ANNEX

G. METEOROLOGY AND HYDROLOGY

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G. METEOROLOGY AND HYDROLOGY

1. Meteorology

1-1 Meteorological Stations

Meteorological Stations are not located in the Project Area, and thus, surrounding stations located in Port Said, Ismailia, Mansura and Zagazig were applied to collect the data of general climate in the Project Area (See Fig.G-1-1). The variety of meteorological data collected are listed below:

Temperature	- Monthly mean, minimum, maximum
Rainfall	- Monthly
Relative humidity	- Monthly mean, maximum, minimum
Sun shine hours	- Monthly
Wind speed & direction	- Monthly
Evaporation	- Mean daily

Period: 1969 to 1978

1-2 Observation in the Project Area

To replenish and check the existing data, automatic recording instruments, long term rain gage, and long term thermo-hydro graph were installed in the area during the field survey.

The observation periods for each meteorological item in the project area are shown below:

Temperature	4/27 to 5/20, 6/1 to 7/6, 7/16 to 8/15, 11/4 to 12/4
R. Humidity	4/27 to 5/20, 6/1 to 7/6, 7/16 to 8/15, 11/4 to 12/4
Rainfall	4/27 to 12/4

In the area, there was no rainfall to be experienced during the study Periods. The monthly mean temperature in the area changed more gradually than in the surrounding areas, and the maximum and minimum values were 32.0°C in July and 25.4°C in November respectively.
The monthly mean relative humidity changed in the range of 71 percent to 73 percent, which is very small.

1-3 Description of Climate

a) Temperature

The annual mean temperature around the Project Area is moderate at between 20°C and 22°C.

The seasonal trend in temperature are shown in Fig. G-1-2 for each station. A somewhat earlier peak temperature in summer is indicated for Zagazig and Ismailia more than for Port Said. This would be expected when comparing the inland and coastal stations. The graph for Port Said shows a relatively slow rise in spring temperatures being followed by a somewhat faster fall in autumn temperatures. Throughout the year the daily minimum average temperatures are lower and the daily maximum average temperatures are higher in the inland area when compared with the coastal area. (See Fig. G-1-3)

The record of maximum and minimum absolute temperatures in the three stations of Zagazig, Ismailia and Port Said, are as follows;

	Zagazig (1931 - 1975)	Ismailia (1946 - 1969)	Port Said (1942 - 1975)
Maximum	46.8°C 3/June/1933	46.0°C 13/June/1965	45.0°C 25/May/1970
Minimum	-3.0°C 7/Feb./1950	0.2°C 23/Jan./1967	2.2°C 6/Feb./1950

b) Rainfall

The seasonal rainfall pattern within the Project area is shown in Fig.G-1-4. Rainfall occurs in the winter season and December and January have the highest rainfall levels in all of the stations. On the other hand, in the summer season, from May to September, there is no rainfall recorded at any of the stations. Port Said has an annual rainfall of 73 mm compared with Damietta's 107 mm. For the other stations there is a decline in rainfall as one moves southward.

The isohyets are as shown in Fig.G-1-5.

Furthermore, the maximum daily rainfall and number of days of occurrence exceeding 1.0 mm and 10.0 mm at the three stations have been observed as follows:

	Zagazig (1926 - 1968)	Ismailia (1964 - 1968)	Port Said (1941 - 1975)
Maximum	24.0 mm 5/Nov./1932	23.0 mm 16/Nov./1964	47.7 mm 5/Dec./1961
1.0 mm	8.3 days	8.0 days	14.7 days
10.0 mm	--	--	1.5 days

As for the Project Area, the annual and monthly rainfall levels are extremely variable from year to year and insufficient in amount for crop cultivation. Therefore, cultivation in the Project area will depend entirely on the supply of irrigation water.

c) Relative humidity

The seasonal trends in relative humidity between coastal from the inland areas are clearly different as shown in Fig.G-1-6.

The coastal area has quite a small variation of 5 percent at Port Said station.

From April to June, the inland area has its driest months of the year, and the fluctuation of seasonal trends is more than in the coastal area.

These trends may reflect the origin of the air masses over the region. The low spring values appear to be caused by dry winds associated with Khamasine depressions.

The daily pattern of relative humidity shows much difference between the nighttime and daytime figures. A value of 55 percent is observed in the daytime and 90 percent in the nighttime.

d) Evaporation

The mean annual evaporation (Piche) observed at each station is shown in Fig.G-1-7 and increases when moving in a inland direction except

for Port Said.

The annual mean evaporation at Port Said is observed at 6.7 mm per day which is 2,450 mm per year, and that at Zagazig is observed at 4.1 mm per day, which is 1,497 mm per year.

The annual evaporation trends are similar to the annual temperature trends. The evaporation value is affected by temperature and wind factor. Therefore, the high reading for Port Said may be explainable in part by the higher wind speeds and the reading for Zagazig may also be explainable by the lower wind speeds observed there.

e) Sunshine Hours

The values for possible sunshine are fairly uniform throughout lower Egypt and the seasonal trends are fairly similar as shown in Fig.G-1-8.

The annual average sunshine hours are estimated at 9.4 hours per day which can be converted to 3,430 hours per year. The value for possible sunshine is 78 percent and varies from a low of 67 percent in December to a high of 88 percent in August.

f) Wind

As shown in Fig.G-1-9 there is a general decrease of the mean annual wind speeds moving inland.

The measurement for Port Said is comparatively higher than the other stations. This may be because the measuring station is located on the shore. On the other hand, the measurement for Zagazig is unexpectedly low.

The seasonal trends are shown in Fig.G-1-9. There is a small peak in the spring season which is possibly associated with the Khamasine depressions.

Annual mean percentage frequencies of wind direction at Port Said, Ismailia, Mansura and Zagazig are shown in Fig.G-1-10.

The coastal station at Port Said trends to show a Northern frequency. Observations of the inland stations at Zagazig, Ismailia and Mansura, show that the most important directions are north and northeast.

1-4 Characteristics of Three Stations

As the results of data analysis, meteorological characteristic of the three stations can be described as follows;

Port Said

Port Said faces the Mediterranean Sea and has small fluctuations of the mean monthly temperature as compared with inland areas. The annual relative humidity is 72 percent which is relatively high. Wind speeds are higher than at other stations.

--- Coastal climate

Ismailia

The monthly mean temperature fluctuates from a high of 29.5°C in August to a low of 14.2°C in January. Furthermore, the relative humidity varies from 52 percent in December to 72 percent in May. Generally, inland climate factors show a large fluctuations in values.

--- Arid inland climate

Zagazig

Zagazig is situated in the Nile delta. Therefore, its climate belongs to the semi-torrid zone. The most important factor is the wind speed which is the lowest value.

--- Arid inland climate
(semi-torrid)

1-5 Adoption of Data for the Project

The Project Area is located at the northeastern part of the Nile Delta and is about 20 km from the Mediterranean Sea.

As the result of field observations, monthly mean, maximum and minimum temperature is the same as the values of Port Said and Mansura stations. From this observation it was found that the monthly mean temperature and relative humidity in the area were similar to the Port Said records. Therefore, the climate data recorded at Port Said Station were adopted for planning climate data in the Project Area.

Table G-1-1 Temperature and Relative Humidity in the Project Area

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
Temperature (°C)	Max.				28.0	29.9	30.8	32.0	31.9			25.4		
	Min.				17.8	21.8	22.0	23.1	23.9			15.7	14.5	
	Mean				22.9	25.9	26.4	27.6	27.9			20.6	19.1	
Relative Humidity (%)	Max.				93	92	91	91	91			95	96	
	Min.				46	53	51	51	53			47	51	
	Mean				73	73	71	71	72			71	74	

Climate Data at Port Said Station (Monthly Mean) 1968 - 1978

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
Temperature (°C)	14.2	14.8	16.4	18.8	22.2	24.9	26.7	27.4	26.2	24.2	20.9	16.4	21.1
Rainfall (mm)	16.0	7.1	10.0	7.3	0.5	0.0	0.0	0.0	0.0	3.6	8.4	15.1	
R. Humidity (%)	73	71	69	72	71	72	74	73	70	69	72	74	72
Evaporation (pitch: mm)	4.9	5.4	6.5	6.6	7.1	7.7	7.9	7.7	8.1	7.6	6.3	4.8	6.7
Possible Sunshine (%)	69	73	69	71	80	86	86	88	87	82	77	67	78
Wind Speed (m/sec)	4.9	5.2	6.0	5.6	5.0	4.6	9.4	3.9	3.9	4.1	4.4	4.4	4.7

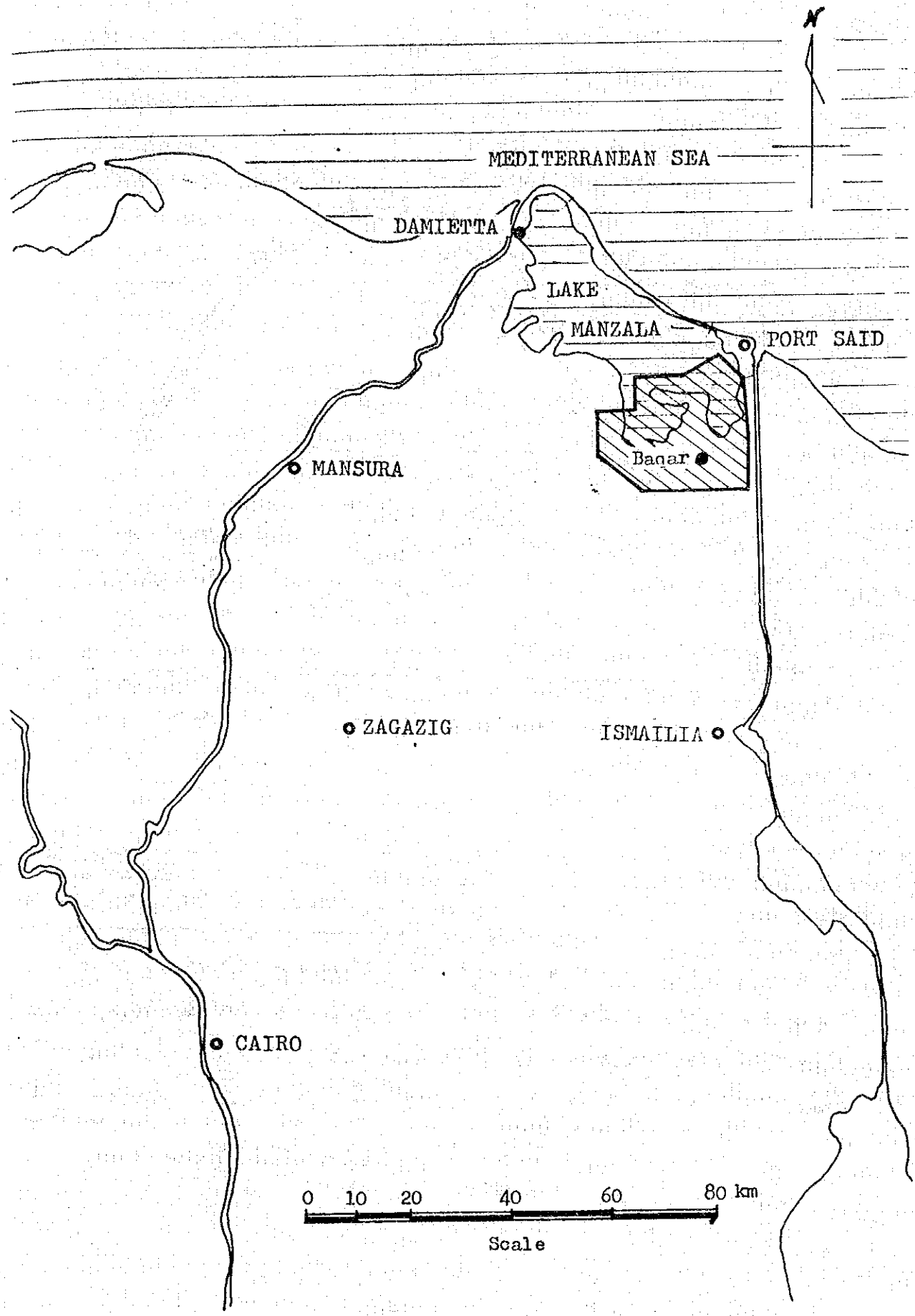


Fig.G-1-1 Location of Meteorological Stations

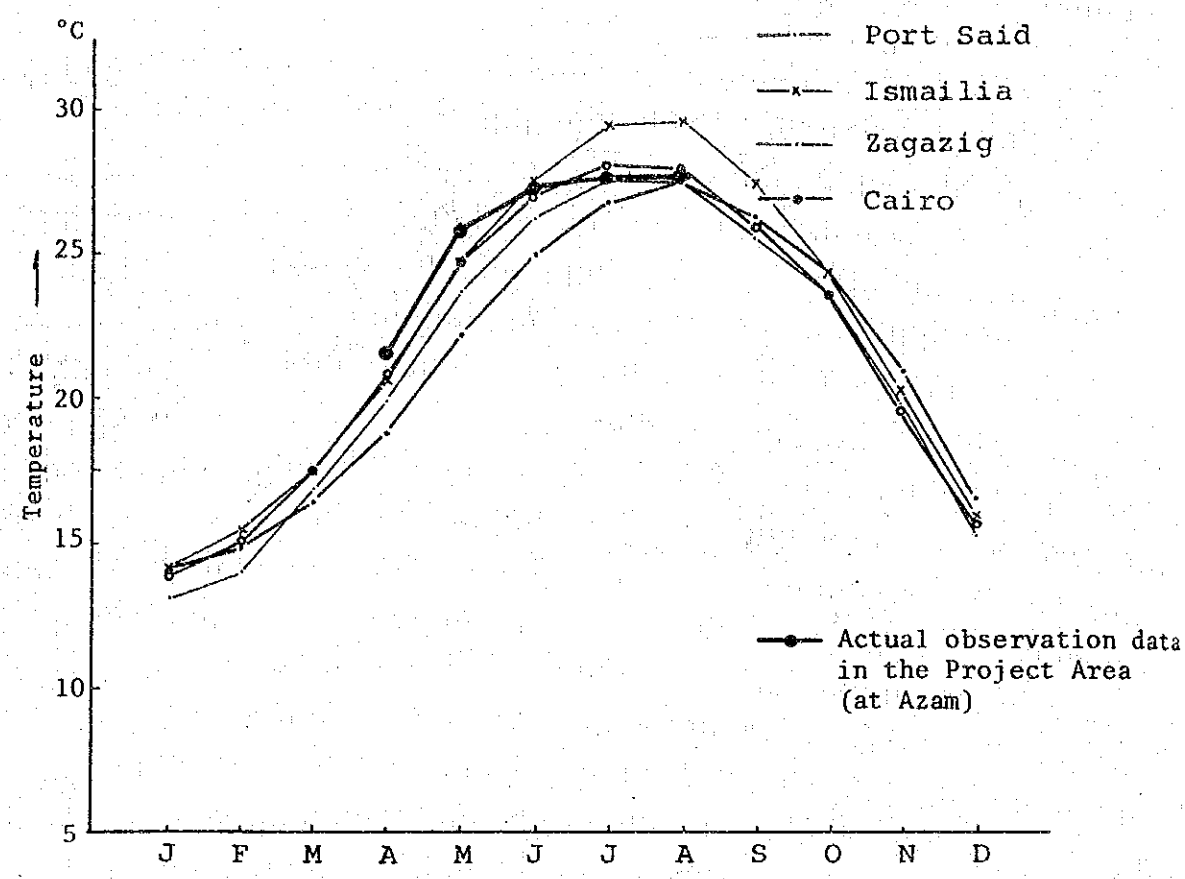


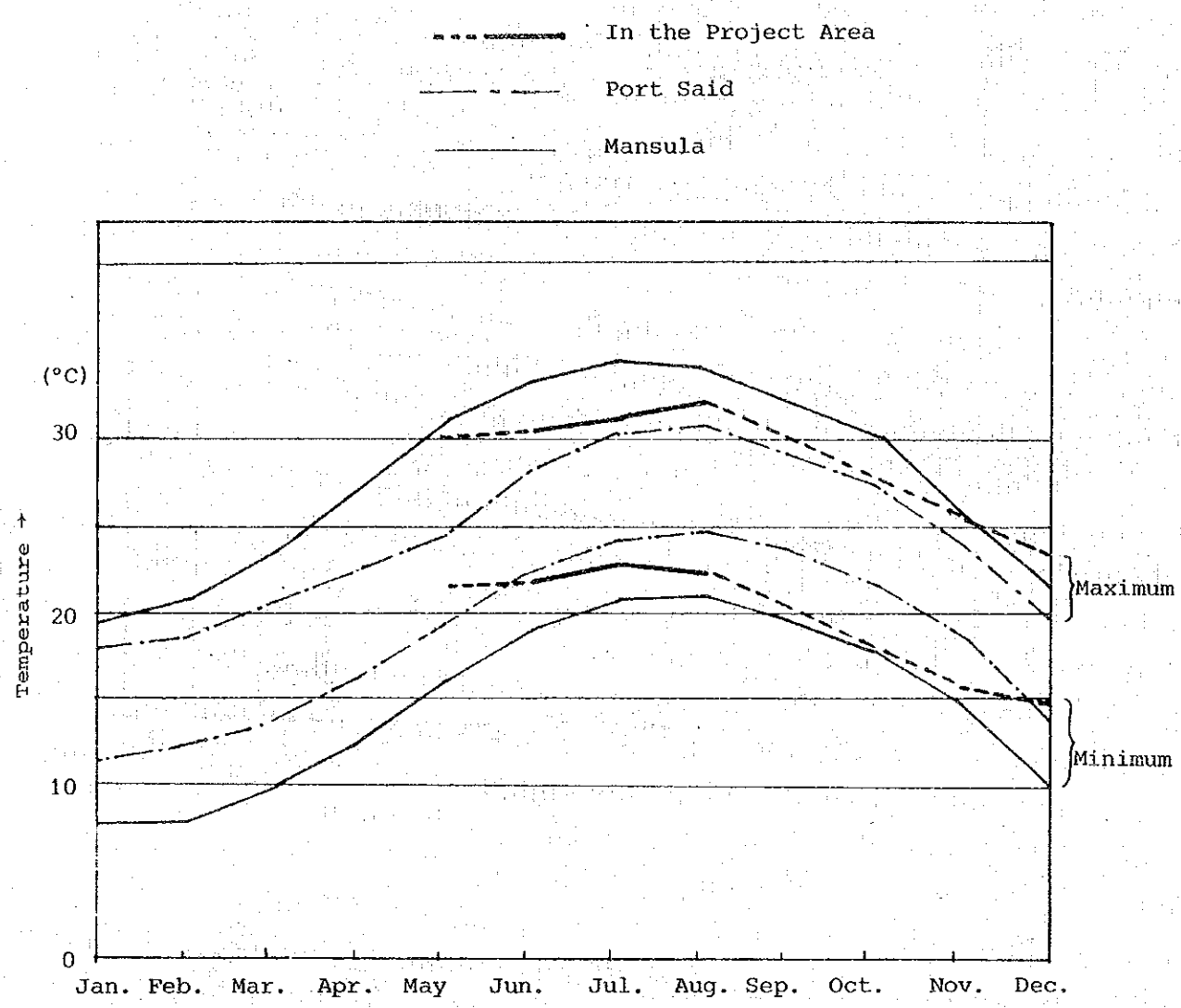
Fig.G-1-2 Mean Temperature

Unit: °C

Station	J	F	M	A	M	J	J	A	S	O	N	D	Mean
Port Said	14.2	14.8	16.4	18.8	22.2	24.9	26.7	27.4	26.2	24.2	20.9	16.4	21.1
Ismailia	14.2	15.4	17.4	20.6	24.7	27.5	29.3	29.5	27.3	24.2	20.2	15.8	22.2
Zagazig	13.1	14.0	16.8	19.8	23.7	26.2	27.5	27.4	25.5	23.5	19.7	15.2	21.0
Cairo	13.7	14.9	17.3	20.9	24.8	27.0	28.1	27.9	25.8	23.5	19.3	15.3	21.5

