factory of larger size or in a custom-built factory.

The following percentages of land utilization in an industrial estate constructed with assistance from the United Nations in a neighbouring country were given as an illustration:

	<i>Percentage</i>
Factory plots for standard and custom-built factories . . .	62.0
Land area under internal roads including pavement, footpath, and verge	20.9
Land area under open space	3.3
Land area under administration building, gate house, parking and open space	3.5
Land area under canteen, clinic, staff residence, and open space	3.8
Land area under warehouse	3.4
Land area under workshops	3.1
Total	100.0

The following widths were adopted for internal roads (in the estate referred to above):

<i>Type of road</i>	<i>Total land width</i>	<i>Paved width (metres)</i>	<i>Verge (planting) width</i>	<i>Footpath width</i>
Main—Type A	18	10	4	4
Main—Type B	21	10	7	4
Secondary	15.5	8	3.5	4
Service	13	6	3	4

In that estate, secondary roads divided the site into blocks of four factories each. Each block was composed of the following elements: covered production area; office accommodation; covered storage area; open storage area; factory expansion space; vehicular access; pedestrian access; toilets and showers; tea and rest-rooms; locker room; car parking. The Group was of the view that the width and size of roads should be flexible, taking into account the architectural grouping and the requirements of transportation.

Buildings should be able to resist fire, earthquake, dust and termites. Normally the industries located in an estate did not require the use of cranes. A clearance at eaves of about 4 metres was adequate. Spans, heights, doors and windows should be standardized as far as possible in order to achieve economy. Factory floors should be strong enough to carry machine loads. They should be non-slippery and capable of being kept clean. A ten centimetre thickness of cement concrete re-inforced with steel mesh laid over a well-consolidated base of hard materials was suitable. Floors should not be finished until the position of machinery was known.

Climatic considerations played a very important part in the design of the buildings, especially in the Middle East in view of its high temperatures during the long summer months. Architectural design should take into account the climatic factors as well as tradition and social factors. Exterior walls should be built of materials which do not readily transmit heat from outside to inside. Heat should be reflected from the roof surface and transmission reduced as much as possible by the right choice of materials and careful design. Glazed areas should be shaded by louvers or sun breakers, or by other methods to prevent excessive heating of the glazing. Heat exclusion could be attempted by using an exterior cavity brick walling of 38 cm. thickness, north lighting structure and glass-fibre roof insulation for the factory sheds. Landscaping, planting of trees and lawns in open spaces contributed to heat exclusion and dust prevention, provided the green areas are properly maintained.

The selection of the type of structure to be used at a particular place depended upon the availability of building materials, local construction practices and relative economy. Consideration should be given not only to the initial cost of construction, but also to the cost of maintenance. The structural frames of work-sheds usually consisted of steel or reinforced concrete. A recent cost comparison of alternative structures showed that a steel frame work-shed with a 16-metre span and covered by corrugated galvanized iron sheet roofing and fibre insulation was about one-third cheaper than a building of reinforced concrete frame with hollow-block roof. Some participants, however, were of the opinion that the difference in cost between steel frames and concrete frames was insignificant, and that the choice between the two would also depend in some countries on local availability of cement as against the need to import steel.

There should be as few obstructions as possible in the covered production area. However, each production process imposed its own logic in

this area; constant requirements such as vehicular access, pedestrian paths and service facilities imposed basic disciplines of siting and access.

The size of the covered storage area would vary with different industries; it would normally be incorporated within the factory building. Provision should be made for increasing its area in the course of time.

Screened yards should be provided for external storage. The inevitable accumulation of industrial debris was common to all manufacturers. It could not be kept within the actual factory building; when exposed to view, it lent an air of squalor to even the best estates. Open storage should therefore be screened from general view by a wall.

Sub-stations, air conditioning or cooler plants and other ancillary buildings required by particular factories should be designed as integral parts of the buildings.

A dependable supply of water was essential. The best arrangement was to get water in bulk from the public supply and to distribute it to the units in the estate. The amount of water required varied widely according to the types of industry and the location of the estate. A figure of 273 litres (60 British gallons) per capita per day was generally accepted in estimating the demands for drinking and sanitary needs as well as for industrial purposes. But allowance should be made for the future expansion of the estate. The main distribution water pipes were usually designed and laid before the demands of the various factories were known. The mains supply and pressure should be suitable for fire-fighting services. Ring systems of supply mains should be used to reduce the danger of supply interruptions caused by pipe breaks and maintenance.

Electric power was used for almost all the power and lighting requirements of light industry because of its cleanness, flexibility and ease of operation. Power requirements varied with the types of industry. For average small-scale to medium-sized industries, one kilowatt per 100 square feet (about 9.3 square metres) of factory space could be used as a standard in preliminary estimates. Industrialists generally recognized that good lighting was important for factory efficiency. Different processes required different lighting intensities, however, and it was difficult to generalize. The selection of lighting fixtures and positioning could be left more satisfactorily to the tenant. An overhead distribution line was cheaper but from the point of view of safety and appearance, underground cables were preferred. As with water supply, ring systems of distribution were very desirable.

An estate or an area should be adequately sewered. The main sewer could often be connected to the sewerage of the municipality or might be led to a separate treatment works. A connexion with the municipal system was attractive on economic, operational and logical grounds. The capacity required from any area could be estimated as equivalent to the water supply to that area. There should be no industrial wastes of complicated character since obnoxious industries were usually excluded from an industrial estate.

However, some industries had effluences requiring pre-treatment before connexion was made to the sewerage of the estate.

Three requirements in regard to vehicular access and parking should be observed for each individual factory: industrial trucks and vans needed direct access to the factory; executive cars should be parked in the vicinity of the office blocks; general parking areas should be nearby.

Suitable areas should be planned for recreational activities.

An administrative building should include, besides offices for the industrial estate authority, certain facilities for tenants of the estate. These might include: post office; bank; central telephone and telex services; personnel and welfare services; clinic; board room; office services, typing and duplicating; show room; library; technical training centre and guest room.

Individual telephone connexions might prove to be expensive. A central exchange in the administrative building could reduce costs appreciably.

Services such as garbage collection, street lighting etc. should normally be provided by local authorities. This should be taken into account at the early planning stages.

The Group discussed a number of planning ratios, and generally endorsed the figures given in the discussion paper. In this connexion, it emphasized the need to pool available information on physical planning criteria, planning ratios, design of buildings and other data and exchange them amongst countries of the region. Standardization of regional data would not only facilitate the establishment of industrial estates, but also would make it possible to advise entrepreneurs constructing their own factories in industrial areas and industrial zones. The Group agreed that this should be one of the functions of the proposed regional centre for industrial development (see Section 5, pp. 62—3).

4. ORGANIZATION, MANAGEMENT AND FINANCING

Organization

In most countries of the region, zoning and the provision of industrial sites were the responsibility of municipalities, under the control of the ministry in charge of municipal affairs. In Kuwait, where industrial areas had been set up, an autonomous Industrial Development Board had been created to administer them. In Saudi Arabia the three industrial estates were being established by the Ministry of Commerce and Industry in co-operation with the municipalities.

In the view of the Group, it was logical that the establishment and management of estates and areas be entrusted to government or government-supported agencies. Municipalities seldom had the financial resources

and technical and managerial expertise required to plan and operate promotional schemes of this type. The agencies responsible for areas and estates should enjoy a large degree of autonomy since government budgetary and administrative procedures were usually too rigid and cumbersome to be applied to projects requiring operational flexibility and businesslike management. They should, however, be subject to policy control of government departments.

In keeping with the promotional role of industrial estates, admission policies should be selective. High priority should be given to new industrial establishments, whether sponsored by the government or by the private sector, that have potential for development, in particular to export-oriented or import-substituting industries. As regards existing units, preference should be given to those able to raise their productivity, productive capacity and employment either through modernization of equipment, or expansion or diversification of production. Units in which non-manufacturing operations such as warehousing were predominant should enjoy the lowest priority in the scheme of admissions. In view of the conditions prevailing in most countries of the region, industries with a heavy consumption of electricity, water and other utilities should generally be excluded. Subject to the general policies of the country and the objectives of the industrial estate programme, outside firms—whether from other regions of the country or from foreign countries—should be admitted to an industrial estate. Foreign firms should not be segregated in a separate area or block, but should be provided with accommodation among national enterprises so as to promote inter-firm co-operation.

The rules of estates and areas should be aimed at maintaining standards of technical performance and professional conduct and discipline in keeping with the promotional as well as the corporate character of the estate. As already mentioned, modernization of equipment might be a condition for the relocation of existing industries. Tenants should observe labour legislation and safety precautions; they should maintain buildings in good condition, use them only for the purpose approved, and make alterations or additions only with the approval of the estate authority. Regulations should also relate to dumping of refuse and scrap, flow of effluence in public drains, exhibition of posters and sign-boards etc. An important provision was that factory buildings could not be sold without the agreement of the estate authority; this precaution was considered necessary to prevent their being used for non-manufacturing purposes. The participation of tenants in the management of the estate would be advantageous; this should be ensured either through their representation in the managing committee of the estate or through formation of an advisory committee.

The Group discussed the advantages and disadvantages of providing the buildings in an industrial estate on lease or outright sale and agreed that since most of the prospective entrepreneurs were likely to have limited financial resources, it would be advisable to lease buildings for a fixed

period at the termination of which the occupants should have the option to purchase them either outright or on easy hire-purchase terms. Custom-built factories in industrial areas should in general be sold outright. In most countries of the region, the land which was or could be used for industrial area or industrial estate development belonged to the state or to the municipality; it should be leased and not sold, so as to retain control over its use.

Rent subsidization for a limited period and on a progressively diminishing scale was considered to be a desirable inducement to entrepreneurship and occupancy. This was consistent with the promotional nature of the estate. The arrangements for sale and lease including subsidized rent on a tapering scale, provision for subsequent purchase etc. should be incorporated in the original agreement for occupancy.

Services and facilities

On industrial estates and areas, facilities such as power, water, gas and communications were required for the very existence of the occupants. Services such as canteen, dispensary, police and fire protection contributed considerably to their welfare, safety and efficiency. Other services and facilities, usually provided in industrial estates, were aimed mainly at improving the productivity of the units served and reducing their production costs. The latter included one or several of the following:

(a) Extension services—advisory or consultancy services, training economic research, technical information, technological research etc.

(b) Financial services—credit facilities, insurance service, financial and cost accounting, auditing, administration of old age pensions etc.

(c) Technical services—tool room, testing laboratories, shops for specialized processes and services for maintenance of equipment and buildings, installation of equipment, tools and equipment lease shops, leasing out machine shop facilities etc.

The Group agreed that government-sponsored activities in the field of technical services should not compete with existing enterprises in or outside the estate. Only such facilities should be provided which could not otherwise be set up by individual initiative or by the joint efforts of the tenants. While there should be a minimum demand in the estate itself to justify the setting up of a particular service, account should also be taken of the demand outside the estate, since the benefits from common services should, as far as possible, be made available to units in a broader area. Such a policy would be in keeping with the principle of using the industrial estate as a general instrument of industrial development.

Where public institutions and services such as training centres and technical and management advisory services existed, the industrial estate

authority should not provide all these itself. It should ensure that, through close co-operation and co-ordination with the other agencies, these services either be set up in the estate or be made available to the tenants.

In a non-specialized estate, the minimum services to be provided in the very beginning would usually include testing and quality certification, tool room, maintenance shop and a good technical library service. Other services would be provided as needs became apparent. On industrial areas, entrepreneurs might require construction and architectural assistance and services such as market surveys, training and legal advice.

As regards the policy of charges for the various facilities and services, it was generally agreed that the extension and advisory services were essentially educational in character and should therefore be considered as a rightful charge on the state and be provided free. The beneficiaries of technical common facilities should be required to pay for services at cost, though subsidies might be needed during the early stages of establishment of the enterprises.

The Group recommended that close working relationships be maintained between the agency providing extension services and financial institutions. This would facilitate the formulation and evaluation of applications for credit, and the supervision of the use of funds. Moreover, extension services should be co-ordinated with those provided by industrial research institutions.

The Group felt that a canteen on an industrial estate might often be more than a convenience for the workers: it would raise nutrition standards and thereby help in improving health and productivity. For that reason, subsidization of a canteen might sometimes be considered. Similarly, a dispensary or clinic might serve not only the workers but also their families and the community at large. In view of the fact that an industrial estate permitted various types of programmes to be integrated, it might be used as an instrument of economic advancement as well as of social and cultural progress.

Financing

The Group noted that in those countries of the region which had established industrial estates or areas, that is, Kuwait and Saudi Arabia, the bulk of financing had been supplied by Governments. Where zoning had been developed, as in Iraq and Syria, financing, principally in the form of provision of land, had been contributed by municipalities, with some assistance from the central government. The Group considered that although the central government would have to finance the largest part of the capital expenditure for the estates, the co-operation of local bodies and public utility companies should be enlisted, wherever possible.

5. INTERNATIONAL AND REGIONAL CO-OPERATION IN THE DEVELOPMENT OF INDUSTRIAL ESTATES AND INDUSTRIAL AREAS

The Group noted with appreciation the work carried out by the United Nations Centre for Industrial Development (now the United Nations Industrial Development Organization), and the United Nations Development Programme, through studies, seminars and technical assistance activities. It recommended that the reports and publications of the Centre for Industrial Development (most of which are listed in Annex III) be studied by the competent ministries and other agencies in their countries. In order to be widely disseminated, the report of the Consultative Group and some of the major documents should be translated into Arabic.

It noted that, in one country of the region, technical assistance for the establishment of industrial estates was being provided by the United Nations Development Programme (Special Fund) as part of an industrial studies and development project. The other countries had not availed themselves, so far, of the assistance which might be provided by the United Nations under its various programmes, including the recently created programme of Special Industrial Services, in the field of small industry development and industrial estates. The Group was of the view that, in all countries of the region, technical assistance in the form of both expert advice and fellowships, was indispensable for planning and carrying out any project in this field. It strongly recommended that, in consultation with the Resident Representatives of UNDP in the respective countries and, if required, staff members and advisers of CID (UNIDO) and the United Nations Economic and Social Office in Beirut, governments review their needs for assistance and formulate requests for technical co-operation. There was need, besides expert advice, for study tours of industrial estates in developed and developing countries and training in small industry development such as that provided by the Research Institute for Management Science at Delft in the Netherlands, and the Small Industry Extension Training Institute at Hyderabad, India. The Group took note of the proposal to organize, under the fellowship programme of UNDP, special group training courses on industrial estates.

The Group deemed it important to create a Centre for Industrial Development for the Arab States as suggested by the Kuwait Conference on Industrial Development in the recommendations (nos. 59 and 60) of its report⁴ and believed that such a Centre should include among its functions the provision of research, advisory and training services related to the promotion of small-scale industries. The Group further believed that the importance of such a Centre justified the provision of assistance by the UNDP (Special Fund sector) for its establishment.

⁴ United Nations Industrial Development Organization, *Report of the Symposium on Industrial Development in Arab Countries*, Document ID/CONF. 1/R. R. 4.

Without waiting until such a Centre could begin to operate, the Group, taking into account the recommendations (nos. 35, 36, and 37) of the Kuwait Conference, believed that there was a great need in the region for intensifying industrial feasibility studies, for conducting research on small-scale industries as a factor of industrial growth and for promoting norms and standards regarding the establishment of industrial estates and areas. The Group hoped that the United Nations, and in particular, the United Nations Economic and Social Office in Beirut, would assist and collaborate with the governments concerned in this direction through their research and operational activities.

ANNEX I

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ANNEX II

AGENDA

1. *Opening addresses*
2. *Adoption of the agenda*
3. *Review of developments in the fields of industrial estates and industrial areas in the countries of the participants*
4. *The role of industrial estates and industrial areas in development policies and programmes, with special reference to promotion of small-scale industries*
5. *Planning of industrial estates and industrial areas*
 - (a) *Pre-project planning*
Feasibility studies, location, type and size, phasing of development, integration with other schemes of economic development
 - (b) *Physical planning and engineering aspects*
Site selection, land utilization and layout, plot and factory sizes, building design, physical utilities and services, economies in construction
6. *Organization and management*
Sponsorship and organizational arrangements, admission policies, sales and lease policies, management, share of tenants in management, co-operative arrangement between occupants
7. *Services and facilities*
Common service facilities, technical counselling and guidance, management counselling, training, information services etc.
8. *Financing of industrial estates and industrial areas*
Sources and forms of financing of the projects, sources and forms of financial assistance to the occupants
9. *International and regional co-operation in the development of industrial estates and industrial areas*

ANNEX III

LIST OF DOCUMENTS

Working Papers

<i>Agenda item</i>	<i>Paper</i>	<i>Symbol</i>
	Provisional agenda	CID/IE. 2/1
	Annotated provisional agenda and proposed questions for discussion	CID/IE. 2/1/Add. 1
4	The role of industrial estates, areas and zones in providing an industrial base in urban and regional development plans, by A. Solow	CID/IE. 2/2
	The role of industrial estates in policies and programmes for the development of small-scale industries, by P. C. Alexander	CID/IE. 2/3
5	Types of industrial estates, by P. C. Alexander	CID/IE. 2/4
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7	Services and facilities for small-scale industries in industrial estates, by A. D. Bohra	CID/IE. 2/6
8	Public and private financing of industrial estate projects and stimulation of private projects by Government authorities, with special reference to India's experience, by B. K. Chatterji	CID/IE. 2/7
9	United Nations activities in the field of industrial estates, by the Centre for Industrial Development	CID/IE. 2/8

Background Papers

	<i>Sales or document number</i>
Establishment of industrial estates in under-developed countries	60. II. B. 4
The physical planning of industrial estates	62. II. B. 4
Industrial estates in Asia and the Far East	62. II. B. 5
Industrial estates in Africa	66. II. B. 2
Industrial estates: policies, plans and progress—A comparative analysis of international experience	CID/VI/14 (ST/CID/10) 66. II. B. 16
Industrial estate plans and projects in some European and other countries, by the Centre for Industrial Development	CID/IE. 1/2
The role of industrial zones, areas and nuclei in development policies and programmes with special reference to the promotion of small-scale industries: The experience of Italy, by C. Alhaique	CID/IE. 1/3
Research parks in the United States: A case study from Colorado, by J. Stepanek	CID/IE/BP. 1
Problems of procedure, administration and relationship to be considered in establishing the United Nations Organization for Industrial Development	A/AC. 126/10

PART III

Industrial Estate Plans and Projects in Some European and Other Countries

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INDUSTRIAL ESTATE PLANS AND PROJECTS IN SOME EUROPEAN AND OTHER COUNTRIES

I. GENERAL SURVEY

IN 1964, THE UNITED NATIONS Secretariat sent a questionnaire on industrial estates to the Governments of those member and non-member states which, according to available information, had plans or projects in this field. The replies to the questionnaire and information derived from other sources served as a basis for comparative surveys of international and regional scope, published by the United Nations.¹ One of these surveys is contained in the present report; it reviews industrial estate plans and projects in some industrialized European countries—Belgium, Denmark, Finland, France, Italy, the Netherlands, Sweden, Switzerland and the United Kingdom—and in some European and other countries in the process of industrialization—Bulgaria, Cyprus, Greece, Ireland, Israel, Malta, Spain and Turkey.

The survey is concerned with different types of industrial clustering which, for the sake of uniformity and consistency, are referred to, as proposed in other United Nations documents,² as “industrial estates” and “industrial areas”. The main distinction between the two is that the latter offer only improved sites, while the former, in addition, feature standard factory buildings built in advance of demand and a variety of services.

With one major exception, the industrial estate does not play any significant role in the development policies of the industrialized countries under review. In these countries, the industrial area is relied upon to further different policy objectives which will be examined below. The exception is

¹ *Industrial Estates: Policies, Plans and Progress—A Comparative Analysis of International Experience* (66. II. B. 16); “Industrial Estate Plans and Projects in African Countries” in *Industrial Estates in Africa* (66. II. B. 2). A similar survey relating to Latin American countries was prepared by the Secretariat for submission to the Seminar on Small-Scale Industries in Latin America, Quito, Ecuador, December 1966 and will be published in 1969 in *Small-Scale Industry in Latin America*. Information on industrial estates in certain countries of Asia and the Far East is contained in *Industrial Estates in Asia and the Far East* (62. II. B. 5).

² P. C. Alexander, “Types of Industrial Estates”, Document No. CID/IE/1/6 (to be published by the United Nations in *Promotion of Small-Scale Industries in the Developing Countries*, 1968).

the United Kingdom, where the industrial estate not only originated but achieved considerable development, especially in the past thirty years. In Belgium, Finland, the Netherlands and Sweden, a few small estates have been set up—in the latter three countries in the form of flatted factories—but the industrial area and the industrial zone remain, in these countries, the principal instrument of development. Of all the countries of this group, only Denmark has neither areas nor estates—assistance is provided only for the building of individual factories.

On the other hand, it is the industrial estate which is the prevailing form of industrial clustering in nearly all the developing countries under review, the number of projects, however, being small and some of them being currently at the planning or construction stage. Industrial estates are planned in Cyprus, Greece and Turkey and are functioning in Ireland, Israel and Malta. Cyprus, Malta and Turkey also have a few industrial areas. Spain is the only country of this group which has no industrial estates but is actively developing industrial areas.

In Bulgaria, as in other centrally planned economies, there are no estates and areas of the types discussed here, that is, projects providing physical and other inducements to the location and establishment of private industrial concerns. In these economies, however, the economies and other advantages of industrial clustering are well recognized, and the underlying principles are fully used in planning, zoning, locating and constructing industries, as part of the over-all planned distribution of productive forces, at the national, regional and local levels.

In the other regions surveyed by the United Nations Secretariat—Asia and the Far East, Africa and Latin America—the distinction between area and estate is highly significant. As a rule, an industrial area, in these regions, offers little besides a site with the necessary infra-structure. Few, if any, services or measures of assistance are an integral part of the project, and, where such services are obtainable, they have to be sought independently; in particular, financial and other assistance for building factories is rarely directly or closely associated with the area project. Fiscal and other incentives usually exist in countries of these regions, but they are general promotion measures, frequently with a nationwide coverage. Where successful, the industrial areas in these regions have attracted mainly large-scale and medium-sized industries. On the other hand, the industrial estates in these regions provide, besides standard factories, various common service facilities, technical assistance and other forms of industrial extension, training and various incentives especially devised to promote small-scale and medium-sized industries.

In the advanced European countries under review, the distinction between area and estate is conceptually the same, but its economic and technical implications in regard to the attraction and promotion of industry are of much less importance. In all these countries financial assistance is made available at liberal conditions to the occupants of the areas by the

sponsoring authority and/or by closely associated financing institutions for factory construction and purchase of equipment. In most cases, special tax incentives are devised for the relatively less developed regions where industrial areas are usually located. Engineering, management and efficiency services are widely available from commercial consulting organizations and many industries turn to them as a matter of course.

For obvious reasons, the more advanced the country or the region, the less the need for, and the scope and intensity of, the promotion and assistance efforts, and vice versa. In any country the need for encouragement and support is greater in the case of small-scale industries than in that of large ones. In all the advanced countries under review, industrial areas are set up in relatively under-industrialized or depressed regions, and special promotion programmes have been drawn up to attract industries and facilitate their establishment. However, the approach and the extent of the measures adopted vary greatly.

Although the economy and standard of living in Scotland and in the North-East of England and Wales are higher than in the relatively advanced regions of many developing countries, the Government of the United Kingdom has carried out a policy of massive government action and assistance on a scale and at a cost comparable to, and often higher than, what has been done in the field of industrialization in many developing countries. Over the past thirty years this has included large investments in infra-structure, physical industrial facilities, new towns, and substantial tax, financial and other concessions and subsidies. During this period, the focus of the Board of Trade's policy changed from rehabilitation of certain areas to nationwide regulatory distribution of industry and to promotion of employment in districts with a high rate of unemployment. Because of these policy changes, of new developments during the war and post-war periods and of the success achieved, the scope of government assistance was gradually narrowed down, but while certain grants, special loans, rental rebates, tax concessions and preferential supply of scarce raw materials were abandoned, the provision of standard factories for rent on industrial estates and of certain related services remained a constant feature of all programmes. At the same time, assistance to individual enterprises on group sites or individual sites against a known demand was, and still is, provided.

In Italy, on the other hand, the development of the Mezzogiorno (southern Italy) until 1957 was based principally on a comprehensive programme of tax, customs and financial incentives and on the construction of basic infra-structure works at the regional level, in the expectation that these measures would suffice to induce a large and growing inflow of industrial undertakings. It has only been in the past ten years that, in addition to these measures, encouragement has been given to the provision of physical industrial facilities in the form of large and small industrial areas. Although the development laws permit construction of

"advance" factories and provision of common services, none have so far been made available. In the view of some observers,³ the industrialization of the Mezzogiorno, if it is to be intensified and accelerated, calls for the provision of such facilities, in other words, not only for industrial areas but for industrial estates as well as for technical assistance and other promotional services.

The French approach has been similar thus far to that of Italy, though the geographical scope of the promotion effort has been smaller and less concentrated and the extent of measures narrower. To accelerate development in certain regions the construction of factories for unknown future purchasers is now given consideration. In Belgium, the construction of premises for industries is authorized by the 1959 decree establishing development zones, but the industrial area rather than the industrial estate continues to be the norm.

As mentioned earlier, all the countries in the process of industrialization reviewed here, except Spain, have plans or projects of industrial estates featuring standard factories, common facilities and other services. All such projects are aimed at promoting small-scale and medium-sized industries, and in most cases are integrated, though to an unequal extent, in an over-all programme of development of this sector. The establishment of industrial estates is, in other words, a part of a programme including complementary measures of development such as financing, industrial extension, training, and so on. The need for such an integration has been stressed in several United Nations documents⁴ and is illustrated by many examples throughout the world of industrial estates remaining vacant, being slowly occupied or facing other difficulties if entrepreneurship is not stimulated, if financing is not readily available, and if technical assistance or training are not provided. The scope of these complementary measures evidently varies with the degree of development of the country or the region, the educational level of prospective entrepreneurs and the skill of manpower, the extent of private financial resources and other factors.

In Malta, the provision of standard factories of different sizes offered for rent at subsidized rates on two industrial estates, of a quality control laboratory providing free analyses, of grants and loans for plant and equipment and of tax and customs concessions ensured, in four years, the occupancy of eleven factories on one estate and of three out of six factories on another estate. A third industrial estate has recently been established.

³ For example C. Alhaique in Part IV, "The Role of Industrial Zones, Areas and Nuclei in Development Policies and Programmes, with Special Reference to the Promotion of Small-Scale Industries: The Experience of Italy".

⁴ For instance, P. C. Alexander (1966), "The Role of Industrial Estates in Policies and Programmes for the Development of Small-Scale Industries", Document No. CID/IE.1/5 (to be published by the United Nations in *Promotion of Small-Scale Industries in the Developing Countries*, 1968).

In Ireland, the success of the Shannon Free Airport Industrial Estate, the most important of the three promotional estates in the country (two other estates are private, profit-motivated ventures located at Dublin and a third is semi-public), is due, in part, to its location at the airport,⁵ to advance factories at low rent, to tax concessions for the occupants, easy financing, and to various services provided by the management.

In the other countries—Cyprus, Greece and Turkey—industrial estates are at the planning stage and, while policies are still being worked out, indications are that the programmes will be combined with other measures for the development of small-scale industries.

The preceding discussion already gives some indications of the objectives of industrial estate and industrial area programmes in the countries under consideration. These objectives, which fall into several main groups, are usually combined, although there are considerable differences in the emphasis placed on some of the policy components and on the measures adopted for their implementation.

Regional development, especially of depressed and rural areas, is, in conjunction with decongestion of urban centres and town and country planning, the main objective in the industrial countries. In the industrializing countries, the objectives include one or several of the following: stimulation of local entrepreneurship and promotion of industrialization, especially of small-scale and medium-sized light industries; attraction of foreign enterprises; and checking over-crowding in metropolitan centres and major cities by promoting industrialization in suburban areas and smaller towns.

In most countries the policies have their origin in decisions of the government, normally in the form of laws. Among the industrial countries, the United Kingdom is the only one where sponsorship, financing and management of industrial estates are entirely and exclusively in the hands of government agencies—the three Industrial Estate Management Corporations. In Belgium, France, Italy and the Netherlands, the organization pattern is characterized by the participation of local authorities—provinces, departments, communes and groups of communes—and of representative private organizations (such as chambers of commerce and industry) associated in semi-public corporations, consortia and non-profit industrial foundations; a considerable part of the infra-structure financing, however, is done either directly by the state or through state-sponsored financial institutions.

In the countries in the process of industrialization, the state plays the major role in sponsoring and establishing industrial estates, either directly or through government corporations. In Israel, however, the government gives strong encouragement, in particular through special mortgage loans, to the establishment of industrial estates by private companies. In Turkey,

⁵ Part VI, "Pre-Project Planning for Industrial Estates".

the main pattern is similar to that of the advanced countries, most estates and areas being co-sponsored by municipalities and chambers of commerce; assistance is also given to the establishment of estates by private trade co-operative associations, through credit at liberal conditions out of a special industrial estate loan fund.

The private estates in Israel and Turkey are promotional, non-profit projects.

It is of interest to note that there are, in the group of countries under consideration, a number of private, profit-motivated industrial areas and estates. All of these are located in or near large industrial centres, where land for industrial use is scarce, where industries are eager to settle and are willing to pay relatively high prices not only for improved land but also for services provided by the developer. Private areas and estates exist in Belgium (Sint-Niklaas-Waas, near Antwerp), Ireland (Dublin), the Netherlands (Rotterdam) and the United Kingdom (London and Manchester). All were established before enactment of industrial decentralization legislation.

For evident reasons, industrial estates are normally smaller than industrial areas. With the exception of the United Kingdom, where estates cover from 50 acres (20 hectares)⁶ to more than 700 acres (283 hectares), the size of the estates in most countries under review ranges from 5 to 12 hectares (12 to 30 acres); in Israel, the built-up area of flatted factory estates ranges from 0.4 to 4 hectares (1 to 10 acres); in Greece, 80 to 90 hectares of land are available for industrial development at Kavalla and 500 to 700 at Salonika, but it is probable that only part of these areas will be used for industrial estate construction. In Belgium, the size of the industrial areas ranges from 50 to 100 hectares (123 to 247 acres); in France, the average industrial area is of about 50 hectares (123 acres).

The size ranges for standard factories in some countries are as follows:

	<i>Square metres</i>	<i>Square feet</i>
Ireland	465 to 4,185	5,000 to 45,000
Israel	250, 750, 1,000, 2,000	2,690, 8,070, 10,760, 21,520
Malta	1,060 to 11,160	11,400 to 120,000
United Kingdom	139, and 465 to 4,650	1,500 and 5,000 to 50,000

Most of the estates and areas admit all types of industries except some, such as those emitting smoke and noise, which are prohibited by zoning regulations. In practice, most industries are small and medium light manufacturing establishments. Specialized estates (for automobile parts, wood and metal industries, respectively) are established or planned in Israel and (for wood-working) in Turkey.

⁶ One hectare = 2.471 acres; one acre = 0.40468 hectare. One square hectare = 10.76 square feet; one square foot = 0.0929 square metre.

Most countries offer special fiscal inducements and liberal financing to industries establishing in industrial estates or areas and/or in so-called development regions. Five-year exemption from land taxes is provided in Belgium. A capital investment grant of 20 per cent, assistance in retraining labour and tax relief are provided in France. Building grants and tax exemptions are available in Ireland. Rent subsidies are available in Israel, Malta and the United Kingdom. In Israel, exemption from municipal taxes and reduction in income taxes are also granted. The most comprehensive system of special inducements is found in southern Italy. The facilities available are: grants of up to 85 per cent of the infra-structure expenditure; up to 50 per cent of the cost of construction of buildings; up to 25 per cent of cost of plant and equipment for individual enterprises and exemption from customs duties; ten-year exemption from income tax; 50 per cent reduction in certain excise taxes; reduction in freight rates; preferential award of government contracts, and so on. Malta makes grants towards capital costs and awards a ten-year exemption from income tax. Subsidization of the cost of plant sites and grants towards construction costs are made in the Netherlands. Rent subsidy, training grants, training facilities and grants towards the cost of plant and machinery are made in the United Kingdom.

In their replies to the United Nations questionnaire, the competent authorities in France, Ireland, Israel, Malta and the United Kingdom stated that, on the whole, the programmes have been successful in meeting the objectives assigned to them. In France, industrial areas in the provinces have contributed to curbing concentration of industrial activity in the Paris region. The Shannon estate in Ireland has attracted foreign enterprises and has substantially contributed to the promotion of export trade. In Israel immigrants have been attracted to manufacturing industries through ready availability of rented factory accommodation, and industry has been established in development areas. The industrialization of southern Italy has been stimulated by comprehensive measures of development, in which industrial areas are playing an increasing role. In Malta, both industrial estates have been rapidly occupied and need is felt for more projects of this type. In the United Kingdom, light industries have been attracted in large numbers to development areas, employment has been promoted and many new industries, including foreign enterprises, have been established.

In recent studies, expert panels of the European Economic Community have proposed to set up large industrial centres, especially in depressed and relatively less developed countries, where certain types of industries would be integrated. The idea, which is based on the "development pole" theory, is to develop, around large "complex-cycle" (or "multiple-cycle") industries such as mechanical and electrical engineering, electronics and advanced chemical industries (pharmaceuticals, farm chemicals, dyes, textiles etc.) using elaborate manufacturing processes, a whole network of inter-industrial exchanges largely based on sub-contracting with small-scale

or medium-sized "single-cycle" (or "short-cycle") industries. This type of development is expected to exert a much higher multiplier effect on the local economy than the establishment of small-scale industries in scattered industrial estates.⁷

A pilot scheme along these lines, involving the establishment of nine major mechanical engineering factories and of about thirty auxiliary, maintenance and sub-processing light engineering firms, is being developed in the Bari-Taranto industrial area in southern Italy. Industrial investment is expected to amount to about 100 billion lire (\$US 166 million) and total new industrial employment to about 10,000 workers. Construction of the complex will take four years and full operation is expected to be achieved by the end of 1970.

2. COUNTRY DATA

Belgium

The establishment of industrial areas in Belgium is motivated primarily by considerations of regional development; regional surveys have been undertaken and industrial areas are expected to be an integral part of a regional development plan. Secondly, the establishment of industrial areas is one of the measures for the development of depressed regions where certain fiscal and financial incentives for industrialization are provided. Thirdly, their establishment is also influenced by the requirements of town planning legislation.

Sponsorship of industrial areas is by the state, the provinces, the communes and inter-communal bodies; these authorities may act alone or in co-operation with others. The first industrial areas in Malines and Bruges were established by communes. The development of two depressed regions, Borinage and Hageland-Sud-Campine, and of industrial areas in them (e. g. Ghlin-Badour) was directly undertaken by the state. Only one industrial area, at Sint-Niklaas-Waas, near Antwerp, has been privately sponsored by a foreign firm—Slough Estates Ltd. of United Kingdom—specializing in this type of development.

There are three types of industrial areas in Belgium:

(a) Areas designed for large factories, often serving heavy industry, and with a considerable infra-structure of roads, canals and railways;

(b) Areas designed for small and medium-sized processing industries, more clearly linked with the consumer markets and less dependent upon the infra-structure for heavy goods transport;

(c) Small industrial areas designed for a few small undertakings meeting specific regional needs.

⁷ The pros and cons of this policy are discussed by A. Molinari (1962), "Some Controversial Questions Concerning Industrial Estates", in United Nations, *Industrial Estates in Asia and the Far East* (62. II. B. 5).

Data from regional development plans and the economic expansion programme drawn up by the Bureau of Economic Programming are used for determining the types of industries suitable for a particular location. The average size of industrial areas ranges from 50 to 100 hectares (123 to 247 acres). They generally provide improved plots of land with the necessary utilities (electric power, water, sewerage, steam, gas etc.) and transport facilities (accessible highways and or canals, quays, wet docks, roads, railway connexion). Sites and industrial premises are provided to investors by the public authorities through sale, leasing and other forms of disposal. In general the price of buildings is based on prime cost and land is available at a relatively low price.

Financing for the establishment and development of industrial areas is undertaken by the commune, an inter-communal corporation and at times by a province or the state. The necessary infra-structure works are largely subsidized by the state and often wholly undertaken by it.

Five-year exemption from land taxes is provided for industries located in depressed areas.

Substantial assistance is provided by public authorities, with the help of specialized institutions or agencies, to help occupants of plots in industrial areas to obtain low-interest loans, to construct or to lease premises, to obtain hire-purchase loans and to solve manpower problems.

In its reply to the United Nations questionnaire on industrial estates, the Belgian Government assessed its experience as follows:

“It must be observed that considerable time—at least several years—is needed to obtain appreciable results from a policy of promotion of industrial areas. Work on the Ghlin-Badour area, for instance, was begun in 1958, and the first factories went into operation in 1962. This part of Borinage is now undergoing an industrial revival which was un hoped for ten years ago. Likewise, very encouraging results have been achieved in such towns as Bruges and Malines, which were the first to have a policy of industrial areas, and in other regions of the country, such as Zuiderkempen and Limbourg. But these results were only achieved as a result of efforts carried on for many years.

“It is obviously difficult to say whether the positive achievements recorded after a certain time are due entirely to the effort expended or whether they are partly the result of the favourable conditions which have prevailed during recent years.

“The experience acquired also makes it possible to indicate the need to overcome a number of obstacles in the way of achieving the desired objectives, namely:

- lack of co-operation of certain regions either with the central authorities or with development corporations;
- regional rivalries or local conflicts at times causing dispersion or excessive overlapping of industrial areas, some of which must wait too long for development;

shortage of skilled labour, budget difficulties and relative government instability, prejudicial to continuity in the execution of development programmes;

shortage of engineers in the administration, causing delays in the execution of road and water projects;

the tendency to give priority to social expenditures rather than productive investment and, in time of budget difficulties, to reduce first the funds earmarked for large works;

the inevitable technical difficulties that arise because of the imponderables and risks inherent in such large engineering projects as the construction of dams and mains, sewers, river diversion and canal enlargement."

Bulgaria

The planning of the development of economic regions and of the territorial distribution of productive forces in the country is effected by the State Planning Committee. On the basis of scientific methods, the state determines the most rational specialization and structural composition of industry in each economic region and district, consistent with the full utilization of the region's resources in raw materials, manpower and so on, and provides for the development of industry by allotting the necessary capital outlays.

The specialization of a region is considered to be rational when the production costs of the specialized branches are the lowest, that is, when a given product is produced with the minimum investment of labour and materials. A major objective is to narrow down the differences in the levels of economic development among all regions and districts by accelerating the development of regions and districts that were economically stagnant before the war and by slowing down the growth of the more advanced regions and districts. Substantial differences between the standards of living in rural and urban communities should be reduced and eliminated.

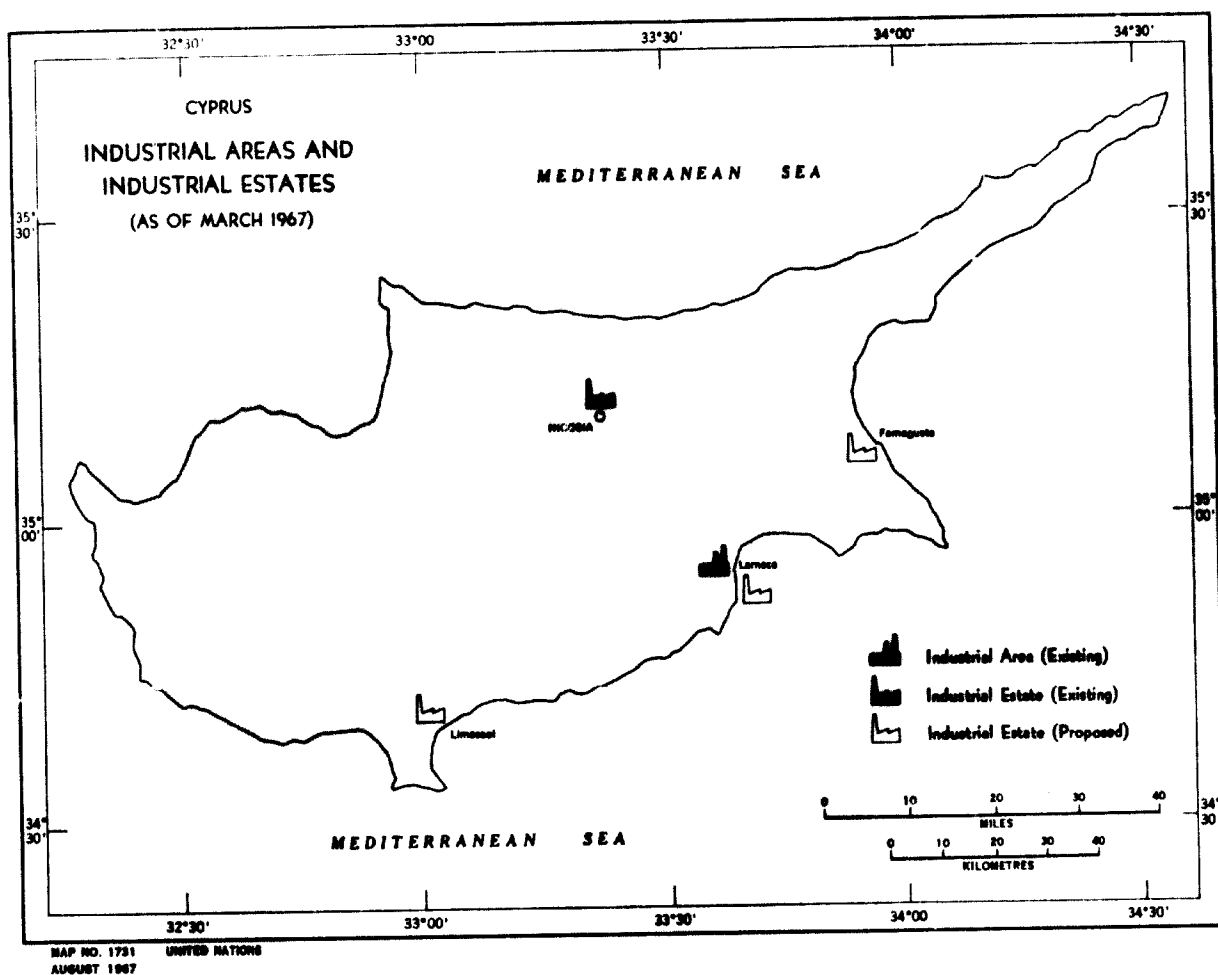
Cyprus

Industrial estates are being established in Cyprus as part of the country's five-year economic development plans. The estates are aimed at promoting small-scale and medium-sized light industries and at influencing industrial location. The estates are in suburban locations and provide both improved sites and advance nursery factories, with electricity, water, telephone, sewerage and canteen facilities. Sites and factories are leased on a long-term basis at low rentals. The construction of factory buildings and the installation of a plant on rented sites can be financed by loans from the Cyprus Development Corporation.

The first industrial estate at Nicosia has already been established and the first tenants have started construction of their buildings. The estate

comprises an area of about 68 acres (27.5 hectares), about one-fifth of which is taken up by internal roads, parking area, landscaping area and open space. The estate will accommodate 36 small and medium industries which will provide employment for about 3,400 persons. Plans are under way for establishing the second industrial estate at Limassol. Industrial estates will also be established at Larnaca—which has now an industrial area—and at Famagusta.

In 1966, the Government requested United Nations assistance for drawing up a programme of establishment of free-zone industrial estates at Nicosia and Famagusta for the promotion of export-oriented industries. Feasibility studies on these estates were prepared by a United Nations team in 1967.



Denmark

In its reply to the United Nations questionnaire on industrial estates, the Ministry of Commerce, which is responsible for industrial development in Denmark, made the following statement:

"Industrial estates in the sense of a complex of industrial enterprises on a basis of a planned scheme with regard to pre-built factory accommodation, financing, provision of joint facilities, etc., do not exist in Denmark and are not planned to come into existence.

"As an attempt to further regional development in depressed areas, the Government has recently embarked on a scheme according to which the Ministry of Commerce and local municipal authorities or local development societies working on a non-profit basis are authorized to finance the building of factories which can either be bought or hired by industrial enterprises. Such factory buildings are, however, only meant to contain one single enterprise as it is felt that the existence of several enterprises under one roof may complicate later extensions and render a change to private ownership difficult.

"It may be added that about ten years ago, a co-operative society, with financial aid from the Ministry of Commerce, started a so-called "Workshoptown" in Copenhagen consisting of blocks of buildings containing workshops or small factories on the same principle as semi-detached houses with joint facilities for heating and power supply but these buildings are mainly used by artisans and hardly fall under the scope of the questionnaire."

The "workshoptown" mentioned above is located at Valby, a suburb of Copenhagen.⁸ It consists of four buildings—three single-storeyed buildings and one three-storey building. The estate was sponsored by the National Association of Danish Enterprise (Lands Foreningen Dansk Arbejde). Each of the buildings is occupied by a co-operative society. One of the buildings has twelve tenants (members of the co-operative society) and two others have six and eight tenants, respectively. Each tenant firm employs on the average ten persons. One of the tenants in the fourth building (three-storeyed) has 70 employees. The main objective of this industrial estate is to provide better accommodation and working conditions to artisan and handicraft undertakings, and thereby increase their productivity.

The estate was financed by: loans from Marshall Aid counterpart funds to the co-operative societies (15 per cent of the total cost); share capital of the co-operative societies; mortgage loans from banks and insurance companies; a mortgage on the site given by the municipality; a mortgage on the buildings by the contractor (10 per cent of the contract sum). The counterpart fund loan was to be repaid over a period of 20 years and each of the other mortgage loans over a period of 40 years. The co-operative society is the owner of the estate, but the personal liability of the holders of co-operative shares is limited to the initial contribution.

The floor area of the estate is 17,300 square metres (about 186,000 square feet). There are 14 basic types of workshop units, ranging in floor area from 88 square metres (about 946 square feet) to 690 square metres (about 7,420 square feet). Besides production space, there are cellars for storage, offices and toilets. Central heating, canteens, street lighting and

⁸ Research Institute for Management Science (1958), *Industrial Estates: A Study of the Experiences in Western Europe*, Delft, The Netherlands.

parking space are provided. In the three-storey building there is a central bookkeeping department.

The total costs of operation are apportioned to the tenants in proportion to the space they occupy. The charges (rent) are initially quite high as large instalments have to be paid on the mortgages.

The National Association of Danish Enterprises felt that the co-operative arrangement was not very suitable for promotion of industrial estates. According to the Association:

“The basic difficulty of the co-operative system is the necessity to find the greater part of the co-operative share capital before building activities can be started. The co-operative share capital is so great, and the risk of building activities of this type so considerable that it is not possible to obtain building loans or start building until it has been secured that the full share capital will be paid before the buildings are completed and final mortgage arrangements are made. On the other hand, the subscription of the co-operative share capital is impeded by the fact that it is not always possible to say with certainty when the buildings will be completed and how great the final costs will be. It is not possible to determine these factors until all co-operative shares have been subscribed. Further, it is often difficult for the enterprises which likely would be interested in the matter to decide whether they will be interested in the premises at the supposed date of completion. Enterprises looking for new premises often need them promptly or within a short time.”

Finland

In Finland, a number of cities have reserved industrial zones where sites improved with basic facilities are offered to industrialists on 30 to 50 year leases. In some cities—Helsinki, Tampere, Lahti, Kajaani, Joensuu, Valkeakoski and Kuovola—industrial buildings have been constructed by joint-stock companies, under the sponsorship of central organizations of small industry. The buildings vary from single to six-storey structures, with a total space of 12,000 to 56,000 cubic metres, floor units of 50 to 200 square metres and from 4 to 35 tenants per building.

France

In France, industrial areas are considered a part of the economic infra-structure to be established for promoting regional activity. Regional development is promoted in regions having a surplus labour force, in regions suffering from depression in certain industries and in regions which are under-industrialized.

While regional development is the main objective in establishing industrial areas, there are other influences, both national and local. At the national level, studies are made of over-all requirements for industrial

areas and their regional distribution and a programme is drawn up for a fifteen-year period, taking into account the need to ensure economic expansion and increased productivity of French industry, and to check the tendency towards concentration of industrial activity in the Paris region. At the local level, requirements of town planning, replacement demand for factory accommodation and demand for new factory accommodation (to create new employment opportunities) are taken into consideration.

The sponsorship of industrial areas is by local or regional communities, communes, groups of communes, departments or chambers of commerce. In general, the sponsoring agency establishes a semi-public corporation for developing industrial areas. The semi-public corporation is administered by a board of directors and comes under the control of a government appointed commissioner who is attached to the corporation and who has wide powers. The semi-public corporation enjoys considerable financial, administrative and tax advantages.

The Société centrale d'équipement du territoire (SCET), a subsidiary of the Caisse des dépôts et consignations, participates in the equity capital of the semi-public corporations, assists them in obtaining loans and advises them on procedures and techniques of management. The Fonds national d'aménagement foncier et de l'urbanisme (FNAFU) provides short-term loans at low rates of interest (2.5 per cent) for a two-year initial period (which can be extended to four and six years) to public communities, chambers of commerce and industry and to bodies acting on their behalf such as the semi-public corporations. The Caisse des dépôts et consignations and the Crédit foncier also participate in the financing of industrial areas.

As of 31 July 1963 there were in France 230 industrial areas covering a total of 11,000 hectares (about 27,000 acres). Of these, 135 areas covering a total of 6,500 hectares were built with the assistance of FNAFU and 95 areas on 4,800 hectares were built by semi-public corporations with the assistance of SCET. The size of the area varies according to local or regional needs. It is usually estimated on the basis of an average employment ratio of 50 to 70 workers per hectare (20 to 28 workers per acre), a ratio which allows for a possible expansion of the undertakings. The industrial premises are usually built by the firms themselves; however, a commune or a semi-public corporation may build for sale or lease to firms. These premises are usually sold on hire-purchase. In some cases consideration is being given to building factories in advance of demand.

The general rules which are usually followed in siting industrial plants and which usually influence a firm in its decision to establish itself in an industrial area are:

- (a) There should be a balance between the size of the firm or firms and that of the receiving area and its resources (labour, urban facilities);
- (b) Care should be taken not to isolate the firm but, on the contrary, to encourage—if possible, simultaneous—establishment of several industrial plants with different products;

(c) The equipment in the area should be sufficient to meet the firm's needs;

(d) The new industry should complement existing activities;

(e) The technical, financial and commercial level of the firm must also be taken into consideration.

There are no absolute and rigid criteria, however, for siting industrial plants.

Firms in an industrial area established in a development region which receives state aid for industrial development, are entitled to certain special inducements. These are: (i) a special capital investment grant up to a maximum of 20 per cent of the investment, (ii) assistance in retraining labour, (iii) direct state loans, (iv) loans from specialized credit institutions, and (v) tax relief.

In its reply to the United Nations questionnaire on industrial estates, the French Government stated:

"It is difficult to draw up any exact balance sheet of the action taken in regard to industrial areas in France, and still more difficult to reach any final judgement on the results achieved, both because this is the kind of activity that is closely related to the over-all development policy of regional expansion and urbanization and because, far from being near completion, the work undertaken is, on the contrary, still in progress. Moreover, the effects of the establishment of an industrial area are not visible immediately, but only after several years.

"The measures taken to further industrial decentralization and regional expansion have already had good effects; but although the objective of achieving a perfectly balanced distribution of activities throughout the country as a whole is still far from realization, it has at least been possible to curb severely the tendency to concentrate expansion almost exclusively for the profit of certain economically strong regions and particularly the Paris area.

"The establishment of industrial areas in many provinces has facilitated decentralization, but the undertakings which have been decentralized are not always situated in the industrial areas. Moreover, the enlargement of existing establishments, which plays a not inconsiderable part in economic expansion, is often effected on the spot, either within the factory itself or on adjoining lands already owned by the undertaking. Lastly, a large part of decentralization activities consisted of re-occupying existing premises.

"Nevertheless, there are grounds for thinking that the establishment of industrial areas or estates will exercise a growing influence; many local communities have become aware of the importance, often decisive, for their future of the establishment in sufficient numbers of under-

takings and have taken the necessary steps to establish improved and developed areas likely to prove attractive to such undertakings.

“It is also to be noted that the industrial estate is a very important inducement, the improvement of which is quite rightly regarded by the public authorities as a decisive factor in determining the situation of industries.

“Nevertheless, in order to achieve maximum efficiency the various public or private measures which have been taken with regard to industrial areas and estates should be controlled and guided in accordance with the established plans so that achievements may be related to needs.

“In these questions it is essential to reconcile objectives and means and thus achieve close co-operation among all those having responsibility at different levels.”

