Table A-16 ECONOMIC INDICATORS IN THE THIRD PLAN (1986-1990)
(JD Million at 1985 Prices)

Item	Third Plan Period						Sum 1986-1990	Average Annual Growth Rate 1986-1990 %
	1985	1986	1987	1988	1989	1990		
1. Gross Domestic Product (at Factor Cost)	1,359	1,399	1,469	1,550	1,640	1,739	7,797	5.1
2. Net Indirect Taxes	222	269	287	302	329	344	1,531	9.2
3. Gross Domestic Product at Market Prices (1+2)	1,581	1,668	1,756	1,852	1,969	2,083	9,328	5.7
4. Imports of Goods and Services	1,442	1,433	1,462	1,517	1,616	1,649	7,677	2.7
5. Total Resources (3+4)	3,023	3,101	3,218	3,369	3,585	3,732	17,005	4.3
6. Consumption	1,759	1,825	1,885	1,936	1,994	2,058	9,698	3.2
a) Private	1,353	1,407	1,455	1,492	1,537	1,587	7,478	3.2
b) Public	406	418	430	444	457	471	2,220	3.0
7. Investment	485	474	470	518	617	627	2,706	5.3
a) Gross Fixed Capital Formation	485	454	467	517	607	617	2,662	4.9
b) Change in Stocks	-	20	3	1	10	10	44	-
8. Exports of Goods and Services(*)	779	802	863	915	974	1,047	4,601	6.1
9. Total Uses (6+7+8)	3,023	3,101	3,218	3,369	3,585	3,732	17,005	4.3
10. Ratio to Domestic Product at Market Prices (%)								
a) Consumption	111	109	107	105	101	99		
b) Investment	31	28	27	28	31	30		
c) Imports of Goods and Services	91	86	83	82	82	79		

(*) Excluding Income from Factors of Production.
Source : Five Year Plan for Economic and Social Development 1986-1990, Ministry of Planning, Jordan.

Table A-17(1) ADMINISTRATION DIVISIONS ACCORDING TO THE 1979 CENSUS

Code	Locality	Code	Locality	Code	Locality
1	Amman Governorate	23	Mafraq District	41102	Ayy Nahia
		231	Mafraq Sub-dist.		
11	Amman District	23101	Mafraq Nahia	412	Qasr Sub-dist.
111	Amman Sub-dist.	23102	Bal'ama Nahia	41201	Qasr Nahia
11101	Ammen Nahia	23103	Sama Serhan Nahia		
11102	Na'oor Nahia			413	Mazar S. Sub-dist.
11103	Sahab Nahia	232	Sabha Sub-dist.	41301	Mazar Nahia
11104	Muaqqar Nahia	23201	Sabha Nahia		
11105	Jizah Nahia			414	Safi Sub-dist.
		233	H.4 Sub-dist.	41401	Safi Nahia
112	Wadi Essier Sub-dist.	23301	H.4 Nahia	40402	Mazra'ah Nahia
11201	Wadi Essier Nahia				
		24	Ramtha District	42	Tafilah District
12	Zarqa District	241	Ramtha Sub-dist.	421	Tafilah Sub-dist.
121	Zarqa Sub-dist.	24101	Ramtha Nahia	42101	Tafilah Nahia
12101	Zarqa Nahia			42102	Bsaira Nahia
12102	Azraq Nahia	25	Ajloaun District		
12103	Bierain Nahia	251	Ajloaun Sub-dist.	5	Ma'an Governorate
		25101	Ajloaun Nahia		
13	Madaba District			51	Ma'an District
131	Madaba Sub-dist.	26	Aghwar N. District	511	Ma'an Sub-dist.
13101	Madaba Nania	261	Aghwar Sub-dist.	51101	Ma'an Nahia
13102	Dieban Nahia	26101	Aghwar Nahia		
				512	Shoebak Sub-dist.
2	Irbid Governorate	3	Balqa Governorate	51201	Shoabak Nahia
21	Irbid District	31	Balqa District	513	Wadi Mousa Sub-dist.
211	Irbid Sub-dist.	311	Balqa Sub-dist.	51301	Wadi Mousa Nahia
21101	Irbid Nahia	31101	Balqa Nahia		
21102	Tayybeh Nahia	31102	Arbhah Nahia	52	Aqaba District
21103	Mazar N. Nahia	31103	Zayy Nahia	521	Aqaba Sub-dist.
				52101	Aqaba Nahia
212	Karak Sub-dist.	312	Dair Alla Sub-dist.	52102	Quairah Nahia
21201	Karak Nahia	31201	Dair Alla Nahia	52103	Wadi Araba Nahia
213	Bani Kenanah	313	Shoonah S. Sub-dist.		
	Sub-dist.	31301	Shoonah Nahia		
21301	Bani Kenanah Nahia				
		4	Karak Governorate		
22	Jarash District				
221	Jarash Sub-dist.	41	Karak District		
22101	Jarash Nahia	411	Karak Sub-dist.		
		41101	Karak Nahia		

Table A-17(2) ADMINISTRATION DIVISIONS AFTER 1985

1. Amman Governorate
   - Amman City and Localities
   - Wadi Essier Sub-district
   - Sahab Sub-district
   - Muaqqar Sub-district
   - Jizah Sub-district
   - Na'oor Sub-district
   - Madaba District
     - Madaba City and Localities
     - Dieban Sub-district

2. Zarqa Governorate
   - Zarqa City and Localities
   - Azraq Nahia
   - Bierain Nahia

3. Irbid Governorate
   - Irbid City and Localities
   - Wastiyyah Nahia
   - Mazar S. Sub-district
   - Tayybah Sub-district
   - Koorah District
   - Bani Kananah District
   - Jarash District
   - Ramtha District
   - Ajloan District
     - Ajloan Town and Localities
     - Kufranjah Nahia
   - Aghwar S. District

4. Mafraq Governorate
   - Mafraq City and Localities
   - Bal'ama Nahia
   - Sama Serhan Nahia
   - Rwaished Sub-district

5. Balqa Governorate
   - Salt City and Localities
   - Ardhah Nahia
   - Zayy Nahia
   - Dair Alla District
   - Shoonad J. District

6. Karak Governorate
   - Karak City and Localities
   - Ayy Sub-district
   - Safi Sub-district
   - Ghor Safi and Localities
   - Ghor Mazra'ah Nahia
   - Mazar J. District
   - Qasr District
     - Qasr Town and Localities
     - Faqqo'e Nahia

7. Tafielah Governorate
   - Tafielah City and Localities
   - Masa Nahia
   - Bsaira Sub-district

8. Ma'an Governorate
   - Ma'an City and Localities
   - Husseiniyyah Nahia
   - Shoabak Sub-district
   - Wadi Moosa Sub-district
     - Wadi Moosa Town and Localities
     - Iel Nahia
   - Aqaba District
     - Aqaba City and Localities
     - Wadi Araba Nahia
     - Quairah Sub-district

Source : Statistical Yearbook 1985, Department of Statistics, Jordan.

Table A-18 NUMBER OF LOCALITIES IN STUDY AREA AND JORDAN BASED ON THE 1979 CENSUS

Governorate	Greater Amman Area (1)					Wadi Mujib Basin (2)					Other Area than (1) and (2) in Jordan (3)					Grand Total
	Special City	Over 10,000	3,000 to 10,000	below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	below 3,000	Total	
Amman	1*	6	6	152	165	-	-	1	76	77	-	-	-	8	8	250
Zarqa	2**	1	2	10	15	-	-	-	-	-	-	-	1	27	28	43
Irbid	-	-	-	5	5	-	-	-	-	-	1***	1	45	244	271	276
Mafraq	-	-	-	2	2	-	-	-	-	-	-	1	-	120	121	123
Balqa	-	2	3	56	61	-	-	-	-	-	-	-	3	17	20	81
Karak	-	-	-	-	-	-	-	1	78	79	-	1	2	31	34	113
Tafielah	-	-	-	-	-	-	-	-	-	-	-	1	1	38	40	40
Ma'an	-	-	-	-	-	-	-	-	-	-	-	2	1	89	92	92
Total	3	9	11	225	248	-	-	2	154	156	1	6	53	554	614	1,018

Note : * Amman city
** Zarka and Ruseifa cities
*** Irbid city

Table A-19 POPULATION AND AVERAGE ANNUAL RATE OF POPULATION GROWTH BY GOVERNORATE IN JORDAN

Governorate	Population		Average Annual Rate of Population Growth 1961-1979 (%)
	1961*	1979**	
Amman	433,618	1,173,170	5.69
Irbid	273,976	611,280	4.56
Balqa	79,057	147,827	3.54
Karak	67,211	125,959	3.55
Ma'an	46,914	74,761	2.62
Total in Jordan (East Bank)	900,776	2,132,997	4.91

Sources; * Results of the First Census of Population and Housing on Nov. 18, 1961.
** Results of the Housing and Population Census on Nov. 10, 1979.

Table A-20 POPULATION IN THE STUDY AREA BY GOVERNORATE (BASED ON THE 1979 CENSUS)

Unit : Thousand

Governorate*	Study Area			Outside Study Area	Grand Total
	Greater Amman Area	Mujib Basin	Total		
Amman	842	22	864	3	867
Zarqa	290	-	290	16	306
Irbid	3	-	3	535	538
Mafraq	1	-	1	72	73
Balqa	117	-	117	31	148
Karak	-	47	47	42	89
Tafielah	-	-	-	37	37
Ma'an	-	-	-	75	75
Total	1,253	69	1,322	811	2,133

* New organization of governorate

Table A-21 POPULATION IN THE STUDY AREA BY LOCALITY GROUP
(BASED ON THE 1979 CENSUS)

Unit: Thousand

Locality	Study Area			Outside Study Area	Grand Total
	Greater Amman Area	Mujib Basin	Total		
Special Cities	881*	-	881	113**	994
Cities (over 10,000 pop.)	213	-	213	114	327
Towns (3,000 to 10,000 pop.)	50	8	58	271	329
Small communities (below 3,000 pop.)	109	61	170	313	483
Total	1,253	69	1,322	811	2,133

Note: * Three cities of Amman, Zarqa and Ruseifa.
** Irbid.