Source: Climatological Normals

Fig.G-1-3 Daily Maximum, Minimum Temperatures



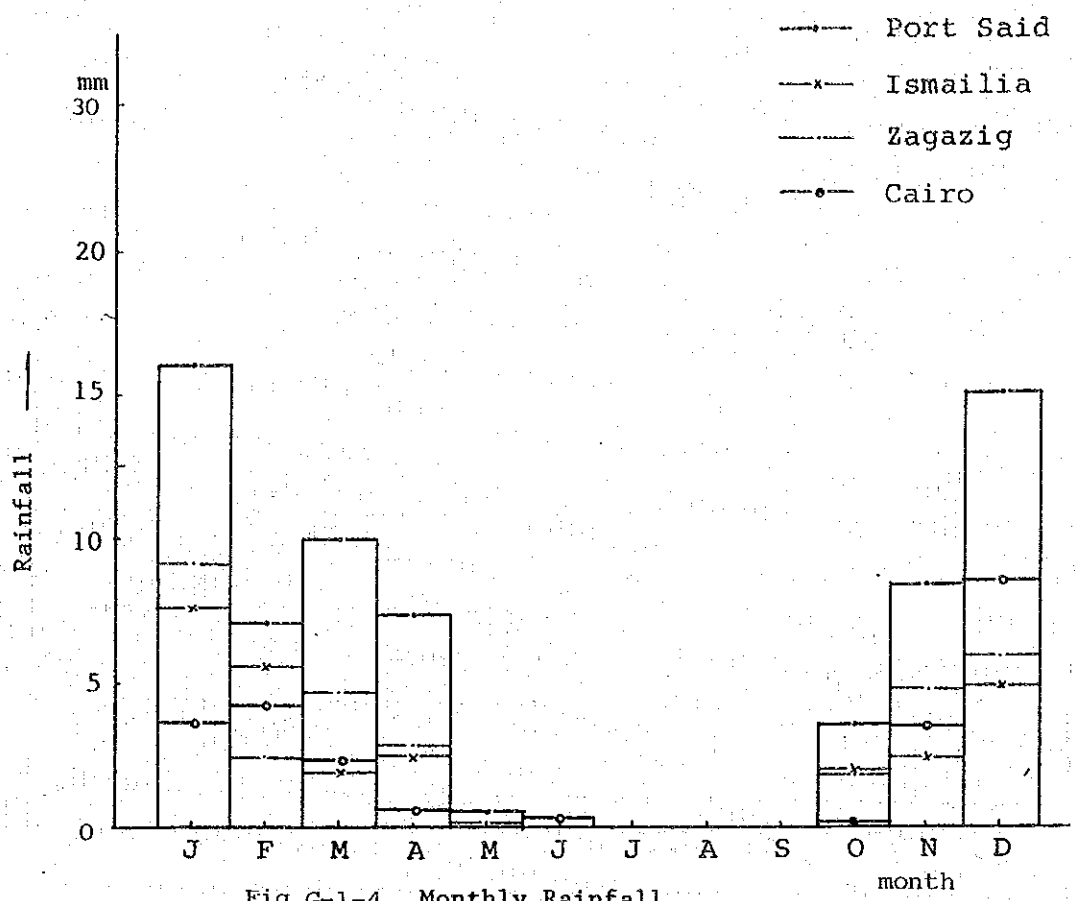
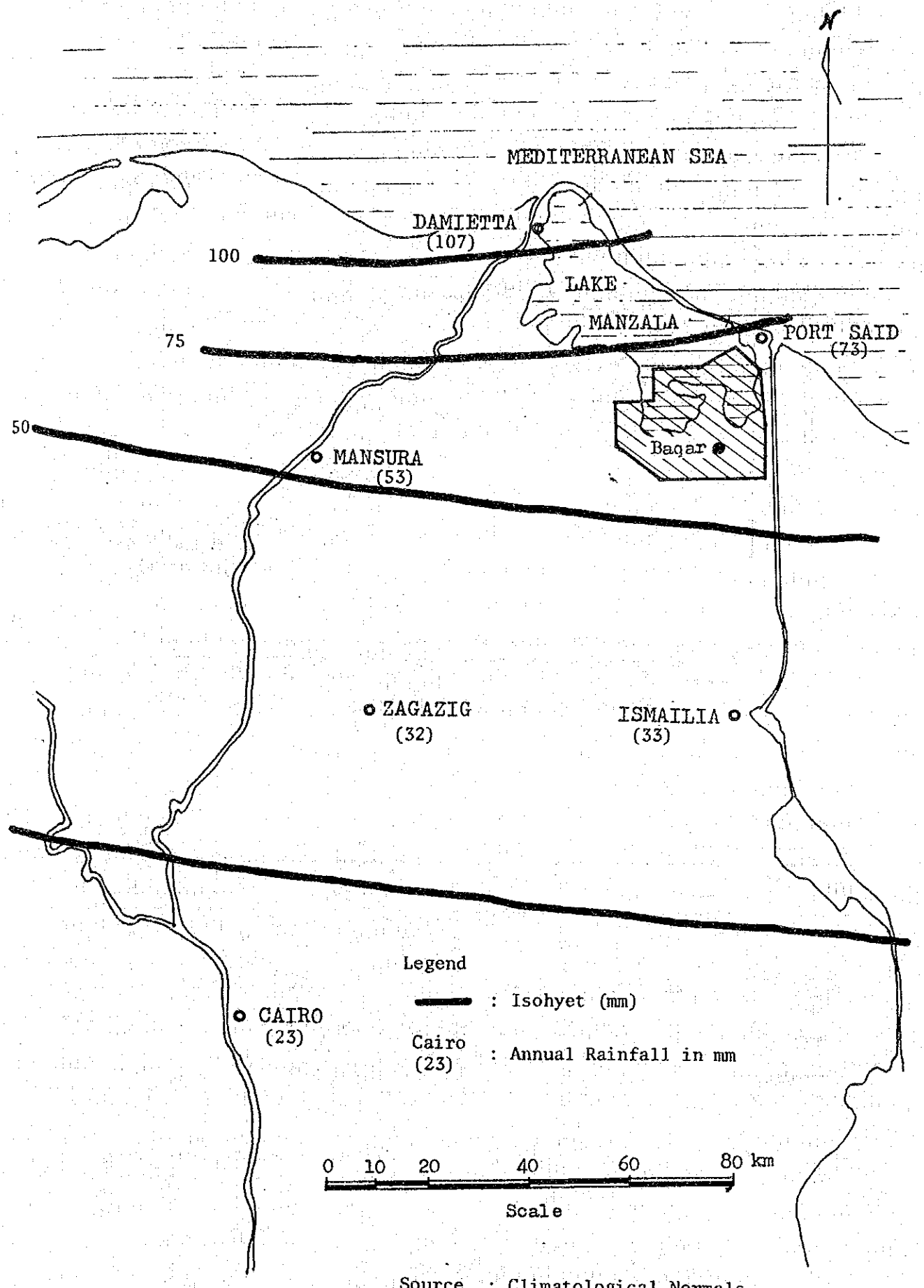


Fig.G-1-4 Monthly Rainfall

Monthly Rainfall Unit: mm

Station	J	F	M	A	M	J	J	A	S	O	N	D
Port Said	16.0	7.1	10.0	7.3	0.5	0.0	0.0	0.0	0.0	3.6	8.4	15.1
Ismailia	7.7	5.7	1.9	2.3	0.0	0.0	0.0	0.0	0.0	2.0	2.4	4.9
Zagazig	9.1	2.4	4.5	2.9	0.4	0.0	0.0	0.0	0.0	2.1	4.6	6.4
Cairo	3.7	4.2	2.3	0.6	0.5	0.3	0.0	-	-	0.1	3.5	8.6

Source: Meteorological Authority
Climatological Normals



Source : Climatological Normals

Fig.G-1-5 Total Annual Rainfall and Isohyet

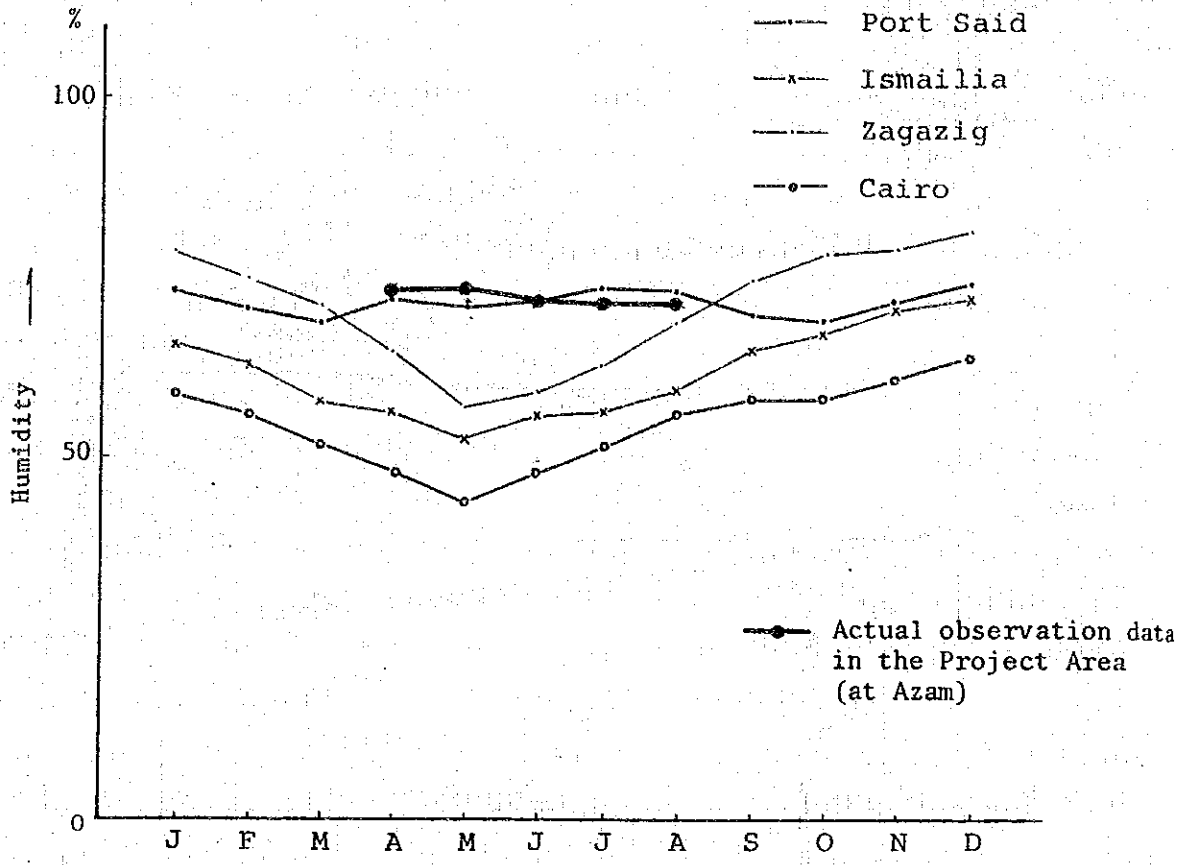


Fig.G-1-6 Relative Humidity

Unit: %

Station	J	F	M	A	M	J	J	A	S	O	N	D	Mean
Port Said	73	71	69	72	71	72	74	73	70	69	72	74	72
Ismailia	66	63	58	56	52	56	56	59	65	67	71	72	62
Zagazig	79	75	71	65	57	59	63	69	75	78	79	81	71
Cairo	59	56	52	48	44	48	52	56	58	58	61	64	55

Source: Climatological Normals

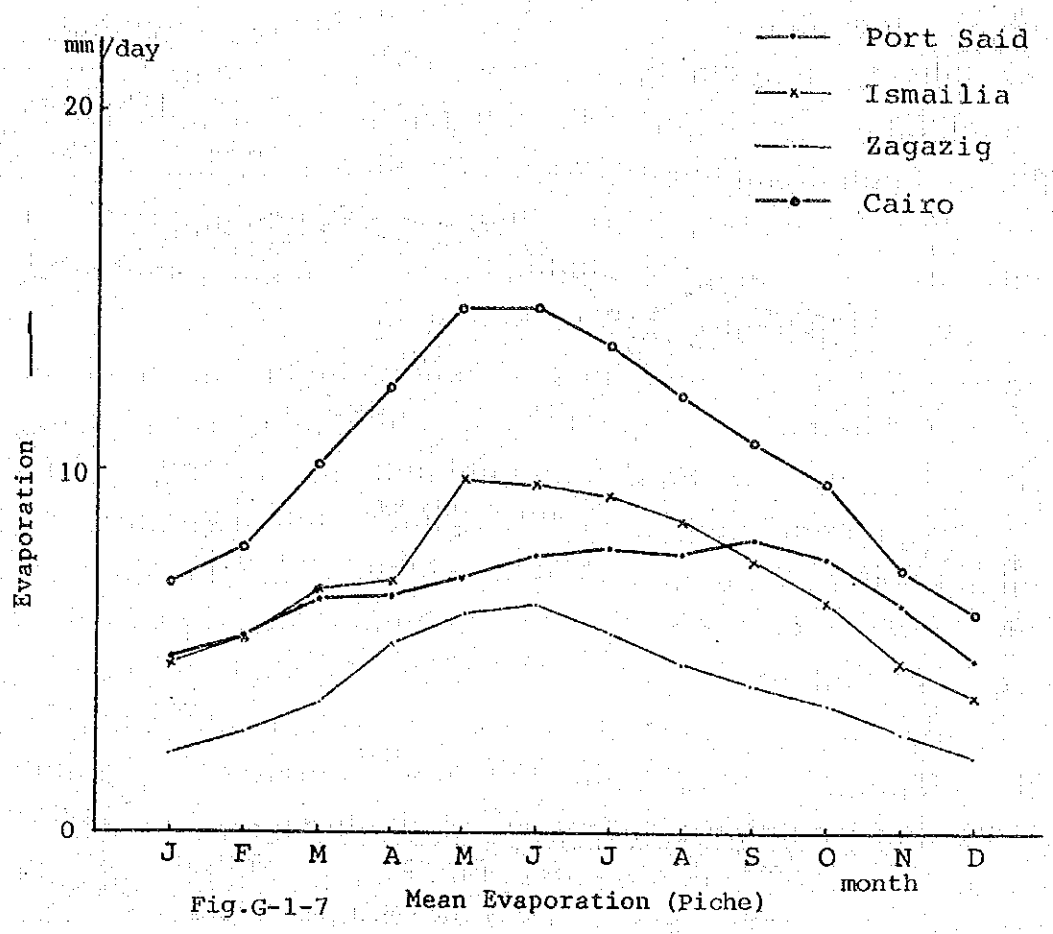


Fig.G-1-7 Mean Evaporation (Piche)

Unit: mm/day

Station	J	F	M	A	M	J	J	A	S	O	N	D	Mean
Port Said	4.9	5.4	6.5	6.6	7.1	7.7	7.9	7.7	8.1	7.6	6.3	4.8	6.7
Ismailia	4.7	5.4	6.8	7.0	9.8	9.7	9.3	8.6	7.5	6.4	4.7	3.8	7.0
Zagazig	2.2	2.8	3.6	5.3	6.1	6.3	5.6	4.7	4.1	3.6	2.8	2.1	4.1
Cairo	7.0	7.9	10.2	12.4	14.6	14.6	13.4	12.1	10.8	9.7	7.3	6.1	10.5