Greece

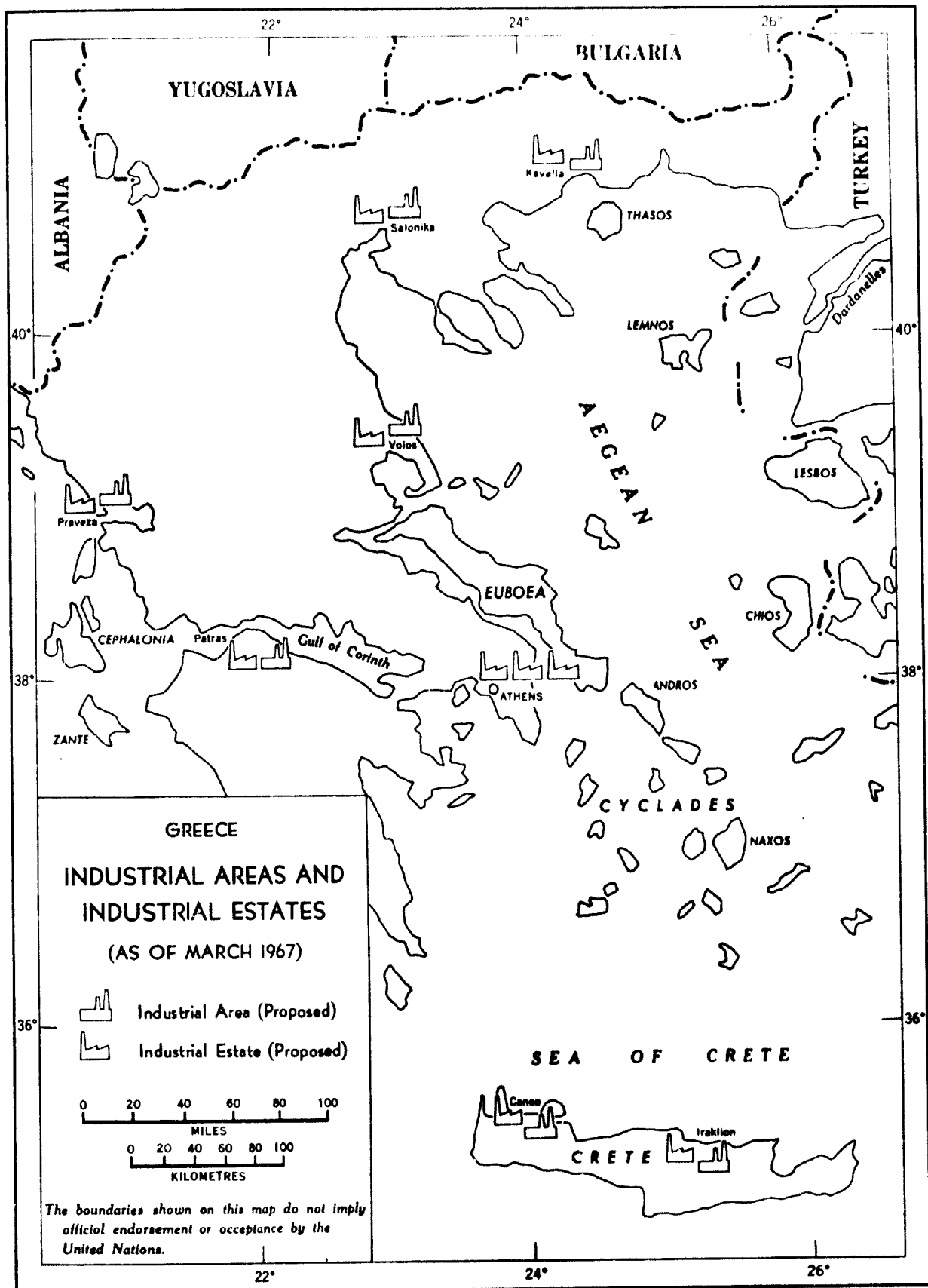
In accordance with the government's policy of regional development and industrial decentralization, the Industrial Development Corporation carried out, at the end of 1962, feasibility studies for the location of industrial estates at Salonika, Volos, Patras, Kavalla and Heraklion (Crete). These studies dealt with the location, land requirements and organization of industrial estates. The major objective in selecting these centres was to provide additional employment, particularly to the under-employed agricultural population, by attracting industry to these regional centres, while preventing the migration of manpower towards the Athens region.

In 1964 the Industrial Development Corporation was transformed, together with other agencies, into the Hellenic Industrial Development Bank, which took over the industrial estate programme. In 1965, Law No. 4458 concerning industrial estates was enacted. The law provides for acquisition of land through compulsory expropriation, construction of standard factories and custom-made factories, special duty and tax concessions and financing of industrial estates; the latter will be met partly or entirely by the Public Investment Budget, the relevant item being appropriated to the Bank. The Bank may also issue bonded loans in order to buy land or to finance industrial estates. In 1966 the Bank set up a separate corporation—the Hellenic Industrial Estates Development Corporation—for developing industrial estates.

The industrial estates will be managed by the Industrial Estates Development Corporation. Developed plots will be either sold on credit or leased to industrial enterprises. The price of land will be maintained at low levels. The size of the industrial estates ranges from 80 to 90 hectares in Kavalla to 500 to 700 hectares in Salonika (about 198 to 222 acres and 1,235 to 1,730 acres). The common facilities to be established in industrial

estates might include security, fire protection, medical service, mess room, parking and, possibly, an industrial training centre and a workers' shuttle service.

Technical assistance for its industrial estate programme was provided to the Greek Government by the United Nations in 1966. With the assis-



tance of a United Nations expert, a programme has been formulated for establishing the first industrial area, industrial estate and industrial free zone at Salonika. It is proposed to develop 50 hectares within a five-year period as an industrial area for industries of all types and sizes. Fourteen hectares are to become an industrial estate for small-scale industries; this estate is to have 60 factories ranging from 200 to 900 square metres, a tool room and a testing and quality control laboratory as common service facilities, and an industrial extension centre.

Besides the five centres mentioned above, the Hellenic Industrial Estates Development Corporation proposes to establish industrial areas at Preveza and Canea. The sizes of these industrial areas will range from 40 to 60 hectares (100 to 150 acres). In the Athens district, it is proposed to organize specialized industrial estates for small textile, leather shoes and marble industries.

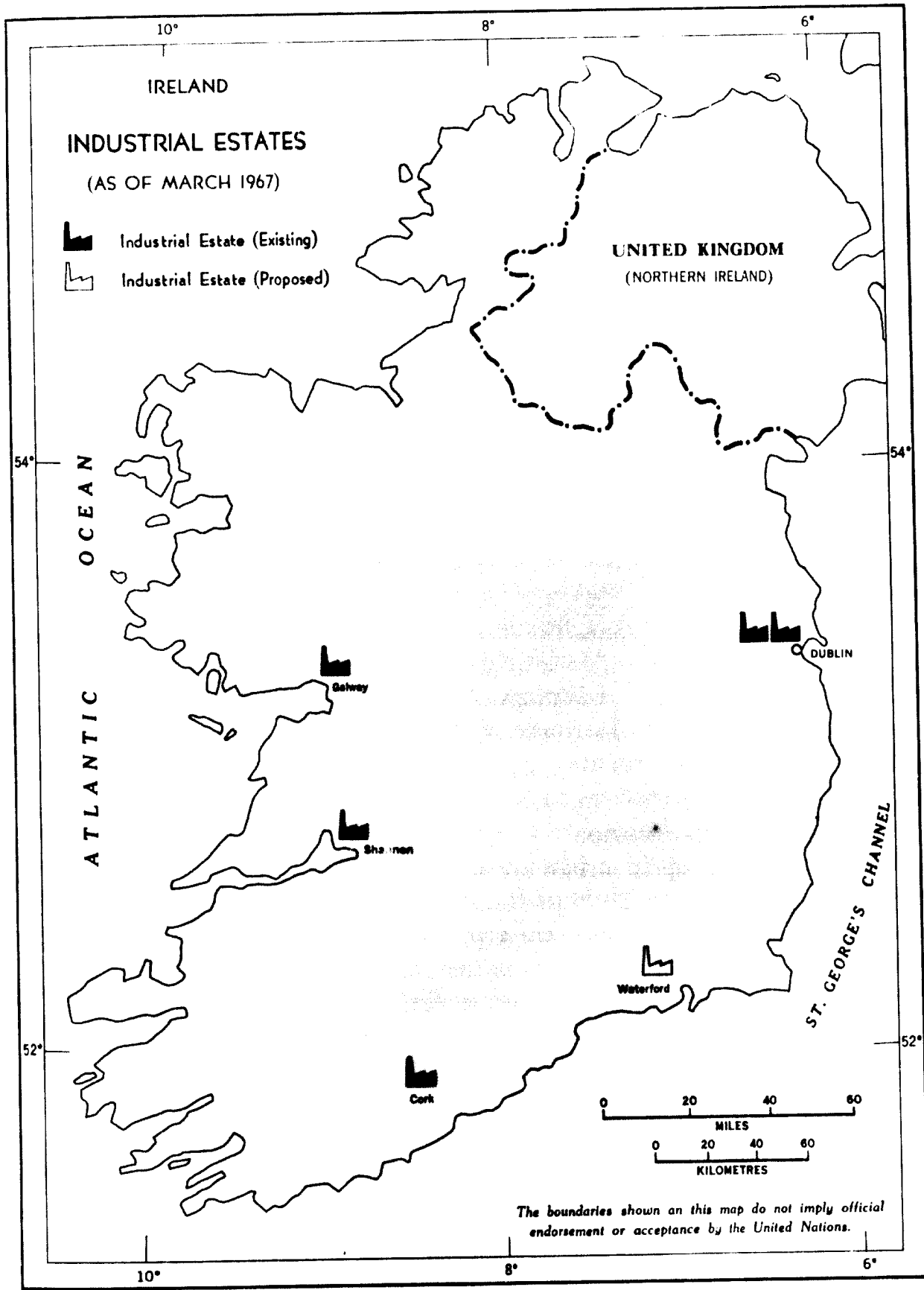
Ireland

Ireland has five industrial estates in operation and a sixth one under construction. Three of these estates—at Shannon, Galway and Waterford—are Government-sponsored, the two at Dublin are private estates and the one at Cork is provided by the Harbour Commissioners. The principal objective of the publicly-sponsored estates is to provide inducement to industrial development and attraction of new industries, particularly from abroad.

The principal estate was established in 1959 in the Shannon Customs Free Airport area by the Shannon Free Airport Development Co., Ltd., which is a state-sponsored body. The estate is designed primarily to attract light to medium industry which can take advantage of air transportation facilities. By 31 December 1966 the estate had 29 enterprises, 14 of them manufacturing, employing 3,958 persons. The estate contains standard factories with plot areas of 2,500, 16,750 and 18,750 square feet (232, 1,525 and 1,745 square metres), mainly in terraced blocks, which are offered for rental or sale. Some industries occupy several standard factories in the same terrace. There are also standard warehouses of 3,500 square feet (324 square metres), built in terraces for entrepôt enterprises. Sites are available for non-standard factories, one of which has been built to date. The total area of this estate is 185 acres (75 hectares). The Development Company provides advisory services in recruitment, training and industrial relations, and is building a new town associated with the industrial development. The town at Drungeely Hills, a suburb adjacent to the estate, has dwelling houses and flats, shops and a community centre. Technical training facilities are to be provided in the estate for the use of all the firms.

Industrial estates are also to be provided by the State at Galway and Waterford, which are designated as growth points. At Waterford construction of standard factories has commenced; these will also be in

terraced blocks, each unit being 18,281 square feet (1,699 square metres) in area. Estate areas will be: Waterford 60 acres (24.3 hectares); Galway 43 acres (17.4 hectares). Their main purpose is to provide inducement to industrial development and attraction of new industries, especially from abroad.



MAP NO. 1733 UNITED NATIONS
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Factory rents at Shannon, Waterford and Galway may be subsidized by the State. Grants are available towards the cost of buildings, equipment and training. Export profits are exempt from tax for ten years (in Shannon, until 1983). Similar grant and tax provisions exist for individual enterprises throughout the State, with specially favourable grant terms in underdeveloped areas.

Two private enterprise estates with advance factories have been established at Dublin, one with a total area of 10 acres (4 hectares) and factories of 8,000 to 42,000 square feet (740 to 3,900 square metres) and one with a total area of 30 acres (12 hectares) and plot areas of 5,000 to 45,000 square feet (460 to 4,180 square metres). Estates without advance factories, but otherwise fully developed, are also provided by the Cork Harbour Commissioners and by private enterprise in Cork. All estates are non-specialized and open to any type of industry, including warehousing operations and services.

The application of regional physical planning in Ireland is indicating a number of areas suitable for the attraction of new industries, for industrial zoning, and for industrial estate development. Preliminary studies are being undertaken at several towns for locating such estates.

Israel

Since 1955 the Ministry of Commerce and Industry has been taking an active part in the planning of industrial estates (known in Israel as industrial centres for workshops and small industry) by providing financing through development loans. The Ministry of Housing is responsible for the planning and execution of industrial zones, areas and estates, including the infra-structure and the buildings. Other kinds of assistance are made available through the Institute of Productivity and the Institute for Standards and Measurements.

The main objectives in establishing industrial estates are dispersal of population and prevention of urban congestion. However, industrial estates are also set up in urban areas, the objective being to remove industrial enterprises and workshops from unsanitary or unfit premises or from residential areas where they are a public nuisance. Industrial estates are relied upon to achieve economies in the cost of buildings and services, and to increase efficiency by improving the rate of productivity and by stimulating inter-firm co-operation.

Two types of industrial estates can be distinguished in Israel, those in existing urban areas and those in developing areas and new towns. Most of the industrial estates in main cities consist of flatted factories located in buildings of two to four storeys with a basement for storage and/or parking. The establishment of these industrial estates is sponsored by the Government, by government companies, by municipalities or by private companies and contractors. In some cases private and public authorities co-sponsored the industrial estate. The industrial estates in main cities are

situated on plots of land containing several four-storeyed buildings with an area of 1,000 to 2,000 square metres (about 10,750 to 21,500 square feet) per floor. The total floor area in the largest industrial estate in Tel Aviv is 60,000 square metres (about 650,000 square feet). While most of the industrial estates are non-specialized, there are some industrial estates for production of automobile spare parts, and others for wood and metal industries are being planned.

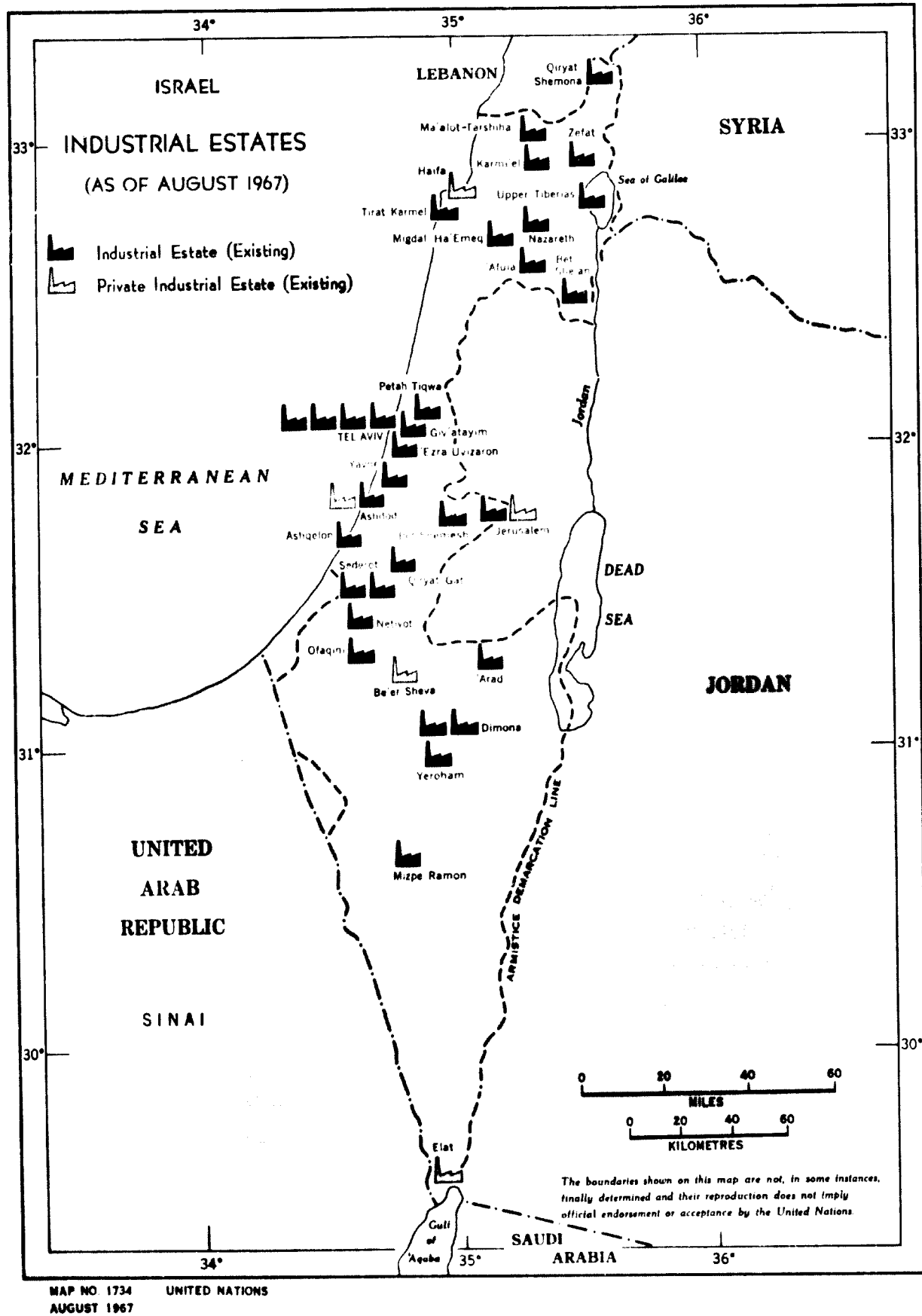
In developing areas and new towns, as in existing towns, industrial estates are planned in advance of demand. When the construction of infrastructure and buildings in the industrial estate is completed by the Ministry of Housing, the estate is handed over to the government company which is in charge of managing the estate, sub-letting or selling the factories and maintaining the buildings and the estate. In some cases the government company itself builds the industrial estate. In the developing areas, most of the buildings are single-storeyed, but on sloping sites double-storeyed buildings are constructed. Standard sizes of work units are 60 square metres (about 645 square feet), 95 square metres (about 1,000 square feet) and in special cases 250 square metres (about 2,680 square feet). Enterprises which need a larger area are given several units forming an area up to 1,000 square metres (about 10,750 square feet) or more, if necessary.

All the estates, both in existing towns and in developing areas, provide roads, electricity, water supply and sewerage. In larger industrial estates, additional facilities are planned such as restaurants, offices, shops and parking area. The investment per square metre (excluding plot and development) ranges from I£ 150 to I£ 200 for single-floored buildings and up to I£ 300 for many-floored ones (\$US 50, \$US 66, \$US 100).

In development areas one government company manages all industrial estates in the matter of sub-letting, caretaking and cleaning. The management of industrial estates, built by privately-owned companies which sell the buildings after construction, is undertaken by the occupants grouped in voluntary associations. In the case of the industrial estate at Tel Aviv, the company which built the estate established a subsidiary company—with which the holding company and the occupants are associated—for managing the services. Some companies both construct and manage the industrial estates.

Government loans are available, as intermediate financing, to private building companies to provide mortgages of up to 50 per cent of the cost to buyers. In development areas government-owned companies build industrial estates and sub-let factories. In other localities and towns where there is not enough private initiative, Government and municipalities participate in the establishment of building companies and in their capital.

Factories in industrial estates in development areas are sub-let at a rent of 7 to 8 per cent of the cost of the building, as compared to the normal rent of 12 to 15 per cent applicable in larger cities. In development areas the occupant of a factory has the option to buy it from the govern-



ment company, in which case half the rent paid is deducted from the price of acquisition. Other incentives in development areas are: exemption from municipal taxes (which are usually about 30 per cent of the rent) and reduction of income taxes (25 instead of 46 per cent). Assistance in the field of technique and management is not included in the estate facilities, but is available from special government institutions.

In evaluating its experience in the establishment of industrial estates, the Ministry of Commerce and Industry of the Government of Israel has stated, in reply to the United Nations questionnaire, that they have helped in:

“(a) improvement of production by means of modern buildings, (b) integration of immigrants from abroad thanks to the possibility of renting buildings in various centres, (c) bringing industries to development areas by means of establishment of industrial estates in advance of demand, and (d) elimination of public nuisance and removal of industries from bad conditions to satisfactory dwelling conditions.”

According to the reply, the problems which require more study and experience are:

“(1) More efficient caretaking of the large industrial estates; (2) Problems of vertical and horizontal transport of working materials in many-floored buildings; (3) Functional efficiency of industrial estates (of one branch), and (4) Diversification of the technical and economic services to various industrial enterprises in large and many-floored industrial estates.”

Italy

In Italy, the industrial area (“zone”) of Naples was founded as early as 1904 by the municipality under a special state law; seven industrial areas were established between 1917 and 1949 in the industrially developed northern part of the country. It was only in 1953 that an area was opened in the under-developed southern part of the country—at Catania, in Sicily. In 1957 and 1959 the Government passed two laws on the development of southern Italy; these laws stressed the role of industrial areas and estates in the industrialization of that region and set forth uniform rules for their establishment. Under these laws, the Government is to assist in the creation of large areas of industrial development as well as of industrial “nuclei” of narrower scope. “Industrial areas” are encouraged in larger geographical units comprising populations of at least 200,000; “industrial nuclei” are set up in centres consisting of one municipality or part of a municipality. Besides 13 industrial areas in northern Italy, 12 areas and 27 nuclei are being developed in southern Italy.⁹

The industrial estate programme in the South is part of a comprehensive public investment programme. In 1950 the central Government established the *Cassa per il Mezzogiorno* (Fund for Southern Italy) to finance a public investment programme in irrigation, reclamation, reforestation, road building and other overhead facilities. The law passed in 1957 made it possible for provincial and local authorities, chambers of commerce and industry and other interested bodies to form a consortium (public law association) for the establishment of industrial estates and for carrying out

⁹ See map, p. 118.

the necessary infra-structure investment. These consortia promote the establishment of either larger industrial development areas or smaller industrial nuclei. The establishment of industrial areas and industrial nuclei and the formation of consortia are subject to the approval of the Committee of Ministers for the Mezzogiorno. The Cassa per il Mezzogiorno makes grants to consortia for site improvement, building costs, installation of machinery and so on. Complementary financial assistance is provided by three regional credit institutes—one for the mainland, one for Sicily and one for Sardinia.

The industrial areas and industrial nuclei in southern Italy have until now developed the land and the infra-structure and made available to industrialists developed plots at reasonable prices. The law, however, also provides for the consortia to undertake construction of factory buildings and organization of common service facilities. This has not yet been undertaken by any of the consortia.

The special inducements offered for the establishment of industrial areas and nuclei in southern Italy are comprehensive. Capital grants amounting up to 85 per cent of infra-structure expenditure for establishment of areas or estates, including compensation for land expropriated, and up to 50 per cent of cost of constructing factory buildings are available to the consortia. For small-scale and medium-sized industries located in industrial estates, grants from 10 to 25 per cent are available for new plant and equipment. Tax incentives include exemption from customs duty for building materials and machinery, ten-year exemption from income tax, exemption from municipal taxes and 50 per cent reduction in excise taxes on electric power and building materials. The other incentives include participation in equity capital by credit institutions, reduction in freight rates, preferential award of contracts from public administrations and subsidizing (by the Cassa per il Mezzogiorno) of interest rates at which funds are lent by special credit institutes.

Malta

The Government of Malta has established three industrial estates—the first at Marsa, consisting of eleven factories which were constructed during the period 1957—1960; the second at Msierah, consisting of eight factories constructed during the period 1960—1965; and the third at Mriehel with four factories (1965—1966). The estates at Marsa and Msierah are almost fully occupied and the Government proposes to extend further the industrial estates at Msierah and Mriehel.

The industrial estate programme in Malta is integrated with the country's industrial development plans and admission to the estates is open to new and expanding undertakings, both local and overseas, which are assisted to set up or expand by the Government's aids to industries scheme. The Marsa industrial estate is sited midway between the main harbour and the airport, which are three miles apart. The Msierah estate

is about five miles from both harbour and airport. The Mriehel estate is much nearer to the harbour and the airport.

The industrial estates provide facilities of power, water, gas, sewerage, access roads and fire protection, in addition to general-purpose factory buildings constructed in advance of demand. Both construction and management are in the hands of different government departments, while over-all control is exercised by the Department of Industry.

The size of the Marsa estate is 22.28 acres and of Msierah 12.8 acres (9 and 5 hectares). Standard factories are of two sizes, i. e. 12,500 square feet (1,161 square metres) and 25,000 square feet (2,322 square metres). Built-up factory accommodation ranges in size from 11,400 to 120,000 square feet, with an average size of 29,000 square feet in Marsa and 22,370 square feet in Msierah. The three industrial estates employ about 1,800 persons, and an additional 1,400 new jobs in other industrial enterprises (outside the estates) have been created. The employment potential of the estates, after full development, is 6,000.

Fully-serviced sites are leased for a period of 99 years at 10s. 6d. per 1,000 square feet. Standard factory buildings are leased at a rental of 2.18 per cent of the cost of construction which amounts to 9d. per square foot per annum. The lease is for a period of 16 years and can be renewed for three further 10-year periods.

A quality control laboratory has been set up by the Department of Industry at the Marsa Estate to service enterprises in all the estates. Laboratory analyses are carried out free of charge. The Department of Industry also has a small staff of experts to give technical and managerial guidance and assistance to local industrialists.

Special inducements provided to enterprises in the industrial estate include financial grants (normally $33\frac{1}{3}$ per cent of the capital costs of erecting premises and of providing plant, machinery and equipment; 50 per cent in very exceptional cases); loans for a period of ten years; income tax holidays for ten years; subsidized factory rentals; exemption from customs duties on imports of building material, machinery and equipment; exemption from or reduction in customs duties on materials/components; and financial grants for the training of Maltese labour.

In reply to the United Nations questionnaire on industrial estates, the Government of Malta has evaluated its experience of the industrial estates programme as follows:

“The main objective of the Malta Government industrial estates was to provide suitable premises where new and expanding undertakings, especially those attracted from abroad, could start operating with the least loss of time. It has been found that the most suitable building is the general-purpose type of factory though in some cases it may be necessary to provide purpose-made factories for particular industries. The smaller type of factory, that is, 10,000 to 12,000 square feet has been found more indicated for the light industries which form the greater part of the industries attracted to Malta. These are

more easily disposed of than the larger factories provided, however, that suitable provision for eventual extension is made. When factories are built in advance there is the advantage of satisfying industrialists' requirements without much delay in view of the fact that the steel frames have to be procured from abroad."

A United Nations technical assistance expert reported in 1965 that Malta needs to establish one or more new industrial estates, catering especially for small-scale industries. Such estates should have standard factory accommodation of 2,000 to 7,000 square feet and should include establishment of common service facilities, such as tool and die-making, blueprinting, technical libraries and so on. The expert has recommended United Nations technical assistance for feasibility studies on location and planning of these new estates.

The Netherlands

The Government of the Netherlands provides subsidies and incentives for the establishment of industrial areas and of industrial enterprises in designated primary and secondary development regions (the rate of subsidy being lower for secondary regions), with a view to creating additional employment in less industrialized regions and relieving congestion in industrialized centres.

There are four different kinds of organizations engaged in developing and operating industrial areas in the Netherlands. These are: (i) the municipality; (ii) the *industrieschap* (a joint body of two or more municipalities); (iii) the *industrie stichting* (a non-profit industrial foundation formed by collaboration of municipal authorities and private interests); and (iv) the limited liability company, either private, governmental or jointly owned. The industrial foundation is the most common form of management. About one hundred industrial areas have been set up by foundations and municipalities, many of them in the relatively less developed parts of the country.

The Government provides two incentives: (1) 50 per cent subsidization of the price of plant sites in 44 development centres, provided that 20 per cent of the land bought is used in construction; (2) grants towards construction cost at differential rates for different locations, the amount of grant varying with the extent of floor space covered.

Besides industrial areas thus established in the development regions, the Netherlands has two flatted-type industrial estates in Rotterdam. These estates were constructed by the Government after the Second World War to rehabilitate small-scale industries. This type of estate was adopted because of the working space shortage which resulted from the destruction of the city during the war. Facilities of gas, water, electricity, heating etc. are provided in these buildings. The Government no longer encourages the construction of flatted-type factory buildings, as business and industry are not in favour of it.

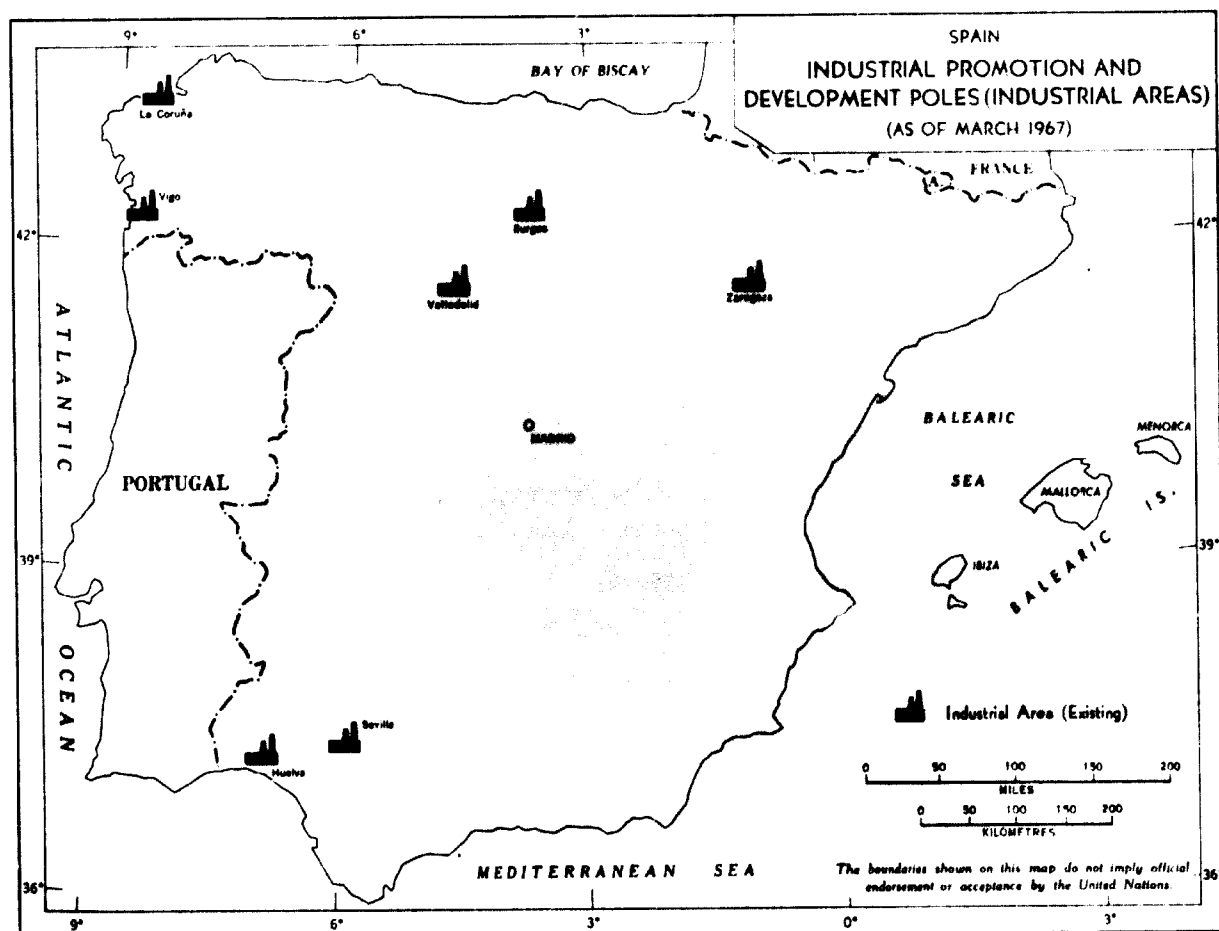
Spain

On 28 December 1963 the Government enacted a law whereby a four-year Economic and Social Development Plan was approved. The Government based its policy of regional development on the establishment of "industrial poles" and industrial areas. Two types of poles are distinguished:

- (1) Localities where no industry exists but where resources and potentialities indicate good prospects of industrial development are considered as "promotion poles"; this is the case of Burgos and Huelva;
- (2) Localities where industry exists and where there are good prospects for accelerating and expanding industrialization; this is the case of La Coruña, Vigo, Valladolid, Zaragoza and Seville.

Both types of poles cover areas ranging from 100 to 200 square kilometres. Within the poles, industrial areas offering improved plant sites for sale are set up as an incentive to the establishment of industrial enterprises. The average size of the areas is 650 square metres, within a range of 90 to 2,050 square metres.

Industries are admitted in the industrial areas of the promotion poles if they have an investment of at least 3 million pesetas (\$US 50,000) and if they create at least 20 new jobs; they are admitted in the development



poles if these figures are, respectively, 5 million pesetas (\$US 84,000) and 30 new jobs. The occupants may receive five-year tax concessions, duty-free imports, subsidies and easy credit facilities. Each project must be approved by the Ministry of Industry.

At the end of 1966 there were in the industrial poles six government-sponsored industrial areas and four private ones. These had attracted 1,068 enterprises with a total investment of 69 billion pesetas (\$US 1.2 billion) and an employment of 103,719.

A number of public and private industrial areas are also set up in other localities.

Sweden

In Sweden, besides reserved industrial zones in cities and towns, a number of industrial buildings have been erected by municipalities, by co-operative societies or by joint stock companies. The buildings and workshop space are specifically designed for separate service and sales shops (for instance, watchmakers, jewellers), for service and repair shops (painters, shoemakers, printers), for bigger service and repair shops (auto repairing, carpentry etc.) and for manufacturers or sub-contractors. The workshops are generally leased at a reasonable rent. Such buildings have been constructed in Stockholm, Norrköping, Örebro, Uppsala, Karlstad, Östersund, Västerås and Gävle. In Stockholm the buildings are multi-storeyed; the biggest has a total floor area of 30,000 square metres. In Östersund there are three single-storeyed buildings of 600 square metres each. No special services are provided, but the state and the municipality give loans through associations of industrialists to individual small industrialists and to co-operatives for buildings and machinery.

Switzerland

Special efforts have been made to establish industrial areas in the relatively under-industrialized canton Valais in Switzerland. A non-profit association—*Société Valaisanne de recherches économiques et sociales*—was founded in 1951 with the objective of attracting industry as a means of improving the standard of living. The Société set up industrial committees for each commune, to carry out surveys and feasibility studies for industrial areas; a limited liability company for financing industries; and a co-operative marketing company. The Société had a law passed which enabled the Canton Government to provide subsidies of 10 to 20 per cent to the municipalities to buy land for industrial zones and of 10 to 30 per cent to develop industrial estates.

The industrial estates established through the efforts of the Société are located on the main road to Italy, along the River Rhone and the Simplon railway. The land is acquired by the municipality and either leased free or sold on hire-purchase over a twenty-year period. Exemption

from municipal taxes is available for a period of ten years. The factory buildings are constructed by the industrialists. The industrial estate near Sion covers 40 hectares of land and is zoned separately for large industries and small industries. A small industry is usually allotted 3,000 square metres of land. During the five-year period ending in 1957, 29 new enterprises were attracted to Sion—a figure which represents an annual rate of increase six times the average annual rate during the previous forty years.

Turkey

The First Five-Year Development Plan (1963—1967) of Turkey envisaged the establishment of industrial estates and investment in the requisite infra-structure as a means of developing industry. The objectives governing the establishment of industrial estates are:

(a) To bring scattered small industries and workshops together and to provide common installations and encourage complementarity, thus establishing a basis for their integration and development;

(b) To select industrial locations with a view to increasing total productivity and promoting a balanced inter-regional development;

(c) To locate industrial areas in accordance with the requirements of town planning.

Industrial estate projects in Turkey are sponsored by the State, the chambers of commerce and industry, municipalities and trade co-operatives. While costs of infra-structure facilities and of development of industrial areas and industrial estates will be met by the State and the municipality, the institutions and establishments which are to occupy industrial areas and industrial estates will contribute to the expenses within their means.

No industrial estate has as yet been established under state sponsorship. However, intensive studies have been made to determine feasible locations for industrial estates by means of regional surveys conducted by the Regional Planning Bureau of the Ministry of Reconstruction and Development. In the Gaziantep province, a comprehensive survey of economic development, resources, demographic growth, industrial structure, development of infra-structure and of future growth possibilities has been carried out. As a result of this survey a project was formulated, with United Nations assistance, to set up a pilot industrial estate at Gaziantep. It is envisaged that the provincial government will acquire an area of 50 hectares of land for developing an industrial estate and an adjoining industrial area. During the next five years, 60 standard factories of four different sizes would be built on five hectares of land on the industrial estate. After two or three years, an industrial area will be developed on 20 or 25 hectares of the land, where developed plots will be provided for large, medium and small industries.

The Government of Turkey has appropriated TL 10 million (\$US 1.11 million) in the 1964 budget and TL 15 million (\$US 1.66 million) in the

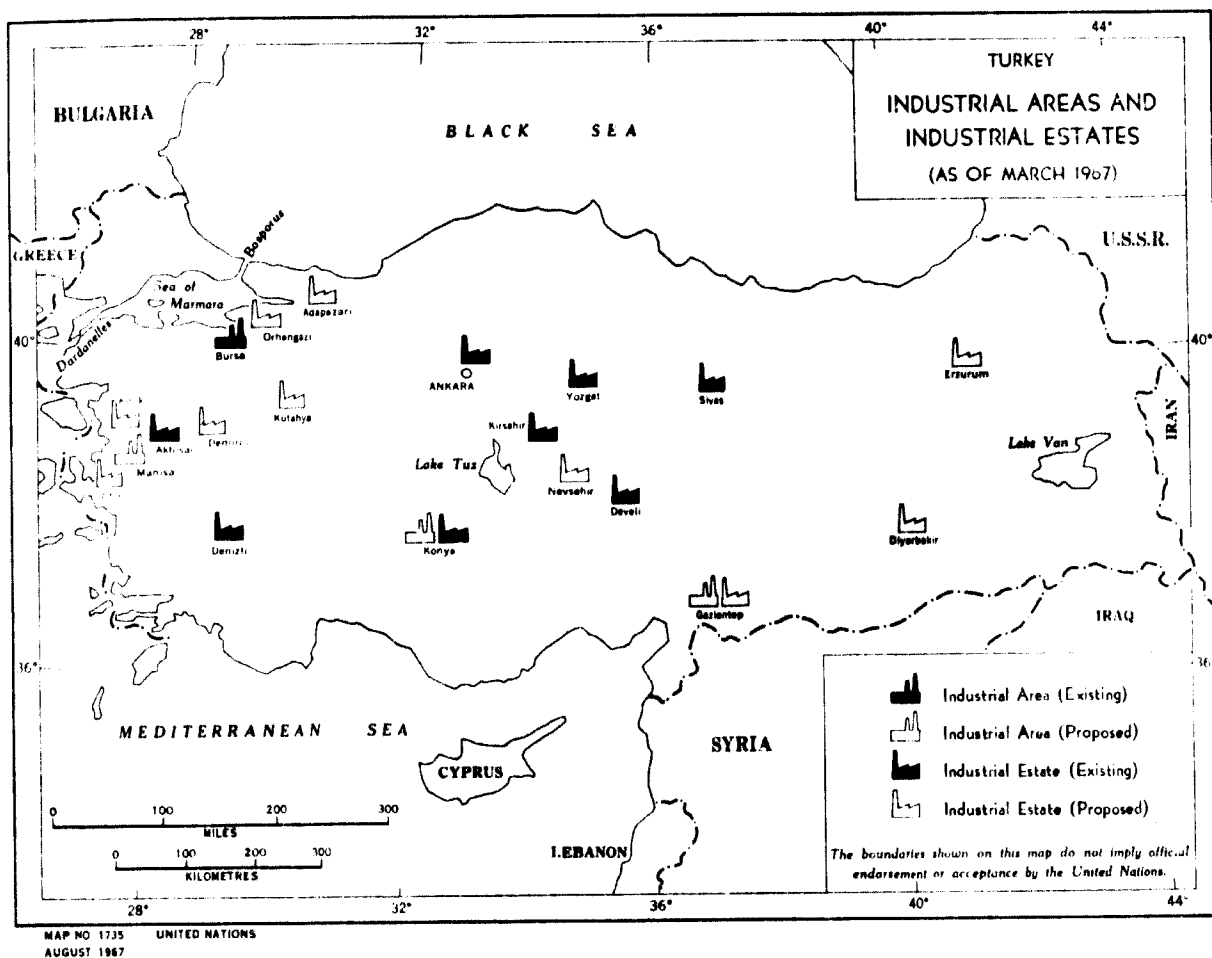
1965 budget for the industrial estate programme; these funds are deposited in the Halk Bank as an industrial estate loan fund. Allotments will be made to provincial governments, municipalities and co-operative associations for establishing industrial estates, after approval of the location, the site and the building plans by an Evaluation Committee of the representatives of the Ministries of Finance, Commerce, Industry, Reconstruction and the Halk Bank. While the industrial estate loan fund and the industrial estate programme are administered by the Ministry of Industry, regional planning and the determination of the location of industrial zones are the function of the Ministry of Reconstruction.

Besides the pilot industrial estate project at Gaziantep, sponsored by the Government, a few other industrial estates sponsored by other agencies are under way in Turkey.

Chambers of commerce and industry have sponsored industrial estate projects for large and medium industries at Bursa and Manisa. A feasibility study for establishing an industrial district at Bursa was carried out in 1961 by the Government of Turkey and a consulting firm for the United States Agency for International Development. The industrial district at Bursa, sponsored by the Bursa Chamber of Commerce and Industry, has already been established on a site of 150 hectares (about 371 acres). A feasibility study for the Manisa Industrial District was carried out in 1964 by the Union of Chambers of Commerce, Industry and Commodity Exchanges of Turkey on behalf of the Manisa Chamber of Commerce and Industry, and steps are under way for establishing an industrial district near Manisa.

At Denizli there is an example of an industrial estate successfully established by a co-operative association. The estate was started by a co-operative formed by the owners of copper working, automobile repairing, blacksmithy, wood working and engineering shops, some 230 in all. From their own resources they raised TL 4 million and have borrowed TL 2.7 million from the Workmen's Insurance Fund. With these sums they acquired about five hectares of land in a reasonably central location and have built 250 workplaces on it. The plans were prepared by the Secretary of the Chamber of Industry who is a professional architect. Six premise sizes are provided, ranging from a 50 to a 200 square metre covered area. By the middle of 1964, the buildings had been erected but not occupied. Water and electricity were provided by the municipality. More funds were required at that time for completing the drainage and sanitation, and the service roads.

Other industrial estates are being sponsored by industrial co-operatives which have applied for assistance from the industrial estate loan fund. In Antalya, an industrial co-operative has acquired 30 hectares of land for building an industrial estate. It is estimated that the estate will provide for 180 factory units of three sizes—50, 75 and 200 square metres, and for common facilities of 1,000 square metres; it will cost TL 6.5 million. In



Burdur, an industrial co-operative plans to establish an industrial estate for the wood-working industry. The cost for 40 factory sheds of 75 square metres each and common facilities of 200 square metres is estimated at TL 1.6 million.

A tentative allocation of the industrial estate loan fund of TL 10 million (of the 1964 budget) indicated that fourteen industrial estates would be sponsored by municipalities, seven by co-operatives and three by provincial governments.

Industrial estates at Sivas, Develi, Kirsehir, Akhisar, Ankara, Yozgat, and Konya are about to be completed. Construction of industrial estates has started at Izmir, Nevsehir, Kinik, Erzurum, Demirci, Adapazari, Diyarbakir, Kutahya and Orhangazi.

United Kingdom

The United Kingdom, along with the United States of America, was the first country to establish industrial estates about eighty years ago. The earliest industrial estates, established before the nineteen-thirties, were private profit-motivated and commercially operated real estate ventures — Trafford Park, Manchester, and Slough, West of London. Since the thirties, the Government of the United Kingdom has promoted the establishment of industrial estates as one of the instruments for industrial development of depressed areas, under the Special Areas Legislation of 1936 and 1937,

the Distribution of Industry Acts of 1945 and 1950, the Town and Country Planning Acts of 1947 and 1954, and the Local Employment Act of 1960. The establishment of industrial estates forms part of a comprehensive programme including investment in overhead facilities, grants and loans, temporary exemption from taxes and rates, subsidies on rent and restrictions on building construction in congested areas.

Before the war a principal objective of the industrial estate programme was to contribute to the creation of employment opportunities in specified depressed areas of England, Wales and Scotland. In the post-war period, a nationwide policy of industry distribution was adopted. The Government assumed full location control under the Town and Country Planning Legislation, with a view to avoiding congestion in heavily industrialized and populated areas, and inducing new industries to settle in development areas, unemployment areas, new towns and in Northern Ireland. Under the Local Employment Act of 1960, which replaced earlier legislation on distribution of industry, government action is directed mainly towards the development of areas of unemployment. Promotion of industry is the principal tool of this policy, and the provision of industrial estates plays a significant role in the programme.

The policy objectives and the role of the Government in the establishment of industrial estates in the United Kingdom have thus changed over the last eighty years—from private profit-motivated real estate ventures in the beginning of this century, to aiding the rehabilitation of depressed areas in the nineteen-thirties, to regulatory distribution of industry over wider areas of the country in the nineteen-fifties, and finally in the nineteen-sixties to maintaining a reasonable level of employment throughout the country.

Although both privately-sponsored and government-sponsored industrial estates exist in the United Kingdom, the major programme today is that of the Government. In March 1964 there were 48 government-sponsored industrial estates: 23 in Scotland, 20 in England and 5 in Wales.

These estates are known as Board of Trade industrial estates,¹⁰ for in the United Kingdom a considerable degree of control is exercised by the Board of Trade over the construction and management of industrial estates. Until 1960, industrial estates were constructed and managed by "trading estates companies" established by the Commissioners of the Board of Trade. There were five such companies and their jurisdiction covered specified "development areas" in different regions. With the adoption of the Local Employment Act which was valid for the entire country, the estate companies were replaced by three Management Corporations—one each for England, Scotland and Wales. Each Management Corporation consists of a Chairman and four members, appointed by the Board of Trade.

¹⁰ In Northern Ireland, the local Government provides advance standard factories in industrial estates as well as on industrial sites. In 1960, there were six industrial estates already established and two being planned.

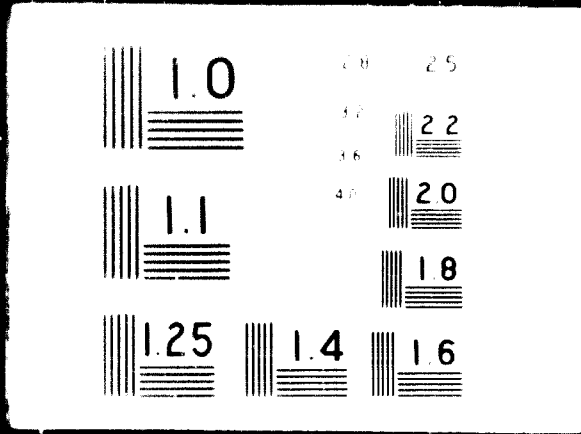


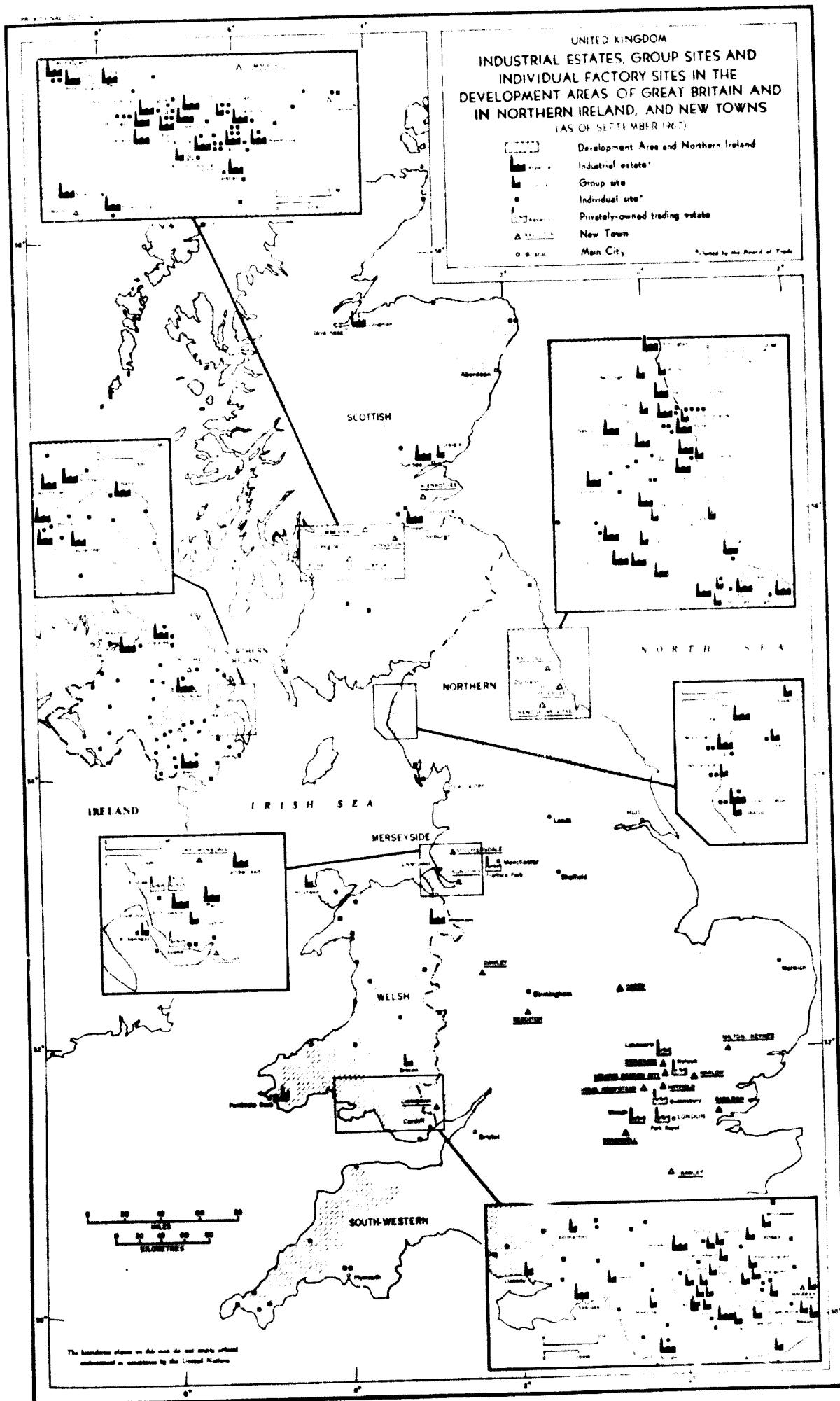
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Among these five men there must be one or more persons with experience in accounting, building or estate management, an industrialist and one trade unionist. These are part-time appointments, except in the Corporation for England where there is a full-time chairman, who carries out the duties of the general manager. The other two Corporations have separate full-time general managers. The general manager is the head of the permanent full-time staff and has general responsibility for the management of the estates and sites, including the construction of factory buildings. The Board of Trade issues directives to the Corporations on such matters as capital expenditures and the form of accounts. Apart from these major financial matters, guidance is also given on terms of lease, rent policy, staff salaries, and so on. The Corporations are empowered to make appointments and promotions to posts up to a certain level, but at higher levels, the approval of the Board is required. Further, the Board of Trade holds the freeholds of all land and properties and grants leasehold interest, usually for a period of 99 years, to the Management Corporation. Each capital project (factory building, development of land, etc.) is submitted by the Management Corporation concerned to the Board of Trade, which, after full consideration of the cost, employment and location, either rejects the application or grants a covering financial authority enabling the Corporation to proceed. After having received such authority, the Management Corporation acts as a commercial developer, instructing architects, seeking tenders and entering into building contracts. The Management Corporation supervises the contracts and hands over the complete buildings to the tenants. A number of Estate Managers, under the control of the General Manager, operate area offices, each covering one large and a few smaller adjacent estates and group sites.

The Management Corporation does not control the organization and operation of the enterprises on the estate. Tenants on the estate commonly form associations through which common problems can be presented to the management.

In addition to the development of industrial estates, which vary in size from 50 to 750 acres, the Management Corporations, with the approval of and finance from the Board of Trade, also build factories for rental or sale on other sites. These are known as group sites (miniature estates having two or three factories) and individual sites (where only one factory is located).

A survey of 55 industrial estates (45 government and 10 non-government estates) in 1959 indicated that 49 per cent of the estates had 50 acres (20.25 hectares) or less, 15 per cent had 51 to 100 acres (20.65 to 40.5 hectares), 24 per cent had 101 to 500 acres (40.9 to 202.5 hectares) and 12 per cent were larger than 500 acres in size.

The size of an estate and its occupancy are influenced primarily by the employment needs of an area. Factories in industrial estates are let out to industrialists who plan to start suitable new projects if the Board of

Trade is satisfied that the amount of employment to be created justifies the expenditure involved. Factories of 5,000 to 50,000 square feet, which are suitable for most types of medium and light industry, are frequently built in advance of demand. Extensions to existing Board of Trade factories are provided in suitable cases and small factories having as little as 1,500 square feet are sometimes built on the estates to help new entrants to industry to get production under way. The facilities on the estates, however, are open equally to large and small firms.

The industrial estates provide general facilities, such as power, water, gas, sewerage, surfaced streets, transport and communications. Supply arrangements are usually made by the industrial estate management with the concerned agency in the town—electricity company or board, water department of a municipality, telephone company and so on. Postal, banking and railroad trucking facilities in or near the estate are also generally provided by the concerned agency, the estate management merely making offices, land or siding available to the agency. In a few big estates, however, internal rail or truck transport is provided by the estate management.

The Slough Trading Estate Ltd., which is the largest private estate, has a well-known health service, hospital and occupational hygiene centre. A government-operated training centre has been functioning in the estate since 1927 and provides training in a number of trades. The estate also provides a trouble-shooting technical service to assist industrial managers in solving specific problems on request.

As regards sales and lease policies, the general policy in the United Kingdom—both in the government estates and the private estates—is only to lease land and buildings. In government estates, where the Board of Trade holds the freeholds of all land and properties, the Management Corporation is granted a leasehold interest for a period of 99 years (in a few cases 999 years) and the Management Corporation normally enters into a lease with an approved tenant for a period of 21 years (20 years in Scotland). The lease to the tenant is at current market value rental as assessed by the Government's District Valuer.

