INDUSTRIAL LOCATION
IN TRIPOLI AND BENGHAZI

By :

Dr. Mohamed El-Mehdawi

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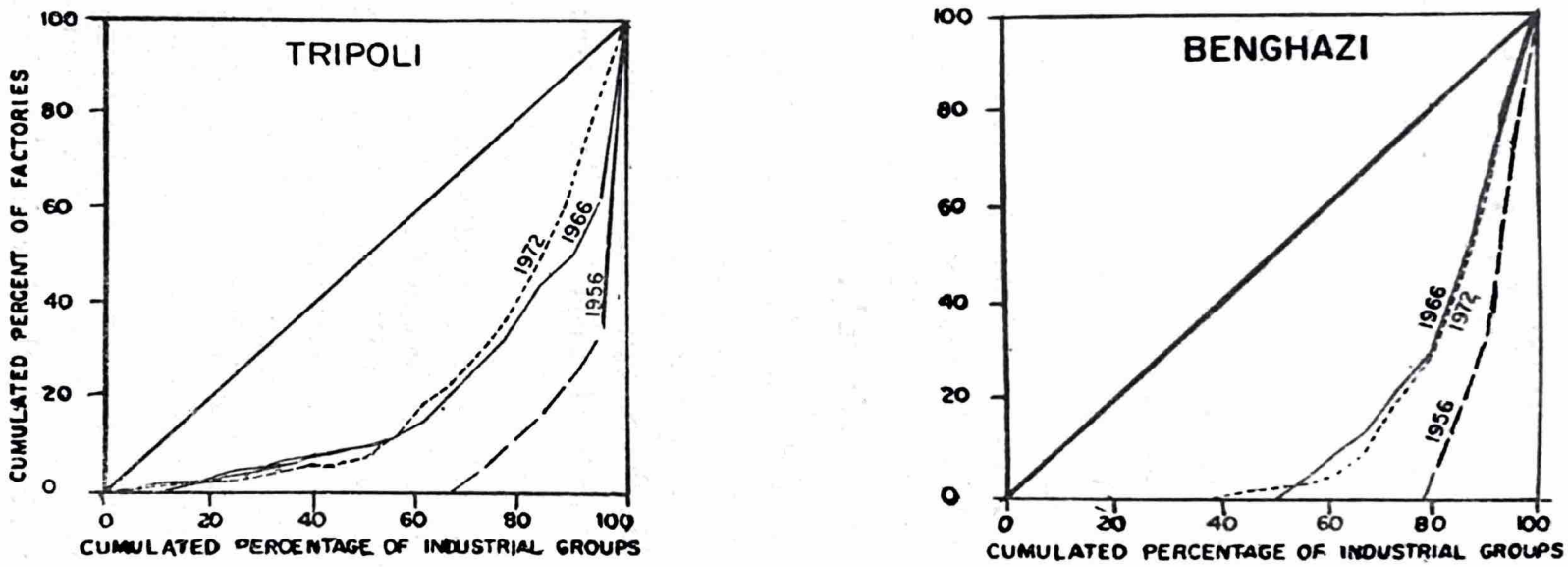
According to the Industrial census of 1971, Tripoli and Benghazi were the most important industrial cities in Libya, containing about 73 percent of all the establishments with more than 10 workers, and employing about 84 percent of the total workers. The types of industries present in the two cities, the clements of their structure, and other considerations such as which has the more rapid growth and industrial expansion, are the concern of this study.

The reason why Tripoli rather than Benghazi is called the industrial town of Libya becomes evident when the industrial structure of the two towns is examined. More factories are located within the contiguous area of Tripoli and, in addition, the establishments of Tripoli are larger and employ more people.

It is difficult to determine the extent to which diversification has increased in the two cities since 1956, and to compare the diversification of establishments in the two towns with that in Libya as a whole, because there are no annual statistics for industry in these two cities. Therefore this study examines all the factories listed in the 1971 Industrial Census, and excludes all those which closed before 1971. But it must be remembered that the number of establishments in Libya in 1971 was few, and the number which closed previously must be fewer. For this comparative study the diversification of the establishments has been calculated for these two cities, and for Libya as a

FIG. (1)

Fig. LORENZ CURVES FOR INDUSTRIAL ESTABLISHMENTS IN TRIPOLI AND (1) BENGHAZI 1956, 1966 AND 1971



whole. Table (1) presents data illustrating the percentage of factories in 18 branches of industry for three time periods, 1956, 1966, and 1971. Comparing Tripoli and Benghazi, Figure (1) shows that Lorenz Curves for each successive time period lie closer to the diagonal in the case of Tripoli than in that of Benghazi, and it can be concluded that the industrial structure of Tripoli has become more diverse than that of Benghazi. During these three periods the industrial structure of Libya has undergone major changes, most of which are reflected in the diversification indices ([1]).

Although the changes in the country as a whole have been important, those occurring in Tripoli have been more so, as is illustrated by Figure (2). The 1956 diversification index for Tripoli was 15.0 and for Benghazi 17.0, as compared with a value of 21.0 for the whole of Libya in that year. In 1966 the index for Tripoli had risen to 40.0 a large increase of 25.0 during ten years, and in Benghazi it had mounted to 35.0 a rise of 18.0. During the same time the national index had increased by only 15.0. By 1971 the Tripoli index had risen to 45.0, an increase of 5.0, while the national index was 37.0, an increase of only 1.0. The figure for Benghazi had dropped by 1.0 to about 34.0 In other words, while diversification over the whole country was rising by a little less than 75 percent, that of Tripoli had trebled and that of Benghazi had doubled. It is quite clear that industry has been diversifying much more rapidly in Tripoli than in Benghazi, or in Libya as a whole. The value for Benghazi and Libya during the period 1966-1971 has remained virtually static, while in Tripoli the tendency is for diversification to continue to increase, but at a slower rate. It is clear that Tripoli is the most highly-diversified and most important industrial city in Libya. Moreover, according to the 1971 industrial Census, Tripoli contains about 46 percent of

TABLE (1)

Percentage Distribution Of Industrial Establishments in 18 Major Branches in Tripoli Benghazi and Libya in 1956, 1966, & 1971

Industry	LIBYA			TRIPOLI			BENGHAZI		
	1956	1966	1971	1956	1966	1971	1956	1966	1971
Food processing	53.1	41.4	32.3	63.2	36.0	21.0	33.3	20.9	17.0
Soft drinks	6.2	2.6	1.9	—	—	1.8	16.7	4.7	2.0
Tobacco	3.1	0.7	0.3	5.2	1.3	0.7	—	—	—
Textiles	3.1	5.3	3.6	—	8.0	4.8	16.7	4.7	4.0
Clothes	—	0.7	1.9	—	1.3	4.2	—	—	—
Leather	3.1	0.7	0.3	5.2	1.3	0.7	—	—	—
Shoes	—	0.7	0.6	—	1.3	0.7	—	—	—
Carpentry	3.1	9.2	15.5	—	6.7	15.6	—	16.3	20.0
Furniture	—	1.3	0.8	—	2.7	1.8	—	—	—
Paper	3.1	1.3	1.5	5.2	2.7	2.4	—	—	1.0
Printing	12.6	7.9	3.8	10.6	8.0	4.8	33.3	13.9	6.0
Chemicals	12.6	6.6	5.8	10.6	8.0	9.0	—	6.9	4.0
Rubber	—	1.3	1.6	—	2.7	3.6	—	—	—
Plastic	—	0.7	0.6	—	1.3	0.7	—	—	—
Cement	—	—	0.6	—	—	—	—	—	1.0
Cement products	—	3.2	6.9	—	1.3	3.0	—	4.7	12.0
Other building materials	—	10.5	13.2	—	12.0	15.0	—	16.3	19.0
Metal work	—	5.4	8.8	—	5.4	10.2	—	11.6	14.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source : Computed by auther from data in I.R.C. **Industrial Establishments Census 1971, Tripoli, 1972.**

all Libya's industrial establishments which employ more than 10 workers, all of them located within the city, whilst Benghazi has about 29 percent of the total, some of which are located in adjacent areas such as El-Gawarsha and El-Hawari.

There are several possible explanations of this. The increase in the importance of Tripoli for highly diversified manufacturing has been for historical, economic, geographical and political reasons. It has grown to be the largest metropolitan area in Libya, covering about 33 square miles (2). From an historical point of view most of the Italian establishments were in Tripoli. Some of these remained after the Italians had left and were taken over by Libyans, whose success in operating them encouraged other Libyans to establish new and renew old ones. Moreover, the conurbation with its present population of about 454 thousands is by far the most significant urban centre of production and consumption in Libya, as indicated by the concentration of skills and of high incomes. Table (2) shows that the total consumption expenditure of 1970 is nearly 10 percent higher in Tripoli than in Benghazi. The concentration of large numbers of people within a large city forms a market not only for mass-produced goods, but also for more esoteric products (3).

The new functions of the city as the capital of the country and centre of most of the government administration, banks, insurance companies, oil companies, and of industrial research, cause it to receive more government investment than any other urban area. Concentration of economic activities carried out by either the national or international agencies, which moved from Benghazi and Beda, acts as a strong pulling factor in Tripoli. Labour is also more easily available in Tripoli than in Benghazi. Even if there is no unemployment, workers can

Fig (2.) A Comparison of the Rates of Diversification of Industry Between Libya As A Whole, Tripoli and Benghazi, 1956–1971

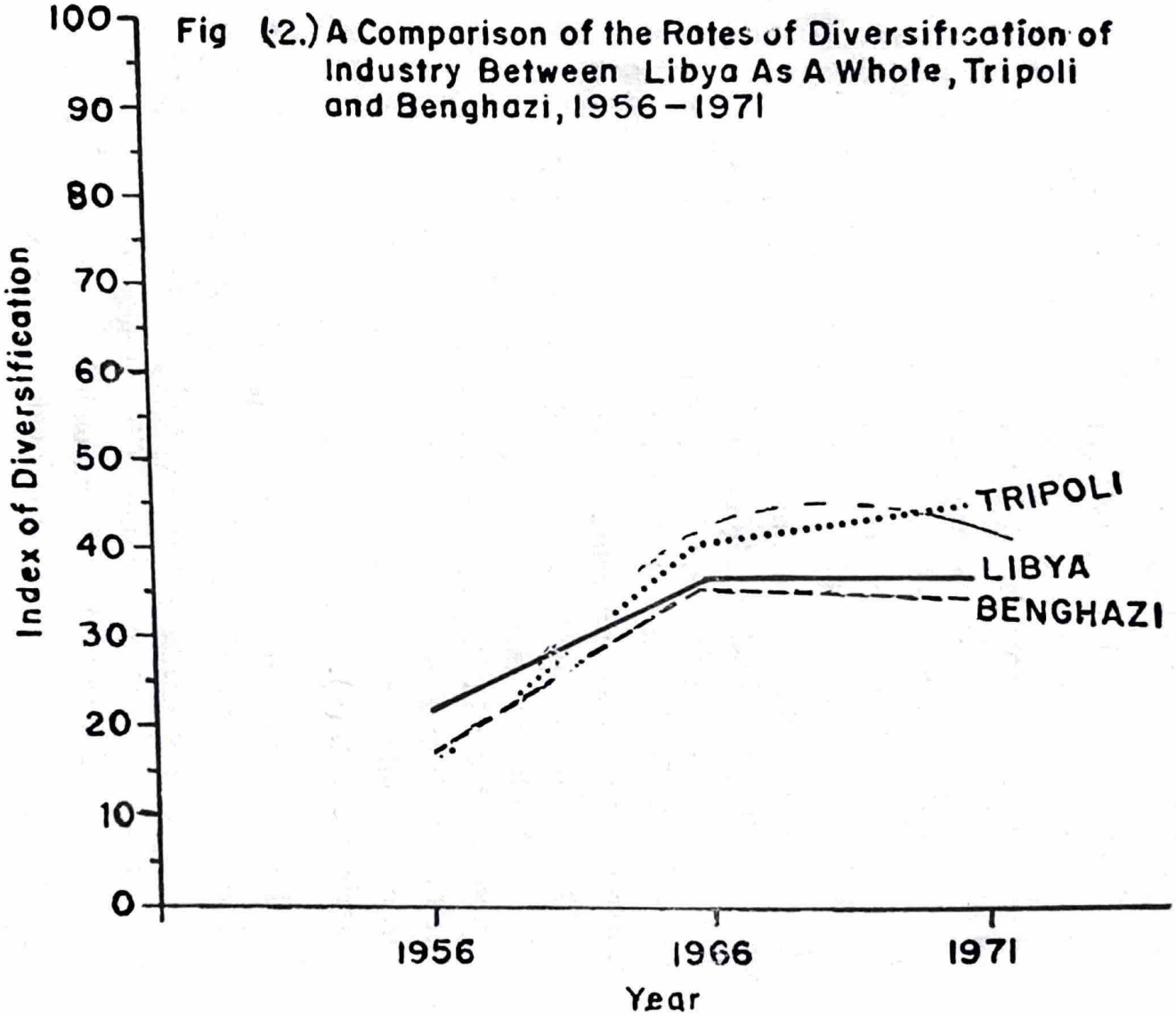


TABLE (2)

Consumption Expenditure On Some Consumption Items in Tripoli And Benghazi, 1970 (in LD, 000)

Consumption Items	Tripoli	Benghazi
Food	31.565	29,820
Consumer goods (other than food)	2,776	2,596
Clothing, textiles, furnishings	6,368	4,884
Household equipment and durables	6,896	6,041
Total	47,605	43,341

Source : Census And Statistical Dept. **Statistical Abstract 1970,** Tripoli, 1972.

be attracted from other establishments, besides which there are also some facilities available for training skilled workers. Tripoli close to largest industrial training centre (Nasr El Din Ghami Institute) and Faculty of Engineering, while in Benghazi there is only vacational training and the training centre was transferred to Tobruk.