Source: Climatological Normals

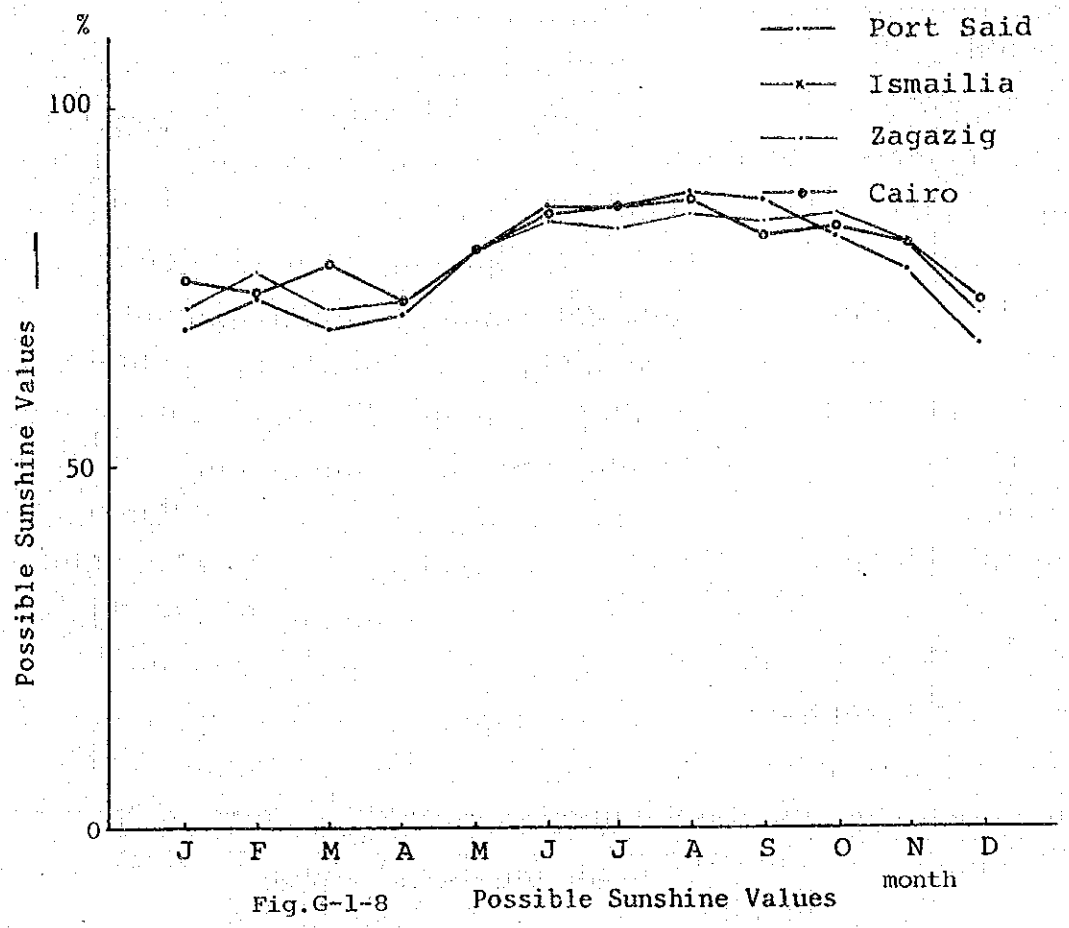


Fig.G-1-8 Possible Sunshine Values

Unit: %

Station	J	F	M	A	M	J	J	A	S	O	N	D
Port Said	69	73	69	71	80	86	86	88	87	82	77	67
Ismailia												
Zagazig	72	77	72	73	80	84	83	85	84	85	81	71
Cairo	76	74	78	73	80	85	86	87	82	83	81	73

* No data available in Ismailia

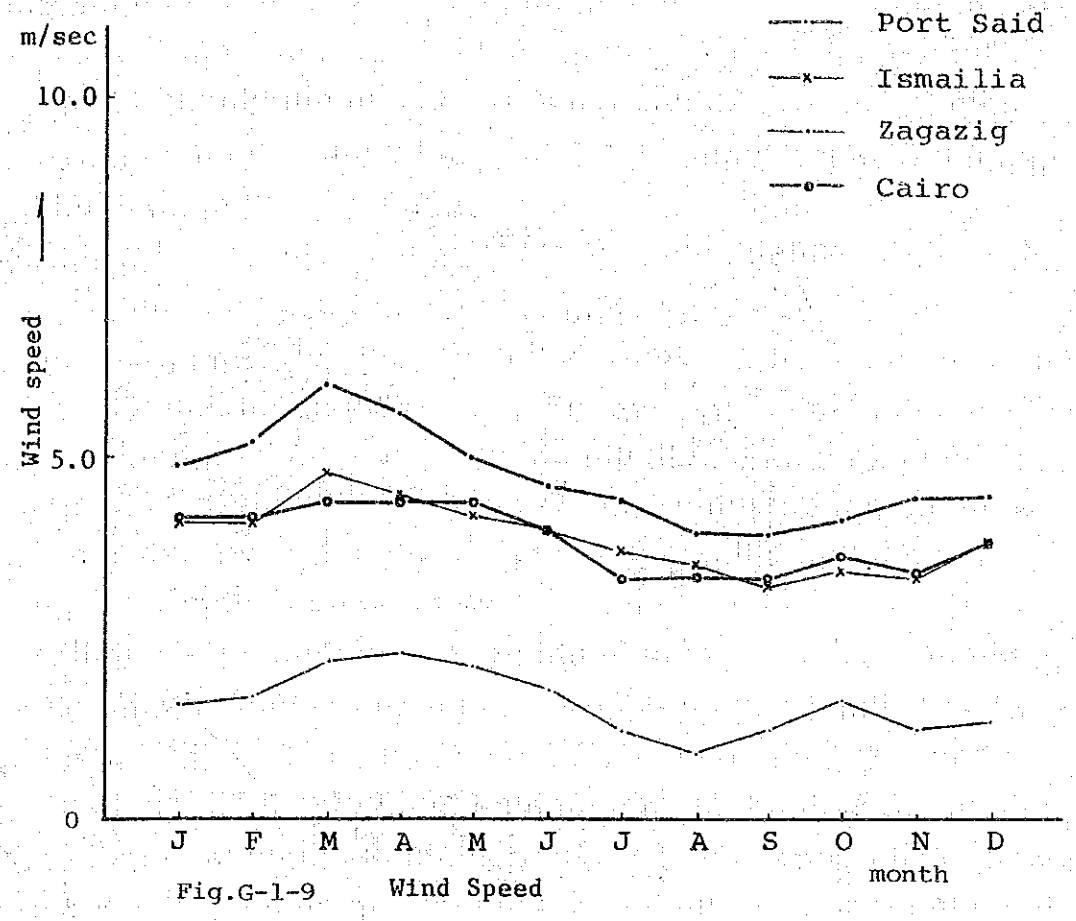


Fig.G-1-9 Wind Speed

Unit: m/sec

Station	J	F	M	A	M	J	J	A	S	O	N	D
Port Said	4.9	5.2	6.0	5.6	5.0	4.6	4.4	3.9	3.9	4.1	4.4	4.4
Ismailia	4.1	4.1	4.8	4.5	4.2	4.0	3.7	3.5	3.2	3.4	3.3	3.8
Zagazig	1.6	1.7	2.2	2.3	2.1	1.8	1.2	0.9	1.2	1.6	1.2	1.3
Cairo	4.2	4.2	4.4	4.4	4.4	4.0	3.3	3.2	3.3	3.6	3.4	3.8

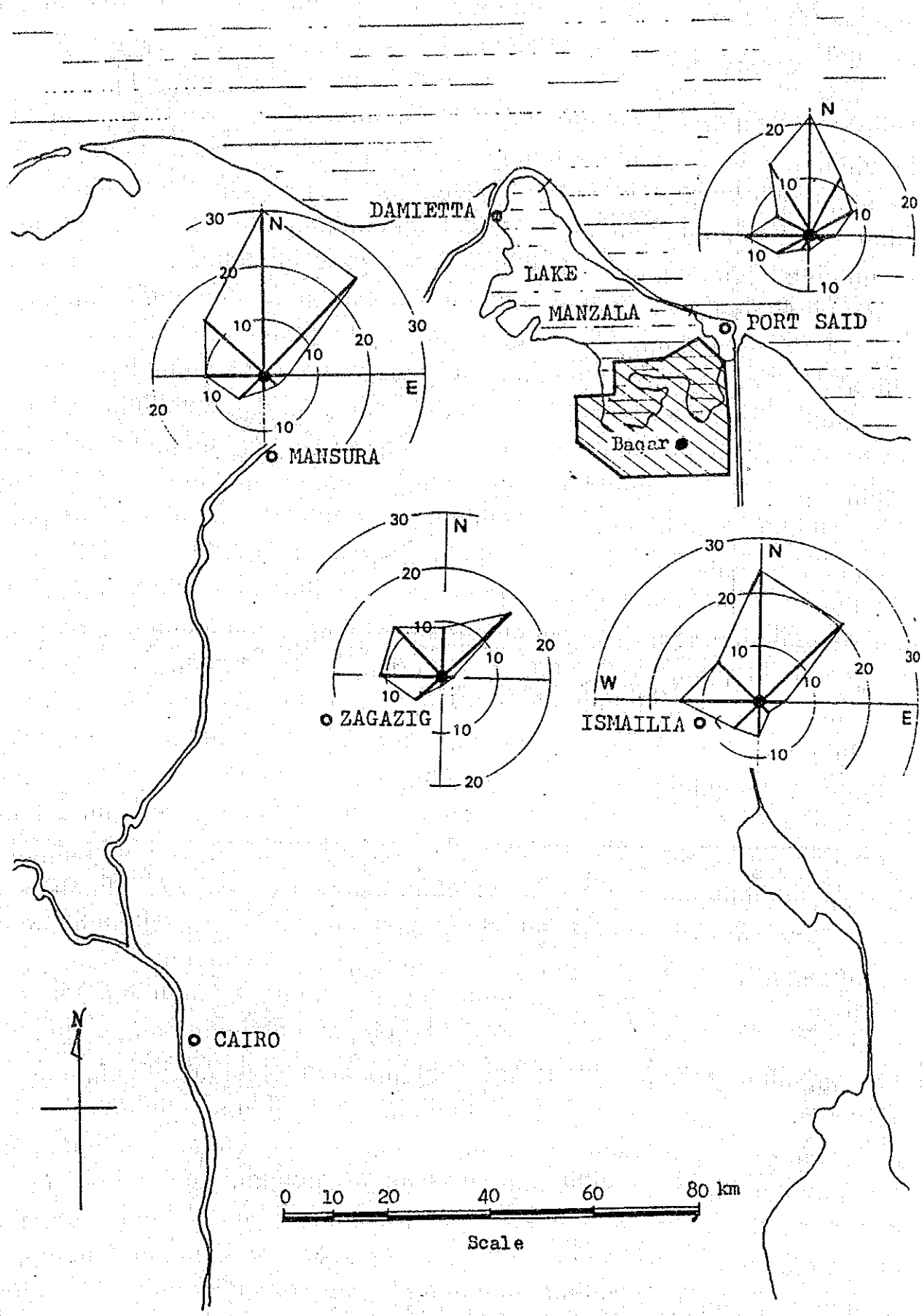


Fig.G-1-10 Annual Mean Percentage Frequency of Surface Wind

2. Hydrology

2-1 Water Level of Lake Manzala

Lake Manzala is a shallow delta-lake containing brackish water with an average depth of 0.80 meter.

The water level change of Lake Manzala is caused by wind speed and direction, Mediterranean tide and inflow from the three main drainage canals. During the field survey period, water level recorders were installed to observe the water level and to check the flow volume of the Hadous drain respectively. The data of the lake show that no daily change occurred. However, seasonal change amounting to 0.07 m appeared during the observation period from April to December 1983. The surface elevation of the lake was topograpically surveyed at 0.40 from the fringe of Matariya and 0.35 meter in the South Port Said Area. Therefore, the water level may be influenced by climate factors, seasonality and others. Published water level records are not available for Lake Manzala, however, there are sources of information as follows:

- The maximum elevation was surveyed at 0.6 meter and the minimum 0.3 meter near Port Said Town. (Source: Port Said Master Plan)
- The water level changes within ±0.2 meter. (Source: Lake Manzala Study)
- The water level elevation of Lake Manzala was observed at 0.4 meter near Matariya and 0.35 meter in the South Port Said area. (Topographic Survey results)

The records of Mediterranean tide at Port Said are as followings.

Highest high water level	EL +0.55
Lowest low water level	-0.65
Average annual high W.L.	+0.-4
Average annual low W.L.	+0.04

It can be said that although the data from the Port Said Master Plan are influenced by the Mediterranean tide, the water level of the area is not influenced. Therefore, the water level of the Project Area in the lake was decided to be 0.50 meter by appling the maximum value.

2-2 Drainage Canals

There are three main drainage canals of Hadous, Ramsis, and Bahr El Baqar in the Project Area through which drainage water from other areas flows into Lake Manzala as shown in Fig. G-2-1.

(1) Hadous drain

Hadous drain which is the largest drain in the eastern Nile Delta, and one of the major water sources of the El Salam Canal, commands a drainage area of about 2,300 km^2.

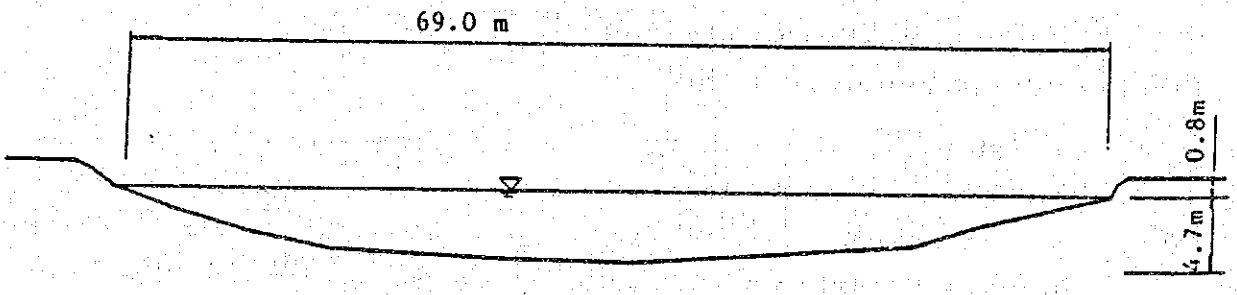
Water flow from the Hadous drain to Lake Manzala is about 3,300 million cubic meter per year and its monthly flow is shown in Table G-2-1. The variation in flows are attributed to changes in water supply quantities, crop rotation of the cultivation area, or irrigation and drainage efficiency.

Monthly variation in flow also takes place because of the different water requirements for the cultivation stage of the catchment area. In February, discharge from the water supply system is closed for maintenance of the canals.

Typical cross section, water velocity and flows at the outlet of the drain to Lake Manzala have been investigated druing the field survey as shown below.

Hadous Drain

A= 210 m (30-June 1983)
V= 0.25 m /sec
Q= 40 m^3/sec

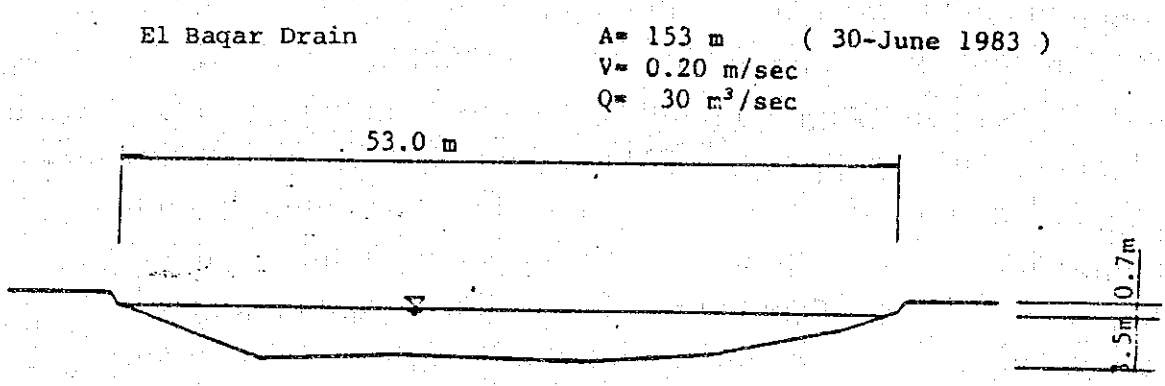


(2) Bahr El Baqar Drain

The Bahr El Baqar Drain is 97 km long and flows through the East Nile Delta to Lake Manzala.

The Bahr El Baqar has an average flow discharge of about 1,680 million cubic meter per year. Its monthly variation is slight except in February when the flow discharge is reduced to about 60 percent of the monthly average flow discharge.

Flow records for the Bahr El Baqar Drain have been taken by the Ministry of Irrigation from 1974 to 1978 and are shown in Table G-2-1. During the field survey, the typical cross section and velocity have been measured as shown below.



The water quality of Bahr El Baqar Drain is affected by Cairo sewage water. Salinity of its drainage water is slightly lower at about 700 ppm compared with that of other drains. Along the Bahr El Baqar Drain in the Project Area, farmers are using its water for irrigation.