Several leases embody a mutual break clause, permitting the rent to be revised, but apart from this the rent remains unchanged for the duration of the lease. Therefore, although the average current market value of rental now being charged on new leases (and renewals of leases) is about four shillings a square foot in England (and less in Scotland and Wales), the general level of rents under existing leases is much lower. Rents are based on current market values assessed in the light of local conditions, with the consequence that the poorer the local conditions are, the less the rent is. This results, in effect, in a subsidy to the poorer areas. An industrialist desiring a factory different from the standard design is asked to pay the difference in cost either in cash or in instalments, or in the form of an increased annual rental.

The Board of Trade has sometimes sold land or factories on the perimeter of estates and has occasionally leased factories on a 99-year lease. In Scotland there is a preference for owning factories and the Board of Trade has, in the past, sold several large factories on amortization over a period of 20 years, but these factories were located on individual sites and not in an industrial estate. In the New Towns developed by the Board of Trade in co-operation with the New Town Corporations, industrial sites are either leased for 99 years and 999 years, or sold on the condition that a factory is built within a specified period.

The Slough Estate, Ltd., does not sell land or factories. All factories on the estate are rented to tenants. Rents are based on amortized building costs plus a fixed percentage for operating costs and a margin of profit.

As regards special inducements there is, as has been pointed out above, an element of subsidy in the rents charged by the Industrial Estates Management Corporation. In addition, training grants, training facilities and grants toward the cost of plant and machinery are offered to firms establishing themselves on an estate or individual site. Moreover, factories are built to specific requirements in a range of sizes in advance of demand.

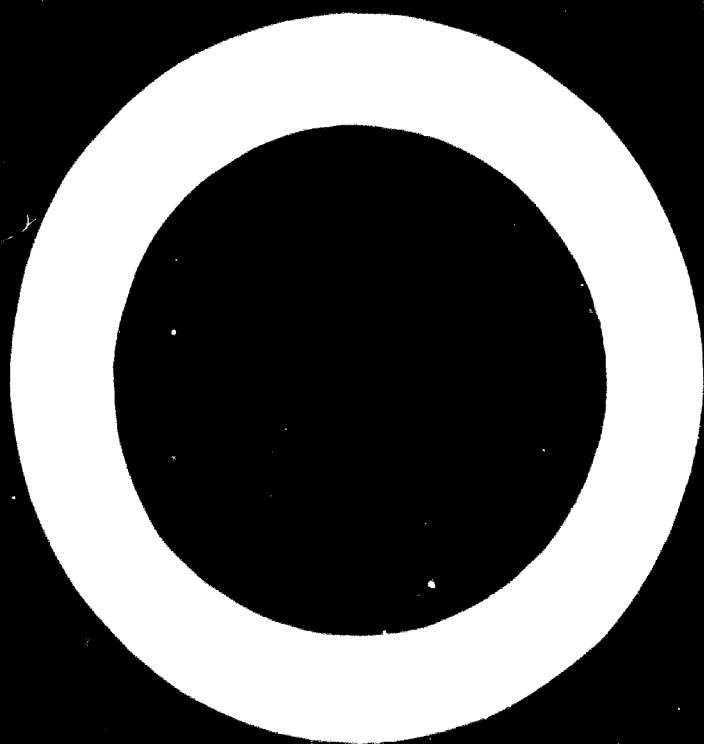
In evaluating the experience of industrial estates in the United Kingdom, the Board of Trade stated in March 1964:

"The Board of Trade's industrial estates have been developed on the basis of public responsibility. They have made a positive contribution towards the objective of reducing structural unemployment in the older industrial areas by attracting modern light industries. Had it not been for the facilities offered by the industrial estates many new firms and new industries would not today exist in Scotland, South Wales and North-East England. This is probably true for example of many of the 40 American firms who have set up in Scotland since 1965. The undoubted success of many firms on the estates has been a potent factor in inducing other concerns to follow their example and today in Scotland it is particularly hoped that the motor car vehicle industry will create yet another growth nucleus around which many expanding companies will gather.

"The staff of the Management Corporations represent a wealth of experience in the development of industrial estates. Experience has shown the value of planning an estate at an early stage, especially in relation to the estates road system and the allowance made for extensions to factories. As an example the Master Plan for Team Valley was laid down 25 years ago and its principal feature was a centre avenue running almost due North-South for 1.6 miles. Factories built were provided with sufficient land to double their floor space. The success of this estate owes much to this plan which has been faithfully followed. The new estate in North East England at Tec-side is to be planned on a similar basis.

"The success of the estates has also been due to the wide range of facilities and assistance offered to industrialists. Among the inducements offered to firms establishing themselves on an estate or individual site in a development district are training grants, training facilities and grants towards the cost of plant and machinery grants. Moreover, factories are built in a range of sizes in advance of demand and to specific requirements. The availability of these inducements in addition to the accepted advantages of being on an estate, for example, a rented factory enables capital resources to be devoted to the development of the business, make the industrial estate an attractive proposition for many firms.

"The Board of Trade's industrial estates have aimed at certain high standards of planning, building and estate management which have been of considerable interest to other countries contemplating similar enterprises."



PART IV

*The Role of Industrial Zones, Areas and Nuclei in Development Policies and Programmes, with Special Reference to the Promotion of Small-Scale Industries: the Experience of Italy**

* Paper presented to the Consultative Groups by Mr. Claudio Alhaique, Economic Adviser, Istituto per l'Assistenza allo Sviluppo del Mezzogiorno, Rome, Italy.

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INDUSTRIAL ZONES, AREAS AND NUCLEI — ITALY

1. INDUSTRIAL ZONES AND GENERAL ECONOMIC DEVELOPMENT POLICIES IN THE MEZZOGIORNO

A COMPREHENSIVE POLICY for the establishment of industrial zones¹ in Italy is of recent origin. Up to a few years ago, the establishment of industrial zones was not so much the outcome of general development programmes but rather the result of local initiatives and efforts. The circumstances giving rise to industrial zones were quite varied. They included action by groups of private industrialists interested in the development of certain localities, the need to prevent local economic crises due to a decrease in certain resources and in traditional productive activities, the influence of local political leaders and other considerations.

In 1950 the State adopted a comprehensive policy for the depressed region of the Mezzogiorno (southern Italy) and, as an organism for carrying out that policy, set up the Cassa per il Mezzogiorno.² It was only seven years later, in 1957, with the Law No. 634 of 29 July, that encouragement was given to the establishment of industrial zones as part of this policy. The law stated that "in order to favour new industrial initiatives to be concentrated in a given zone, the Communes, Provinces, Chambers of Commerce, Industry and Agriculture, and other interested bodies can form Consortia with the object of carrying out, developing and managing works for equipping the zone, such as road and rail connexions, water and energy supply for industrial use, light and sewerage. The Consortium can undertake any initiative considered useful for the industrial development of the zone". The law made special provisions for

¹ The term "industrial zone" is used in Italy to designate a tract of land improved for industrial use. The Law No. 634, passed in 1957, contemplates the possibility of providing industrial buildings to be sold or rented to the industrialists—which, in the terminology used by the United Nations, would make the zone an "industrial estate"—but, as will be seen later, no such facilities have yet been provided in any zone. It will also be seen that "areas of industrial development" and "industrial nuclei" which are, respectively, large and small territories where industrialization is to be promoted, have recently been established. Since no industrial estates providing factories and services exist in Italy, the present report refers to zones, areas and nuclei as defined and described in the text. [Editor's note.]

² An agency created specifically for financing and co-ordinating special allocations for the development of southern Italy. Founded by Law No. 646 of 10 August 1950, its duration was extended, by Law No. 717 of 26 June 1965, to the end of 1980.

the expropriation of the land required, for carrying out the above-mentioned infra-structure works, for contributions which the Cassa was authorized to make for this purpose, and for other relevant matters.

The actual results of these measures will be examined later. It is of interest to note here that, as from the promulgation of the law, the industrial zones and the consortia which were set up to administer them became a part of a co-ordinated policy for the development of the country. About the same time it was realized that the problem of the Mezzogiorno should not be considered as special to that part of Italy but, because of the dimensions of the territory and the population involved, should be regarded within the scope of the life of the country as a whole.

Amongst the numerous objectives of the Italian policy for the establishment of industrial zones in the Mezzogiorno are the following:

(a) The concentration of expenses for infra-structure. In order to create in the Mezzogiorno a favourable environment for industrial initiatives to be undertaken by local operators, by entrepreneurs from central and northern Italy or by foreigners, some basic infra-structures—such as communications, water, light, power, drainage—should be made available. As these could not be provided over the whole region of the Mezzogiorno, the creation of zones, suitably equipped, would ensure a concentration of infra-structure investments at some key-points. This would prevent a harmful dispersion of existing financial resources and would stimulate and facilitate new productive initiatives.

(b) In turn, the concentration of industrial initiatives would help to encourage the integration of various enterprises, particularly the integration of large basic industries with the small-scale and medium-sized industries dependent upon them. Thus an impulsion would be given which would start a spontaneous process of industrialization, a development which would not have occurred if the same initiatives had been spread more or less haphazardly over such a large territory.

(c) Finally, the particular type of organism called upon to manage the industrial zones of the Mezzogiorno—that is, the consortia which are autonomous public bodies working in liaison with local authorities such as communes and provinces—would gradually stimulate the local authorities to improve their organization, to operate in a responsible and co-ordinated manner, and above all to do things for themselves. This would weaken that mentality of inaction, of waiting passively until the central authorities proffer paternalistic benefits, a mentality which is so common in the local environment of almost all developing countries, not excluding the Mezzogiorno, and which is so harmful to economic and social progress.

It is hardly necessary to mention that industrial zones were not the only incentive for the establishment of industries in the Mezzogiorno. As will be seen in the next section, all kinds of financial, fiscal, customs and other advantages were also made available.

2. INFRA-STRUCTURE DEVELOPMENT VERSUS FINANCIAL AND FISCAL INCENTIVES

The idea of setting up a network of industrial zones in the Mezzogiorno as an instrument of industrialization has not been looked upon favourably by all those interested in the problem in Italy.

Many answers have been given to the basic question: "What is the best policy to follow for helping and encouraging new industrial initiatives in the Mezzogiorno?" As in other countries faced with the same problem, various tendencies have emerged. The following are the two fundamental conflicting opinions:

(a) A flow of industrial initiatives into any given geographical area is not haphazard, but occurs when an area offers favourable environmental conditions and is provided with basic infra-structure. This is evidenced by the progress of development in northern Italy during the past century. Therefore, to ensure a flow of industries into the Mezzogiorno, it is advisable to concentrate the effort of development on the infra-structure; by creating the same favourable conditions which existed at first only in the northern section of the country, operators will be attracted to the southern region.

(b) In no case would the provision of infra-structure and the creation of favourable environment be sufficient to ensure a flow of industrial initiatives into an under-developed area. This is particularly true of Italy because of its geographic configuration and the resulting distance between Mezzogiorno and European centres. It is, therefore, absolutely necessary to balance the negative factors—since it is difficult to modify them—by offering the potential operator a series of incentives in the form of loans, grants, tax exemptions, and so on.

There is an element of truth in both opinions. Neither of the two theories has been completely accepted in the majority of countries. But attempts have been made in most developing countries to create a minimal infra-structure basis acceptable to the operators and, at the same time, to guarantee a certain number of special advantages to encourage investments. For example tax concessions and permission to export profits and take out capital exist almost everywhere. But other types of help, such as long-term loans at favourable interest rates, or grants, are available in a relatively small number of countries. Because of the basic weakness of their economies, many countries would not be able to support such fiscal and financial drains.

In the majority of cases, the organization of industrial zones in Italy reflects more the former than the latter of the above theories: the industrial zone is itself a form of infra-structure, the chief advantage offered to the operator being the availability of improved land at favourable conditions. Yet in some cases the entrepreneurs are also offered inducements of a financial character, in addition to the facilities of the zone. In some countries,

inducements are offered only to operators who establish themselves within the limits of an industrial estate. Until now, this has not been the case in the Mezzogiorno where incentives for new industries are granted without regard to specific location, in particular, without reference to whether the location is within or without an industrial zone.

The principal inducements offered in the Mezzogiorno are as follows:

- Ten-year exemption** from income tax and from other special taxes in connexion with the construction of the plant.
- Reduced rail freight charges** for construction materials, machinery and equipment necessary for setting up productive undertakings.
- Credit at low interest rate** (down to 3 per cent a year) with a fifteen-year term, covering 70 per cent of the total investment and including a percentage for the acquisition of initial inventories with special favourable conditions for amortization (no repayment for the first two years, an additional period of three years during which interest but no principal is paid, and repayment of the principal beginning only after the sixth year).
- Free grants for construction of plant** (up to a maximum of 25 per cent) and purchase of machinery (up to 10 per cent).
- Equity participation** in industrial enterprises to provide the balance of the necessary capital, by special public credit institutions, which allow very wide flexibility in their operations.
- A guarantee from the State** to buy from the industries established in the Mezzogiorno 30 per cent of their total output.

3. INDUSTRIAL AREAS AND INDUSTRIAL NUCLEI IN THE MEZZOGIORNO: ORIGIN AND RECENT DEVELOPMENTS

In 1957 a law was passed in reference to industrial zones—in which industrial concentration would be encouraged—without developing this concept in detail. This law introduced a modern policy of industrial concentration in Italy.

Further to the enactment of the law, the competent authorities, in particular the Italian Ministerial Committee for the Mezzogiorno, thought of substituting for the traditional concept of "industrial zone" the relatively newer and more comprehensive one of "industrial development area". An "area" covers a large and homogeneous territory comprising several communes. Its purpose is to promote and bring about a wider economic and environmental transformation and to constitute a centre of attraction for industrial development. Within such a wide area there would be special poles of concentration, that is, special zones suitably equipped to attract new productive undertakings.

To be officially recognized and to enjoy the special facilities provided for by the law, the industrial development areas must fulfill a series of conditions and minimum requirements which should be certified by a special commission. The conditions are that there should be an effective trend towards industrialization in the locality, a population of not less than 200,000 within the area, complementarity between the economy of the principal commune and that of the surrounding localities, an existing infra-structure and an absence of negative factors such as liability to landslides, earthquakes, and so on.

In 1960 the Committee of Ministers for the Mezzogiorno ruled that in certain localities which did not meet the above conditions but where there were good prospects for industrial concentration, small "industrial nuclei" could be set up. The nuclei were intended to promote industrial concentration on a smaller scale than the areas, by stimulating the establishment of a limited number of enterprises taking advantage of a narrower market, by using local raw materials, and so on. The basic difference between an "industrial area" and an "industrial nucleus" is one of size. Only one zone with the necessary infra-structure is permitted in a nucleus while in an area the number of zones varies, in practice, from two to three.

In the map of Italy the location of the areas of industrial development and of the industrial nuclei is indicated as of the middle of 1966. It is probable that considerable time will elapse before provision is made for other areas or nuclei, as the number of those already sanctioned is in excess of the present possibilities. There are now 39 sanctioned projects—12 areas and 27 nuclei.

The total surface of the areas is 14,485 square kilometres, and that of the nuclei, 14,025. Areas and nuclei cover 20.6 per cent of the total surface of the Mezzogiorno which has 138,102 square kilometres.

A total of 31 industrial zones are established in the 39 areas and nuclei. Their total surface is 286.8 square kilometres, of which 167.3 (58.3 per cent) are still available for industrial occupants, the remaining 119.5 square kilometres (41.7 per cent) being already occupied by industrial enterprises or used for roads and general services.

After a project to set up an area or a nucleus has been formulated, the local organs promoting it form a consortium whose statute must be approved by a decree of the President of the Republic. The statute follows in general a standard pattern drawn up by the central organs in order to define the scope of the project and to provide guidance to the local authorities. When approved, the consortium is recognized as a public entity and can begin its activities after nomination of council members, executive committee, president and so on.

The first task of the consortium is to prepare a master plan for the area or the nucleus, devised so as to stimulate and co-ordinate integrated

industrial development within the territory concerned. In particular, the plan indicates the most suitable location for the built-up area and the works which should be carried out to provide adequate infra-structure in the area or nucleus. Thus, the master plan provides a basis upon which the consortium can build its activity. Master plans become operative only after they have been duly approved by a decree of the President of the Committee of Ministers for the Mezzogiorno.

The special privileges enjoyed by the consortia setting up areas or nuclei may be summarized as follows:

(a) The Cassa per il Mezzogiorno can assume the burden of the expenses connected with the preparation of the master plans.

(b) The Cassa can give grants to the consortia of up to 85 per cent of the cost of carrying out the infra-structure works for which they are responsible; advances may also be given for the remaining 15 per cent not covered by the grant.

(c) The Cassa can give advances to the consortia even for the operational costs of these infra-structure works.

(d) In cases where the consortia are not in a position to carry out the works of infra-structure, even with the facilities mentioned above, the Cassa is authorized to provide these at its own expense.³

(e) The Cassa can make contributions to the consortia amounting to up to 50 per cent of the costs of construction of industrial buildings to be handed over subsequently to operators interested in establishing their enterprises in the areas and nuclei.

(f) The Cassa can give funds to the consortia to cover expenses for land expropriation made necessary by the establishment of industrial plants and the construction of industrial buildings.

(g) The Cassa can be authorized to share in the expenses of the organization and activities of the consortia on the basis of their annual budget.

³ It is interesting to note that, initially, the contribution by the Cassa per il Mezzogiorno to the consortia was fixed at a maximum of 50 per cent of the cost of carrying out infra-structure work in industrialization areas and nuclei; in 1962 this contribution was raised to 85 per cent and in 1965 coverage was provided for the balance of 15 per cent and the Cassa was authorized to pay for all infra-structure work when the consortia are not able to support even a part of the cost. These modifications became necessary when it was found that the consortia were confronted by almost insurmountable obstacles in raising funds additional to those provided by the Cassa. The difficulties are due either to the chronic debit position of the local entities—communes and provinces—in the Mezzogiorno, which precludes them from assuming further financial burdens, or to the fact that the consortia have no fixed assets and are unable to provide real guarantees to the banks or special institutes against possible loans.

(b) The consortia can take advantage of a special procedure to expropriate land and buildings.

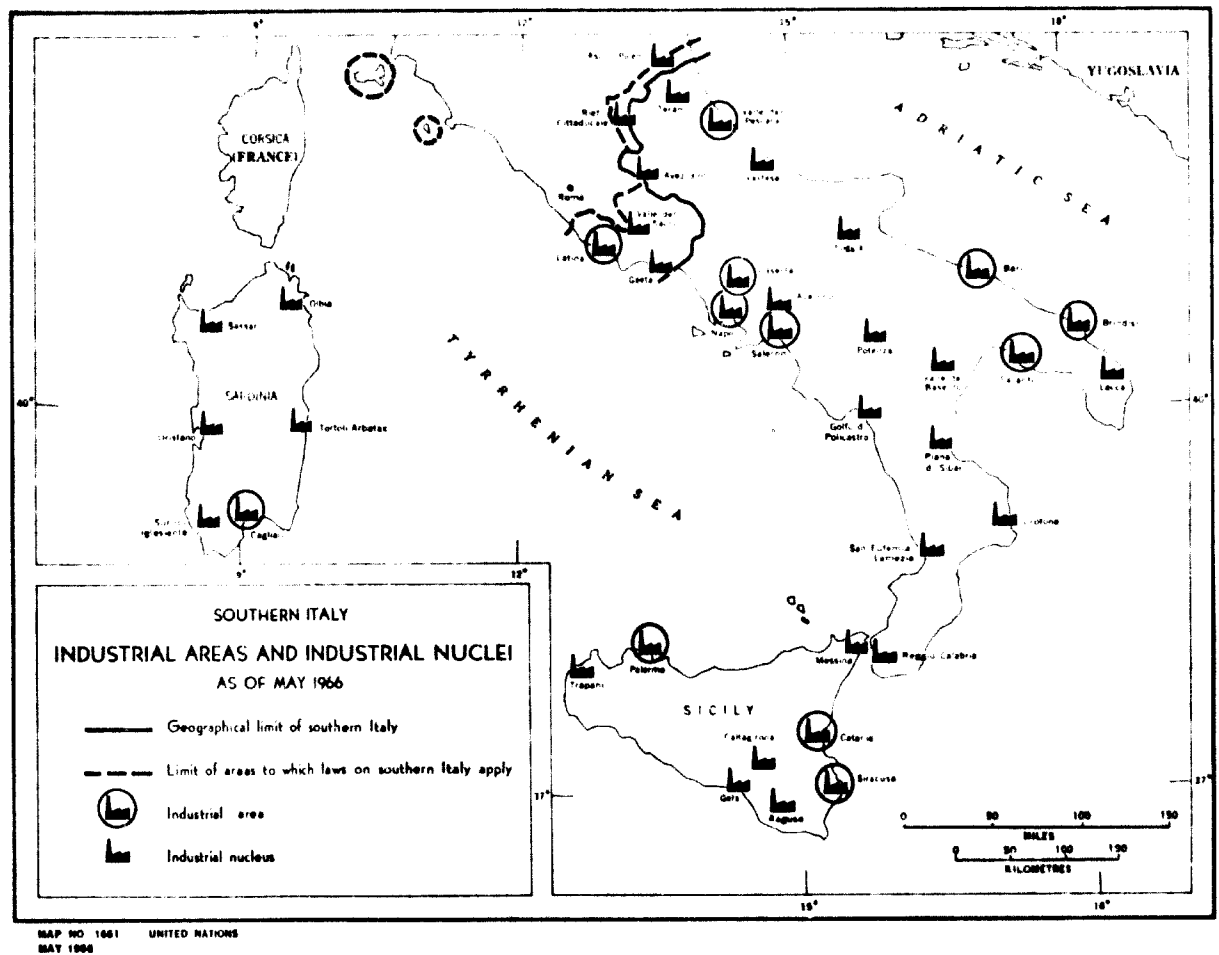
(i) The consortia benefit from special tax facilities on all their operations.

It should be noted that the only inducements offered so far to the entrepreneurs in the industrial areas and nuclei of the Mezzogiorno have been improved land and general infra-structure facilities at a relatively attractive price. Despite the fact that the law contemplated the possibility of the consortia constructing industrial buildings for sale or rent to the industrialists, no initiative of this type has yet been taken, nor are any special services such as training of workers, repair, maintenance or lease of machinery, transportation or cafeterias provided by the consortia to the industries installed within the zones. This is due to two main reasons. In the first place, the consortia were entirely engaged during the past years in preparing their master plans and in finding the financial means for infra-structure works, not to mention problems of general organization. In the second place, there was a doubt that such facilities would meet the desires and requirements of the industrialists. It was considered that Italian entrepreneurs, not being accustomed to standard factories, would maintain their preference for building their own factories according to their individual needs, and that, not being accustomed to common facilities and services, they would have no confidence in this kind of inducement.

These considerations are only partly true. Italian industrialists, especially those in the small and medium-size industries, are indeed, with few exceptions, strong individualists, and it is not as easy to associate them with a view to developing a common activity as in other parts of the world. Yet they cannot be unaware of the advantages offered by some of these facilities. It is likely that in the near future, as soon as the main infra-structure is completed, the consortia will begin to provide common services, industrial buildings and so on, as a further inducement for the attraction of new industries. This might also serve to improve and modernize the outlook and attitude of Italian entrepreneurs.

The degree of success achieved by the 39 industrial areas and nuclei of the Mezzogiorno varies greatly. At the end of 1965, the situation in a certain number of areas and nuclei was on the whole quite satisfactory: master plans had been prepared and approved by the competent authorities, infra-structure work was in an advanced state of readiness, and the flow of new industrial undertakings proceeded at a good rate. There were, however, cases where no measure of agreement among the local interested bodies for the formation of a consortium could be achieved.

Why is this so and what conclusions can be drawn from this experience in regard not only to the development of the Mezzogiorno and of Italy but also to the development of industrializing countries in general? What mistakes have been made and what modifications to the policy followed thus far in Italy seem to be called for?



4. THE FIRST RESULTS OF THE EXPERIENCE IN THE MEZZOGIORNO

While the industrial zones in the Mezzogiorno arise from the same law and have an almost identical legal structure, there are profound differences in their origin, their functioning, and their efficiency. The projects may be divided into three main types according to their origin.

First, projects in which the development of the area or the nucleus took place after one or more important productive enterprises had been established or were in the process of establishment in the territory, sometimes as a result of the initiative of private industrial groups and, at other times, of that of State agencies.

It is generally held that, in such cases, it was the establishment of the large enterprises which led to a decisive "breakthrough" in an environment of economic and social stagnation. However, the industrial zones have also contributed to this breakthrough both by providing additional economic infra-structure—some of which is necessary for the operation of the large enterprises—and by stimulating the development of certain forms of social infra-structure—town planning, communications with outside areas, technical schools, and so on.

The small-scale and medium-sized industries established around the major enterprises are supplying goods and services to the latter, or processing some of their products.

The industrial areas of Brindisi, Taranto, Syracuse, and the industrial nucleus of Valle del Basento (Matera) are typical instances of such projects. The Brindisi area was set up after the establishment of the great private petrochemical plant of Monteshell (Montecatini and Shell); the Taranto area was developed in connexion with Italy's fourth steel centre belonging to Italsider (one of the members of the State-owned IRI group); the Syracuse area was related to the chemical enterprises of Simeca and Celene, both of which belong to the Edison group (private industry); the nucleus was tied in with the petroleum operations of AGIP Mineraria and the petrochemical plant of ANIC (both belonging to the Ente Nazionale Idrocarburi, ENI, a State-owned group). Many other examples could be given—for instance, the Reggio Calabria nucleus is linked to the Omeca plant for the manufacture of parts for railroad cars (mixed private and public funds) and the Vastese nucleus to a glass factory at Vasto.

Second, projects in which the development of the area or the nucleus preceded the establishment of productive enterprises. In such cases it was the project itself which, through a favourable environment, and the availability of infra-structure, served to attract small-scale and medium-sized industries using local agricultural, mineral and other natural resources and coming, for the most part, from outside the zone, even from abroad. Most of the nuclei are in this category, from Potenza to Avellino, from Sassari to Teramo and many other places.

Finally, there is a third category of projects in the Mezzogiorno whose establishment has been inspired more by town-planning and land settlement considerations in connexion with decentralization policies than by industrial concentration programmes. Typical of these are the industrial area of Naples and that of Roma-Latina.

Thus there is in the Mezzogiorno a confrontation between two basic opinions regarding industrialization, opinions which, on occasion, give rise to polemics and discussions at high scientific and operative levels.

One opinion is that an initial "shock" from outside, which would break through environmental conditions, is indispensable to set in motion economic development in general and industrialization in particular. The shock may be provided by the establishment of a large industrial plant, and may be due to State initiative when private initiative is either lacking or insufficient.

The other opinion is that an intensive effort to promote new or already existing small local initiatives is more suited to the conditions of a developing region. Such an effort would tend to transform gradually an economy based on agriculture and handicrafts into an industrial economy

and, in particular, to stimulate the transformation of handicrafts, first into small-scale industries and then into medium-sized ones.⁴

From an international viewpoint such a "confrontation" provides a frame of reference for judging the directions which should be taken in the future either by the governments of individual developing countries or by international organizations providing technical assistance.

The following considerations are based on the experience of the Mezzogiorno and the results achieved so far by the industrial zones established there.

In any given zone or region, the transformation of the environment from a predominantly agricultural economy to an industrial one can be neither fast nor easy and cannot be achieved without profound economic and social repercussions. It certainly cannot be a matter of a few years but of a decade at least.

With some exceptions, the injection into a stagnant environment of a large industry, even if it is considered as a "motive" one, such as a steel plant—as is the case at Taranto—would not, in the absence of special promotion measures, be sufficient over a short- or medium-term to spark a spontaneous movement towards further industrial concentration, nor would it lead by itself to the spontaneous establishment of a sizable number of small-scale and medium-sized local industries around it. The reasons for this are the following:

(a) The local tendency will be, above all, to concentrate efforts on finding jobs for the greatest possible number of blue- and white-collar workers in the big industry which offers the best security for stable employment.

(b) The industrial complex—which almost always comes from another region—will, at first, certainly try to get its supplies and equipment from outside the zone, especially if it is associated with groups whose head offices are elsewhere.

(c) To some degree, the managers of the large establishment will certainly, at first, lack confidence in the local environment. This will be due in part to the fact that the local businessmen do not have the capacity for dealing with large industrial complexes in such matters as price stability, guarantee of quality and delivery dates. Because of this, it will not be easy to establish effective relations between the large organization and the local environment.

(d) An environmental breakthrough due to the establishment of a large industry will make itself felt principally in the fields of commerce and consumption. The level of consumption of local inhabitants employed

⁴ For more details, see United Nations (1960), *Establishment of Industrial Estates in Under-Developed Countries* (60. II. B. 4), and A. Molinari (1962) "Some Controversial Questions Concerning Industrial Estates", in United Nations, *Industrial Estates in Asia and the Far East* (62. II. B. 5).

in the big plant will increase, especially in comparison with the lower and more intermittent earnings from agriculture which they formerly enjoyed. Thus there will be a strong demand for consumer goods and this, in turn, will be reflected in a rise in prices which will not lighten the difficulties for those families which have not found employment in the big industry.

(e) One positive indirect effect of the establishment of a large complex, from the industrial viewpoint at least, will be an increase in building activity owing to the greater demand for housing and the improvement in the standard of living.

(f) The attempts of the small industries to "hook into" the large industry in order to supply it with goods and services and to process its products will soon be exhausted on account of the difficulties encountered, especially because of the lack of a valid entrepreneurial environment. Even where local capital is available (almost always derived from agriculture and real estate) it is generally not invested in industry due to the higher risks involved.

(g) The establishment of industrial zones of the second type—that is those which are a means for attracting new industries from outside—has had effects that vary noticeably from one case to another. There is evidence that where a zone is near an important urban centre in which a more or less spontaneous process of industrialization is under way, even though only on a small or medium operational level, its establishment has stimulated other local initiatives or has attracted new industries from the outside, especially from the North of Italy. In contrast, where an industrial zone is set up near a depressed small urban centre, the attractiveness for outsiders and local initiative are very small or negligible, in spite of occasional energetic efforts by the local authorities and organisms and of especially attractive forms of assistance.

In the latter case, an unfavourable geographic position far from the coast or, more important still, from airports, plays a fundamentally negative role. Usually there is also a "preferential" element, that is, other zones a short distance away which are more favourable and better situated, and which thus exert an important counter-attraction effect.

(h) The establishment of zones of the third type—that is, those which are part of town planning programmes aimed at bringing about decongestion and a more rational siting of existing industries—has been the most difficult to achieve, both from the structural and organizational viewpoint. The development of such zones has been and still is slower than that of other zones, probably because there was less urgency in setting them up.

(i) The number of economic sectors in which "motive" industries can be set up—that is, industries able to attract spontaneously a certain number of small-scale and medium-sized industries—is small, and the establishment of subcontracting relationships is not always easy to achieve.

The above conclusions are not intended to give the impression that the first basic opinion is entirely wrong and that prospects of success lie only with the second. It should be recognized that, at least until now, the establishment of large industrial plants in a zone where the economic and social environment is really depressed has not led to further industrialization as fully or as rapidly as theory would lead one to expect.

5. LOCATION OF INDUSTRIAL ZONES IN THE MEZZOGIORNO

Up to now, the results of the experience of industrial zones in the Mezzogiorno have been examined with reference to the establishment of large factories in certain localities. The experience will now be briefly considered in respect to the influence which the geographical location of the zones has had upon the establishment of new industries. Location has been near (a) big towns, (b) in a typical agricultural environment, (c) in the vicinity of ports and/or (d) in tourist areas.

(a) The existence of a large centre of population in the immediate vicinity of an industrial zone is, for economic operators, a much more important factor than would appear at first glance. While a process of industrialization is not automatically found near all large cities, such locations are usually the most attractive for a variety of reasons, not all of which are economic, to potential industrialists.

However, there are strong reasons for any government interested in stimulating balanced industrial development in all regions of the country to follow a policy aimed at discouraging the establishment of industries near the large centres and at encouraging decentralization.

It may be said that, except in rare cases, the siting of industrial zones near large population centres is not advisable. Two cases may be considered: either it is useless to set up an industrial zone aimed at attracting new initiatives in the vicinity of a large city where there is already a spontaneous process of industrialization; or, if there is need to stimulate new initiatives, it is better to establish the zone at a distance from the larger centres—the question as to how far distant will evidently vary according to the circumstances.

The only logical reason for creating industrial zones near large population centres⁵ is the need to relocate existing industrial establishments in a more rational manner according to sound town planning principles; for example, removal of noisy, dangerous and harmful industries from residential areas; improvement of housing in certain areas; industrial expansion where sufficient space is not to be found within the town, and so on. The most interesting examples of industrial zones or estates which fulfill these requirements are not to be found in the Mezzogiorno, nor

⁵ Apart from "demonstration" industrial estates for small-scale industries.

elsewhere in Italy but, as far as Europe is concerned, in the United Kingdom.

Several industrial zones in the Mezzogiorno are situated near important population centres. The following examples relate to "areas of industrial development":

<i>Industrial area</i>	<i>Population 1964</i> (principal town)
Rome	2,500,000
Naples	1,220,000
Palermo	622,000
Bari	329,000
Cagliari	200,000
Salerno	131,000
Pescara	100,000
Latina	56,000

(b) The establishment of industrial zones in regions whose economy is structurally and traditionally agricultural is certainly a difficult project and, in some ways, a dangerous one in view of the social disturbance that such zones usually produce. An agricultural environment does not by itself constitute an attraction for new industries and there is a risk in investing in infra-structure which is not very productive. The best chances of success would be in localities where there are prospects of processing local agricultural products.

(c) The proximity of industrial zones to important and well-equipped seaports is a considerable attraction for the establishment of certain industries, especially those which receive their raw materials and export their finished products by sea. The proximity of an airport with frequent and regular air service connecting major centres at home and abroad, or the proximity of important highways, are a greater stimulus than proximity to a port.

(d) The presence of tourist attractions near an industrial zone may play both a positive and a negative role. On the one hand, where tourist facilities are well developed they can be attractive to businessmen, quite apart from any economic reason. On the other hand, the interference and possible conflict between industrial and tourist activities are only too obvious. In such circumstances the establishment of an industrial zone is advisable only if the plants are at some distance from the tourist locality so as to avoid such undesirable effects as disfigurement of the countryside, air and water pollution, and the like. The zone should be so located, however, that the factory workers can easily and quickly get to it.

6. PRICE OF LAND AND COST OF LAND IMPROVEMENT AS FACTORS AFFECTING THE ESTABLISHMENT OF INDUSTRIAL PLANTS

What influence does the availability of land, at a reasonable price and provided with infra-structure, have on the decision of entrepreneurs to establish themselves in a certain locality?

The answer to this question is important since it permits some conclusions to be drawn about the limits to the establishment of industrial zones in developing countries or regions on the one hand, and about the suitability of zones in satisfying the real needs of industrial entrepreneurs on the other.

In the Mezzogiorno, because of the autonomy of the areas and nuclei and because of local factors, there are considerable variations in the terms and conditions on which land is offered. Terms and conditions are not only varied, they are often "elastic". For example, in some cases the authorities responsible for industrial zones quote an "official" price and at the same time indicate they are quite ready to bargain or may even offer the land free when it is required for some important industry or one that offers steady employment for a large number of local workers. Such lack of fixed standard prices for land obviously makes it much more difficult to arrive at generally valid conclusions.⁶

None the less, the experience of the Mezzogiorno seems to indicate a number of trends.

(a) As far as industry is concerned, the price of land in zones offering infra-structure facilities equal to those in possible alternative locations does not seem to be a decisive factor in the choice of one or another site. One explanation is that the cost of land usually accounts for a very small part of the total investment of an industrial establishment.

(b) The relative indifference of economic operators to the cost of land is evidenced, in particular, when there is a choice between alternative locations at a distance from each other. As a rule, it is not the cost of the land that influences the decision but quite different factors—proximity to ports, airports, major highways, large consumer markets and to large cities where employees would like to live, and other economic and non-economic factors. On the other hand, if the alternative is between land in industrial zones located close to each other (in the Mezzogiorno this can often be the case since there are 39 such projects for the region), then the smallest difference in the price of land may be a decisive factor. Its importance is often exaggerated: there are actual cases in which businessmen have chosen to put their factories on land belonging to a commune, just

⁶ To give an example of conditions at the time of writing, prices for land equipped with basic infra-structure (roads, electric power, water, sewerage etc.), in nuclei where development did not require much work, range from about \$U.S. 0.50 a square metre in the industrial nucleus of Frosinone about forty miles from Rome, to about \$U.S. 3.00 a square metre in the industrial nucleus of Reggio Calabria.

outside the boundaries of an industrial zone and not a part of it, the reason being that the commune offered the land at 10 cents a square metre less than the industrial zone.

The explanation is partly psychological. Once the choice of a location has been made, the purchase of land becomes a strictly financial matter and even a small saving may appear important to the operator. Moreover, the payment for the land is the first of the expenses the operator has to make in carrying out his construction programme which includes buildings, machinery and so on.

Strangely enough, it happens that in selecting a piece of land outside an industrial zone, because of the small saving afforded, the operator does not take into account more important expenditures he must incur, for example major work and expenditure on infra-structure which would have been furnished to him in the industrial zone on better terms or even without cost.

(c) The existence of different prices and conditions of industrial land in the same area is often a factor which disconcerts and repels the operator who would prefer a fair fixed price so that he would not have to face the problem of selecting one of many plots of land whose characteristics are more or less identical. It would therefore seem to be advisable, wherever possible, to fix standard prices for land or at least to limit alternative prices in well-defined cases.

(d) Propaganda to attract industries when the basic infra-structure is not yet available but is only planned or under construction may be very dangerous and may produce the opposite effect to that hoped for. Quite rightly, the operator is not interested in what the condition of some zone will be in two, three or more years. He wants to know what the position in the zone is now.

(e) When a central or local authority selects a tract of land for an industrial zone, it should take into account the type, ownership and cost of land and the cost of providing infra-structure.

Part of the difficulties encountered in establishing efficient industrial zones in the Mezzogiorno has been due to the fact that *before* setting these up, no consideration was given to whether there was land belonging to the local authorities (communes or provinces), which these could offer free to the consortium responsible for the administration of the zone, or whether—as has happened in a great number of cases—land had to be bought or expropriated from local owners. All this creates serious legal and financial problems and, above all, delays the initiation of the project.⁷

⁷ Because of this lack of consideration, very expensive land had to be expropriated in some areas of the Mezzogiorno, since it had been valued as agricultural land and therefore commanded a high price. This obviously had adverse repercussions on the final cost and hence on the price of the land offered to the entrepreneurs.

7. ATTITUDE OF ENTREPRENEURS TOWARDS INDUSTRIAL ZONES IN THE MEZZOGIORNO ACCORDING TO SIZE OF INDUSTRIES AND ORIGIN OF THE INDUSTRIALISTS

What has been the general attitude of entrepreneurs towards industrial zones in the Mezzogiorno? To answer this question, distinctions should be made according to the size of the industrial undertaking and the origin—local, northern or foreign—of the entrepreneurs.

The attitude of entrepreneurs and managers of large enterprises recently established in the Mezzogiorno is mostly critical, though there are some exceptions. The following are the main criticisms which they make:

(a) The existence of the industrial zone is due to the fact that we established our factories there.

(b) Often our group has had to carry out or finance, at least by advancing the funds, the construction of the indispensable infra-structure which should have been provided as a part of the industrial zone.

(c) We were continually under pressure, either during the time we were building our factories or while we were operating them, to make use of local individuals or businesses. We cannot submit to such pressures because we must run our business on strictly economic lines and in accordance with our own views, without any outside interference.

(d) We cannot concern ourselves directly with the creation and development of small or medium industries around our plant. If such industries establish themselves and can offer us good terms, we can make use of them or sell them our products. Otherwise we will continue to deal with concerns outside the nucleus or area or sell our products outside the territory in accordance with the above-mentioned criteria.

(e) We have no special interest in determining what particular services the industrial zone can offer us, since the very size of our undertakings calls for a high level of self-sufficiency in many operations such as transport, catering, sanitation, maintenance, and so on.

The attitude of medium-sized and small-scale entrepreneurs, by contrast, seems to be favourable to industrial zones. They too, however, have some criticisms to make about certain features which they consider to be unsatisfactory—such as delays in providing the promised infra-structure, deficiencies in some services, difficulties in establishing relations (as had originally been hoped for) with the large industries in the locality, and long-drawn procedures for getting the land assigned to them. Many of them wish there were better and more services over and above the provision of improved land.

The other important distinction in the attitude of entrepreneurs with regard to industrial zones is whether the persons concerned are local entrepreneurs, entrepreneurs from northern Italy, or foreign investors. In general the local entrepreneurs seem to be in favour of the zones and are willing

to settle there—in particular, to transfer existing enterprises there. The local entrepreneurs are almost always small businessmen. The attitude of industrialists from northern Italy varies very considerably, according to the zone in which they are established. Some show enthusiasm for the transfer into the zone, others regret the decision. Their attitudes depend upon differences in the efficiency and standards of organization of the zone. This also affects the attitude of prospective occupants contemplating establishment in a zone. In general, the attitude of foreign entrepreneurs passes through two successive phases. The first is one of disillusionment with the environment, the procedures, the commercial and work customs which are different from those of their country of origin; the second phase is largely favourable, especially because those responsible for industrial zones generally give foreign operators particularly good treatment.

8. NATIONAL AND INTERNATIONAL CO-OPERATION AND TECHNICAL ASSISTANCE FOR THE DEVELOPMENT OF INDUSTRIAL ZONES AND THE ESTABLISHMENT OF NEW FACTORIES IN THE MEZZOGIORNO

The Istituto per l'Assistenza allo Sviluppo del Mezzogiorno (IASM) is an Italian organization which provides technical assistance for the development of industrial zones and the establishment of new industries in the Mezzogiorno.

The Institute was created in 1962 for the following two purposes: first, to stimulate action in Italy and abroad for attracting new industries to the Mezzogiorno; second, to help industrialists in all phases of programming and in setting up their enterprises. IASM has extended its activities by providing assistance to the consortia in setting up industrial areas and nuclei in the Mezzogiorno. It gives them free consultancy to solve their structural, organizational, juridical, fiscal and other problems. It also helps them to co-ordinate their activities on a wide territorial basis, thus limiting irrational competition; to make their propaganda and promotion work more effective in attracting new industries; to improve their relations with entrepreneurs, and so on. In doing this, the IASM does not interfere in any way with the autonomy of the consortia.

IASM is a legal private body, but its aims are eminently public. The organisms with which it is associated and which contribute financially to its operation are public bodies—the Cassa per il Mezzogiorno and the special credit institutions for the industries of southern Italy. It does not operate for profit and its services are by and large free of charge.

There has always been a lively interest in many countries in the experience of the industrialization of the Mezzogiorno and the co-ordinated effort undertaken to achieve it. It is only recently that concrete international collaboration has been given to this effort. Financial assistance in the form of loans, either from the World Bank or from the European Invest-

ment Bank, has been a real contribution to industrialization. These loans however have always been single individual investments for some specific works in the Mezzogiorno, some of which are in the industrial zones. This purely financial assistance has had no influence on the methodology of the industrialization process and much less on its concentration through industrial zones.

One international co-operation project which aimed, among other things, at localizing part of the industrialization process was begun some years ago in Sardinia through the establishment of a so-called "pilot-zone" for integrated development. It was carried out chiefly as an experiment by OECE (now the Organisation for Economic Co-operation and Development). But the most consistent results of this experience—which are still valid today—have been more in the artisan sector than in that of industry proper.

Quite different is the present programme undertaken under the sponsorship of the European Economic Community for the creation in the Mezzogiorno of a real "development pole" in the Puglia region. A consulting group, Italconsult Company, carried out a thorough study in which all the resources and geographical and socio-economic characteristics of the "pole", which comprises the three major centres of Bari, Brindisi and Taranto, were fully examined. A certain number of "motive" industries which could be profitably located within the pole were selected. For each industry, a detailed programme was drawn up which sets forth the fundamental economic and technical factors on the basis of which entrepreneurs may arrive at well-considered judgements. A practical search has been carried out on an international scale by the interested industrial groups to implement the programme, and its transition from the study to the operational phase is imminent.

This is the first practical industrialization experiment to be carried out in the Mezzogiorno with international support. At present it is too early to make a forecast of its results, but these will certainly be of high value for developing countries all over the world.

9. CONCLUSIONS

The experiences, both positive and negative, gained in the industrialization of the Mezzogiorno may provide some lessons to countries with similar economic and social conditions. Though adaptations and modifications are necessary on account of the extreme variety of local and regional situations, some conclusions drawn from these experiences may be valid elsewhere.

These conclusions and suggestions, some of which have been alluded to earlier, are summarized below.

Relations between political and industrial circles

The establishment of industrial zones requires technical and economic action which, to the maximum extent possible, should be free from political interference. It is only too true that in many developing countries—and even in the more advanced economies—there is a tendency for politics to be unduly mixed up with economics. This is often the case as regards the organization and operation of industrial zones.

It is hardly necessary to say that such a situation should be avoided wherever possible. Industrial zones should be built and operated without political pressure or interference, on the sole basis of technical and economic criteria. Only thus can one be sure that the zones will gain and maintain the confidence of both local and outside operators. Such confidence is indispensable if the estates are to achieve their objectives.

Naturally this does not mean that the industrial zone should be a kind of "state within a state" as far as its organization and activity are concerned—that is, an entity not subject to general political direction. But it does mean that central and local political authorities should not in any way impinge upon the structure and operation of the zone.

Number of zones

Attention has already been drawn to the undesirability of a proliferation of industrial zones in the Mezzogiorno. One cannot overly caution against proposals to increase, often as a result of irrational political pressures, the number of industrial zones in a given area. The number of zones can be reasonably arrived at only on the basis of surveys of the special situation in each country or region, such as the extent of the territory, the possible alternative sites in relation to natural resources, major communication networks, and so on. It may often be preferable, within certain limits, to risk rejecting some quite productive project rather than to invest in infra-structure and create superfluous organisms which only confuse and discourage the operator without helping him to make his choice.

Choice of location for industrial zones

It is impossible to dictate *a priori* the theoretical and absolute criteria for the choice of location of industrial zones. It is better, at least in the beginning, for the governments and agencies concerned to try to conform as far as possible to the natural tendencies of industrial concentration than to attempt to force the preference of the operators, except in obvious cases where this may result in economic, demographic and other distortions. If, for example, entrepreneurs show a clear preference for a certain large population centre, an attempt should be made to set up an industrial zone, certainly not in the urban perimeter of such a town—this might cause insuperable problems of town planning—but not too far away.

The situation is naturally different when there is more than one zone and when there is a stated intention to scatter industrial location, or when alternative locations are suggested by the existence of certain raw materials, such as mineral and agricultural products, or by the availability of power in the neighbourhood. In such cases some amount of "compulsion", disregarding the spontaneous preference of the entrepreneurs, is advisable. This may succeed, however, only if—in addition to land with basic infrastructure—certain other indispensable services are offered such as workers' housing, shopping centres, schools, and the like. In the absence of these, the economic advantages of establishing industrial enterprises would run the risk of being cancelled out by fairly serious social disadvantages.

Choice of administrators and managers of industrial zones

When choosing the men responsible for setting up and operating industrial zones, it should not be forgotten that the tasks they have to perform are extremely delicate and the problems facing them—legal, economic, technical, and organizational—are very complex. Experience shows that the success of an industrial zone lies fundamentally with the choice of the men who will direct it. In Italy, selection has frequently been influenced by political considerations and the importance of appointing competent persons has not always been given due weight. This matter has been so strongly felt in Italy that it has been the subject of a circular in 1964 from the President of the Committee of Ministers for the Mezzogiorno. This emphasized the necessity for consortia which are public bodies to use their autonomy by being especially careful to entrust responsible posts to technically qualified men who are aware of the novelty and new spirit which inspires the legislation for the Mezzogiorno. In other words, the consortia must avoid the harmful mistake of putting at the head of organizations which have to perform fundamental duties of promotion and management requiring technical and economic knowledge men who may be illustrious in other fields but who do not have the specific qualifications for such tasks.

It may be said that only rarely have men with special industrial experience been appointed in the industrial zones of the Mezzogiorno. This has been a negative factor which in some cases has had important repercussions, since the public officials and politicians who have generally been made presidents and directors of industrial zones have not always shown that they possess the required ability, competence, energy, and independence of judgement. A close contact with the world of industry—whether in the private or the public sector—seems therefore to be most advisable.

The need for additional facilities to promote industrialization

The experience gained seems to show that the establishment of industrial zones offering improved land on good terms is not in itself sufficient, except on rare occasions, to bring about an effective concentration of fac-

ories and to attract new initiatives from outside. To achieve this, the following considerations should be taken into account:

(a) Industrial zones would function more effectively if medium-scale industries badly sited in nearby localities and wishing to expand were transferred to the zones;

(b) Industrial zones would stimulate the establishment and modernization of local small-scale industries if, apart from land and infrastructure, essential services were offered, especially ready-to-use standard factories and industrial extension services;

(c) Industrial zones would effectively attract new initiatives from other regions or from abroad if competition by other communes or territorial bodies offering zones, sites and other inducements, were appreciably reduced, and if special advantages, such as tax concessions, credit facilities and other incentives were made available exclusively to the industries which establish themselves on the industrial zone.

In the absence of some or all of these conditions, it is unlikely that the establishment of industrial zones of the traditional type would be sufficient to induce a steady flow of new industries from outside into the zones, especially today when international competition is on the increase.

Legal and financial structure of the zones

It has been mentioned earlier that in the Mezzogiorno the consortia setting up industrial areas and nuclei are public entities organized in collaboration with local territorial bodies—communes, provinces and in some cases regions. In the north of Italy there are privately-sponsored zones. In other countries, the organization of industrial estates, parks and areas varies considerably: some are privately-sponsored, profit-motivated ventures; others are private but seek objectives of public interest and are usually closely linked with the competent public administrations; some private companies have investments guaranteed by contributions and long-term loans from ministries which exercise various kinds of control over the estates, even to nominating directors and so on; some estates have a mixed (public and private) organization; others are purely public bodies.⁸

The following conclusions are suggested by the experience in the Mezzogiorno:

(a) Public sponsorship and organization have some advantages (in particular the fact that the zone does not serve the special interests of some individual enterprise) but also some important disadvantages such as the possibility of local or central political interference, dead-weight of bureaucracy, lengthy procedures and the like.

⁸ See United Nations (1966), *Industrial Estates: Policies, Plans and Progress—A Comparative Analysis of International Experience* (66. II. B. 16).

(b) Zones sponsored by private companies working in the public interest might often be a good formula.

(c) Financing of the zones should not be limited to land acquisition and infra-structure work but should also be made available for management expenses.

(d) Especially in a developing region, it is very unlikely that sufficient financial resources would be available locally—at least for infra-structure work; consequently, the financial intervention of the State is almost inevitable.

(e) When the State finances the whole operation however, in particular through grants, there is a risk of perpetuating or aggravating the tendency to wait for outside help, an attitude which is so common in depressed areas. Since the conscious and active participation of local interests is indispensable, it is useful, whenever possible, to provide at least a part of the funds needed by the zone in the form of low-interest, long-term loans for which the management of the zone would be responsible and which should be repaid out of revenues coming from the operation of the zone.

Propaganda to attract new industries to the zones

When there are several industrial zones in a country or region, care should be taken that propaganda in the country or abroad should not be undertaken by any one zone on its own. Publicity should be co-ordinated between all the industrial zones to avoid confusing the entrepreneurs.

Any form of propaganda to attract industries to a given zone—publications, pamphlets, leaflets, meetings, contacts with operators by mail or in person, conferences and so on—should contain information on the characteristics of the zone such as geographical position, proximity to highways, technical and economic advantages, existing infra-structure, resources of power, raw materials, skilled workers, training schools and so on. If possible, information should be given on the industrial enterprises already established and the productive sectors which would seem to be most suited to the zone. Above all reference should be made to the markets on which the products may be sold. General information is useless and has an effect contrary to that hoped for. The special advantages, existing or potential, in the country or region and which apply to the enterprises setting up in the zone should be stated realistically, so as to avoid creating illusions or making promises that cannot be fulfilled.

Propaganda will be all the more effective if concrete projects are thoroughly worked out for specific industries which could be set up in a zone; such projects could be submitted to local, national or foreign groups already operating in that particular industrial sector. These projects can be prepared without excessive cost when they concern small-scale and medium-sized enterprises, but not large industries.

Promotion of small-scale industries

Many small-scale industries are characterized not only by their structural and organizational weakness but also by the strong individualism of their owner-managers, a factor which makes it difficult for these businessmen to collaborate with other industrialists, even though there is great need for such co-operation. A fully-equipped industrial estate offers good opportunities for overcoming these disadvantages. It enables small enterprises to benefit from a rational organization of their productive activities and from co-operation with other enterprises in the same or connected sectors. Some of the more important features of such an industrial estate are:

(a) Construction of "standard factories" or blocks of industrial buildings with individual units separated by easily removable prefabricated partitions.

(b) Provision of common productive services, such as warehousing, repair shop, test laboratory, joint use of machinery, rental of machinery, specialized training for workers, for small and medium industries.

(c) Provision of equally important ancillary services such as transport, catering, crèches and schools for the workers' children, meeting halls and clubs, health centres and so on.

(d) Provision of common services for the commercial operations of small-scale industries, such as joint exhibitions of products, joint publicity and salesmen, common procurement and so on.

(e) Advisory services on technical, organizational, commercial, financial and legal matters, and tax consultancy.

An almost unlimited range of facilities and services of this type may be provided in industrial estates. As a rule not all the necessary services can be provided from the outset, nor is it advisable to do so without having first carried out surveys of needs and possibilities, and without having explored the potential for co-operation between industries. It is certain, however, that the grouping of a number of enterprises in the same locality and in rationally designed buildings, apart from other obvious advantages, can facilitate co-operation between individual productive units. Today, such co-operation and/or provision of services and assistance which small enterprises cannot provide for themselves are fundamental conditions of their development, especially in developing countries.

Such services are useful not only for small-scale industries but also for artisan industries. In many developing countries where artisan activities are common, industrial estates could set aside special space and buildings for them.