Table A-22(1/4) POPULATION IN THE STUDY AREA BY NAHIA
(BASED ON THE 1979 CENSUS)

1979 Code	Greater Amman Area (1)					Wadi Mujib Basin (2)					Other Area than (1) and (2) in Jordan (3)					Grand Total
	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	
1	880,464	137,044	38,163	76,981	1,132,652	-	-	3,759	17,810	21,569	-	-	4,739	14,210	18,949	1,173,170
11	617,327	97,451	29,715	54,650	799,143	-	-	3,759	5,721	9,480	-	-	-	-	-	808,623
111	617,327*	73,309	29,715	39,798	760,149	-	-	3,759	5,721	9,480	-	-	-	-	-	769,629
11101	617,327	61,462	24,302	15,501	718,592	-	-	-	-	-	-	-	-	-	-	718,592
11102	-	-	5,413	6,511	11,924	-	-	-	-	-	-	-	-	-	-	11,924
11103	-	11,847	-	4,219	16,066	-	-	-	-	-	-	-	-	-	-	16,066
11104	-	-	-	9,113	9,113	-	-	-	-	-	-	-	-	-	-	9,113
11105	-	-	-	4,454	4,454	-	-	3,759	5,721	9,480	-	-	-	-	-	13,934
112	-	24,142	-	14,852	38,994	-	-	-	-	-	-	-	-	-	-	38,994
11201	-	24,142	-	14,852	38,994	-	-	-	-	-	-	-	-	-	-	38,994
12	263,137	11,655	8,448	7,330	290,570	-	-	-	-	-	-	-	4,739	10,824	15,563	306,133
121	263,137	11,655	8,448	7,330	290,570	-	-	-	-	-	-	-	4,739	10,824	15,563	306,133
12101	263,137**	11,655	8,448	7,330	290,570	-	-	-	-	-	-	-	4,739	1,236	5,975	296,545
12102	-	-	-	-	-	-	-	-	-	-	-	-	-	5,648	5,648	5,648
12103	-	-	-	-	-	-	-	-	-	-	-	-	-	3,940	3,940	3,940
13	-	27,938	-	15,001	42,939	-	-	-	12,089	12,089	-	-	-	3,386	3,386	58,414
131	-	27,938	-	15,001	42,939	-	-	-	12,089	12,089	-	-	-	3,386	3,386	58,414
13101	-	27,938	-	15,001	42,939	-	-	-	-	-	-	-	-	2,770	2,770	45,709
13102	-	-	-	-	-	-	-	-	12,089	12,089	-	-	-	616	616	12,705

Note: * Amman Nahia
** Zarka and Ruseifa Nahias

Table A-22(2/4) POPULATION IN THE STUDY AREA BY NAHIA
(BASED ON THE 1979 CENSUS)

1979 Code	Greater Amman Area (1)					Wadi Mujib Basin (2)					Other Area than (1) and (2) in Jordan (3)					Grand Total
	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	
2	-	-	-	4,089	4,089	-	-	-	-	-	113,424	48,571	236,587	208,609	607,191	611,280
21	-	-	-	-	-	-	-	-	-	-	113,424	-	122,514	88,601	324,539	324,539
211	-	-	-	-	-	-	-	-	-	-	113,424	-	91,442	49,866	254,732	254,732
21101	-	-	-	-	-	-	-	-	-	-	113,424***	-	68,320	38,545	220,289	220,289
21102	-	-	-	-	-	-	-	-	-	-	-	-	9,952	3,883	13,835	13,835
21103	-	-	-	-	-	-	-	-	-	-	-	-	13,170	7,438	20,608	20,608
212	-	-	-	-	-	-	-	-	-	-	-	-	21,098	19,160	40,258	40,258
21201	-	-	-	-	-	-	-	-	-	-	-	-	21,098	19,160	40,258	40,258
213	-	-	-	-	-	-	-	-	-	-	-	-	9,974	19,575	29,549	29,549
21301	-	-	-	-	-	-	-	-	-	-	-	-	9,974	19,575	29,549	29,549
22	-	-	-	3,472	3,472	-	-	-	-	-	-	-	37,943	25,490	63,433	66,905
221	-	-	-	3,472	3,472	-	-	-	-	-	-	-	37,943	25,490	63,433	66,905
22101	-	-	-	3,472	3,472	-	-	-	-	-	-	-	37,943	25,490	63,433	66,905
23	-	-	-	617	617	-	-	-	-	-	-	21,351	-	51,209	72,560	73,177
231	-	-	-	617	617	-	-	-	-	-	-	21,351	-	37,489	58,840	59,457
23101	-	-	-	-	-	-	-	-	-	-	-	21,351	-	25,336	46,687	46,687
23102	-	-	-	617	617	-	-	-	-	-	-	-	-	4,541	4,541	5,158
23103	-	-	-	-	-	-	-	-	-	-	-	-	-	7,612	7,612	7,612
232	-	-	-	-	-	-	-	-	-	-	-	-	-	10,356	10,356	10,356
23201	-	-	-	-	-	-	-	-	-	-	-	-	-	10,356	10,356	10,356
233	-	-	-	-	-	-	-	-	-	-	-	-	-	3,364	3,364	3,364
23301	-	-	-	-	-	-	-	-	-	-	-	-	-	3,364	3,364	3,364
24	-	-	-	-	-	-	-	-	-	-	-	27,220	11,209	9,553	47,982	47,982
241	-	-	-	-	-	-	-	-	-	-	-	27,220	11,209	9,553	47,982	47,982
24101	-	-	-	-	-	-	-	-	-	-	-	27,220	11,209	9,553	47,982	47,982
25	-	-	-	-	-	-	-	-	-	-	-	-	37,262	17,399	54,661	54,661
251	-	-	-	-	-	-	-	-	-	-	-	-	37,262	17,399	54,661	54,661
25101	-	-	-	-	-	-	-	-	-	-	-	-	37,262	17,399	54,661	54,661
26	-	-	-	-	-	-	-	-	-	-	-	-	27,669	16,357	44,016	44,016
261	-	-	-	-	-	-	-	-	-	-	-	-	27,669	16,357	44,016	44,016
26101	-	-	-	-	-	-	-	-	-	-	-	-	27,669	16,357	44,016	44,016

Note: *** Irbid Nahia

Table A-22(3/4) POPULATION IN THE STUDY AREA BY NAHIA
(BASED ON THE 1979 CENSUS)

1979 Code	Greater Amman Area (1)					Wadi Mujib Basin (2)					Other Area than (1) and (2) in Jordan (3)					Grand Total
	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	
3	-	76,355	12,237	28,323	116,915	-	-	-	-	-	-	-	10,218	20,694	30,912	147,827
31	-	76,355	12,237	28,323	116,915	-	-	-	-	-	-	-	-	-	-	116,915
311	-	76,355	12,237	20,522	109,114	-	-	-	-	-	-	-	-	-	-	109,114
31101	-	76,355	12,237	13,509	102,101	-	-	-	-	-	-	-	-	-	-	102,101
31102	-	-	-	3,618	3,618	-	-	-	-	-	-	-	-	-	-	3,618
31103	-	-	-	3,395	3,395	-	-	-	-	-	-	-	-	-	-	3,395
312	-	-	-	-	-	-	-	-	-	-	-	-	3,777	17,287	21,064	21,064
31201	-	-	-	-	-	-	-	-	-	-	-	-	3,777	17,287	21,064	21,064
313	-	-	-	7,801	7,801	-	-	-	-	-	-	-	6,441	3,407	9,848	17,649
31301	-	-	-	7,801	7,801	-	-	-	-	-	-	-	6,441	3,407	9,848	17,649
4	-	-	-	-	-	-	-	4,143	42,765	46,908	-	24,404	13,915	40,734	79,051	125,959
41	-	-	-	-	-	-	-	4,143	42,765	46,908	-	11,926	10,602	24,641	47,169	94,077
411	-	-	-	-	-	-	-	-	14,023	14,023	-	11,926	4,432	12,215	28,573	42,569
41101	-	-	-	-	-	-	-	-	14,023	14,023	-	11,926	-	7,499	19,425	33,448
41102	-	-	-	-	-	-	-	-	-	-	-	-	4,432	4,716	9,148	9,148
412	-	-	-	-	-	-	-	-	14,177	14,177	-	-	-	1,456	1,456	15,633
41201	-	-	-	-	-	-	-	-	14,177	14,177	-	-	-	1,456	1,456	15,633
413	-	-	-	-	-	-	-	4,143	14,565	18,708	-	-	-	3,993	3,993	22,701
41301	-	-	-	-	-	-	-	4,143	14,565	18,708	-	-	-	3,993	3,993	22,701
414	-	-	-	-	-	-	-	-	-	-	-	-	6,170	6,977	13,147	13,147
41401	-	-	-	-	-	-	-	-	-	-	-	-	6,170	1,774	7,944	7,944
41402	-	-	-	-	-	-	-	-	-	-	-	-	-	5,203	5,203	5,203
42	-	-	-	-	-	-	-	-	-	-	-	12,478	3,313	16,091	31,882	31,882
421	-	-	-	-	-	-	-	-	-	-	-	12,478	3,313	16,091	31,882	31,882
42101	-	-	-	-	-	-	-	-	-	-	-	12,478	3,313	8,801	24,592	24,592
42102	-	-	-	-	-	-	-	-	-	-	-	-	-	7,290	7,290	7,290

Table A-22(4/4) POPULATION IN THE STUDY AREA BY NAHIA
(BASED ON THE 1979 CENSUS)

1979 Code	Greater Amman Area (1)					Wadi Mujib Basin (2)					Other Area than (1) and (2) in Jordan (3)					Grand Total
	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	Special City	Over 10,000	3,000 to 10,000	Below 3,000	Total	
5	-	-	-	-	-	-	-	-	-	-	-	41,046	5,416	28,299	74,761	74,761
51	-	-	-	-	-	-	-	-	-	-	-	14,124	5,416	19,587	39,127	39,127
511	-	-	-	-	-	-	-	-	-	-	-	14,124	-	6,147	20,271	20,271
51101	-	-	-	-	-	-	-	-	-	-	-	14,124	-	6,147	20,271	20,271
512	-	-	-	-	-	-	-	-	-	-	-	-	-	7,060	7,060	7,060
51201	-	-	-	-	-	-	-	-	-	-	-	-	-	7,060	7,060	7,060
513	-	-	-	-	-	-	-	-	-	-	-	-	5,416	6,380	11,796	11,796
51301	-	-	-	-	-	-	-	-	-	-	-	-	5,416	6,380	11,796	11,796
52	-	-	-	-	-	-	-	-	-	-	-	26,922	-	8,712	35,634	35,634
521	-	-	-	-	-	-	-	-	-	-	-	26,922	-	8,712	35,634	35,634
52101	-	-	-	-	-	-	-	-	-	-	-	26,922	-	1,646	28,568	28,568
52102	-	-	-	-	-	-	-	-	-	-	-	-	-	5,619	5,619	5,619
52103	-	-	-	-	-	-	-	-	-	-	-	-	-	1,447	1,447	1,447
TOTAL	880,464	213,399	50,400	109,393	1,253,656	-	-	7,902	60,575	68,477	113,424	114,021	270,875	312,544	810,864	2,132,997

Table A-23 PERCENTAGE OF POPULATION OF MALE AND FEMALE AND AVERAGE NUMBER PER HOUSEHOLD (BASED ON THE 1979 CENSUS)

Governorate	Population (%)			Number per Household (persons)
	Female	Male	Total	
Amman	47.6	52.4	100.0	6.7
Irbid	48.4	51.6	100.0	6.8
Balqa	48.0	52.0	100.0	6.3
Karak	47.6	52.4	100.0	6.6
Ma'an	43.5	56.5	100.0	6.1
Total (East Bank)	47.7	52.3	100.0	6.7