Industry is also attracted by the various external economies made possible in Tripoli by the more adequate services and utilities, such as electricity. Tripoli has the largest power station in the country, with a production of about 351,000 thousand Kilowatt hours in 1969. It also has the main airport and port its airport being deeper and with more facilities than that of Benghazi. Table (3) shows the great importance of the Tripoli port and airport. Furthermore, Tripoli has developed as the transport node for the whole western muhafadat. A large number of buess daily serve areas containing at least three - quarters of the western Muhafadat's population. Moreover, its location

TABLE (3)

Percentage Of Ships, Planes, Loaded And Unloaded, Tripoli Port And Airport, 1971

Classification	Libya (1)	Tripoli (2)	% (2)-(1)
Number of commercial ships entering ports	4,513	2,439	54.0
Goods unloaded in ports (in thousand tons)	3,009	1,801	59.9
Goods loaded in ports (in thousand tons)	20	10	50.0
Number of planes landing at airports	6,706	3,941	58.8
Goods unloaded at airports (in tons)	12,111	9,810	81.0
Goods loaded at airports (in tons)	2,411	1,879	78.0

Source : Census and Statistical Dept. **Statistical Abstract 1971,** Tripoli, 1973.

gives Tripoli two further advantage over Benghazi. Firstly, it is closer to the western countries, making raw materials, machines, techniques and spare parts cheaper and easier to import. Secondly, it is located in the centre of a fertile hinterland which maintains about two-thirds of the Libya population. Four of the main cities in Libya (Misurata, El-Zawia, Homes and Gharian) are located within 130 miles of Tripoli and the development of a new motorway system has extended its market as well as the supply of raw materials. Moreover, the urban settlements of this area perform as central places, serving areas within the city's market region.

(a) Industrial Distribution And Location in Tripoli :

This section will study the distribution and location pattern of the manufacturing industries within the city and its 18 districts. Table (4) gives a detailed analysis of the number

TABLE (4)

Distribution of Establishments And Workers By Industry In Tripoli, 1971

Type of Industry	No. of establishments by size of workers			Total	Total number of employment	% of Total
	10-19	20-49	50 and over			
Food processing	15	7	14	36	2,178	28.6
Soft drinks	1	—	2	3	674	8.9
Tobacco	—	—	1	1	1,200	15.8
Textiles	4	3	1	8	222	2.9
Clothes	4	1	2	7	186	2.4
Leather	—	1	—	1	22	0.3
Shoes	1	—	—	1	18	0.2
Carpentry	13	8	1	22	477	6.3
Furniture	1	1	1	3	218	2.9
Paper	—	1	3	4	210	2.8
Printing	6	—	1	7	140	1.8
Chemical products	3	7	4	14	582	7.6
Rubber	4	2	—	6	117	1.5
Plastic	1	—	—	1	16	0.2
Cement	3	1	2	6	265	3.5
Other building materials	9	12	3	24	645	8.5
Metal work	7	8	1	16	445	5.8
Total	72	52	36	160	7,615	100.0

Source : Calculated by author from data in I.R.C. **Industrial Establishment Census 1971**, Tripoli, 1972.

of establishments arranged by size. The table shows that 45 percent of the establishments within the city in 1971 were small (employing only 10-19 workers). The food, soft drinks, building materials and carpentry industries accounted for about 57 percent of all establishments and of the total of workers. It is obvious that most of the industries in the city of Tripoli are still traditional.

The most important branch of industry, measured according to total number of workers, is food processing, which accounts for 29 percent of the total persons employed. A detailed breakdown shows that 1,158 workers, or 53 percent of the total number of food workers, were connected with six establishments, and that 688 workers, 32 percent of the total in this category, were connected with three tomato canning establishments. The area surrounding Tripoli to the south is the greatest centre for tomato production. In 1969 Tripoli and El-Zawia Muhafadat produced about 1,200,000 tons which accounted for about 93 percent of the country's total production. The establishments buy the produce during the harvest season from the farmers who bring it to them. The number of workers in these factories is not stable. There is a high seasonal peak in the summer, but numbers decline to about 40 to 60 during the rest of the year. This contrast is due solely to the nature of the work. At the height of the season, the work does not require experience, nor is it physically demanding, but a large number of workers are needed. During the rest of the year, however, the tasks are physically more taxing, and therefore strong and expert men are more desirable as workers (4).

Building materials, and the manufacture of cement, bricks, flagstones and lime products are the next important industries by total of workers. The construction boom in the

city has a great deal to do with the continued growth of this industrial category. Chemical industries, such as gas cylinders toiletries, soap, perfumes and paints, can be related to the change in people's way of life, and the increased demand for more sophisticated articles.

As far as the location of these establishments within the city is concerned, it has been stated earlier that there was no formal policy for industrial location, either between the regions or within the cities. Therefore industrial sites within Tripoli were selected in the city by the entrepreneurs themselves, who sought somewhere close to the port, to the C.B.D. and to their own homes. In 1968, the Municipality of Tripoli set aside special zones for the location of new establishments within the city, and asked the old establishments to move wherever possible in order to reduce industrial problems such as smells and pollution. After this, most new establishments were established in some of these zones, but others were located elsewhere reasons which will be discussed later. In spite of the municipal order for old establishments to move, and the increase of the land values in C.B.D., only a few establishments complied. Of the 40 establishments interviewed (24 percent of the total establishments in the city), 33 were established before 1969, but only 6 establishments (18 percent) had moved from previous sites. The main reasons for re-locating establishments were the increased space required to gain economies in production and the desire to organize production techniques in favourable economic circumstances. Those establishments which moved had either been unable to obtain space near their former sites or had wished to construct new buildings.

The industrial establishments in Tripoli are widely scattered throughout the city and to give a clear picture of their distribution the coefficient of location is very useful, since it

TABLE (5)

Distribution of Industrial Workers By Industries For Each District in Tripoli, 1971

District / Industry	Food	Soft drinks	Tobacco	Textiles	Clothes	Leather	Shoes	Wood products	Furniture	Paper	Printing	Chemicals	Rubber	Plastic	Cement production	Other building material	Metal work	Total in each district
1. Medina	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Central	33	—	—	—	114	—	—	—	—	—	27	—	—	—	—	—	—	174
3. Omar Muchtar	220	—	1200	34	10	22	—	95	—	—	102	115	15	—	—	—	29	1842
4. Ad-Dahrah	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Garden City	55	18	—	—	—	—	—	—	—	—	—	—	—	—	—	31	—	104
6. Sidi Kalifa	353	—	—	54	—	—	18	29	—	—	11	—	38	—	—	—	69	572
7. Sug Talatha	30	—	—	28	—	—	—	186	—	52	—	—	40	—	—	—	14	350
8. Georgompopoll	176	—	—	13	—	—	—	—	—	—	—	54	—	—	—	—	—	243
9. East Gurgi	445	—	—	—	—	—	—	33	18	—	—	25	—	—	—	30	20	571
10. Forest En Nast	130	—	—	—	—	—	—	33	170	60	—	103	14	—	—	158	66	734
11. North Sug El-Jumaah	65	—	—	93	52	—	—	12	—	—	—	—	—	—	—	13	—	235
12. Sug El-Jumaah Central	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
13. Fornaj	77	—	—	—	—	—	—	37	—	—	—	—	—	—	—	21	—	135
14. University	26	—	—	—	—	—	—	—	—	—	—	22	—	—	75	—	—	123
15. Hadbah El-Khadra	10	656	—	—	10	—	—	52	30	43	—	233	10	16	66	256	208	1590
16. West Gurgi	370	—	—	—	—	—	—	—	—	—	—	30	—	—	—	46	39	485
17. Gargaresch	—	—	—	—	—	—	—	—	—	—	—	—	—	—	124	90	—	214
18. East Fornaj	176	—	—	—	—	—	—	—	—	55	—	—	—	—	—	—	—	231
Total	2178	674	1200	222	186	22	18	477	218	210	140	582	117	16	265	645	445	7615

Source : Computed by author from data in I.R.C. **Industrial Establishments Census 1971, Tripoli, 1972.**

TABLE (6)

Coefficient of Localization of Industries in Various Districts of Tripoli, 1971

Industry	The Coefficient of Localization
Food	45
Soft drinks	78
Tobacco	76
Textiles	66
Clothes	84
Leather	76
Shoes	93
Carpentry (wood)	40
Furniture	69
Paper	63
Printing	66
Chemicals	36
Rubber	57
Plastic	79
Cement products	75
Other building materials	51
Metal work	42

indicates the degree of concentration of each type of industry. It is also an aid in finding out the industrial diversity within each of the 18 districts of Trpoli's city. To examine the coefficient of localization of the industries within Tripoli, one should keep in mind the following classification originated by Sargent Florence ([5]) : industries with a value between 40 and

TABLE (7)

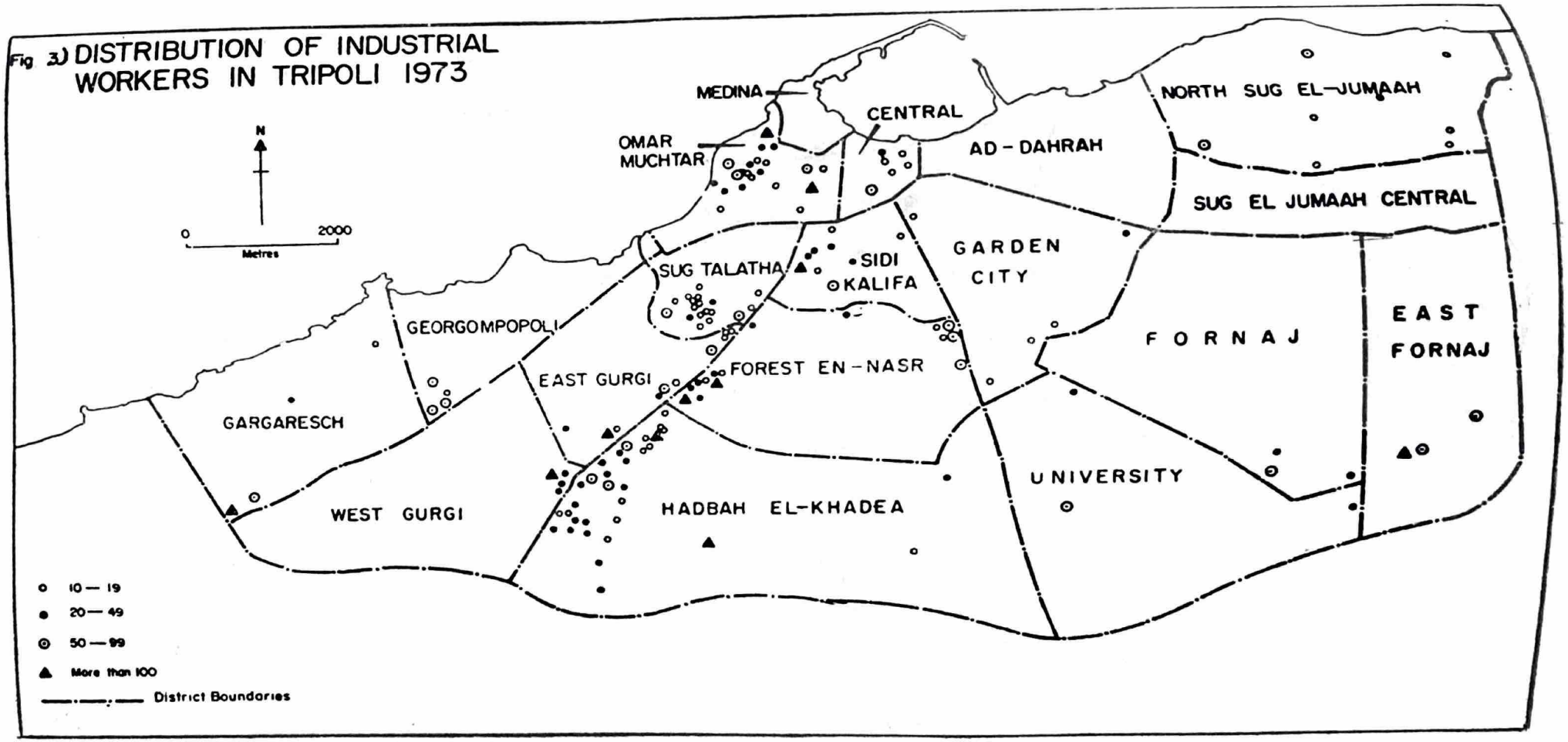
Industries Arranged According to Concentration in Each District of Tripoli