In this connexion it should be noted that small industries and artisan workshops situated in the central zone of cities are frequently irrationally organized, unhygienic and have to meet high costs and rents. The transfer of such workshops into industrial estates offering decent accommodation

at a modest price can often be the only means of eliminating factory problems in the city.

Complementary relations between large and small industries

Reference has already been made to the technical, organizational and psychological obstacles to the establishment of complementary relations between large and small industries. It may be of interest to mention a step which has recently been taken, as an experiment, in the Mezzogiorno. It is the formation of what is called a "sub-contractors' exchange", on the model of those set up in France and in some other developing European countries, such as Spain and Greece. An exchange is basically an information centre which can be used by all industrial enterprises—especially in the engineering sector—of a certain territory for placing and receiving orders for the supply of mechanical parts or for the use, for a number of days or hours, of certain machinery.

The exchange facilitates the establishment of subcontracting relations between small and medium enterprises and, whenever possible, between small and large enterprises. The experiment under way in the Mezzogiorno is conducted by the consortia sponsoring industrial zones in certain regions, in particular in the Puglie. It is intended to promote closer and continuous relations between enterprises established within and bordering on the estate.⁹

⁹ A comprehensive study of subcontracting as a means of promoting small-scale industries in the developing countries will be published by the United Nations in 1969. [Editor's note.]

PART V

*The Role of Industrial Estates, Areas and Zones in Providing an Industrial Base in Urban and Regional Development Plans**

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by the Department of Economic and Social Affairs (1961, 1962b, 1965, 1966), and through the holding of regional seminars in the Far East and in Africa. Not only did the Seminar on Industrial Estates in the Region of the Economic Commission for Asia and the Far East provide guidance in the form of a series of recommendations, but it assembled the most comprehensive collection of case studies, surveys and data on industrial estate programmes undertaken in the countries of that region and in some industrial countries of other regions (United Nations, Department of Economic and Social Affairs, 1962a).

Until now, attention has been focused principally on the industrial promotion function of estates and on their physical design rather than on their role in connexion with urban and regional development planning. We shall attempt here to synthesize the most important aspects of industrial estates, areas and zones as seen from the vantage point of urban and regional development policy, keeping in mind that their principal purpose, especially in developing countries, is to advance the process of industrialization.

Thus, industrial estates form part of two systems: they have to be considered simultaneously as elements of urban and regional planning and as elements of economic and industrial development. The understanding of these relationships is fundamental and they will be discussed in greater detail in the following section, pp. 139-146.

The thesis of this paper is that industrial estates, areas and zones can make a significant contribution, but only as one of many co-ordinated elements of urban and regional planning, in providing an industrial base for development and in guiding industrial location. The role which they can play depends entirely on a combination of factors which must be considered jointly and inseparably, namely:

- (a) The broad framework of national economic and industrial development policies;
- (b) The general goals of urban and regional development policies;
- (c) The specific objectives which are intended to be achieved by industrial estates;
- (d) The constraints imposed by the characteristics of the urbanization process and of urban areas and the criteria of urban and regional planning;
- (e) The types of industries to be served and their characteristics in terms of locational, land, facilities and service requirements;
- (f) The types, characteristics and requirements of industrial estates to be established;
- (g) The supplementary and accompanying urban planning measures to be taken in conjunction with the establishment of industrial estates.

1. INDUSTRIAL ESTATES, AREAS AND ZONES AS ELEMENTS OF URBAN AND REGIONAL PLANNING IN THE CONTEXT OF NATIONAL ECONOMIC DEVELOPMENT

Characteristics of industrial estates, areas and zones

An *industrial estate*² is generally defined as a device by which—on a large suitable tract of land and under a single or unified development and management—provision is made, on a rental, lease or sales basis, for the establishment and operation of individual industries: that is, sites, serviced by streets and utilities, including often, but not always, industrial buildings, and a range of common services, whose variety depends on the needs of the industries and on the management decisions of the estate. The management operation, especially in developing countries desiring to promote industrial growth, may consist of a variety of aids to industries, such as initial financing, subsidies, common services, publicity and promotion and technical assistance in the production and marketing processes. For detailed definitions of industrial estate concepts, see W. Bredo (1960) and United Nations, Department of Economic and Social Affairs (1966). Another characteristic worth mentioning is that industrial estates select the industries to be admitted to the estate in accordance with certain criteria and subsequently maintain certain controls to assure harmonious development and to prevent nuisances or other negative effects of individual industries. Thus—and this is fundamental—the term industrial estate refers simultaneously to three aspects: the physical facilities (land, buildings, streets, utilities); the common services which are provided; and the institutional mechanism of development and continuing management and operation of the estate.

Within this broad definition there are many types of industrial estates. The size of the estate, its location, the nature of common services, the amount of direct or indirect subsidies or inducements to be provided, the types of industries to be admitted, the controls to be enforced, whether buildings are to be put up and what kind, and many other factors, will depend on the purposes which the industrial estate programme is intended to accomplish. Different types of industrial estates are described by the United Nations, Department of Economic and Social Affairs (1961 p. 33) as follows:

“An industrial estate can be the centre of an industrial city or of an area of industrial development, or a modest cluster of small industries and handicrafts in a rural locality. It may be a landscaped park or a utilitarian tract. It may be zoned for heavy or light industries, or both, or reserved for certain specific industries or ancillary enterprises working as sub-contractors for large concerns.

² Industrial estates are called industrial parks in the United States; sometimes the term “industrial district” is also used.

It may offer improved sites, custom-built factories, or general-purpose factories, or any combination of these features. It may provide a variety of services affording economy and convenience to the industrial occupants."

An *industrial area*³ is a piece of land purchased by a developer, whether private or public, and subdivided into improved industrial building lots, usually of varying size, which are sold or, in some cases, leased to individual companies or industrialists desirous of setting up industries. An industrial area or subdivision can be defined essentially as a real estate operation.

Industrial zones are merely areas of land or parts of the city which have been designated or zoned officially for industrial use.⁴ Such official zoning is essentially regulatory in nature and usually implies certain controls over land use, type of industry, density and other requirements. Such zones may already be occupied fully or partly by existing industries, they may consist of vacant land which may be improved or unimproved, and there may be other uses such as residence or commerce present or permitted in industrial zones.

All three devices—industrial estates, areas and zones—exert varying degrees of influence over the location of industry, and provide varying degrees of developmental stimuli, but fundamental differences exist between them. The distinction between industrial estates and industrial areas is that, in the former, there is not only an initial developmental function of providing land, building, utilities and services, but the estate manages the operation on a continuing basis and provides additional services which act as incentives to the establishment of industries. In industrial areas, the initial development function is limited to the subdivision and improvement of land, and the operation terminates with the sale of industrial lots. If the sale is made at cost or on a limited profit basis, industrial areas can be considered as a limited aid to industries. In the case of industrial zones, there is no developmental function and the action is merely regulatory, stating where industrial location may or may not take place.

Thus the selection of each of the above devices or a specific mix of them will depend, at least in part, on the degree of incentives considered

³ Industrial areas are often referred to as industrial subdivisions, and in the United States are frequently not distinguished from industrial parks.

⁴ There is frequent confusion about the term "industrial zone". As used in this paper the term designates a piece of land or a district legally zoned for industrial use. In other instances the term is used merely to describe an area in which industry has located. In Italy industrial zone is used to define a tract of land provided with infrastructure which may be located either in an "area of industrial development" which is a relatively large area of up to 25 km radius, including one or more population centres with a total of at least 200,000 people, or in an "industrial nucleus" which is a development area of smaller size. See United Nations, Department of Economic and Social Affairs (1962a) chapter on "Some Controversial Questions Concerning Industrial Estates".

necessary to assist industrial development (small industries usually requiring more help than large ones) and to induce industry to establish itself in locations, such as in smaller towns, which it would not seek on its own whereas large metropolitan areas tend to be spontaneously attractive to industry.

Whereas industrial zoning always implies governmental regulation, in several countries industrial estates and areas are established also by private enterprise, motivated by profits. Since we are here concerned with the promotion of industrialization and with guiding industrial location in the interest of economic and social development, we shall consider industrial estates and areas as tools of governmental policy rather than as private enterprise undertakings.

Industrial estates, areas and zones are intended to influence, through regulations or through positive developmental measures, locational and investment decisions of industrial entrepreneurs, for whom the determining motive is profitability and efficiency. Consequently, one of the principal criteria for the employment of these devices and of the tests of their efficiency is whether they will satisfy the demand and need of the customer—in this case the industrial entrepreneur.

Contribution to goals of national, regional and urban development

W. Bredo (1960) and the United Nations, Department of Economic and Social Affairs (1961, 1962a, 1962b, 1965, 1966), have written on the benefits which may be derived from industrial estates and on the limitations which should be taken into account.

Many advantages can be obtained by the public sector as well as by the private entrepreneur from a combination of such devices as industrial estates, areas and zones. These permit advance acquisition or reservation of suitable land for industry, concentration of development in suitable locations and on suitable sites, large-scale unified development of industrial land, services and facilities, co-ordination with other elements of urban development, continuing management and technical support operation, combination with fiscal and other incentives, and some controls over unplanned haphazard industrial location.

In summary, experience both in developed and in some developing countries shows that if properly used, industrial estates, and to a lesser degree industrial areas and zones, can, in conjunction with other measures, promote industrialization, guide industrial location and contribute substantially to the following commonly enunciated goals of urban and regional planning and of national economic and industrial development:

- (a) Contributions to economic and industrial development:
 - (i) Promote more rapid industrialization of the country;
 - (ii) Increase national and local industrial employment;

Criteria for examining the role of industrial estates, areas and zones

If industrial estates are to be evaluated in terms of their contribution to the attainment of a specific goal or set of goals, some of the following specific criteria need to be applied:

(a) Does an industrial estate contribute to the goal better than some other urban planning solution or form of investment?

(b) If so, what type of industrial estate is preferable and under what conditions?

(c) Is the cost or expenditure commensurate with the benefits or desired results?

(d) Does the industrial estate produce any undesirable or negative by-products?

(e) What external conditions must be satisfied in order that an industrial estate can contribute effectively to the accomplishment of the goal and so that negative by-products can be avoided?

(f) Does the industrial estate satisfy the needs and demands of the industrial entrepreneurs for whom it is intended?

Unfortunately, these important questions can only be answered on a speculative and general basis as there are little empirical and factual survey data available to evaluate the performance of industrial estates and the effectiveness of such programmes undertaken in different countries. Most of the literature on this subject is hortatory in nature, proposing guidelines, standards and criteria but evaluating only in the most general terms the consequences of industrial estates programmes and their successes or failures. Some studies, however, such as those by C. M. Brown (1966, pp. 15—18), C. D. Rogers (1961), and the United Nations, Department of Economic and Social Affairs (1962b, 1966), give more detailed information. Much could be gained if governments evaluated their industrial estate programmes and if a comparative analysis of national programmes were undertaken on the basis of these evaluations and other material.

2. LAND AND FACILITIES FOR INDUSTRY: A NEGLECTED PROBLEM

Industrialization as a joint goal of urban planning and economic development

It has been recognized by now that, in developing countries the rate of industrialization, with few exceptions, is lagging behind the rate of urbanization, and that the economically active population is growing faster, especially in the large cities, than the number of jobs (particularly industrial jobs) which are being created. It is true that new industries,

especially footloose or market-oriented industries, are also attracted in increasing numbers to the larger urban areas for many well-known reasons, but new industrial jobs are lagging far behind the population explosion concentrated in a few metropolitan areas. C. Bauer (n. d.), for example, has noted that:

"...many of the nations of Asia today have a larger urban population than is justified by their degree of industrialization or general economic development, as measured, for example, by the proportion of their population engaged in non-agricultural occupations. In terms of employment in productive industry, the gap (between Asian and Western countries) is still greater, as the high proportion of urban "service" jobs in Asia is a reflection of economic lag, not of progress as in the West" (p. 7).

J. P. Powelson and A. A. Solow (1965) reported the same trend in Latin America:

"In Latin America urban population increased by about 30 million during the last decade, from sixty-five and a half million to almost 96 million people, and is expected to increase by another forty-two million to a total of 138 million by 1970, or double that of 1950. This represents an annual growth of between 4 and 5 per cent as compared to a rural growth rate of only 1.5 per cent, and a total population growth of about 2.5 per cent to 3 per cent."

At the same time smaller towns are stagnating or losing population because new industries do not settle there, and, consequently, new industrial jobs to absorb or attract the labour force are non-existent.

The economic base of urban areas depends principally on the provision of industrial employment in reasonable proportion to the population, since each industrial job supports additional numbers of jobs in services. H. McKinley Conway, Jr. and F. H. Stedman, Jr. (1961) have shown that 174 additional persons were employed for every 100 workers employed in a new plant. In the chemical industry the multiplier effect of every new job was 2.6. In the United States, Department of Commerce (1962, p. 1), a more conservative ratio of 0.4 secondary jobs for each primary job was used. Naturally, the magnitude of such multipliers will depend on many factors and will vary from country to country, from city to city, and from industry to industry.

In addition to employment, a new industry brings many other benefits to a community. An increase in *per capita* income can be expected not only from the wages paid, but also as a result of industry's purchases in the community and the general stimulus to commercial and service establishments. Increased tax revenues can also be expected. Thus, the provision of additional industrial jobs, and especially the attraction of "export" type industries through a programme of industrialization, becomes

a major goal not only of national economic development, but of urban development planning, especially at the local level.

The importance of land and urban infra-structure facilities for industrial development

From the point of view of the industrialist, as well as in terms of the development of the urban area, one of the most important components in facilitating the establishment of industries is an adequate supply of land of suitable quality and quantity, properly located, adequately serviced by transportation systems and utilities, reasonably priced and readily obtainable for industrial use. Land that meets all those qualifications is called prime industrial land. There is much demand for it and there is precious little of it in most urban areas. A more detailed discussion on the supply of industrial land may be found in section 4 of this paper, pp. 166-8.

The industrially developed countries, and especially their urban communities, have recognized for some time now that suitable land and physical facilities for industry are essential inducements to attract industrial growth, and such concepts as industrial estates, industrial zoning and comprehensive planning of land and physical facilities for industry have become an accepted part of urban and regional planning.

In some countries such as the United Kingdom, the control over industrial location and the provision of industrial estates in new towns constitute policy at the national level. In the Union of Soviet Socialist Republics a similar situation prevails. In the United States, industrial land and facility planning is carried on by planning offices of local government, often in an endeavour to compete with each other for the attraction of industry.

In practically all developing countries industrialization programmes are being pushed vigorously, and various types of financial and economic incentives such as tax exemptions, import duty reduction and technical assistance are being provided. But only recently, and only in a limited number of cases, has it been recognized by governments that the provision of land and physical facilities, especially the establishment of industrial estates, is—in combination with other economic and financial incentives—an important factor in attracting private capital investment in industrialization and in facilitating the establishment of industries.

Puerto Rico has been notable in including the consideration of land and facilities in its overall industrial promotion programme to attract capital from the United States. India has established and implemented a national policy of industrial estates with the goal of promoting small local industries in rural and urban areas. The United Nations, Department of Economic and Social Affairs (1962a), has indicated that a number of other Asian countries have started to pay increasing attention to industrial land

and facilities in urban areas. In Latin America an increasing number of feasibility studies for industrial estates have been made by P. F. Castaños (1964), K. E. Duke et al. (1964), R. Risso Patrón (1962) and the United States, National Urban Planning Office and A. A. Solow (1961). According to the reports of H. C. Adley (1964) and of the United Nations, Department of Economic and Social Affairs (1965), interest in industrial estate development is growing also in African countries.

In spite of these laudable efforts, it is safe to state that not nearly enough attention is being paid to the problems of land and facilities for industrial development in the rapidly growing urban areas of developing countries. One of the reasons for this may be that these efforts, and especially the establishment of industrial estates, have been in the hands of special national or sometimes local agencies, directly responsible for industrial development programmes. Yet these same agencies have had little control over land use planning and other developmental aspects of urban areas, such as the overall provision of economic and social infra-structure, which is essential in order to attract and facilitate industrial development. On the other hand, in most cases the authorities actually responsible for urban planning, whether at the local or national level, have done very little from the overall urban development point of view to assist industrial development through any form of industrial land and facility planning or through the provision of an adequate and properly located supply of industrial land. In many instances urban planning agencies are non-existent, or where they do exist, their programmes are ineffective. It would seem that, especially in most developing countries, the national governments have given little priority to the planning of the over-all development of urban areas, and that local municipalities have not had adequate powers and resources to cope with their urban development problems. The United Nations Department of Economic and Social Affairs (1962b, p. 3) has succinctly defined this problem by stating that: "urban and regional planning considerations have so far played a very small role not only in the industrial estate projects but even in the large-scale industrialization programmes of a number of less developed countries".

Existing problems

The problem of industrial land has, in consequence, been greatly neglected and many unfavourable physical, social and economic conditions are developing in connexion with the establishment of industries in urban areas. The following generalizations can be supported by many specific examples:

(a) The supply or availability of prime industrial land is usually limited, especially in cities of developing countries which have severely limited provision of utilities and services.

(b) This limited supply of good industrial land, if now specifically preserved for industry—and generally it is not—is being whittled away by other competing uses which may be of lesser importance for economic development than industry.

(c) As a consequence, industry is forced to pay exorbitant prices for land, and uses up its precious capital for that purpose, remaining with insufficient working capital.

(d) Moreover, industries are forced to select locations haphazardly wherever they can find them, thereby creating numerous problems for themselves and for the urban area.

(e) The haphazard dispersal of industries in the metropolitan area forces the municipalities to extend highways, water supplies and other urban infra-structure in an uneconomic way, thereby creating excessive financial burdens in the public sector at a time when economies and efficiency should be of the essence.

(f) Uncontrolled location of nuisance causing industries adversely affects the adjacent areas and may depress property values.

(g) On the other hand, by excessive separation of industry from residences, an additional burden is put on the already inadequate transportation system and congestion of traffic is magnified.

(h) Lack of urbanistic controls encourages the formation of slums around newly established industries.

(i) Sometimes industries use land which should be reserved for other uses from the community's point of view.

*The requirements of industry with regard to location, land and
infra-structure*

One of the most critical factors in the effective use of tools such as industrial estates is a thorough understanding of the requirements of different types of industry with regard to location, land and infra-structure. We are dealing here with the demand factor. The location decisions of industries have been studied a great deal, and research on this subject is being carried on constantly. As a result, various models for industrial location decisions have been developed at the regional and local level. Yet in practice, many mistakes have been committed in the location of industrial estates and other facilities for attracting industries, and many failures could have been avoided by a more realistic understanding of the factors which influence industrial location decisions and other requirements for successful industrial establishment.

W. Bredo (1960, p. 45) draws particular attention to the dangers of poor site selection which does not take into proper account the requirements and desires of the industrialist, and he cites specific cases of mislocation of industrial estates.

C. Rapkin (1963, p. 27) has drawn attention to the fact that industrial location requirements are constantly changing as a result of: (i) technological changes in transportation, production and management; (ii) economic, social and behavioural changes in terms of consumer markets; and (iii) other forces which reorient the location choices of new industries, or which force relocation decisions of existing industries due to locational, site, physical or structural and functional obsolescence.

Changes in transportation systems are playing a particularly significant role in the location of industrial estates. Increasing preference is shown for proximity to highways as against railroads, especially at interchanges (entrances and exits) to freeways. Air transportation for certain types of goods, and especially for passengers, is becoming an increasingly significant factor in location, at least in the United States where there are some 35,000 private planes owned by American businesses. Industrial estates are being set up in combination with airstrips—sometimes called airports—so that executives may be spared the time-consuming and bothersome trip to and from public airports. *Time* (1965) reports that about 200 such complexes are being planned or built. Such industrial airport sites are particularly attractive to manufacturers of light, high-value products and to research and development firms. Thus industrial estates are being developed next to major airports, such as the one in Shannon, Ireland, which was started in 1959. According to P. D. McGovern (1962) nine firms were in production by 1962 and over 1,000 persons were employed. A new town was planned west of the industrial estate. Smaller cities in the United States, bypassed by the trans-continental jet, utilize the airport as a way of attracting new light industry. La Crosse, Wisconsin, is cited by *Time* (1965) as an example of a hundred-acre industrial park being built next to the municipal airport.

An analysis of the location of, and demand for, industrial land must consider two aspects for each type of industry: (i) macro-decision—the desired location within the country and region; and (ii) micro-decision—what specific site to choose within the generally selected area. Both aspects are, of course, inter-related.

With regard to macro-decisions, it can be expected that major industries connected with the processing of agricultural products and raw materials will continue to locate in a dispersed fashion close to the sources of raw material. Industries such as apparel, textile goods, leather and leather goods, plastics, rubber goods and certain other articles, especially export goods, have characteristics which do not require plant locations at sources of raw materials or major markets, but rather at locations which show strong transportation linkages, especially highway and port locations (railroads are becoming increasingly less important, except for bulk and heavy weight products such as agricultural and other commodities). Certain other industry groups appear to be tied to locations in or near major urban areas: food products, furniture, printing and publishing, metal

products, scientific instruments, research and development, and some stone, clay and glass industries. Some of these industries require a skilled and diversified labour market, some require inter-industry and service linkages, and some are consumer market oriented; all of these conditions are to be found only in large and rapidly growing urban areas. Finally, there are industrial complexes which depend heavily on inter-industry linkages, such as petro-chemical, steel, heavy machinery and automobile manufacturing complexes.

The general trend due to technological changes in production, transportation and communication seems to be towards a more flexible pattern of industrial location, so that more and more footloose industries that are not definitely tied to specific location advantages have increasing locational choices, given an adequate transportation and communication network.

Yet, why is it that many footloose industries which could locate in any urban community choose to move to the major metropolitan centres? One reason, of course, is that the smaller urban communities often lack such utilities as electric power, water and other infra-structure facilities essential for an industry. But even where these facilities are present, survey after survey has shown that industrialists often prefer to move to a large metropolitan area. They are attracted by the totality of urban conditions, facilities and services, and especially by satisfactory living conditions in terms of many alternative choices within the urban area for the managerial and technical personnel and their families: cultural, educational, health and recreation facilities, shopping, banking, professional services, adequate housing, to mention only a few. In fact, when these conditions are present in their totality, individual negative factors such as higher costs of land are often overlooked. Thus, other economic and technical conditions being equal, and within limits of cost-benefit analysis, there are other considerations, often of a non-economic nature, influencing locational decisions. For example, in an analysis of Ciudad Guayana in Venezuela, L. Rodwin (1965, p. 14) states:

“Still another implication was the need to set a fairly high priority on the provision of facilities which would attract key managerial staff as well as skilled professionals and workers. The calculus of cost and benefits could not be precisely formulated at the time. But the weight of opinion was that good schools, well designed neighbourhoods, improved communication, recreation and shopping facilities and an attractive urban setting would help to reduce labour turnover . . .”

In a publication of the United States Department of Commerce (1961b, p. 5) a manufacturing executive declared: “...when, checking a locality for possible plant sites, management has an eye as much on the quality of parks and school maintenance and on how effectively peak-hour traffic conditions are handled as on markets for its products”.

The United Nations, Department of Economic and Social Affairs (1962a, p. 29), summarized the importance of social overhead in location decisions as follows:

"In selecting the location, account had to be taken of the availability of housing, public transportation, schools, hospitals, etc., and of the prospective increased demand for such facilities resulting from the occupation of the estate. The Seminar considered that the availability of a minimum of social as well as economic overhead facilities was in most cases a prerequisite for the establishment of an estate in a given location. Demand for most of them would increase from the earliest stages as a result of the rise in employment and income induced by industrialization."

Once a region or urban area has been selected, factors which influence (at the micro level) the siting decisions in connexion with the establishment of a new industry are the availability of a sufficient quantity of prime industrial land and the possibility of taking advantage of external economies. The desire is usually to locate as close to the urban centre or sub-centre as possible in order to benefit from such external services as banks, post offices and other service facilities, provided that these benefits are not outweighed by such disadvantages as excessively high cost of land, traffic congestion, lack of parking and so on.

A survey of a growing metropolitan area in a developing country showed that not a single firm wanted to relocate further than 7.5 miles from the boundary of the city, and that, in fact, as many firms wanted to relocate closer in as wanted to move further out. According to the report published by J. Latta (1964, p. 27), all firms wanted to relocate within 25 minutes driving time from downtown. According to the survey conducted by the United States, National Urban Planning Office, Ministry of Development and Public Works, and A. A. Solow (1961, p. 53) at Managua (the capital of Nicaragua, with a population of about 250,000), the large majority of industries established or relocated during the five years previous to the survey were within 7.5 miles from the centre of the city, and the majority of industrialists interviewed indicated a preference of 2 to 3 miles from the centre, giving as the principal reason, the lack of transportation, especially for office personnel, and of housing for the employees beyond these distances.

The same survey noted that the majority of workers either walked to work or used bicycles or buses. But there was a problem for office employees, especially for the females: practically none of them had private cars and refused to take public buses which they considered unsafe and uncomfortable. Industrial establishments located too far from the city had the additional cost of providing their own transportation for such employees. In such situations industrial estates could provide their own transportation for several industries at lower costs than individual industries. Thus, while in more developed countries larger ownership of automobiles and increased mobility permits more extensive decentralization

of industries within a metropolitan area, and the distance between place of employment and employee residence is less important, in developing countries proximity to workers' housing or adequate public transportation become critical factors in site selection and limit the locational choices of some industries.

Occasionally a pleasant environment for the factory will be sought and paid for, but in other instances, especially where initial capital is limited, amenities are overlooked and operations are started on a shoe-string basis in locations which provide no luxuries but only bare essentials for the minimum amount of investment and operating cost. This is particularly true of small local industries and should be taken into consideration where the goal of industrial estates is to promote small-scale industries. While these industries often operate in highly deficient quarters, and while their efficiency and productivity could be increased through larger and better physical facilities such as can be provided by industrial estates, it has been pointed out that these advantages might be off-set by the tendency of industrial estates to provide facilities on too luxurious or too lavish a scale, at a cost which represents either an excessive load on small individuals or an unreasonably high subsidy by the government providing such facilities. This danger has been pointed out in an article by the International Labour Office (United Nations, 1962), which discusses comprehensively to what extent labour and management in small industries may be affected by industrial estates.

Other factors being equal, the initial cost of land and its improvement in terms of access roads and utilities is an important consideration for the industrialist. In a survey of industrial establishments in Managua, which was conducted by the United States, National Urban Planning Office, Ministry of Development and Public Works, and A. A. Solow (1961, p. 55), the initial low cost of land was given as the most frequent reason for selection of site; closeness to highways and transportation ranked second, and adequate space, proximity to markets and compliance with zoning ranked third.

Industrialists have also been willing to pay premium prices for locations which provide visual advertising value. It was found that frequently, in spite of high land costs, industries preferred to locate at interchanges and in ribbon form along major highways, preferably along those leading from the city to the airport. Surveys indicate that the reason for this has been not only accessibility but the desire for visibility.

It is generally claimed that by virtue of economy of scale, industrial estates should be in a position to offer comparable land at costs lower than those obtained through individual negotiations and purchase. Few comparative studies are available to substantiate this claim. Studies in the United States indicated that land in privately developed industrial estates actually sells at a higher price than comparable land individually sold. The purchaser is compensated by the time gained in moving into a ready-made situation. The previously cited study of Managua estimated that the

unsubsidized cost of developed land in the proposed industrial estate would be quite competitive or even lower than similar land sold in the open market, quite aside from the other advantages offered by the estate. Naturally, costs of land in industrial estates may be lowered through direct and indirect subsidies in order to make it attractive to the industrialist, but there are obvious limitations on the use of subsidies in capital-short countries, and the costs would have to be carefully verified against benefits.

The amount of land or size of lot desired will vary from industry to industry, and no universal standards can be set. Some industrialists, long established in central urban areas, will accept considerable congestion. However, in buying industrial sites on the outskirts of cities in the less congested areas, whether to establish a new industry or to relocate an old one, more land is often purchased than needed for future expansion. This is attributed, by the survey conducted by the United States, National Urban Planning Office, Ministry of Development and Public Works, and A. A. Solow (1961, p. 49) to speculative tendencies to keep land for further resale at higher prices.

Space consumption by industry, usually measured in terms of employee density per acre is increasing. On the basis of an analysis of recent trends, the expert C. Rapkin (1963) recommended a land area standard for new industry of 30 to 50 acres per 1,000 employees or twice as high as the rate used at present by older plants in a city in the United States.

The studies made by D. A. Muncy (1954) and C. D. Rogers (1961) of metropolitan areas in the United States have established a close relation between acres of industrial site area, coverage, distance from centre of the city and other factors. Generally, these studies showed that the highest employee density was found in factories located within 5 miles of the business centre of the city, and that industries in suburban areas tended to occupy larger amounts of land per employee.

It may perhaps appear that inasmuch as this is not a treatise on the location of industry, we have dwelt too long on the demand factors, but since industrial estates and areas are supposed to meet the locational and site requirements of industrialists through the supply of land and facilities, it is most important to pay the greatest attention to the demand aspect in order to ensure the advantages of industrial estate programmes.

3. THE ROLE OF INDUSTRIAL ESTATES IN CONNEXION WITH REGIONAL DEVELOPMENT AND INDUSTRIAL LOCATION POLICIES

Goals and objectives of regional development policies

In those cases where governments have established policies for regional development—and as yet they are in a minority—the goals under-

lying such policies are of both a social and economic nature, as has been stated for Puerto Rico by R. Picó and L. Lopez McCormick (1964, p. 23): "The goal of our government is to achieve a uniform economic and social development in the entire island." From the economic point of view, such goals desire to minimize development and operational costs and to maximize productivity and the utilization of resources, whether natural or human. Thus, for example, the economic argument advanced by C. Bauer (1962) in favour of decentralization has been that the cost of urban infra-structure and other costs of urban development are excessive in large metropolitan areas. Another economic justification for giving priority to the development of certain regions has been the desire to exploit the richness of their natural resources. A further economic rationale has been the need to integrate lagging and leading regions of the country and sectors of the economy in order to achieve a balanced economy. B. Higgins (unpublished) states, for example: "Economic development means eliminating the lagging sectors and taking full advantage of the leading sectors or growing points, maximizing the spread effects of growth where it occurs and overcoming the tendency for productivity of leading and lagging sectors to pull farther and farther apart".

From the social viewpoint, the pretence is made that the goal of regional development and industrial location policies is to obtain as wide and as balanced a geographic distribution of development benefits as possible. It is claimed by C. Bauer (1962; see particularly the chapter on "Urban Living Conditions, Overhead Costs, and the Development Pattern") that housing and living conditions for the masses of low income urban families are relatively worse in large urban areas than in smaller ones, or at least that these negative conditions can be easier corrected in smaller than in larger urban areas. It is also held that unless development is brought to stagnating and backward areas, the standard of living of the inhabitants of those regions will decline and people will migrate to the large metropolitan centres.

A review of a number of cases indicates that governments which, in connexion with their national development and industrialization programmes, have adopted regional policies, have done so for one or more of the following reasons:

- (a) To prevent continued concentration of population and capital investment in large urban areas;
- (b) To promote decentralization of economic activity and to encourage the growth of small towns;
- (c) To achieve a more balanced geographic distribution of development;
- (d) To achieve, for political and social reasons, as wide a geographic distribution of development benefits as possible;
- (e) To develop natural resources and their regions;

- (f) To develop and interconnect outposts for reasons of defence;
- (g) To industrialize the rural regions;
- (h) To integrate rural and urban economies;
- (i) To stabilize or reverse the trend of economic decline in certain regions;
- (j) To obtain a pattern of development which will have the lowest socio-economic costs.

In order to achieve these goals and to implement regional policies, the location of sources of employment, especially industrial employment, becomes of paramount importance as this is the principal way to provide a sound economic base for the sustained growth of different regions and urban areas. Thus, the establishment and implementation of policies governing the location of industries are the essential underpinnings for achieving the goals of regional development.

It has been pointed out in previous sections that the trend of individual decision-making, both on the part of individual households and on the part of investors in industrial establishments, is to concentrate in large and rapidly growing urban areas and to leave undeveloped, stagnant and declining regions. Consequently, the above policies imply essentially an attempt by governmental action to reverse, halt, or at least control what appears to be a spontaneous trend.

Experience has amply shown that such fundamental trends based on individual desires, decisions and actions cannot be changed by mere control measures, but can be counteracted—if at all—only by positive governmental action. Such action usually necessitates public investments, such as industrial estates or some other forms of subsidy or incentive, which result—at least temporarily—in direct or indirect costs of the government. Usually the combination of these measures is costly, considering especially the limited resources of developing countries.

In addition to the necessity of maintaining a reasonable balance between costs and benefits, it is essential for the governments and their public agencies to select those patterns of regional development and those measures, including industrial estates, which will lead to the desired end and which, for a minimum cost, will give maximum results toward implementing regional policies.

Within the framework, experience to date has shown that industrial estates can be useful tools in implementing regional development and industrial location policies, provided they are used (a) as integral parts of comprehensive regional development plans and national urbanization policies; (b) in conjunction with many other measures as part of a total regional development programme; and (c) within an efficient time sequence of allocation.

Industrial estates in relation to alternative patterns of regional development

The type of industrial estates and other measures of physical and land planning to be used depends on the pattern of regional development, on the spatial distribution of industrial development that is desired and, of course, on the types of industries to be accommodated. But all these considerations go hand-in-hand. For example, an industrial estate in the proximity of a new steel mill, or in connexion with a petrochemical complex that is perhaps situated in a relatively undeveloped area, will be quite different from one that proposes to encourage the growth of small industries in existing small urban communities. Again, an industrial estate in connexion with a new port development may show quite different characteristics from one that is to attract new industries to medium-sized cities that are intended to act as growth poles for stagnant agricultural regions. Consequently, the development of an industrial estate programme should be closely related to the specific regional development alternatives and should be preceded by an analysis and evaluation of various regional and spatial development patterns.

The process of developing such alternatives must take into account the distribution of industrial job opportunities at two levels: regional and local. Analysis at the regional level will consider such aspects as the unique qualities for industrial development that may exist in different parts of the country, the physiography and natural resource base, the man-created potential for development in terms of physical facilities, the socio-economic aspects of population, income and so on.

The local level involves a more detailed look at specific existing urban concentrations, locational points and sites within the chosen region to determine their relative advantages. In terms of industrial estates, this local level becomes particularly meaningful, as H. Adams and Greely (1962, p. 21) have stated: "For only when job locations are defined for local areas can program decisions be made on factory space, industrial land, and community facilities and services."

In addition to the social, political and economic goals previously discussed, the range of possible patterns of industrial location follows logically from the considerations enumerated above, and must take into special account the realities and constraints of existing patterns and trends of development, and of the mobility of labour, management and capital. This involves essentially an evaluation of the degree to which current trends in the location of manufacturing employment can be changed, and of the resources that are available to do so.

The principal alternative spatial forms of regional development and guided industrial location consistent with the previously cited goals are:

(a) Widest possible dispersal to existing small and medium-sized urban communities.

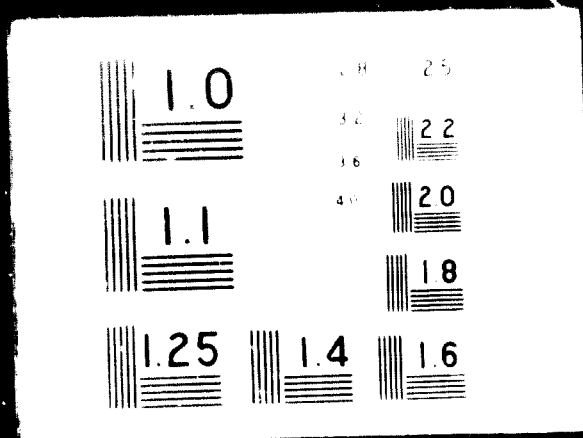


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(b) Concentration of development in a limited number of major centres or development areas which already provide an impetus to growth, or to those centres where, if additional concentrated external impetus is provided—not only in the urban area but in the urban region serviced by it—growth is likely to take place (the growth pole theory).

(c) At significant transportation points such as at ports, airports, or in certain especially favourable locations along major highways.

(d) In connexion with development of natural resources such as coal, steel, oil and so on.

(e) Through the establishment of new towns (this may be related to items (b), (c) and (d) above).

The two alternatives, widest possible dispersal of many small development inputs (including industrial estates) or concentration in a limited number of locations, are discussed by the United Nations, Department of Economic and Social Affairs (1961, pp. 37—38), under the heading of "Intensive or Extensive Industrialization Policies and Programmes Related to the Establishment of Industrial Estates." While the advantages and disadvantages of each alternative are pointed out and illustrated by examples, no definite conclusion is drawn by the United Nations study.

Obviously no hard and fast rule can be established, and each case has to be considered on its own merits. This author leans to the view that the theory of concentrating efforts on a limited number of "regional growth poles" is gaining support, and that this theory has particular applicability to the successful establishment of industrial estates.

The desire to distribute developmental benefits evenly and widely to as many small urban areas as possible is sometimes politically, sometimes socially, motivated. Yet unless, in addition to the establishment of industrial estates, adequate and multiple resources can be made available to bring many small stagnating urban areas to the "take-off" point, the danger of failure will be ever present.

India has developed and tried to implement what is perhaps the most ambitious programme of industrial decentralization. This programme has been quite successful in stimulating and assisting the development of small industries through the use of industrial estates. However, according to a number of observers, the success of trying to induce industrial development in rural areas or in small towns of 20,000 to 50,000 population, as has been attempted in India, seems questionable unless these areas are satellites of a larger metropolitan centre which can offer the necessary environment for industrial growth. W. Bredo (1962, p. 244) stated: "One would tend to agree with the Seminar on Rural Industrialization held in New Delhi in 1960 that cities of 20,000 to 50,000 population are probably too small to use as economic nuclei... It does not seem feasible to consider every district town or city as a potential focal point for industrial development." And the United Nations, Department of Economic and Social Affairs

(1966, p. 20), reported: "Rural industrial estates . . . have thus far not been very successful in India, and current thinking emphasizes the development of selected small towns and semi-urban centres—which are the transport and market centres for surrounding rural areas—as growth centres." While generalizations should be viewed with caution, the population figure of 100,000 to 200,000 has been mentioned as a size below which cities are unable to supply the many desirable features that in combination stimulate industrial growth. C. Clark (1965, p. 53) reaches the conclusion that "... regions based on towns with populations of somewhere in the neighbourhood of 100,000 to 200,000 with probably a few larger towns should be able to meet their economic needs, and also be socially and politically better off." B. Harris (1962) argues that "the prospects of establishing strong industrial nuclei are definitely enhanced if the program is based on cities with a population in the neighbourhood of 100,000 or larger" (p. 252). He goes on to say that "The viability of industrial growth is directly correlated with the size of the city or with the size of an adjacent metropolitan center, inversely correlated with the distance from a large center, and positively correlated with the size and self-contained character of the industrial establishment" (p. 268).

The case for using industrial estates in connexion with large-scale industrial expansion in development regions which have a predetermined minimum size and growth potential is well made in a review of Italian experience by A. A. Molinari (1962, p. 415). In Puerto Rico, the initial policy of providing industrial buildings in many stagnating small communities in the hope of attracting industry did not meet with complete success because these communities lacked over-all services and amenities. The policy was subsequently modified to concentrate comprehensive developmental efforts, including industrial estates together with other accompanying measures, on a limited number of selected urban nuclei that showed growth potential. In a review of Puerto Rico's regional development policy R. Picó and L. McCormick Lopez (1964, p. 15) state: "... the region was defined as a group of inter-related municipalities with a common city center around which their socio-economic activities revolve."

A comprehensive study of Central America, conducted by K. E. Duke et al. (1964), evaluated the feasibility and location of industrial estates, and concluded that only in the capital cities of the five countries was the infra-structure base adequate to support a full-scale industrial estate:

"From an examination of the minor elements of existing and planned infra-structure upon which industrial developments will depend, it is evident that industrial parks could most feasibly be located in the capital cities. In nearly all instances, transportation facilities are far better developed in the capitals than in smaller cities and the capital cities are better provided with water, power, telecommunications, and other services" (p. 125).

In a study made by the United States, National Urban Planning Office, Ministry of Development and Public Works, and A. A. Solow (1961) of industrial land, facilities and estates in Nicaragua, the following conclusions were drawn:

"It is recommended that for industries that require proximity to urban areas rather than to sources of raw materials, there be followed a policy of concentration in a few selected cities rather than a dispersal. This means that with limited resources at hand, priority should be given to improving utilities, roads, services and industrial land in those cities which are attracting industries because they already have some of these facilities" (p. 18).

The success of the industrial estate programme in the city of Queretaro, Mexico, is attributed by P. F. Castaños (1964) to the careful selection of that city as an industrial regional growth pole. A recent study made for the United Nations by Resources for the Future Staff Inc. (1966, pp. 37 f.) strongly supports this growth pole theory whereby "development policies may be focused on providing the most promising regional center with the endowment of well-designed physical facilities, basic institutions, and economic assets to expedite its performance of the growth pole function, not only to provide a benevolent economic environment for new industry but to create an environment for living which will be attractive to the professional, managerial and technical personnel. . . . Thus, the government may adopt policies of inducing the location in the regional center of new industries by developing well-planned industrial estates. . . ."

Due to technological changes in production and transportation, the effect of regional and national transportation networks and terminal facilities such as ports and airports upon industrial locational patterns is gaining in importance, and, within broad locational policies, will influence the specific location of industrial estates perhaps more than most other factors. A relatively recent study conducted by R. Picó and L. McCormick Lopez (1964) in Puerto Rico came to the conclusion that transportation linkages, especially highways, terminal facilities and, in particular, ports, are the fundamental criteria for a logical pattern of decentralization; four alternative patterns closely related to highway transportation systems and linkages were evaluated (p. 22).

In the United States, C. D. Rogers reports that the Interstate Freeway system is exerting a strong influence on the location of industries and industrial estates, especially at interchanges within metropolitan urban regions.

The above discussion of regional locational patterns is not intended to define a single pattern but rather to draw attention to the importance of determining alternative patterns as a precondition to selecting the types of industrial estate programmes that may be suitable in each case.

The contribution of industrial estates to regional development programmes

In most cases where governments have adopted specific policies of decentralization, as for example, in Puerto Rico or the United Kingdom, or of developing an industrial base in smaller towns or rural areas, as in India, or of trying to attract industries and employment to deteriorating regions as in Italy or the United Kingdom, they have made use of industrial estates, in conjunction with other programme elements, as tools of regional policies.

In promoting a decentralization policy of strengthening smaller urban areas and providing them with an adequate industrial base, the advantages of industrial estates can be considered from the point of view of: the industrialist or industry; the agency implementing the regional decentralization policy; and the local community. With regard to the industrialist, two objectives for strengthening the industrial base of the community must be included: (a) attracting industrialists and investment of capital from outside the urban community and (b) mobilizing local capital and the local entrepreneurship (which usually will be of a small-scale industry type) together with the development or expansion of local industries.

From the point of view of broad regional decentralization and industrialization policies, and in relation to specific spatial patterns of industrial location as discussed in the previous section, the use of industrial estates appears to offer a number of advantages.

With regard to small urban areas, the cost of raw land *per se* is usually relatively low and does not present a problem to a prospective industrialist. But developed and well-serviced land is usually very limited or non-existent, since small towns usually lack most urban infra-structure facilities. By concentrating development of utilities and services in a single developmental industrial area, substantial economies of scale can be obtained. Public utilities, access roads, communication systems and other urban infra-structure can be provided at less than if they are furnished by either the government, the municipality or the industrialist acting independently in dispersed isolated locations. Thus, not only better facilities can be provided to attract industry, but economies are likely to result both for the urban community and for the industrialist.

By bringing together a large number of industries, preferably of an interrelated character, in an industrial estate, it becomes possible for them to benefit from a common pool of managers, supervisors, skilled workers, services and also from the exchange of goods. The isolation of individually located industries, which is particularly marked in smaller urban areas, would thus be overcome through location in an industrial estate. This would be particularly applicable to small-scale industries.

As has been indicated previously, special incentives to industry must be provided to locate in smaller towns, which find it difficult, if not

impossible, to compete with the larger urban areas. An industrial estate by itself cannot make up for all the deficiencies of small urban areas, nor will it be a sufficient attraction without other complementary inducements, but an industrial estate can provide such special benefits as a number of joint services, facilities, subsidies in terms of promotion and technical assistance which are not only cheaper to provide where industries are concentrated in an estate, but which often could not be provided to dispersed locations. This advantage applies both to the development of small local industries and to the attraction of industries from outside; it will also depend on the amount of subsidy the promotional agency is willing to provide.

The industrial estate appears to be a suitable and relatively economic form of providing a packaged deal of ready-made, "turn-key" facilities into which the industrialist can move without wasting time, effort and money on a search for land, on negotiating for utility connexions, on clearing the title and so on.

From the point of view of the urban community, the concentration of industries in an industrial estate presents a number of advantages, especially if its location is suitably selected in relation to other land uses and to transportation facilities. With the certain knowledge that industries will be located in that specific place, the community can plan the development of the urban area to be harmonious with the location of the industrial estate, and can provide social overhead facilities at lower costs.

From the point of view of encouraging the development or expansion of local industries and entrepreneurship of the small urban community, the inherent advantages of an industrial estate enable a number of small-scale units to have the benefits of common services and other facilities, such as a good site, electricity, water etc. which they could not normally obtain by themselves.

Policies to decentralize industry to smaller towns imply, in effect, efforts to counteract the natural trend of concentration in the big metropolitan urban areas. Such a policy means offering to a potential new industry faced with a location decision, inducements which can compete with the attraction of the big urban area, or it may mean providing inducements and facilities for local entrepreneurial talent to establish new or expand existing industries within the smaller urban areas. Aside from such measures as tax exemptions, subsidies and the like, the use of industrial estates has proved to be an effective tool. In fact, by its nature, it is a dynamic development instrument which encompasses many positive elements, and is thus much more effective in connexion with decentralization programmes than the use of industrial areas or industrial zones.

The role of industrial estates in regional decentralization is perhaps best summarized in an Argentine study by R. Risso Patrón (1962, p. 10):

"Industrial estates are an excellent means to stimulate industrial decentralization, provided that they are established in carefully chosen

centers on the basis of their potential ability to act as economic nuclei and to extend their influence and penetrate into the less developed regions. The establishment of industrial estates in such key points could give a great impetus to the development of small and medium-sized industries in less privileged regions. This could become the most efficient program at the disposal of governments, at all levels, for the orderly and economical promotion of industrial development."

Conditions essential to the success of industrial estates in regional development programmes

The previous sections as well as an evaluation of case histories, studies and literature to date, suggest very strongly that, in addition to factors directly affecting the feasibility of establishing an industrial estate such as availability of a suitable site and immediate services, a number of broad conditions must be met (such as regional and local infra-structure, co-ordination of sector programmes, timing of development measures, supplementary incentives and aids to industry, and institutional considerations) to ensure the success of industrial estates in connexion with regional development programmes. Some of these conditions have already been mentioned but they will be summarized here again.

First and foremost it is essential to spell out explicitly the goals of the regional programme, to adopt official policies of regional development, urbanization and industrialization and to translate these into alternative spatial patterns and development programmes, taking care to select the most suitable alternatives. All of the above measures must be based on adequate studies and surveys.

It is essential to co-ordinate industrial estate projects and other types of industrialization programmes with overall development programmes for a region. Thus, the United Nations, Department of Economic and Social Affairs (1961, p. 32), states:

"Finally, it appears that, while investment in infra-structure facilities is not per se an inducement in regard to location and establishment of industry, programmes for setting up industrial estates can be fully effective only when integrated with basic development plans."

An effective regional infra-structure system which includes transportation (especially highway, air and, in some instances, rail and water) and communication systems (telephone, telegraph, radio and postal service) is essential. These linkages are necessary to connect resource areas with markets, agricultural areas with metropolitan centres, inaccessible and outlying regions with the mainstream of economic, social and political activities. Similarly, the availability or possibility of development of energy sources, water supply and disposal systems are necessary elements.

A completely co-ordinated and ample programme is necessary for the provision of supporting social overhead services within the urban community where the industrial estate is to be located. What is meant here are such items as housing, good schools, medical and hospital facilities, police and fire protection, recreational facilities and other amenities and urban services of good quality. This, of course, is seldom found in smaller urban communities, and the costs as well as the local managerial initiative to provide such facilities and services must be carefully weighed. Such facilities or services are particularly important if outside industries are to be attracted to smaller urban communities, and they have been found particularly useful as an inducement for managerial and technical personnel. Very large companies have, of course, the resources to provide at least a minimum of such facilities to their key personnel and skilled workers. In the past, the provision of such facilities has been done in so-called company towns, but lately management has recognized the problems that such situations create, and integration with the local community is the order of the day. This, of course, requires that the locality provide such facilities—sometimes with the assistance of the companies.

Social overhead services may be much less important where the objective of the industrial estate is to mobilize local capital and entrepreneurship, especially of small-scale industries. But in such a case it must be ascertained that the local entrepreneurship is available and will take advantage of the facilities of an industrial estate.

To attract industries to isolated locations and small towns, industrial estates will generally need to provide more services, inducements and common facilities, and usually at a higher subsidy rate than that in large urban areas, to compensate for the absence of many such facilities in the community.

In industrial estates which intend to develop small industries and to mobilize local entrepreneurship in small communities, not only a series of common services have to be provided, but additional technical assistance and education in management, marketing etc. as well, especially for small-scale industries. India is perhaps the only country which has attempted to emphasize this aspect on a large national scale.

Additional subsidies such as tax exemption and differential rates may also be required, at least as an initial measure.

Assurance must be obtained that the necessary resources for public investment and other incentives will be available over an adequate period of time, and that all elements of the over-all programme and of the establishment of the industrial estate itself will be developed in a suitable time sequence.

The execution of such an integrated programme according to a comprehensive plan will be the responsibility of many governmental agencies. In addition to the industrial development agency, which may handle the industrial estate and other elements of the industrial develop-

ment programme, the local urban municipality will be involved in specific projects as well as in over-all services, as will be such relatively independent agencies as state or national highway departments, water and sewer authorities, housing agencies, electric power companies, air transport authorities, and many more. Adequate institutional co-ordination and implementation become the key to success, and the difficulties should not be underrated. The importance of obtaining firm advance commitments for essential facilities required by an industrial estate is well illustrated by the following statement by S. P. Walsh (1963):

“Action by a dozen agencies is often required to bring water, sewers, storm drainage, gas, electricity, telephones, fire protection, access roads, and rail trackage to the property. Excessive costs and long delays can occur if firm agreements are not made at the outset as to specifically what services will be provided, by whom, when, and at what cost (if any) to the developer. Verbal assurances of full co-operation often overlook the time involved in policy decisions, appropriations, and construction scheduling.”

Only seldom is the agency in charge of preparing regional and local urban plans also responsible for development and execution, though this may be the case when special regional development or new town agencies are set up; but even then a number of additional agencies will be involved. In some instances development regions or areas are officially designated, requiring the co-operation of all agencies, with the principal responsibility assigned to an existing or new agency. Here again, numerous problems of co-ordination, co-operation, programming and timing must be overcome. Sometimes financial inducements from a central or regional agency are used to encourage co-operation of other agencies. This is not the place to expand on this subject, but it is certainly vital to resolve these public managerial problems if industrial estates are to be successful and to fulfill their role in regional development programmes.

4. INDUSTRIAL ESTATES AND THE PROVISION OF INDUSTRIAL LAND AND FACILITIES IN CONNEXION WITH COMPREHENSIVE PLANNING OF URBAN AREAS

Having considered the contribution of industrial estates and related measures within the framework of broad policies for urbanization, regional development, decentralization and industrial location, we turn to a more detailed analysis of the planning of the individual urban area.

It was pointed out in Section 1 of this paper that the provision of suitably located land of adequate quality and quantity for industrial use, together with the required economic and social infra-structure facilities,

should be considered as one of the most important elements of every comprehensive urban development plan. This applies equally to guiding the renewal and expansion of existing urban areas and to the planning of new towns. In all cases, the fundamental criteria are:

(a) To provide an adequate economic and industrial base for the urban community;

(b) To ensure, from the urban planning viewpoint, that the best possible land, together with the necessary services and utilities, will be provided for industrial use, and that it will be available at reasonable costs and at a time when it is needed;

(c) To provide the land and services in such a manner as to minimize social costs and other possible negative effects of industry upon the urban community (such as traffic congestion and encroachment on other uses);

(d) To plan in such a way as to allow for continuing growth and change, taking into special account factors of change.

Translated into a planning process, this requires determining the economic base of the urban community; the demand and supply aspects of land and facilities for industry; and the most effective means—including industrial estates, areas, zones, and other measures—of ensuring an adequate supply of suitable land in relation to estimated demand, taking into account all other goals and developmental requirements of the urban area in question, and applying these measures within the framework of a comprehensive urban development plan.

The supply of industrial land within the urban area

In Section 1 of this paper the demand for industrial land in terms of the requirements of different types of industries was discussed. Determining the supply of suitable land within the urban area to meet this demand is the next most important step to be undertaken as part of the comprehensive urban planning process.