Source: Statistical Yearbook 1982, Department of Statistics, Jordan

Table A-24 PERCENT DISTRIBUTION OF POPULATION BY SEX AND AGE GROUPS IN 1979 AND 1985

Age Group	1979 (census)			1985 (Estimation)		
	Female	Male	Total	Female	Male	Total
0-4	19.2	18.7	19.0	18.3	18.0	18.2
5-9	17.3	17.1	17.2	15.8	15.6	15.7
10-14	14.6	14.4	14.5	14.2	14.3	14.2
15-19	10.5	11.1	10.8	12.0	12.2	12.1
20-24	7.7	7.4	7.5	9.0	9.2	9.1
25-29	5.6	5.5	5.5	6.2	6.3	6.2
30-34	4.9	5.2	5.1	4.6	4.6	4.6
35-39	4.5	4.8	4.6	4.2	4.0	4.1
40-44	4.3	4.2	4.2	3.9	3.8	3.9
45-49	3.1	3.3	3.2	3.3	3.4	3.3
50-54	2.2	2.5	2.4	2.6	2.7	2.6
55-59	1.8	1.7	1.8	1.9	2.0	2.0
60-64	1.4	1.5	1.4	1.4	1.4	1.4
65 and more	2.9	2.6	2.8	2.6	2.5	2.6
0 to 14	51.1	50.2	50.7	48.3	47.9	48.1
15 or more	48.9	49.8	49.3	51.7	52.1	51.9
All ages	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Statistical Yearbook 1982, 1985, Department of Statistics, Jordan

Table A-25 POPULATION OF 15 YEARS OR MORE OF AGE BY TYPE OF ACTIVITY, GOVERNORATE AND SEX IN THE 1979 CENSUS

Unit : Persons

	East Bank		Amman		Irbid		Balqa		Karak		Ma'an	
	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%
1. 15 years or more												
Total	1,029,673	100.0	575,786	100.0	283,719	100.0	72,423	100.0	60,287	100.0	37,458	100.0
Male	530,813	100.0	298,078	100.0	141,983	100.0	37,212	100.0	31,601	100.0	21,939	100.0
Female	498,860	100.0	277,708	100.0	141,736	100.0	35,211	100.0	28,686	100.0	15,519	100.0
2. Employed												
Total	406,069	39.4	228,818	39.7	104,672	36.9	28,976	40.0	25,312	42.0	18,291	48.8
Male	376,528	70.9	208,840	70.1	99,060	69.8	27,175	73.0	23,830	75.4	17,623	80.3
Female	29,541	5.9	19,978	7.2	5,612	4.0	1,801	5.1	1,482	5.2	668	4.3
3. Unemployed												
Total	40,247	3.9	24,564	4.3	10,626	3.7	2,004	2.8	1,659	2.7	1,494	4.0
Male	36,454	6.9	22,574	7.6	9,096	6.4	1,826	4.9	1,531	4.8	1,427	6.5
Female	3,793	0.8	1,990	0.7	1,430	1.0	178	0.5	128	0.4	67	0.4
4. Inactive												
Total	583,357	56.7	322,404	56.0	168,621	59.4	41,443	57.2	33,316	55.3	17,673	47.2
Male	117,831	22.2	66,664	22.3	33,827	23.8	8,211	22.1	6,240	19.8	2,889	13.2
Female	465,526	93.3	255,740	92.1	134,694	95.0	33,232	94.4	27,076	94.4	14,784	95.3

Source : Governorate Main Results of the 1979 Census, Department of Statistics, 1984

Note : Percent (%) means the ratios of number of the employed, the unemployed and the inactive to the total population of 15 years or more of age.

Table A-26 ENPLOYED POPULATION OF 15 YEARS OR MORE OF AGE BY INDUSTRY AND SEX IN THE 1979 GENSUS

Industry	Total		Male		Female	
	Persons	%	Persons	%	Persons	%
Total (East Bank)	406,069	100.0	376,528	100.0	29,541	100.0
Agriculture, Forestry & Fishing	46,049	11.4	45,685	12.1	364	1.2
Mining & Quarrying	6,062	1.5	6,018	1.6	44	0.2
Manufacturing	32,196	7.9	30,297	8.1	1,899	6.4
Electricity, Gas & Water	2,387	0.6	2,357	0.6	30	0.1
Construction	63,861	15.7	63,641	16.9	220	0.8
Wholesale & Retail Trade	41,402	10.2	40,540	10.8	862	2.9
Transport & Communications	26,827	6.6	26,672	7.1	155	0.5
Financial Institutions, Insurance, real Estate & Business Services	8,242	2.0	6,936	1.8	1,306	4.4
Public Administration & Defence	152,238	37.5	133,591	35.5	18,647	63.1
Social Community Service	6,081	1.5	3,330	0.9	2,751	9.3
Other Services	20,724	5.1	17,461	4.6	3,263	11.1

Source: Results of Housing and Population Census 1979, Vol.2 Population Characteristics, Part One, 1983.

Table A-27 INSTALLED CAPACITIES OF POWER STATIONS IN JORDAN IN 1985

Unit : MW

Station	Power Unit			Total
	Steam	Gas	Diesel	
1. JEA	363	182	56.5	601.5
HTPS	3x33	14	-	395
-do-	4x66	18	-	
Marka P.S.	-	4x18	30	102
Amman South G.T.	-	2x30	-	60
Aqaba Central P.S.	-	-	2x3.5	22
-do-	-	-	3x5	
Karak P.S.	-	18	3x1.5	22.5
2. Other Organizations	73	-	37.5	110.5
IDECO	-	-	6	6
Cement Factory (Fuheis)	-	-	9	9
Petroleum Refinery Co.	14	-	2	16
Potash Co.	15	-	-	15
Fertilizer Co.	44	-	-	44
El-Hasa Phosphate Co.	-	-	12	12
Municipalities & others	-	-	8.5	8.5
3. Total	436	182	94	712

Note, JEA: Jordan Electricity Authority
HTPS: Hussein Thermal Power Station
IDECO: Irbid District Electricity Co.

Source : Annual Report 1985, JEA

Table A-28 ELECTRIC ENERGY GENERATED BY AUTHORITY IN JORDAN

Unit : GWh

Authority	1981	1982	1983	1984	1985
1. Electricity Sector	1,085	1,320	1,641	1,929	2,121
JEA	1,037	1,287	1,609	1,908	2,102
IDECO	23	17	20	15	17
Municipalities & others	25	16	12	6	2
2. Industrial Sector	152	192	277	336	374
El-Hasa Phosphate Co.	69	29	13	-	12
Cement Factory	47	51	51	44	42
Petroleum Refinery	33	50	55	56	66
Potash Co.	3	2	44	85	108
Fertilizer Co.	-	60	114	151	146
3. Total	1,237	1,512	1,918	2,265	2,495

Notes: JEA means Jordan Electricity Authority, and IDECO means Irbid District Electricity Co.
Source: Annual Report 1985, Jordan Electricity Authority.

Table A-29 ELECTRIC ENERGY PRODUCTION BY ORIGIN OF GENERATION IN JORDAN

Unit : GWh

Origin of Generation	1981	1982	1983	1984	1985
1. Electricity Sector					
Steam	668	1,038	1,368	1,685	1,916
Gas	112	36	41	19	4
Diesel	305	246	232	225	201
2. Industrial Sector					
Steam	36	112	213	292	320
Diesel	116	80	64	44	54

Source: same as Table A-28.

Table A-30 ELECTRIC ENERGY CONSUMPTION BY SECTOR

Unit : GWh

Sector	1981	1982	1983	1984	1985	Average Annual Growth Rate (1981-1985)(%)
Domestic	382	455	539	604	655	14.4
Industrial	349	488	715	851	903	26.8
Commercial	140	160	177	233	268	17.6
Water Pumping	84	98	108	151	215	26.5
Street Lighting	20	25	28	38	46	23.1
Others	53	48	56	67	64	4.8
Total	1,028	1,274	1,623	1,944	2,151	20.3

Source : same as Table A-28.

Table A-31 LENGTH OF ROAD NETWORK IN JORDAN

Unit : km

Category	1977	1982	1985		
			Total	Paved	Unpaved
Primary Roads	1,919	2,004	2,436	2,156	280
Secondary Roads	820	867	1,035	867	168
Sub-total	2,739	2,871	3,471	3,023	448
Rural Roads	2,097	2,304	2,532	2,382	150
Total	4,836	5,175	6,003	5,405	598

Sources: (1) National Transport Study, Draft Final Report, Ministry of Transport.
(2) Five Year Plan for Economic and social Development 1986-1990, Ministry of Planning.

Table A-32 NUMBER OF VEHICLES REGISTERED IN JORDAN

Category	1980	1981	1982	1983	1984	1985
Passenger Cars	84,701	97,274	111,469	123,492	131,816	144,998
Trucks, Pick-Ups, Tankers	28,920	35,903	39,886	43,834	48,365	55,114
Buses	1,431	2,126	2,704	3,056	3,346	4,250
Others	19,499	21,621	23,782	27,401	28,130	30,630
Total	134,551	156,924	177,841	197,783	211,657	234,992

Sources: (1) Data of Ministry of Transport
(2) Same as Source (2) in Table A-31

Table A-33 RAILWAY TRANSPORT

Category	1981	1982	1983	1984	1985
Passenger (thousand persons)	58.6	49.5	33.4	30.2	34.2
Cargo (thousand tons)	1,545.2	2,161.9	2,595.2	3,152.7	2,582.7

Source: Statistical Yearbook 1985, Department of Statistics.
Note: Quantity of phosphate accounted for more than 99% of the total quantity of cargo.

Table A-34 SHIPPING ACTIVITY IN AQABA PORT

Unit : Thousand tons

Category	1981	1982	1983	1984	1985
Goods loaded	3,530	3,836	5,059	7,158	8,178
Goods unloaded	5,805	7,837	6,099	6,448	6,370
Total	9,335	11,673	11,158	13,606	14,548
No. of Vessels	1,744	2,599	2,454	2,329	2,671

Source: see "source" in Table A-33

Table A-35 NUMBER OF TELEPHONE SUBSCRIBERS BY GOVERNORATE

Governorate	1981	1982	1983	1984	1985
Amman	48,424	56,166	63,972	80,987	109,411
Irbid	12,839	14,859	16,139	17,784	21,187
Balqa	4,969	5,426	5,858	5,509	4,316
Karak	4,066	4,746	5,308	5,445	5,929
Ma'an	3,000	3,286	3,771	3,938	4,133
Total	73,298	84,483	95,048	113,663	144,972

Source: Statistical Yearbook 1985, Department of Statistics

Table A-36 AVERAGE NUMBER OF TELEPHONES PER 100 INHABITANTS (TELEPHONE PENETRATION RATIO) BY GOVERNORATE

Governorate	Actual		Plan	Percentage of Telephones per Household in 1990 (%)
	1981	1985	1990	
Amman	3.8	7.2	19.2	114.8
Irbid	2.0	2.9	12.9	80.5
Balqa	3.1	2.5	9.1	57.0
Karak	3.0	4.1	12.2	74.9
Ma'an	3.7	4.6	12.8	76.5
Average	3.2	5.5	16.3	99.5

Table A-37 AVERAGE ANNUAL RATE OF POPULATION GROWTH USED FOR POPULATION PROJECTION

Unit : (%)

Locality	1979 to 1985	1985 to 1990	1990 to 2005*
Amman city	5.0	5.0	4.0
Zarqa & Irbid cities	4.5	4.5	3.5
Ruseifa city	4.5	4.5	4.5
Other cities (over 10,000 pop.)	3.5	3.0	2.8
Towns (3,000 to 10,000 pop.)	3.0	2.8	2.5
Small communities (below 3,000 pop.)	2.0	1.8	1.6
National Average	3.7	3.6	3.1

* The period "1990 to 2000" shown in World Bank's report was altered to "1990 to 2005", assuming that the same growth rate will continue till the year 2005.
(after "Water Sector Study Report", World Bank, 1984)