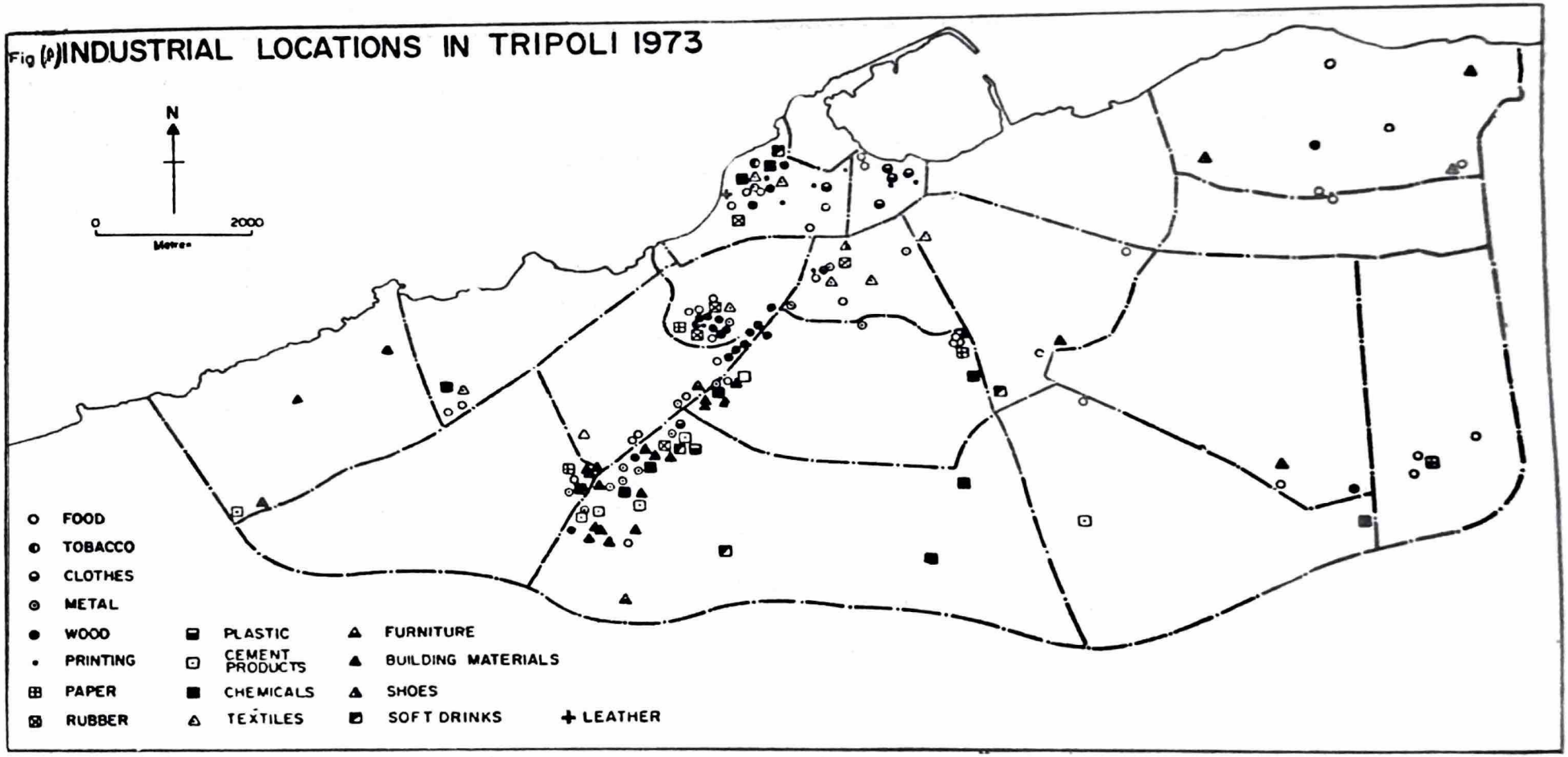
DISTRICT	INDUSTRIES
Central	Clothes and printing
Omar Muchtar	Tobacco, leather and printing
Garden City	—
Sidi Kalifa	Shoes, rubber and textiles
Sug Talatha	Wood, rubber and paper
Georgompopoli	Rubber and food processing
East Gurgi	Food processing
Forest En-Nasr	Furniture, paper and other building materials
North Sug El-Jumaah	Textiles and clothes
Sug El-Jumaah Central	—
Fornaj	Wood
University	Cement production
Hadbah El-Khadra	Plastics, soft drinks, metal work, chemicals and other building materials
West Gurgi	Food processing
Gargaresch	Cement production
East Fornaj	Paper

60 are moderately localized, those with lower values are fairly well spread over the region, and industries with values above 60 may be taken as heavily localized.

Tables (5) and (6) show the distribution of workers and the coefficients of location of 17 industrial categories in the 18 districts of the city (*). Most of the industries are heavily localized. This is either because there is only one factory and 100 percent of its labour is therefore in one district ,e.g. the tobacco and leather industries in Omar Muchtar Districts, shoes

(*) The classification of the districts was due to the classification of the Tripoli Master Plan, final report of 1969.

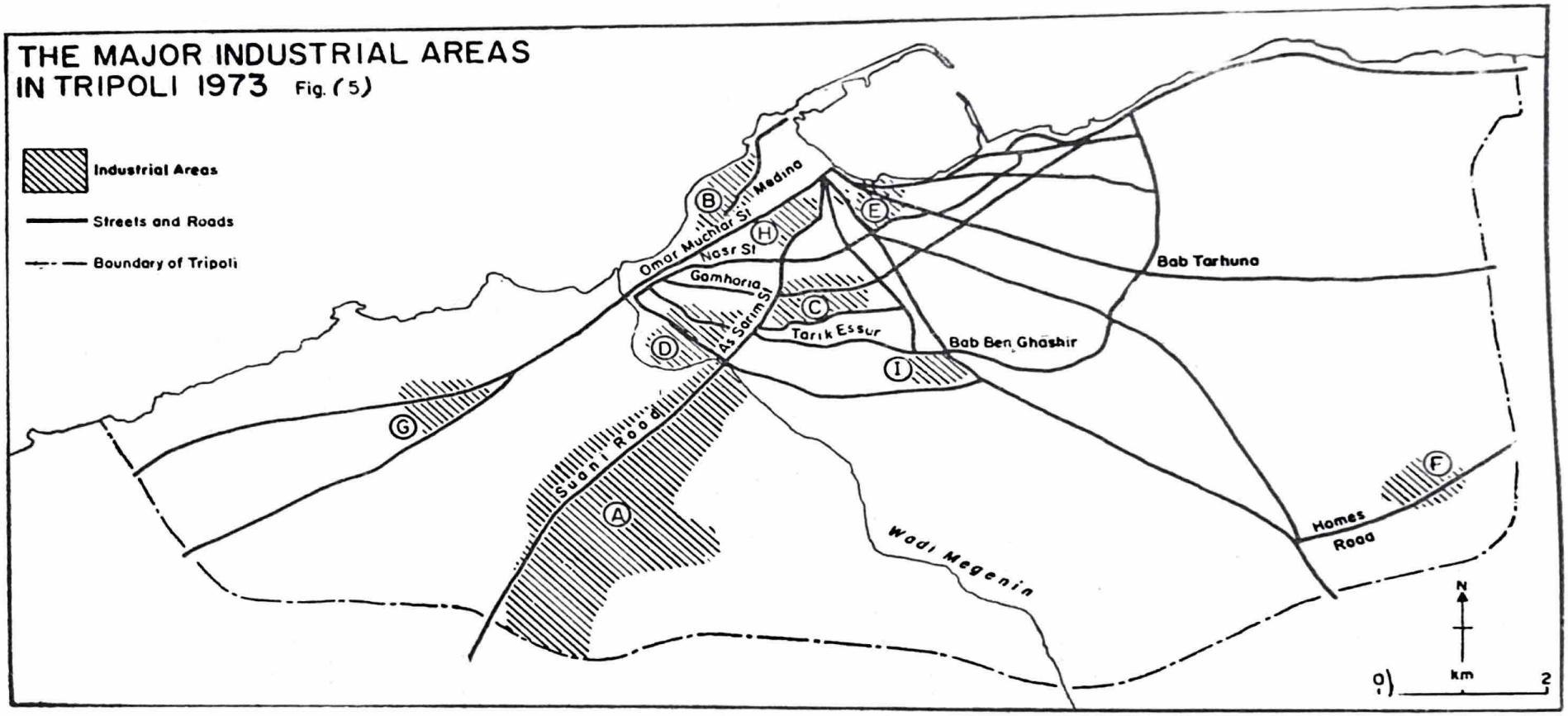

Fig 3) DISTRIBUTION OF INDUSTRIAL WORKERS IN TRIPOLI 1973
N
0
2000
Metres
MEDINA
CENTRAL
OMAR MUCHTAR
AD - DAHRAH
NORTH SUG EL-JUMAAH
SUG EL JUMAAH CENTRAL
SUG TALATHA
SIDI KALIFA
GARDEN CITY
GEORGOMPOPOLI
FORNAJ
EAST FORNAJ
EAST GURGI
FOREST EN-NASR
GARGARESCH
UNIVERSITY
WEST GURGI
HADBAH EL-KHADEA
10 — 19
20 — 49
50 — 99
More than 100
District Boundaries


Fig (6) INDUSTRIAL LOCATIONS IN TRIPOLI 1973
N
0
2000
Metres
FOOD
TOBACCO
CLOTHES
METAL
WOOD
PRINTING
PAPER
RUBBER
PLASTIC
CEMENT PRODUCTS
CHEMICALS
TEXTILES
FURNITURE
BUILDING MATERIALS
SHOES
SOFT DRINKS
LEATHER

in Sidi Kalifa, and plastics in Hadbah El-Khadra District), or because most of the factories with large numbers of workers are located in one district. For example two large establishments with 97 percent of the total workers in the soft drinks industry are in Hadbah El-Khadra; four clothing establishments employing 61 percent of this industry's total workers are in Central District ; and one establishment with 78 percent of the furniture industry's total is located in the Forest En-Nasr District.

The foodstuffs, wood, rubber, other building materials and metal work industries have moderate coefficients of localization. The food industry is widely distributed, located in 15 districts, but its moderate coefficient result from about 80 percent of its workers being located in only six districts. In spite of the fact that the chemical industry is located in seven districts, it has a low coefficient, possibly because most of its workers are located in one of the industrial districts. Other industries show a high concentration, each of them located in a few districts. Table (7) shows the type of industry concentrated in each district according to coefficients of location. Only six districts depend significantly on one industry and the other districts have more than one. Five highly industrialized districts have about two-thirds of the total workers, each having three industries or more concentrated in it. These districts are Omar Muchtar, Sidi Kalifa, Sug-Talatha, Forest En-Nasr and Hadbah El-Khadra.

By comparing this distribution of industrial concentration among the districts in relation to their respective products with the answers to question about marketing the production, certain conclusions may be reached. Industries which deal with foodstuffs, wood and building materials production, whose products are mainly for local consumption in the city, are found in many


THE MAJOR INDUSTRIAL AREAS
IN TRIPOLI 1973 Fig. (5)
Industrial Areas
Streets and Roads
Boundary of Tripoli
Omar Muchtar St
Medina
Nasr St
Gamhoria St
As Sarim St
Tarik Essur
Bab Tarhuna
Bab Ben Ghashir
Suani Road
Wadi Megenin
Homes Road
A
B
C
D
E
F
G
H
I
N
0
km
2

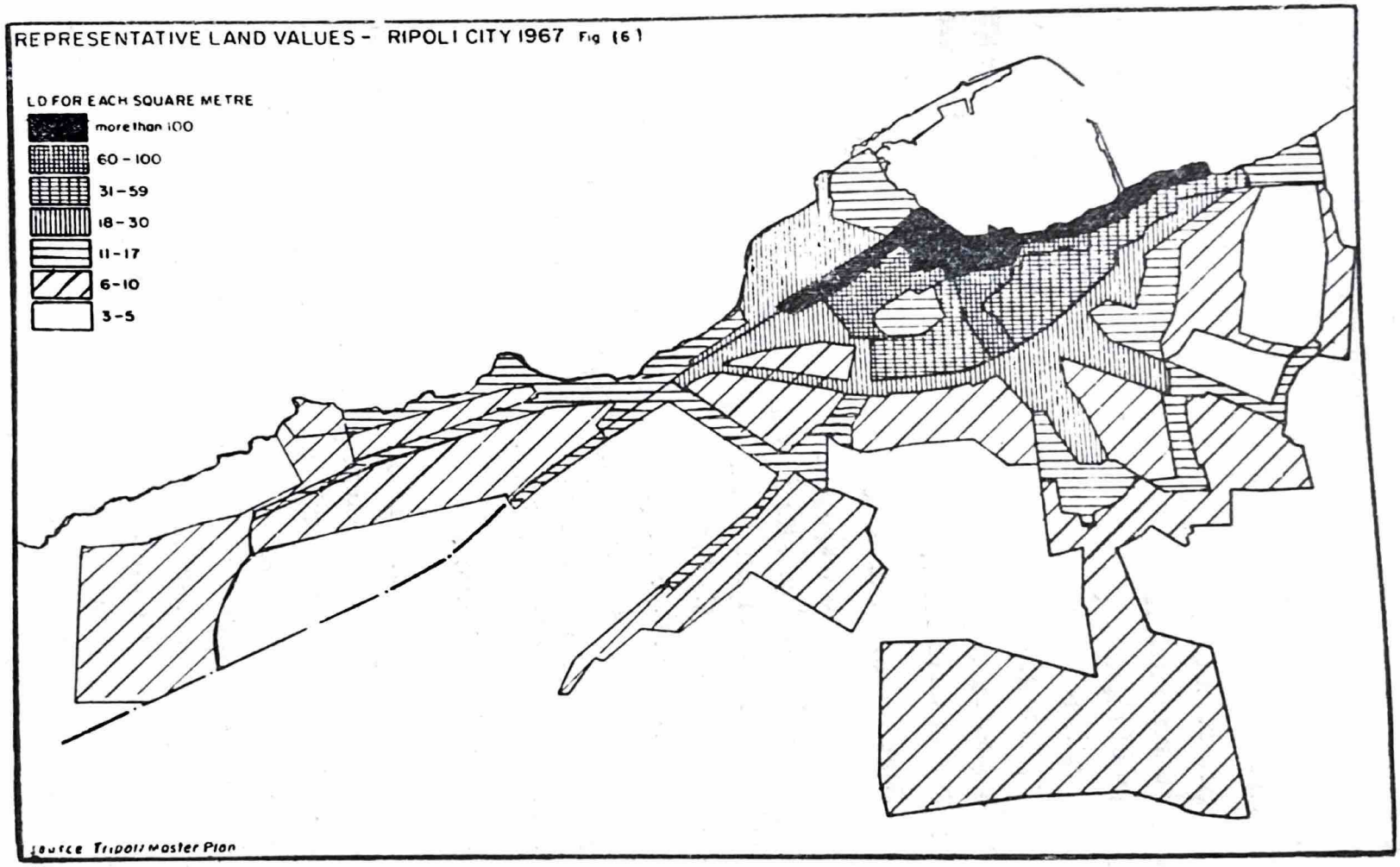
districts, as close as possible to the local district markets. Others industries, such as tobacco, soft drinks, furniture, plastics and chemicals, are localized in one or two districts, especially in The Suani Road area, because their products do not depend on the local market, but are taken to other parts of the country.