The amount of land occupied or needed by industry is a relatively small proportion of the total land area in use, as is borne out, for instance, by P. A. Stone (1964, p. 12) and J. H. Nedercorn and E. F. R. Hearly (1963, p. 4). In the first 12 British New Towns the average amount of land in industrial areas was 12 per cent of the total town area of 6 acres per 1,000 persons. In 40 large United States cities the mean proportion of land devoted to industry was 10.9 per cent of the developed urban area. But the supply of prime or suitable industrial land is rather limited, since only small portions of the urban area will meet the exacting specifications required by industry. Some land may not be topographically suitable, since industry requires relatively flat land. Due to technological trends, however—at least in the more developed countries—steeper land than that used in the past can be used effectively

by industry. This is illustrated by the New Town, Don Mills, in Canada. Some land may not have the soil and sub-soil characteristics needed for factory construction—it may be in flood zones. Other sites may not be close enough to transportation or inadequately serviced by utilities. Some land areas may be eminently suited for industry, but are wholly or partly occupied by other uses, or are in blighted neighbourhoods, so that sites large enough to meet the needs of individual, large modern industries, or of industrial estates accommodating an agglomeration of inter-related small industries, cannot be obtained without lengthy negotiations for land assembly, excessive costs of clearance and renewal. This is particularly true in built up locations which are especially desired by some industries. On the other hand, more outlying sites that may be suitable in other respects, may be considered by the industrialist to be too far from downtown facilities and from housing. Vacant land desired by industry may be actually more suitable for other uses from the point of view of the community: it should perhaps be better reserved for recreational, residential or commercial use. Finally, and this is a frequent case in the metropolitan areas of developing countries, land speculation drives the prices of vacant land suitable for industry beyond the economic limits of sound capital investment, and some land may be withheld altogether from the market for very long periods of time.

Thus, the many factors involved in obtaining land lead to a shrinkage of the effective amount of suitable industrial land until it can and does become a critical commodity. For example, in an industrial planning study by T. J. Manickam *et al.* (1964) of a major capital city in the Caribbean (Trinidad) it was calculated that the known industrial land reserves in the metropolitan area were only slightly more than half of the total estimated requirement over the period 1964—1984. This problem becomes even more aggravated if we look towards the future. The demand for industrial land is on the increase, not only because of the growing number of industries, but because of the larger land requirements of industry. At the same time, as urban growth continues to proceed at an accelerated pace, more and more vacant land is absorbed by various non-industrial uses, and it is absorbed in such an inefficient helter-skelter way that the most desirable industrial sites become unavailable, especially in built-up locations, and industry is forced to scatter and locate on sites that are neither suitable nor economical for the industry or for the community.

The role of industrial estates, areas and zones in ensuring an adequate supply of industrial land

It can readily be seen that it is of fundamental importance to determine the available supply of suitable industrial land and to relate it not only to the direct requirements of industry, but to the developmental needs of the urban area as a whole, according to a comprehensive long-

range plan. It is essential that means be found to preserve suitable industrial land and to make it available to industry as and when needed, thereby promoting industrialization and, at the same time, influencing the choice of the most suitable location of industry in relation to the urban area. It is in this light that a further examination is made of the merits and limitations of industrial estates, areas and zones.

Merits and limitations of industrial zones

Industrial zoning is one of the earliest means of controlling the location of industries within urban areas, and its usefulness under certain conditions is unquestionable. However, experience with industrial zones has shown serious limitations in their use as a tool to guide industrial location to the right places, to reserve the most suitable land for future industrial use, and to stimulate the growth of the industrial sector and the establishment of new industries—all of which is of particular importance in developing countries. The action of designating industrial zones without taking further developmental steps is merely regulatory. It defines where industrial location may or may not take place, but this does not ensure in any way that industrial location will actually take place in a desirable way. As H. Adams and Greeley (1962, p. 4) have put it:

“The use of zoning as a method of implementing a desirable pattern of industrial development is limited by the fact that the zoning of land for industrial purposes does not of itself stimulate such development. However, land controls of this type can be effectively used to prevent industrial expansion in areas which do not conform to the desired future pattern and also to ensure that high standards of development are followed where industrial uses are permitted.”

Originally, industrial zoning developed as a negative control, i. e. to ensure that industries, especially those causing hazards and nuisances, would be kept away from residential areas. Zoning was based on the concept that industry, especially heavy industry, was the least desirable land use, and that the land must be protected from it. This attitude grew out of the early days of industrialization in a free enterprise system in the now developed countries, where—in contrast to the developing countries today—industry sprang up in urban areas by itself, so to speak, without the government having to promote industrial development. The local community thus had to take measures to protect itself against the undesirable by-products of the industrial processes. According to P. W. Michalowski (1965, p. 9): “Communities perceived industry as an undesirable land use, zoned ill-suited land for industrial use, paid little attention to technological advances making it a non-offensive neighbour. The greater fault was in the lack of appreciation for the role of industry.”

Not only was poor land assigned to industrial use and good land withheld, but non-industrial uses were permitted in industrial zones, so that large tracts of land were broken up by the sale of lots for commercial establishments and housing, making it difficult for industries or industrial estates to obtain lots of sufficient size.

Naturally, there is little advantage in the transfer of such negative aspects of industrial zoning to urban areas of developing countries, where the principal goal is to increase industrial growth. In recent years, the negative attitude expressed in industrial zoning has been replaced by a positive approach. New trends in zoning recognize that industry, as stated by the United States National Industrial Zoning Committee (1951, p. 3), "is a legitimate land use . . . and is entitled to protection against encroachment". It is also recognized that industry requires land with specially suitable characteristics, and that such land should be reserved for industry. However, even where such land is assigned to exclusive industrial use through zoning, there is no guarantee that it can and will be used by industry, or that it will be kept in reserve until needed for industrial use. A recent study of industrial land in the Pittsburgh area (United States, Southwestern Pennsylvania Regional Planning Commission, 1965, p. XXI), concluded that "zoning, while remaining an important land use control, cannot be expected to accomplish the long-range reservation of industrial land".

On the one hand, zoning limits the amount of land available for industry. It creates a monopolistic situation, for if such land is in private ownership, there is no compulsion to sell it. Especially in rapidly growing urban areas of developing countries, where the real estate market is highly speculative for a number of well-known reasons, land zoned for industry often is offered at prices that are so high as to represent an obstacle for industrialization, or is entirely withheld from the market precisely at critical times when it is needed to facilitate the industrialization process.

On the other hand, at given times there may not be sufficient industrial demand for vacant zoned land and, at the same time, there may be pressures to use that land for other purposes, a situation which often leads to a change in zoning designation so that land suitable for industry is whittled away—at least this has been the experience in the United States. According to the Wisconsin Division of Industrial Development (1957, p. 25) "It is considered very doubtful that any privately-owned lands can be retained as a restrictive industrial zone for more than several years. The (city planning or zoning) commission or the courts are almost certain to recognize hardship in such a case". There is no doubt that similar pressures to modify industrial zones will develop in many other countries unless extremely strong legal protection of land-use zoning exists, and in most developing countries it does not.

There is another limitation of industrial zones. In a number of countries, zoning (i. e. public control of land use without acquisition or compensation) is considered as unconstitutional and as illegally affecting private property rights. While limitations on those uses of land which directly and visibly create public health and accident hazards are generally accepted, limitations imposed by zoning controls, such as the withholding of vacant land from non-industrial uses because it may be in the interest of the community to have this land available at some future day for industrial purposes, is not accepted as a legitimate use of governmental power without compensation to the land owner.

In many instances excessive amounts of land are zoned for industrial use. In such cases zoning as a locational guidance device loses its value, except in a very broad and general way, and it encourages attempts to convert parts of the industrial zones to other uses on a haphazard basis.

A detailed study of industrial zones in Managua, Nicaragua, where the first zoning ordinance in Central America was successfully introduced, illustrates a number of problems that arise in connexion with industrial zoning. For example, of the 800 hectares zoned for heavy and light industry, only 33.8 per cent was net vacant usable land from which lots large enough for typical modern industries could be obtained. The other two-thirds of the land consisted of land already in industrial use (9.2 per cent), land in non-industrial uses and in lots too small for industry (19.2 per cent), land that was unusable due to topography and other factors (14.2 per cent) and land occupied by streets (23.6 per cent). On the basis of estimated demand, it was considered that the amount of available land would be adequate for future industrial development, provided that it would be reserved exclusively for industrial use. However, in spite of this apparently ample supply, the study, made by the United States, National Urban Planning Office, Ministry of Development and Public Works, and A. A. Solow (1961, p. 61), found that actual availability was limited by excessive prices: "Frequently the asking price is higher than the prices which industrialists are willing to pay. This is due, in large part, to the fact that industrial location is limited by zoning, that the amount of vacant land serviced by good access roads and utilities is limited, and that it is held by a few land owners who are not anxious to sell, and who put speculative values on their land" (p. 61).

Large tracts of undeveloped land may be zoned for industrial use, but this does not mean that industrial zones will actually be developed in the form of an efficient land pattern suitable for industrial needs, or that public services, utilities and transportation will be available at the right time, unless industrial zoning is accompanied by additional positive developmental actions taken by the government. Often industrial zones are established by urban planning agencies without adequate consultation with industrial development agencies, and without fully understanding the needs and requirements of industry.

In the past, too rigid zoning has led to a segregation of all industrial uses from residences to a point where the journey to work has become a real problem. This is a particularly important factor in the location of industrial estates, and particularly so in less developed countries. It has been recognized that due to changed technologies and improved site planning, many industries have lost their nuisance effect. D. O'Harrow (n. d.) maintains that the old classifications have to be replaced by a concept of performance zoning which attempts to substitute quantitative measurements of the possible noxious effects of an industry for the classification of industries considered *a priori* to be noxious.

There is yet another drawback to the use of industrial zones, and that is the inelasticity of regulatory controls, for once they are officially adopted as statutory requirements, it is a slow and painful process to adapt them to changing conditions. If industrial zones are used as a tool it is essential to ensure mandatory periodic revisions of the regulatory controls—say at intervals of every five to ten years.

Finally, the mere fact that land is reserved for industrial use by means of industrial zones in no way makes it easier for the prospective industrialist in his task of selecting and evaluating the most suitable site, negotiating its purchase, obtaining clear title and securing utilities and services—all of which are time consuming and add to the costs and may well discourage an industrial investor from going ahead with his plans.

In spite of these limitations, the establishment and official and legal designation of zones within an urban area suitable and permissible for industrial use are essential initial steps in the process of urban industrial land planning. Industrial zoning should be used to a much greater extent in the planning of urban areas in developing countries than has been done until now. Such an approach will determine the over-all supply of industrial land in terms of quantity, quality, location and the absorption rate in relation to the demand factor; it will provide a framework for relating industrial zones within the urban area to all other land uses and elements of an urban development plan, such as transportation and utilities; it will protect other land uses from the intrusion of undesirable industrial effects; and it will segregate, where necessary, especially noxious industries.

The reservation of industrial zones through regulative control is less costly than the establishment of industrial areas and estates, which require the investment and immobilization of a large amount of capital over long periods of time—a problem for capital-short countries where many needs compete for scarce capital resources.

However, in using industrial zones as a tool, the most modern principles of industrial zoning should be applied and should be adapted to the local conditions and specific goals contemplated. Moreover, it should be recognized that industrial zones are only a first step and must be accompanied by other more positive developmental measures.

*Industrial areas and the development of the industrial land
bank concept*

Obviously the acquisition of suitable tracts of land, their improvement through provision of utilities, and the subdivision into industrial lots ready for sale and lease, are much more affirmative developmental measures than the mere industrial zoning of land. Consequently, they are bound to exert a stronger influence on attracting industry, and will provide a much more definite means for reserving vacant land for future industrial use. We are speaking here of a programme undertaken by public or quasi-public agencies with the specific goal of serving the interests of the community and of facilitating the establishment of industries, rather than by private developers for speculative motives.

An industrial area development programme offers one or more of the following advantages:

(a) A lower unit price may often be obtained by purchasing a large tract of land.

(b) Economies of scale are likely to lead to lower development costs per unit.

(c) A more efficient design can be obtained, resulting in better land utilization and economies in utility layouts and installations.

(d) Economies achieved through (b) and (c) above can either be passed on to the industrialist in terms of lower costs or may be ploughed back into more attractive landscaping and other higher quality environmental improvements.

(e) A more harmonious, unified and appealing environment can be established to attract industry.

(f) Unsuitable land uses and undesirable industrial establishments can be kept out since control over the sale of land is maintained.

(g) As against servicing industries in dispersed locations, there may be savings in public expenditures for main utility lines, access roads, fire protection, and other urban infra-structure, for industries grouped in single locations. This may also lead to better quality public services.

(h) Land can be acquired under normal market conditions, thus saving the costs of inflated land values when development is imminent. Provided that the operation is run on a non-profit or, at least, non-speculative basis, substantial economies in land costs can be passed on to the industrialist.

(i) Immediately available land can be provided to the industrialist, so that he need not waste time and money on extensive search for a site, title clearances, site and utility improvements.

(j) Interim use of the land is possible until it is actually converted to industry.

However, there are also a number of limitations and problems to be considered:

(a) An industrial area or subdivision will usually require a substantially large tract of land in a single location to make the operation worthwhile. Such large tracts of vacant land may be difficult to obtain, especially in built-up urban locations, unless condemnation powers, such as those operating in urban renewal procedures in the United States, can be used to unite the many small parcels into which land has usually been subdivided. Otherwise, it may be necessary to search for land in outlying locations, which may not be immediately attractive to industrialists.

(b) Considerable initial capital investment is required on a quasi-speculative basis. Even with careful market analysis, a substantial risk is involved due to factors beyond immediate control, and the risk is greatly increased by the fact that all the investment is concentrated in a single spot. This limits the choice for industries. What if transportation or other conditions change and other sites become more attractive to industry?

(c) Usually the development of industrial areas in developing countries would be undertaken by public or quasi-public agencies specifically established for that purpose. Unless these co-operate closely with the agencies charged with planning and development of the urban area to ensure that the selected sites fit into the over-all development plans, there is danger that complementary developmental measures and priorities will not be adequately co-ordinated. For example, a large new industrial area may require workers' housing nearby, the extension of highways, water lines and other facilities.

(d) There is also a danger that unless effective zoning exists (and most often it does not) to protect the surroundings, undesirable and blight conditions may develop in the vicinity of the industrial area; in fact, as often happens, these conditions are attracted by the new industrial area itself.

(e) Since industrial area programmes, as defined here, are limited to development and sale of land, they may not be adequate for small industries that require additional financial and technical assistance in terms of factory buildings, services etc. such as only an industrial estate can provide.

Some of the limitations of industrial areas described above have led to a more flexible concept which ensures that suitable land will be reserved in growing and constantly changing urban areas, and that it will be made available for industrial growth when and where needed. This is the concept of an *industrial land bank system*, which consists of the acquisition, reservation, immediate or future development, subdivision and sale or lease of land in various locations for industrial uses. Ideally this system would be carried out according to a comprehensive plan. The system would be operated by a public or quasi-public agency, probably an indus-

trial development agency working in close co-operation with the urban planning agency.

A land bank would have advantages over an industrial area programme in that the former would be much more flexible, for it would be able to acquire different sized parcels of land of varying quality in different locations, and could offer a wide choice of industrial sites—from raw land to completely developed industrial lots. In fact, an industrial area programme could easily be incorporated and expanded into a land bank programme. As a result of such a flexible programme of diversified supply to meet diversified demand, there would be less likelihood that land would remain idle, as may perhaps occur in an industrial area where all sites are in the same location.

The city of Pittsburgh in the United States is one of the first authorities to apply successfully the concept of the industrial land bank. A Land Reserve Fund of four million United States dollars was jointly established by the City of Pittsburgh and the Urban Redevelopment Authority in 1964. P. W. Michalowski (1965, p. 58) reports that to date, the fund has been utilized to acquire land in the right-of-way of a proposed development, to acquire property for an in-city industrial estate, and to purchase land adjacent to a renewal area so as to accommodate the expansion of industrial plants.

Armed with adequate initial capital to be used on a revolving basis, and with condemnation powers supported by adequate legislation to obtain co-operation from other public and private agencies, and effectively administered, an industrial land bank could be a significant tool for implementing industrial development and location policies in urban areas.

An industrial land bank is nothing more than a specific form of the general concept of advance public land acquisition as a tool of urban development which, of course, is not new. Sweden has long used this practice with success. But advance acquisition for the specific purpose of industrial development may be more acceptable in developing countries bent on industrialization than public land acquisition for other purposes which may meet with stronger opposition.

Industrial estates

The industrial estate is a logical extension of the industrial area concept. It offers all the advantages of the latter, but by going beyond the mere provision of suitably developed and serviced land, it offers additionally incentives such as industrial buildings, a variety of common facilities and services, continuing management, financial assistance and other inducements. It would seem reasonable to assume that by providing all or some of these additional advantages, a positive influence can be

exerted over the location of industries. As this influence is considerably stronger than the offering of land in industrial areas, an additional stimulus for industrial development would thus be provided. However, since the cost of providing such additional benefits is substantially higher than the provision of developed land without buildings or services, at least two questions arise:

(a) Under what circumstances and for what purposes is it necessary or desirable to provide these additional benefits to industry, and what are the benefits, as compared to the costs, to the urban or national community in doing so?

(b) If it is decided that such additional facilities are necessary, should they be concentrated in a single spot—the industrial estate—or should they be provided by means of a more flexible system to various industrialists locating in different parts of the urban area?

If long-term credit facilities for new industrial buildings are considered necessary, would it be better to provide them without necessarily requiring the industrialist to locate his enterprise in the industrial estate? Or, if some form of technical or management assistance is needed in connexion with stimulating the small local entrepreneur, could this not be provided as a service to individual small industries regardless of where these are located? The industrial estate is often advocated as an “incubator” of small new industries. But the success of small, rising industries has often been attributed to the dynamic drive of the entrepreneur, starting off in a very modest and economical physical setting (in lofts, in old sheds, in temporary or disused structures) rather than in a fancy and costly physical setting such as is frequently offered by the industrial estate. This type of costly plant, unless heavily subsidized, will put an additional and often excessive financial burden on the industrialist, especially in developing countries.

Compared to other methods, industrial estates would offer particular advantages; their employment should be seriously considered under the following conditions:

(a) Where the grouping of industries in a single location would be advantageous because of the interrelated nature of the industries;

(b) Where it would be more economical for the community, the industrial development agency or the industrialist to provide facilities and services in a single location rather than in dispersed locations;

(c) Where economies of scale could be achieved in initial construction or in subsequent management;

(d) Where a careful market analysis has indicated that there will be sufficient demand to fill the industrial estate within a given period of time;

(e) Where suitable location, attractive to industries, has been determined for the industrial estate;

(f) Where the additional incentives provided by the industrial estate—as compared to an industrial area—are really incentives to attract or stimulate industrial development;

(g) Where the construction of an industrial estate has been fully co-ordinated with other external measures, such as provision of access and main utility lines, which are most often not under the direct control of the agency handling the industrial estate;

(h) Where comprehensive and detailed project plans and feasibility studies for the industrial estate have been made, and where adequate initial resources and good continuing management have been ensured.

One thing is certain—an industrial estate, like a large-scale housing project, requires a relatively large tract of land in a suitable location. Such a tract is especially difficult to obtain in the large or rapidly growing urban areas. By virtue of its size, it will exert a considerable influence over the surrounding area. The dangers represented by uncontrolled growth of slums, springing up on vacant land around industrial estates, are strongly emphasized by the United Nations, Department of Economic and Social Affairs (1962b, pp. 4—5). Consequently, adequate provisions must be made at an early stage in the urban land use and development plan to reserve in the right locations sites of adequate size for projected industrial estates. The impact of such major industrial installations upon all other elements of a community should be anticipated, and the development of areas adjacent to industrial estates should be controlled. In this respect, the urban planning agency must work closely with the agency undertaking an industrial estate programme.

Application to existing urban areas

A number of practical experiences as well as numerous studies indicate that in existing urban areas, industrial estates, areas and zones can be successfully though differently applied to programmes for the renewal of central areas of large cities; to guide and control the expansion of large metropolitan areas and the decongestion of city centres; and to strengthen the industrial-economic base of small and medium-sized towns.

In spite of the efforts towards decentralization, indications are that large metropolitan areas will continue to attract more people and industries, and that urban areas will spread and expand with a movement from the centre to the periphery. At the same time, there is a constant process of obsolescence of industrial plants which occurs especially within the central core and which is accompanied by renewal efforts and relocation in the suburban areas. Although the basic trends are similar, there are enormous variations in specific characteristics between cities in different countries and at different stages of development. Whatever these differen-

ces, it is essential to view industrial estates, areas and zones as part of a total metropolitan urban planning process for renewal and development.

In the more developed countries, a large number of industrial plants and facilities, built many years ago in the central areas of cities, have often become so obsolete that the demand for complete renewal, accompanied by relocation in the suburban areas, becomes substantial.

This situation is illustrated by the following description of Scotland by R. E. Nicoll (1965, p. 56):

“Much of our industry is housed in accommodations which date from the boom that took place in the last quarter of the 19th century. Already there are signs that these old and obsolescent factory buildings are becoming increasingly difficult to let, despite their low rentals. Congested sites, buildings with comparatively small clear floor areas, floor loading limitations, poor loading and unloading facilities, lack of parking and traffic congestion all contribute to the unattractiveness of these old industrial areas.

“Much of this type of accommodation will have to be demolished through our renewal programmes, displacing in the process large numbers of industrial concerns. Many of these can and should be located away from the central area but nevertheless many can justify relocation near the centre and large-scale industrial projects will be required to relocate them.”

As an example of the scale and importance of industrial renewal, the same report describes one typical area in Glasgow as follows:

“Through the rundown of a number of large concerns in an important industrial complex within the City, concerns which numbered their employees by the thousands, large areas of derelict and obsolescent industrial premises resulted for which no future use could be foreseen. As a result, they formed the nucleus of a very depressed area extending to over 1,000 acres and containing nearly 40,000 people—an area of unemployment, industrial dereliction, poor housing, old communications and a general lack of amenity. The whole area has been declared a renewal project by the Corporation of Glasgow, and a joint team of staff from the Planning Department and the University of Glasgow (Department of Social and Economic Research) with offices in the area are working together to prepare a total renewal programme to convert the area into an economic growth point.”

The changing functions of the central city also make the consideration of industrial relocation essential. In the more developed countries capital resources, both private and public, make urban renewal projects on a large scale possible. Moreover, space demands for highways, parking, slum clearance projects, and other non-industrial uses often force the displacement of industrial establishments in the public interest. In most cases,

relocation takes place in the suburban rings within the same metropolitan area.

In some countries, such as the United States, where politically independent municipalities within a single metropolitan area compete with each other for local real estate tax revenue, the central city makes every effort through improved access and transportation, urban renewal, and the use of industrial estates to retain industry, and the outlying areas make similar efforts to attract industry. While such competition is obviously not in the best interest of efficient development of the entire metropolitan area as a unit, it has been a powerful incentive to use industrial estates in connexion with industrial renewal and relocation programmes within the boundaries of central cities. For example, according to the United States Department of Commerce (1962a, p. 5), Providence, Rhode Island, in developing one of the first in-city industrial renewal projects, argued that:

“Rapidly developing local firms were leaving cramped congested quarters in Providence for outlying sites large enough to allow for expansion as well as parking, landscaping, and other amenities. If the city failed to provide in-town land suitable for local plant facilities, valuable tax revenues would be forfeited along with departing industries and jobs. As a start in solving the problem it was decided to develop a planned industrial park inside the city limits.”

In 1956, a 60-acre slum area in the City of Providence was converted into the West River Industrial Park. By 1959 thirteen local firms had relocated in the industrial park and employed more people at their new location than at their old one.

Similarly, a study made by C. Rapkin (1963, p. 59) of Utica, New York, United States, stated:

“The principal objective of industrial renewal is the provision of an adequate physical structure within which industry can efficiently operate without interfering with the prerogatives of private management in the process. We must make certain that each industrial establishment has a place in which it can afford to go before it is dislocated. This goal may require that one facility be built before another one is torn down. It may demand the extension of public financial aids, the granting of moving expenses to facilitate essential but costly shifts, and even the public construction of facilities in instances where private enterprise is unable to organize or finance a desirable undertaking.

“Ideally, an industrial renewal program would begin by encouraging movement to new industrial parks and continue with the establishment of new or rehabilitated industrial concentrations in the central core. Renewal of the core would demand a co-ordinated effort which

brought residential and commercial development into phase with industrial development."

In developing countries, capital scarcity and relative newness of industrial establishments limit the scope of urban renewal activities and the amount of relocation that is possible, so that the emphasis in urban development programmes will be on how to accommodate the location of new industries rather than the relocation of existing ones. Nevertheless, even in cities of developing countries there are industrial relocation problems, often as a result of major highway and public works programmes, and because existing plants outgrow their present quarters and need space for expansion. However, before industrial renewal, industrial zoning and possibly industrial parks are put into use in central urban areas of developing countries, account must be taken of special local characteristics and needs. Such programmes should be so handled as to preserve the advantages of centrally located small industries and workshops. These establishments provide substantial employment in their present location which does not require a daily journey to work and does not tax the usually inadequate public transportation system. These small industrial establishments, operating within modest physical facilities, absorb labour and will contribute significantly for many years to the industrial base of urban areas. Consequently, industrial estates as part of urban renewal projects should adapt their programmes specifically to the needs of the displaced small industries. Design and planning aspects of industrial estates and industrial buildings specifically intended for small-scale industry are described in United Nations, Department of Economic and Social Affairs (1962b, pp. 23—54). Such an adaptation will not be easy, for in urban renewal projects where centrally located land is much in demand, there will often be the temptation to serve large modern industries and to let the displaced small marginal establishments fend for themselves. Industrial zoning can also be helpful if it is applied in such a manner as to permit the preservation of industrial establishments within downtown residential and commercial areas, provided they are neither obnoxious nor a danger to public health.

However, it is obvious that within total metropolitan areas especially in those of the less developed countries, industrial renewal within the central city will be less significant quantitatively, due to scarcity of land, congestion, high costs and capital shortages, than industrial development on vacant land in the expanding periphery of the urban area. It is here that a combination of industrial zones, areas, estates and land banks as part of a comprehensive development plan for the entire metropolitan area becomes of fundamental importance. In this context the use of industrial estates becomes a significant and practical tool to guide industrial development to desired locations in the metropolitan area, to achieve economies in public services, to save on land development costs, and to utilize efficiently scarce land resources.

In some instances, effective use of industrial estates can be and has been made in converting such areas as abandoned airfields, military camps and reclaimed land to industrial use in an orderly, economical and efficient manner. An interesting example of this type, cited by the United Nations, Department of Economic and Social Affairs (1962a, p. 335), has been the Kwun Tong industrial estate in Hong Kong, built on 87 acres of reclaimed land which was formerly a refuse dump.

Since metropolitan areas attract industry in any event at the expense of other smaller urban areas, the question has been raised whether, in developing countries, it is necessary or advisable to offer the additional inducement of industrial estates, which represent an expensive capital outlay by the public sector, and whether as a matter of locational policy, it would not be more advisable to invest in industrial estates in smaller urban areas to attract industry and merely to guide the location of industry within the metropolitan area by means of industrial zoning.

No hard and fast rule can be made on these points, and decisions will have to be made in each case, depending on the policies of regional location and the goals of the industrial development plan. The main consideration is that enough problems are created by the dynamics of industrial land use in metropolitan areas to warrant a strong programme that will exploit the advantages and benefits of industrial zones, areas, estates and land banks as an integral part of the urban development planning process.

In smaller towns the problem of industrial land, both with regard to scarcity and cost, is much less acute than in the large centres, nor is the demand for industrial land appreciable. What is usually inadequate is the urban economic and social infra-structure. For these reasons, industrial estates are naturally more suitable than industrial zones or areas as incentives to industrial development of smaller towns. However, they will be effective only if they form part of a comprehensive and simultaneous development programme for all mutually reinforcing aspects of the community.

Application to the planning of new towns

The role of industrial estates in the development of new towns is particularly significant, but it will vary with the purpose and type of the new town to be established. For example, new towns may be satellites within a metropolitan area, or they may be independent self-contained cities. They may be dormitory towns or they could include a significant industrial employment base. They may be built from scratch on virgin land like Brasilia, or they may be an expansion around an existing nucleus. They may be planned in connexion with major installations or natural resource development projects, such as ports, hydroelectric dams, oil refineries, steel mills and mining, or they may be intended as national capital cities. Their purpose may be to take the "overspill" population of

large metropolitan areas, as in England, or they may be proposed as centres of agricultural regions in connexion with colonization, irrigation or other types of regional development programmes.

Provided that the specific industrial base and other characteristics of each type of new town are taken into proper account in the planning of industrial estates, areas and zones, the combined use of these elements is not only a suitable but an essential component in providing a sound economic and industrial base for a new town. Yet, a number of studies and reports indicate that at the inception of most new town projects not nearly enough attention has been given to the industrial base and the corresponding land and infra-structure facilities. This seems to have occurred with frequency in the construction of new capital cities. Thus, the United Nations, Department of Economic and Social Affairs (1966, pp. 27, 38) observed that: "Recent experience in the founding of capital cities indicates that unfavourable economic and social conditions prevail where a wide productive base is lacking," and recommends that: "The administrative, economic and political functions of a capital city should be supplemented by a diversified industrial and commercial base which could ensure a variety of employment for its population."

A more detailed study made by J. E. Hardoy (1964, pp. 17, 19) of the planning of three new capital cities, Canberra, Brasilia and Islamabad, states:

"... it is surprising how little importance the planners of the three cities attributed to the economics of the new capitals and of their areas of influence."

However, Hardoy goes on to say that,

"Of the three cities studied, it is undoubtedly in Islamabad that the need for a more diversified economic base was most clearly appreciated. The industrial development of Islamabad was a matter to which its planners gave attention, specifying the form in which applications for industrial sites were to be submitted (to the Capital Development Authority), the size of the sites (from 2,000 square metres to forty hectares), and the manner in which the city's industrialization was to proceed."

On the other hand, it is precisely the new town, where planning is possible from the start, that offers opportunities for creating an efficient and satisfying land use pattern. Such a pattern is almost impossible to achieve in the development of an existing urban area. As compared to the problems created by set land use and ownership patterns of an existing urban area, a new town offers unique opportunities:

- (a) The most suitable land can be reserved for industrial sites;
- (b) Sufficient land for future expansion can be reserved at the outset;

(c) Land for industry can be sited in locations which will establish an efficient and proper relationship between industry and other land uses, especially housing and the central business areas of the town, and between industrial location and transportation facilities;

(d) By integrating the functions of planning and development, the provision of public services and utilities can be fully co-ordinated with the construction of industrial estates;

(e) Timing and execution of construction can be related closely to the stages of over-all development of the new town;

(f) Financing of industrial estates can become an integral part of the over-all new town fiscal development programme, rather than an after-thought.

The first and most essential step will be the determination of the type of over-all industrial base for the new town: the types of industries, total employment, and the time staging of development. Based on such a programme for industrial development, the next step would be to allocate the necessary over-all amount of land and specific site areas for industrial use in appropriate locations in relation to other land uses and to all other elements of the new town development plan. It is at this stage that the concept of industrial zones would be most applicable, by establishing clearly the zones for different industrial groupings within the new town plan.

Experience has shown that large-scale industries such as oil refineries, steel plants and automobile factories, once they have made a location decision, usually have the resources to acquire and develop their sites, buildings and other directly related industrial facilities, so that they do not require assistance or incentives in form of industrial estates. What is principally needed in such cases is an allocation of adequate land or sites in locations that are suitable both from the industry's and the community's viewpoint. For this purpose industrial zones will in most instances be adequate.

The next step in new town development will be to provide these industries with the necessary external public services and urban infrastructure facilities such as access roads, communications, electric power, water supply, waste disposal, housing, community and commercial facilities, although some of the larger industries may be in a position to provide their own power and water supply and even housing and community facilities for their workers. Naturally, since we are talking about entirely new towns, it would appear almost self-evident that all of the above facilities would be planned in a co-ordinated fashion ahead of time and would be provided *ipso facto*. This, however, is often not the case, or rather it is done in the plan but not consistently followed up in the execution. Thus, with regard to these external facilities and services, co-ordination and timing of development become the most important elements.

In terms of organized and readily available land, buildings, facilities and services, industrial estates in new towns offer particular advantages for the grouping of medium-sized and smaller establishments. Moreover, there is hardly any doubt that in new towns where an opportunity exists at the outset to provide such facilities concentrated in a limited number of selected locations rather than in a dispersed and haphazard pattern, substantial economies in development and operational costs can be obtained.

One of the most important components of a sound economic base for a new town is a diversified mix of industries rather than reliance on a single type industry. This fact is so well recognized that it hardly needs to be mentioned. Nevertheless, it is an element which has been neglected in many instances. Reference has already been made to the limited economic base of new capital cities. Commenting on the location of India's large-scale industries in new and outlying towns, Britton Harris (1962, p. 274) states:

"Under alternative conditions, the very large industrial undertakings of the Union Government and the construction of new industrial townships for the production of steel and other basic industrial goods would provide an excellent umbrella for the further expansion of related industries, the training of an industrial labor force, and the growth of associated services and residential-service activities. Through wholly inappropriate planning, in my view, these new towns have essentially been zoned against further spontaneous industrial development."

Similarly, this writer has observed the absence of any efforts to create a diversified industrial base in new or developing towns around new port installations and oil refineries in several Central American countries, such as Acajutla in El Salvador, Corinto in Nicaragua and Puerto Barrios in Guatemala.

The United Nations Symposium on the Planning and Development of New Towns attached the greatest importance to the need for industrial diversification of new towns, especially in developing countries. Thus the United Nations, Department of Economic and Social Affairs (1966, p. 6), reported:

"Building planned new towns was often the only way to develop space-bound natural resources, such as iron and steel, coal and other resources (aluminium, oil, power plants, river valley projects, virgin lands and harbours). New towns constructed in developing countries seemed to be predominantly of this type . . . However, such resource development programmes often resulted in single activity towns, with their well-known economic and social dangers. The Symposium therefore recommended that measures for diversification of the economic and especially the industrial base of such towns, be part of the planning at the earliest stages . . . The Symposium further affirmed that

the need for a diversified economic base was imperative in towns of all types. This recommendation applied to the new capital cities as well as to new towns built to decongest metropolitan areas."

For developing countries with a rapidly growing population and a labour force consisting largely of unskilled workers, the advantages of a diversified mix of industries, both as to type and size, offer not only a better adaptability to changes in technology and industrial structure and to cyclical or seasonal aspects of the market, but help to obtain a better balance between capital-intensive and labour-intensive industries. Another advantage of installing small industries in new towns where large ones already exist, is to utilize efficiently the established infra-structure.

The industrial estate becomes an important tool for assisting the new town to obtain a diversified industrial base, since the industrial estate lends itself particularly well to serving clusters of diversified, though possibly related, small and medium-sized industries, rather than the larger single-purpose industry. Thus, even where the principal impetus to a new town development comes from one or a few basic major industries (possibly related to natural resources) an industrial estate can and should be effectively used for groups of smaller industries to achieve diversification.

This was well recognized in the United Nations, Department of Economic and Social Affairs (1966, p. 7) reporting on the Symposium on the Planning and Development of New Towns:

"Small industries often required services and facilities which very large industries could, if necessary, supply on their own. Though industrial estates alone could not, in most cases, be the justification of a new town, they could help to stimulate small-scale enterprises and contribute to expanding diversified employment opportunities in industry as well as in related trades and services".

An example of such an approach is seen in the Planning of the New Town of Guayana in Venezuela as reported by L. Rodwin (1965, p. 17):

"... Although the heavy industries constitute the principal activities of the region, they were largely capital-intensive and did not furnish enough employment. Other economic activities were not only anticipated but had to be encouraged. One means was to provide attractive sites and facilities for light industrial areas".

In two countries, at least, the Union of Soviet Socialist Republics and the United Kingdom, the planning of industrial sites and the provision of industrial estates has been given particular importance as a factor in providing an industrial base for new towns. According to N. V. Baranov (1964), in the Union of Soviet Socialist Republics "most new towns are industrial centres and their layout is affected by the location and organization of industrial sites", and the advantages of efficiency and economy of grouping industrial sites into industrial estates in new towns are emphasized: "By instituting co-operation among enterprises, pooling storage

facilities, and laying out access roads, service roads and blocks of industrial buildings and installations according to a rational scheme, the space taken up by industrial districts can be kept down and the land and civil engineering works can be used efficiently."

One of the principal objectives of the British New Town programmes has been to syphon off the overflow population from excessively large cities such as London and to provide an industrial employment base in the new towns. A recent survey conducted by C. M. Brown (1966, p. 15) of eight industrial estates in new towns located in the general London region indicated that no less than 59.2 per cent of the firms regarded the facilities afforded by an estate layout and a modern factory as major advantages of their new location, and "many executives were enthusiastic about the advantages that stemmed from a location within a community of industrial enterprises, often with complementary manufacturers".

One advantage of new towns is that there are many less constraints than in existing urban areas in determining and planning from the beginning the most suitable size, number and location of industrial estates in relation to residential, central business district and other land uses; to the transportation system; and to the over-all development plan. Of particular importance here—and of particular applicability to developing countries where resources are limited—is the role which industrial estates can play in achieving efficiency with regard to minimizing the journey to work, locating employment as close as possible to residential areas and to business districts while at the same time preventing traffic jams in peak hours due to excessive concentration of industries in single spots.

It is interesting to note that these criteria have been, or are being, adopted equally by the Union of Soviet Socialist Republics and by the United Kingdom in their New Town programmes, and that as a consequence, new theories are replacing old ones and the radical spatial separation between industry and residence is being abandoned, leading to a closer integration between these two land uses. The same principles apply equally to siting of industrial estates close to residential areas in existing urban areas of developing countries. According to T. J. Manickam *et al.* (1964) in a study on Trinidad "most important is the need to plan industrial and residential areas in close relationship to each other". These scholars support a distribution of industrial areas in different sectors of the urban area rather than in a single location in order to bring industry and residence closer together.

With regard to number and size of industrial estates, the previously cited survey by C. M. Brown (1966) of new towns in the United Kingdom concluded that "it is preferable that, rather than one very large industrial estate, there should be two or more medium-sized ones".

With regard to location C. M. Brown (1966) recommends that the principal industrial estate "be within easy access of the town centre and the neighbourhoods", and that only those industrial estates which specifi-

cally accommodate industries which cause nuisances, and which are by far in the minority (Brown states that "nine-tenths of the industry that has so far moved to the new towns has been light and clean"), be located at some distance. Citing specific examples, the study states:

"It is a distinct advantage of the industrial estate of Stevenage, that it is located within half a mile of the town centre, and in no way are the amenities impaired by the proximity of factories. Similarly, the centrality of the industrial estate at Welwyn Garden City has much to commend itself" (p. 17).

These recommendations are justified on the grounds that: external economies will not increase beyond a certain size; single large estates have experienced traffic problems due to excessive concentration of work people in one area; and movement from residence to work can be facilitated by minimizing concentration of employment in a single estate. With reference to external economies C. M. Brown (1966) states that "it is reasonable to assume that on an estate of, say, 200 acres, all the necessary facilities and services can be provided and that external economies are not likely to increase proportionately on larger estates". Sites and facilities should be provided in new towns for all types of industries, but those causing nuisances should be separated.

N. V. Baranov (1964, p. 7) states that similar principles have been adopted by planners in the Union of Soviet Socialist Republics regarding size, number and siting of industrial estates in new towns, as indicated by the following statements:

"Enterprises should be grouped together in industrial districts according to the nature of their output so that they can co-operate as closely as possible in the use of transport, engineering works, power and heat supply, and in the organization of building and storage. Health requirements should be strictly observed, and industries which do not emit offensive substances should be sited as close as possible to the residential area . . . A small town will usually have only one industrial district Large towns have more than one, especially where industrial enterprises differ greatly in nuisance value, transport requirements, and so on. Multiple industrial zoning eases the transport problem for the labour force and cuts down the distance between job and home."

In the United States, where zoning has traditionally emphasized separation between industry and residences, the sentiment is changing, and the Planning Advisory Service of the American Society of Planning Officials (1959, p. 8) advocates a closer integration, listing specific conditions for compatibility between planned industrial districts and nearby residential areas, such as absence of unpleasant or harmful effects, elimination of industrial traffic on residential streets and provision of buffer strips.

Planners in both the Union of Soviet Socialist Republics and the United Kingdom advocate, especially for small-scale, light industrial establishments, even a closer integration with residential and commercial uses, whereby light and service industries would be combined—in the United Kingdom, with shops and service industries in the neighbourhood centres of new towns (C. M. Brown, 1966, p. 18). In the Union of Soviet Socialist Republics, integrated industrial-residential-recreational areas would form “integrated urban districts” to be incorporated into new town plans in order “to bring the mass of the people close to their places of employment,” and to make the town “a more convenient and comfortable place to live in” (N. V. Baranov, 1964, p. 7).

By virtue of being eminently suitable to small-scale industries, and of establishing an orderly and harmonious development pattern of industrial land, the industrial estate concept lends itself particularly well to the promotion of such integrated development patterns, not only in new towns with a strong industrial base, but in connexion with planned large-scale housing developments, especially for workers’ families or satellite communities within metropolitan urban areas. In this respect, a similarity to the neighbourhood shopping centre concept can be observed. In fact, a new concept may be emerging here: the industrial-commercial estate as a nucleus for residential neighbourhood unit development.

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PART VI

*Pre-Project Planning for Industrial Estates**

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PRE-PROJECT PLANNING FOR INDUSTRIAL ESTATES

INTRODUCTION

THIS PAPER SETS OUT the main tasks to be performed in the pre-project planning of an industrial estate and some of the main considerations which must guide the performance of these tasks. These considerations are drawn up in the form of a "project proposal"; i. e. a statement by which the men who must supply the finance and the authority required to implement an industrial estate project can judge the merits of the proposal. Its preparation is a complex job. There are so many variables in industrial estate planning that there are numerous possible solutions. In a given set of circumstances, the essential point in working out the most appropriate solution is to ask the right questions about each important element of the problem. In any given problem, it should be fairly easy to determine which elements are important and which are not.

In this paper, an attempt is made to set out all elements of possible importance in planning and scheduling an industrial estate project, with a view to providing a frame of reference for the authority initiating the estate, by setting the planner's terms of reference, and for the planner, by providing him with a check-list which may be refined or corrected by his own knowledge and experience.

In preparing the paper the author has relied heavily on published works. A list of those found most useful and to which indebtedness is acknowledged is appended (see Bibliography, p. 232).

1. THE PROJECT PROPOSAL

The terms of reference of the person charged with preparing a project proposal for an industrial estate will vary with the purpose and type of the estate, the existence of a site or the need to select one, and with other considerations. The task may range from provision of a few partially-developed acres as a site for industry to construction of a fully-developed estate with prebuilt factories and a complex range of services. All or any number of the following elements may be included in the terms of reference, the common essential factor being the economic substantiation of the proposal.

Contents of the project proposal

A project proposal may include any or all of the following elements:

Statement of terms of reference and, if these do not make it clear, of the purpose of the industrial estate and the area required for it.

Description of the general area (town or region) chosen for the industrial estate location, its advantages and disadvantages and why it was preferred over other possible areas.

Description of the site proposed, in words and drawings, and of the alternative sites over which it was preferred.

Reasons for selecting the proposed site.

List of types and sizes of industries suitable for location on the estate based on assessments of feasibility and desirability.

Tentative layout plan for total development.

Tentative layout plan for the first stage of development, if the project is to proceed in stages. It is likely that there will be fewer unknowns in relation to the first stage, which will normally be a more precise plan.

Description of necessary utilities to be provided—roads, water, power, drainage, sewers and so on.

Reasons for providing or not providing ready-built factories.

Description of common service facilities recommended and justification of the proposals and recommendations as to how the facilities should be provided.

Estimate of the time required for each stage of work from inception to first occupation and to completion.

Recommendations in regard to the selling or leasing of sites or buildings, and charges for services.

Proposals for promoting the estate. If this cannot be done successfully within the framework of existing laws and agencies for the promotion of industry, a statement of what wider provisions might be needed should be drawn up.

Recommendations with regard to the organization required for the construction, operation and management of the estate.

Proposals for controls, including restrictive clauses in lease agreements or covenants.

Estimate of the capital cost of works for the first stage and for the total development.

Estimate of operational, administrative and promotional costs.

Over-all estimate of income and expenditure and of the return on investment (short-term and long-term) which can be expected.

Recommendations with regard to financing.

Statement of the benefits to be expected other than direct financial return, such as employment created and contribution to local taxation.

Purpose of the industrial estate

The objective or group of objectives to be achieved by a particular estate should be stated in clear and precise terms from the beginning. If the objective is incorrectly identified, the plan will probably be wrong; if the objective is unclear, the planning will be confused.

A clear statement of the objective should precede pre-project planning and, indeed, should determine the qualifications needed in the planners. Can one man do the job, or is a team required? Should the planner provide over-all economic substantiation, or is this available from an earlier regional study? What are the skills required—economics, architecture, engineering, town-planning, sociology, traffic-planning, or others? Specialized skills may of course be needed on the pre-project plan, but the statement of the objective will determine those most important from the beginning. If the planner is not given such a statement he must obtain it.

A discussion of industrial estates policies does not belong to this paper, but the following list of objectives—some of which may be combined—indicates the variety of programmes in which industrial estates may play a role:

- Implementation of a population distribution policy at the regional or national level;
- Encouragement of industrial growth in particular areas to provide employment where it is most needed;
- Promotion of industrial entrepreneurship, especially in the indigenous group of the population;
- Encouragement of growth in the industrial sector of the economy, especially in small-scale and medium-sized industries;
- Achievement of economies of concentration in industrial development in relation to services, communications and all other facilities;
- Exploitation of natural resources such as timber, minerals, oil, by a concentration of user-industries;
- Provision of conditions which will attract foreign investment and entrepreneurship;
- Positive zoning of industry in relation to town planning, urban renewal and slum clearance schemes;
- Decentralization of industry as a counter to urban concentration;
- Diversification of industry in a given location in order to achieve greater stability of employment and trade;
- Exploitation of advantages of locations such as proximity to river, sea or airports;
- Improvement of working conditions in industry;
- Increase of tax income to municipal and other authorities by encouraging new industries and facilitating the expansion of existing ones;
- Strategic distribution (in a military sense) of industry and/or of population;

Achievement of commercial profits in privately-sponsored industrial estate projects.

Relationship to over-all plans

An industrial estate is part of an economic and social environment extending initially over the area from which its labour is drawn, then over areas from which it takes its raw materials, power and industrial services, and over the area in which its products are sold. It is necessarily a part of the many economic and social activities in its environment. The former may include other industries, agriculture, distribution, services and tourism. The latter include housing, education, health services and recreation.

Ideally, planning should be for the region first and only subsequently for the estate—or, sometimes, system of estates—which will help bring about and form part of the total physical plan for the region.

A regional development plan has been defined in two specific ways (United Nations, Technical Assistance Office, 1964)¹:

(a) "A plan is a model of an intended future situation with respect to economic and social activities, their locations and land area required and the structures, installations and landscape which are to provide the physical environment for these activities; and

(b) "A plan is a programme of action and pre-determined co-ordination of legislative, physical and administrative measures designed to promote the change from the present to the proposed situation."

It is clearly more logical and ultimately more efficient to design the whole in outline before designing the part. In commenting on an earlier draft of this paper the United Nations Centre for Housing, Building and Planning set out the principles which would govern the approach to industrial estates with particular reference to regional planning. These merit quotation in full:

"In terms of over-all physical planning industrial estates can be an important tool for the expression of a policy of population distribution for a metropolitan or resource base region.

"In this connexion, therefore, it is important to think in terms of planning a system of industrial estates for a given region (or country) rather than a series of individual industrial estates to be planned successively 'as the need may arise'. The technique of planning a system in this fashion would not only ensure a better land use pattern for the region but would also facilitate the staging of development including the provision of the infra-structure and services.

¹ A full list of the publications referred to in this paper will be found in the Bibliography, p. 232.

"In regions which are partially industrialized it is extremely useful to undertake first of all a survey of existing firms to collect data on industrial types, site size, expansion needs and traffic generating capacity.

"An analysis of the data provided by such a survey will make it possible to construct much more realistic plans for future industrial estates. In addition, by combining such data with the industrial, employment and production targets established in the economic plan, economic goals and objectives can be translated into space requirements.

"The physical planning agency in co-operation with the industrial development agency can then select general locations for the industrial estates which will be required to provide for the estimated employment and production. In this phase the physical planning agency will take into account such factors as land capability for agricultural use and other competing claims. It will also consider such factors as topography and drainage, land ownership, ease of servicing, relationship to existing or proposed uses of adjoining areas, and accessibility to labour supply, port and airport facilities.

"Ideally, the final stage in this process is not to create merely industrial estates or industrial estates plus housing areas, but rather comprehensively planned centres, areas or districts which would include along with industrial estates, residential areas and centre core areas of shops, schools, churches, administrative offices and other required community facilities. The industrial estates would therefore be component parts of a comprehensive town plan on a conveniently small scale (micro-region) which would depend for its scale and character on its relation to the over-all urban pattern of the broader region within which it is located."

Clearly, regional planning and the above principles would provide the best basis for determining industrial location and for selecting the location and size of the estate. It would enable the industrial estate planner to take account of the total environment and of changes to be expected in that environment. Such planning should be backed by legislative measures to prevent undesirable development (for example, of industrial slums around the estate) and to secure desirable development (for example, of new housing made necessary by increased employment and standards of living).

The present paper must also, however, take account of situations where the planner may have to produce a proposal without the opportunity, time or resources to prepare a regional plan; and of situations where the location and/or size of the estate may be pre-determined. The following sections are therefore set out to cover all possible situations in a general way but they should, wherever suitable, be applied in the light of the principles and methodology quoted above.

As a minimum, in the absence of an over-all plan, the planner will have to take account of the immediate environment as regards housing, transport facilities and amenities. Unless he engages in this wider study, what would otherwise be an ideal estate could be choked by uncontrolled growth or starved by inadequate development in its surroundings.

An illustration of the desirability of over-all planning is afforded by the relationship between manufacturing industry and tourism, both of which may be important economic activities in the same region or country. It is obvious that they conflict in claims for land use, but it would be short-sighted to say that because one exists in a particular area the other must be excluded. For example, Puerto Rico promotes industrial location, tourism, and rum in one advertisement. The amenities which attract tourists may serve also to attract industrialists. A first-class hotel may be important in opening up an area to outside industrial development. Growth in tourist traffic will improve services by air, sea, road and rail and incidentally provide better services for industry. The solution to the problem of conflicting claims for land use, therefore, may lie not in abandoning one but in careful planning and zoning to provide the best possible conditions for both.

2. PRE-PLANNING SURVEYS

Size of industrial estates

In some cases, the size of an industrial estate may already have been determined for a particular location. For example, the planner may be told "We have 80 acres at this port on which we want to build an industrial estate" or "We want a 100-acre industrial estate here as part of the plan for this region". In such cases, the planner must verify that an estate of that size is economically feasible and can be supported by the existing infra-structure (including population) in terms of criteria for site selection such as those set out in section 3 below. If any part of the infra-structure is inadequate, the planner must state what is needed—for example, better roads or greater power supply—and balance the cost of such provisions against the alternative of reducing the size of the estate. Whether he determines the balance of advantage in economic or social terms will depend on the purpose of the estate, but even where the purpose is a social one he must set out the cost of achieving it.

In a few cases the size may be stated without reference to location. For example, it may be national policy to establish a 20-acre (8 hectares)²

² One acre = 0.404687 hectare.

industrial estate as a pilot project in the promotion of small industrial enterprises, the location to be that which offers the best prospect of success. In this instance the planner's task is to select among competing locations the one which will offer the best prospects for rapid occupancy of the estate by efficient and productive small-scale industries. Again, the size may not be stated but may be determined by available finance or by limiting factors in a particular location, or derived from a study of the types of industry likely to be available to the location.

It may be that there are no such precise limitations to size. The infrastructure may be adequate for a very large, or several smaller, estates. In these circumstances, are there any guides to the ideal size? Generally speaking, the bigger the estate the greater the economies that can be expected in developing the area and in providing buildings, services and facilities. Also, the bigger the estate is the more attractive it will be as a market for commercial suppliers of materials and equipment and services to industry. Factories on the estate will be better able to avail themselves of each other's productive resources as suppliers and subcontractors, thus tending to improve the profitability and productivity of all factories. Risks are better spread on a large estate; the failure of an individual firm will have less effect on the economy of the estate and on the community, and workers can obtain other jobs more easily. In these terms, therefore, the bigger the estate, the better.

But size also has disadvantages. Too great a concentration of workers in one area will impose strains on housing, commuting, and traffic movement generally. These strains may not be avoidable, or their removal may add new costs to the project that may defeat its economic or social purpose. The correct balance between these opposing considerations can only be determined in terms of the precise location of the estate. For example, very large estates are made possible in the United States because—among other reasons—the majority of people own cars and are willing and able to commute.

One British expert, Lord Holford, has stated that the optimum size of an estate for light industry is between 50 and 150 acres (20 and 60 hectares). He said that it could be assumed that 100 acres of light industrial development in full production would contain between 50 and 70 factories and employ between 4,000 and 6,000 workers. This is not an unwieldy size for correlation with housing estate or small-scale satellite development. The Clyde Valley Report recommends that estates should be larger than 50 acres wherever possible.

Another way of looking at size is from the viewpoint of administration of the completed estate, particularly where it contains rented factories and provides various central services and facilities. It has been suggested that from this point of view about 30 acres is a minimum, and 100 an optimum. But much larger estates could be justified in relation to special location advantages.

Small-scale and rural industrial estates

Much smaller estates than indicated in the preceding section may be called for in the realization of regional plans. Throughout the present paper, the industrial estate is considered primarily as a location for general manufacturing industry, where a wider range of utilities and services are provided, including in many cases some pre-built standard factories. Such estates call for the greatest detailed attention to their planning. But their existence does not, and should not, exclude the need for smaller industrial locations throughout a region.

The smaller industrial locations may simply be small developed sites located with regard to regional development proposals. Estates in this category will be tied in to the existing or proposed infra-structure of roads, power, water supply and sewerage. Labour will be available from existing nearby villages or proposed housing developments. The estates will not call for special infra-structure development and the question of economy of scale discussed in the last section will not arise or will be of little importance. Nor will there normally be a complexity of services calling for resident estate administration, so that questions of economy of administration will not be of serious weight. Such small estates fulfill a necessary purpose in providing logical industrial locations related to over-all land use plans and population distribution.