Table A-38 POPULATION IN STUDY AREA AND JORDAN

Unit: Thousand Persons

Governorate	1979 (Census)					1985 (Estimation)					1990 (Estimation)					2000 (Estimation)					2005 (Estimation)				
	(1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)	(1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)	(1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)	(1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)	(1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)
Amman	1,132	22	1,154	19	1,173	1,471	24	1,495	22	1,517	1,825	27	1,852	24	1,876	2,612	32	2,644	29	2,673	3,129	35	3,164	32	3,196
Irbid	4	-	4	607	611	5	-	5	725	730	5	-	5	834	839	6	-	6	1,067	1,073	6	-	6	1,209	1,215
Balqa	177	-	177	31	148	140	-	140	36	176	160	-	160	40	200	206	-	206	48	254	233	-	233	53	286
Karak	-	47	47	79	126	-	53	53	93	146	-	58	58	104	162	-	69	69	129	198	-	75	75	144	219
Ma'an	-	-	-	75	75	-	-	-	89	89	-	-	-	101	101	-	-	-	127	127	-	-	-	143	143
Total	1,253	69	1,322	811	2,133	1,616	77	1,693	965	2,658	1,990	85	2,075	1,103	3,178	2,824	101	2,925	1,400	4,325	3,368	110	3,478	1,581	5,059
" (%)	(59)	(3)	(62)	(38)	(100)	(61)	(3)	(64)	(36)	(100)	(62)	(3)	(65)	(35)	(100)	(65)	(3)	(68)	(32)	(100)	(67)	(2)	(69)	(31)	(100)

Note: Notation on population show in the table is classified according to the following categories of area;
(1) Greater Amman area (within 30km with center in the Amman city)
(2) Wadi Mujib basin area
(3) Study area; (1)+(2)
(4) Other area than (1) and (2) in Jordan
(5) Jordan

Table A-39 PER CAPITA DOMESTIC WATER DEMAND PROJECTED IN EACH STUDY REPORT

Unit : l/c/d

Locality	1975				1979				1982				1985				1990				2000				2005			
	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]	[1]	[2]	[3]	[5]
Amman city	80	80	-	-	-	-	-	85	-	-	96	-	110	-	-	88	-	-	117	94	120	105	-	94	-	-	133	-
Zarqa city	85	75	-	-	-	-	-	70	-	-	83	-	110	-	-	73	-	-	96	77	120	100	-	77	-	-	112	-
Irbid city	85	70	-	-	-	-	-	70	-	-	79	-	110	-	-	73	-	-	92	77	120	95	-	77	-	-	108	-
Cities over 10,000 population	65	65	-	-	-	-	-	70	-	-	62	-	90	-	-	73	-	-	75	77	110	85	-	77	-	-	92	-
Towns 3,000 to 10,000 population	65	55	-	-	-	-	-	70	-	-	50	-	90	-	-	73	-	-	62	77	110	70	-	77	-	-	79	-
Communities below 3,000 population	65	45	-	-	-	-	-	44	-	-	38	-	85	-	-	48	-	-	50	56	100	55	-	67	-	-	67	-

Note: [1], [2], [3] and [5] mean respective references shown in Section 7.1.

Table A-40 ESTIMATES OF THE PER CAPITA DOMESTIC WATER DEMAND (PCDWD)

Unit : l/c/d

Locality	1979	1985	1990	1995	2000	2005
Amman city	90	95	100	105	110	115
Zarka & Irbid cities	75	80	85	90	95	100
Cities over 10,000 pop.	65	70	75	80	85	90
Towns 3,000 to 10,000 pop.	60	65	70	70	75	80
Communities below 3,000 pop.	40	45	50	55	60	65

Table A-41 NON-DOMESTIC WATER DEMAND PROJECTED IN EACH STUDY REPORT

Unit : % /1

Locality	1975				1982				1985				1990				2000				2005			
	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
Amman city	14	38	-	-	-	-	10	15	14	40	-	-	-	-	20	15	14	43	30	15	-	-	30	15
Zarqa city	14	27	-	-	-	-	10	15	14	28	-	-	-	-	15	15	14	30	25	15	-	-	25	15
Irbid city	14	29	-	-	-	-	10	15	14	30	-	-	-	-	15	15	14	32	25	15	-	-	25	15
Cities over 10,000 population	10	23	-	-	-	-	10	10	10	23	-	-	-	-	10	10	10	23	20	10	-	-	20	10
Towns 3,000 to 10,000 population	10	18	-	-	-	-	10	10	10	19	-	-	-	-	10	10	10	21	15	10	-	-	15	10
Communities below 3,000 population	5	11	-	-	-	-	10	10	5	14	-	-	-	-	10	10	5	18	10	10	-	-	10	10

Note: [1], [2], [3] and [4] mean respective references shown in Section 7.1.

/1 ; Percent means a ratio of the non-domestic water demend to the domestic water demand.

Table A-42 ESTIMATES OF NON-DOMESTIC WATER DEMAND

Unit: %*

Locality	1979	1985	1990	1995	2000	2005
Amman city	20	20	20	25	25	25
Zarqa & Irbid cities	15	15	15	20	20	20
Cities over 10,000 pop.	10	10	10	15	15	15
Towns 3,000 to 10,000 pop.	10	10	10	15	15	15
Communities below 3,000 pop.	10	10	10	10	10	10

* Percent (%) shows a ratio of the non-domestic water demand to the domestic water demand.

Table A-43 WATER LOSSES IN DISTRIBUTION SYSTEMS

Unit: %*

Reference & Locality	1975	1982	1985	1990	2000	2005
[1]						
Amman Zarqa & Irbid cities	35	-	25	-	15	-
Other localities	30	-	20	-	15	-
[2]All localities	20	-	-	-	20	-
[3]All localities	-	20	-	20	-	20

Note: [1], [2] & [3] mean respective references shown in Section 7.1.
* Percent (%) shows a ratio of water loss to the domestic and non-domestic water supplies (except large-scale industrial water supply).

Table A-44 ESTIMATES OF THE PER CAPITA MUNICIPAL WATER DEMAND

Unit: l/c/d

Locality	1979	1985	1990	1995	2000	2005
Amman city	130	137	144	158	165	172
Zarqa & Irbid cities	104	110	117	130	137	144
Cities over 10,000 pop.	86	92	99	110	117	124
Towns 3,000 to 10,000 pop.	79	86	92	97	104	110
Communities below 3,000 pop.	53	59	66	73	79	86

* Municipal water demand consists of domestic and non-domestic water demand and water losses in the distribution systems.

Table A-45 (1/2) MUNICIPAL WATER DEMAND IN STUDY AREA AND JORDAN

Unit : MCM/year

Governorate*	1979 (1)	1979 (2)	1979 (3) (1)+(2)	1979 (4)	1979 (5) (3)+(4)	1985 (1)	1985 (2)	1985 (3) (1)+(2)	1985 (4)	1985 (5) (3)+(4)	1990 (1)	1990 (2)	1990 (3) (1)+(2)	1990 (4)	1990 (5) (3)+(4)
Amman	46.19	0.45	46.64	0.41	47.05	64.08	0.57	64.65	0.53	65.18	84.82	0.70	85.52	0.65	86.17
Irbid	0.08	-	0.08	16.70	16.78	0.09	-	0.09	21.83	21.92	0.12	-	0.12	27.47	27.59
Balqa	3.30	-	3.30	0.70	4.00	4.30	-	4.30	0.88	5.18	5.33	-	5.33	1.08	6.41
Karak	-	0.94	0.94	1.96	2.90	-	1.19	1.19	2.52	3.71	-	1.46	1.46	3.08	4.54
Ma'an	-	-	-	2.00	2.00	-	-	-	2.58	5.58	-	-	-	3.21	3.21
Total	49.57	1.39	50.96	21.77	72.73	68.47	1.76	70.23	28.34	98.57	90.27	2.16	92.43	35.49	127.92

Note: Notation on population shown in the table is classified according to the following categories of area;

(1) Greater Amman area (within 30 km with center in the Amman city)
(2) Wadi Mujib basin area
(3) Study Area; (1)+(2)
(4) Other area than (1) and (2) in Jordan
(5) Jordan
* According to the former administrative units.

Table A-45 (2/2) MUNICIPAL WATER DEMAND IN STUDY AREA AND JORDAN

Unit : MCM/year

Governorate*	2000 (1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)	2005 (1)	(2)	(3) (1)+(2)	(4)	(5) (3)+(4)
Amman	141.56	0.99	142.55	0.92	143.47	178.30	1.17	179.47	1.08	180.55
Irbid	0.17	-	0.17	41.30	41.47	0.20	-	0.20	50.01	50.21
Balqa	8.11	-	8.11	1.54	9.65	9.82	-	9.82	1.83	11.05
Karak	-	2.06	2.06	4.59	6.65	-	2.43	2.43	5.49	7.92
Ma'an	-	-	-	4.83	4.83	-	-	-	5.83	5.83
Total	149.84	3.05	152.89	53.18	206.07	188.32	3.60	191.92	64.24	256.16

Note: Notation on population shown in the table is classified according to the following categories of area;

(1) Greater Amman area (within 30 km with center in the Amman city)
(2) Wadi Mujib basin area
(3) Study Area; (1)+(2)
(4) Other area than (1) and (2) in Jordan
(5) Jordan
* According to the former administrative units.