Are industries distributed throughout each district, or are they concentrated in one or two parts of each district ? Comparison of Figures (3) and (4), which show the various industrial locations in Tripoli, indicate that except in Sug Talatha district, industries are mostly concentrated either at the western or the eastern edge of each district, largely because they are adjacent to main roads.

Nine industrial areas can be recognized within the metropolis. They comprise about 6.6 percent of the total land in the city ([6]), and correlate with four main roads, connecting Tripoli with other parts of the country (Figure 5) : (A) Suani Road, (B) North West, (C) Sidi Kalifa, (D) Sug Talatha, (E) North Central, (F) South east, (G) South west, (H) South Central, and (I) Bab-Ben Gashir. The rationale for determining and defining the types of industries that are characteristic of each area is now explained in detail.

(a) Suani Road Area :

This is the main industrial area in Tripoli in terms of number of industrial workers, number of establishments and size. It extends from north-east to south-west along the Suani Road, covering the east part of East Gurgi Districts, the north-east of West Gurgi, and the west part each of Forest En-Nasr and Hadbah El-Khadra. In 1971, about 2,890 workers, 38 percent of the total workers in Tripoli, worked here, and more than one-third of the establishments in the city are sited here. Several industrial activities have been established on both sides


REPRESENTATIVE LAND VALUES - RIPOLI CITY 1967 Fig (6)
LD FOR EACH SQUARE METRE
more than 100
60 - 100
31 - 59
18 - 30
11 - 17
6 - 10
3 - 5
Source Tripoli Master Plan

of this road along a distance of approximately 3 Kms. Development as an industrial area is recent, 87 percent of the total number of establishments having been established since 1966, and most of the buildings were erected for industrial purposes. These factories are either newly-established or transferred from the inner part of the city and erected on large plots of land in cheaper areas.

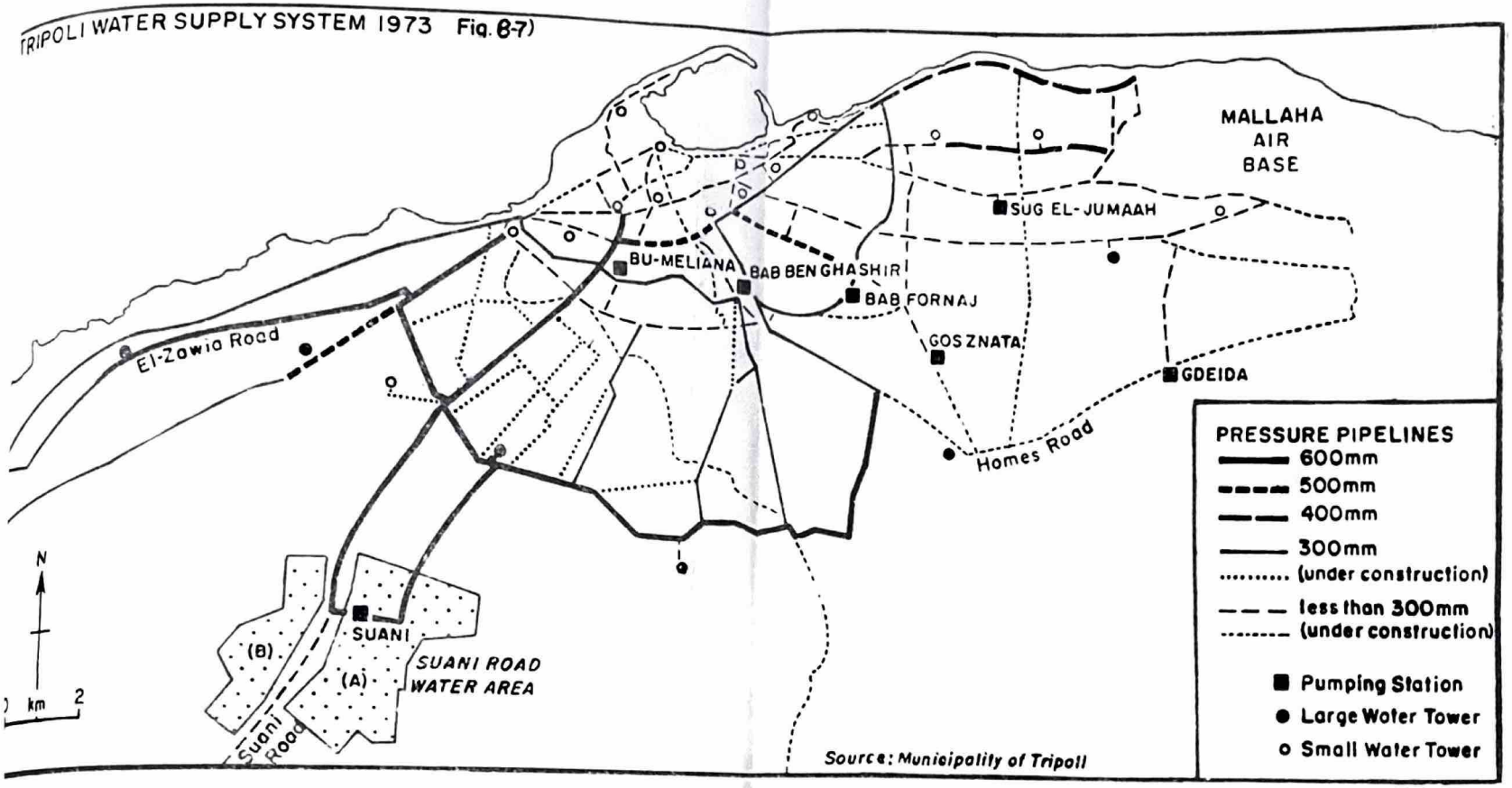
The industrial structure of the area is diversified. Leading industries are plastics, furniture, foodstuffs, building materials and chemical industries, the first two with 100 percent, and the latter with more than 50 percent of the total workers in each industrial group. Industries have been set up here for many reasons. Land was becoming increasingly scare and expensive in the urban core, where annoying legislation was also proving less conducive to the establishment of large-scale production. Individual corporations have been erecting plants in outlying districts during the last seven years, where there were large lots of cheap land close to the city. The land value in this area is much cheaper than in other parts of the city (Figure 6). Much of the land in this area was zoned for industrial purposes, and this factor has to a large extent been responsible for the present expansion and diversification. The establishments are therefore capable of expanding over a wide area without increasing costs tremendously, especially those establishments whose raw materials and finished products are bulky (e.g. building materials, metal work and soft drinks). This area can be extended further south to accommodate more industrial establishments. It is far from residential areas, and the municipality was right to decide that most heavy and noisy industries should be placed here to avoid considerable nuisances caused either by noise, such as that of cutting steel or clanking bottles, or by unpleasant smells, such as that of rubber or chemicals which

can be smelt at a considerable distance during the hot summer.

Moreover, it is located near the Suani water station (Figure 7), which provides Tripoli with all its water requirements. The establishments can obtain their water from public pipelines, especially from the major pressure pipeline « A » (600 mm) which passes along the Suani Road. On the other hand, half of the establishments interviewed had installed their own water supply by sinking wells. The public water is still required by some industries, especially the food and soft drinks industries, because of the salinity and high calcium content of Tripoli underground water ([7]). Suani Road site is suitable for getting water any time, while establishments inside the city are sometimes unable to get the quantity which they need because of the small pipelines and the increased consumption inside the city in summer.

The location of the area along the main road also minimises the transport costs of raw materials and of finished products. The Suani Road runs from the north to the south-west, linking with the central business district to the north, and with the important agricultural part of the Geffra plain in the south, which provides a large proportion of the city's fruits and vegetables. In addition, many heavy vehicles travel this route carrying agricultural produce into the city and manufactured articles from it. Consequently some of the biggest garages, services and repair stations have been located on this road which has naturally and unavoidably become very congested.

The major handicap of this area might be its distance from the residential areas of the workers, but this problem has been tackled by providing special transport services and public buses which bring workers from different parts of the city.


TRIPOLI WATER SUPPLY SYSTEM 1973 Fig. 8-7)
MALLAHA AIR BASE
SUG EL-JUMAAH
BU-MELIANA
BAB BEN GHASHIR
BAB FORNAJ
GOS ZNATA
GDEIDA
El-Zawia Road
Homes Road
SUANI
(B)
(A)
SUANI ROAD WATER AREA
Suani Road
N
km 2
PRESSURE PIPELINES
600mm
500mm
400mm
300mm
(under construction)
less than 300mm
(under construction)
Pumping Station
Large Water Tower
Small Water Tower
Source: Municipality of Tripoli

Twenty-two establishments interviewed in this area, and five of these provided special transportation while workers for the remainder came either by public buses or by private cars. Table (8) reveals that the largest number of public passenger journeys on buses in 1967 was made on the Fellah and Gargaresch lines ([8]). The Fellah line runs along the southern part of the Suani Road (see Figure 8).

TABLE (8)

Distribution of Daily Journeys To Work, Tripoli, 1967

Bus Line	Direction of journey	No. of journeys	Average no. passengers per day
Ad-Dahrah-Sug El-Jumaah	East	56	3,360
Arada-Sug El-Jumaah	East	56	3,360
Armus - Arada	East	56	3,360
Znata - Arada	East	56	3,360
Jama Bent El-Bay	East	70	4,200
Sidi Masri - Fornaj	South-east	56	3,360
Gargaresch	West	84	5,040
Gurgi	West	56	3,360
Fellah	West	84	5,040
Hadbah El-Khadra	South-east	70	4,200
Accara - sh. El-Zawia	South	36	2,120
	South	56	3,360
Circle No. 1	C.B.D.	18	1,080
Circle No. 2	C.B.D.	18	1,080
Circle No. 3	C.B.D.	18	1,080
Circle No. 4	C.B.D.	28	1,680
Total		818	49,040

The twenty-two establishments interviewed here had 1,187 workers, and in answer to question about Labour, 27 percent were reported to live within one Kilometre, 47 percent came from between one and five Kilometres, and 26 percent lived more than five Kilometres away.

As for the disadvantages of the industrial area, its location in the south and south-west of the city is satisfactory from the point of view of the prevailing north-westerly winds, but not for the Ghibli winds which blow over the city for many days during the year (Table 9). These south-westerly winds carry the fumes, odours, dirt and gases of the establishments over the residential areas. Moreover, there is no sewerage system in the area. Thus some of the establishments have constructed special sumps, some of which contain acids and alkalis which pollute the ground water, while others burn their sewerage in the area, in the case of the match works, causing frequent fire hazards and threatening their neighbours. There is also no regular service for the removal of waste materials ; ten of the establishments interviewed rely on their own disposal trucks, the others selling their refuse or even throwing it onto nearby land.

TABLE (9)

The Number Of Days With Ghibli Winds In Tripoli, 1960-1964

Year	J	F	M	A	M	J	J	A	S	O	N	D	Total
1960	4	10	9	10	13	7	3	3	—	9	4	—	72
1961	—	—	3	9	12	3	3	1	2	3	6	8	50
1962	3	—	8	10	12	5	4	1	3	3	3	—	52
1963	9	10	9	7	2	12	5	2	5	—	8	13	82
1964	—	8	11	6	8	8	5	8	1	16	4	8	83

Source : Meteorological Office, 1966.