In agricultural areas the small estates accommodate local industries such as food-processing plants, food-packing plants, primary processing of agricultural raw materials, creameries and repair workshops for agricultural machinery. They may be combined with supply depots for agricultural requirements such as fertilizers, fuel and equipment. Their purpose will be the development of agriculture as well as the development of rural industry.

Another category of industrial estate is that which, though much more completely developed and serviced than the small estate, is still planned on a small scale. In this case the diseconomies of scale may be offset by social or economic benefits, especially in a developing country where the purpose of the estate is to promote small industry by providing it with incentives and services. Shortage of entrepreneurs, of skilled labour and of markets for products may place limits on size. The "demonstration effect" may be important, especially for the first few estates, and the achievement of economies of scale may then not be a paramount consideration. But whether or not the economic size is achieved, thorough feasibility studies must be undertaken at the planning stage.

Workers per acre and balance of employment

Related to the size of the estate is the question of the number of workers per gross acre. This will of course depend on the type of industry

and on the density of development. Accurate forecasts are impossible but rough forecasts are usually necessary. As a rule, industrial estates are devised for light industries. Heavy industry tends to prefer less restricted sites, in terms both of expansion possibilities and of use restrictions, and is in any case generally excluded by regulation from the estates. For an average development, primarily of light industry, a figure of 50 workers per acre (124 workers per hectare) would be normal within a range of 30 to 70 workers per acre.

Where existing industry in the region is representative of the type and size of industry likely to be located on the estate, a study of its size, employment, products etc. will give more precise data for planning. The estimates should show the numbers of men and women likely to be employed, for in any given social environment there should be a correct balance of employment of both sexes. These data are important for determining the types of industry which can be set up. There is also a social aspect: if there are many jobs for women and too few for men, the men will be unable to support families or will migrate to places with better prospects, with consequent social ills. Employment estimates are also necessary to determine requirements for housing and social amenities.

Types of industry

It is necessary in pre-project planning to determine with some precision the types of industry to be established on the estate. The less developed the economy, the greater is the need for this factor to be taken into account. An estate cannot be planned on the mere expectation that industry will settle in it; it must be known that there is scope for specific industries and that the needs of these industries will be met in the chosen location. Evidence in this regard will provide the main part of the economic justification of the project.

Where common services are to be provided, many of them, for instance training centres, supply depots and foundries, should be planned in relation to the prospective industries. Economic surveys are also useful for promoting trade, subcontracting or co-operative purchasing among firms. Promotion of entrepreneurship will be most efficient when it is directed in accordance with a list of industries most suited to the estate.

Surveys may range from the preparation of a list of "likely" industries, based on national import statistics, to detailed feasibility studies for each possible industry. The latter would call for specific examination of markets, materials, labour availability and suitability, supplies and services, production and distribution costs and many other factors. The site selection criteria listed below should be assessed not merely for industry in general but for particular industries.

Survey method

In the absence of a regional plan which should ideally precede site selection and which would indicate at least the general location of the estate, the search for the best site will normally be carried out in at least two stages: first, the selection of the most favourable general area (region or town) and then the choice of the best site within this area. These stages roughly coincide with two types of work: first, the desk research at the centre, followed by on-the-spot inspection of possible sites and their surroundings. Between these two stages, the data relative to the site selection criteria will be collected. How the work will break down between the stages will depend on the relative importance of various criteria (which in turn will depend on the purpose of the estate) and on the availability of information—including population and labour statistics, market data and maps—from central sources.

The most important part of the second stage will be a study of existing factories and workshops in the area. Ideally this study may form part of the regional planning approach suggested earlier, and in this connexion it should provide data on industrial type, site size, present employment, expansion needs and traffic generating capacity. It will in any case be needed to determine the types of industry likely to be located on the estate. In this regard the planner will be particularly interested in the possibilities of transforming local handicraft undertakings into modern manufacturing units. The study should also determine, at least in the more immediate vicinity of the proposed location, the services and supplies available to new industry and give valuable information in regard to markets. It should indicate the skills available in the area as part of the examination of labour suitability.

There can be no hard-and-fast rule about the extent of the area to be covered in the industrial survey or about the depth of the study. Whether all industries are examined, or all above a certain size, or merely a sample, will depend on many factors including the availability of statistical information, the importance of various factors related to the purpose of the estate, the level of the existing economy, and whether an urban or rural site is proposed.

3. CRITERIA FOR SITE SELECTION

The criteria listed below, while set out in relation to site selection, are also relevant to sites which have already been determined. Where the site sought is for a pilot project, special criteria may be needed. As a rule, the best location for a pilot project will be in or near a large town. The success of a project near the largest city will not prove anything about the possibi-

lities of estates as a means of correcting regional imbalance. But if a "demonstration effect" is the main objective, it may be best to locate the estate wherever success is most likely, even though the site may not be typical of future locations. It may be desirable to attach the estate to another growth nucleus such as a large basic industry—a steel-works, for example, or a major electrical generating station. Big projects like these will require transport, communications and other elements of social infra-structure which might also serve the estate. In this case the criteria below should be checked for the development of the whole industrial complex.

Labour availability

The planner should estimate the present and future population available for employment and establish the fact that it will at least be adequate. To do this he needs information on population trends relating to the rate of natural increase or decrease and of emigration or immigration; figures of unemployed and under-employed in the various possible areas; and information on existing employment and on any new demands on labour supply likely to arise. He should check on the proportion of the listed unemployed that is in fact suitable for industrial employment.

Changes in the pattern of employment are important. An area where employment is declining because of the passing of traditional industry (for instance, through depletion of mineral resources) or because of technical change (for instance, the increasing mechanization of a major industry) may not only have available labour, but labour accustomed to industrial life and having industrial skills.

The balance of existing employment should be checked. In estimating labour availability account must be taken of new service employment arising from new industrial employment. One United Kingdom estimate is that three people are employed in services for every two employed in manufacturing industry. Similarly, it is estimated that in the British New Towns, industrial workers will form from 17 to 20 per cent of the total population. A United States estimate gives eight service workers to every three industrial workers.

A drift of population from agricultural areas to urban centres also creates employment needs. Stimulation of industrial growth in smaller towns within the area from which people are moving is often resorted to in an attempt to check such migration.

Skills available in the area will be indicated by the study of existing factories and workshops. Examination of existing technical schools, of their output and ability to increase output, will also be needed. Information on where students go at present on completion of courses, both from technical and primary schools, will be valuable in the assessment of labour supply.

The labour supply should be within reasonable commuting distance, unless housing and community development are an integral part of the industrial project or unless they are promised (and this is a less sure base) in terms of an over-all development plan. There must be good roads to facilitate commuting and a rail link would be a bonus. The limit to commuting distance depends on the means of travel—cars, public transport, bicycles or walking, in descending order. The fact that very long distances are covered by commuters in some places should not distort the picture—this may well arise from lack of planning in the past and should not influence planning for the future. It should be remembered also that the modern industrial estate, with rare exceptions, consists of low buildings using electric power in pleasant landscaped surroundings. It is therefore unnecessary to establish the estate at a distance from housing. It is unlikely that any estate will be well located if it is more than fifteen miles from a population centre, and even this distance demands cars and public transport. Preferably the distance should be much less—the shorter the better.

If the site is located at a distance from existing housing, it will almost certainly be necessary to provide housing near the site, at least for those people who must be on quick call to factories. Where there is insufficient housing for the general work-force within a convenient distance, the alternatives of either providing new housing near the estate or improving methods of commuting should be examined. The solution may depend on the adequacy of existing housing for the new labour force. There are few areas with surplus housing, and in many of these the infra-structure is already so burdened that it may prove less expensive to provide new houses at the estate than to build them at the nearest town, particularly when costs of commuting are taken into account. These costs may fall in part on the industries, in part on the workers, and in part on the community at large and represent in total an economic burden which can be capitalized to relate directly to housing costs. If new housing is provided at the estate, the planner must be mindful of the need to have a sufficient population in the new area to support necessary facilities and amenities—schools, shops, churches and recreational centres.

Markets and communications

Markets and communications are related because the industrialist is concerned with accessibility to markets rather than proximity, though the latter will be important for small local industry. In many small firms frequent contact between the proprietor and his customers is vital. Actual distance will also be important where transport forms a large element of cost or where products are perishable. The general trend is for the work-

content of industrial products to grow and for the relative importance of transport costs to decline.

Population figures and *per capita* incomes are not the only indicators of a market. Large industries for instance, oil installations, or military establishments in otherwise sparsely populated regions may constitute useful markets for many types of industry. Import-export statistics—if available for the area—are valuable, and inspection of goods on sale in local shops can provide guidance. A survey of local industry also provides a source of information.

Highways are essential means of communications for most estate-type industry, and the estate should be linked to the national communication system or to a large urban centre. Railways are a bonus rather than a necessity, except in areas where the highway system is inadequate. Traffic forecasts may indicate a need for highway improvements to cater for the growing industrial and commuter traffic. The highway authority should undertake to carry out these improvements in a timely fashion. Where both highway and estate are paid for out of central funds, the anticipated cost of improvements will be a factor in comparing alternative sites. The site should desirably have a long highway frontage, not to provide additional points of access (which could be traffic hazards) but to aid in the promotion of the estate. Factories supplying local markets will be particularly interested in the advertising value of sites on the frontage.

Airports are growing in importance for industrial development, not only because they permit quick transport to market of high-value-for-weight products but because of the readily available supply of spares and urgently needed materials. Moreover, they facilitate supervision of industries set up by foreign capital, an important factor where the purpose of the estate is to attract outside investment and skills. Two examples from the Shannon Free Airport Industrial Estate illustrate the growing importance of air transport: one factory exports pianos by air, achieving thereby savings in speed to market, reduced crateage, and reduced breakage; and a data-processing firm punches and verifies cards for American clients, competing successfully in speed and price from a distance of three thousand miles.

Accessibility to sea ports is important, and is essential for export-oriented industries or industries using raw materials from overseas. In choosing a location, such industries will pay particular attention to distances from ports and to frequencies of sailings from these ports to various destinations. Good postal and telephone facilities are necessary to most industries, and industries with overseas connexions also need good telex facilities. Actual delivery time of letters to and from key centres should be checked as well as the loading on existing telephone exchanges and whether these can be extended in good time to take the new industrial load.

Supplies and services

Supplies and services are less likely to relate to raw materials (except in relation to a specific industry or say, to an estate aimed at using agricultural products) than to the availability of industrial hardware and the many services on which industry calls—from stationery to engineering maintenance. The study of existing factories and workshops will show the supplies and services which are available locally and those which need to be provided in the estate. Typical industrial requirements include foundry-work, plating, joinery, electrical services, plumbing and general engineering maintenance. Most of these services need not be located in the immediate vicinity of the estate, but their value diminishes the more distant they are from the site.

Local enterprise

As has often been stressed in United Nations publications, a fundamental condition of the success of industrial estate projects is that they should be integrated in programmes of broader scope, for instance in small-scale industry or regional planning programmes. Another condition is that regional and local authorities should realize the role and importance of industrial estates and work to help them succeed. It is conceivable that disinterest in industrial development—possibly because of other major pre-occupations such as tourism—would militate strongly against success even in an area favourable in every respect to industrial development. As a rule, interest in industrialization will be evidenced by the existence of plans and projects in this field.

The best and most helpful indication of the suitability of a projected industrial estate is the existence of a local master-plan relating industrial to over-all development. On the site one can quickly get an impression of how well or badly the local authority manages its affairs. Housing, traffic planning, roads, health services, schools, churches and public amenities are part of the necessary infra-structure of industry and their quality will influence its success. Other indicators are: service industries—electric power, gas, railways, air and sea ports—keen to increase their market; voluntary bodies—for instance, chambers of commerce—prepared to help; and prominent citizens enthusiastic for the project.

It is during the selection of the site that the developer is in the most powerful position to get bids for support. These can be in many forms and should be taken into the assessment. They can include cheap or free land; supply of main utilities to the site; development of connecting roads or needed housing; fixing of special rates of local taxation for new industry; provision of special educational facilities; supply of power, gas or water at low rates; direct investment in the project; and support in the promotion

of the project. The final stages of selection may thus be combined with negotiation.

Utilities

Power: An adequate and dependable supply of electric power is essential. This would favour sites near power stations or main high-tension lines. For average small-scale to medium-sized industrial enterprises, the available capacity requirement would be of the order of 1 KW per 100 to 200 square feet (9 to 18 square metres) of factory space, assuming full use of modern powered equipment.

Water: The general water supply pattern of possible areas should be examined first in terms of rivers, reservoirs and main pipe-lines. The nearer the site is to a main supply, the better. In the absence of an existing water supply the feasibility and costs of the required water will call for a specialized engineering study. The requirement for drinking and sanitary needs would be about 10 gallons (45 litres)³ per worker per day. Water will also be required for industrial purposes, fire-fighting, landscape maintenance and possibly factory cooling. These demands will vary greatly according to industry types, the estate plan and the estate location. Although there is a danger that any figure regarding water requirements might be misleading, it is necessary to have some preliminary planning guide in order to estimate likely total demand. An industrial development with mixed light-to-medium industry, with no very special water requirements (as would be the case for paper-making) and ignoring factory cooling, would have a total requirement of from 30 to 80 gallons (136 to 364 litres) per worker per day: a figure of 60 gallons (273 litres) could be used in preliminary estimates.

Sewerage: Sewer capacities (apart from storm water which may be treated separately) can be taken as equivalent to the water supply. If there is no existing system adequate for the new development, proximity to suitable disposal points (sea, large rivers, or land areas for treatment) will be important. It is assumed that all industrial effluents will be treated, if necessary, to conform with standards of acceptability for the general system.

Gas: Gas can be a useful bonus, necessary to a minority of firms, but the increasing use and availability of bottled gas reduces the importance of a town supply or of piped gas on the estate. The attraction of natural gas must be related to the probable duration of the supply.

In estimating utility requirements, allow for the housing—if any—to be built in association with the estate.

³ One imperial gallon = 0.045460 hectolitre.

Climate

In general the climate of a given area will be suitable for industrial development if people are already working there successfully. It may be necessary to remember this, particularly if the site location is being determined by someone from a more temperate area. Industry has developed most rapidly in climates which were not only harsh, but which added to the cost of production the need for heating factories. Hotter climates, particularly with architectural advances in the insulation and cooling of buildings, should be equally suitable for industry. Records of wind velocities and of earthquakes may be important not only in relation to site selection but in relation to building design.

Educational facilities

Educational facilities are referred to in part under the headings "Labour availability" (pp. 205-206) and "Local enterprise" (pp. 208-209). Educational facilities at all levels, and particularly at basic and technical levels, are important.

The existence of a university or a higher technological college is an attraction to many types of industry. Qualified men can be recruited readily. Top level technological advice can be obtained from the staff, and research and testing facilities are normally available. Special courses can usually be provided to meet specific industrial requirements.

Land availability and costs

In determining the size of the land for an estate, consideration should be given to the requirements for expansion and to the question whether reserve land should be purchased at the same time. Usually such an investment is desirable, because the industrial project will increase land values around it, and because zoning or planning controls may not be strong enough to protect the land from other development. In the absence of such controls it will probably also be necessary to acquire a "buffer zone" around the estate, particularly along highway approaches, to prevent undesirable growth in the surroundings.

The cost of land, relative to the total cost of the project, is unlikely to be a major determinant of location unless the site adjoins a large city. If it is associated with a large urban development, slum clearance or redevelopment schemes may indicate possible sites. Land ownership is likely to be more important, and a site which would involve several different owners, possibly with unclear or complicated titles, could mean long and serious delays in starting the project. The fewer the owners the better; and best of all is if the state or the local authority owns the land.

Site suitability

The ideal site will be level but well drained, with soil of good bearing quality and an arable top-soil to facilitate landscaping. It has been recommended that slopes should not exceed 1 in 10. A slope as steep as this would cause serious difficulty where large floor areas are required and particularly where factories will be expanding. Slopes of more than 1 in 15 or 1 in 20 will call for expensive "cut and fill" and will seriously interfere with access to factories from various points. The site should not be subject to flooding or subsidence. Test bores will be required to determine soil bearing conditions. A bearing capacity of about one ton per square foot would normally be ample. Piling should not be required for two-storey buildings or for normal industrial floor loadings. Taller buildings are the exception on most modern estates and the extra cost of piling for these is not likely to be significant in the total.

Availability of building materials and labour

The size of building jobs already carried out, and their cost, will be the best indicators for estate construction. In the absence of such data a careful examination of local materials, of the feasibility and cost of transporting non-local materials, and of available building skills will be required. This survey may determine the design of buildings: a good architect can design adequate factories which can be erected largely by unskil'ed labour if necessary.

4. PLANNING THE ESTATE

The standard factory

Whether or not the estate is to contain pre-built standard factories should be decided before planning begins. This will depend upon the purpose of the estate. An estate for the development of small-scale industries in a developing country will usually feature standard factories, the extra cost being considered as a necessary promotional expenditure.

The arguments in favour of pre-built standard factories are several and weighty:

(a) It has been widely demonstrated that a great variety of industrial operations can be carried out efficiently in non-specialized standard buildings.

(b) Standard factories can readily be leased, saving the industrialist capital expenditure at a developmental stage which makes great demands

on his capital. (Non-standard factories can also be leased but only to a specific type of tenant and re-leasing, if necessary, will be more difficult.)

(c) Standard factories enable production to start quickly—often a requirement for new industrial projects.

(d) They avoid problems and effort for the industrialist in a field in which he is unlikely to be experienced—that of construction and arranging for services.

(e) They can be so planned as to facilitate expansion, even where this is not forecast by the industrialist.

(f) They will improve standards of working conditions and hence of productivity in industry (but with restraint—lavishness would be uneconomic for the developer and the industrialist).

(g) They give the developer better control of the appearance, facilities and amenities of the whole estate.

(h) Rentals can be adjusted according to the purpose of the estate, whether it is to encourage a particular industrial development or to produce a profit.

(i) They can reduce the cost and increase the speed of building by making possible the use of standard components and building methods.

If standard factories are to be used, they are the basic building block of the estate, or of the part of the estate which they occupy; their sizes should be determined as a first step in planning. The sizes can vary enormously according to the purpose of the estate and one estate will normally contain several sizes.

It is generally desirable to limit the number of sizes of basic units on a given estate. A single, well-planned basic unit can be used in multiples to provide a wide variety of factory sizes. Keeping to this unit will give economies in standardization of components and in construction and will facilitate maintenance and repair. A well-designed unit can also give a pleasing harmony to the estate as a whole and will simplify the layout of blocks and buildings.

It is very unusual for a prospective industrial tenant to have such a precise picture of his requirements as will enable him to say: "A working area of 4,000 square feet would be too small, but I do not and will not want 6,000 square feet". If the area is big enough for him, he will usually welcome some undefined amount of extra space even when he is paying rent for it. In a general-purpose estate, therefore, the upward steps in building sizes can be fairly large.

Typical sizes of buildings would be: 400 to 1,500 square feet (37 to 139 square metres)⁴ for rural crafts, for small nursery factories in which new industry could develop to a stage of needing larger premises, and for service workshops; 1,500 to 6,000 square feet (139 to 557 square

⁴ One square foot = 0.092903 square metre; one foot = 0.304801 metre.

metres) for larger nursery factories, service workshops, and small developed industries; 6,000 to 25,000 square feet (557 to 2,322 square metres) for general industrial development; 25,000 square feet and upwards—usually in multiples of a basic unit of around 10,000 or 20,000 square feet—for larger industries.

Most general industrial estates use mainly basic units of sizes within the two middle ranges listed above. E. D. Mills (1965) has illustrated the use of a basic building unit of 450 square feet (30 × 15 feet) as a rural terrace craft unit, doubled to 900 square feet as a terrace workshop unit, doubled again to 1,800 square feet as a terrace nursery factory unit, or multiplied to give a standard factory unit of 9,450 square feet expandable to 27,000 square feet. In practice a larger basic unit would probably be used for the larger sizes to give fewer columns.

A similar approach is to use a few basic sizes in common terraces, with non-load-bearing side walls so that they can be removed to allow a firm to occupy more than one unit. Thus a terrace of twelve units each of 6,000 square feet (557 square metres) might be occupied by five factories each of 6,000 square feet, two factories of 12,000 square feet each, and one factory of 18,000 square feet. Further, the terrace can be so planned that the end units can be further sub-divided, say into four units of 1,500 square feet each.

An alternative to terrace planning is to build the standard units in lots which allow for expansion. Typically (as in Puerto Rico) the lot allows the factory to expand to double its initial size. These lots are discussed more fully on pages 218-219.

Which of these alternatives is better will depend on development costs of the lots versus terrace sites, and will be related to the speed of development. A terrace provides for economical site use and gives a good finished appearance but a terrace with empty gaps in it does not look well. While the completion of a terrace prevents expansion of factories within it, most industrial-estate-type firms can transfer to larger premises elsewhere on the estate without incurring inhibiting costs or inconvenience.

When the sizes of basic units have been decided, the shape can be determined by trial layouts on the site plan. Sides in a 2 : 1 ratio, commonly used or approximated, can be used for most sizes.

Detailed building design is a part of final planning rather than of the project proposal; but broad specifications are necessary for preliminary layouts and cost estimates. A number of factors should be taken into consideration. Factories will have three main sections: work floor, offices and toilets. It is also desirable that each factory should have an enclosed open yard. In smaller factories the office area will usually be under the common roof; in larger factories it is desirable to roof offices separately because of the lower and hence less expensive roof required and so that, if desired, the roof can be built strong enough to support

a second floor for expansion. Roof-supporting columns hinder work layout and work-flow, but long spans are expensive; roof spans selected (which determine the basic unit) will be a compromise between these two considerations. Any column sterilizes about 30 square feet (nearly 3 square metres) of factory floor around it and therefore involves a cost (which should be taken into account in reaching the compromise solution) of 30 times the building cost per square feet. The economic span for larger buildings is likely to be between 50 to 100 feet. The bay spacing will be governed by the type of roof and glazing used. Where building widths exceed 30 or 40 feet, or where factories are built in terraces, roof glazing rather than wall glazing will be necessary. For smaller buildings, E. D. Mills' suggestion for "portal frame structures with a bay spacing of 15 feet (4.57 metres) and a span of 30 feet (9.14 metres)" should be effective.

Other important recommendations made by E. D. Mills (1965, p. 24 f., 30) include:

"Buildings [in hot climates] must be designed so that walls and windows have the minimum exposure to the sun by placing the long axis on the average path of the sun and providing wide overhanging eaves to create shade.

"Buildings in any hot climate should be designed with cross-ventilation . . . In arid regions, where winds are hot and dry in summer and cold in winter, ventilation openings, windows, and the like can be reduced for comfort.

"Generally, temporary buildings are not cheap and they usually last too long, finally becoming inefficient and expensive eyesores."

Roof heights will affect costs. Light and medium industry, where forklift trucks are commonly used for the movement and stacking of goods, will expect heights to trusses of not less than 12' 6" (3.81 metres).

The costs of existing buildings, and the experience of builders in the area, will usually permit sufficiently accurate estimates to be made on the basis of specifications in very broad outline for the project proposal. Where these are not available, more complete design will be required for costing.

Floor design will depend on soil conditions. With reasonable subsoil, a 6-inch layer of dry-fill, and a 6 to 8-inch (15 to 20 centimetre) layer of concrete, smooth finish and dust-proofed, should meet most industrial requirements.

The use of air-conditioners or air water-coolers may need to be considered.

Multi-storey "flatted" factories are not considered, because they are more suited to urban re-development schemes than to industrial estates; as such, they must form a secondary part of a total city plan.

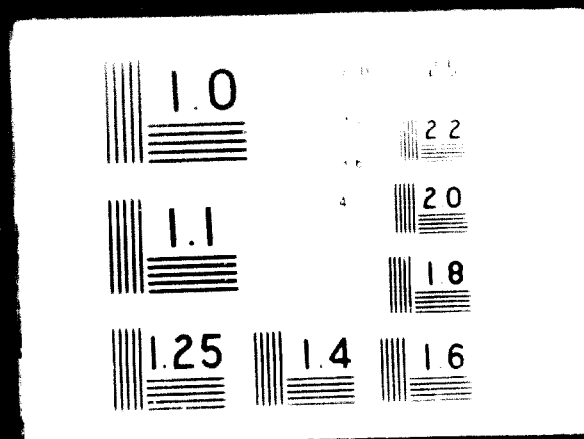


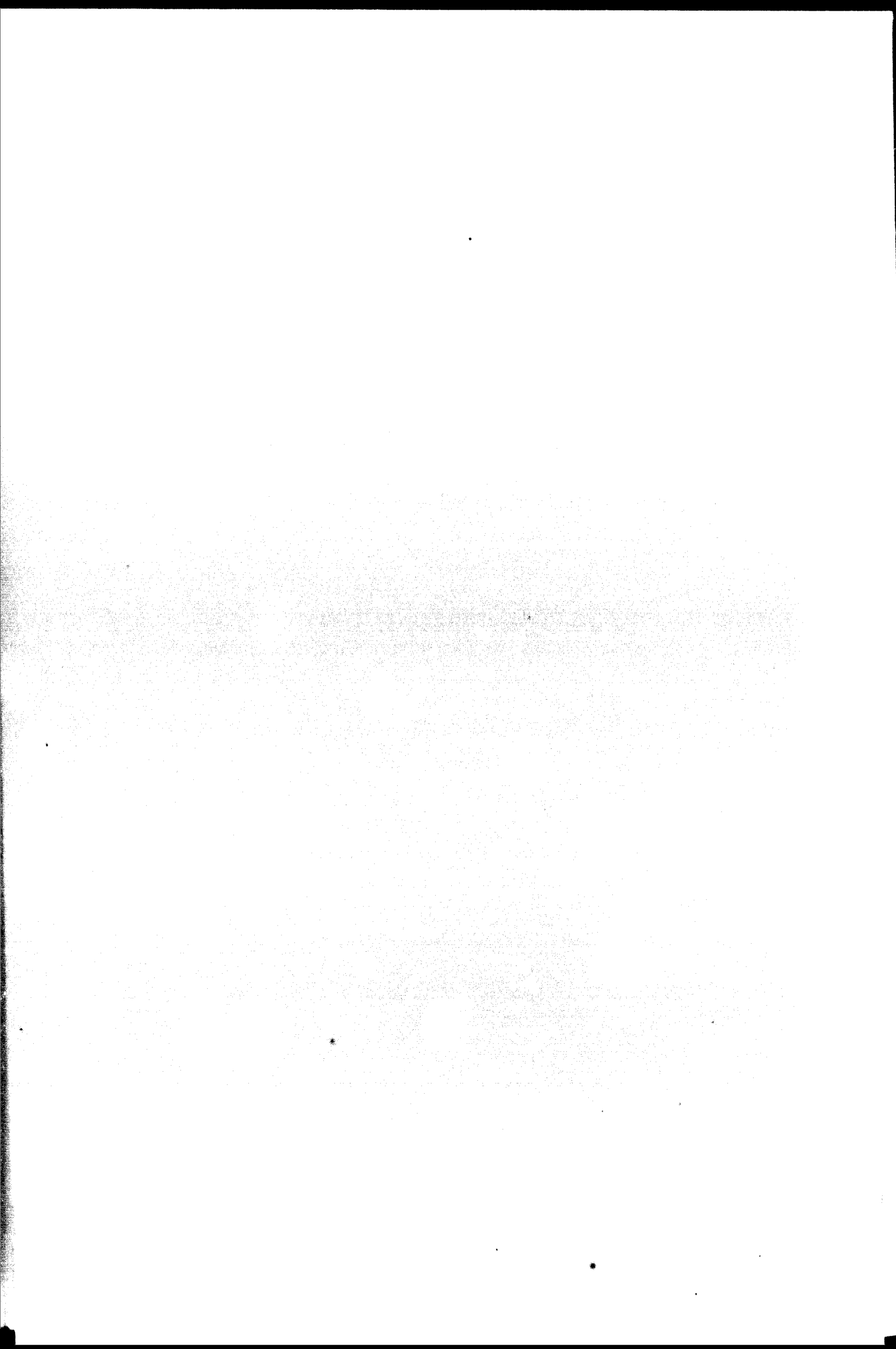
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Building standards, which will affect costs, have to be fixed in relation to the purpose and location of the estate. For example, if an estate is aimed at attracting foreign industry, both standards and rents should be competitive with locations in other countries. If it is aimed at promoting local small industry, standards should provide some improvement on existing buildings but within cost limits which will give acceptable rents. If it is close to housing, the appearance and standard of finish of factories will have additional importance. Also, costs of maintenance must be borne in mind at the design stage. A building cheap to build but expensive to maintain could be bad economy.

Roadways

Roadways must be designed in outline at the preliminary planning stages since their widths will determine the site layout and, together with their carrying quality, the costs involved. The main considerations in their planning are:

Roadways should be adequate for estimated traffic flow and provide against congestion between the main highway and any point on the estate where goods or personnel will be loaded or unloaded.

Roadways should give economy in development and not occupy an undue proportion of the estate area (say, not more than 25 per cent—a reasonable figure would be 15 per cent).

Roadways should not contain traffic hazards such as acute-angled junctions, multiple junctions, concealed junctions, mixtures of pedestrian, bicycle and vehicular traffic, or steep hills. Traffic should ideally be one-way. Vehicles should be able to be parked safely without relying on the brakes.

Road design should provide for the installation and easy maintenance of utilities including water, power and sewerage mains on verges.

Roadways should not be congested by vehicle loading or unloading, or by car-parking. These should be either completely separated from the roadway or in clearly-defined docks with limited access to the traffic-carrying road.

During the first phase of development some roadways may be paved only on part of their ultimate widths; but it is necessary to allow sufficient right-of-way from the beginning, with utilities so sited that they will not be covered by road-widening.

These considerations generally indicate a rectangular road pattern in so far as the shape of the site (including the desirability of using natural drainage runs) allows. Cul-de-sacs restrict movement and are undesirable where inter-communication between factories and access to central services are important, but may be necessary to open up

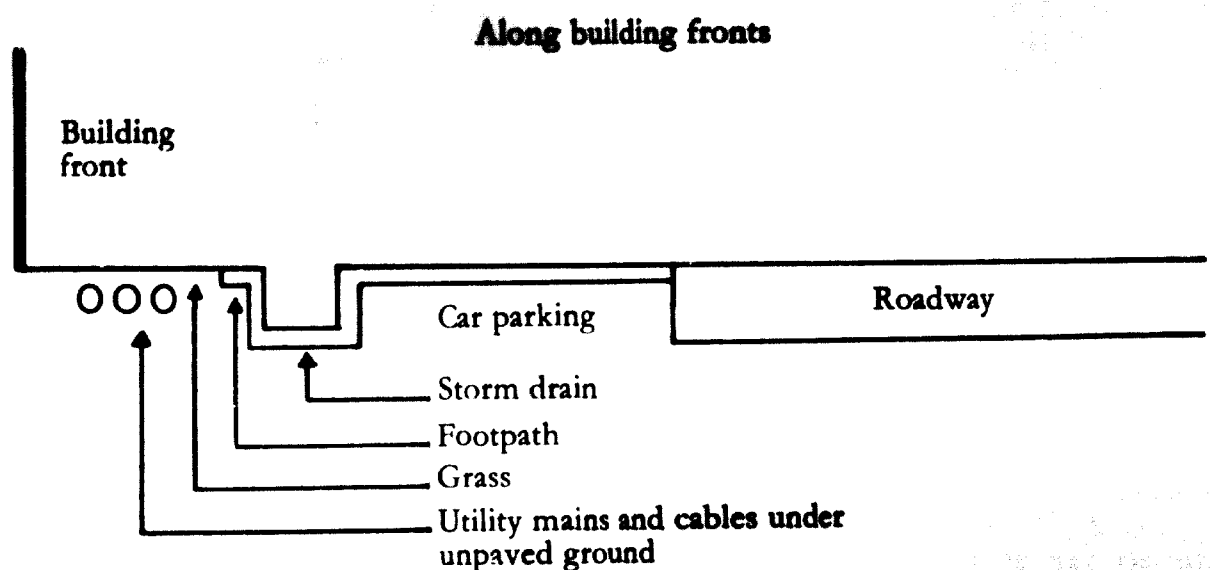
isolated sites. They also have advantages in eliminating through traffic and in reducing road and utility costs.

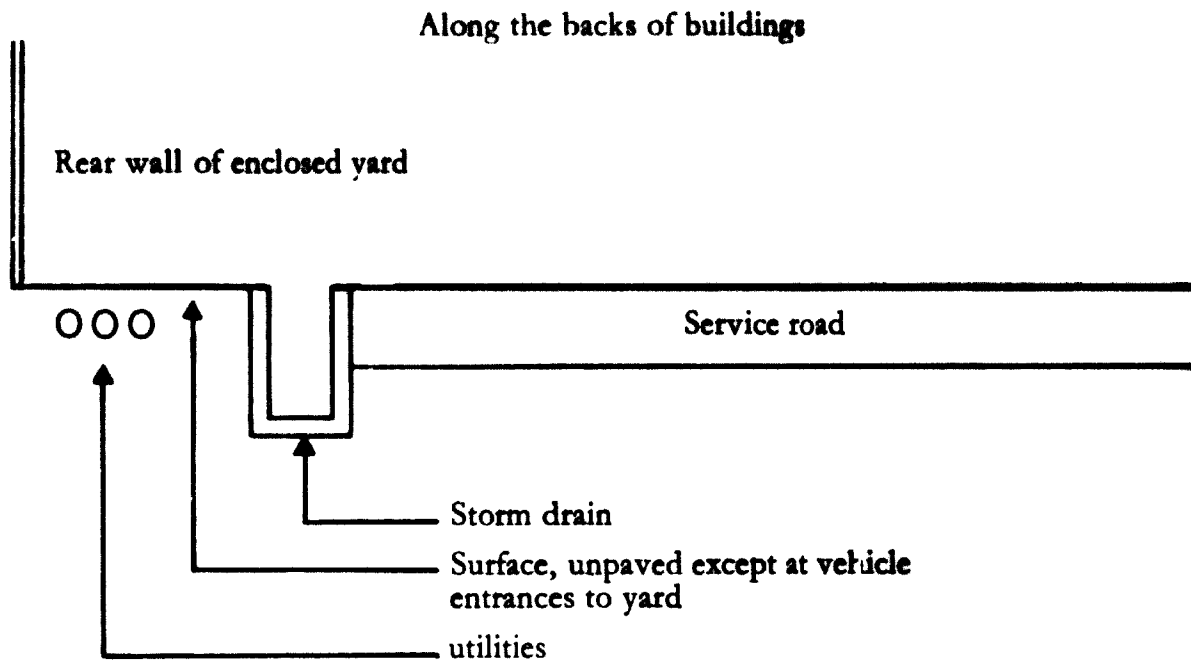
Roadway design is clearly subject to many variables and can hardly be discussed in a general way. One such variable is whether individual factory lots, containing their own car-parking and vehicle-loading areas, or terraced standard factories are to be used.

In the case of individual lots, roadways serve only for traffic flow and the main question to be decided is whether factory lots should be connected directly to the roadway, or whether interference with main road traffic should be limited by providing a subsidiary service road. Which of these solutions is best will depend largely on the size of individual lots. It is desirable not to have intersections with the main road at intervals more frequent than about 600 feet (183 metres); but the desirable will have to be related to the possible in terms of cost.

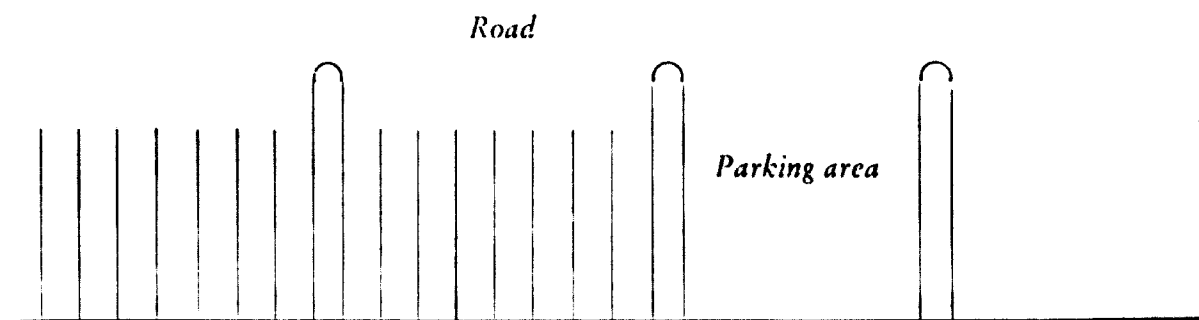
Terraced standard factories are used in so many estates (entirely or for part of the estate) that it is worth examining the road pattern involved in more detail. The terraced standard factories call for two types of roadway: a roadway for traffic movement and for access to the fronts of factories, with some parking provision along the fronts, and a service roadway for access to the backs of factories where the loading and unloading of goods normally takes place.

Typical cross-sections of such roads are shown as follows:





Normally building fronts (and backs) will face each other across such roadways, and the section on the left of the road will be duplicated on the right. Parking areas will be divided up by "fingers" to separate them clearly from the road, thus:



The depth of such parking areas would be at least 15 feet (4.57 metres); 18 feet would be better where it can be afforded. Utilities are kept under grass or unpaved areas for easy maintenance. Storm drains may or may not be covered throughout, and may or may not feed into general sewers. Curbs are normally provided to roads. Useful dimensions are: width of truck, 8 feet; lane for parking parallel to curb, 10 feet; minimum lane for moving traffic, 12 feet; minimum curb radius for trucks, 25 feet; for tractor-trailer vehicles, 40 feet.

It is desirable to choose a paved road width which is used in the general road systems of the area as drivers will be accustomed to it. Building, maintenance and repair methods and costs will be well known. Also, roads may later be taken over by the local authority. The width will depend on anticipated traffic densities and little guidance can be given. Existing estates have main roads from 24 to 50 feet wide; secondary roads from 16 to 38 feet wide; and service roads from 10 to 22 feet wide. (In the United States the dimensions are larger.)

Where many workers will be cycling or walking within the estate it will be necessary to provide paths separated from vehicle-carrying roads. While the street-lighting system need not be designed at this stage, provision for it must be made in cost estimates. Increasing machine values mean increasing shift-work, and the modern estate will need good lighting.

Railways

In practice, where an estate is served by a railway, the railway authority will normally be responsible for designing and constructing the stations, sidings, and connexions to factories. It is usual to run rails along the rear of factory lots, and it is desirable to sink spur tracks so that waggon floors will be level with factory floors (Bredo 1960). Level crossings should be eliminated or kept to an absolute minimum so as to reduce accidents.

Blocks and lots

The size of the blocks, that is, the areas to be subdivided into factory lots, each of which is provided with all the utilities, will determine the road plan. Their long dimension—along the road—will be set in terms of economy of road and utility lengths and ease of access to lots. Their depth (unless determined by the size of terraced standard factories) will be chosen both in terms of economy and in terms of affording flexibility within the range of factory sizes to be provided in that part of the estate. Generally, depths are favoured which will give a 2 : 1 rectangle to individual lots, with the short side along the frontage.

Lot depths in large industrial estates in the United States vary from about 125 feet to about 600 feet. Depths in the recently-planned Teeside Industrial Estate (United Kingdom) for small and medium industries average 300 feet for most sites. The shorter the depth, the greater the proportion of roadways to total area. To estimate the size for a particular estate, one should take the likely size of factory, add for trucking and parking areas, for outside storage space (where this is useful), for expansion space to be provided and for clear areas to be left around factories; then establish the 2 : 1 rectangle which would give this area. The longer side of the rectangle would be the lot depth which will be the same as the block depth where factories have front and rear access; or half the block depth where there is front access only.

What proportion of the total area should be covered with buildings? The "industrial park" concept of large landscaped areas around factories may be attractive, but too much open space would be a departure from principles of concentration, convenience and economy.

Where these benefits are important, the less open space the better. When we allow for open areas within lots—landscaping, car-parks, roads and loading docks—the built-up area should not exceed 50 per cent of the total area; United Kingdom research indicates that the figure should be one-third. Many estates permit building on no more than half the lot; some allow it on two-thirds. Open space for landscaping can usefully be combined with employee recreation areas.

It is usual to lay down a minimum distance between buildings and roads—for example, 75 feet from major roads and 10 feet from side roads. One purpose is to preserve access for fire-fighting.

Provision can be made for the expansion of terraced factories by using non-load-bearing side walls, so that the industrialist may reserve the plot beside his factory and, when it is built upon, remove the intervening wall. In the case of factories on individual lots, it is common practice to allow 100 per cent expansion space. If this is not used, it may be valuable for an adjoining factory which wishes to expand beyond 100 per cent. If this expansion allowance is inadequate for a particular industrialist, it will still be possible to make a special arrangement with him.

Parking facilities

Trends in car ownership are universally upwards. Unless ample provision is made now, factories may be severely inconvenienced in the future—even to the stage of re-location—or very expensive solutions, such as multi-storey parking, may have to be found. It is not necessary to make hard-stands for more than current needs but areas must be reserved, possibly as grassed areas which can be paved as required. If, in the future these areas are not required for parking they could still be used for factory buildings or for other estate purposes. By way of illustration: in Puerto Rico one parking space has been provided for each 12 employees; in the United States many estate covenants call for one space per 500 or 1,000 square feet of factory space, or for every 1 1/2 or 3 employees. Each parked vehicle will require about 300 square feet, allowing for manoeuvring space.

There are two general types of car-parks: employee parks, which may be detached from, but should be near to, factories; and visitor's and executives' parks, in front of or beside factories. It is usually desirable to provide for bicycles—the small areas involved can be beside factories, preferably inside yards.

Bus lay-bys for taking on or letting off passengers, and possibly a central bus parking area and shed, will also be required. The lay-bys should be spaced so as to be not more than five minutes' walk from any factory.

If a high level of car ownership is likely, a Radburn layout as

adopted in the Teeside plan should be considered. This involves road approaches to the backs of factories and car-free areas for pedestrians at the office ends. These car-free areas are finished as pleasantly landscaped courts, and road-noise interference with office operations is removed. Canteens can also be suitably located facing the courts.

Utilities

In the ideal situation where the estate is planned in relation to total community development, utilities such as water mains and sewerage will be provided most economically as part of, or as an extension of, the community system. Only where this is not feasible will an independent system be provided.

Water and sewerage mains (and power mains, where these are underground) together with gas pipes and steam supply pipes, where they are provided, should run alongside roads, preferably under grass or unpaved ground for easy maintenance access. Estates where buildings have deep set-backs from roadways (say 100 feet) may be an exception. In large estates with several utility mains, underground walk-ways may be considered, but these are extremely costly.

Water: Where expensive treatment is needed for available water, separate systems for potable and non-potable water may be desirable. Supply needs of blocks and of factories can be estimated as indicated in part 3 (under the heading "Utilities") to determine the sizes of mains. There may also be insurance requirements which would fix minimum sizes for mains. Where economically feasible, "ring" systems of mains should be used to reduce the danger of supply interruptions caused by pipe breaks, to enable sections of mains to be shut off for maintenance, and to prevent pressure drops when several users on the line are drawing water at the same time.

Sewerage: Pump houses and treatment plants should be planned to minimize pipe runs while avoiding nuisance from smells. Capacities required from any area can be taken as equivalent to the water supply to that area. Usually the system will be designed to accept normal domestic sewerage; trade effluents which do not conform to acceptable standards should be treated by the factory concerned before entering the system. Where large quantities of trade effluent are anticipated, a separate disposal system for these may be worthwhile but is expensive. Whether or not storm-water drains are connected to the sewerage system will depend on the total run-off and the rate of storm-water run-off. Most often, the storm-water system is best kept separate.

Power: It costs much more to bury electric cables than to run them on overhead poles, but the extra cost may be justified by greatly-improved

appearance and greater safety. This is particularly so in densely-built estates—for example, where terraced factories are used. Distribution substations, at which high voltages are reduced to user voltages, will be located on the estate in accordance with the anticipated load pattern. Main line capacities can be estimated as indicated in section 3, page 209. Close co-ordination with the electricity authority in planning and providing for growing loads will be essential. As with water, ring systems of distribution are very desirable.

Steam: Consideration may need to be given to the supply of steam for industrial processes and factory heating from a central boiler house. This may be an economic proposition for a densely-built development, where pipe runs and consequent losses will be small, and where it is possible to estimate closely in advance what total requirements will be. Otherwise it will be necessary to install or provide boiler capacities for the maximum possible load, which may never be reached. Unless steam is produced in conjunction with the generation of electric power, it is unlikely that a central station will be able to compete with individual oil-fired boilers in factories.

Zoning

The zoning or planned separation of different types of industry will:

Minimize nuisances caused by smoke, dust, noise and odours (clean air is required by many modern industries and can only be provided by disposing of the sources of air pollution at a sufficient distance or by eliminating them altogether);

Minimize risks from fire or explosion;

Reduce traffic hazards (for instance, by separating road and rail);

Enable needs to be met most economically (for instance, by grouping heavy steam-users around a central boiler plant, grouping rail users together, grouping nursery factories near common service facilities);

Provide the most attractive over-all appearance for the estate (for instance, by zoning standard factories according to size and separating them from individually-built factories which are likely to be of miscellaneous styles).

Grouping factories together merely because they have similar products is not recommended. Industrialists probably prefer to be at a distance from other factories using the same skills because of the possible unsettling effects on workers. Zoning is therefore partly a matter of prior planning and partly a matter of selection of industries and their allocation to suitable sites.

Estate services

The extent to which services should be supplied by the estate developer will depend on the purpose of the estate and on the availability and quality of services from commercial firms, the local authority and the state. Services can also be provided by co-operative arrangements between factories. To the extent that these sources can supply the needs, they can be rented premises, or licensed to operate on the estate. This will minimize the developer's commitment and at the same time enable him to secure a return from profitable services. Industrial services such as foundry-work, forging and woodworking may be provided by commercial entrepreneurs, if there are sufficient opportunities, or by the sponsoring authorities if the estate is aimed at promoting small industry development.

The following list covers the most important services provided on existing estates:

- Removal and disposal of industrial waste, combined with salvage.
- Fire and police protection.
- Canteens.
- Bus terminal for commuter traffic.
- Rentable warehouse space.
- Health service, ranging from a first aid station, as a minimum, to fully equipped medical and dental facilities.
- Post office and telephone/telex exchange.
- Bank, shipping and insurance agencies.
- Communal repair and maintenance workshop.
- Central garage for vehicle maintenance and repair.
- Training centre.
- Building and maintenance service.
- Customs and excise office.
- Showrooms for industrial estate products.
- Supply depots for industrial hardware, machines and general equipment.
- Recreational centres and playgrounds.
- Children's crèche.
- Central office services (ranging from translating, typing, duplicating, and printing, to data processing with the possibility of a computer service).
- Meeting rooms, club rooms.
- Advisory services and assistance in recruitment and selection, wage determination, industrial relations, welfare services, selection and installation of machinery, methods improvement, supervisory training, business finance, production management, and marketing.
- Foundry to supply ferrous and non-ferrous castings.
- Common leasing shop to lease out portable tools and other machinery, with skilled operators to guide in use.
- Woodworking shop.

Forging and heat treatment shop.
Toolroom to supply dies, jigs, etc.
Research and testing centre; technical library.
Weighbridge.

One of the advantages of an industrial estate is that its firms can use spare production capacity in sub-contracting for, or supplying parts to, other firms on the estate. For example, a firm with a plating plant or with injection-moulding machinery may not run at full capacity, but can offer a service to other firms. Thus, the total productive capacity of the estate is better used. Over supply of central manufacturing services would bring the opposite result—under-utilization of resources—and therefore must be guarded against.

The siting of central services requires careful thought. A "central" canteen must be sited in relation to walking distances and the length of the lunch-break; on a large estate this will call for more than one canteen.

Phasing estate development

The cost of developing land (providing drainage, roads and utilities) is high and therefore development is normally carried out in stages related to the rate of growth. No general rules can be laid down, but certain points might be borne in mind. The best attraction to industry is to have successful enterprises already on an estate, in a pleasant environment and supplied with all necessary utilities and services. Therefore the first phase should be achieved quickly and should be reasonably complete in itself. Development work on the first phase area should be completed as quickly as possible, so that buildings can be erected in an area free of heavy builder's plant and excavations and the dirt and inconvenience that go with them. Grassing, tree-planting and other landscaping should be commenced as soon as possible, if necessary fencing in the areas involved against disturbance by building operations. It should be possible to route constructional traffic for further areas around rather than through the first area. To achieve better promotion of the estate, the first phase area will probably be located near the main highway.

These considerations serve as a guide to the size of the first phase area. This area should not exceed what can be completely developed within two or three years. The size of successive phases up to the completion of the entire estate need not be determined in advance—experience will permit more accurate determination—but the over-all plan should permit development in logical steps, building work being separated from area development as far as possible.

Some works may need to be carried out full-scale at the beginning—for instance, embankments to prevent flooding of the area, or main drainage. Other works, such as water-mains or main sewers, may be carried out most

economically in full scale at the beginning as pipe size does not normally greatly affect the cost of pipe laying. Roads may be widened in accordance with growing traffic demands.

It is essential that utilities be phased so as to be ready to meet requirements in good time. If early industries encounter grave difficulties from lack of water, for example, the estate will acquire a bad reputation which will be difficult to overcome. Similarly, the need to phase housing and community development to industrial development calls for close co-ordination between the estate agency and the housing agency and may indicate that one agency should accept responsibility for both.

5. OPERATIONAL CONSIDERATIONS

Restrictions

Restrictions on the activities of estate industries are necessary in their own interest, and a good code of restriction will enhance the attractiveness of the estate to industry. The restrictions can be in the form of covenants between the industries and the estate agency, restrictions included in the lease, or licensing arrangements. They will also call for screening of prospective occupants. Whatever the mechanisms used, the restrictions should secure:

- Avoidance of nuisances—smoke, dust, odours—which would affect the operation of other industries.**
- Avoidance of hazards—fire, explosion—which could endanger neighbouring premises.**
- Maintenance of the estate's appearance by preventing unauthorized building (including fences and walls); by controlling sign-boards and advertisements; by preventing the dumping of waste; by limiting the uncovered area which may be used for storage; by providing for the preservation of landscaped areas; by specifying building set-backs; and by limiting building to a stated proportion of the lot.**
- Maintenance of utilities by preventing the disposal of harmful effluents into sewerage systems, and by enabling control to be exercised in the use of water—for example, by forbidding carwashing.**
- Maintenance of leased properties by preventing unauthorized interference with building structures; by restricting use of buildings to the purpose stated in the lease; by preventing unauthorized subleasing; and by requiring tenants to keep buildings in good condition.**
- Maintenance of any necessary degree of compatibility between factories; for example, by ruling out very large firms which might dominate the estate or too many firms producing the same goods.**

Rental versus selling

Whether it is best to rent or to sell buildings, or to lease sites on which the industrialist will erect his own building, depends on the purpose of the estate. Frequently it is desirable to offer all possibilities.

Renting of standard buildings has advantages for the developer and the industrialist. Standard buildings may, of course, also be sold. It is argued that the ownership of buildings ties the industrialist more effectively to the estate and to the community; when he is the tenant of a rented building, he can more readily locate elsewhere. This is not necessarily so. Ownership of a building gives the industrialist an asset which he can sell, and by doing so he may move more readily. Where the estate agency retains ownership it can participate in rising property values, adjusting rents upwards on termination of lease agreements or on changes of tenancy. The major argument in favour of selling (and circumstances may make it an over-riding argument) is that the estate agency recovers its capital investment more quickly and can re-invest it, if desired, in further development.

Leases can be drawn to cover any period of years—a lengthy period, to tie the industrialist to the estate, or a short period to encourage entrepreneurs in risk ventures and to enable rent adjustments to be made more frequently. All leases should be terminable on consent of the lessor, for example to enable a tenant to move to larger premises on the estate or to take account of a tenant's inability to continue through causes beyond his control.

Where standard buildings are leased, it is customary to have them completed to a "shell" stage, with final partitioning, electrical work, finishes and the like to be decided in agreement with the tenant, or to be provided by the tenant. Special finishes or alterations to the building may involve increased costs which might not be of value to any subsequent tenant. It is good policy to separate payment for these "extras" from "standard" rental and to collect it over a short period.

Options to buy may usefully be incorporated in lease agreements, to give the attraction of greater flexibility in arrangements and to enable the industrialist to defer capital commitments until his expensive establishment phase is past. Options are usually exercisable only within a limited period, say five years. The selling price at each year is fixed in advance and the extent to which this is made attractive (for instance, by allowing for rental payments already received) will depend on the rental or sale policy of the estate agency.

Rental charges need not be uniform over the years, and may be scaled upwards so that the industrialist's burden will be eased in the establishment period. The level of rents may be subsidized, initially or throughout, as part of a policy of encouraging industrialization. Nor need rental charges be uniform over the estate—they may be scaled according to location, for

example, with higher rents for buildings on the frontage of the estate or near central facilities.

It is frequently desirable to grant industrialists options on land adjoining their buildings, to facilitate expansion. The charge for options should take full account of the development costs of land, unless a subsidization policy applies. If it does, the option period should be strictly limited to encourage rapid full development of the estate and to prevent unsightly gaps in development. The option can be extended in individual cases if desired, possibly at a higher charge.

Administration

The skills required and the demands on management in developing an estate are different from those needed for operating the estate. Unless the estate is a very large one, involving new construction and heavy promotion over a long period of years, it is desirable to think of these requirements separately, even though they may be supplied by one administration.

Administration at the stage of construction and initial promotion—the need for which ends with the full development of the estate—can often best be supplied by a national or regional agency responsible for the development of several estates. However, this has the disadvantage that those responsible for shaping the estate are not directly responsible for its successful administration. There is much to be said for having the long-term administrator closely involved in planning and construction.

The change in management requirements as the project progresses through planning, construction, promotion and growth to completion indicates the desirability of having a flexible administrative and technical force. This can be provided by using consultants and contractors wherever feasible rather than building up a large “permanent” administration. Even for continuing tasks such as building maintenance and landscaping, the trend is to have these done by contract in accordance with carefully-written specifications.