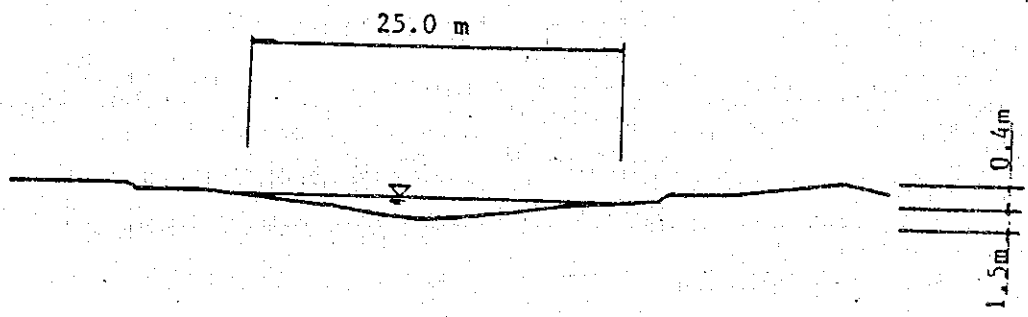
(3) Ramsis Drain

Ramsis drain was constructed as a watercourse to connect the Nile delta and Manzala Lake making it a branch of Saft drain. The flow discharge and velocity of the drain were not measured during the field survey because the direction of flow was not constant.

A typical cross section at its outlet to Lake Manzala has been measured as below.

Ramsis Drain

Before the Project Area



After the Project Area

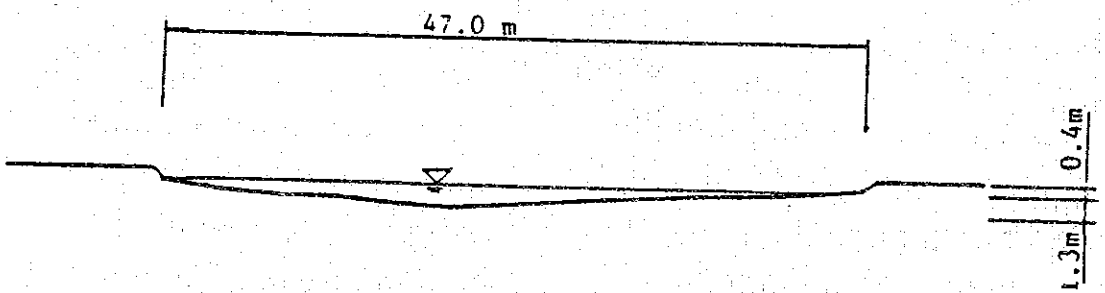


Table G-2-1 Flow Records for the Drains

Month	Bahr El Baqar Drain						Hadous Drain					
	Year					Average	Year					Average
	1974	1975	1976	1977	1978		1974	1975	1976	1977	1978	
Jan.	111.600	137.826	127.162	151.632	130.076	131.659	155.765	184.467	170.680	304.347	219.722	206.996
Feb.	60.128	124.432	119.500	92.222	106.700	100.596	50.083	145.773	252.453	179.025	164.949	158.457
Mar.	134.854	120.776	127.176	126.976	142.976	130.552	230.392	322.605	229.192	294.310	230.786	261.457
Apr.	148.080	129.156	125.264	116.304	154.380	134.637	239.088	280.504	249.394	309.877	208.199	257.412
May	139.681	165.664	124.616	130.076	149.099	141.827	199.124	275.910	224.430	284.889	190.700	235.011
Jun.	134.880	142.080	120.080	102.726	145.650	129.083	254.516	298.898	249.045	331.211	224.572	270.948
Jul.	149.806	132.020	118.976	111.996	164.176	135.395	328.434	446.149	347.731	309.337	307.132	347.757
Aug.	161.014	148.676	135.876	173.476	164.176	156.644	198.400	388.940	355.011	326.265	321.430	338.009
Sep.	162.336	158.952	150.530	167.104	158.880	159.560	344.510	366.465	352.259	329.926	310.136	342.659
Oct.	157.976	153.352	138.486	157.300	162.750	153.973	310.922	365.781	314.806	375.023	291.934	331.693
Nov.	175.376	137.880	134.580	145.176	155.880	149.778	221.814	287.841	264.963	314.402	238.146	265.433
Dec.	184.264	172.372	135.538	148.535	130.975	154.347	234.682	289.213	258.322	291.829	225.075	259.800
Total	1719.995	1723.186	1557.84	1623.573	1765.718	1678.051	2867.730	3648.646	3278.263	3650.540	2932.881	3257.632

Unit: MCM
Source: Ministry of Irrigation

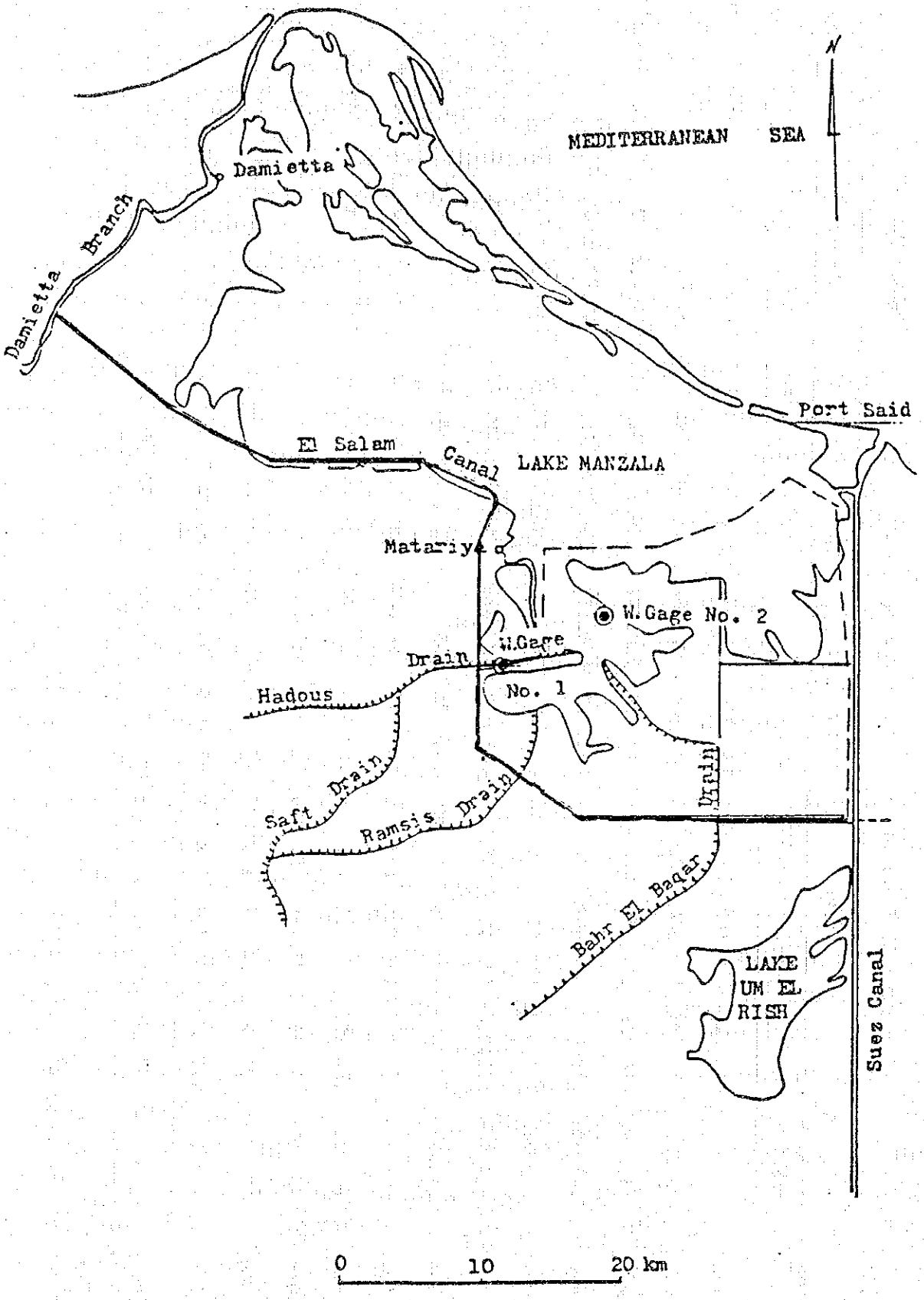


Fig.G-2-1 Canal and Drains in the Study Area

2-3 El Salam Canal

(1) Project Water Sources

The sources of water for the Project will be the Damietta Branch of the Nile River and drainage water from the Sirw and Hadous Drain.

The El Salam Canal will supply water for land reclamation projects located to the south of Lake Manzala and the northeast of the Sinai Desert. The total area to be irrigated by the canal is approximately 600 thousand feddans. The first phase is located on the west side of the Suez Canal and will irrigate 200 thousand feddans using a total water supply of 6.35 million cubic meter per day. The second phase is to expand the irrigation areato an additional 400 thousand feddans in Sinai. The water supply will then be increased to 18.85 million cubic meter per day.

The project area is included in the first phase of the El Salam Project. The design of the section of the El Salam Canal which is concerned with the Project are shown in Fig.G-2-2 for the longitutinal profile and Fig.G-2-3 for the cross section at a point 48.75 km in distance from Damietta Branch of the Nile River after mixing with the Hadous drainage water.

(2) Ratio of the mixture

a) After mixing the water, salinity is not to exceed 817 parts per million.

b) The maximum proportion of salinity of the mixture is not very harmful for agriculturral production in consideration of the prevailing temperature in Egypt, but due caution to provide good drainage is indispensable.

c) The water of the "Lower SARW" will be used to the maximum extent as it is less saline compared with that of HADOUSS DRAIN. The water will be drawn from EL SARW at its crossing with El Salam Canal and the amount will be 0.5 million cubic meter per day at the beginning and reach 2 million cubic meter per day, as appropriate.

d) The proportion of the Nile waters to be used will be very high during the month of February because of the high salinity of the drain waters and in order to wash the soil.

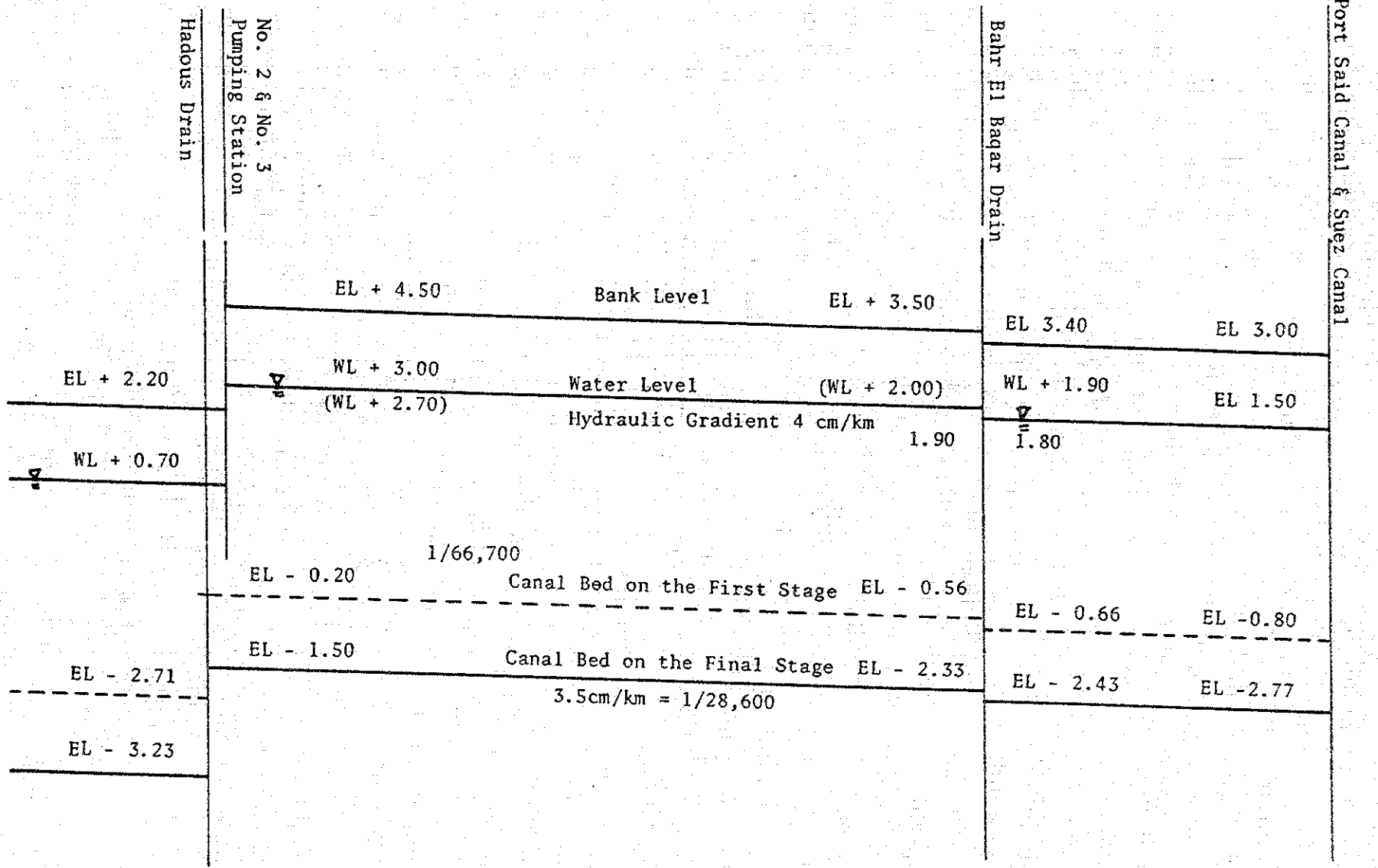


Fig.G-2-2 Longitudinal Profile of the El Salam Canal

Source: El Salam Canal Project
M.O.I. 1979

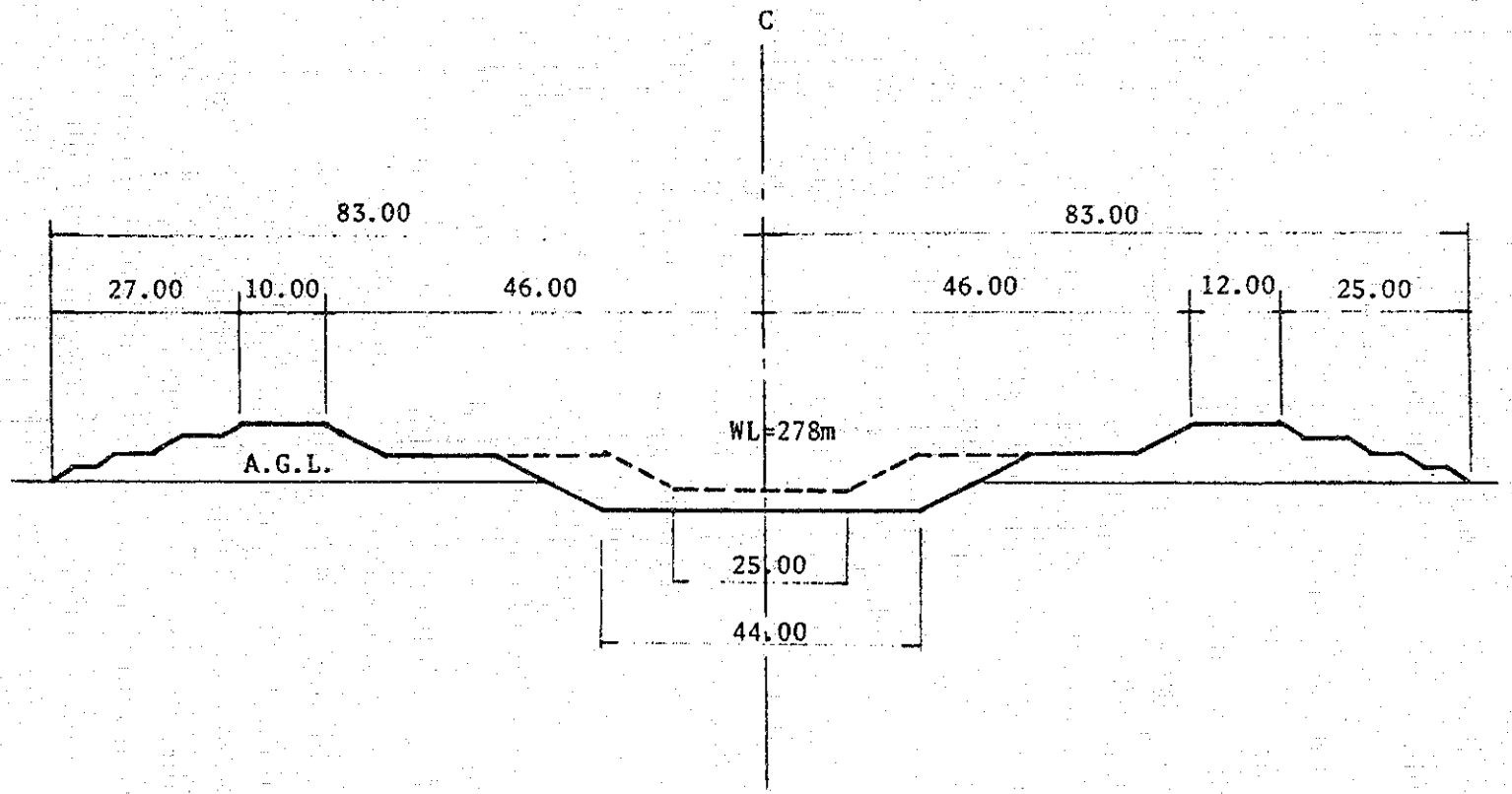


Fig.G-2-3 Cross Section of El Salam Canal at 48.75 Km in distance from the Dammiatta Outlet (after Mixing with Hadous Drainage Water)