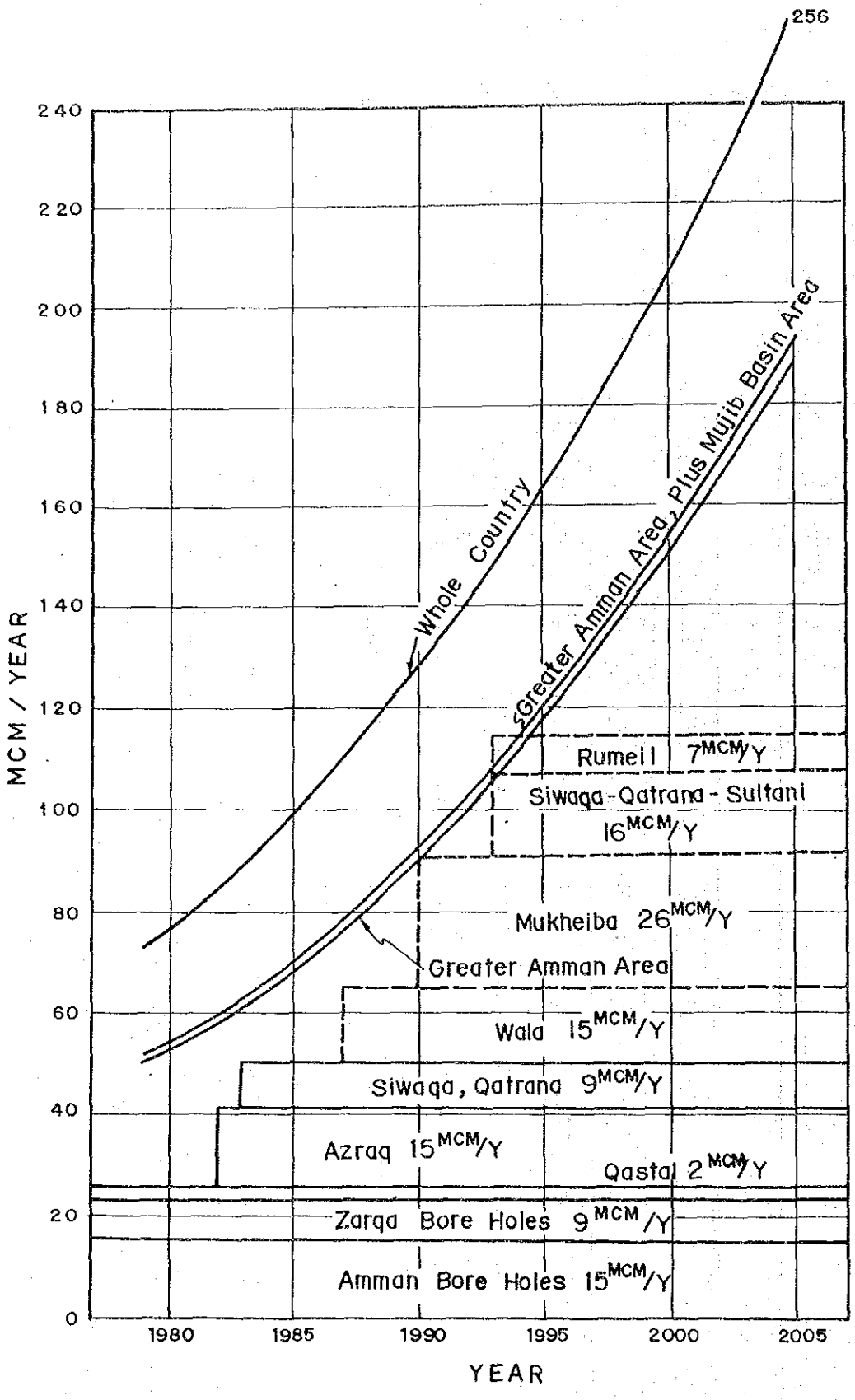

Fig.A-1

Municipal Water Demand and Supply

THE HASHEMITE KINGDOM OF JORDAN
HYDROGEOLOGICAL AND WATER USE STUDY OF THE MUJIB WATERSHED
JAPAN INTERNATIONAL COOPERATION AGENCY

APPENDIX B

HYDROLOGY

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1. INTRODUCTION

This Annex describes the result of the meteorological and hydrological study in the Mujib watershed (the Area) during the period from November 1984 to February 1986.

The study covers the following items which concern the grasp of potentiality of surface water in the Area.

1. to estimate flood runoff volume for continuous 26 years at the proposed damsites.

2. to estimate flood runoff peak discharge for dam design.

3. to estimate sediment load and inflow to the reservoirs of proposed damsites.

These studies are carried out as the master plan level and the result described below should be scrutinized for further study level.

2. STUDY AREA

The Area is composed of two major drainage systems. These drainage systems are Wadi Wala and Wadi el Mujib which run westward and empty themselves into the Dead Sea. River bed slopes are gentle in the eastern area due to the sediment transportation by wind and scarce rainfall. On the other hand, slope in the downstream area are steep due to flush flood erosion and comparatively much rainfall.

Wadi el Mujib originates from the southern end of the Area and its main tributaries are Wadi el Hafira, Wadi Sultani and Wadi Sueida. Muddy flat areas called "Qa'" extend themselves along the upper reaches of Wadi el Hafira and Wadi Sultani. Two check dams exist in the down reaches of these swamps. The catchment area of Wadi el Mujib is about 4,500 km^2. Wadi Wala of which catchment area is about 2,100 km^2 originates from northern part of the Area. Main tributaries are Wadi Zafaran, Wadi el Halq and Wadi Shabik. Downstream reaches of the main channel with elevation less than 450 m is called Wadi Heidan.

Both drainage systems of Wala and Mujib have perennial flow only in downstream reaches where elevations are lower than 400 m. Source of the base flow is dependent on the continuous array of springs along the channels. The base flow volume at the confluence of these two wadis is 1.1 m^3/s.

3. AVAILABLE DATA

3.1 Meteorological Data

3.1.1 Rainfall data

All the rainfall stations have been registered and named by the agencies concerned in accordance with the drainage system. There are 34 rainfall stations in the Area and more than 30 stations adjacent to the Area. In this study, the obtained daily rainfall record are examined in taking account of the duration and interruption of the record and representatively, then 53 stations are selected for the study to utilize the data therein. Location of the stations is shown in Fig. B-1.

Fig. B-2 shows the duration of the daily rainfall data. Of them, 23 stations are selected as key stations for the runoff simulation model. In case there is an interruption period, the daily rainfall record at adjacent stations is transported after examining the correlation between the rainfall records at the stations. Correlation coefficient of each 23 key station is shown in Table B-1.

Monthly rainfall record at selected key stations from 1960 to 1985 water year are tabulated in Table B-2. Based on the annual mean value for the 26 years, isohyetal map is developed as shown in Fig. B-1 .

3.1.2 Evaporation data

WAJ and Meteorological Department have operated 4 evaporation stations in the Area. The recorded data up to 1976 are summarized in National Water Master Plan. In this study, additional data after 1976 water year are collected. Duration of records for these four stations are shown in Fig. B-3.

3.1.3 Other meteorological data

(1) Other meteorological data such as air temperature, relative humidity, sunshine hour are observed at meteorological stations operated by Meteorological Department. In and near the Study Area, 6 meteorological stations are in operation since 1962. These data of recent 7 years are used for irrigation planning which are described in Appendix G. Summary of these data is shown in Table G-2.3 of Appendix G.

(2) Soil moisture contents data are collected by Department of Agriculture every ten-day interval. These data consist of soil moisture content (weight percentage) of irrigated and non-irrigated area, and their depths are at every 10 cm up to 100 cm. According to continuity of data and the location of the stations, three stations such as Wadi Dhuliel, Irbid and Shoubak are selected for this study. Data are converted to volume percentage and used as a soil moisture factor governing the azonal area. Evaporation process in the runoff simulation model is described in Clause 6.3.

3.2 Hydrological Data

3.2.1 Existing water level/discharge record

Water levels and discharge stations at four gauging stations such as Wadi Wala at Kings Highway (Wala at U/S), Wadi Wala at weir (Wala at D/S), Siwaqa at Desert Highway (Siwaqa at D/H) and Wadi Mujib at Kings Highway (Mujib at K/H) are operated by WAJ. The stations have relatively long recording durations. Locations are shown in Fig. B-1.

Direct measurement for flood had been carried out at each gauging station for the preparation of rating curves, but for recent years same rating curves have been used for conversion to discharge. The information on recent rating curve are as follows;

Station	Latest Rating Curve	Condition of Section
Wala at U/S	1980	Side; Concrete Bed; Natural
Wala at D/S	1972	Concrete Section
Siwaqa at D/H	1974	Side; Concrete Bed; Natural
Mujib at K/H	1973	Concrete Section

River beds at Wadi Siwaqa and Wadi Wala U/S are in natural conditions, so discharge data at these two stations after the year of latest rating curve are not so much appreciated as before. Summary of monthly flood runoff and total runoff at the stations are shown in Table B-3 and Table B-4. There is another water level gauging station at Sultana dam reservoir operated by WAJ and is checked every several weeks. But there is a scarce information on sediment volume in the reservoir after the construction and also zero gauge of the records has not been observed.

3.2.2 Sediment data

(1) Suspended load data

Suspended load samples have been taken at water level gauging stations in the Area. These samples have been analysed by NRA regarding the weight percentages of soils as sediment content rate. There is no information on particle size distribution of the wash load materials. The relations between sediment flux and discharge at the time of sampling are developed from the data. Data before 1975 water year were refered from Water Master Plan. Available data after 1975 water year at each gauging station are as follows;

Station	Period	Nos of Samples
Wala at K/H	Mar. 1976 - Mar. 1985	83
Wala at D/S	Mar. 1979 - Feb. 1981	112
Siwaqa at D/H	-	-
Mujib at K/H	Mar. 1979 - Feb. 1980	9

(2) Others

In addition, there is sediment information on Sultani dam reservoir. WAJ carried out reservoir storage investigation in 1986 and the accumulated sedimentation volume for the past 20 years is assumed to be 0.9 MCM or 75% of initial storage capacity of the reservoir .

4. METEOROLOGY

4.1 Climate

The climate feature of the Area is described by the trends of north-south and west-east. The climate in northern and western mountainous area is Mediterranean, while eastern hills and southern hills has arid or semi-arid climate. Most rainfall occur due to Mediterranean air mass formed during winter season from October to April. Therefore all the climatic factor such as atmospheric pressure, temperature, relative humidity and sunshine hours are essentially influenced by this macrotic trend.

According to this feature, hydrological year has been defined as the period from October to September, which is then called as "water year". All the meteorological and hydrological data have been considered according to the water year. For example, water year of 1975 means the period from October 1975 to September 1976.

Mean temperature at each station is affected by its elevation. Excluding the Wadi Wala station (El. 450 m), other four stations, namely Na'our (El. 910 m), Al Jiza (El. 715 m), Madaba (El. 785 m), Rabbah (El. 920 m) and Hassan (El. 1,200 m) stations have similar mean monthly temperature. Mean monthly temperature for three months from December to February at the five stations show less than 10°C and during four months from June to September in summer season, the temperature reaches a range from 21°C to 24°C. For transition period between summer season and winter season, the temperature respectively inclines from 10°C to 20°C for three months from March to May and declines from 20°C to 10°C for two months from October to November. Mean monthly temperature of the Wadi Wala station shows rather higher figures than those of other stations.

Mean monthly relative humidity varies within a range from 60% to 75% for four months, December to March and ranges from 40% to 55% for other eight months.

Mean monthly wind run in highlands is generally strong and affected by the elevation. Wind runs at higher elevated areas range from 2.6 m/sec to 4.2 m/sec and ones at lower elevated areas show values at the range from 2.0 m/sec to 3.3 m/sec.

Mean monthly sunshine hour obviously varies according to seasonal change. Sunshine hour for five months from May to September (summer season) is more than 10 hours/day and in winter season, sunshine hour declines from 9 hours/day to 6 hours/day for five months from October to February.

Meteorological data at the six stations in and around the basin are as shown in Table G-2.3 of Appendix (I)-G.

4.2 Rainfall

Annual rainfall in the region varies from 50 mm to 500 mm and its distribution is noticeably biased to the western and northern part of the whole Mujib basin as shown in Fig. B-1. The Wala sub-basin, northern part of the basin, has the annual amount of 189 mm and another sub-basin, the Mujib sub-basin, has 128 mm. Seasonal rainfall distribution for both sub-basins show the same pattern, as shown in Fig B-6 and Fig B-7.

In general, coefficient of variation (Cv) of annual rainfall increases according to the decrease of the amount of rainfall. Fig B-5 shows their relations in the Middle East and North Africa. This figure indicates that the relation between rainfall and Cv in the Mujib basin is relatively weak and Cv value in the Area with much rainfall is higher. On the other hand, there exist relatively stable rainfall even in desert area. Regarding the annual rainfall amount within the whole region, wet years are chronotogically noticed in 1966, 1973 and 1979. The largest values of daily rainfall after 1960 within the region is 140 mm at Karak on December, 1980 followed by 135 mm at Khanzira on January, 1965.