Whether or not the estate is being established by a central agency, there will be a need for a strong local estate management with wide powers, subject to any necessary over-all policy, to promote the estate, to negotiate contracts, sales and lease agreements and to ensure the effective running of the estate as a whole. Depending on the purpose of the estate and on the need to co-ordinate industrial development with outside community development, it may be desirable to set up a local board of management which could include representatives of the local administrative authority, utility and transport authorities and local commercial interests as well as of the estate authority.

The tasks which may devolve on the permanent estate management will include:

- Construction of new buildings and utilities in successive phases of development;
- Maintenance of buildings, utilities and landscaping;
- Supply and administration of services;
- Promotion of the estate;
- Negotiations of sale and lease agreements;
- Co-ordination of outside services, such as transport for workers;
- Examination and approval of proposals for alterations to buildings, siting of advertisements, sign-boards, and so on;
- Application of controls to ensure that all conditions of tenancy and restrictive covenants are kept;
- Collection of rentals and service charges and preparation of control accounts.

It is impossible to generalize in regard to the size and organization of the management structure, which will vary according to the size of the estate, whether lease or sale policies are followed, and according to the extent of the services supplied directly by the estate agency. In developing the management structure it will probably be better to work back from the "developed estate" situation rather than forward from initial needs.

6. SPECIALIZED ESTATES

Specialization can be in terms of purpose (e. g. an industrial nursery); products (e. g. in order to use certain resources such as petroleum by-products); skills (e. g. to make more effective use of handcraft skills such as carpet-making or woodcarving); or location (e. g. a port location). Some considerations relative to this last type of specialization will be reviewed here, noting only that the other types of specialized estates, while having possible advantages in particular circumstances, may have the serious disadvantage of lack of diversification and hence lack of stability in times of industrial recession.

Port estates

Seaports are specially attractive to industries handling heavy or bulky loads such as heavy engineering, milling and many chemical industries. They are also attractive to export-oriented industries and to industries supplying shipping needs. The attraction is greatest when the port has a high frequency of services and is capable of handling large vessels.

The problems of industrial estate development near such sea ports are unlikely to be those of attracting industry (provided the labour supply is

available) but rather of estate planning in relation to high land costs, existing development, restricted space, public amenities, and integration with port facilities such as docks and warehouses. In most such places, therefore, estate development will definitely follow port development and the authority concerned will be the port authority. Where port facilities are non-existent or undeveloped, but where they could be provided and possibilities for industry are good, industrial development may be a primary concern, as was the case in the Italian port of Marghera. The success of Marghera is based on offering bulk industries (chemical, metallurgical, petroleum, etc.) their own waterside frontage and enabling them to provide directly all loading and unloading facilities (G. Giavi, 1962).

Airport estates

Rather different considerations generally apply to airports, which are becoming increasingly attractive as estate locations. Airports are newer and will normally have less existing development on their perimeters—indeed, they are often deliberately separated from existing communities. In addition to the location advantages already mentioned, airports are usually served by good highways which can also serve for the initial development of industry. (But road planning will call for special attention to ensure that the necessary ease of movement between the airport's terminal buildings and the city it serves is not disrupted.) The flat terrain in which airports are sited is ideally suited to modern one-storey factory buildings with large level floor areas; such terrain permits maximum flexibility in estate layout. The flat terrain also increases the need for attention to landscaping—trees should be planted at the earliest possible stage in the project.

Where a new airport is to be built, the possibility of associating an industrial estate with it should be examined and, if decided upon, the estate's location, land requirements and general layout should be taken into account in planning the airport.

Industrial location at airports, if planned in relation to runways and flight-paths, will not lead to any operational hazards or nuisance. Aircraft noise is usually of little or no concern. A relevant factor in relation to building location is the diminishing need of modern aircraft for a variety of runway directions to suit wind direction. In existing airports a study of the recent history of runway use may indicate the possibility of taking one or more runways out of commission in order to give wider scope in building location.

To quote a recent study (USA, Federal Aviation Agency 1965):

“A location which often is a good choice for the industrial park is on the side of the runway opposite the terminal. This is particularly true of airports used by air carriers, where diversion of industrial traffic from the terminal traffic boulevard is advisable. Also in this

area, airport supporting services are not competing for land to use for activities such as terminal auto parking and commercial concessions. A location in the vicinity of the general aviation area has the advantage of being close to the area where the aircraft will be stored and maintained. This location keeps ground taxi time at a minimum."

The same study states: "An airport industrial park should be at least 50 acres to justify the management effort required for planning, promotion, and continuing operation". This comment can be taken as relating to industrial estates in general and therefore would be subject to the qualifications set out on pages 200-201.

Housing, which will often be required at airport locations because of their separation from existing locations, will be more subject to noise nuisance than will factories; houses must therefore be located a sufficient distance from flight paths or insulated.

Special clauses will be necessary in restrictive covenants or leases. Smoke-emission will generally be completely banned, or permitted only within approved hours to permit blowing-out of burners. Radio-emissions will likewise be forbidden. Special attention will be paid to external lighting, and illuminated signs will be forbidden or restricted in nature or location so that there will be no danger of confusion with airport operational lighting. Similarly, specially shaded street lighting will probably be necessary.

Where the purpose of the estate is the modernizing of industry, an airport location can have an important psychological advantage in that the industrialist is in daily contact with the still new and rapidly advancing technology of aviation through proximity to aircraft activity and the facilities, architecture, services and personnel associated with it.

An airport may provide a good location for an industrial estate whether or not the industries there will use air cargo services. But the close availability of these services remains the most important industrial characteristic of the airport. The type of industry which will be attracted and aided by air cargo services is, as already mentioned, that which produces goods having a high value-for-weight ratio, because the extra cost of air over surface transport will have a proportionately small effect on the selling price. The amount of extra cost that can be carried with advantage depends on other factors. Fragile goods are likely to travel better by air, with consequently lower breakage loss and/or insurance cost. Perishable goods (dressed meat, fish products, and so on) may require air transport. Products subject to rapid fashion change—the colour of garments, for example—may gain in competitive advantage by greater speed to market (*Time*, 1965). Goods travelling in small lots to widely scattered markets, particularly where quick delivery is called for—machine replacement parts, for example—may also call for air transportation.

As pointed out in a recently published handbook (Groenewege and Heitmeyer, 1964), a "full and direct comparison of air and surface ship-

ment and distribution goes far beyond a simple comparison of transport rates, to cover direct shipping costs, indirect costs, and intangible factors".

Groenewege and Heitmeyer describe a "total cost approach" in which the main cost elements can be summarized as follows:

Transport charges.

Packing and crating costs. Packing and crating costs can be greatly reduced for air freight, and the weight saving will also be reflected in transport charges.

Pick-up, transfer and delivery charges. Pick-up and delivery charges are usually less than for surface freight, and there are no additional charges for transfers between connecting airlines.

Insurance premiums. These are much lower for air freight than for most surface transport.

Interest charges—capital turnover. "The faster goods are delivered, the sooner capital goes back to work."

Warehousing and inventory costs. "The most immediate and tangible savings result from the complete elimination of transit warehousing and related handling and wharfage charges, in the actual process of moving goods from one place to another. The second, and usually larger, group of savings is connected with storage warehousing, tied up with the holding of inventories, particularly in market areas."

Charges for documentation. Much less elaborate documentation is needed for air than for surface transportation.

Customs clearance costs. "At most airports customs clearance takes far less time, provided the necessary papers are available and in order."

Industries considering location on an airport estate may not be experienced in air transportation and it will be highly desirable to have available expert advice to help in assessing the transport economics related to their product. This can be supplied by airline cargo representatives; by qualified commercial shipping agencies; or by the employment of a specialist on the estate staff.

A final point is that the trend is towards a reducing gap between air and surface transport charges for most commodities. The applicability of air transport will extend to a growing number of products and many items now shipped by surface will certainly move by air in the future.

The ideal situation is where the estate can be located close to both a sea port and an airport. Aside from the communication advantage, there will be a good diversity of industrial development and a good balance between male and female employment since a sea port tends to attract heavier industry and an airport caters for lighter industry. Close organizational co-ordination between the port authorities and the estate authority will be vital and the project is likely to have the greatest over-all success where there is one authority responsible for all elements.

The possibility of giving the port estate duty-free status may be considered. This isolates the estate, in custom terms, from the remainder of the country and permits import of raw or partly-manufactured materials without payment of duty. Duty only becomes payable when the products leave the estate for the rest of the country. Dutiable goods coming into the estate from other ports can be brought in under bond.

Where the industries are concerned primarily with the home market, it is doubtful if duty-free status gives a worthwhile advantage. The benefit of the delay in duty-payment on imported raw materials will be offset by the work associated with customs clearance of goods to and from the home market. On the other hand, where the industries are mainly exporting and are likely to require substantial imports, duty-free status can give definite advantages. If these are to be fully realized it is essential to have a high-level customs officer on the estate, charged with advising and assisting the firms there, and to have minimum formalities associated with import and export clearances—only those formalities necessary for the collection of needed statistical information.

7. COMPLETION OF PROJECT PROPOSAL

Time and cost figures have to be applied to each element planned. Figures should be obtained from regional experience relative to each aspect of the work, and applied to the quantities or personnel involved in the proposal. Circumstances will dictate the limits of accuracy required: the more accurate the data, the greater will be the time and cost involved in preparing the proposal.

After the proposal is accepted, the next stage will be to prepare an over-all master plan related to each phase of construction, charted time schedules for each contract (at least simple bar-charts, though the complexity and cost of the project will probably justify more sophisticated critical path analysis techniques), and detailed contract drawings for the first phase. At the same time, the organization will be set up, any necessary legislation obtained, and land acquisition completed. One of the first tasks of the new estate authority will be to design its promotional campaign and to commence it in a timely fashion.

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PART VII

*Public and Private Financing of Industrial Estate Projects and Stimulation of Private Projects by Government Authorities, with Special Reference to India's Experience**

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FINANCING OF INDUSTRIAL ESTATES—INDIA

INTRODUCTION

AFTER THE SECOND World War, political developments in a large number of countries brought to the forefront the compelling need for economic development. The newly emerging independent nations had many problems to face—a major one being the need for speedy industrialization for raising the general standards of living. The process of economic development demands adequate resources, trained personnel, pragmatic planning and an efficient administrative machinery. But most of the developing countries suffer from the lack of these prime requisites, although they have the will and desire for economic improvement. In the process, the Governments of these countries have in most cases to assume an active role, providing the necessary capital, initiative, assistance and incentive, and at the same time employing various measures, either directly or through agencies and institutions, for achieving the desired results.

One of the important aspects of industrialization is the development of small-scale industries and one of the most effective instruments to promote these is the industrial estate. As a technique for development, it has long ago received recognition in some of the advanced countries such as the United Kingdom and the United States. In these countries, the industrial estate is used primarily as a device for planned location of industries or for development of backward pockets like the depressed areas in Wales. In the developing countries its principal objective is to promote industrial entrepreneurship. In some countries, for instance in Ireland and Malta, it is to attract foreign capital and enterprise. At present, 56 countries—12 in Europe, 3 in North America, 11 in South America, 16 in Asia and the Far East and 14 in Africa—either have established industrial estates or have programmes for their establishment (United Nations, 1966).¹

Among the industrializing countries, India has the largest industrial estate programme, both as regards number and geographical coverage. This programme is part of the country's programme of development of small-scale industries, the objectives of which are to create immediate and per-

¹ A full list of the publications referred to in this paper will be found in the Bibliography, page 255.

manent employment on a large scale at relatively small capital cost, to meet a substantial part of the increased demand for consumer goods and simple producers goods, to facilitate mobilization of resources of capital and skill which might otherwise remain inadequately utilized and to bring about integration of the development of these industries with the rural economy on the one hand and large-scale industry on the other.

The successive Five-Year Plans contemplated a comprehensive programme for the establishment of industrial estates, initiated by the central Government. The programme was a necessary step because the idea was new and central initiative and guidance were required to test it and to infuse confidence in other agencies. Today the industrial estates are mostly controlled and managed by the state governments. Their growth over the years has been remarkable as shown in Table 1.

Table 1

	<i>Number of estates</i>	<i>Amount allocated (millions of rupees)^a</i>
First Five-Year Plan		
(1951—1956)	10	5.8
Second Five-Year Plan		
(1956—1961)	110	111.2
Third Five-Year Plan		
(1961—1966)	300	302.0

^a Rs. 4.76 = \$US 1 before 6 June 1966; Rs. 7.50 = \$US 1 from 6 June 1966.

As regards the Fourth Five-Year Plan (1966—71), a Working Group constituted by the Government of India to assist in the drafting of the plan for small-scale industries has recommended an expenditure of Rs. 650 million on the growth and development of industrial estates and the establishment of new estates during this period at 149 urban centres and 700 growth points (small towns) spread over the country.

The growth of small industries being the *raison d'être* for the establishment and development of industrial estates in the country, it was only natural—having regard to the size and population of the country—that such estates should be formed in larger numbers in India than elsewhere, including perhaps the developed countries. The examples and illustrations in this paper have consequently been drawn mostly from India, although efforts have been made to refer to achievements in other countries.

This paper is concerned with the financing of industrial estates and the subject will be discussed according to the types of industrial estates (see Annex, page 256).

Leaving aside some very specialized types of projects such as research estates of universities, the various types of industrial estates have been grouped under three broad categories—the first relating to the sponsorship or ownership of the estates, the second to their location and the third to

their type of industrial activity. The sub-headings under the various categories provide for permutation and combination as it were, inasmuch as an urban industrial estate can be functioning on an ancillary basis or on a composite or functional basis, and can be owned or operated by the government or by a privately formed co-operative or corporation or can be "private assisted", that is, subsidized by the government. Similarly, a rural industrial estate can be functional or composite, and can be privately operated or be run or merely subsidized by the government. This would apply also to the industrial estates located in the suburban or semi-urban areas. As the subject of this paper is concerned only with the financing of industrial estate projects, the rules and regulations of the various types of estates, in particular those pertaining to the formation of co-operatives and corporations, have not been touched upon.

Table 2 indicates the position of the industrial estates as of 31 March 1965.

Table 2

	<i>No.</i>	<i>Rs.</i>
Total of industrial estates sanctioned by the Centre (increased from 300 sanctioned for the entire Plan ending 1966)	341	
Estates functioning	130	
Estates completed but not functioning	57	
Estates under construction or at preliminary stage	154	
Sheds constructed in all the estates	4,574	
Sheds allotted	3,941	
Sheds occupied for production purposes	3,425	
Sheds functioning	2,803	
Units functioning	2,416	
Units that have reported production	1,629	
Employment reported	43,698	
Half-yearly production reported		196,971,599

1. FINANCING OF ESTATES ACCORDING TO SPONSORSHIP OR OWNERSHIP

The question of financing of industrial estates is closely related to the nature of the sponsoring authority, and the suitability of a particular agency in turn depends to a considerable degree on the country's state of development and the policy it follows in regard to the respective roles of private enterprise and the state. This constitutes the primary difference

between the growth of industrial estates in the developed and developing countries.

Government and municipal industrial estates

The government sponsored and financed industrial estate has hitherto been the norm in the development of industrial estates in India, as—for obvious reasons—it would be in any developing country. Initially, in order to appeal to the minds of the people and the state governments, a demonstration of its utility in a concrete form was necessary. This task was undertaken by the central Government and thus the industrial estates at Okhla and Naini came into existence. In due course one such estate in every important industrial city was actively planned, but with the passage of time the programme was considerably enlarged and it was decided to form a whole network of estates.

Two experiments were tried at an early stage: one consisted of transferring the management and development of the estates to the state governments, and the other of transferring it to a government corporation, the National Small Industries Corporation Ltd. Thus two industrial estates, one at Okhla (since transferred to the Delhi Administration) and the other at Naini, were handed over for management and expansion purposes to the Corporation. The present position is that the state governments manage practically all the urban, semi-urban and rural industrial estates and are also entrusted with the formation and development of new estates under a system of loans and grants (described below) from the central Government which also prescribes norms and standards to be observed in the construction of the estates.

The Government of India and the state governments have not so far formulated any proposals for transferring complete industrial estates to private ownership and management on the basis of lease on rent, outright sale or hire-purchase. However, within certain industrial estates, occupation of individual worksheds by industrial units has been allowed on each of these bases. Moreover, plots of land have been developed in an estate, either directly or through a government corporation, for outright sale or sale on hire-purchase basis. In the case of outright sale, the sale deed is executed only after the worksheds are constructed. During the period of construction the Government or the corporation arranges for assignment of the lease of the land by the occupying units to a credit institution as security for obtaining term finance for the construction of the worksheds. In other cases, the Government has allowed units to construct worksheds in the capacity of Government's contractors, and thereafter to occupy the sheds either on outright sale or on hire-purchase. Occupation of worksheds on the basis of lease on rent is a common feature which is found, for example, in the Naini, Howrah and Millerganj industrial estates. Sale of constructed worksheds, either

outright or on hire-purchase, was allowed, for example, at the Baruipur industrial estate. The sale of developed plots of land, again outright or on hire-purchase, was undertaken by the Maharashtra Government at the Kandivli industrial estate. And lastly, whenever an industrial estate comes up in a "rural industries project",² the industrialists to whom plots are allotted in the estate are allowed to act as government contractors for constructing the worksheds and to occupy them either on outright sale or hire-purchase. In all these cases, however, whether the plots and worksheds are leased or sold, the estates continue to be government estates since their management continues to rest with the Government.

State governments in India can assist individual units located in government estates in a way which they cannot do for units located outside the estates. As has been indicated, some government estates provide for occupation of worksheds on the basis of lease on rent, while others extend hire-purchase facilities under which the instalment amounts paid by the units contain the rent. In both cases, the rent charged to the units is lower than the economic rent for an initial period of three to five years. Thereafter, the economic rent is charged.

Most of the state governments do not allow the sale of individual factories to third parties, for they are apprehensive that this would tend to destroy the group character of the estates. This rule, however, meets some criticism on the grounds that unrestricted saleability of assets induces the creation of equity, which in turn could release the government funds locked up in these estates for employment in further ventures of this kind.

To induce the state governments to fulfil the commitments laid down in the five-year plans, the central Government advances them the entire cost of the estate in the form of loans. Cost of the land and buildings is provided by way of a loan repayable over a period of twenty years, and the rest of the expenditure incurred in developing the land and providing the utilities is met out of a further loan which can be extended up to thirty years. These loans carry interest at the rate of 4 1/2 per cent per annum, which can be considered to be economic in the context of the prevailing interest rate structure.

In many other developing countries the picture is not much different from that of India, inasmuch as there, too, government industrial estates—and not private or private-assisted estates—play the major role. Thus, in Puerto Rico a government organization, the Puerto Rico Industrial Development Company, has been entrusted with the responsibility of improving certain plots of land, constructing buildings on them and renting or selling them to entrepreneurs. The programme is closely linked to the land use planning scheme of the Puerto Rico Planning Board which has over-all responsibility for land use and industrial zoning.

² See section 2, page 250.

In Jamaica, the Industrial Development Corporation, a non-profit government company, has established an estate in the vicinity of Kingston. The Corporation assists investors by selling factories or leasing them for five years—in the latter case, the lessees have the option to buy the factories at any time during the lease period. In Mexico, two industrial estates are being constructed—one by the Federal Electricity Commission which owns the land, and the other in the area of a new industrial township under development by the Government of Mexico. The Nigerian Department of Commerce and Industries has developed a small estate at Lagos as a pilot project with the idea of providing modern factory accommodation which can be taken on rent. The estate is well located and provides, among other things, the basic utilities. The department also constructs the factories and provides the necessary recreational facilities. The Sind Industrial Estate Ltd., a government corporation in Pakistan, organized in 1947, has established two industrial estates—one at Hyderabad near Karachi and the other at Mangopir on the outskirts of Karachi. The aim has been only to develop the land and provide the basic utilities. In East Pakistan, some industrial areas are being developed jointly by the East Pakistan Communications, Buildings and Irrigation Department and by the Industries Department. The estates mentioned, which are also for large industries, have been developed with loans obtained from the Government, the management vesting in the Board of Directors representing the Government and the industrialists. Rent subsidies for an initial number of years are being given in Malta, Puerto Rico, Trinidad and the United Kingdom.

There is a move in India, particularly in cities like Bombay and Poona, to get local bodies such as municipal corporations interested in taking up the construction of industrial estates, primarily because the local problems related to industrial estates have assumed significant importance; civic problems such as sanitation and transport have become acute with the growing demand for factory accommodation in these cities. The civic bodies normally raise their resources for financing their capital projects by bond issue, and this method can also be utilized for financing the development of these estates. However, the return on such investments being uncertain, the bond issue, to be successful, must be actively supported by the government, institutional investors and local bodies such as chambers of commerce. The dividend could also be guaranteed by the government.

Private estates

In the developing countries, private sponsorship of industrial estates has understandably not assumed a significant role. In view of the fact that the establishment and development of industrial estates involve large financial commitments with long gestation periods, it is natural

that private entrepreneurs are not adequately motivated to invest in ventures of this kind. Furthermore, most of the developing countries suffer from shortage of both capital and entrepreneurship. In contrast to this, in the industrially advanced countries such as Australia, Canada, France and the United States, diverse forms of private agencies have taken the initiative to form estates, and in Japan this role has been performed mainly by co-operatives. The railroads have also played an important part in financing the development of industrial districts in the United States because of the obvious advantages that are to be gained in the growth of freight-yielding traffic.

In India, particularly in the State of Punjab, the development of co-operative and non-co-operative private industrial estates is gathering momentum, and even individual concerns — both limited liability companies and partnership firms—are setting up small industrial estates by constructing workshops on surplus land in their factory areas for the purpose of letting them out on rent. Punjab—the wheat granary of India—had a large number of wholesale traders, called arhatiyas, who dealt in wheat when controls were non-existent and credit facilities from banks were plentiful. With the fixation of priorities, industrialization has received precedence over wholesale trading, and the arhatiyas are changing over to industry. The more well-to-do among them had lands in their name in the suburbs of towns and cities which they are now utilizing as sites for the construction of their own factories and for setting up small industrial estates, consisting of about a dozen workshops, for their less affluent friends and relatives. These industrial estates receive practically no assistance from the Government and their tenants usually function on an ancillary basis to the landlord-industrialists and enjoy the advantages accruing on this account.

To some observers, these estates appear to be gross deviations from the universally accepted concept and norms of industrial estates, but this criticism does not seem to apply to the somewhat larger estates sponsored by private agencies and certain public bodies. In Gujarat, for example, a chamber of commerce has decided to sponsor an estate by assisting in the formation of a co-operative society. Its members have contributed to the society's "owned" funds, and have taken the sanction of the Registrar of Co-operative Societies to apply for a loan, which may be as much as twelve times (this is a special case—usually it is ten times) the "owned" funds of the society from a credit agency in order to develop land and construct sheds. The loan is repaid in instalments scheduled to keep step with the progress of the construction work. Private industrial estates can also be formed in Maharashtra provided the site and the industries to be set up are approved by the state government.

In India, private organizations such as co-operative societies or limited liability companies are encouraged to set up their own industrial estates. For example, if co-operative societies collect a sum of

Rs. 100,000 by way of equity, they may obtain loans of up to Rs. 1 million, repayable in annual instalments over a period of eight to ten years, repayments commencing one or two years after the completion of the estate. The co-operative banks may advance the required loans to such co-operative societies by seeking refinance, if necessary, from the Reserve Bank of India. The state governments assist such co-operatives in the acquisition of suitable plots of land under the respective land acquisition statutes.

As regards limited liability companies, if they subscribe to equity to the extent of say, Rs. 100,000, it is not difficult for them to obtain reasonable loans from those Small Industries Development Corporations and Industrial Development Corporations that have arrangements for granting such loans. The amortization period of such loans may extend up to ten years, repayments being on an annual basis and commencing one or two years after the completion of the estate. The loans may be made available in suitable instalments to coincide with the various phases of the development and construction of the estates. This would ensure effective utilization of the funds lent, securing for the lender the advantage of supervision and control over the loan operations. Normally such financial proposals allow for adequate protection from the point of view of the lending institution inasmuch as the land and the other assets are automatically charged to its favour.

Private assisted estates

The differences between a private and a private assisted industrial estate on the one hand, and a private assisted and a government industrial estate on the other, are often not clear, and it may be useful to dilate somewhat upon the subject.

A private estate is promoted by a private agency which may itself own the estate, the entrepreneurs being tenants, or the entrepreneurs may be the owners of the individual plots and worksheds, the agency performing merely the managerial functions. In many cases the procedure is to allow the entrepreneurs to purchase the individual plots and worksheds under hire-purchase arrangements with the private agency. In addition to its managerial functions, the agency is then also performing proprietary functions but only as long as the hire-purchase amount has not been fully paid.

A private agency differs from a private assisted agency in that it receives practically no concession or incentive from the government or from government agencies, although it may be the recipient of commercial loans and advances from them. Further, the individual units in the private estate may receive from the government or the government agencies fiscal and other concessions and incentives as well as loans and advances (including hire-purchase loans) on concessional terms for meet-

ing their fixed assets and working capital requirements. This may give the impression that these facilities are being extended to the estate itself, particularly where all or the majority of the units are receiving them, but actually this is not the case.

A private assisted estate is operated by a private corporation. It may also extend outright purchase and hire-purchase facilities to its units, but the concessions and incentives granted by the government or a government agency may be directly extended to it or—to put it more correctly—through it to all the units.

A government estate may be run by a government-owned autonomous corporation or financed by a government investment bank.

The private assisted industrial estate is a compromise between the desire of the government that industrialists should construct estates on their own initiative, and the desire of the industrialists that the government should provide them with the necessary incentives to enable them to construct such estates, quite apart from the government incentives that the individual units, particularly the small units, receive. However, the schemes under which assistance to private estates is extended by the government or a government agency in the various developing countries, including India, are not many in number. This is in marked contrast to the number of incentive schemes that have been devised for the individual small entrepreneur.

The Government of India has recently made an arrangement with the Life Insurance Corporation of India, a government undertaking, under which the Corporation advances loans to meet the capital requirements for the setting up and development of estates by co-operative societies and joint stock companies. The co-operatives or the companies need to raise among themselves only 20 per cent of the capital for the purpose of the scheme, 60 per cent of the capital is to be provided by the Life Insurance Corporation, the balance of 20 per cent being advanced by the state government. The loan of the Corporation has to be repaid in thirteen instalments, the first instalment falling due three years after the first portion of the loan is obtained. The loan advanced by the Corporation needs to be fully covered by a state government guarantee, and carries 8 per cent interest with 1 per cent rebate for prompt repayment. An additional stipulation is that all general insurance of the estate (co-operative or company) and the occupant-units, including the insurance of machinery and equipment, should be placed with the Corporation's subsidiary, the Oriental Fire and General Insurancy Company Ltd. The purpose for which loans may be granted under this scheme is the development of land and the construction of sheds. Up to now, seven applications amounting to Rs. 3,013,607 have been made under this scheme and six applications amounting to Rs. 2,535,487 have been sanctioned by the Life Insurance Corporation. The Maharashtra Government is proposing to take full advantage of the scheme in the fourth Plan.

Foreign investments

Foreign investments in industrial estates, whether private, private assisted or government estates, can, like foreign investments in other industrial ventures, always be helpful to a developing country. Foreign investments can be either from private or public sources—in the latter case either from a foreign government or from an international financial institution. Although there have been quite a few cases in India of individual units operating in industrial estates entering into foreign collaboration agreements and successfully implementing the manufacturing programmes decided upon, foreign collaboration for the development of industrial estates has not as yet assumed sizable proportions. Foreign investments from private sources have been rather limited. This is most probably due to the high cost of supervision and administration involved and to the inherent risks in investing in a scheme in which a large group of entrepreneurs is engaged in different lines of production; such a group is held together only by the strings of a co-operative society or of a limited liability company, and the entrepreneurs can easily disengage themselves whenever they desire. In spite of the difficulties of securing foreign private capital, countries like Ireland, Malta, Puerto Rico and Singapore have attracted foreign enterprises to their industrial estates. And as far as foreign government financing of industrial estates is concerned, India is considering granting loans to Uganda and Tanzania to enable them to establish a few such estates.

There is scope for industrial estate projects to be financed by inter-governmental and international financing agencies. The Commonwealth Development Corporation (for Commonwealth countries), the European Development Fund of the European Economic Community (for countries in Africa associated with the EEC), the Inter-American Development Bank (for member countries of Latin America) and the African Development Bank (for African member countries) can finance, partly or wholly, the establishment of industrial estates in the developing countries concerned. This could also be done by the International Development Association (IDA) or the International Finance Corporation (IFC) (affiliates of the World Bank) through the governments or the national financial or industrial development corporations. The IDA is actually financing certain industrial estate projects in Pakistan. In November 1962, it provided a credit to Pakistan of \$US 6.5 million, a part of which was intended to finance two industrial estate projects—one at Gujranwala and the other at Sialkot. The loan is for a period of fifty years and repayments start after eleven years. No interest is charged on the loan, but a nominal annual service charge of 3/4 per cent is levied.

Assistance is given to a number of countries for pre-investment studies and planning of industrial estates under the United Nations Development Programme, that is, under the Expanded Programme of

Technical Assistance and the programme of the Special Fund. Fellowships for advanced overseas training are also awarded to the nationals of various countries participating in the industrial estate programmes.

Despite all these arrangements, foreign investments play only a small role in the promotion of industrial estates in developing countries, and the main sources of finance continue to be the central government and municipal bodies and private investors.

Equity and working capital

The two elements involved in financing the development of an industrial estate are equity and working capital—their amount determines the size and general layout of the estate.

Equity: Among the cost elements that have a direct bearing on equity, the first and foremost are land cost and land improvement cost. Acquisition cost and cost of land improvement constitute a sizable portion of the initial expenses involved in developing an industrial estate. Several factors such as location of land, type of land and time of purchase affect these costs. In developing countries land values rise rapidly when development takes place in the surrounding region, and very often governments have taken advantage of this: land purchased by them at low prices, which has been found to be in excess of requirements after the industrial estate has been fully laid out, has been formed into an industrial area and plots in it have been sold to industrialists at considerably higher prices.

The items that come up next for consideration are the installation of utilities—water, power, roads, drainage, sewerage, street-lighting and the like—then the construction of factory buildings and of an administrative building in the estate, and finally the provision of accommodations for a bank, post office, first aid centre, canteen, watch and ward and other facilities and amenities.

The cost of constructing factory buildings depends on a variety of factors, chiefly the cost of materials and labour, the layout and design of the buildings and the requirements of the prospective tenants. There are also other factors to be considered. While it is difficult to obtain finance for the development of land, financing the construction of worksheds in industrial estates is now an acceptable credit proposition in some countries. In fact, an element of competition among credit institutions is noticeable in this type of financing, presumably because it carries assurance of a better marketable security than mere improved land would offer. The estate authorities, therefore, should ascertain the cheapest source of finance for the construction of the worksheds.

Financing the construction of factory buildings in industrial estates has been taken up on a fair scale by credit institutions in the United

States. A private company, corporation or foundation sponsoring and developing an industrial estate can, after providing the initial equity, obtain financial assistance from mortgage banks, insurance companies, investment syndicates and real estate development and construction companies. The equity capital of the sponsor is usually used for improving the tract and installing the utilities, and the financial assistance of the mortgage and other banks is spent on the construction of buildings and the installation of plant and machinery. The larger industrial districts have been developed in this manner. The major part of the Los Angeles Airport Industrial Tract has been developed with life insurance funds. Also, insurance companies have purchased industrial buildings in several industrial districts and leased them back to the manufacturers on a long-term basis.

Working capital: Funds for meeting the working capital requirements of industrial estates need to be sizable if all the purposes for which such estates are established are to be fulfilled. Industrial estates are not merely intended for providing factory accommodation to industrialists, but are also meant to perform a promotional role in the industrialization of the country. This positive role, which consists of stimulating industrial entrepreneurship and modernizing existing enterprises—in particular those working in unsanitary and congested premises—by steering or relocating enterprises towards modern buildings located on a common site where a variety of services may be provided, is often forgotten by those who consider that industrial estates are not necessary as a tool for industrialization if industrialists are offered incentives in other forms. Factories situated in compact areas offer economies of scale of production, efficiency arising out of specialization and opportunities for inter-trading. They generally heighten the industrial climate as the entrepreneurs and the operating staff learn from one another and are encouraged to take advantage of one another's services. They offer industrial extension services and training as well as common service facilities such as central procurement of raw materials and development of common transport services, and associations are organized for fire fighting, for example, and for effective representation of difficulties to the authorities.

In order to play this positive role effectively, the industrial estate requires working capital for the provision of financial, technical and managerial services. If it is decided to pass on the cost of such services to occupant-units, this should be done on a "no profit, no loss" basis; otherwise the cost would not only suppress incentives but would even generate disincentives. The chart in the Annex gives a broad idea of the maximum working capital requirements of an industrial estate. Admittedly, every industrial estate need not feature all the facilities listed, but financial arrangements have to be made to provide those considered necessary.

As far as the managerial and technical services listed in the chart are concerned, funds spent on them may be recovered by the estate

authorities from the trainees or the occupant-units, as the case may be. The initial expenses may be incurred by the estate authorities from a government or municipal loan or grant sanctioned to the estate, and recoveries may be made subsequently in the form of proportionate payments or subscriptions from units or fees from trainees calculated on a "no profit, no loss" basis.

The financial services listed in the chart may best be rendered if the necessary arrangements are made with a commercial bank. The raw materials purchased by the estate authorities may be stored in a depot and hypothecated to the bank against accommodation; the release of the raw material may be arranged according to the requirements of the occupant-units against deposit of the cost by the units in the estate's credit facility account with the bank. The estate may undertake direct loaning to units against the hypothecation of their finished goods stored in a common warehouse, and in turn obtain advances from the bank against the rehypothecation of such goods. Of course the commercial bank would not be in a position to assist the estate authorities to issue guarantees, since a fund to support such guarantees would be necessary; for this, the government or the municipal body would have to sanction a loan or a grant. To satisfy the legal requirements, the estate should be a body capable of suing and being sued, and the estate authorities should have the necessary borrowing, lending, guaranteeing and mortgaging powers.

Stimulation of private projects by the government

It is often held that the formation of private estates can be accelerated if the government grants the individual occupant-units more concessions and incentives than those available to small units establishing themselves outside industrial estates. It is also thought that the formation of private assisted estates would be encouraged if, in addition to the occupant-units, the estates themselves are offered adequate concessions and incentives.

The incentives recommended for the dispersal of industries by the Committee on Dispersal of Industries of the Small-Scale Industries Board of India have a bearing on these observations. The Committee has divided the incentives into three categories as follows:

(a) Provision of social overheads—

- (i) Provision of factory accommodation at concessional rates of rent for a period of three to five years; or its provision for the purpose of purchase either outright or on hire-purchase basis.
- (ii) Provision of housing facilities.
- (iii) Provision of common service facilities.

(b) Supply of raw materials on a priority basis.

(c) Fiscal incentives which include exemption for five years from payment of sales tax, import duties, excise duties, octroi, municipal tax and income tax including corporation tax—the exemption to be made available by the process of refund.

(d) Other incentives—

- (i) Subsidized electricity, tariff and water charges.
- (ii) Credit facilities.
- (iii) Machinery on hire-purchase.
- (iv) Subsidy on freight charges.

The Government of India has provided relief from tax on capital gains where an assessee-unit sells its industrial property—such as a factory building—in an urban area to acquire a factory building at a lower price in a non-urban area. The latter area must not be an industrial estate, but in the case of a small unit it will almost invariably be an estate since no small unit would shift to a non-urban area unless an industrial estate is set up there.

There is another view on the subject of government stimulation of private projects which deserves careful examination. The starting point of this view is a rebuttal of the stand that both industrial estates and estate-units, which are generally small, require fiscal and monetary concessions and incentives to exist. It is claimed, at least in India, that private estates and their units do not require concessions and incentives, but only timely and adequate loan facilities, if necessary at normal rates of interest, to meet their recurring and non-recurring requirements, i. e. their working capital and fixed assets requirements. If the government can arrange for these loan facilities, it will provide sufficient stimulation for the formation and growth of private industrial estates.

It is to be conceded that in the long run the government industrial estates would need to become private assisted and then private estates, and their fixed and working capital requirements, both estate-wise and unit-wise, would have to be met institutionally. Yet in the initial stages, if the government takes this stand rigidly and does not perform even residuary functions—one of them being that of a lender or guarantor in the last resort—the formation and development of private estates will no doubt suffer. It cannot be said with certainty that credit institutions, if provided with an adequate cover for the risk by way of guarantee, will agree to finance estates and units which they consider sub-marginal; in fact, some of them would not care to finance at all despite an adequate risk cover.

Nevertheless, no opportunity should be lost in obtaining finance from the credit institutions, at least in respect to the estates and units which they consider good credit risks, with or without the extra risk cover. This will mean less government funds tied up. In order to reduce further the amount of tied up funds, the government can, by legislation, bring in also the municipal bodies (in India, the zilla parishads or district councils) as

guarantors and lenders to hold the last but one position in the line of guarantors and lenders, the last position being held by the government itself.

The estate authority could be brought in the position preceding that of the municipal body for the purpose of meeting the fixed assets and working capital requirements of individual units, provided the estates are made bodies that can sue or be sued and have borrowing, lending, mortgaging, guaranteeing and underwriting powers.

Finally, the credit institutions could be first in the line for lending to, and guaranteeing on behalf of, the industrial estates and the units in them. The position would then be that if a loan to a unit is not forthcoming from the credit institution, despite the estate's guarantee, the unit would approach the estate itself for the loan. Similarly, if a loan to an estate is not forthcoming from the credit institution despite the municipal body's guarantee, the estate would approach the municipal body for the loan. The estate's loan to the unit would then be guaranteed by the municipal body, and the municipal body's loan to the estate guaranteed by the government.

The guarantees could take two forms; they could be either guarantees of loans or underwriting of share issues if the estates or units are limited liability companies. In order to diffuse the liability further, the guarantee to the credit institution by the estate and the guarantee to the credit institution or to the estate by the municipal body may be insured with the municipal body and the government respectively, and the municipal body may in turn re-insure its insurance liability with the government. This could also apply to the underwriting obligations in the form of sub-underwriting and re-underwriting of issues. The sanctioning or refusal of a loan by the credit institution would need to be completed in a week, while the guarantees would have to be automatic, although they need not provide full cover. The percentage of guarantee cover could be higher for defence-supply units and units connected with agriculture or agro-industries, the estates with such units being in the majority. The percentage could also be higher where the units and estates serve the ends of export promotion and import substitution, and for rural and suburban or semi-urban estates and their units. It could likewise be higher when the industrial estate is situated in the free zone of a port such as the type of zone India has at Kandla port, or proposes to have at Haldia port.

The advocates of this scheme consider that with this procedure the sanctioning of loans will be considerably expedited and, because of the guarantees, such loans would also be need-based, that is, commensurate with the needs of the estates and the units. Moreover, there would be diffusion of liability, and—owing to the guarantees—the funds required for operating the scheme from the level of the government downwards would be small. The government would require only nominal funds to honour its guarantee and insurance commitments, and the municipal body or the estate authority could obtain funds to support its guarantee and insurance commitments

through the issue of bonds, the repayment of principal and payment of minimum dividend being guaranteed by the government. Finally, the protagonists consider that the scheme will institutionalize the sources of credit of the industrial estates and of their units; the credit institution will broaden its coverage of loans to such borrowers on the basis of a liberal approach which the guarantees would make possible. The government would be required to extend no direct assistance at all, unless it decides to grant concessional foreign currency loans to importing units against a loan from, say, the International Development Association, repayments being made by exports. Because of their guarantee commitments, the municipal body and the estate authority, being in the proximity of the estate, will—like all good guarantors—maintain a watch on the loans of the credit institution. The interest charges and guarantee fees levied on the borrowing estate or unit would not be heavy if they are deliberately kept low by the participating lending and guaranteeing institutions. This would be possible since the risk borne by each of these institutions would be considerably reduced and diffused; in fact, the guarantee cover furnished by the government and, if possible, by the municipal body, should be free of charge. The credit institution may not always have funds to spare for financing both the establishment of an industrial estate and its day-to-day transactions. In such a case, the government should extend adequate refinance facilities to the credit institutions so that its assistance to the estate does not suffer owing to paucity of funds at its disposal.

2. FINANCING OF ESTATES ACCORDING TO LOCATION

Urban, suburban or semi-urban and rural industrial estates

As is to be expected, the popularity of urban industrial estates, both in the developed and developing countries, is on the increase (149 such estates are expected to be established in the Fourth Five-Year Plan in India). This increase is due to the numerous facilities available in such locations, facilities (particularly for the production of the more complex types of goods) which may not be available to such an extent to the semi-urban and rural industrial estates. In view of the development effort made by most central and local government authorities, some elementary facilities such as water and roads are likely to be found in rural areas, but others such as power, trained labour and markets will usually be lacking. Even when the market for certain goods, for instance agricultural implements, is essentially in the rural areas, manufacturing is usually undertaken in urban areas because of the availability of skilled and relatively cheap labour and the proximity to markets for raw materials. The primary obstacle to the establishment of industrial estates in rural areas is the lack of investors interested in the development of such

estates and of entrepreneurs interested in operating there. Because of this, rural industrial estates in India have been developed almost entirely by the state governments, and the few industrialists-tenants functioning there have been induced to do so by various promotion measures and operational subsidies such as rebates on electricity and other charges. Understandably such subsidies have to be sizable to enable the entrepreneur to maintain, for example, some specialized and skilled workers and supervisors on wages higher than what would be payable in cities, or to pay for the higher cost of transport of raw materials and finished products owing to the estates being situated in relatively remote areas.

Despite the above-mentioned obstacles, the necessity of industrializing rural areas in a country like India, in particular through industrial estates, cannot be overlooked, primarily because of the social content of such a programme. India has 564,718 villages (1961 census) which have a population of 359 million out of a total population of 439 million. It is only right, therefore, for such vast multitudes to demand and expect a share in the process of industrialization. The Government has recognized this and is considering the feasibility of launching a programme in the Fourth Five-Year Plan to establish rural estates at 700 growth centres in the country. But the programme has a lacuna which must be filled before its success is assured, for it can be said straightaway that no enterprise will go to a rural estate unless it is sufficiently compensated for the disadvantages it will suffer on account of its unfavourable location. The Punjab and Maharashtra Governments have realized this, but the incentives provided by them are insufficient. The Punjab Government grants a 15 per cent rebate on electricity charges to units in rural estates, which is higher than a similar concession granted to units in urban estates, and the Maharashtra Government pays for the acquisition of land required by co-operative estates establishing outside Greater Bombay; the land is thereafter made over to the co-operative on a thirty-year extendable lease and at a 5 per cent *per annum* rental. The other terms of this scheme are:

(a) Provided the society raises 20 per cent of the total cost of the project by way of share capital from its members, the Government will grant a matching loan of a like amount without interest, returnable after fifteen years in one lump sum, on the condition that 1/15th of the loan amount is credited to a sinking fund every year (this is done by the Government actually subscribing to the share capital of the society to that extent);

(b) If for the remaining 60 per cent of the total cost of the project, the society obtains a loan from the Life Insurance Corporation under the scheme described earlier,³ the Government will stand guarantee for the loan.

³ See section 1, page 237.

Although this scheme applies also to existing estates or those being established in Nagpur and Poona, it is essentially meant for rural estates. Such estates have been established at Kolhapur, Kurla, Ichalkaranji, Sangli, Nanded and Parli.

Rural industrial estates have recently been established—within areas classified as “Rural Industries Projects” under a scheme sponsored by the Planning Commission—at the following centres in India: Anantapur, Kathua, Hiranagar, Anantnag, Shopian, Kozhikode, Durg, Rajnandgaon, Bhilai, Hubli, Malerkotla, Kangra, Sunam, Dehra-Gopipur, Phulpur and Solan. A rural industries project covers practically the entire district in which it is located, excluding the headquarters town or city. The units located within the project are granted hire-purchase facilities extending up to a period of twenty years of capital assets for the acquisition. The units located in the rural industrial estates in these projects also enjoy these facilities.

The necessity for developing semi-urban and suburban industrial estates arises primarily out of the concentration of industries in the larger cities where, because of the growth of factories in residential areas, the localities become unhealthy. The dispersal of industries to semi-urban areas without attracting them into industrial estates is no doubt possible, but this should be avoided if the future generations of people in these areas are not left to face a situation similar to which the residents of the larger cities— from which industrialists are being persuaded to move out—are at present experiencing. The dispersal of industries to suburban industrial estates, which is more or less under state patronage, is gaining momentum in the areas of Bombay and Poona. The expenses incurred in the transfer of machinery and equipment from the city areas falling within the development plans of the Bombay Municipal Corporation, to the suburban estates being developed by the Corporation, are in part borne by the latter. The Bombay and Poona municipalities have schemes to reduce congestion in the city areas by developing suburban industrial estates. Sites approved by the Government are developed by these municipalities into estates, and thereafter the plots are leased or sold to small industrialists, sometimes on a hire-purchase basis, for the construction of sheds. The industrial estate at Hadapsar (Poona) has been constructed in this manner. The following suburban industrial estates have been developed in the Bombay and Poona areas either by the Government, the Maharashtra Industrial Development Corporation, or the municipalities: Goregaon, Hadapsar, Kandivli, Kurla, Lonavala, Malad, Marol and Wagle.

The distribution according to location of 102 functioning industrial estates in India is shown in Table 3.

Table 3. Distribution of 102 functioning industrial estates according to location^a

	No. of estates	Total area		Average area per estate	
		Acres	Hectares	Acres	Hectares
Urban ^b	57	2,183	884	38.3	15.5
Semi-urban ^c . . .	29	646	262	22.3	9.0
Rural ^d	16	148	60	9.2	3.7
Total	102	2,977	1,206	29.1	11.8

^a The data relates to 30 September 1964.

^b Urban: Cities and towns having a population of over 50,000.

^c Semi-urban: Towns having a population of 5,000 to 50,000.

^d Rural: Villages having a population of less than 5,000.

3. FINANCING OF ESTATES ACCORDING TO THE TYPE OF INDUSTRIAL ACTIVITY

Functional, composite and ancillary industrial estates

Composite industrial estates, where units engaged in many different industries are operating, are common not only in India but also in other developing countries, though of late efforts are being made at some places for the development of functional industrial estates. The estates in India sponsored by the state governments are mainly composite industrial estates, though private endeavours towards the development of functional estates in the Punjab—where, for example, the units would be manufacturing radios, bicycles and other products—are now in evidence; some estates of this type have already come into existence. Proposals for setting up functional estates for the manufacture of automobile parts, scientific instruments, electric meter components, ceramic goods and so on are under examination by some of the state governments.

The scope for ancillary industrial estates is considerable. It is frequently said that the future of small industries lies in their working as ancillaries, not to one or two giant industrial concerns, but to a number of them, as is the present trend in the United States. Two types of ancillary industrial estates can be envisaged: one formed with the initiative and assistance of individual large industrial undertakings, essentially to meet their needs of manufactured components, parts and stores at lower cost; the other formed by the small industrialists themselves, engaged primarily in the execution of orders of a number of large undertakings instead of manufacturing for the general market. Ancillary estates of

the former type have been formed by the Hindustan Machine Tools Ltd., Bangalore and the Heavy Electricals (India) Ltd., Bhopal—both public sector undertakings. There is much scope for the Government to set up ancillary industrial estates in India owing to the active role it has assumed in certain strategic spheres of industry. The Hindustan Motors Ltd., a private enterprise, has a programme to set up an ancillary industrial estate near Calcutta.

The Indian pattern of financing an ancillary industrial estate set up by a government undertaking like the Hindustan Machine Tools Ltd., Bangalore, is unique inasmuch as the entrepreneur who wishes to function there has to provide only 20 to 30 per cent of the capital investment required, the rest being met by the large undertaking concerned and by the various agencies associated with the programme of assisting small industries. Thus, the government authorities connected with the large project provide developed plots of land, factory sheds and other facilities. The banking office situated in the estate caters to the day-to-day financial requirements of the operating units. As the tenants are selected only after careful scrutiny of their background and qualifications, the safety of the equity investment of the government is more or less assured. Owing to the shortage of raw materials, the large parent undertaking provides the units with raw materials, especially in cases where the price and delivery schedule are rigidly stipulated. Such raw materials are even supplied on deferred payment terms which provide an opportunity to the tenant-units to set off the cost of raw materials against the price of the goods supplied. The tenant-units are, however, allowed to procure their own materials where possible, so that they do not become totally dependent on the large undertaking.

4. CONCLUSION

Summing up, it may be said that although up to now the industrial estates in the developing countries, including India, have by and large been developmental projects launched by the governments, there is great scope for private agencies gradually to take over this duty. With proper planning and close co-ordination among the concerned agencies and departments, there is no reason why this should not be possible.

Meanwhile the establishment of government and of private assisted estates, with the concessions and incentives extended to them, should continue and even expand, so that industrialization gains the required momentum. The industrial estate as a technique for development has advanced beyond the stage of doubt and dispute, and it is now left to the developing countries to make ample use of this technique, so that under-industrialization in their areas becomes a thing of the past.

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UNITED NATIONS ACTIVITIES IN THE FIELD OF INDUSTRIAL ESTATES

INTRODUCTION

ALTHOUGH INDUSTRIAL ESTATES were first set up nearly eighty years ago, it has only been within the past thirty years that their number has increased significantly, at first in the industrial countries and, in the last ten to fifteen years, in the developing countries. While in the advanced countries the role of industrial estates was principally to induce industrial decentralization or, especially in the United States, to facilitate industrial location in or near large urban centres, it soon became apparent that in the developing countries the industrial estate could be a highly effective tool for the development and planned location of industry, particularly of small-scale and medium-sized enterprises, the improvement of management, processing and productivity through provision of integrated assistance, servicing and training facilities, the attraction of industry from abroad, and the achievement of other development objectives. In certain developing countries, in particular India and Puerto Rico, large industrial estate programmes were devised and implemented in the course of the nineteen fifties. At the end of that decade and the beginning of the nineteen sixties, interest for industrial estates was spreading in developing countries in all regions.

The value of the industrial estate as a tool for development was recognized by the Economic and Social Council at its twenty-seventh session, in April 1959. The Council adopted a resolution (709 A [XXVII]) in which, among other things, it requested the Secretary-General to "lay particular emphasis on projects of direct practical value to economic development" and especially on "projects concerning industrial zones and estates". In accordance with this request, the Secretariat of the United Nations undertook, in its work programme on industrialization, a series of research studies and seminars on this subject—the latter organized in cooperation with the regional economic commissions—and encouraged governments to set up industrial estates, availing themselves, as necessary, of the assistance offered by the United Nations under its technical cooperation programme and the programme of the Special Fund.

In 1961, the General Assembly of the United Nations adopted a resolution (1710 [XVI]) in which it designated the current decade as the United Nations Development Decade, in which major efforts would be made to accelerate economic growth in the developing countries. In this

resolution, the Assembly requested the Secretary-General to draw up proposals for the intensification of action in the fields of economic and social development by the United Nations system of organizations, with a view to furthering the objectives of the Development Decade. In his proposals,¹ the Secretary-General laid stress, among other things, on industrial estates for small-scale industries as one of the areas in which a massive and increasing effort was required on the part of governments and in which a corresponding expansion in supporting activities by the United Nations would be needed.

The effectiveness of industrial estates as an instrument for the development of small-scale industries was also recognized by the Committee for Industrial Development² which, as from its first session, held in 1961, included a series of research studies and seminars on this subject in the Secretariat's programme of work. At its fourth session, in March 1964, the Committee recommended an expansion in government requests for technical and Special Fund operations in this field.

The purpose of the present paper is to provide a brief review of the activities of the United Nations in the field of industrial estates. The first part discusses the rationale and scope of research projects and seminars already carried out or being prepared by the Secretariat. The second part describes the facilities offered by the United Nations to assist governments in the establishment and operation of industrial estates and the procedures for obtaining such assistance.

1. RESEARCH PROJECTS AND SEMINARS

Form, purpose and scope

Most of the research studies on industrial estates already carried out or planned by the Secretariat are closely linked with regional and interregional seminars on the subject. The studies usually relate to the main items of the agenda of the seminars and serve as discussion papers in the proceedings.

Both the Economic and Social Council and the Committee for Industrial Development have repeatedly stressed the usefulness of pooling expert knowledge and experience from both advanced and developing countries in seminars and working parties focused on specific industrialization problems of high priority, with a view to contributing to their understanding and solution. Another objective expected from seminars and

¹ United Nations (1962), *The United Nations Development Decade—Proposals for Action*, New York (62. II. B. 2).

² United Nations, *Official Records of the Economic and Social Council, Thirty-third Session*, Supplement No. 2, document E/3600/Rev. 1, para. 71; *Thirty-sixth Session*, Supplement No. 14, document E/3781, para. 33; *Thirty-seventh Session*, Supplement No. 6, document E/3869, paras. 44 to 46; *Thirty-ninth Session*, Supplement No. 6, document E/4065, paras. 103 to 109; and *Forty-first Session*, Supplement No. 6, document E/4203, paras. 80 to 86.

studies is that the interest of governments would be stimulated to undertake certain types of projects which have received inadequate attention. In the field under consideration, the seminars and related studies are expected to help, in the light of regional conditions and needs, in evolving guidelines for the formulation and implementation of policies, programmes and standards for industrial estate projects, encouraging governments to set up industrial estates, and providing guidance for the formulation and implementation of technical assistance operations.

Regional projects are undertaken in close co-operation between the Secretariat at Headquarters and the regional economic commission concerned. These projects are expected to contribute to the elaboration of an extensive body of experience and information to serve the needs of countries which are at different stages of development and which are placed in different economic, social, geographic and climatic conditions.