Table G-2-2 Calculation of the amounts of water to be drawn (a) from Nile (b) from "the lower SARW" and (c) HADOUSS Drain to keep the allowable salt content

Month	Water requirements Monthly (mill m^3/month)	Daily (mill m^3/day)	Total Sanity	(a) The N I L E Total	Ratio Salt	Total Salt	(b) EL S A R W Total	Ratio Salt	Total Salt	(c) HADOUSS Total	Ratio Salt	Total Salt	MIXED WATER Total	Ratio Salt	Total Salt
Jan.	240	8	6,400	4.0	250	1,000	1.0	800	800	3.0	1,540	4,620	8	802	6,420
Feb.	300	11	8,800	8.5	250	2,125	0.5	1,000	500	2.0	2,704	5,408	11	730	8,033
Mar.	305	10	8,000	4.0	250	1,000	1.0	1,449	1,449	5.0	1,071	5,355	10	780	7,804
Apr.	310	10	8,000	5.0	250	1,250	1.0	1,151	1,151	4.0	1,200	4,800	10	720	7,201
May	305	10	8,000	2.5	250	625	1.5	503	754	6.0	1,021	6,126	10	725	7,254
June	570	19	1,520	9.5	250	2,375	1.5	1,065	1,598	8.0	1,330	10,640	19	769	14,613
Jul.	570	19	15,200	9.5	250	2,375	1.5	1,000	1,500	8.0	1,255	10,040	19	732	13,915
Aug.	540	18	14,400	8.5	250	2,125	1.5	920	1,380	8.0	1,130	9,040	18	697	12,545
Sep.	520	14	11,200	7.50	250	1,875	2.0	1,190	2,380	4.50	1,490	6,750	14	782	10,955
Oct.	160	5	4,000	1.5	250	375	1.0	860	860	2.0	1,290	2,580	5.5	743	3,715
Nov.	340	11	8,800	5.0	250	1,250	1.0	635	635	5.0	1,400	7,000	11	807	8,885
Dec.	390	13	10,400	5.0	250	1,250	0.5	540	270	7.5	1,190	8,925	13	824	10,715

Source: The Peace Canal Project, MOI

A P P E N D I X - G

G-1 MONTHLY CLIMATE DATA FOR PORT SAID STATION

Port Said Meteorological Station

Location:	Lat. 31°16' Long. 32°17'
Ground Elevation:	1.0 m
Altitude:	6.1 m
Height of Wind Recording Instrument:	19 m
Period:	1969 - 1978
Data:	Maximum Mean Temperature
	Minimum Mean Temperature
	Monthly Rainfall
	Maximum Relative Humidity
	Minimum Relative Humidity
	Wind Speed
	Wind Direction
	Sunshine Hours
	Mean Daily Evaporation

MAXIMUM MEAN TEMPERATURE

(Unit: °C)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
1969	16.8	19.6	22.1	21.1	24.8	27.6	29.4	29.6	29.6	27.1	24.1	20.7	24.4.
1970	19.5	20.5	22.9	24.1	27.1	28.9	30.9	30.9	30.8	27.2	23.2	19.7	25.5
1971	21.1	19.6	21.5	22.0	26.7	29.5	30.1	31.8	29.9	27.0	23.6	19.0	25.2
1972	19.2	19.2	20.9	23.9	25.9	27.4	30.5	32.3	31.7	29.6	24.5	20.3	25.5
1973	18.0	21.1	20.8	22.5	26.1	29.9	32.1	31.3	30.7	29.7	22.9	21.0	25.5
1974	16.3	19.8	21.8	23.2	25.5	28.9	31.3	31.3	30.6	28.9	24.0	19.0	25.1
1975	18.3	19.3	21.9	23.7	26.0	29.2	31.0	31.1	31.0	28.9	24.3	20.1	25.4
1976	19.3	18.3	21.1	24.5	26.6	27.8	30.9	30.9	30.6	29.1	25.8	19.7	25.4
1977	17.2	19.3	19.0	22.7	25.0	28.3	30.3	30.6	29.0	25.4	23.8	17.9	24.0
1978	17.3	18.9	19.9	22.6	25.6	27.7	29.2	28.3	28.1	26.9	26.5	18.8	24.2
Mean	18.3	19.6	21.2	23.0	25.9	28.5	30.6	30.8	30.2	28.0	24.3	19.6	25.0

MINIMUM MEAN TEMPERATURE

(Unit: °C)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
1969	10.0	12.8	14.2	15.0	19.0	23.1	23.3	23.6	24.3	21.7	18.9	12.6	18.2
1970	12.6	11.4	13.4	15.7	17.8	20.7	22.4	23.2	22.5	18.6	16.4	11.2	17.2
1971	12.4	10.2	12.4	13.7	18.2	20.8	22.0	23.2	21.7	18.0	15.0	11.7	16.6
1972	11.2	11.2	12.7	16.0	18.1	21.1	22.8	24.2	23.4	22.1	17.7	12.9	17.8
1973	9.2	11.6	12.1	14.6	17.9	21.6	23.7	23.4	23.1	24.0	18.6	13.6	17.8
1974	10.1	11.5	14.6	15.4	17.6	21.1	23.2	23.7	23.0	21.3	15.8	11.7	17.4
1975	10.4	11.1	13.4	15.6	18.4	21.4	23.4	23.7	23.0	20.7	16.7	12.3	17.5
1976	10.0	10.0	12.4	15.0	18.1	20.6	22.2	22.3	21.4	20.6	17.2	13.6	17.0
1977	11.1	13.4	13.2	15.1	19.2	22.1	24.3	23.7	24.0	21.0	18.7	12.9	18.2
1978	11.5	13.1	13.9	16.7	20.5	22.8	24.6	23.7	23.4	22.4	17.2	14.0	18.7
Mean	10.9	11.6	13.2	15.3	18.5	21.5	23.2	23.5	23.0	21.1	17.2	12.7	17.6

MONTHLY RAINFALL

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1969	14.5	1.0	15.3	1.0	2.0	0.0	0.0	0.0	0.0	20.7	1.0	0.5	56.0
1970	12.7	0.6	7.6	2.2	0.0	0.0	0.0	0.0	0.0	4.0	11.0	18.2	56.3
1971	21.1	2.2	2.6	18.8	0.4	0.0	0.0	0.0	0.0	0.4	17.3	42.8	106.6
1972	2.3	14.4	29.9	13.7	0.5	0.0	0.0	0.0	0.0	0.2	14.1	36.2	111.3
1973	17.5	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.2	30.0
1974	50.9	15.4	5.5	2.7	0.0	0.0	0.0	0.0	0.0	0.0	1.7	7.4	83.6
1975	7.7	19.9	6.2	12.9	0.0	0.0	0.0	0.0	0.0	0.4	2.7	13.0	62.8
1976	0.5	14.8	1.1	5.7	0.2	Trac	0.0	0.0	0.0	1.3	1.2	9.5	34.3
1977	21.5	1.2	14.9	11.4	1.9	0.0	0.0	0.0	0.0	7.3	0.0	16.5	74.7
1978	11.4	1.4	7.0	4.2	0.0	0.0	0.0	0.0	0.0	1.6	33.0	7.0	65.6
Mean	16.0	7.1	10.0	7.3	0.5	0.0	0.0	0.0	0.0	3.6	8.4	15.1	68.1

MAXIMUM RELATIVE HUMIDITY

(Unit: %)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
1969	96	96	96	93	100	92	90	89	89	93	93	91	93
1970	98	89	96	92	87	89	89	92	90	95	96	97	93
1971	99	96	98	95	97	95	92	91	95	93	96	99	96
1972	96	95	93	98	91	91	94	87	89	83	93	98	92
1973	84	97	87	89	93	82	90	91	90	89	93	98	90
1974	92	99	90	97	88	86	89	92	83	90	90	86	90
1975	91	95	92	92	85	90	91	96	93	98	90	99	93
1976	94	94	97	96	94	97	98	95	94	95	97	97	96
1977	99	99	98	97	93	96	95	84	86	85	90	88	93
1978	100	93	90	84	83	88	91	95	87	91	84	93	90
Mean	96	95	94	93	91	91	92	91	90	91	92	95	93

MINIMUM RELATIVE HUMIDITY

(Unit: %)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
1969	41	34	29	31	54	33	52	53	47	45	47	34	42
1970	43	24	16	14	14	29	38	33	45	32	41	42	31
1971	26	31	16	43	31	24	48	31	45	38	41	37	34
1972	42	32	27	23	16	29	43	29	40	34	44	40	33
1973	39	35	30	22	31	23	44	40	49	38	48	45	37
1974	39	32	38	20	27	38	46	44	23	27	35	36	34
1975	33	34	16	32	20	28	37	44	45	44	30	41	34
1976	30	32	26	21	38	47	24	49	27	31	28	31	32
1977	39	23	25	20	35	36	39	49	43	39	18	40	34
1978	34	28	18	16	28	25	45	53	35	14	33	33	30
Mean	37	31	24	24	29	31	42	43	40	34	37	38	34

WIND SPEED

(Unit: %)

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Calm & Variable	1.0	0.7	0.6	0.4	0.4	0.3	0.4	0.7	0.7	0.4	0.7	1.3
1 - 3 (Knots)	18.5	15.0	8.2	9.6	13.3	13.0	13.7	17.4	17.6	16.2	17.6	23.7
4 - 6 "	18.6	16.0	11.8	13.6	15.7	19.8	21.4	25.3	25.4	23.5	21.2	19.6
7 - 10 "	24.4	25.5	24.9	25.1	28.7	30.6	33.0	33.6	34.8	34.3	29.8	23.2
11 - 16 "	24.4	28.6	34.7	38.2	33.9	32.0	28.8	22.0	20.5	23.0	24.9	20.7
17 - 21 "	7.8	8.8	13.7	9.9	6.3	3.7	2.6	1.0	0.9	2.3	3.9	7.5
22 - 27 "	4.5	4.4	5.0	2.9	1.6	0.6	0.1	0.0	0.1	0.3	1.6	3.6
28 - 33 "	0.7	0.9	1.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.3
More than 34 Knots	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Mean (Knots)	4.9	5.2	6.0	5.6	5.0	4.6	4.4	3.9	3.9	4.1	4.4	4.4

WIND DIRECTION

(Unit: %)

Direction	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Calm & Variable	2.6	1.5	1.0	0.7	0.6	0.5	0.8	0.9	1.4	0.7	1.3	2.7
345° - 014°C	4.5	9.2	11.0	19.9	31.2	33.5	26.5	27.3	35.7	25.2	16.2	5.5
015 - 044	5.1	9.3	9.9	12.5	15.6	9.0	4.0	4.7	11.2	20.5	17.9	8.6
045 - 074	6.8	9.9	11.5	12.8	10.6	4.3	0.9	0.7	2.9	11.4	14.2	8.5
075 - 104	5.8	8.8	9.7	9.1	7.5	2.5	0.4	0.3	0.8	3.7	3.8	6.3
105 - 134	3.9	4.2	3.8	3.4	2.9	1.4	0.3	0.3	0.5	1.6	1.6	4.1
135 - 164	4.5	2.9	2.9	1.9	1.5	1.1	0.4	0.3	0.5	1.8	1.5	4.1
165 - 194	7.4	4.1	3.3	1.7	1.0	0.6	0.2	0.3	0.4	1.3	2.7	6.6
195 - 224	14.1	6.8	3.8	1.8	1.2	1.2	0.5	0.9	0.6	2.1	5.1	14.4
225 - 254	19.5	14.0	8.8	4.1	3.0	3.0	3.9	4.1	3.3	3.8	8.7	18.9
255 - 284	14.9	14.0	14.7	8.1	5.4	7.7	15.3	15.3	8.3	7.4	10.8	10.6
285 - 314	6.0	7.6	9.3	8.4	5.9	10.9	16.1	13.4	6.9	5.7	6.4	4.8
315 - 344	4.9	8.5	10.3	15.6	13.6	24.3	30.7	31.5	27.5	13.8	9.8	4.9

SUNSHINE HOURS

(Unit: hr.)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1969	5.7	8.0	6.5	9.1	9.8	12.2	11.5	-	9.9	8.6	8.3	6.9
1970	7.1	8.0	8.3	9.9	10.8	12.1	12.1	11.7	11.0	9.7	8.0	7.0
1971	7.6	8.0	8.6	9.4	11.4	12.3	12.2	11.6	10.8	9.5	7.7	5.1
1972	7.8	8.6	7.5	8.2	10.1	12.3	12.1	11.8	10.5	9.2	7.6	7.0
1973	7.6	8.4	9.1	10.2	12.0	12.4	12.3	11.5	10.8	10.1	-	7.1
1974	5.8	7.5	8.1	8.4	11.8	12.2	12.2	11.7	10.2	9.5	8.4	6.6
1975	6.9	7.6	9.1	-	11.5	11.8	11.8	11.3	10.5	9.9	7.6	6.1
1976	7.2	7.0	8.4	9.3	10.5	11.6	12.0	11.6	10.4	8.4	8.0	7.3
1977	7.2	9.7	8.8	8.6	10.4	11.2	11.3	11.0	10.2	9.1	8.6	7.2
1978	8.0	8.4	8.2	9.7	11.0	11.8	11.8	11.3	10.3	8.5	7.6	6.6
Mean	7.1	8.1	8.3	9.2	10.9	12.0	11.9	11.5	10.5	9.3	8.0	6.7
Monthly Mean	220	227	257	276	338	360	369	357	315	388	240	208
Possible Sunshine	320	311	373	397	420	417	429	403	363	350	310	309
Percent (%)	69	73	69	71	80	86	86	88	87	82	77	67

MEAN DAILY EVAPORATION

(Unit: mm/day)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
1969	3.8	5.4	6.4	6.7	6.1	8.9	8.2	7.2	7.4	8.4	7.5	5.8	6.8
1970	4.5	5.2	6.0	6.1	6.6	6.1	6.1	6.3	5.7	5.3	5.5	4.6	5.7
1971	4.0	5.1	6.2	5.0	5.6	5.9	5.8	5.4	5.1	6.0	5.1	4.7	5.3
1972	4.1	4.8	4.2	7.8	5.9	7.0	5.4	5.2	5.3	5.6	4.7	4.7	5.4
1973	3.9	4.7	5.0	5.0	4.8	4.7	4.9	5.0	5.0	3.1	2.7	3.5	4.4
1974	4.1	4.3	3.1	4.5	4.4	5.0	4.3	4.4	4.4	4.4	5.6	4.0	4.4
1975	4.0	3.8	4.2	-	4.3	4.4	4.3	4.4	4.3	4.0	3.9	3.4	-
1976	3.3	3.4	3.7	4.1	4.0	3.2	3.8	3.8	3.6	3.9	3.4	5.3	3.8
1977	4.2	5.0	4.9	6.1	5.7	5.6	5.1	4.8	5.1	6.2	5.1	3.8	5.1
1978	3.7	4.1	5.5	6.0	6.3	6.5	5.9	5.8	6.5	5.1	4.9	3.8	5.3
Mean	4.0	4.6	4.9	5.1	5.4	5.7	5.4	5.2	5.2	5.2	4.8	4.4	5.1

G-2 : CLIMATE DATA IN THE PROJECT AREA

(observation record)

April - August, 1983

Climate Data in the Project Area in 1983

Time	30, June		1, May		5, May	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	18.0	84	17.0	88	17.0	88
1	17.5	88	17.5	90	16.8	92
2	16.6	91	17.0	90	16.2	94
3	16.0	92	17.0	92	15.8	94
4	16.0	92	15.9	89	15.1	93
5	16.0	92	15.8	92	14.7	94
6	15.7	87	16.0	88	14.0	97
7	17.6	80	18.6	78	14.4	94
8	20.1	71	21.0	58	17.0	84
9	24.2	43	23.4	40	20.4	67
10	25.6	34	25.3	34	22.0	56
11	26.1	38	26.1	32	23.1	54
12	25.8	45	27.6	32	24.0	55
13	27.3	30	28.6	36	25.2	42
14	27.6	27	29.3	30	25.4	44
15	27.6	40	29.0	29	26.0	40
16	27.4	46	26.7	41	25.5	52
17	26.0	42	25.5	47	24.0	62
18	24.0	60	24.1	60	23.0	68
19	20.6	76	20.6	69	20.1	81
20	19.0	75	19.7	83	19.6	79
21	18.2	72	19.0	88	19.3	83
22	18.1	73	18.4	85	18.0	90
23	18.0	82	18.0	89	17.0	92

Climate data in the project area in 1983 (continued)

Time	10, May		15, May		20, May	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	19.0	86	19.4	92	18.7	90
1	18.9	89	19.2	92	18.7	91
2	19.0	86	19.2	92	18.8	92
3	19.1	84	19.0	92	18.6	93
4	19.1	84	18.1	90	18.0	94
5	19.1	81	17.4	91	18.0	92
6	19.4	73	17.1	92	19.0	87
7	20.0	76	18.6	86	20.3	79
8	21.1	78	20.5	81	22.0	68
9	22.0	77	22.6	68	23.0	62
10	23.0	70	24.5	57	24.1	56
11	21.9	83	26.4	44	25.5	51
12	21.1	78	28.0	43	26.7	48
13	23.0	66	29.0	39	27.5	46
14	24.5	63	30.1	35	27.0	57
15	26.4	56	27.0	68	26.2	60
16	27.0	54	27.1	62	25.0	68
17	26.0	58	27.3	56	23.3	73
18	22.2	78	25.0	67	22.2	76
19	20.8	86	23.0	80	21.2	81
10	20.3	88	22.0	86	21.0	82
21	20.2	86	21.0	89	20.5	83
22	19.3	91	20.2	90	20.2	86
23	19.0	93	19.8	91	20.2	86