(b) North-West Area :

This is one of the oldest industrial areas, old industries operating here, including the tobacco establishment (established

in 1924), The Tripoli Gas Company (1935), and The Libyan Company of Gas Production (1931). Here the tobacco, leather and printing industries are highly concentrated. These industries owe their importance to the fact that they were established before the area gained popularity as a residential area, its present main function.

In this old inner urban area the establishments have characteristically drawn their workers from the old city close by. The area is also close to the harbour and to the main power station. In the past the location was suitable since it was away from the residential area, but as time progressed, urban growth crept towards the west and the south and surrounded the area, and its location is no longer satisfactory. Moreover, its location in the north-west of the city means that the prevailing westerly winds annoy the residents living in the east and south-east of the area.

(c) Sidi Kalifa Area :

This is a small area in the west part of Sidi Kalifa district, where industries are clustered together in a few streets. It is within half a Kilometre of As-Sarim and Gamhoria streets which connect it with the C.B.D. Approximately 550 or 7.5 percent of the industrial workers of the city workers in this area. The leading types of manufacturing are shoes, where all of the industry's workers are concentrated, rubber (24 percent) and textiles (23 percent). Such goods are orientated largely to a local market, hence their development here over the past ten years when land was made available for factory sites. The availability of workers and proximity to the pumping station of Bu-Meliana were further reasons for its development. Like the north-west area, the Sidi Kalifa area is unsuitably located from the point of view of the prevailing winds. Perhaps the

location of industry in this area is one of the reasons which discourages rapid urban growth farther south, because the prevailing westerly winds carry some of the industrial pollution towards the south.

(d) Sug Talatha Area :

A small industrial area located in the southern part of the Sug Talatha district, north of Wadi Megenin, this is considered as the northern extension of the Suani Road area. The area has about 5 percent of the total workers, is dominated by light industry, and most of the establishments are small, employing between 10 and 30 workers. The important industries are carpentry, rubber and paper, which employ 41 percent, 34 percent and 25 percent respectively of the total workers. These types of industry are noisy or smelly.

The low density of residents, the cheapness of land, the wadi Magenin (which could be used for sewerage disporal, though it is far from ideal for this purpose), the proximity of the Suani Road and its wood stores, and the first ring road, were the main resons for industrial location in the area. However, this area offers no other advantages to industries, because it is limited by urban growth and by the wadi whose flats are subject to flooding.

(e) North Central Area :

This area is occupied by very light industries which are scattered within one square Kilometre. Total industrial workers were slightly less than 200, mainly employed in clothing, printing and food processing. The industrial structure shows the expected emphasis on these three types of industry traditionally associated with city centres. Most establishments are of one-

storey only, because all industries located here are light and small-scale and the rents are high. The market offers the advantages of easy contacts with consumers ; other location factors were fluctuating demand for workers, the high transport costs of this type of industry and personal preference. Moreover the raw materials and finished products are small and not bulky and there are no serious problems concerning amenities, because these industries create little industrial nuisance.

(f) South-East Area :

This small area is located at the beginning of the Motorway which goes to the east of the country (Homes Road). Foodstuffs and the paper industry are concentrated here. It has the advantage of the availability of cheap land, and the motorway which provides a good link with the central commerciai district and the eastern agricultural lands, used both as a source of raw materials and as a market. It is also located beside the main 600 mm water pipelines. The location from a climatic point of veiw might be suitable for industry, but this area offers little possibility for further extension, being bounded by arable land whose produce is of great economic value to the city.

(g) South-Western Area :

The area is located mostly in the southern part of Georgompopoli district on the main western road which connects the city with the western parts of the country. Its industrial structure reflects the significance of the large foodstuffs and textile establishments. The presence of the western motorway, the low cost of the land, and the availability of workers from surrounding areas were the location factors.

(h) *South Central Area :*

The area has a similar industrial structure to the north central area, and the reasons for its location are the same, thus the comments made about that area apply equally to this.

1. *Bab Ben-Ghashir Area :*

This is a small old industrial area, all of those establishments were established before 1967. Its site beside the Ben-Ghashir pumping station and the eastern motorway, and the low price of land, were the main reasons for its evolution here. Now the possibility of industrial location is limited, owing to urban growth surrounding the area.

The remaining, 1,184 of the city's industrial workers' strength, or about 15.5 percent of the total workers (Table 10) were scattered in establishments in different parts of the city

TABLE (10)

Distribution of Industrial Workers Among Industrial Areas In Tripoli, 1971

Industrial area	No. of workers	% of total
Suani Road	2,896	38.0
North-West	1,704	22.4
Sidi-Kalifa	553	7.3
Sug Talatha	363	4.8
North Central	184	2.4
South-East	268	3.5
South-West	214	2.8
South Central	81	1.1
Bab Ben-Ghashir	168	2.2
Outside industrial areas	1,184	15.5

Source : Computed by author from data in I.R.C. **Industrial Establishments Census 1971, Tripoli, 1972.**

outside the boundaries of these nine areas. The reasons are either personal choice, or to build prosperity, or the close proximity of an ancillary activity in the case of the flour mill located at Fornaj to be close beside the public grain store.

A chronological study of industrial development in Tripoli shows that the western, the southern, and especially the south-western parts were those in which a distinctive industrial area originally developed. This may be due to the fact that the growth of the city during the Italian period was more rapid towards the east. During this period the Libyan were concentrated in the old residential areas of Mizran, Belkhair and Ad-Dahrah while the Italians built new residential areas to the east and south-east of the old city. Khuga stated that,

> " The Italians succeeded in regulating the height and layout of multi-storey buildings, and also developed five residential areas on the Italian style. These areas are now located within the middle zone, I.C. Ad-Dahrah, " Case Populare " and " Citta Giardino " and Shara El-Shatt. Three of these were reserved for Italian settlers and Shara El-Shatt residential quarter was reserved for high Italian officials (army and civil servants). The creation of " Citta Giardino " or garden city was inspired by the idea of garden cities as propounded by Ebenezer Howard " (9).

The concentration of the population in the east during that time made the Italians locate their establishments on the open land in the south and north-west parts. Once a factory succeeded in its location, new entrepreneurs were encouraged to build close by, especially when there was no city planning system. The new growth of the city towards the south and west in

recent years has influenced some new industrial locations, especially those of industries dealing with construction (such as carpentry, furniture, cement products, building materials and some chemical industries), so as to avoid the high costs of transportation, since most of their raw materials and products are bulky.

Moreover, in the east arable land and many gardens, the Air Base and a large number of government administrative buildings impede industrial development. In addition, the land value here is more expensive than in the south and none of the main roads leading to other parts of the country pass through the eastern area.

(B) Industrial Distribution And Location in Benghazi :

Benghazi is the most important city in eastern Libya, and its major growth pole. In 1973 the city had about 264,500 inhabitants, slightly more than half of the population of Tripoli. It covers an area of about 1,035.00 hectares (10), but industrial sites occupied in 1969 only about 17.10 hectares, about 1.6 percent of the total area. In 1971 the city had about 27 percent of all Libyan establishments, employing 1,789 workers, or about 14 percent of the total number in establishments employing more than 10 workers. Table (11) shows that the present manufacturing base of Benghazi city consists of food production lines (such as macaroni, sweets, flour, bread and soft drinks), building materials and metal work, these industrial groups accounting for 60 percent of the total establishments and about 53 percent of the total workers.

TABLE (11)

The Distribution of Industrial Establishments And Workers In Benghazi, 1971

Industry	10-19	20-49	50 and over	Total establishments	Total workers	% of workers
Foodstuffs	15	1	1	17	285	15.9
Soft drinks	1	1	—	2	39	2.2
Textiles	1	1	2	4	250	14.0
Leather	—	1	—	1	23	1.3
Carpentry (wood)	16	4	—	20	326	18.2
Paper	1	—	—	1	11	0.6
Printing	6	—	—	6	74	4.1
Chemicals	1	2	1	4	136	7.6
Cement products	4	4	—	8	134	7.5
Other building materials	10	6	—	16	294	16.4
Metal work	11	3	—	14	196	11.0
Others	2	—	—	2	21	1.2
Total	68	23	4	95	1,789	100.0

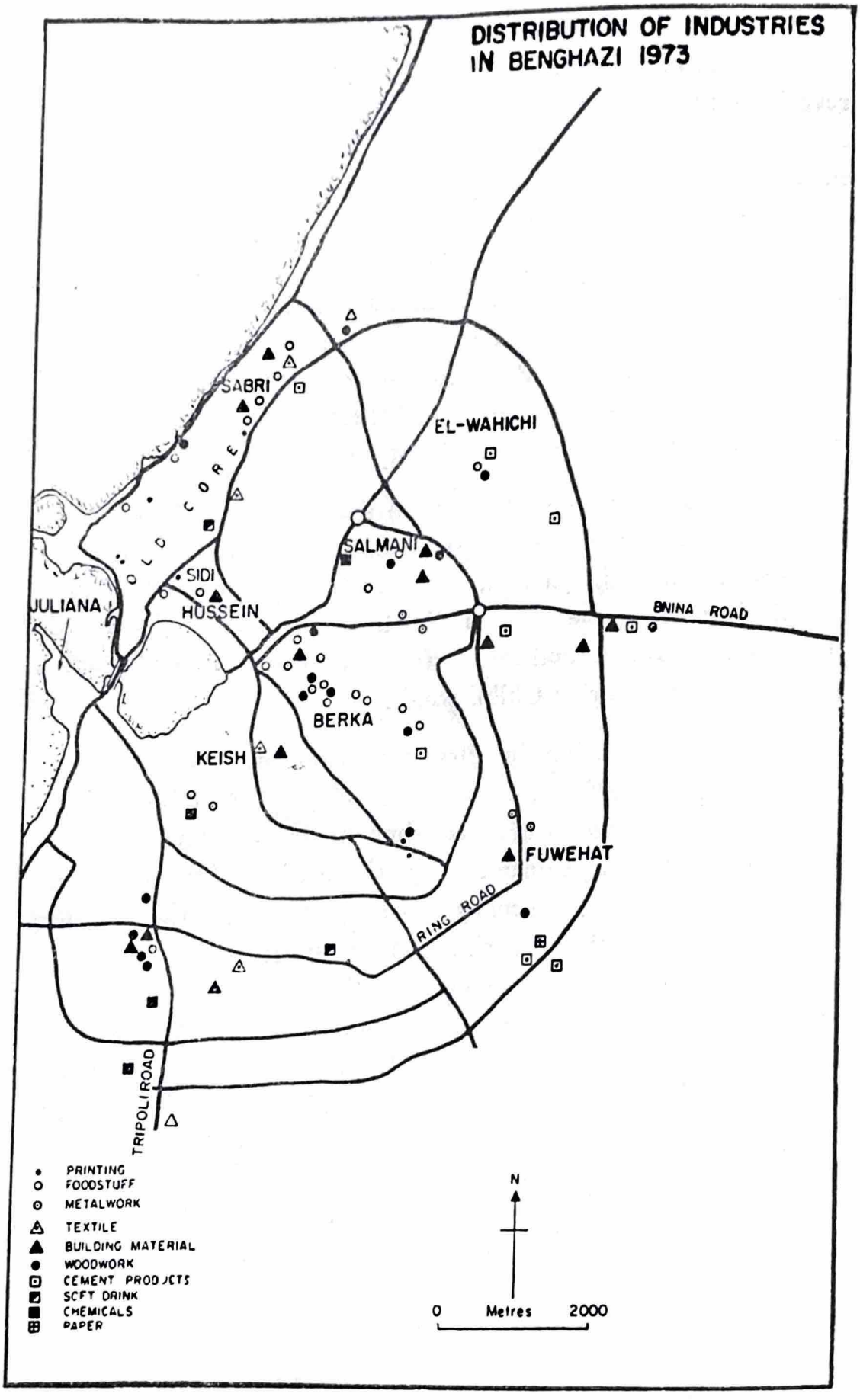
Source : Computed by author from data in I.R.C. **Industrial Establishments 1971**, Tripoli, 1972.

Although there is some diversification, activities connected with construction industries form a striking majority. Carpentry, plumbing and lime production are the large traditional groups. Comparing this table with Table (4), it is clear that establishments in Benghazi are more traditional than those in Tripoli. In Benghazi four establishments, only about 4 percent of the total, have more than 50 workers, while 36 (22.5 percent) of Tripoli's establishments are in this category. Tripoli also has more types of establishment than Benghazi : tobacco, rubber, clothes, plastic, matches, shoes and paints, which are already produced in Tripoli, have not yet appeared in Benghazi.

Turning to industrial location within Benghazi, Figure (8) reveals that in the city's present stage of development industry is not concentrated in any major belt or area. Several establishments of a traditional nature, such as carpentry, bakeries, soft drinks establishments and others concerned with building materials and metal work, exist in various sections of the city associated with crowded areas near the interior local markets, and generally near the main roads. Other establishments are scattered along the Ring Road, including a Pepsi Cola bottling plant, some building materials establishments and various metal work industries serving the whole city market.

The remaining industrial activities are mainly associated with oil exploitation and consist of oil company storage yards, such as Macobar Libya Inc., Borwed of Libya, and Tabalino, mostly located on the Tripoli Road, an unsuitable location because their fumes and dust affect recent urban residential areas, especially during Ghibli winds.