4.3 Evaporation

Potential evaporation from open water surface is calculated by multiple of 0.7 as pan coefficient. Annual evaporation from open surface in the area where planned dams are located is estimated to be from the range of 1,700 mm to 2,200 mm. In this study, the following monthly data which is an arithmetic means of the four evaporation stations are used for the estimation of evaporation loss from the surface of dam reservoir.

(mm)

Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
Monthly Total											
171	99	69	67	85	132	172	245	281	297	282	225
Daily											
5.5	3.3	2.2	2.2	3.0	4.3	5.7	7.9	9.4	9.6	9.1	7.5

In the Area, moisture supply to the evaporating surface is too limited by the shortage of rainfall, so actual evaporation from the basin is far less than potential evaporation. According to the runoff simulation model mentioned in chapter 6, annual actual evaporation is estimated to be about 90% of annual rainfall in the area.

5. HYDROLOGY

5.1 Flood Runoff

5.1.1 Annual flood volume

Flood water in the wadis is dependent on the capricious storms in the catchments, which occurs during the rainy season from October to May. These flush floods are directly discharged out to the Dead Sea within a few days after a storm, leaving no water to be used for any purpose except the water stored in the existing two small dams on the upper tributaries in the Wadi Mujib.

According to the observed data for about 25 years, annual flood flow at Wala U/S, Wadi Siwaqa and Wadi Mujib K/R are 19 MCM, 4.3 MCM and 21 MCM respectively. Annual maximum of daily mean discharge at each station occupy high percentage of annual total runoff volume, especially at Siwaqa station. For Siwaqa the percentage exceeds 70 %.

5.1.2 Peak discharge

To obtain the peak discharge for each flood volume, their relations are developed by using the flood data at 3 water level gauging stations, such as Mujib at K/H, Wala U/S and Siwaqa at K/H. Envelope curve relations are as follows:

Wadi Mujib at Kings Highway;
(Mujib Basin 4,500 km^2) $\quad Q_p = 58.0V^{0.9506}$

Wadi Wala at Kings Highway;
(Wala Basin 2,000 km^2) $\quad Q_p = 297.0V^{0.5317}$

Wadi Siwaqa
(Mujib Basin 450 km^2) $\quad Q_p = 206.3V^{0.5840}$

where, Q_p = Peak Discharge (m^3/s)
V = Flood Volume (MCM per unit of flood)

This relation indicates that flood duration is proportional to the flood peak in Wala Basin, on the other hand flood duration does not change so much for each flood and its hydrograph gets steeper according to the flood volume in Mujib Basin as shown in Fig B-8, Fig B-9 and Fig-10. This difference may be the result of the high concentration of rainfall in the mountainous area of Wadi Mujib Basin.

Finally, these equations are applied for the computation of the design flood discharge of the spillway for the proposed dams as described in Appendix (I)-F.

5.2 Base Flow

Perennial base flow is maintained by springs and groundwater runoff from the intersect zones of saturated aquifers in the bottom of wadis. In the Wadi Wala, the base flow springs out at just upstream of Wala bridge where Kings Highway crosses the Wadi Heidan at the elevation of about 450 m. According to the base flow measurement carried out along the main channel of Wadi Heidan, the base flow suddenly increases noticeably at 5 km downstream from the Wala bridge at the elevation of 350 m. Fig. B-11 and Fig. B-12 show the profile of base flow. The maximum volume measured is 500 liter/sec or 15 MCM/y and its value decreases some because of infiltration into the deeper aquifer. The base flow volume at Heidan spring, main component of the base flow, is 15 MCM/y at average and its long term fluctuation is not so apparent according to the record for 20 years as shown in Fig B-13. Downwards to the confluence at Wadi Mujib, the base flow increases up to 23 MCM/y. In the Wadi Mujib, the base flow springs out from just upstream of the Mujib bridge where Kings Highway crosses the Wadi Mujib at the elevation of 150 m. The base flow gradually increases downwards collecting the spring water from sandstone aquifers with rather high salinity. The flow

discharge just upstream of the confluence is about 12 MCM/y, which is one third of the total base flow of 35 MCM in the whole Mujib basin.

Most of the base flow in the Wadi Heidan is dependent on the groundwater runoff from the B2/A7 aquifer which is the major exploiting aquifer in the Study Area. There is a direct hydraulic connection between the base flow and the B2/A7 aquifer along the area between elevation 250 and 450 m in the wadi, which give us a caution of developing groundwater in the B2/A7 aquifer in and around the area.

5.3 Sediment

5.3.1 Data analysis

Suspended load transported in the river is highly dependent on the floods occurring in the wet season. In general, relation between suspended sediment load and water discharge is logarithmically represented by an equation as follows:

$$Q_s = K\ Q^{n}$$

where, Qs : Suspended load (kg/sec)
Q : Discharge (m^3/sec)
K, n : Constants

Observed records at four gauging stations mentioned in 3.3.2 are scattered as shown in Fig B-14, Fig B-15 and B-16. Based on the records, parameters K, and n are estimated for each stations by the least square method, and the following is the results :

Station	K value	n value
Wala gauging station (at Kings Highway & the weir)	4.095×10^{-3}	1.055
Siwaqa gauging station	3.814×10^{-3}	1.300
Mujib gauging station	3.397×10^{-3}	1.229

5.3.2 Bed load transport

Annual inflow volume in Sultana reservoir during 20 years is estimated to be 64 MCM and accumulated sediment volume reaches 0.9 MCM which is equivalent to 1.4% of the total inflow volume. Because of lack of measured background it is difficult to identify suspended load and bed load transportation. In case that suspended load weight is assumed to be 1% of discharge and all the suspended load contained in the stored water are trapped, accumulated suspended load in the reservoir reaches 0.3 MCM for twenty years. The rest of the total sedimentation, or, bed load transport is calculated to 0.6 MCM, which is about 1% of total inflow volume into Sultani dam reservoir. From this assumption, annual bed load transport might be the same as the annual suspended load transport. This rate seems to be high because of the existing phosphate mine upstream of the dam reservoir and mining residuals inflow to the reservoir.

6. RUNOFF STUDY

6.1 Runoff Record

Runoff record at four hydrological stations includes more or less interrupted period. In order to grasp flood water potential by continuous record, it is necessary to interpolate the missing runoff data through runoff simulation study. For this purpose, Modified Tank Model is applied to generate daily discharge. Finally, the runoff at selected 20 damsites are estimated on the basis of the model and daily basin rainfall at the damsites.

6.2 Basin Division

The Area is divided into 24 sub-basins in considering the rainfall depth, pattern and selected damsites. Accordingly, the runoff depth is assumed to be uniform over a sub-basin. Basin division in the Area for runoff study is shown in Fig. B-17.

6.3 Procedure of Simulation Study

(1) A tank model is constructed to simulate the flood runoff at four gauging stations and also base flow at Wadi Heidan and at the confluence of Wadi Wala with Wala Mujib. Detailed process of simulation is described in the following section.

(2) The calibration of the model is made to obtain the good fit to monthly mean runoff.

(3) Calibration is performed by means of the trial and error method, and models which entails the best fits are adopted for the relevant key stations.

(4) The estimated daily runoff at the gauging stations and selected damsites are converted into monthly runoff.

6.4 Simulation Model

(1) Basic Concept of Tank Model

A tank of the model is basically considered to have two holes; one at the bottom and another at the side as shown in Fig. B-20. When the tank is filled with water, the water will be released from these holes. In the runoff analysis, water released from the side hole corresponds to runoff of a stream and water from the bottom hole goes into the groundwater zone.

The depth of water released from a hole is given by the following relation:

$$I = a \times H$$

where, I : Depth of water released (mm/day)
a : Coefficient of hole (1/day)
H : Water depth above the hole.

For the purpose of natural runoff simulation, four tanks combined vertically are used as a base of the model. The top tank represent the ground surface and top soil, and its output correspond to flood runoff. The second tank represent the sub-surface runoff and evaporation. The third tank and fourth tank correspond to base flow from the groundwater. In the course of the simulation, daily rainfall depth is put into the top tank and the depth of water released from a hole is calculated by the above equation. The water from the bottom hole is put into the second tank and the same process is repeated up to the fourth tank. The depth of stream runoff is given as the sum of the water released from side holes.

(2) Evaporation

Loss due to evaporation is expressed by subtracting the depth of

daily evaporation depth from the storage of the top tank.

In case there is no storage in the top tank, evaporation is assumed to take place from the second tank in proportional to the storage of second tank. Evaporation ratio from the top tank is decided from observed pan evaporation data described in Clause 4.3.

In the model, this evaporation ratio takes place only for a few days after rainfall occurrs.

(3) Soil Moisture Behaviour

The top tank has a special structure simulating soil moisture content in surface and sub-surface soil layers. This structure is developed for the Area having distinct wet and dry seasons where surface soils are usually dried up in the dry season. In this model, soil moisture structure is divided into two parts, namely, the primary and secondary soil moisture. The former is set at the bottom of the top tank. The latter is set at the bottom of the second tank. These moisture components comprise of zonal and azonal soil, respectively. When the primary soil becomes dry, the evaporation ratio decreases exponentially. This behavior deeply depends on the meteorological conditions, soil texture and also land use condition. Decrease ratio is defined as follows:

$$M = Mo \exp(-aDT)$$

or $$a = - 1/DT * \log_e(M/M_o)$$

where, a : evaporation decrease ratio (1/day)
DT : time from the end of wet season
Mo : initial value of soil moisture content at the end of wet season (To)
M : soil moisture content after DT from To.

In this study, data of soil moisture content (weight percentage) at

three agricultural stations are used for the determination of the value of "a". After converting weight percentage to volume percentage, 10-year average of soil moisture content (depth 0 mm - 500 mm) are calculated for each station. The Soil is assumed to be homogeneous in the depth considered, and solid ratio and specific gravity are assumed to be 0.45 and 2.7, respectively. Fig. B-19 indicates that the decrease ratio at these stations are almost the same inspite of the difference of the locations, and average value of 0.002 is used as an initial value all over the Area. The relationship between soil moisture content and evaporation in azonal area is defined from the equation above

$$E = dM/dt = dM_0 \exp(-at)/dt = -aM$$

where, E : evaporation from azonal area, or secondary evaporation

This formula implies that secondary evaporation is proportional to the storage of the second tank and the evaporation procedure is the same as that of runoff from the holes of other tanks.

(4) Component of Tank Model diagram, concentration of daily rainfall patterns such as occurrence and volume are different in the Study Area, consequently runoff hydrological phenomena might be different in the area. In this study, therefore, basin are divided into 23 sub-basins in consideration of their rainfall pattern and its topographic features as mentioned in Clause 6.2. Accordingly, Tank Model components are distributed for these sub-basins and combined as shown in Fig. B-18. The top and second tank of each sub-basin is independent, but the third and fourth tank is common for Wala tributary (sub-basin A1 to A9) and Mujib tributary (sub-basin A10 to A23), because each tributary is assumed to have one groundwater body and base flow only appears downstream of the tributary.