Climate data in the project area in 1983 (continued)

Time	5, June		10, June		15, June	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	22.5	85	23.0	86	25.6	90
1	21.8	86	22.4	88	25.0	91
2	22.0	91	22.2	89	24.9	92
3	21.4	90	21.9	91	24.4	87
4	21.3	90	21.3	90	23.6	92
5	21.0	96	20.7	94	23.6	93
6	20.7	95	20.5	94	23.2	94
7	21.5	91	21.9	86	24.0	91
8	23.0	80	23.1	80	25.0	82
9	24.0	72	24.5	78	26.0	77
10	25.5	64	25.7	69	26.6	72
11	27.0	56	27.1	54	27.1	70
12	28.0	52	27.9	60	27.6	70
13	29.2	50	27.8	53	28.1	68
14	29.3	54	27.0	64	28.1	65
15	29.3	55	26.5	68	28.4	60
16	27.5	68	26.5	65	28.0	62
17	26.1	76	26.9	62	27.5	70
18	25.6	77	26.3	70	27.0	72
19	24.9	80	25.0	72	26.0	76
20	24.0	83	24.0	77	24.9	81
21	23.2	87	23.6	78	24.0	86
22	22.8	88	23.5	81	23.9	85
23	22.3	91	23.3	83	23.6	87

Climate data in the project area in 1983 (continued)

Time	20, June		25, June		1, July	
	Temperautre (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	22.5	90	25.1	85	24.0	84
1	22.5	90	25.0	90	23.2	82
2	22.5	90	24.4	90	23.2	83
3	22.0	93	23.9	92	23.0	89
4	21.9	95	23.2	95	22.1	94
5	21.9	95	23.0	96	22.0	94
6	21.4	96	22.8	96	22.0	94
7	21.7	97	23.0	94	23.0	91
8	24.5	80	24.5	83	26.3	75
9	26.0	67	25.5	76	27.0	76
10	27.0	64	26.8	69	28.0	71
11	18.5	57	27.5	62	29.7	58
12	29.6	54	28.5	54	29.5	59
13	29.7	57	29.2	52	31.0	35
14	30.4	49	29.8	53	31.5	46
15	31.2	46	29.0	58	31.5	61
16	31.2	41	29.0	58	31.0	69
17	31.8	44	28.0	59	30.5	70
18	39.5	54	27.8	64	30.0	72
19	37.9	67	26.0	70	28.0	73
20	26.0	81	25.0	76	26.0	82
21	25.0	86	24.2	78	25.1	85
22	24.5	90	24.0	75	24.9	87
23	24.0	91	23.7	78	24.6	87

Climate data in the project area in 1983 (continued)

Time	5, July		17, July		20, July	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	23.2	88	24.0	84	23.9	88
1	22.8	90	24.0	91	23.6	89
2	22.3	92	23.7	90	23.4	93
3	22.2	94	23.1	93	23.0	91
4	22.0	92	22.8	93	22.0	94
5	22.0	95	22.5	94	22.0	94
6	21.9	93	22.1	93	22.0	93
7	22.5	90	23.0	92	22.3	89
8	24.9	77	25.0	79	23.7	82
9	26.5	64	27.0	65	25.0	73
10	27.7	58	28.1	59	26.0	65
11	27.4	57	29.0	57	27.7	57
12	28.0	59	29.2	55	28.5	51
13	28.9	55	29.2	55	29.5	50
14	29.9	54	29.7	53	30.2	48
15	29.8	57	30.4	58	21.0	47
16	29.5	60	30.1	54	31.7	47
17	29.8	60	30.2	54	30.5	55
18	29.1	60	29.1	60	29.5	61
19	27.1	68	27.4	67	27.0	73
20	26.0	75	26.0	76	26.0	81
21	25.0	80	25.2	80	25.4	84
22	24.5	83	24.8	82	25.0	85
23	24.1	87	24.4	85	24.8	86

Climate data in the project area in 1983 (continued

Time	25, July		30, July		5, Aug.	
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	24.9	89	25.0	87	24.8	92
1	24.8	90	24.8	88	24.4	92
2	24.9	90	24.3	87	24.0	92
3	24.3	91	23.7	91	23.8	92
4	24.1	94	23.4	92	23.4	93
5	23.4	95	23.0	94	23.0	92
6	23.0	95	22.6	94	22.5	92
7	23.2	94	23.0	92	22.1	92
8	25.0	84	24.5	80	23.8	86
9	26.0	79	26.7	70	25.5	80
10	26.9	74	28.2	64	27.0	70
11	28.4	66	29.4	60	29.0	60
12	29.9	54	30.0	56	30.0	58
13	31.0	57	30.3	48	31.2	50
14	32.0	42	31.1	46	32.0	51
15	33.2	43	32.3	45	33.1	50
16	34.0	36	32.1	52	32.8	60
17	33.5	42	31.2	52	32.5	61
18	32.0	54	30.0	57	32.1	60
19	30.0	65	28.0	64	30.9	61
20	27.7	78	26.1	76	28.2	70
21	26.7	78	25.3	78	27.2	77
22	26.0	83	24.9	80	26.0	86
23	25.0	90	24.5	86	25.3	91

Climate data in the project area in 1983 (continued)

Time	10, Aug.		15, Aug.			
	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)	Temperature (°C)	Humidity (%)
0	24.0	91	24.0	91		
1	23.8	92	23.8	91		
2	23.4	92	23.6	90		
3	23.0	93	23.0	93		
4	22.9	93	23.0	93		
5	22.5	94	22.5	93		
6	22.4	94	22.2	94		
7	22.0	94	22.5	95		
8	24.0	87	25.0	72		
9	25.5	85	27.3	70		
10	27.0	68	28.4	62		
11	28.0	61	29.9	57		
12	29.1	54	30.4	54		
13	30.4	48	30.9	56		
14	30.9	45	31.8	54		
15	31.0	43	30.3	66		
16	30.1	46	30.1	67		
17	30.9	44	29.8	69		
18	30.0	44	28.7	71		
19	28.1	52	27.1	80		
20	26.5	62	26.5	79		
21	25.8	71	26.0	83		
22	25.4	77	25.5	83		
23	25.0	83	23.0	88		

Records of Temperature and Relative Humidity
in the Project Area

Station: Bahr El Baqar Village

Month/Day	Temperature (°C)			R. Humidity (%)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
4/27	27	14.5	19.7	85	42	66.5	From 4/27 to 7/20 the Station has not experienced any rainfalls.
4/28	28	16.75	24	98	52	77	
4/29	28	20	24	91	48	75.3	
4/30	30	20	24	97	40	71.8	
5/1	29	21	24.3	90	58	72	
5/2	29	21	25.3	98	58	72	
5/3	27	18.8	24.5	97	60	75	
5/4	28	21	24.8	96	56	75	
5/5	30	21	24.8	90	48	72	
5/6	27	22	24.5	90	69	79.3	
5/7	27	21	23.5	91	60	75	
5/8	30	21	24.3	92	42	73.5	
5/9	29	21	24.8	91	62	76	
5/10	37	22	30.8	91	22	63	
5/11	28	24	25.5	89	60	77.5	
5/12	30	23	25.8	91	51	72.8	
5/13	29	22	25.8	88	62	77.8	
5/14	28	22	25	98	64	78.3	
5/15	27	22	24	97	60	75.3	
5/16	31	22	26	91	43	71.3	
5/17	33	23	27	98	39	69.5	
5/18	33	23	27.5	91	30	62.8	
5/19	34	19.5	27.5	91	39	70	
5/20	33	23	28	88	40	64.5	
5/21	29	24	25.5	91	60	76.8	
5/22	29	22	25	90	59	75	
5/23	30	21	25	89	59	77.5	
5/24	32	22	25.8	93	50	73.5	
5/25	31	21	25.5	91	52	76.3	
5/26	32	22	26.5	91	40	71.8	

Bahr El Baqar Village(continued)

Month/Day	Temperature (°C)			R. Humidity (%)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
5/27	31	25	29	90	60	76.5	
5/28	30	22	25.5	91	59	77	
5/29	29	21	24.8	91	58	75.3	
5/30	30	22	25.3	98	60	77.8	
5/31	30	22	25.8	91	59	72.8	
6/1	32	22	26	95	41	72.3	
6/2	32	23	26.5	93	50	78	
6/3	28	21	23.8	91	61	75.3	
6/4	30	21	24.5	92	40	70.5	
6/5	29	21	24.3	90	52	74	
6/6	29	21	25.3	92	50	71.5	
6/7	27	22	24.5	93	60	74	
6/8	38	21	27	91	52	71	
6/9	29	21	24.5	90	43	70.8	
6/10	27	22	24.5	90	69	79.3	
6/11	27	21	23.5	91	62	75.5	
6/12	30	21	24.3	92	42	71	
6/13	29	21	24.8	91	62	76	
6/14	38	22	28.5	91	22	62.8	
6/15	27	24	25.8	89	60	76	
6/16	30	23	26	91	51	72.8	
6/17	29	22	25.8	89	62	78	
6/18	28	22	25	91	63	76.3	
6/19	27	22	24	91	60	73.8	
6/20	31	22	26	91	43	70	
6/21	33	23	27.3	98	39	69.5	
6/22	33	23	27.5	91	30	62.8	
6/23	33	23	27.3	91	39	70.3	
6/24	33	23	27.8	89	40	64.8	
6/25	29	24	25.5	91	60	77	
6/26	28	22	24.5	90	59	75.3	
6/27	30	21	25	89	60	77.8	

Bahr El Baqar Village (continued)

Month/Day	Temperature (°C)			R. Humidity (%)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
6/28	32	22	25.8	91	59	75.3	
6/29	31	21	25.5	91	52	76.3	
6/30	32	22	26.5	91	40	70.3	
7/1	31	23	26.5	90	60	77.8	
7/2	30	22	25.5	91	59	77	
7/3	30	21	25	91	58	75.3	
7/4	29	22	25	91	61	76.3	
7/5	30	22	26	91	58	72.8	
7/6	32	22	26	92	41	72	
7/7	32	23	26.5	92	50	77.8	

Records of Temperature and Relative Humidity
in the Project Area

Station: Bahr El Baqar Village

Month/Day	Temperature (°C)			R. Humidity (%)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
7/17	30.2	23.1	26.35	94	59	73.875	From 7/17 to 11/4, there are no rainfall experienced.
7/18	31	23	26	90	55	75	
7/19	29	23	25.5	90	65	76	
7/20	31	23	26	91	46	74	
7/21	33	24	27	89	52	75	
7/22	84	24	27.5	90	42	75	
7/23	31.5	25	27	92	56	77	
7/24	31	23	26	88	55	75	
7/25	33	24.50	28	91	42	75	
7/26	34.5	22.5	26	94	38	78	
7/27	32	24.5	27	92	41	71	
7/28	32	22	26	94	49	73	
7/29	32	24	27	90	38	69.5	
7/30	33	24	27	91	45	71	
8/1	33.5	23.5	27	93	37.5	70	
8/2	34	23	28	76	48	63	
8/3	32.5	25.5	28	93	59	78.5	
8/4	33	26	29	90	50	75	
8/5	33.5	24	28	92	50	75	
8/6	33.5	24	27	92	54	78	
8/7	32	25	27	93	52	76	
8/8	31	24	27	90	48	75	
8/9	31.5	23.5	27	93	72	85	
8/10	31	23	27	93	42	70	
8/11	30.5	22.9	27	92	51	73	
8/12	31	23.1	26	93	56	79	
8/13	31.5	23	26	92	54	77.5	
8/14	32.5	23.5	26	94	46	75	
8/15	30.5	23	27	93	65	78	
8/16	29	23	27	94	58	76	

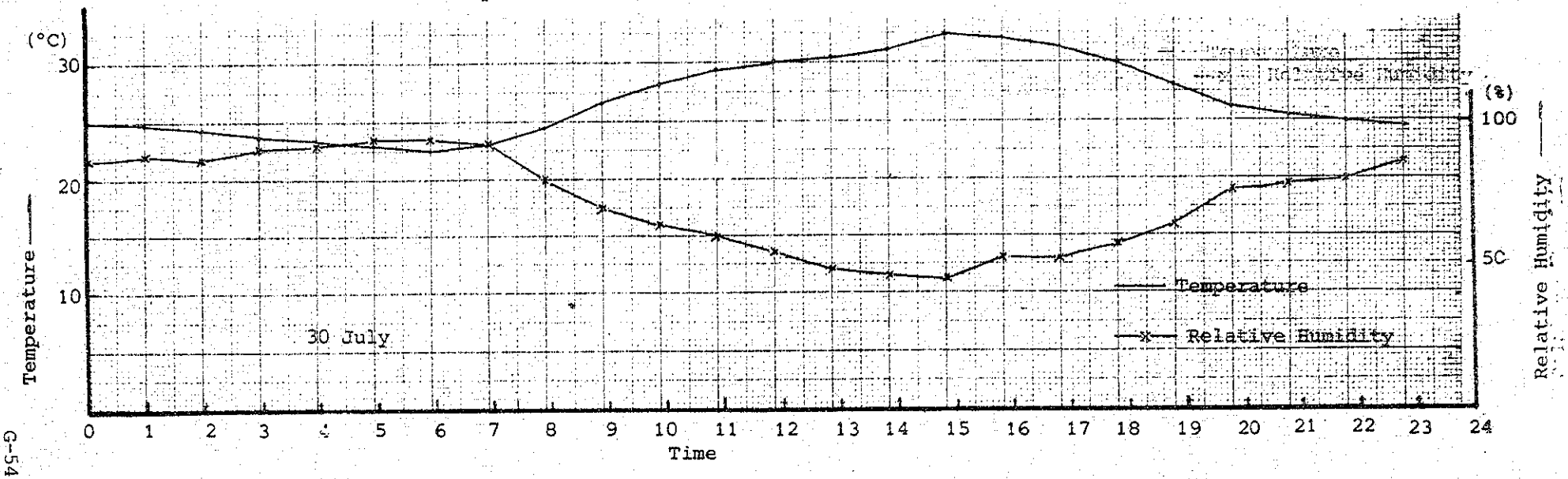
Bahr El Baqar Village : (continued)

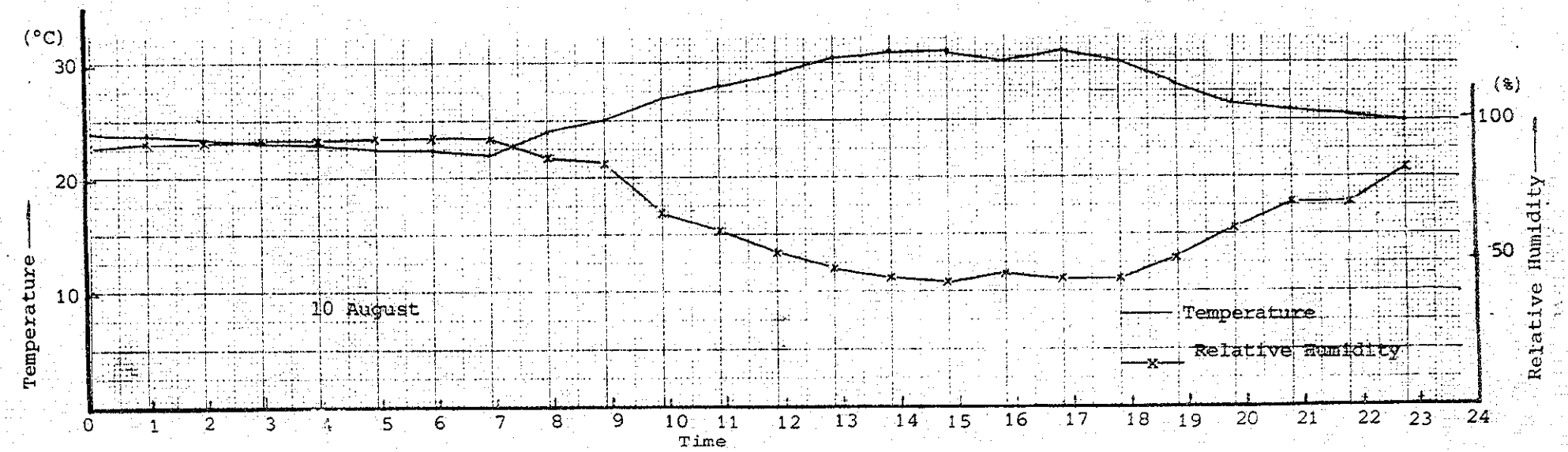
Month/Day	Temperature (°C)			Relative Humidity (%)			Remarks
	Max.	Min.	Mean	Max.	Min.	Mean	
11/5	25.0	19.1	22.1	94	60	77	
11/6	26.0	17.6	21.8	96	52	74	
11/7	24.8	18.0	21.4	98	54	76	
11/8	25.1	16.2	20.7	94	48	71	
11/9	24.9	15.1	20.0	96	47	72	
11/10	25.0	14.5	19.8	97	50	74	
11/11	24.9	16.3	20.6	92	49	71	
11/12	22.6	16.5	19.6	92	62	77	
11/13	21.5	15.0	18.3	94	58	76	
11/14	24.0	14.5	19.3	98	48	74	
11/15	26.1	15.2	20.7	96	48	73	
11/16	27.5	15.4	21.5	93	30	62	
11/17	28.0	17.0	22.5	82	34	58	
11/18	32.0	14.8	23.4	88	26	57	
11/19	29.1	16.0	22.6	96	34	65	
11/20	26.2	16.5	21.4	98	30	64	
11/21	24.3	15.6	20.0	96	52	74	
11/22	25.0	14.1	20.0	96	48	72	
11/23	25.9	15.0	20.5	97	42	69	
11/24	23.4	15.1	19.3	96	60	78	
11/25	21.8	16.5	19.2	95	60	78	
11/26	24.0	16.5	20.3	95	52	74	
11/27	25.0	15.0	20.0	96	50	73	
11/28	26.5	14.3	20.4	97	50	74	
11/29	25.1	13.7	19.4	92	44	68	
11/30	25.4	14.0	19.7	94	38	66	
12/1	24.6	14.0	19.3	96	48	72	
12/2	24.0	14.0	19.0	96	40	68	
12/3	22.5	14.0	18.3	95	58	77	
12/4	23.5	16.0	19.8	96	57	77	