Industrial location in Benghazi contrasts with that in Tripoli. Unlike Tripoli, Benghazi has no particular industrial area. The distribution of establishments in Benghazi may be ascribed to the morphology and the shape of the city, which is divided by swamps into many quarters, such as Berka, Sabri, Keish, Fuwehat, Sidi Hussein, El-Wahichi and the old city. Each of these quarters grew up as an isolated area, in contrast to Tripoli. This might influence factories of each type to find locations in each quarter, especially in the case of traditional industries, so as to provide close links with the local markets. It is especially of establishments which deal with daily demand, such as bakeries, printing, soft drinks and building materials, and these account for a high percentage of the small establishments within the city. Time is important and direct contact


DISTRIBUTION OF INDUSTRIES IN BENGHAZI 1973
SABRI
OLD CORE
EL-WAHICHI
SALMANI
SIDI HUSSEIN
JULIANA
BNINA ROAD
BERKA
KEISH
FUWEHAT
RING ROAD
TRIPOLI ROAD
PRINTING
FOODSTUFF
METALWORK
TEXTILE
BUILDING MATERIAL
WOODWORK
CEMENT PRODUCTS
SOFT DRINK
CHEMICALS
PAPER
N
0 Metres 2000

with the consumar is often imperative, because of the intermittent and ephemeral demand for their products. Industries of this type are generally composed of numerous small plants which are insensitive to the high rents of the central business district and contiguous areas (11).

Most of the establishments in Benghazi are small-sized units, about 96 percent having less than 50 workers and 68 establishments less than 20 workers. Small establishments do not require specially constructed buildings ; obsolete buildings are often suitable since the process units are relatively small and the processes are of seasonal character and have a fluctuating demand for workers.

(C) New Industrial Zones :

Having discussed the present industrial location in Tripoli and Benghazi, it is of value to discuss the proposals for new Industrial zones in these two cities. Where are they to be located, and why ? Have they a good potential for future growth ? The previous section showed that industrial location in these two cities did not evolve according to any particular plan. There was no concept of zoning in Libya, residential areas and commercial business were allowed to develop alongside industrial plants, and industries allowed to establish themselves in residential areas. These trends, however, could not continue, and the cities of Libya, particularly those which accommodate modern industrial establishments, need master plans to put forward basic policies for their development, to determine the framework of their structure, and to decide general relations between the various uses for land.

In both Tripoli and Bnghazi new large establishments

have contributed to the a celerated development of industrial zones ([12]).

Problems have been :

1. lack of suitable industrially zonedland in the old centres of the cities ;
2. traffic congestion and the cramped condition of older industrial areas ;
3. the increased use of the automobile as a preferred method of travelling to work, necessitating ample parking space for employees at new plant sites ;
4. increased truck transport of industrial products, requiring additional space for service parking and loading ;
5. a preference by institutional investors for financing construction in planned districts where security of investment is more certain ;
6. change in the plant design for establishing new facilities demanding larger sites.

It would be more economic for establishments to be located together for their mutual benefit in zones where all could profit from the available facilities and site services. The regulations should be based on accurate studies of future urban growth and of factors affecting industrial locations, in order not to zone for industrial occupancy any district which for reasons of topography or other geographical features might be for residential use([13]). In 1968, the municipalities of Tripoli and Benghazi each set up a master plan for future development of land use within their cities, each one containing zones for the industries proposed for future development. In Libya

there was no legislation dealing with the location of industry within the cities, so these proposed zones may be effective in reducing the problems mentioned above. Moreover, they offer large areas of land for the organization of a suitable zone for industrial development in relation to services, communications and other facilities. The locations chosen by some establishments have previously been discussed, and the following study will throw light on the future trends of industrial location and expansion.

In Tripoli, the municipality chose many zones for industrail location from 1969. According to the master plan, these zones were distributed in various parts of the city (Figure 9), under certain classifications (Table 12) and preference standards. When the writer asked the chief engineer-in-charge in the municipality the main reasons for the location of these zones, and why just one or two zones had not been selected instead of such a large number, the answer was that when the municipality started to classify land use, it found that some industries were already established in these areas and since it might have proved difficult to transfer them, all the empty space around them was zoned for future industries, as is seen from a comparison of Figures (9) and (5). Obviously, this is an inadequate criterion for future industrial locations, because previously the choice of industrial location was that of the entrepreneurs themselves, some of whose locational decisions may be irrational. Moreover, most of the areas mentioned earlier (e.g. the Suani Road, the zone of Sidi Kalifa and the one beside Bab Ban-Ghashir) are located within residential areas. Sooner or later, these zones will be removed.

Studying these new planned industrial zones and their potential for future industrial location, it becomes clear that

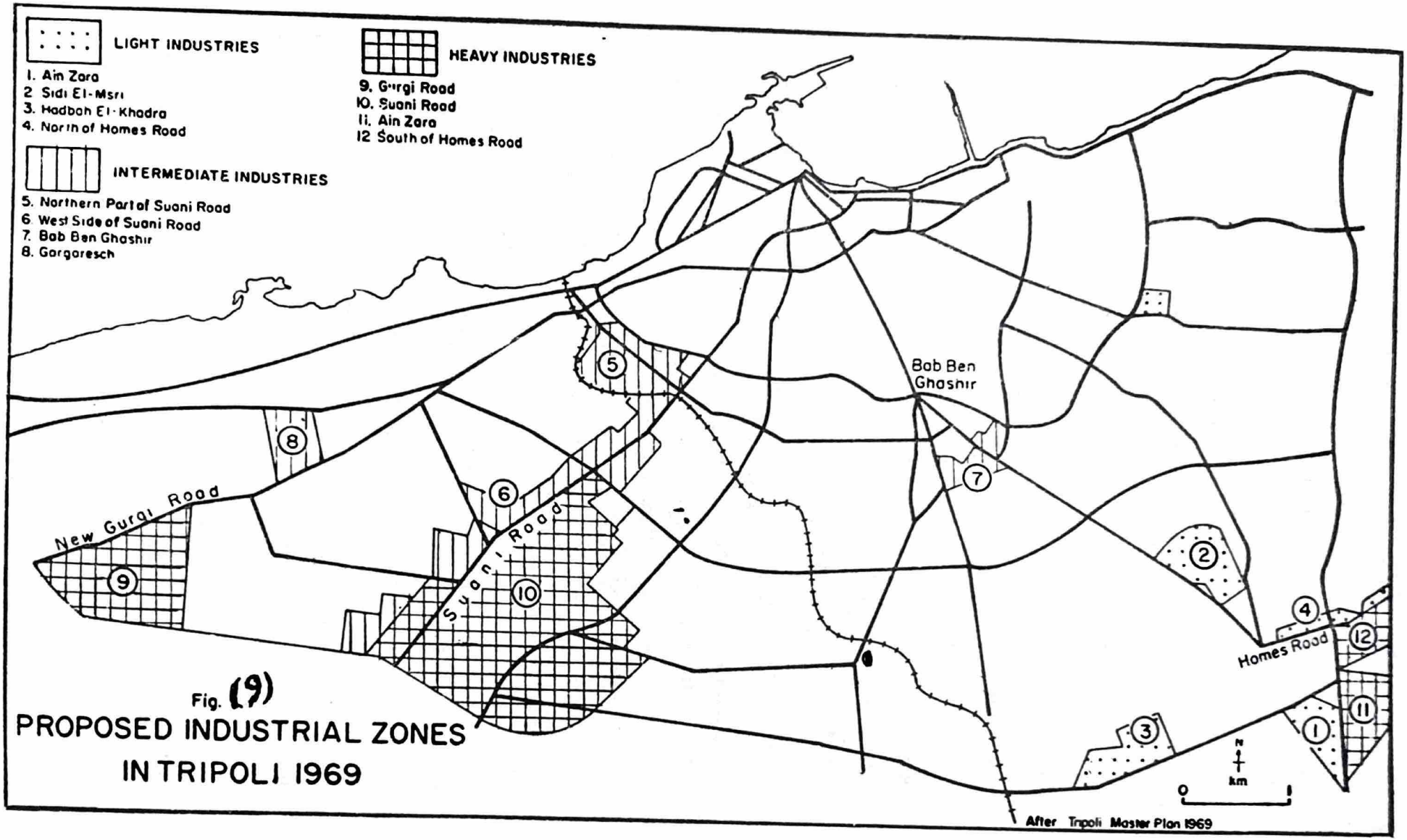


Fig. (9)

PROPOSED INDUSTRIAL ZONES IN TRIPOLI 1969

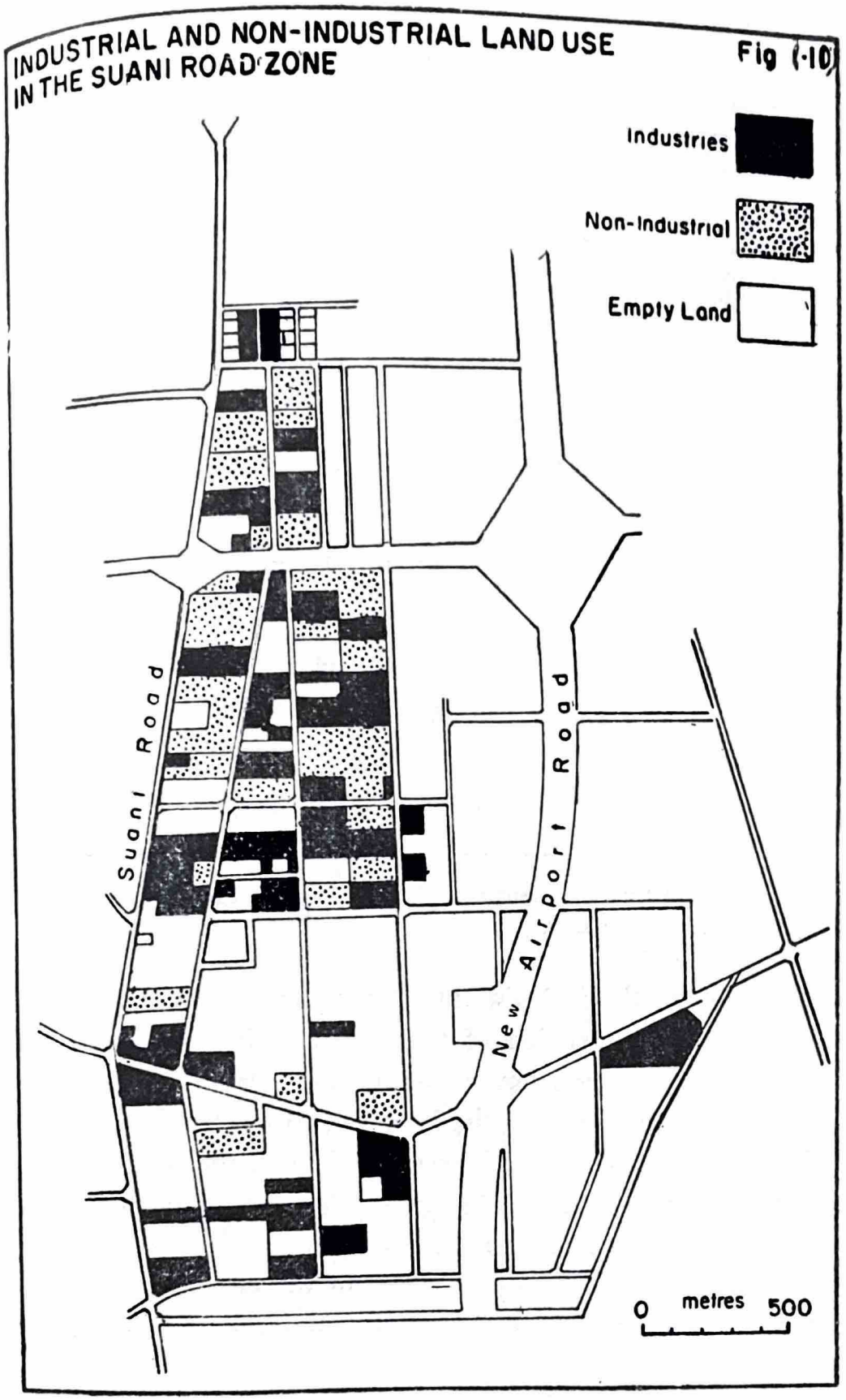

INDUSTRIAL AND NON-INDUSTRIAL LAND USE
IN THE SUANI ROAD ZONE
Fig (·10)
Industries
Non-Industrial
Empty Land
Suani Road
New Airport Road
0 metres 500

TABLE (12)

The Industrial Zones Proposed In Tripoli, 1969

Categories	Location	Size in hectares
1. Light industries	1. Ain Zara	65,300
	2. Sidi El-Masri	26,600
	3. Hadbah El-Khadra	51,500
	4. On the north of Homes Road	28,600
2. Intermediate industries	5. North part of Suani Road	79,900
	6. South-west of Suani Road	20,200
	7. Beside Bab-Ben-Ghashir	30,700
	8. Gargaresch	38,500
3. Heavy industries	9. Gurgi Road	13,700
	10. Suani Road	506,400
	11. Ain Zara	45,400
	12. South of Homes Road	97,000

Source : Ministry of Planning, **Tripoli Master Plan, Final Report,** November 1969.