(5) River Channel Recharge

There are wadi channels where B2/A7 layer directly outcrops on the

bed and/or slopes of the wadis. Therefore, river channel recharge is considered as one of the recharge factors in the model. River channel recharge is proportional to the (1) length of the river channel where recharge occurs, (2) permeability of the bedrock, (3) pressure head and (4) width of the channel. That is

$$Q_r = k \times h \times B \times L \times 10^{-3} \qquad (1)$$

where, Q_r : recharge (MCM/day)
h : pressure head (m)
B : channel width (m)
L : channel length (Km)
k : permeability (m/day)

When the Manning's formula is used, the pressure head is

$$h = i^{0.3} \times (nq/B)^{0.6}$$

where, n : Manning's "n"
i : slope of riverbed
q : discharge (m^3/s)

Suppose that the Daily runoff (Q) represents the discharge at the time considered, then

$$q = Q \times 10^6/86,400$$

where, Q is in MCM unit.

Substituting this relation to the first formula mentioned above and simplifying,

$$Q_r/L = 0.004346 \times k \times B^{0.4} \times i^{-0.3} \times n^{0.6} \times Q^{3/5}$$

Let B = 15 m, n = 0.05, i = 1/100 to 1/200 and k = 0.864 m/day then this relation is approximately represented by the following equation as shown

in Fig B-21;

$$Q_r/L = 2.5 \times 10^{-3} Q.$$

The length of the wadi channel for recharge is estimated from geological map, and its value is shown below.

Channel No.*	Recharge Length of River Channel (km)	Slope
L1	9.0	1/100
L4	18.0	1/100
L5	13.0	1/160
L6	3.0	1/150
L7	10.0	1/190
L12	4.0	1/105
L13	6.0	1/170
L14	8.0	1/170
L17	20.0	1/100
L18	22.0	1/165
L20	17.0	1/150
L21	7.0	1/175

Note *: See Fig. B-18.

6.5 Input Data

(1) Evaporation from the top tank

Evaporation from saturated soil surface is adopted for the evaporation from the top tank as described in Clause 6.4 (2). As mentioned in Clause 3.12, A-pan evaporation rate at seven climatological stations are available. Evaporation from saturated soil surface is calculated by A-pan evaporation rate multiplied by 0.6. In addition, when rainfall of more

than 0.5 mm/day occurs, evaporation ratio from the top tank is set to be half of the ratio described before.

(2) Basin rainfall

Rainfall stations in and near the Study Area described in Clause 3.1.1 are divided into six groups according to the similarity of hydrological and topographical characteristics. After calculating the correlation coefficient matrices by groups as shown in Table B-1, doubtful or lacking data are replaced by estimated data from the information of the station which has high value of correlation coefficient and also has relatively large data population. Average basin rainfall for 23 sub-basins are estimated by area-allocation weight mean value of point rainfall of selected 23 rainfall stations. These key stations and their weights for the polygonal network are shown in Table B-5 .

6.6 Calibration

The simulation model is calibrated to have a good fit to monthly runoff at the water level gauging stations. All of the Tank Model components for sub-basins start with the same initial storage conditions. In the southern area of Mujib basin such as sub-basin A16 and A19 which include huge muddy swamps called Qa' el Hafira and Wadi el Sakhariya, flood is retarded in the area and its volume decreases because of relatively high evaporation rate. In this simulation study, retarding losses and evaporation losses in these retardation areas are approximately estimated by the difference between calculated flood runoff at sub-basin A16 and A19 and observed flood runoff at Qatrana and Sultani, respectively. These values are 3.0 for Qa' el Hafira and 2.5 for Wadi el Sakhariya.

In addition, storage capacity of two existing dams, Qatrana and Sultani, are set to 4.0 MCM and 1.5 MCM respectively. Flood reaches downstream of each dam, in case that accumulated storage volume from the beginning of the rainy season exceeds the storage capacity of each dam

reservoir.

Finally, daily discharge data are calculated for 26 years considering the conditions described above. Fig. B-22 and Fig. B-23 show the monthly total of calculated and observed daily discharge at Wala gauging and Mujib gauging stations. In general the calculated discharge have a good fit for observed discharge. But there seemed to be large difference for some floods. This difference results from some factors such as disunity of rainfall pattern and insufficiency of the density of the rainfall stations.

6.7 Estimated Flood Runoff

6.7.1 Runoff coefficient

Flood runoff feature in the basin is the small value of runoff coefficient and most of the rainfall is evaporated. According to the results of Tank Model simulation, runoff ratio for each sub-basin ranges from 4% in the desert area to 15% in the northern and western ridge of the Study Area. Their distributions are shown in Fig. B-25.

The values in the Mujib Basin are higher than those in the Wala basin as shown in Fig. B-24. This difference results from high concentration of the rainfall pattern in the Mujib Basin.

6.7.2 Flood volume at planned damsites

Daily discharge at planned 20 damsites for 26 years are estimated from this simulation study. These daily discharge data are summarized into monthly total as shown in Table B-6. Annual flood volume for some return periods at each damsite are created by applying Gumbel distribution function and using Thomas' plotting position for data checking. Additionally, peak discharge at the selected 5 damsites are estimated from probable daily maximum flood volume from the relation between daily flood volume and peak discharge which is described in

Clause 5.2.2. Probable annual flood volume and probable peak discharge are tabulated in Table B-7 and Table B-8, respectively.

7. DAM RESERVOIR OPERATION

For the development of surface water resources at planned damsites, reservoir operation is carried out by using the monthly total of synthesized daily data which is described in Chapter 6.

The base formula is the equation of continuity. Dam reservoir traps as much as flood inflow up to the capacity of the reservoir. This storage volume is calculated by estimating the water supply, irrigation, evaporation from reservoir surface and infiltration into the ground. That is

$$DS_i = I_i - E_i(h) - Inf_i(h) - W_i$$

$$S_i^* = S_{i-1} + DS_i$$

$$S_i = S_m, \quad O_i = S_i^* - S_m \qquad (S_i^* > S_m)$$

$$S_i = S_i^*, \quad O_i = 0.0 \qquad (S_i^* \leq S_m)$$

where,
- i : i month from the beginning
- h : Water depth
- I_i : Flood inflow (MCM/month)
- E_i : Evaporation (MCM/month)
- Inf_i : Infiltration (MCM/month)
- W_i : Intake volume (MCM/month)
- DS_i : Monthly increase of storage (MCM/month)
- O_i : Spillout volume (MCM/month)
- S_i : Storage volume (MCM).
- Sm : Storage capacity (MCM).

Evaporation loss E_i is defined as a function of monthly evaporation depth and reservoir area at month i. The evaporation ratio is referred from Clause 4.3 for all the reservoir at a safety side. Infiltration is estimated by using the following equation;

$$Inf_i(h) = c \times h_i \times A_i$$

where, h_i : Water depth at time i
A_i : Reservoir area at time i
C : Constant

This operation is applied for the evaluation of five selected dams and effective water resources are calculated. The value of "c" depends on the geological condition of the reservoir area and for recharge dam, this value is also essential for the evaluation of the dam. The details of this geological conditions are described in Clause 3 of Annex I-E. The "c" values for the five damsites are as follows:

Damsite	c ($mm/m/km^2$)
Hamman	0.0
Wala	5.0
Siwaqa C	1.0
Nukheila	0.5
Khabra	0.5

Effective water resources are represented with the parameter of effective storage capacity of the dam reservoir and numbers of deficit years. This result is used for dam planning described at Annex (I)-G. Fig. B-26 and Fig. B-27 show the estimated effective water for planned dams of Wala and Nukheila, which are concluded to be major potential sites of surface water development.

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (1/23)

STATION :NA'UR CODE : 23511403

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.710	1.462	71
HASA EVP. ST.	23530607	0.439	5.607	52
HASA P.POST	23530605	0.473	5.187	44
RAYIR EVP.ST.	23600001	0.214	4.934	52
DHAHAL	23540402	0.244	3.462	10
AL-'AINA	23530105	0.963	2.046	8
MUHAI	23530106	0.651	1.745	82
KHANZIRA	23530102	0.583	1.055	106
MANZIL	23530421	0.764	2.173	10
MAZAR	23530413	0.688	1.212	99
KARAK	23530504	0.771	1.053	107
AIY	23530104	0.674	1.075	90
QABR MADHA	23530505	0.951	1.611	6
RAKIN	23530501	0.759	1.196	104
AIN RISAS	23530502	0.770	1.150	104
HASA GAUGING ST.	23530608	0.585	2.113	27
TAFILE	23540201	0.624	1.100	106
QATRANA	23530411	0.709	3.312	84
EL-'AL	23511246	0.866	1.089	43
ABU ALANDA	23511243	0.840	1.475	63
NA'UR	23511403	1.000	1.000	116
ADASIYA JANOUBIYA	23511404	0.819	1.301	68
SAHAB	23530401	0.881	1.656	102
YADUDA	23530402	0.901	1.439	68
YADUDA FAHID ABU J.	23530424	0.957	1.371	50
UMM EL-KINDUM	23530432	0.960	1.613	39
WADI ES-SIR	23511402	0.945	0.841	103
EL-MUWAQQAR	23530403	0.883	2.394	93
UMM EL-AMAD	23530425	0.887	1.474	75
EZ-ZEITUNA EVP.ST.	23530426	0.886	1.710	71
JIZA	23530405	0.850	2.149	106
DHABA' NURSERY	23530415	0.899	2.515	68
UMM EL-RISAS	23530417	0.804	2.251	75
KHAN EZ-ZABEEB	23530418	0.807	2.557	69
SIWAQA EVP.ST.	23530420	0.852	3.321	70
MADABA	23530301	0.887	1.482	112
MA'IN	23530302	0.876	1.274	88
MULEIH	23530428	0.865	1.693	68
WADI WALA	23530406	0.884	1.572	103
JUDAYDA	23530416	0.817	1.546	76
DHIBAN	23530407	0.859	1.502	103
WADI EL-MUJIB	23530408	0.904	2.222	63
JADA'	23530419	0.801	1.073	82
SIRFA	23530429	0.832	1.178	64
QASR EVP.ST.	23530423	0.861	1.245	91
HEMUD	23530409	0.810	1.201	109
RABBA	23530410	0.808	1.176	108
GHOR MAZRA'A	23530101	0.512	3.857	60
GHOR ES-SAFI MET.ST.	23530606	-0.056	5.498	26
GHOR ES-SAFI P.POST	23530601	0.540	3.634	44
PEIR ET-TUNEIB	23530404	0.920	1.952	57
EL-QASTAL	23530414	0.880	1.640	13
QATRANA EVP.ST.	23530434	0.754	3.527	39

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (2/23)