G-3 : DAILY TRENDS OF TEMPERATURE &

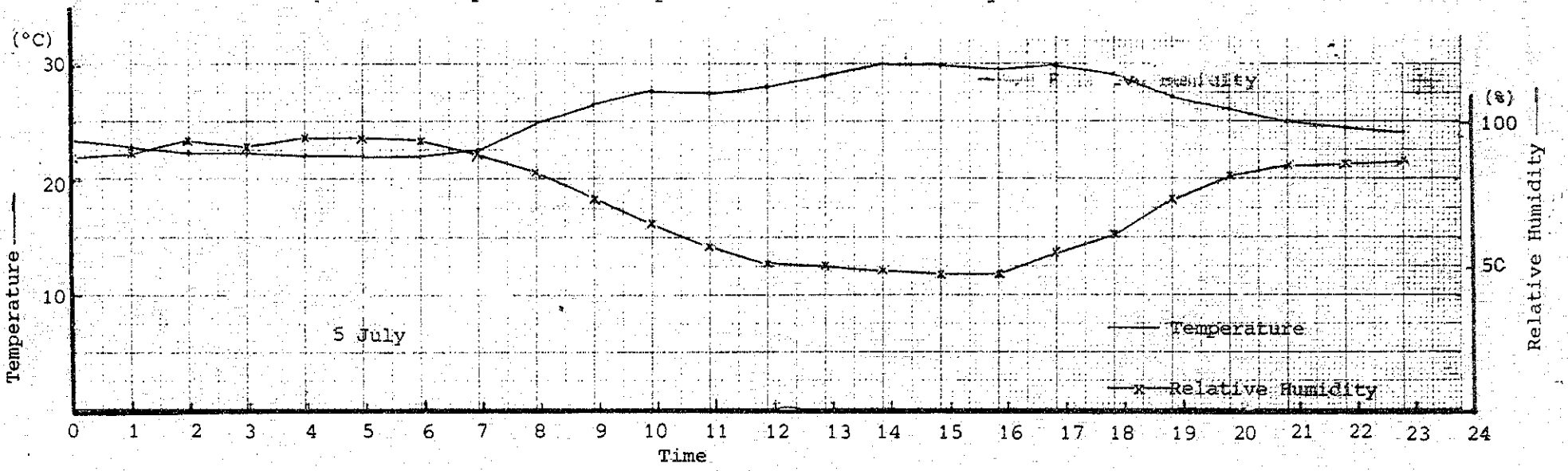
RELATIVE HUMIDITY IN THE PROJECT AREA

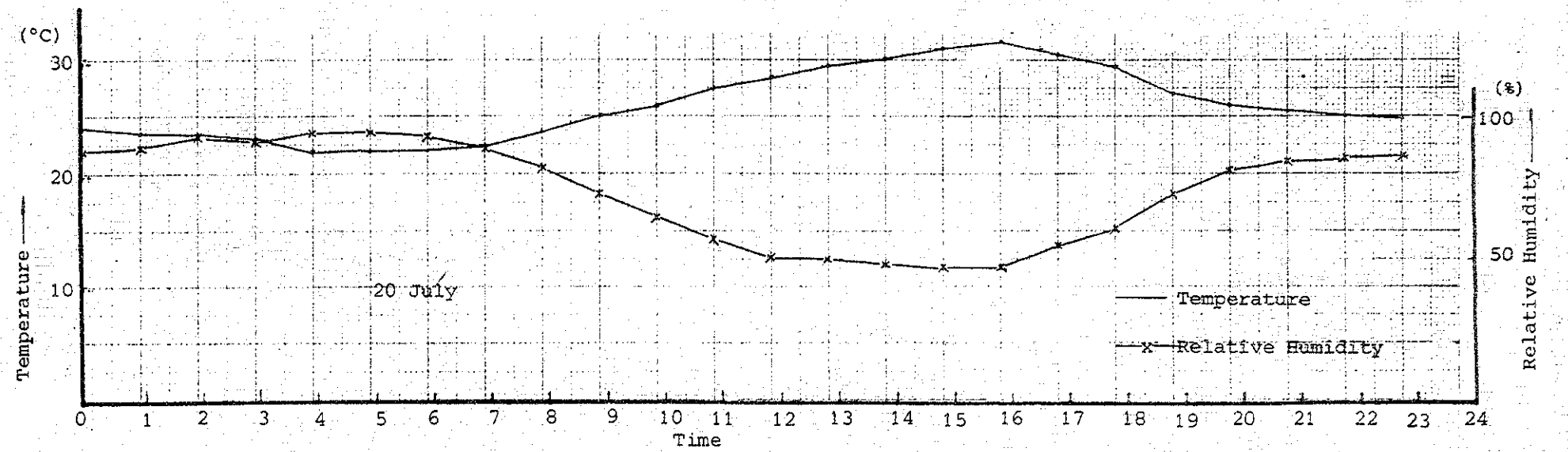
Daily trends of Temperature & Relative Humidity

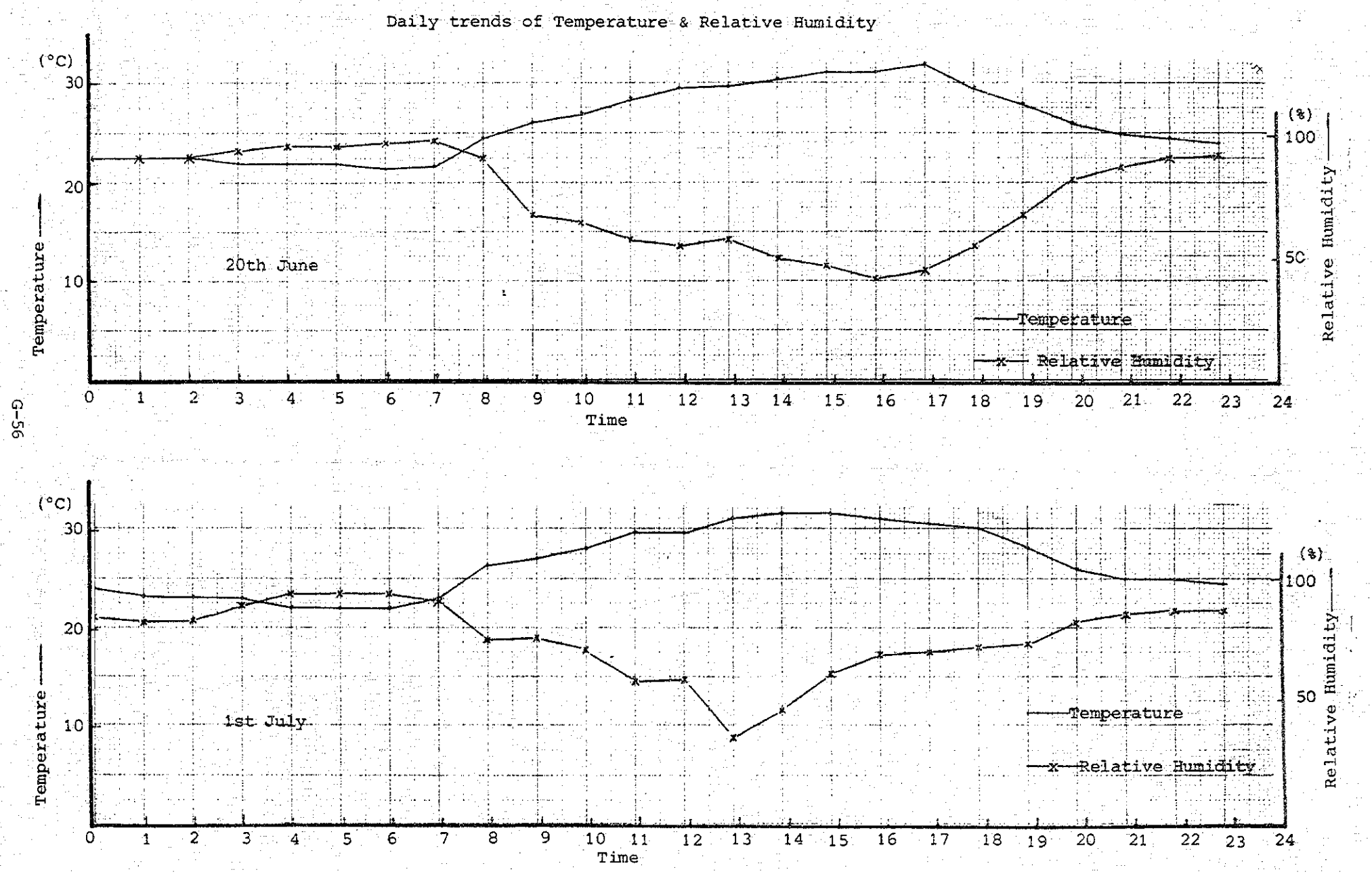


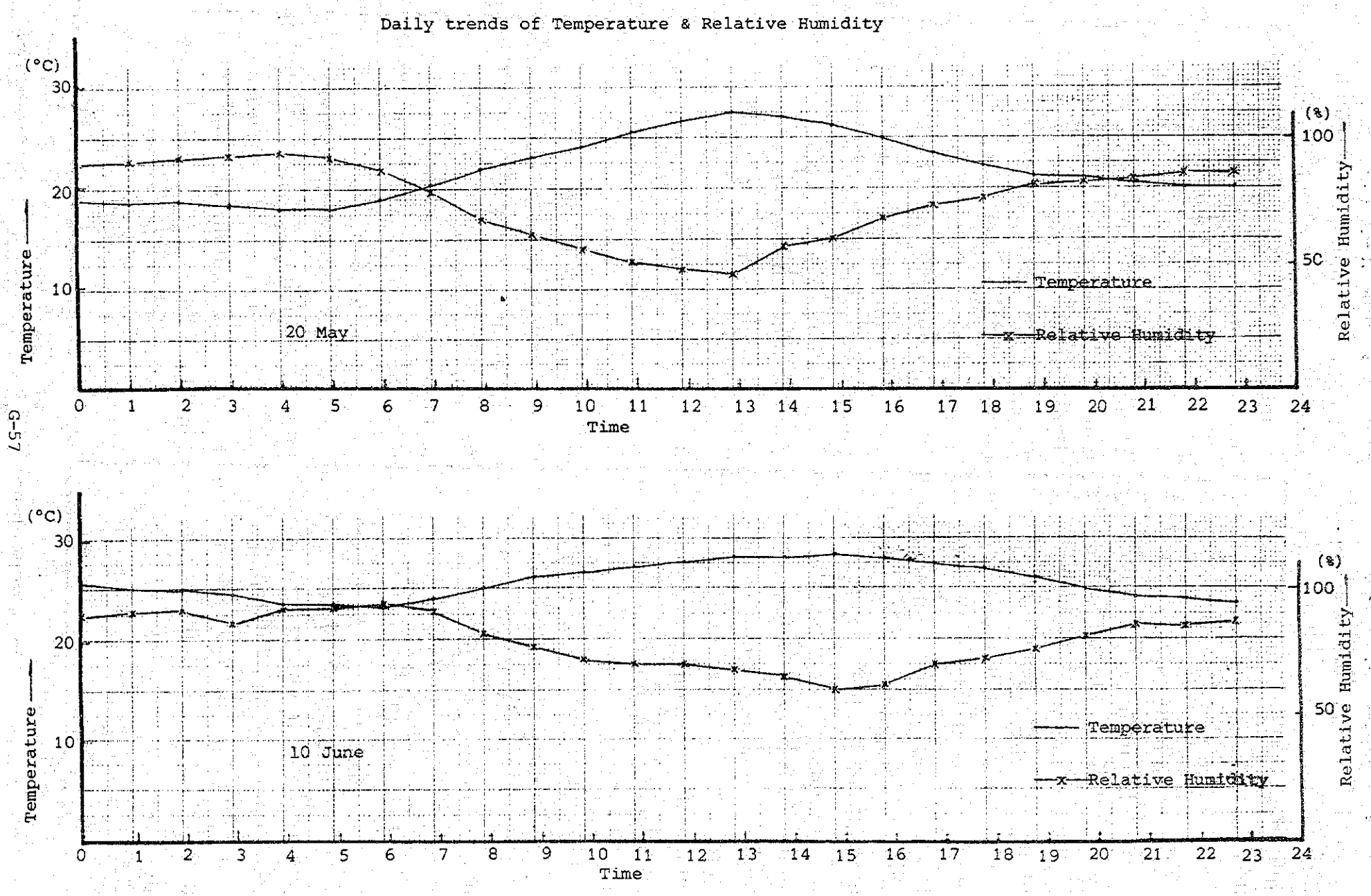


Daily trends of Temperature & Relative Humidity

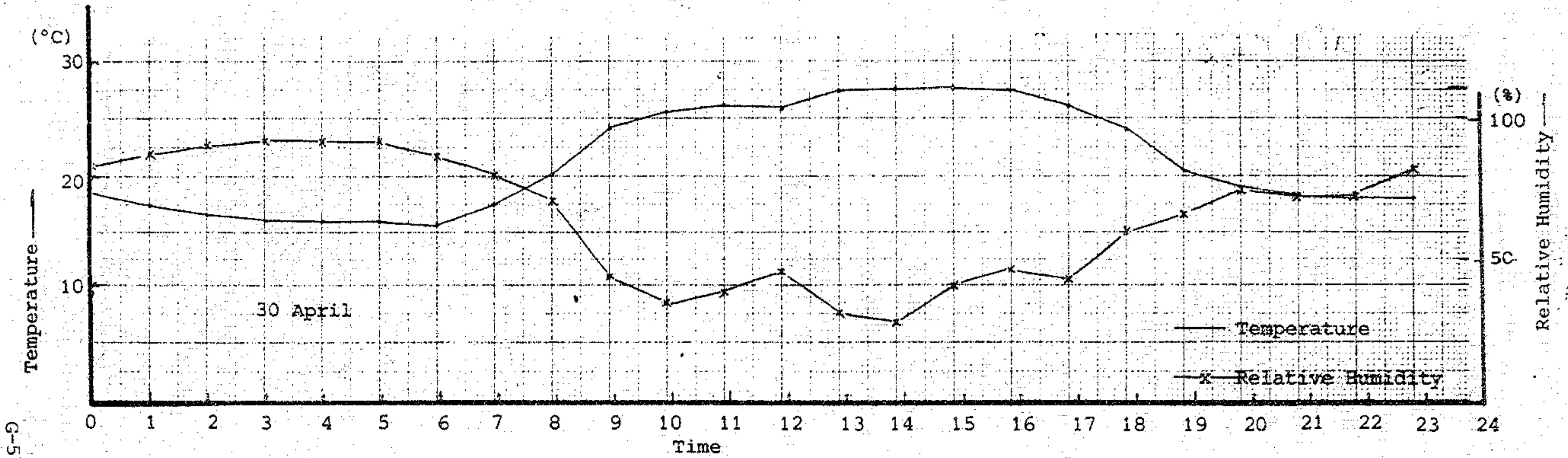


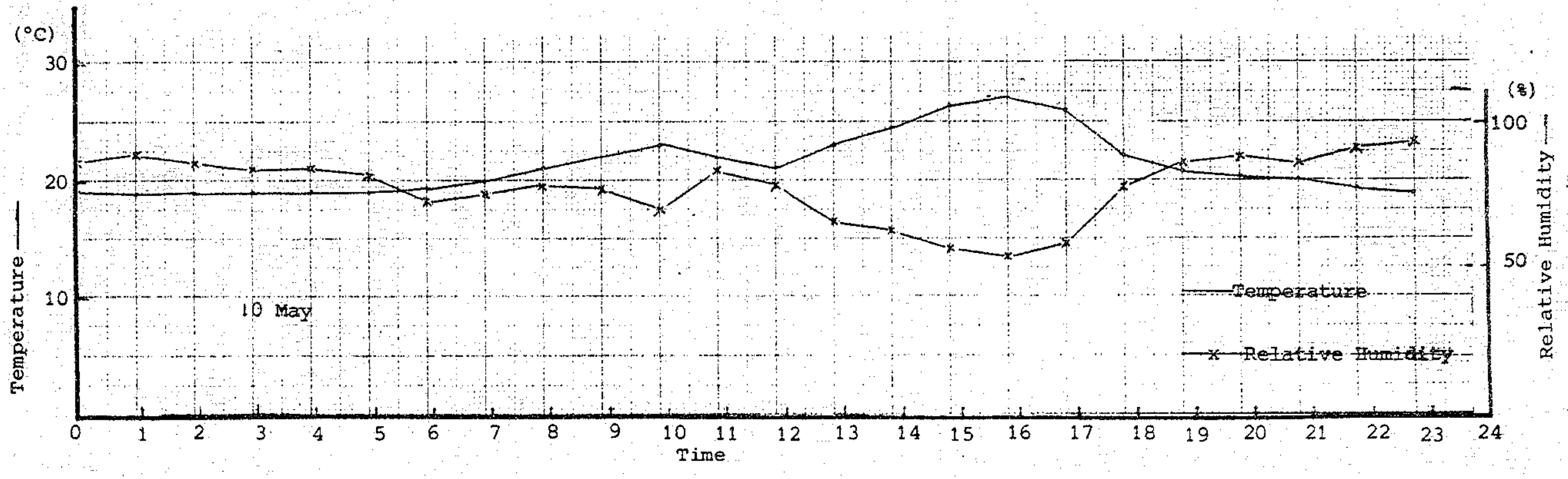



Daily trends of Temperature & Relative Humidity
(°C)
30
20
10
Temperature
20th June
(%)
100
50
Relative Humidity
Temperature
Relative Humidity
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time
(°C)
30
20
10
Temperature
1st July
(%)
100
50
Relative Humidity
Temperature
Relative Humidity
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time


Daily trends of Temperature & Relative Humidity
(°C)
30
20
10
Temperature
(%)
100
50
Relative Humidity
20 May
Temperature
Relative Humidity
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time
(°C)
30
20
10
Temperature
(%)
100
50
Relative Humidity
10 June
Temperature
Relative Humidity
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time

Daily trends of Temperature & Relative Humidity





G-4 WATER FLUCTUATION RECORDS OF HADOUS DRAIN

(3rd, July - 17th, Sept.)