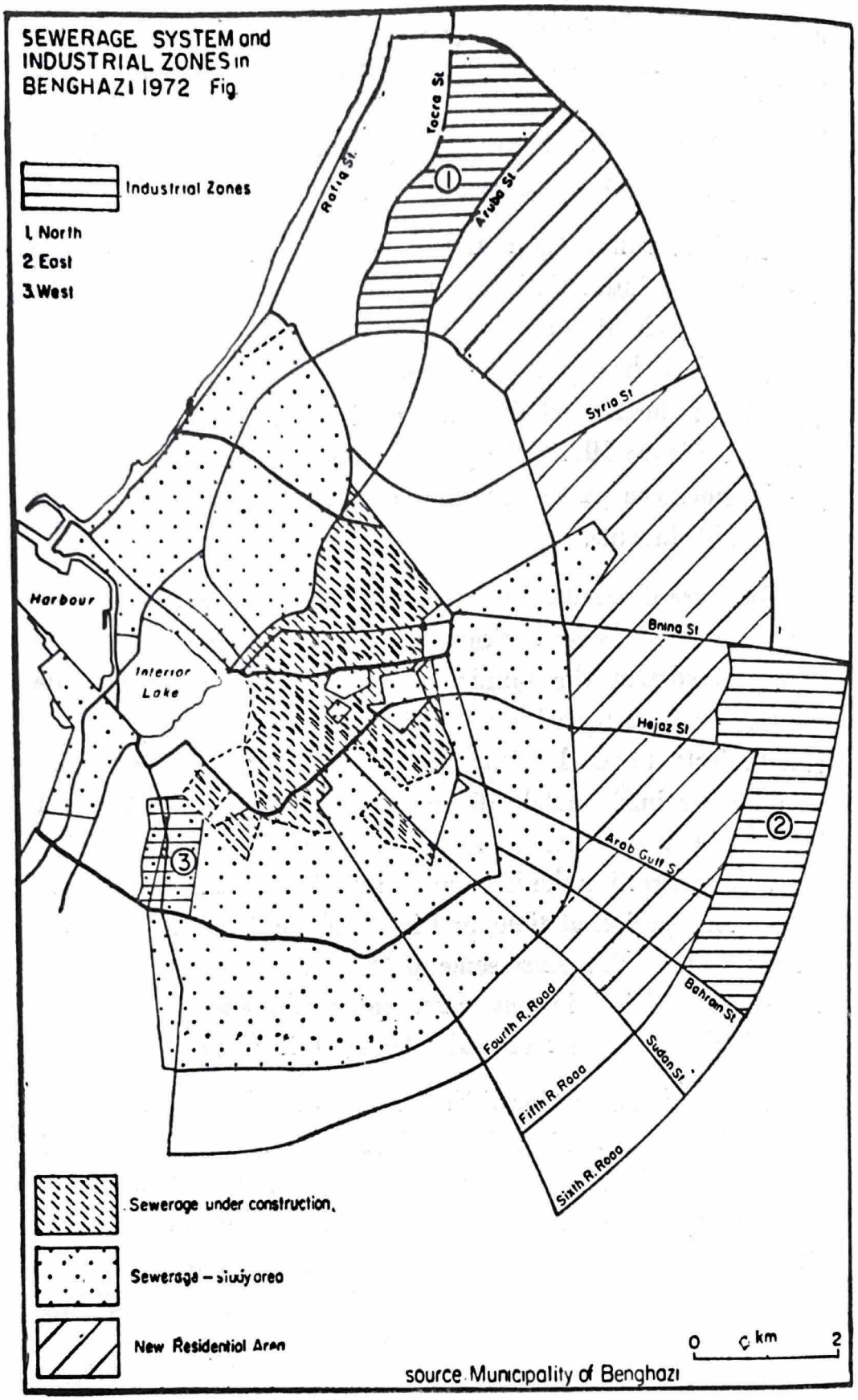
they are totally insignificant. Simply to delineate existing zones, without provision of the necessary facilities, gives no incentive to entrepreneurs to set up new establishments there. Possibly because most of the land is private, the municipality does not have full control over zoned land, the size of a plot of land to be sold, or over its price. So the land of these zones was not classified and offered for sale, except for the north part of Suani Road, which was sold by the owner himself. In the southern zones there are no facilities, no paved roads, sewerage,

communications or electricity, and some have no water supply as yet. Moreover, after establishing the new zones, municipal permission was given to some new concerns (The Mansura Textile Factory, Sidi Saud Factory and some carpentries in Sug El-Jumaah) to set themselves up outside the zones.

In these zones the municipality not only gave building permission to industrialists, but also allowed other commercial buildings, such as ware-houses, open stores, garages and the general office headquarters of some companies to be set up alongside industrial plant, and Suani Road is an example of this (see Figure 10). The problem was that the zones, except for the northern part of the Suani Road Zone, failed to attract new establishments.

In these circumstances, the future of the zones is very limited, unless the authorities change their attitude. It should be explained that the municipal officers responsible for the location of industry within the city have many responsibilities and projects to deal with, and the problems of industrial location are inadequately discussed. The future of industrial location in these zones depends on the efforts of the municipality in controlling the land and selling it at a reasonable price over a long period of time, and in supplying it with the necessary facilities. But, since some of the zones are unsuitable for industrial location in any case, one might suggest that the municipality propose more suitable zones in future.

In Benghazi, the locations proposed are based on a different policy from that in Tripoli. The master plan for Benghazi has three industrial zones : western, eastern and northern (Figure 11). Two of these are located on the outskirts of the city where there are no established sites at present, except for two state-owned establishments under construction in the


SEWERAGE SYSTEM and INDUSTRIAL ZONES in BENGHAZI 1972 Fig
Industrial Zones
1 North
2 East
3 West
Rafia St.
Tocra St
Aruba St
Syria St
Harbour
Interior Lake
Bnina St
Hejaz St
Arab Gulf St
Bahrain St
Fourth R. Road
Fifth R Road
Sudan St
Sixth R. Road
Sewerage under construction.
Sewerage – study area
New Residential Area
0 1 km 2
source Municipality of Benghazi

eastern zone. The third is in a residential area where many establishments already exist.

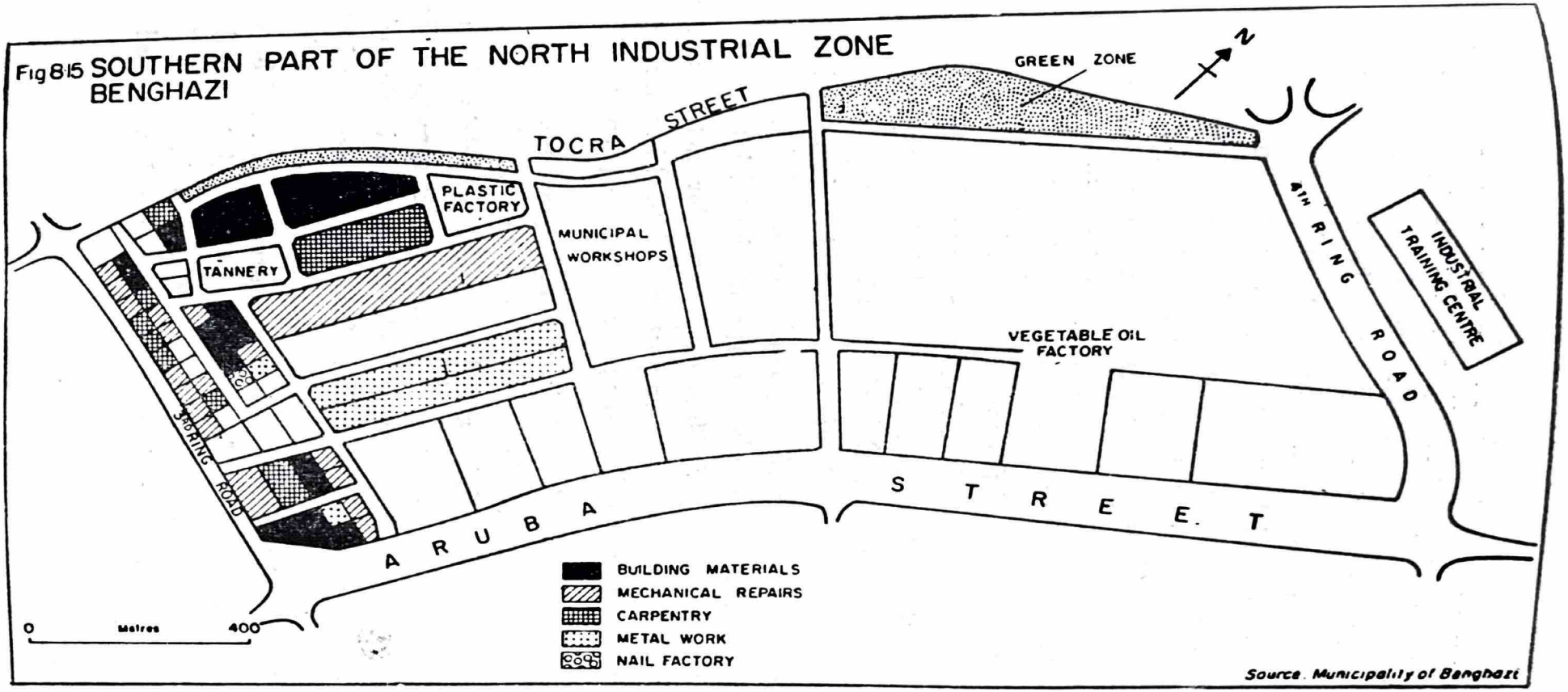
The western zone includes an area of about 140 hectars, with access to Tripoli Road, of which some 50 hectares are already occupied by the existing establishments, consisting of transportation and storage yards mainly related to oil extraction and construction activities (14). The reason which is given by the master plan for choosing this zone is its proximity to the harbour and Tripoli Road. The area might have been a good choice when it was located on the outskirts of the city, but it is now surrounded by new residential areas. Recent urban growth of the city has been more rapid in the west and south, increasing the price of land from LD 1 per square metre in 1960 to about LD 5 or 7 in recent years. Pollution and other industrial problems affect the surrounding areas, because of the wind direction. Clearly this zone is unsuitable for future industrial locations, and the reasons for choosing it are invalid. The municipality should either prevent new establishments from setting up in this area, or make it into a specialist warehousing centre.

The Eastern Zone, covering an area of about 400 hectares, is bounded by Bnina Road in the north, the Fifth Ring Road in the west, Bahrain Road in the south, and Sixth Ring Road in the east, and is proposed for heavy and food production industries. Although the master plan does not give the reason for the choice of this area, there are probably several. The topography of the area, for example, is unsuitable for agriculture, consisting mainly of rocky outcrops, and avoids the region of rapid urban growth, so the land is relatively cheap. Moreover, the empty area to the north and east of the zone is an advantage, because it provides space for future expansion, and there

will be no problems of wind pollution. The zone is also close to the main pumping station which supplies the city, so water is easily available in large quantities. Bnina Road connects the city with the eastern agricultural areas of El-Abïar and El-Marg plains, and adjacent land to the north has been proposed for an industrial residential area, which will satisfy labour requirements.

Up to 1973 only two establishments had been constructed in the zone, a wire and cables factory and a grain mill. Other establishments are intended for location in this zone. Because the municipal effort in developing the zone for industry stopped after outlining and dividing it into categories of industries it is still wthout facilities and, for example, Figure (11) shows that the sewerage pipes under construction or under study are far from the zone. Moreover, the land is still privately owned, and the municipality has given the owners no compensation (1973). The establishments existing here were established by the N.P.O.I. which solved this problem by paying a huge sum of money for special services, utilities and land. The zone has reasonable potential for industrial location, but it is inadequate at present and its future will depend on solving the problems outlined above.

The northern zone is located in the north-east of the city on El-Marg Road, and includes an area of about 300 hectares between Aruba Street in the south, the Fifth Ring Road in the east, Tocra Street in the north, and the Third Ring Road in the west. The zone was classified for workshops and for light industries such as carpentry, some building materials and chemical products. It has several advantages for industrial location, such as (a) the swampiness of the Sebka land which is unsuitable for agriculture and heavy buildings ; (b) it is


Fig 8.5 SOUTHERN PART OF THE NORTH INDUSTRIAL ZONE
BENGHAZI
GREEN ZONE
N
TOCRA STREET
PLASTIC FACTORY
MUNICIPAL WORKSHOPS
TANNERY
4TH RING ROAD
INDUSTRIAL TRAINING CENTRE
VEGETABLE OIL FACTORY
3RD RING ROAD
ARUBA STREET
BUILDING MATERIALS
MECHANICAL REPAIRS
CARPENTRY
METAL WORK
NAIL FACTORY
0 Metres 400
Source. Municipality of Benghazi

government-owned ; (c) it is in the lee of the winds which blow over the city ; and (d) it is sited along the main road to the Gebel Akhdar. In addition, the master plan also proposed that Benghazi's main power station be located at El-Manster, 3 Kilometres to the east, and suggests this as an ideal location for a new industrial harbour (15). A steam power and desalination plant is now under construction. It is the largest plant in the eastern part of the country, with a capacity of about 182,000 K.W. and takes 48,000 square metres of fresh water from the sea. The first stage will be finished in June 1975, and the whole project will be completed by June 1976. So far, the main disadvantage of the zone is that it is largely swamp land without any sort of facilities. The municipality has stated that it will reclaim this land and sell it to entrepreneurs, but it has not yet done so. It took LD 50,000 from the Ministry of Industry to reclaim a large area on which it established its workshop. The rest of the land was divided amongst the entrepreneurs. The southern part was divided into small areas of between 1,280 and 3,700 square metres, for metal work, carpentry etc., while the northern part was divided into large areas for light industries which require more space (Figure 12).