Before reviewing the work of the United Nations in the field of industrial estates, attention should be drawn to the fact that although this method of industrial organization lends itself to the development of large-scale industrial centres and complexes, including heavy and light industries of all sizes, its role in promoting small-scale industries has been principally stressed in the Secretariat's projects. The reason for this is that small-scale industries require from public authorities assistance of a type and scope which, as a rule, is not required by large establishments. The industrial estate is a particularly appropriate instrument for providing such assistance, and the special facilities which it features usually do not need to be provided with a view to stimulating the establishment and operation of large concerns.³ The provision of sites improved in advance and, above all, of ready-built general-purpose factories offered for rent is one of the most powerful incentives for small entrepreneurs having limited financial resources to start up industries. The grouping of small entrepreneurs in an industrial estate makes it practical and economical to provide them with technical assistance in several fields, such as engineering, quality control, maintenance, management and training, with an effectiveness that can seldom be achieved when rendered to individual small enterprises outside the estates. If the estate is sufficiently large, certain assistance and servicing facilities, such as industrial extension and other advisory services, vocational training and so on may be institutionalized as an integral part of the project. Provision of common repair and maintenance shops, tool rooms, warehouses and other common facilities helps in improving labour productivity and product quality and in reducing operating costs. The group-

³ Large industries may benefit from the provision of land, utilities, transportation facilities, zoning and the advantage of industrial clustering, which are an integral part of any industrial area scheme, and the implementation of which may sometimes call for certain forms of government assistance. They do not require, however, the standard factory buildings, common services, assistance facilities and other incentives which are usually featured on government-sponsored industrial estates for small-scale industries.

ing of industries in estates also facilitates the establishment of interdependent and complementary relationships among some of the occupants through inter-trading and inter-servicing and, in some cases, of subcontracting relationships between large-scale and small-scale enterprises.

For these reasons most of the developing countries use or intend to use the device of the industrial estate primarily for the promotion of small units, and the Centre for Industrial Development (now UNIDO) has endeavoured to serve the needs of these countries. In so doing, the Centre for Industrial Development has emphasized the fact that industrial estates are only one facility—though an extremely important one—for the development of small-scale industries and that an industrial estate programme can be effective only if it is integrated in a comprehensive system of measures to assist and serve small enterprises at all stages of establishment and operation, e.g. financing, installation, operation and maintenance of equipment, processing, management and marketing.⁴ Research projects on these related subjects are also included in the work programme of the United Nations Industrial Development Organization and technical assistance operations are undertaken under the United Nations Development Programme. Research and operations in this broader area are, however, outside the scope of the present paper which is limited to activities in the field of industrial estates.

Projects 1960 to 1966

The report, *Establishment of Industrial Estates in Under-developed Countries* (United Nations publication, 60.II.B.4), prepared by the Division of Industrial Development of the Department of Economic and Social Affairs and published in February 1961, was the first United Nations project undertaken in response to resolution 709 A (XXVII) of the Economic and Social Council. It deals principally with the role of industrial estates in policies of industrialization and industrial location in both developed and developing countries, with special reference to promotion of small-scale industries. The report also reviews industrial estates of different types and related problems of planning, establishment, organization, financing, and technical assistance. This report was submitted as a discussion paper to the Seminar on Industrial Estates in the ECAFE (Economic Commission for Asia and the Far East) Region (see page 263).

The report, *The Physical Planning of Industrial Estates* (United Nations publication, 62.II.B.4), prepared by the Bureau of Social Affairs of the Department of Economic and Social Affairs and published in November 1962, is a revised version of a discussion paper submitted to

⁴ See "The Role of Industrial Estates in Policies and Programmes for the Development of Small-scale Industries", to be published in United Nations, *Promotion of Small-scale Industries in Developing Countries*.

the Seminar on Industrial Estates in the ECAFE Region. Its purpose is to provide guidance in locating, planning, laying out and building industrial estates, especially those for small-scale industries. It contains data on the norms for plots, factories, road widths and land use adopted or recommended in various countries.

The *Seminar on Industrial Estates in the ECAFE Region* (Madras, India, 1 to 11 November 1961) was organized by the ECAFE secretariat, the Division of Industrial Development and the Bureau of Technical Assistance Operations of the Department of Economic and Social Affairs. It was attended by 57 participants and observers from 23 countries and 16 representatives of the United Nations, the specialized agencies and non-governmental organizations.

The agenda included the following substantive items:

- (a) Objectives and policies in establishing industrial estates;
- (b) Planning of industrial estates;
- (c) Organization, management and financing of industrial estates;
- (d) Co-operation between, and assistance to, small industries established on industrial estates;
- (e) Co-ordination or integration of industrial estate projects with programmes of urban or regional development; and
- (f) International and regional co-operation in the development of industrial estates.

The report of the Seminar and large excerpts from the discussion and information papers submitted to the Seminar were published in *Industrial Estates in Asia and the Far East*, the contents of which are briefly reviewed in the following.

The publication *Industrial Estates in Asia and the Far East* (United Nations publication, 62.II.B.5), edited by the Centre for Industrial Development (now UNIDO), Department of Economic and Social Affairs, and issued in February 1963, contains the report of the Seminar on Industrial Estates in the ECAFE Region and large excerpts from the discussion and information papers submitted to the Seminar. The report of the Seminar and most of the discussion papers relate to industrial estates as a means of promoting small-scale industries. Discussion papers are concerned with aspects of labour and management, assistance to small-scale units, physical planning, and establishment of industrial estates in rural areas.

The information papers submitted by countries of the ECAFE Region describe plans, progress and problems, review the objectives of the current plans and programmes and, in a number of cases, outline future developments. This volume also includes information papers submitted by some developed countries outside the ECAFE region, and discussion papers on industrial ports, large-scale industrial estates, and on industrial areas versus industrial estates.

A *Questionnaire on Industrial Estates*, prepared by the Centre for Industrial Development, was sent on 11 February 1964 to those member and non-member states which, according to available information, had plans or projects for the establishment of industrial estates. The purpose of the questionnaire was to elicit information from countries, developed and less-developed, on their policies, plans and progress in the field of industrial estates, including organization, management and financing, with a view to deriving some guidelines from an analysis of the replies for the establishment of industrial estates in developing countries. Governments were also invited to evaluate their experience in this field. The analysis of the replies was published by the United Nations in 1966 (see below).

The *Seminar on Industrial Estates in Africa* (Addis Ababa, 14 to 21 December 1964), which covered the region of the Economic Commission for Africa (ECA) was organized by the secretariat of the Commission, the Centre for Industrial Development (now UNIDO) and the Bureau of Technical Assistance Operations. The agenda included the following substantive items:

- (a) General discussion on the role of industrial estates and industrial areas;
- (b) Planning the establishment of industrial estates;
- (c) Physical planning and engineering aspects;
- (d) Organization, management and financing; and
- (e) Regional and international co-operation in the development of industrial estates.

The report of the Seminar and large excerpts of the discussion papers submitted to the Seminar were published in 1966 by the United Nations under the title *Industrial Estates in Africa*, the contents of which are briefly reviewed in the following paragraph.

The publication *Industrial Estates in Africa* (United Nations publication, 66.II.B.2), edited by the Centre for Industrial Development (now UNIDO) and issued in February 1966, contains the report of the Seminar on Industrial Estates in the ECA region, a report on planning, design and construction of industrial estates with particular reference to Africa, prepared by a consultant, and a survey of industrial estate plans and projects in African countries, prepared by the Secretariat on the basis of country papers submitted to the Seminar and of replies of governments to the questionnaire on industrial estates.

The study on *Industrial Estates: Policies, Plans and Progress—A Comparative Analysis of International Experience* (United Nations publication, 66.II.B.16), published in June 1966, is based on replies from the Governments of fifty-six countries to the questionnaire on industrial estates and on other relevant material. The publication discusses objectives and policies (industrialization, regional development, area and community development), planning and organization of industrial estates (sponsorship,

types and sizes of industrial estates), management (administration, admission and occupancy policies, services and facilities, sales and lease policies and special inducements), and financing of industrial estates.

Two *Consultative Groups on Industrial Estates*, one for European and other countries in the process of development, the other for Arab countries of the Middle East, met in October and November 1966. The purpose of the meetings and the scope of the discussion were similar to those of earlier regional seminars.

The *Seminar on Small-scale Industries in Latin America* (Quito, Ecuador, 28 November to 5 December 1966), which covered the region of the Economic Commission for Latin America (ECLA), was organized by the secretariat of the Commission, the Centre for Industrial Development (now UNIDO) and the Bureau of Technical Assistance Operations. One of the main purposes of the meeting was to draw the attention of governments in the region to the role that small-scale industries could play in their industrial development programmes which, so far, have been centred on large projects. The Seminar was principally concerned with the role of the government in promoting the development of small-scale industries and certain specific measures which might be adopted to that end, including the development of industrial estates, a subject to which special emphasis was given in the discussion.

2. TECHNICAL CO-OPERATION

It is not intended in the present paper to describe in detail the organization and procedures of the United Nations Development Programme (UNDP), that is, the Expanded Programme of Technical Assistance (now known as the United Nations Development Programme—Technical Assistance sector) and the programme of the Special Fund (now known as the United Nations Development Programme—Special Fund sector)—information on which may be found in a number of United Nations publications.⁵ It will only be recalled that assistance under both programmes is extended only at the request of governments. Requests are channelled through the Resident-Representatives of UNDP, who serve also in the capacity of Directors of Special Fund Programmes and act as the principal channel of

⁵ See, in particular, *The Expanded Programme of Technical Assistance for Economic Development of Under-developed Countries*, document TAB/1/Rev. 4; the Annual Reports of the Technical Assistance Board to the Technical Assistance Committee, published as *Supplements to the Official Records of the Economic and Social Council*; the Annual Reports of the Governing Council of the Special Fund to the Economic and Social Council, also published as *Supplements to the Council's Official Records*; and recently published booklets: *The Priorities of Progress—The United Nations Special Fund, 1961* (62.I.2), and *Target: An Expanding World Economy—A United Nations Special Fund Report, 1963* (63.I.7).

communications between the United Nations and the Government of the country to which they are assigned. Under both programmes, operations include expert missions, award of fellowships, and, to a minor extent, provision of certain types of equipment and supplies. Capital investment is not financed under either programme.⁶

Assistance in the field of industrial estates may be requested either under the Expanded Programme or the programme of the Special Fund. The principal criteria for distinguishing Special Fund operations from those of the Expanded Programme are the size and duration of the projects. In principle, projects which call for the services of one or two experts for a relatively short period, say, a few months to two years, would be dealt with under the Expanded Programme. More important projects requiring a team of several experts for a longer period of time—not exceeding five years—and involving a substantial contribution on the part of both the relevant Government and UNDP⁷ might be considered by the Special Fund.⁸

The differences in size and duration of each project are in general reflected in differences in the scope of the operations to be assisted from these two sources. As a rule, the Special Fund might be interested in projects covering several or all phases of the establishment of an industrial estate, from early planning to beginning of operations. Projects of more limited scope might be assisted under the Expanded Programme.

The scope of the operations which may be assisted under the two programmes is briefly discussed in the following paragraphs.

Special Fund operations

UNDP (Special Fund sector) would be prepared to consider industrial estate projects involving an initial feasibility study, the preparation of the layout and plans, provision of advice during the construction phase, and the establishment and provision of certain common facilities. In special circumstances, assistance might be provided in the initial administration and direction of an estate, including training of personnel for the administration and maintenance of common services.

Since its assistance is limited to pre-investment operations, the Special

⁶ Such financing may be provided by the International Bank for Reconstruction and Development and its two affiliates—the International Finance Corporation and the International Development Association. The latter is prepared to consider projects for the establishment of industrial estates.

⁷ The contribution of the Special Fund is scheduled to decrease and that of the government to increase during the period of the project.

⁸ The responsibility for implementing Special Fund projects in the field of industrial estates is assumed by UNIDO, serving in the capacity of Executing Agency. A detailed description of the arrangements for the execution of the project is contained in a Plan of Operations, which is a tripartite agreement between government, the Special Fund and the Executing Agency.

Fund would not contribute to the design or construction of industrial plants in the estate, nor would it provide these with capital equipment.

The Special Fund is prepared to support the establishment of certain assistance and servicing facilities for small-scale industries, and it recognizes the particular effectiveness of providing such facilities to the occupants of an industrial estate, a fact mentioned earlier in this report. For this reason, the Fund might consider requests for the establishment of a Small-scale Industries Service Institute as part of an industrial estate. It might also support the establishment of pilot plant facilities on an industrial estate. The services and facilities made available as a result of such Special Fund support would not necessarily be restricted to industries housed on the estate.

The number of experts whose services may be needed to carry out a Special Fund industrial estate project, their field of specialization, period and scheduling of service and terms of reference, and the organization of the team may vary from one project to another. Two examples relating to recent projects may be indicative of the requirements in this connexion.

Subsequent to the submission by the government of an Asian country of a request to the Special Fund for assistance in the establishment of an industrial estate for small-scale and medium-sized industries, a team of two experts—an industrial economist and a civil engineer—was sent on a short-term mission (a total of six man-months) to make a preliminary survey. In accordance with its terms of reference, the team selected, among alternative possibilities, the location and site for the estate, drew up a list of industries which might be set up thereon, prepared a provisional layout and estimated construction and development costs; it also made recommendations on the establishment of an industrial estate authority and on incentives and promotional measures to accelerate occupancy of the estate.

The project was approved by the Governing Council of the Special Fund and a project manager, a mechanical engineer and a civil engineer were appointed during the first year of the project. A managing director, a deputy managing director and a staff of 35 technical, administrative and service personnel were appointed by the Industrial Estate Authority. A site of 50 acres (20.2 hectares) was purchased. Studies were carried out on the layout and physical planning of the estate, including common service facilities and utilities. Specifications for equipment of the common service facilities—a mechanical workshop and a testing laboratory—were drawn up and requisitions for machinery and equipment were prepared and sent to UNDP (Special Fund) which will provide these as part of the project.

In the second year, the team will be joined by a industrial engineer, a chemical engineer and a foundry metallurgical engineer who will operate the common service facilities and provide technical assistance to the occupants of the estate as well as to small industrialists in the surrounding area.

While the team concentrates its work on the estate under construction, it also assists the government in planning industrial estate projects in other parts of the country. The United Nations Development Programme (Special Fund sector) also provides fellowships to the counterparts of the United Nations experts.

At the request of the government of an African country, a team of two officials of the Centre for Industrial Development (now UNIDO) visited the country on a short mission during which, in consultation and in co-operation with government officials, they drew up the main lines of a nation-wide programme of promotion of, and assistance to, small-scale industries and recommended, as part of this programme, the establishment of a first industrial estate as a pilot and demonstration project, and of an adjoining industrial area for industries of all sizes. They selected a site for the estate and area, estimated the construction and development costs and assisted the government in drafting a request to the Special Fund for assistance in carrying out the small industry development programme and in establishing the industrial estate and the industrial area.

During the five-year period of the project, fifteen standard factories of 2,000 square feet each (186 square metres) and fifteen factories of 5,000 square feet (464 square metres) will be erected on part of the 23-acre (9.3 hectares) initial site of the estate (to be doubled in the future). The industrial area—of a total of 104 acres (42 hectares)—will be developed at the rate of 5 acres (2 hectares) per year during the period of the project. The initial common service facilities will include a mechanical workshop and tool room and a testing laboratory.

The Special Fund will provide a team of seven experts (project manager, industrial economist, industrial engineer, civil engineer, chemical engineer, mechanical engineer, and industrial loan evaluator), short-term consultants, fellowships, and equipment for the common service facilities. The project was approved by the Governing Council and a project manager has been appointed. The outline of a hypothetical request to the Special Fund for assistance in establishing an industrial estate is given in Annex I.

Operations under the Expanded Programme of Technical Assistance

As mentioned earlier, a variety of needs in the field of industrial estate development may be served by the United Nations Development Programme under the Expanded Programme of Technical Assistance, at the request of governments. Assistance may range from a brief visit, say one or two weeks, by a staff member of the United Nations Industrial Development Organization or a Technical Adviser on Small-scale Industries and Industrial Estates attached to the UNIDO for the purpose of drawing up a programme of United Nations assistance in this field, to provision of a two-man team for a period of up to two years to assist in the planning

and construction of an estate, the establishment and operation of common service facilities, the management of an existing estate, or other assignments.

The first step usually taken by the United Nations in response to a government request for assistance in the establishment of an industrial estate is to send a team consisting of an industrial economist and a civil engineer for a period of two to six months to make a feasibility study, select the location and site, estimate costs for an estate of the required type and size, draw up the preliminary plans for layout and construction, and schedule the development of the estate. Hypothetical terms of reference for an industrial economist and a civil engineer are given in Annex II.

Sometimes further United Nations assistance is not needed, the government services being able to develop the project up to the final stage, including the preparation of blueprints, the carrying out of construction and the management of the estate once it is established.

In many cases, however, further assistance is requested, for varying periods of time, on the part of specialists in fields often different from those required in the first stage. Thus, a construction engineer may be needed to assist in building the estate; mechanical or industrial engineers to provide advice in setting up and operating common service facilities such as maintenance and repair shop, forging and heat-treatment shop, foundry, die and tool designing centre, and quality control centre; a chemical engineer to assist in the establishment and operation of a testing laboratory; a management adviser to help in the operation of the estate,⁹ and so on. Most of these specialists would also provide assistance to the small entrepreneurs established on the estate and, inasmuch as possible, to those outside the estate.

Fellowships for advanced training overseas may also be made available under the Expanded Programme to national personnel participating in industrial estate programmes. Experience indicates that fellowships are particularly useful when granted to the counterparts of technical assistance experts.

In recent years, the United Nations has increasingly provided—and has encouraged governments to request—multi-expert team missions to furnish integrated and comprehensive assistance in the field of industrial development. Such missions are usually concerned with the formulation of industrialization policies and co-ordinated planning of industrial projects, planning of investment and production in important industrial sectors, selection of high priority industrial projects and preparation of bankable projects for submission to financing institutions. Two recent missions of this type included industrial estate experts who studied, besides industrial estates proper, the problems of industrial location and zoning raised by the

⁹ If need be, experts in vocational training and organization of co-operatives may be provided by the International Labour Organisation.

missions' proposals for the establishment of new industries. The experience gained suggests that the inclusion of industrial estate experts in integrated survey missions would often be useful.

Special Industrial Services

In the course of 1966, a new programme of assistance for the industrial development of the developing countries was established as part of the technical co-operation machinery of the United Nations—the Special Industrial Services (SIS). A fund financed by voluntary contributions is used for special operations by joint approval of the Administrator of the United Nations Development Programme (UNDP) and the Executive Director of the United Nations Industrial Development Organization (UNIDO). Request for SIS assistance may be addressed to either UNDP or the UNIDO through the UNDP Resident-Representatives.

SIS is not a substitute or an alternative to assistance from the UNDP (Technical Assistance sector) or the UNDP (Special Fund sector) but is additional to these, and is of a distinctive nature. Assistance under SIS is given particularly for: (i) manufacturing industry projects for which feasibility studies have already been carried out, in order to promote their financing and implementation; (ii) existing manufacturing enterprises, whose performance needs to be improved; and (iii) exploratory and advisory activities leading to one or both of the above activities. Operations under SIS may lead to, or be generated through, Technical Assistance or Special Fund projects.

Although the programme is still at an early stage, and rules and procedures are still being developed, it appears that assistance to industrial estate projects may be provided under SIS in cases where plans have gone beyond the feasibility study stage and difficulties are encountered in the achievement of the planned development objectives. The difficulties may relate to construction, financing, management, promotion of entrepreneurship, operation of common service facilities, and so on.

As a rule, SIS projects would have a character of urgency, and assistance would be provided speedily.

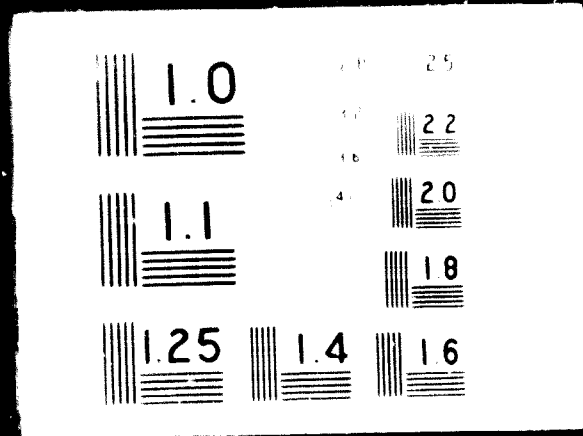


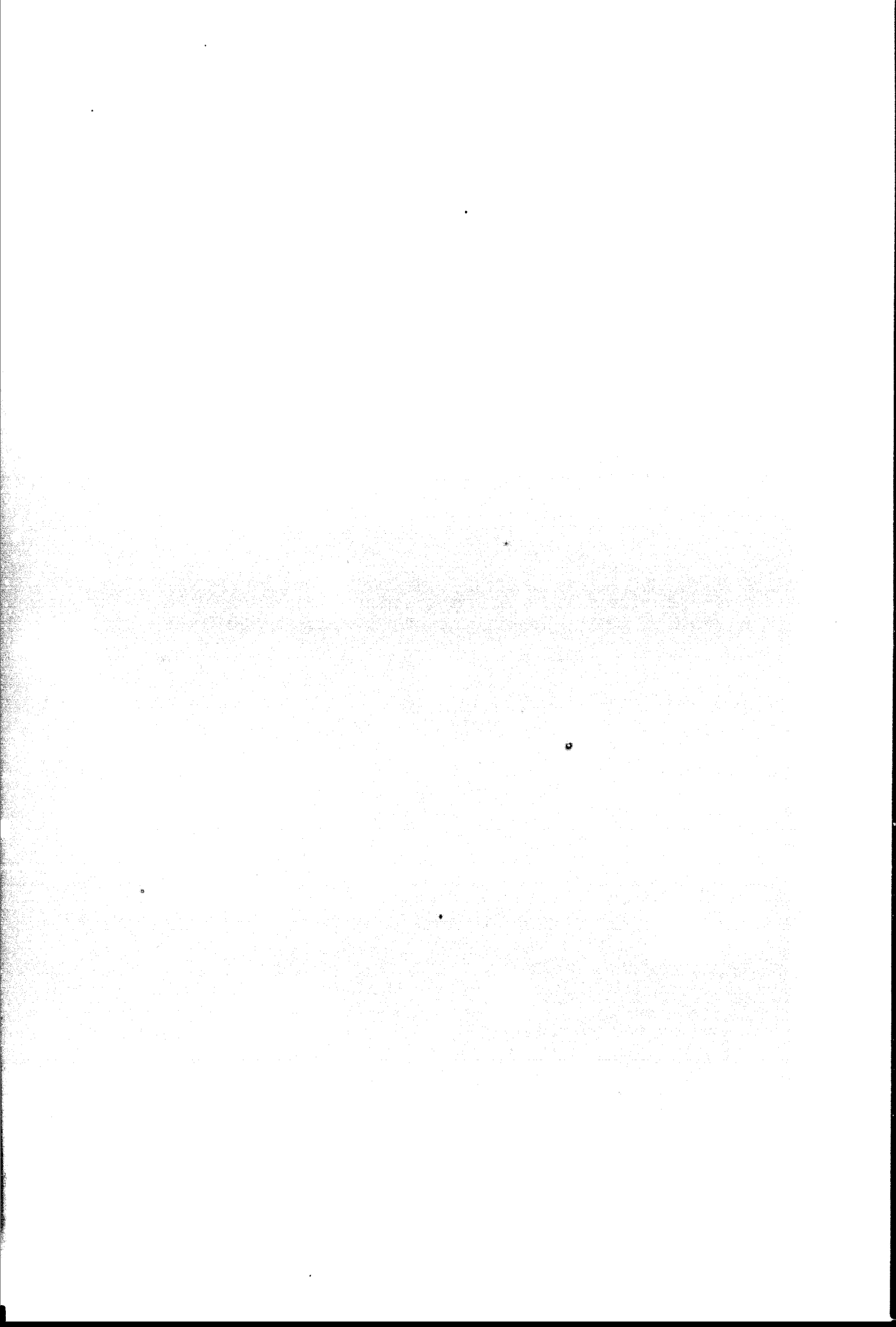
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ANNEX I

OUTLINE OF A HYPOTHETICAL REQUEST TO THE UNITED NATIONS DEVELOPMENT PROGRAMME (SPECIAL FUND SECTOR) FOR ASSISTANCE IN THE ESTABLISHMENT OF A DEMONSTRATION INDUSTRIAL ESTATE

I. BACKGROUND INFORMATION LEADING TO THE JUSTIFICATION OF THE PROJECT

1. *The place of small industries in the country's industrial structure*

General information on the industrial development in the country. Wherever possible information on the number of small establishments and share of small industries in total production and employment.

2. *Main problems limiting small industry development in the country*

A brief review of the major factors limiting small industry development such as absence of credit facilities, skilled workers, technical knowledge, good factory accommodation, and so on.

3. *Policies and programmes for small industry development*

(a) The industrial development policy of the government with special reference to small-scale industries. Description of legislation, whether existing or about to be introduced, which would offer satisfactory incentives for new industries or the expansion or relocation of existing ones.

(b) Agencies for promotion of small industries, if any—for example, small industry development corporations, service institutes, financing institutions, institutes of technology, and industrial research.

4. *Reasons for establishing industrial estates*

Explanation of how the establishment of industrial estates will contribute to the strengthening of small industries and, in particular, to the promotion and development of new entrepreneurship in the country.

5. *Justification for Special Fund assistance*

Explanation of why and how Special Fund assistance through a demonstration project would assist the programme of development of industrial estates and small industries in the country. Brief description of the functioning of industrial estates, if any, in the country and their main problems.

II. THE PROJECT

1. *Background of the proposal*

Brief historical summary of the work leading to the submission of the request to the Special Fund.

2. *Description of the project*

Brief description of the objectives of the industrial estate and its functions. The following points may serve as guidelines:

- Stimulation of new enterprises in the area concerned;
- Relocation of existing units;

Common facility services through workshops and laboratories;
Training of workers and foremen in the workshops and laboratories;
Extension service to small industries in and outside the estate.

The United Nations team will provide advisory services to government and other authorities in the planning and establishment of industrial estates in other locations.

3. *Location and siting*

(a) Assessment of demand, existing and potential, for factory accommodation in the suggested location and in the neighbouring region.

(b) Other factors relevant to location:

- (i) Integration of the project with plans for industrial and residential land use and zoning, if any;
- (ii) Suitability of the land for industrial buildings;
- (iii) Availability of land for future expansion;
- (iv) Economical installation of utilities such as water, electricity, gas and sewerage disposal;
- (v) Availability of economical transport;
- (vi) Convenient access to residential areas.

4. *Planning and layout of the estate*

An assessment of the prospects for industrial development in the area and of the needs of prospective tenants and the type of products they will be manufacturing should be made to serve as a guide for designing a proper layout for the estate. Information on the following points should be furnished:

- (a) Size of the estate;
- (b) Layout of the plots;
- (c) Roads and streets;
- (d) Number and size of factories and provision for future expansion.

5. *Type of factory buildings*

Type and number of factories proposed, and justification for standard factories or custom-built factories as recommended.

6. *Administrative and ancillary buildings*

Brief description of the general facilities and services proposed for the estate to explain the need for ancillary buildings. Ancillary buildings may include administration offices, fire station, post office, bank, transport office, dispensary, canteen, warehouses, showrooms and club rooms.

7. *Technical service facilities in the estate*

Brief description of the technical services and facilities proposed for the estate and their justification. Such facilities may take the form of a fully-equipped small industry service institute or may include one or several workshops such as repair and maintenance shop, machine lease shop, tool room, and testing and quality control laboratory. Details on machinery and equipment required for such centres should be given in an annex.

8. *Admission and lease policies*

Description of the policies recommended for admission of tenants and for leasing, hire-purchase or sale of factories and/or improved sites.

9. *Administrative arrangements*

Description of the legal status of the industrial estate organization and its relations with other government organizations. A short account of the arrangements proposed for planning, construction, financing and management of the estate.

III. ASSISTANCE REQUESTED FROM THE SPECIAL FUND

1. *Duration of the assistance*

Timetable showing estimated date for work on the project, phasing and scheduled date of completion.

2. *Number of experts, fields of specialization, length of service and specific tasks within the project*

The project manager is usually appointed first. Other members of the team may include an industrial engineer, a chemical engineer, a civil engineer and other experts. If there is a concentration of a particular industry in the location, a specialist in that industry may be included in the team. A provision for short-term consultants may be included as necessary.

3. *Number, field of study and duration of fellowships for training abroad*

Such fellowships may be required for the counterparts of the United Nations experts as well as for other nationals engaged in the project.

4. *Types of equipment and supplies required*

The Special Fund may provide some equipment for certain common service facilities, for instance, a laboratory and a maintenance and repair shop.

IV. GOVERNMENT CONTRIBUTION

1. *Land, buildings and construction*

2. *Equipment*

3. *Staff, counterparts and auxiliary personnel*

4. *Ancillary services*

V. FINANCING

1. *Cost of Special Fund assistance (by categories as per III above) on an annual basis for each year of the project*

Special Fund assistance normally will not continue beyond five years, and should diminish in each of the last three years, with the government assuming a steadily increasing responsibility for its continuity.

2. Government counterpart contribution (by categories as per IV above) on an annual basis

The Special Fund will not finance expenditure in local currencies, nor will it necessarily meet all foreign currency costs of a project. The government counterpart contribution may be made either in cash or in kind, or in both. Where the Special Fund supplies the services of experts, the government will be expected to pay to the Special Fund in local currency an additional sum equal to 15 per cent of the full cost of such experts as a cash contribution towards the local operating costs of the project.

ANNEX II

INITIAL PLANNING OF INDUSTRIAL ESTATES—HYPOTHETICAL TERMS OF REFERENCE OF EXPERTS

The following terms of reference for an industrial economist and a civil engineer are given for illustration purposes. In order to show the types of assignments which may need to be carried out in feasibility surveys and initial planning of industrial estates for small-scale industries, the terms of reference are more comprehensive and more detailed than may be needed in certain cases. The period of assignment may vary with local requirements and with the scope of the project. In the example given, the industrial economist and the civil engineer would work as a team. In most cases, and especially in short term missions, the period of assignment of the two experts would be the same. Sometimes, however, the civil engineer may join his colleague only after a few months; for example, if the latter first has to complete a preliminary economic survey. The functions assigned to an industrial economist in the present example may sometimes need to be discharged by an industrial engineer (for instance, those under item 1 (c)).

1. Industrial economist

The industrial economist, specialized in small-scale industries, will, in consultation with the competent government services and in co-operation with the civil engineer, advise the government on the formulation and implementation of an industrial estate programme and the measures necessary to facilitate and stimulate the establishment of small-scale industries in the factories of the estate(s). In particular, the expert will:

(a) Make feasibility studies for industrial estates at alternative locations, in the light of the availability of supporting facilities and of the prospective industrial development of the area. On the basis of this survey, he will recommend the location, site, type and size of the estate(s).

(b) Estimate the type and number of new or existing industries suitable for establishment.

(c) Estimate the power and other utility requirements for each estate. Estimate for each industry: (i) the number of workers and the type, quantity and cost of the machinery needed for production at the appropriate level of capacity; (ii) the investment costs, (iii) working capital requirements; and (iv) the turnover.

(d) Advise on the organization of an industrial estate authority and the organization and management of the industrial estate(s), including the estate's admission policies, rules and regulations, rent or sale policies, rate of charges, and so on.

(e) Advise on methods of financing the construction and development of the industrial estate(s).

(f) Advise on legislative and administrative measures needed for establishing and operating the industrial estate(s), including, if need be, provision of incentives and assistance and servicing facilities for the occupants in the fields of technology, management and financing.

(g) Make recommendations on the organization of training and apprenticeship facilities to be set up on the estates for workers and intermediate supervisory personnel of the industries.

(b) Make recommendations on the number and type of fellowships needed to implement the project, e. g. for the future managers of the industrial estates or for the department heads of the government agency in charge of their establishment.

(i) Make recommendations on further United Nations assistance that might be needed to carry out the project.

2. *Civil engineer*

In co-operation with the industrial economist, the expert will:

(a) Survey, evaluate and select the site of the industrial estate(s), taking into account physical planning requirements, the availability and development prospects of labour, power, water and other utilities, transport, communications, housing, and other supporting facilities.

(b) Prepare estimates of the size and number of factories and other buildings, common facilities and amenities.

(c) Prepare layout and engineering plans for factories, common service facilities, administrative and auxiliary buildings, drainage, sewerage, roads, rail lead tracks, electric stations and other utilities, and recommend appropriate building materials and techniques.

(d) Propose a development schedule for the estate(s).

(e) Advise on the zoning regulations required in connexion with the establishment of the industrial estate(s).

(f) Estimate the cost of development of the estate(s).

(g) Make recommendations on the organization of construction works and on the training of construction workers and intermediate supervisory personnel.

ANNEX

*Research Parks in the United States: A Case Study from Colorado**

* Paper presented to the Consultative Groups by Mr. J. E. Stepanek, who has served as an official of the United Nations Relief and Rehabilitation Agency, a technical assistance expert (industrial engineer, small-scale industries) under United Nations Technical Co-operation Programmes, and a consultant to the Secretariat.

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RESEARCH PARKS IN THE UNITED STATES: A CASE STUDY FROM COLORADO*

INTRODUCTION

EXPENDITURES ON RESEARCH and development in the United States are currently growing faster than the economy. In 1965 the total was estimated at \$US 21,000 million. Of this sum \$US 15,000 million were financed by the Federal Government, \$US 5,500 million by industry, and \$US 500 million by universities and other non-profit organizations. The research was carried out primarily by industry to an amount of \$US 15,500 million, using government grants to supplement industrial budgets. Government laboratories carried out \$US 3,000 million in research projects and non-profit institutions, including universities, \$US 2,500 million.

The largest industrial concerns, for example, General Motors, or the major Government research installations, for example, the central laboratories of the National Bureau of Standards, establish their own research centres. Much of the remainder of the United States research is carried out by institutions whose location has shown, over the past twenty years, a trend towards concentration around major research-oriented universities. Government-financed laboratories are likely to be established in the same area—either operated by or affiliated with a university. This educational and research activity both attracts and generates privately sponsored research institutions and industrial concerns.¹ Geographically concentrated and functionally related groups of this type have been termed "science-industry complexes".

Research parks for scientific institutions, laboratories and research centres and industry have become integral parts of science-industry complexes. The objective of these complexes is both to facilitate growth by providing developed land and to promote interactions inside and outside the parks by providing locations in close proximity to government and university sponsored research.

¹ Often the scientific research carried out at a government laboratory or at a university leads to the formation of new companies. For example, a professor or research administrator may decide to exploit the results of his basic research by designing and placing in manufacture a new product.

1. ESTABLISHING A SCIENCE-INDUSTRY COMPLEX

The three largest science-industry complexes in the United States are located in the Boston area, the Palo Alto—San Francisco Bay area, and around Baltimore. In the Boston area approximately four hundred technically-oriented firms, attracted by the research carried out at the Massachusetts Institute of Technology, Harvard University and affiliated government laboratories, have been established. Approximately half that number are located in the Palo Alto — San Francisco Bay area, near Stanford University or the Berkeley Campus of the University of California and some twenty firms have been established in the Baltimore area around Johns Hopkins.

The widespread interest generated by the first successful science-industry complexes has led to both public and private actions to establish new complexes. The initiative of Duke University, the University of North Carolina and North Carolina State University has resulted, for example, in the establishment of a 5 000-acre (2,000-hectare) research park and the beginning of a science-industry complex. Similarly, the Denver-Boulder area of Colorado with four universities plus six federal government-sponsored research institutions has the base for a science-industry complex.

In 1963 the universities in the Denver area sponsored a University—Industry Liaison Conference which examined the prerequisites for a science-industry complex. More detail was added a year later through a report prepared by the University of Denver Research Institute on the essential elements for a science complex. For Colorado the report recommended the following actions to develop a science-industry complex.

Universities should:

- Attract key research scientists and engineers with national reputations by paying higher salaries;
- Foster and encourage additional outside consulting work by faculty members;
- Obtain additional fellowships to support the best graduate students possible;
- Nurture an environment of intellectual ferment, and
- Initiate courses on entrepreneurship through schools of business.

Business and financial interests should:

- Develop one or more high quality industrial and research park;
- Make additional sources of financing available to deserving small science-based firms; and
- Improve the growth environment for small firms by the provision of technical services.

Science-based industry in the State should:

- Promote the State as the location of additional science-based firms;

Participate in the professional growth of the community particularly through work with universities; and

Encourage government assistance to small firms.

Government groups should:

Provide funds for improved education in science and engineering; and

Consider the impact of State and local taxes on the formation of science-based firms.

An inventory was taken of the existing science-oriented institutions and enterprises in the region of Denver. The region covers an area of approximately 800 square miles and has a population of 1,100,000. A summary of the findings is given in Table 1.

Table 1. Science-oriented institutions and enterprises in the Denver region (1965)

	<i>Enrolment</i>	<i>Research budget (\$US)</i>
<i>Universities</i>		
University of Colorado	14,413	8,788,000
University of Denver	7,874	7,844,000
Colorado State University	11,848	10,134,000
Colorado School of Mines	1,442	387,000
Total (Universities)	35,577	30,153,000
<i>Employment</i>		
<i>Government laboratories</i>		
National Center for Atmospheric Research		400
Joint Institute for Laboratory Astrophysics		80
National Bureau of Standards		1,200
Environmental Science Services Administration		200
US Bureau of Reclamation		1,600
US Geological Survey		1,300
Total (Government laboratories)		4,780
<i>Research and science based manufacturing industry:</i>		
35 enterprises		(approx.) 12,000

2. DESIGNING AN INDUSTRIAL RESEARCH PARK

In 1965 an 800-acre (324-hectare) research park affiliated with the University of Colorado was established four miles northeast of Boulder to remove one of the limitations of the region as a science-industry complex. Preliminary investigations based on growth patterns in other areas showed that certain industrial groups were more likely to locate in the park than others. The groups are listed in Table 2.

Table 2. Probability of location within an industrial research park

<i>High</i>	<i>Average</i>	<i>Low</i>
Aircraft and aerospace	Other electrical equipment	Industrial chemicals
Communication equipment and electronics components	Other chemicals	Motor vehicles
Drugs and medicines	Machinery	Other transportation equipment
Scientific and mechanical measuring instruments	Petroleum refining and extraction	Primary ferrous products
Optical, surgical, photographic, and other instruments	Non-ferrous and other metal products	Fabricated metal products
	Food and kindred products	Stone, glass and clay products
		Paper and allied products
		Textiles and apparel
		Lumber, wood products and furniture

Location criteria for research laboratories were first obtained from a recent study made by the State University of New York at Buffalo (Table 3) and then applied to the park (Table 4). It was recognized that the location of the park had certain advantages due to the proximity of university and government research, and to a physical and cultural environment attractive to scientists and administrators. On the other hand, the park was located in a region that was not yet recognized as a national research or manufacturing centre and that was far removed from any other science-industry complex.

Table 3. Break-up of replies from research laboratories on location factors (in percentage)

	Evaluation of location factors			
	General		Present location	
	Important	Little or no importance	Favourable	Unfavourable
Proximity to:				
Company headquarters	35.2	15.4	72.6	10.8
Company plants	45.4	11.7	74.5	5.7
Important customers	11.5	48.5	36.6	7.8
Other research laboratories	8.5	49.7	41.4	8.6
Proximity to institutions of higher learning for:				
Availability of faculty members as consultants	18.1	31.3	53.5	5.8
Advanced courses for staff	54.5	7.2	65.4	17.3
Recruitment of new staff members	36.4	19.4	48.1	12.2
Community conditions:				
Existence of local chapters of scientific societies	27.9	10.9	71.3	7.0
Suitable housing	74.1	1.8	64.2	11.9
Good local schools	67.3	4.2	76.1	1.9
Cultural activities (music, art, theatre etc.)	32.1	9.1	62.7	9.5
Recreational opportunities	27.7	6.6	72.2	4.4
Weather	9.2	26.2	29.7	16.8
Convenient transportation service to major cities				
	56.4	4.2	64.5	9.7

Source: State University of New York, Buffalo.

An estimate was made that manufacturing concerns with gross annual sales in the range of 100 to 250 million dollars were most likely to establish research and development laboratories at a research park. Larger companies were more likely to develop their own land for research facilities. Smaller companies were less likely to have research budgets large enough to justify separate installations. However, there are a growing number of small research companies undertaking contract research; such companies are likely candidates for location in a research park.

The preliminary investigations also showed that companies in existing research parks received technical services from one another, from government and university laboratories, and from new service companies, such as scientific glassware. In no case, however, was there evidence of studies being made to determine the priority services which

Table 4. Location evaluation of the proposed research park at the Denver-Boulder area of Colorado

<i>Location criteria</i>	<i>Rating of location</i>
First priority	
Access to academic institutions:	
universities with graduate programmes	good
secondary and elementary schools of quality	good
Availability of personnel:	
professional, including ability to attract from elsewhere	excellent
technicians and supporting personnel in the vicinity	fair
suitable housing	fair
Community conditions	excellent
Proximity of home office, or of production operations	poor
Second priority	
Transportation facilities	good
Research atmosphere or professional environment	excellent
Quality sites	excellent
Third priority	
Supporting services	fair
Recreational facilities	excellent
Availability of suitable buildings	good (potential)
Consultants	good
Markets	poor
Taxes	fair
Weather	excellent

science-oriented manufacturing or research companies would like to have provided for them. In 1965 such a study was undertaken with reference to the proposed industrial park in Colorado. Its objective was to identify those services which should be provided either by the University of Colorado or by private initiative in the area of the research park.

Through a questionnaire sent to the directors of 200 industrial research laboratories, the requirements of companies planning to settle in a new research park were determined.

Identification of services

The respondents to the questionnaire were co-operative in identifying the priority to be given to 32 services. The results are presented in Table 5.

Table 5. Break-up of replies on services required by research and development laboratories (in percentage)

<i>Technical services</i>	<i>Priority rating</i>	<i>Convenience services</i>	<i>Priority rating</i>
Computer	61	Restaurant	78
Machine shop	51	Banking	63
Glassblowing	42	Motel	49
Carpentry shop	37	Postal station	39
Chemical analysis	28	Protective service	33
Sheet metal	25	Gasoline station	31
Calibration	22	Conference centre	30
Plating	22	Janitorial	28
Instrumentation	21	Travel bureau	24
Electronics design	10	Reproduction	22
Optical instrumenta- tion	9	Conference rooms	21
Operations research	6	Auditorium	18
Packaging	4	Barber shop	16
Ultrasonic	4	Convenience shopping	15
Antenna design	0	Rent-a-car	12
		Stenographic service	4
		Employment agency	4

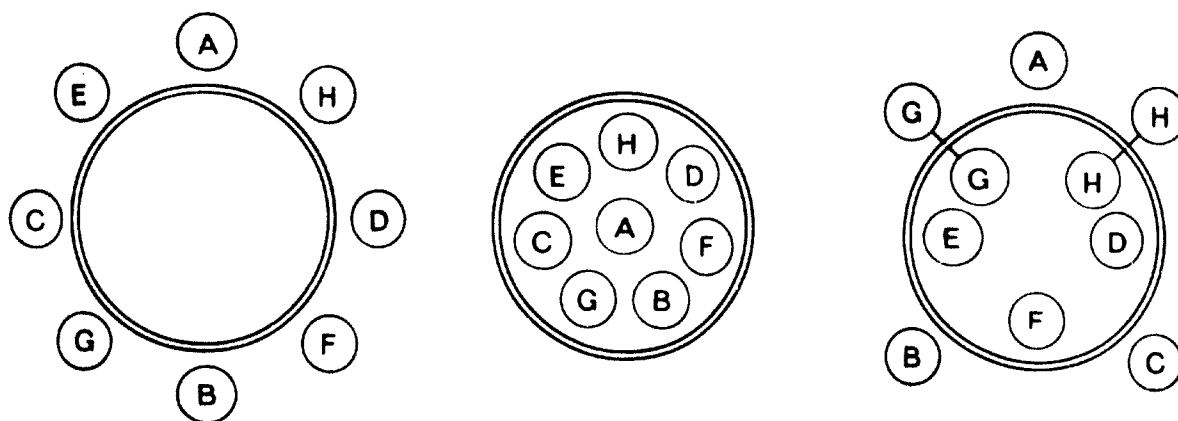
Particular attention was given to the services which normally would be provided by a university. The response appears in Table 6.

Table 6. Break-up of replies on services required from a university (in percentage)

	<i>Service requirement</i>	<i>Service priority</i>
Library	85	52
Admission to symposia and seminars	85	12
Low tuition charges	66	15
Joint appointment on faculty or research staff	48	4
Ticket preference for cultural events	24	1
Receive university publications	21	1
Parking	12	0
Ticket preference for athletic events	4	0

One additional service, the provision of incubator space for young research and development companies, was studied. This information was essential to the University of Colorado which was contemplating the provision of such a space on a non-profit basis. It was considered that, to be economical the building should be designed for multiple occupancy and should probably be multi-storeyed. The study based on interviews and visits to other industrial and research parks that had provided incubator space, led to the recommendation that such space was highly desirable in the proposed park. The recommendation was made that the University of Colorado should proceed with its plan for non-profit incubator space as part of the research park. The first buildings to be constructed should be "building blocks" that could be enlarged as demand developed. The initial building should be no more than two storeys high and should cost no more than \$US 20 per square foot. The variety of needs as to utility services could not be estimated; the suggestion was made, therefore, that initially no special utilities be installed but that provision be made for their installation as required by each client. The market appeared to warrant an initial incubator building of approximately 30,000 square feet (2,787 square metres). The tenants initially would require from 1,000 to 3,000 feet (93 to 279 square metres) each. It was thought that once the tenants' needs reached the 5,000 square feet (464 square metres) limit they should be requested to move out into full-cost space, probably in individual buildings. The period of "incubation" was taken as approximately five years. In other words, subsidized facilities should not be provided indefinitely.

Figure 1. Approaches to planning services for research parks



Research park using facilities of surrounding science centre

Most of the research parks planned to date have been designed primarily to provide sites for new research and development firms which would utilize the scientific facilities in the surrounding area. This is least expensive in terms of initial outlay and where establishment of the park close to the supporting facilities is practical. In large metropolitan areas where scientific resources are numerous and widespread, several research parks may rely on the same basic facilities.

Self-contained science centre and research park

While there are few examples as yet, some observers believe the self-contained science centre is the plan for the future and will offer important advantages over the research park which is nothing more than a real estate venture. In this approach, multi-million dollar facilities are first built at the core of the park and additional activities are located around this nucleus.

Recommended for the proposed research park

A compromise between the two other approaches is recommended for the proposed research park. This plan uses the assets of the neighbouring area, encourages private enterprise, and limits the capital investment involved.

Note: symbols A through H correspond to different types of services, such as those listed in Tables 5 and 6, which may be grouped in different ways in or around a research park.

Location of services

Three areas were identified as preferred locations for technical and convenience services. It was recommended that non-profit services such as library, computer and incubator space be located on a University Research Campus. The University of Colorado later acquired a 52-acre (21-hectare) central tract from the research park for this purpose. The objective was to test and perfect services which later could be made available to the entire State of Colorado.

It was recommended that the commercial services be placed in two locations. One group should be established in an area set aside for this purpose on the research park. (Later, 36 acres [15 hectares] were allocated for commercial services). The commercial services not located on the research park were to be distributed over the science-industry complex.

It was strongly recommended by the companies responding to the questionnaire that the research park should not take the initiative in establishing the commercial services. Thus it is anticipated that private initiative, influenced by market forces, will determine which services will be located at the park and which in neighbouring communities. This approach is in contrast to that of research parks which either depend wholly on outside concerns for services or attempt to provide all services within the park. Figure I illustrates the possible approaches.

3. MANUFACTURING WITHIN A RESEARCH PARK

The research park under review was designed to accommodate light manufacturing as well as research and development companies plus the services essential for their growth. Other research parks have also found it desirable to include manufacturing. A research park in California was designed initially to include manufacturing along with research, development and service industries. Both a research park in North Carolina and one outside of New York City had to abandon their original plan of excluding manufacturing. In all cases, however, it was found that only science-oriented manufacturing companies were likely to settle in a research park.

Many small manufacturing companies, unable to finance significant research of their own, locate in a research park within a science complex because of the proximity of government laboratories and other sources of research assistance. Other companies wish to have their research and manufacturing in close proximity. They want to have the manufacturing facility in the same area, if not in the same building. Medium-sized manufacturing companies with a large proportion of technical personnel

may select a research park because of the stimulation afforded by contacts with other technicians.

Economies of scale in the design of research parks favour the inclusion of manufacturing enterprises since the latter require at least fifteen times more land than research facilities. The design of the research park under consideration allows for the activities predominantly concerned with research or development to be placed in a different area from those predominantly concerned with manufacturing.

The allocation of land by use is as follows:

	<i>Acres</i>	<i>Hectares</i>
Research and development	200	81
Light manufacturing	500	202
University-sponsored non-profit services . .	52	21
Commercial services	36	15

It is estimated that by 1990 employment in the above tracts will exceed 20,000.

4. CONCLUSIONS FOR THE DEVELOPING COUNTRIES

The principles underlying this project and the growing science-industry complex of which it is a part are pertinent to the developing countries. The following conclusions should be further studied for possible development of research parks in these countries:

(a) The rapid increase in research expenditure in the United States and in other industrial countries may need to be paralleled in the developing countries. Their need is for an additional applied research and development effort—not for basic research. The results of the latter are not dependent upon the environment of use and can readily be transferred from country to country. On the other hand, it is becoming increasingly difficult to transfer technologies—the results of applied research—as the economic and technological gaps widen between many of the developing and the industrial countries. The developing countries, acting co-operatively, may have to supply a larger share of their applied research needs themselves if the industrial technologies they employ are to be appropriate to their needs.

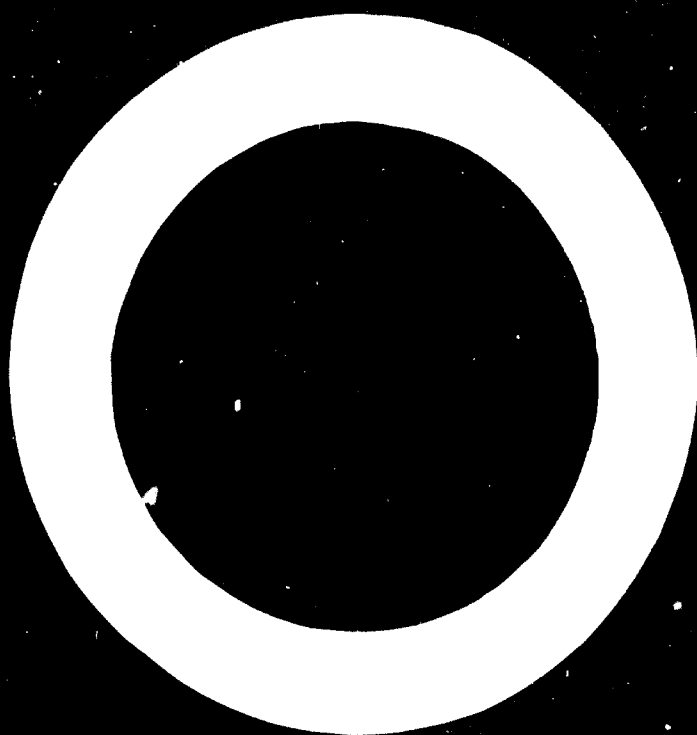
(b) The economies of scale that give rise to science-industry complexes in the United States may be even more important factors in the developing countries where both personnel and funds are severely limited. Studies may reveal major economies by having even technically unrelated government-sponsored research institutes in close proximity.

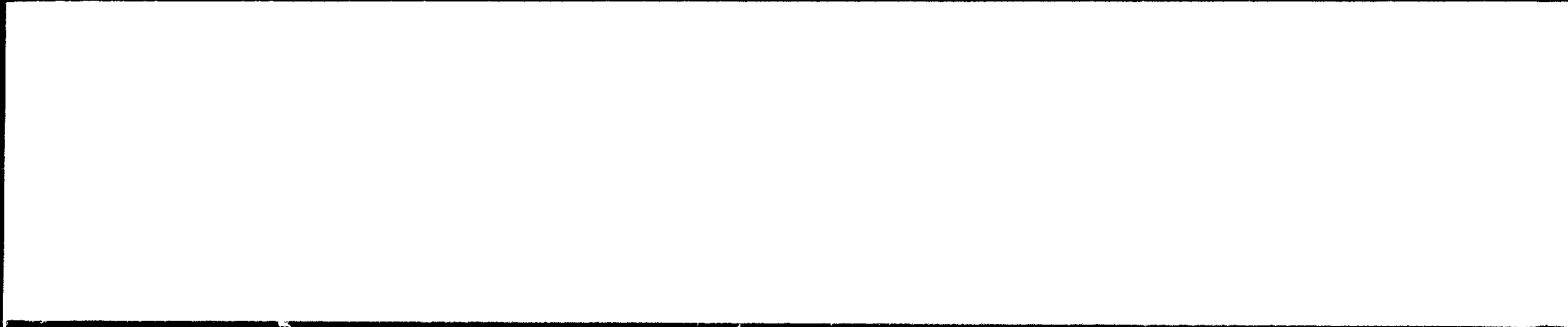
(c) Encouragement of close co-operation among industry, government research institutes, and educational facilities is important in the developing countries where in many instances organizations undertaking research tend to isolate themselves from their economies. Physical proximity is not sufficient without strongly enforced policies favouring interaction. A high concentration of government-sponsored research would not be justified by the gain to the limited number of companies which would be able to locate within the complex. However, the experience gained in perfecting the interactions within the complex would prove valuable for the extension of various forms of assistance to industry throughout the country.

(d) The value of studies to identify the service needs of industry would be undiminished in the developing countries. Services established without a sufficient demand—as often happens—are a waste of resources.

(e) The actions recommended for a science-industry complex in Colorado would apply to a developing country wishing to establish modern manufacturing industry employing technologies appropriate to the environment of the country.







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