Water Fluctuation Records of Hadaus Drain

Date	Time 0:00	6:00	12:00	18:00
July 3	6.9	9.7	8.5	10.6
4	6.8	9.5	8.3	11.2
5	7.5	10.2	9.5	10.8
6	7.0	9.0	7.4	12.8
7	4.8	10.8	11.4	13.4
8	8.0	10.5	10.6	11.8
9	9.0	11.4	9.8	11.0
10	7.7	9.5	8.0	9.2
11	5.8	5.0	-	-
12	-	-	-	-
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	14.9	16.5
17	15.6	17.1	14.8	17.3
18	15.5	16.0	15.0	17.3
19	15.2	16.4	15.4	16.6
20	15.2	17.0	14.0	15.0
21	12.2	15.0	14.0	15.2
22	15.1	16.0	15.2	16.0
23	14.8	16.0	16.6	18.8
24	17.0	17.1	16.8	17.8
25	17.0	15.5	15.4	17.6
26	16.8	16.3	15.3	16.5
27	16.0	17.6	17.0	17.8
28	16.4	18.2	14.9	17.0
29	19.4	20.5	21.4	22.0
30	21.0	21.2	18.0	20.3
31	19.2	20.0	18.7	19.5

Date	Time 0:00	6:00	12:00	18:00
Aug. 1	18.0	20.1	18.0	18.0
2	16.2	17.8	16.0	17.5
3	15.8	18.8	17.3	18.0
4	16.2	18.4	17.5	18.2
5	16.3	17.8	16.9	15.8
6	15.8	17.0	15.5	16.8
7	16.4	16.3	15.8	18.5
8	16.4	17.8	16.2	18.8
9	16.0	16.6	16.0	18.4
10	15.8	16.2	15.8	17.0
11	15.5	14.7	15.3	16.0
12	15.5	14.0	15.7	15.6
13	15.5	15.0	14.4	16.2
14	13.6	14.6	14.8	16.8
15	14.8	16.0	15.3	17.0
16	15.0	16.1	16.3	18.5
17	15.8	16.8	16.3	18.0
18	15.5	16.6	16.5	17.6
19	15.2	15.7	15.2	16.3
20	13.6	15.3	13.0	15.0
21	12.8	14.4	10.5	16.9
22	15.0	16.8	15.6	17.3
23	13.8	17.3	17.8	19.0
24	17.5	19.4	20.0	20.0
25	17.2	20.0	19.8	19.6
26	18.8	19.8	19.6	20.7
27	19.0	20.0	18.0	19.7
28	16.0	19.4	19.6	20.2
29	18.0	19.4	17.5	22.0
30	20.0	21.8	20.8	22.8
31	20.2	23.0	22.0	23.5

Water fluctuation records of Hadaus Drain (Continued)

Date	Time 0:00	6:00	12.00	18:00
Sept. 1	21.0	21.2	20.6	21.5
2	19.0	20.0	20.0	21.5
3	18.8	20.0	20.4	22.5
4	18.0	22.6	22.8	22.8
5	19.4	22.6	16.3	20.0
6	19.2	22.2	21.0	21.8
7	19.5	22.2	20.8	22.2
8	18.0	21.3	20.6	22.0
9	19.6	22.8	21.6	22.8
10	21.0	23.8	21.0	22.0
11	19.0	22.0	20.0	21.0
12	18.0	22.0	18.5	20.8
13	17.8	20.1	19.0	19.8
14	16.0	19.2	19.0	20.4
15	17.0	19.5	19.0	19.5
16	16.0	19.3	18.3	19.6
17	18.0	19.2	18.3	22.0
18	21.0	22.7	21.0	21.3
19	21.7	22.6	20.6	21.8
20	20.6	22.5	22.8	23.8
21	24.0	23.0	23.3	24.0
22	23.0	24.2	23.5	24.0
23	22.6	24.5	24.6	25.8
24	24.1	25.1	24.0	25.4

Date	Time 0:00	0:00	6:00	12:00	18:00
Sept. 25	22.		24.8	25.5	27.2
26	24.8		26.8	28.0	28.2
27	25.8		27.5	28.0	28.8
28	26.4		29.0	29.8	30.0
29	28.1		30.1	31.0	32.0
30	29.0		31.0	31.3	33.0
Oct. 1	29.5		32.3	29.3	27.0
2	22.6		26.4	27.6	30.9
3	26.2		29.6	29.9	32.7
4	28.0		30.0	30.2	32.0
5	28.4		31.8	31.4	32.1
6	27.2		31.0	32.0	34.6
7	31.9		34.0	33.8	34.4
8	31.0		33.9	33.8	34.3
9	30.3		32.6	33.5	34.2
10	29.0		31.9	33.8	35.2
11	29.0		33.0	34.0	34.3
12	26.2		31.9	33.4	33.0
13	29.0		33.2	34.2	34.4
14					
15					
16					

Water Fluctuation Records in Lake Manzala
(at Southern Shore of Kom Ibn Salam)

Date	Time 0:00	6:00	12:00	18:00	Date	Time 0:00	6:00	12:00	18:00
July 17	4.0	3.8	2.8	4.0	Aug. 17	6.5	6.0	4.5	6.2
18	5.0	4.0	3.0	4.0	18	7.2	5.5	4.9	7.0
19	4.8	4.0	3.0	4.0	19	7.4	6.3	4.8	6.6
20	4.5	4.0	3.0	3.0	20	7.0	5.4	4.8	6.8
21	3.1	3.2	2.8	2.5	21	6.5	5.0	5.0	6.8
22	4.8	4.0	3.1	3.4	22	6.7	6.0	5.0	6.8
23	5.0	5.0	4.2	6.0	23	6.7	5.8	5.2	7.0
24	6.0	5.0	4.0	5.0	24	8.3	7.0	6.2	7.0
25	6.0	5.4	4.8	5.1	25	7.7	7.7	6.2	7.0
26	6.3	5.4	4.1	4.7	26	7.9	7.0	6.1	7.2
27	5.5	5.1	5.3	7.5	27	8.1	7.6	6.2	8.1
28	7.5	5.5	4.9	7.6	28	7.8	6.0	6.2	8.2
29	8.7	9.0	7.3	8.0	29	8.5	7.0	6.5	7.5
30	9.0	8.9	7.3	7.2	30	8.2	8.0	7.3	8.4
31	7.4	6.0	6.0	6.0	31	9.5	8.6	8.3	9.2
Aug. 1	5.6	5.0	4.5	5.0	Sept. 1	8.0	7.0	7.0	7.6
2	5.2	5.0	4.8	5.0	2	7.6	7.0	5.7	6.5
3	6.1	4.8	5.0	6.4	3	6.7	5.7	5.5	6.0
4	7.2	6.0	5.0	6.5	4	6.8	6.8	6.3	6.7
5	6.8	5.8	5.1	6.0	5	6.8	6.8	6.3	6.7
6	6.4	6.0	5.7	5.8	6	7.3	6.6	6.0	7.0
7	7.2	6.0	5.0	7.6	7	7.0	6.5	6.0	7.7
8	8.0	7.1	6.0	7.4	8	7.8	6.4	6.0	8.0
9	8.0	6.5	6.0	8.5	9	8.0	6.7	5.8	7.7
10	8.5	7.0	6.5	8.0	10	7.9	5.8	6.3	7.0
11	7.8	6.5	6.0	6.7	11	7.1	6.7	6.0	7.0
12	7.6	6.1	5.3	6.1	12	7.0	6.5	5.8	7.0
13	6.8	5.9	4.9	5.0	13	8.0	6.3	5.2	6.3
14	5.3	4.5	4.2	5.0	14	6.3	5.5	5.2	6.7
15	6.1	5.0	4.7	5.0	15	7.0	5.8	5.1	6.1
16	5.4	5.3	4.8	6.0	16	6.9	6.4	5.2	7.8
					17	8.0			

Tidal Fluctuation of Mediterranean Sea

Water Level Records at Port Said

Monthly mean water level

Month	Water Level
January	-0.03
February	-0.05
March	-0.09
April	-0.09
May	-0.07
June	-0.01
July	+0.07
August	+0.10
September	+0.08
October	+0.04
November	+0.04
December	+0.03

Highest high water level	+0.05
Lowest law water level	-0.65
Average annual high water level	+0.44
Average annual low water level	+0.04

*The elevations are referenced to the National (Alexandria) Datum.

Source: Suez Canal Authority Records

G-5 RESULTS OF ELECTRICAL CONDUCTIVITY TESTS IN LAKE MANZALA

Results of Electrical Conductivity Tests in Lake Manzala

Date	Point No.	E.C. (ms/cm)	Temp. (°C)	ppm
5/23	Baqar (Water) (1)	1,200	28	540
"	" (Water) (2)	1,200	32	530
"	No. 1	1,500	30	680
5/24	S-1	1,600	26	780
5/25	Ramsis (Water)	1,200	27	580
"	" (Canal)	3,200	28	1,500
"	" (Drain)	4,200	28	2,100
6/5	M-9	5,300	30	2,500
6/6	S-5	>10,000	29	-
"	M-11	2,300	30	1,100
"	M-12	2,500	31	1,150
6/7	M-14	5,200	29	2,600
"	M-15	3,200	30	1,500
6/8	M-17	2,300	29	1,100
"	M-18	2,000	29	950
"	M-19	2,400	30	1,000
6/9	M-20	2,300	29	1,000
6/11	M-24	8,900	26	4,700
"	M-25	>10,000	29	-
"	M-26	>10,000	29	-
6/12	M-27	6,600	25	3,600
"	M-28	>10,000	27	-
"	M-29	>10,000	29	-
6/13	S-8	>10,000	29	-
"	M-30	>10,000	27	-
"	S-9	>10,000	31	-
"	M-31	>10,000	30	-
6/14	S-10	>10,000	26	-
"	M-32	>10,000	26	-
"	M-33	>10,000	31	-

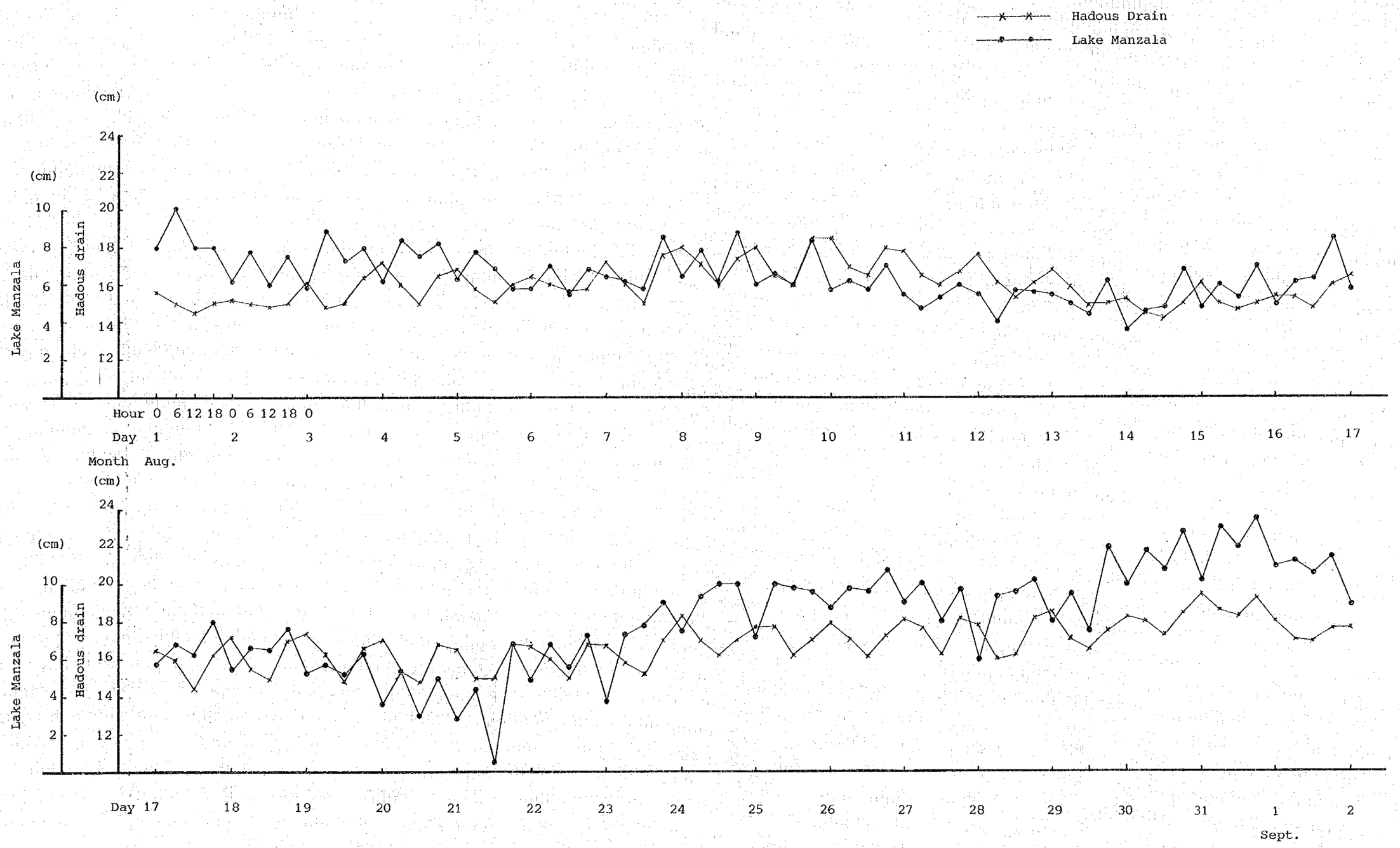
Results of electrical conductivity tests in Lake Manzala (continued)

Date	Point No.	E.C. (ms/cm)	Temp. (°C)	ppm
6/19	Hadous (water)	2/000	30	930
"	Field canal (near Matariya)	3,200	34	1,400
"	Salam (Water)	3,400	29	1,700
"	Paddy Field (Water)	3,600	30	1.800
"	Paddy Field Canal	2,700	32	1,200
6/22	M-34	2,400	30	1,130
"	M-35	2,500	30	1,170
"	M-36	2,600	30	1,200
"	M-37	2,600	30	1,200
"	M-38	2,500	31	1,170
"	M-39	2,650	32	1,250
"	M-40	2,600	31	1,200
6/23	M-41	2,600	31	1,200
"	M-42	2,700	31	1,270
"	M-43	2,500	32	1,170
"	M-44	2,700	32	1,260
"	M-45	2,000	32	940
"	M-46	2,050	31	950
"	M-47	2,100	31	970
6/26	M-48	2,100	25	1,070
"	M-49	2,000	28	960
"	M-50	3,500	27	1,680
"	M-51	4,400	28	2,100
"	M-52	5,800	29	2,800
"	M-53	4,000	29	1,900
6/27	M-54	2,400	28	1,170
"	M-55	2,400	29	1,170
"	M-56	2,700	29	1,270
"	M-57	2,700	29	1,270
"	M-58	4,000	29	1,900
"	M-59	3,000	29	1,400
"	M-60	2,800	28	1,320
"	M-61	3,300	31	1,600

Results of electrical conductivity tests in Lake Manzala (continued)

Date	Point No.	E.C. (ms/cm)	Temp. (°C)	ppm
7/2	M-68	2,400	29	1,120
"	M-69	2,300	31	1,080
"	M-70	2,500	30	1,170
"	M-71	3,200	30	1,520
"	M-72	3,300	31	1,580
"	M-73	3,200	30	1,520
"	M-74	3,400	30	1,620
"	M-75	3,400	29	1,620
"	M-76	3,600	29	1,720
7/3	M-77	1,000	27	480
"	M-78	1,000	28	480
"	M-83	8,800	30	4,400
"	M-84	9,600	30	4,800
"	M-85	9,200	30	4,600
"	M-86	7,800	30	3,900
7/4	M-87	>10,000	30	-
"	M-88	9,500	30	4,700
7/5	M-91	3,200	33	1,500
"	M-93	>10,000	30	-
"	M-94	>10,000	30	-
"	M-96	>10,000	30	-
"	M-98	7,800	31	3,900
7/7	M-99	9,000	31	4,500

G-6 Water Fluctuation in Lake Manzala & Hadous Drain (Aug. 1983)



G-7 Electrical Conductivity of the Lake Water