The rent asked is 10 Dirhams per square metre a month for only five years. No entrepreneurs can establish a firm there, because the municipality has refused to reclaim the land, sell it to the entrepreneurs, or arrange a rent agreement for a longer period. They cannot reclaim the land themselves because the cost of reclamation of an area of swamp with an average water level of between one and four metres would be prohibitive and impossible for small entrepreneurs, and because the rent contracts were for five years only, and it would be difficult for them to recoup their investments in such a short time. The public organization for electricity has refused to

supply electricity to the zone until the land has been reclaimed. It is also interesting to note that although all the establishments to be located here are small-scale ones, which have the right to obtain loans from the R.E.I.B.,(*) the regulation of the industrial bank does not allow loans under these rent conditions. Besides, the municipality has agreed to rent many parts of the zone to non-industrial companies.

Obviously, the municipality of Benghazi, like that in Tripoli, has forgotten its objectives and has been working as a commerical agency. To allocate swamp land for this purpose, and divide it between entrepreneurs, does not help. This zone will have no future for industrial expansion under these circumstances. It may be said that the shortcomings of the municipality may be explained by its inadequate budget and by its lack of co-ordination with other industrial development authorities. Furthermore, the development of these zones came only in the final stage of municipality plan. The new industrial policy concentrates on the rapid growth of industrialization, and the municipalities of Tripoli and Benghazi already have many other projects to deal with. One may suggest that they should take further steps to coordinate with industrial departments. Otherwise, after the new industrial zones have been outlined, responsibility for them should be transferred to the Ministry of Industry, which is the specialized department and which may suggest changes to industrial estates.

(D) Industrial Estates :

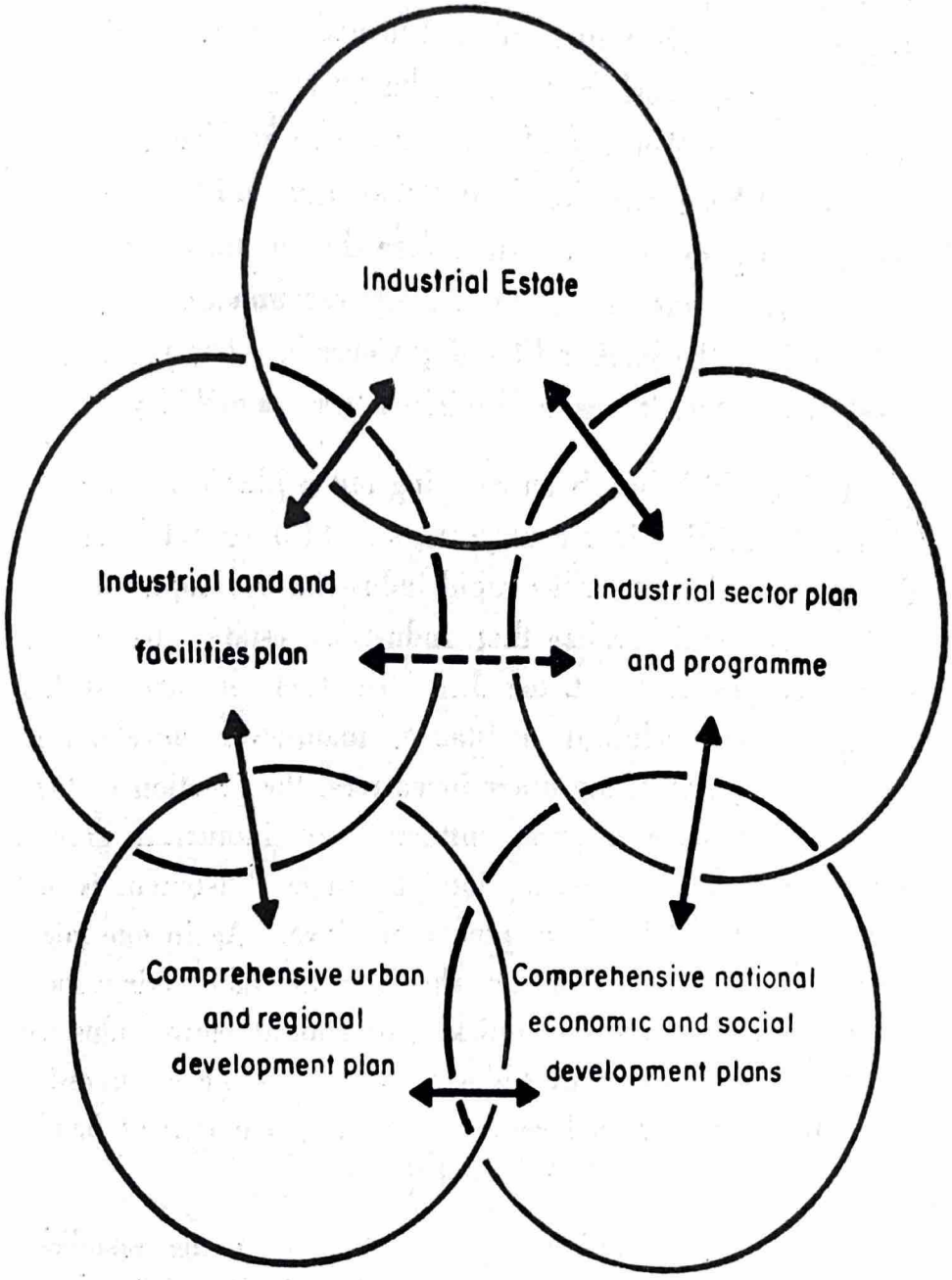
In the previous section we studied the potential of the industrial zones in the two main cities, while this section will discuss the possibility of establishing an industrial estates sys-

(*) Real Estate Industrial Bank.

tem in these cities. The main distinction between industrial estates and zones is that the latter offer only improved sites, while the former feature standard factory buildings built in advance of demand and include a variety of services. Industrial estates are a useful tool for the development of industries, because they provide not only accommodation in workshops and factories equipped with basic utilities, but also common service facilities of various kinds. Furthermore, a whole group of industries at one site will help to overcome many of the initial difficulties facing industrialists and might induce a relatively high degree of worker mobility between them. They thus give favourable conditions for modernization of tools and machines, for improvement of skills and productivity, and for organizing the supply of raw materials on a cooperative basis ([16]). Industrial estates can be considered as subsystems of economic and industrial development planning. This dual relationship is shown in Figure (13) ([17]).

Industrial estates have proved in many countries that they are an effective instrument to attract industry and to regulate its location. In Malta, Cyprus and Turkey, industrial estates have been increasingly used in conjunction with other measures. In Kuwait, The Shuaiba Industrial Estate was started in 1964 in an area of about 7.5 square Kilometres adjacent to the sea, and was designed to create an area in which all necessary industrial facilities can be found. The area is meant to serve medium and large size industries by leasing them land at a normal rent for a period of 50 years and by supplying them with water, power and other facilities ([18]). The Indian second five-year plan provided for the construction of industrial estates in which small industries could obtain cheap gas, water, power and other services; arrangements were also made for the supply of improved tools, machines and raw materials at a reaso-

Fig Industrial estates as sub-systems of urban and regional planning and of industrial and economic development



nable rate (19). In Nigeria, estates occupy about 2,500 acres and provide factories and industrial buildings which are leased to prospective industrialists for upwards of 99 years (20).

In Libya, no plans or projects for industrial estates have yet been formulated. One might wonder why the authorities have omitted industrial estates from their development plans, since they are very important and useful for industrial growth, especially in its earlier stages. The question was put to some officers in the Ministry of Industry, who replied that such a scheme had been considered, and that a committee was set up for this purpose in 1972, but before the committee had completed its study and given the primary recommendation, it was disbanded by the Higher Planning Council. The reason given for this was that it was a Municipality responsibility.

Libya, which has been carrying out a planned programme of industrialization in recent years, should have industrial estates sooner or later to assist rapid industrial development. The authorities should realize that industrial estates are one of many elements and that, together with other measures such as a tariff policy, technical assistance, manpower development, financial help and many other incentives, the creation of these estates might have a great influence on industrial growth. Giving loans and tax examptions to an establishment is not enough for industrial development in Libya. Again one might suggest that the Municipalities should either take their responsibilities seriously and act quickly, or should leave industrial control to the Ministry of Industry which has been successful in establishing industrial centres for the promotion of handicrafts in Benghazi, Misurata and Sebha.

The previou s studies showed that most of the establishments in the country are concentrated in Tripoli and Benghazi,

where there are good markets, power and other facilities, and where workers are available. Expansion is expected in these sities, so the growth of industry in these two conurbations should be watched and guided. In order to aid industrial growth, it seems justificable, particularly in these town, to establish industrial estates in suitable places where particular areas could concentrate industrial establishments, and where could then be given enough floor space and a set of integrated services. This would solve some of the locational problems of industrial concentration within metropolitan centres.

Another consideration should be borne in mind during the choice of a site for an industrial estate, mainly whether the land is public or private property. The problem here is the amount to be invested, for if it is private property, the cost of buying private land accounts for a large part of the total investments in industrial estates. Other considerations are the distance from the site to the market, access to main roads, prospects for urban expansion in neighbouring areas, and the gradient of the ground — a slight slope might facilitate drainage — although the availability of utilities and services within a reasonable distance of course is also important, as is the availability of public transportation for workers at low cost ([21]). One must consider the type of industries to be promoted and number of establishments to be accommodated, and the space required for roads and parking. The direction of the prevailing winds must also play a very important part in the choice of the site, which should be on the lee side of residential areas. Furthermore, the prospects of an estate's growth should also be considered at the detailed 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 ([22]).

The classification of industrial estates should give low priority to warehouses, workshops and administrative offices. The following are the typical percentages of land utilization in some industrial estates constructed with assistance from the United Nations ([23]).

— Factory plots for standard custom-built factories	62.0%
— Land area under internal roads including pavement, footpath and verge	20.9%
— Land area of open space	3.3%
— Land area under administration buildings, gate houses and parking facilities	3.5%
— Land area under canteen, clinic, staff residence	3.8%
— Land area under warehouse	3.4%
— Land area under workshop	3.1%

In Tripoli, as in Kuwait city and Riyadh, one might suggest that planning should be directed towards the uncultivated land outside the conurbation and separated from it by parks and open space. Possibly several areas should be suggested for this proposal, such as Tajora, east of Tripoli, and Suani Ben-Uadim, south of the city. But it seems that the most suitable area that might be suggested is that beside the sea, adjacent to Jansur town, to the south-west of Tripoli. As a whole, it is undulating and parts of it consist of rough pits and are eroded so that levelling and dressing operations would be required to make the site suitable for construction, and a surfaced approach road would have to be built from the adjacent main road. Land for the construction of an industrial estate could easily be found between the road leading of El-Zawia and the sea shore.

The advantages of this location are as follows :

1. The land is government-owned and unsuitable for agriculture. There is adequate space for factory premises and for residential areas for the staff and workers. The area is large and it could be extended in future.

2. The area is relatively rich in ground water. It seems that underground water is much more easily available here than in any other area around the city. It has the nearest big well to the city and water can be drawn at a rate of about 4 cubic metres per hour ([24]).

3. The location is on the main road which connects the city with the western part of the country. It is near the densely populated and cultivated region, and therefore the improvement of transportation facilities to the either region would not be very expansive.

4. It is close to the major market in the country. According to the 1973 census, Tripoli and El-Zawia Muhafadat have 42.3 percent of the total population of the country. El-Zawia city, about 20 Kilometres west of the location, will become of greater importance as a market after the completion of the oil industrial complex.

5. The proximity to El-Zawia Refinery which is under construction. An industrial estate site here could get enough power and suitable quantities of good quality raw materials easily and cheaply after developing the oil complex and establishing some petrochemical industries.

6. The location beside the see gives the establishments the advantage of draining their effluent into the sea. Besides, sea water might be desalinated, as in Benghazi, or used for cooling, as in the Shuaiba Industrial Estate. Also it might

be useful in the future to establish a small artificial industrial harbour. This might serve those establishments which receive their raw materials from abroad, and would enable the finished products to be transported to the eastern part of the country or exported abroad in future.

It may be for these reasons that two N.P.O.I. (*) establishments have recently been set up in this area, and the location of I.R.C. here might reduce the cost of some facilities already introduced by the organization. The obvious disadvantage is the longer distance from the residential area for the workers, but this problem might be solved by having workers from Jansur town, or by improving the public bus services, and using private transportation for each establishment. Another suggestion is that some establishments should be compelled to site themselves in the industrial estate because of their bulky raw materials. An example would be the cement industry, which uses bulky raw materials like gypsum, limestone and cement clinker, so it might be better to locate it close to its raw materials and far from the city ; the recent location for the cement factory in Benghazi, for example, is suitable.

In Benghazi, two of the new industrial zones (northern and eastern) which have been outlined for industrial location seem to be suitable for the establishment of industrial estates, but the success of any such scheme would depend on the ability of the authorities to solve the problem of building an industrial estate with all the necessary facilities.

(*) National Public Organization of Industrialization.

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