STATION :ABU ALANDA CODE : 23511243

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.603	0.831	55
HASA EVP. ST.	23530607	0.379	3.284	39
HASA P.POST	23530605	0.528	3.307	26
RAYIR EVP.ST.	23600001	0.013	3.239	24
DHAHAL	23540402	-	-	0
AL-'AINA	23530105	-0.655	2.831	3
MUHAI	23530106	0.687	1.690	56
KHANZIRA	23530102	0.700	1.080	57
MANZIL	23530421	-	-	0
MAZAR	23530413	0.695	0.901	58
KARAK	23530504	0.756	0.708	57
AIY	23530104	0.744	0.833	56
QABR MADHA	23530505	-0.827	1.651	3
RAKIN	23530501	0.765	0.845	55
AIN RISAS	23530502	0.778	0.788	57
HASA GAUGING ST.	23530608	0.461	1.206	18
TAFILE	23540201	0.603	0.857	56
QATRANA	23530411	0.581	2.023	47
EL-'AL	23511246	0.844	0.703	36
ABU ALANDA	23511243	1.000	1.000	60
NA'UR	23511403	0.817	0.604	58
ADASIYA JANOUBIYA	23511404	0.683	0.918	43
SAHAB	23530401	0.826	1.179	56
YADUDA	23530402	0.823	0.948	33
YADUDA FAHID ABU J.	23530424	0.843	0.990	22
UMM EL-KINDUM	23530432	0.857	1.044	34
WADI ES-SIR	23511402	0.827	0.492	58
EL-MUWAQQAR	23530403	0.699	1.693	49
UMM EL-AMAD	23530425	0.799	0.973	47
EZ-ZEITUNA EVP.ST.	23530426	0.818	1.135	55
JIZA	23530405	0.757	1.698	55
DHABA' NURSERY	23530415	0.853	1.574	47
UMM EL-RISAS	23530417	0.671	1.294	46
KHAN EZ-ZABEEB	23530418	0.656	1.705	41
SIWAQA EVP.ST.	23530420	0.737	2.147	36
MADABA	23530301	0.788	0.944	60
MA'IN	23530302	0.774	0.752	58
MULEIH	23530428	0.779	1.138	57
WADI WALA	23530406	0.762	1.046	59
JUDAYDA	23530416	0.708	0.911	43
DHIBAN	23530407	0.757	0.960	58
WADI EL-MUJIB	23530408	0.772	1.497	25
JADA'	23530419	0.783	0.786	50
SIRFA	23530429	0.770	0.721	54
QASR EVP.ST.	23530423	0.748	0.766	58
HEMUD	23530409	0.756	0.898	59
RABBA	23530410	0.757	0.822	60
GHOR MAZRA'A	23530101	0.749	3.242	32
GHOR ES-SAFI MET.ST.	23530606	0.554	4.169	5
GHOR ES-SAFI P.POST	23530601	0.473	2.659	23
BEIR ET-TUNEIB	23530404	0.784	1.472	44
EL-QASTAL	23530414	0.949	1.102	5
QATRANA EVP.ST.	23530434	0.573	1.985	31

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (3/23)

STATION :YADUDA CODE : 23530402

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.788	0.911	41
HASA EVP. ST.	23530607	0.443	3.624	24
HASA P.POST	23530605	0.690	3.281	18
BAYIR EVP.ST.	23600001	0.348	3.506	31
DHAHAL	23540402	0.871	2.731	7
AL-'AINA	23530105	-	-	0
MUHAI	23530106	0.655	0.984	56
KHANZIRA	23530102	0.666	0.663	74
MANZIL	23530421	0.709	2.230	10
MAZAR	23530413	0.720	0.770	78
KARAK	23530504	0.748	0.646	85
AIY	23530104	0.741	0.680	60
QABR MADHA	23530505	-	-	0
RAKIN	23530501	0.745	0.850	76
AIN BISAS	23530502	0.811	0.776	81
HASA GAUGING ST.	23530608	0.039	6.839	5
TAFILE	23540201	0.712	0.689	69
QATRANA	23530411	0.757	2.139	59
EL-'AL	23511246	0.913	0.744	27
ABU ALANDA	23511243	0.842	0.952	35
NA'UR	23511403	0.898	0.638	65
ADASIYA JANOUBIYA	23511404	0.659	0.772	45
SAHAB	23530401	0.876	1.210	83
YADUDA	23530402	1.000	1.000	93
YADUDA FAHID ABU J.	23530424	0.981	1.108	13
UMM EL-KINDUM	23530432	0.989	1.113	20
WADI ES-SIR	23511402	0.896	0.516	57
EL-MUWAQQAR	23530403	0.888	1.623	79
UMM EL-AMAD	23530425	0.962	1.220	40
EZ-ZEITUNA EVP.ST.	23530426	0.875	1.111	60
JIZA	23530405	0.866	1.612	74
DHABA' NURSERY	23530415	0.870	1.804	66
UMM EL-RISAS	23530417	0.604	1.340	48
KHAN EZ-ZABEEB	23530418	0.769	1.675	41
SIWAQA EVP.ST.	23530420	0.852	2.164	32
MADABA	23530301	0.850	1.000	74
MA'IN	23530302	0.787	0.837	52
MULEIH	23530428	0.693	1.138	53
WADI WALA	23530406	0.859	1.023	78
JUDAYDA	23530416	0.796	1.062	55
DHIBAN	23530407	0.727	1.140	86
WADI EL-MUJIB	23530408	0.874	1.606	34
JADA'	23530419	0.795	0.781	54
SIRFA	23530429	0.686	0.706	48
QASR EVP.ST.	23530423	0.834	0.794	74
HEMUD	23530409	0.816	0.774	86
RABBA	23530410	0.814	0.777	86
GHOR MAZRA'A	23530101	0.687	2.486	46
GHOR ES-SAFI MET.ST.	23530606	0.245	4.100	15
GHOR ES-SAFI P.POST	23530601	0.703	2.541	50
BEIR ET-TUNEIB	23530404	0.948	1.347	31
EL-QASTAL	23530414	0.848	1.353	14
QATRANA EVP.ST.	23530434	0.751	2.313	25

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (4/23)

STATION :SAHAB CODE : 23530401

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.496	0.673	59
HASA EVP. ST.	23530607	0.387	2.775	46
HASA P.POST	23530605	0.411	2.740	40
BAYIR EVP.ST.	23600001	0.084	2.895	48
DHAHAL	23540402	0.189	2.298	10
AL-'AINA	23530105	0.997	1.304	4
MUHAI	23530106	0.597	0.926	77
KHANZIRA	23530102	0.527	0.575	100
MANZIL	23530421	0.759	1.591	10
NAZAR	23530413	0.586	0.650	99
KARAK	23530504	0.664	0.585	109
AIY	23530104	0.580	0.588	87
QABR MADHA	23530505	0.994	1.017	4
RAKIN	23530501	0.692	0.679	100
AIN RISAS	23530502	0.629	0.622	103
HASA GAUGING ST.	23530608	0.444	1.141	23
TAFILE	23540201	0.542	0.589	94
QATRANA	23530411	0.635	1.927	80
EL-'AL	23511246	0.767	0.563	38
ABU ALANDA	23511243	0.824	0.745	57
NA'UR	23511403	0.870	0.542	95
ADASIYA JANOUBIYA	23511404	0.647	0.671	59
SAHAB	23530401	1.000	1.000	114
YADUDA	23530402	0.867	0.750	78
YADUDA FAHID ABU J.	23530424	0.929	0.825	44
UMM EL-KINDUM	23530432	0.943	0.797	34
WADI ES-SIR	23511402	0.856	0.446	86
EL-MUWAQQAR	23530403	0.834	1.460	98
UMM EL-AMAD	23530425	0.875	0.862	69
EZ-ZEITUNA EVP.ST.	23530426	0.834	0.876	73
JIZA	23530405	0.831	1.232	99
DHABA' NURSERY	23530415	0.804	1.319	69
UMM EL-RISAS	23530417	0.774	1.257	71
KHAN EZ-ZABEEB	23530418	0.726	1.570	66
SIWAQA EVP.ST.	23530420	0.732	1.958	60
MADABA	23530301	0.856	0.835	102
MA'IN	23530302	0.686	0.652	72
MULEIH	23530428	0.728	0.868	68
WADI WALA	23530406	0.785	0.877	102
JUDAYDA	23530416	0.675	0.842	80
DHIBAN	23530407	0.756	0.828	105
WADI EL-MUJIB	23530408	0.808	1.257	56
JADA'	23530419	0.733	0.625	78
SIRFA	23530429	0.680	0.584	65
QASR EVP.ST.	23530423	0.666	0.664	96
HEMUD	23530409	0.675	0.674	109
RABBA	23530410	0.684	0.641	110
GHOR NAZRA'A	23530101	0.381	1.951	57
GHOR ES-SAFI MET.ST.	23530606	-0.086	3.741	26
GHOR ES-SAFI P.POST	23530601	0.546	1.789	52
'REIR ET-TUNEIB	23530404	0.864	1.045	48
EL-QASTAL	23530414	0.898	1.320	10
QATRANA EVP.ST.	23530434	0.631	1.675	34

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (5/23)

STATION :MADABA CODE : 23530301

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.613	0.845	69
HASA EVP. ST.	23530607	0.359	2.995	51
HASA P.POST	23530605	0.510	3.095	44
BAYIR EVP.ST.	23600001	0.011	2.813	53
DHAHAL	23540402	0.563	2.941	10
AL-'AINA	23530105	0.982	1.594	7
MUHAI	23530106	0.600	1.068	85
KHANZIRA	23530102	0.627	0.676	110
MANZIL	23530421	0.787	2.052	11
MAZAR	23530413	0.689	0.754	102
KARAK	23530504	0.767	0.684	111
AIY	23530104	0.672	0.682	96
QARR MADHA	23530505	0.964	1.228	6
RAKIN	23530501	0.771	0.785	106
AIN RISAS	23530502	0.755	0.745	110
HASA GAUGING ST.	23530608	0.475	1.264	28
TAFILE	23540201	0.674	0.716	107
QATRANA	23530411	0.606	2.124	90
EL-'AL	23511246	0.747	0.626	41
ABU ALANDA	23511243	0.793	0.902	63
NA'UR	23511403	0.882	0.612	107
ADASIYA JANOUBIYA	23511404	0.671	0.767	65
SAHAB	23530401	0.865	1.061	107
YADUDA	23530402	0.845	0.884	73
YADUDA FAHID ABU J.	23530424	0.905	0.882	52
UMM EL-KINDUM	23530432	0.870	0.771	38
WADI ES-SIR	23511402	0.861	0.487	96
EL-MUWAQQAR	23530403	0.779	1.518	97
UMM EL-AMAD	23530425	0.888	0.966	78
EZ-ZEITUNA EVP.ST.	23530426	0.753	0.969	71
JIZA	23530405	0.802	1.356	107
DHABA' NURSERY	23530415	0.818	1.592	73
UMM EL-RISAS	23530417	0.752	1.336	78
KHAN EZ-ZABEEB	23530418	0.742	1.714	71
SIWAQA EVP.ST.	23530420	0.802	2.153	71
MADABA	23530301	1.000	1.000	116
MA'IN	23530302	0.779	0.795	85
MULEIH	23530428	0.748	0.990	71
WADI WALA	23530406	0.793	0.988	105
JUDAYDA	23530416	0.761	0.950	81
DHIBAN	23530407	0.776	0.949	109
WADI EL-MUJIB	23530408	0.857	1.469	65
JADA'	23530419	0.801	0.701	87
SIREA	23530429	0.786	0.741	68
QASR EVP.ST.	23530423	0.791	0.791	96
HEMUD	23530409	0.777	0.787	114
RABBA	23530410	0.785	0.751	112
GHOR MAZRA'A	23530101	0.573	2.413	61
GHOR ES-SAFI MET.ST.	23530606	-0.024	4.069	26
GHOR ES-SAFI P.POST	23530601	0.591	2.320	47
BEIR ET-TUNEIB	23530404	0.806	1.135	53
EL-QASTAL	23530414	0.892	1.139	13
QATRANA EVP.ST.	23530434	0.460	1.820	39

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (6/23)

STATION :JIZA CODE : 23530405

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.639	0.536	57
HASA EVP. ST.	23530607	0.426	2.330	45
HASA P.POST	23530605	0.460	2.214	41
BAYIR EVP.ST.	23600001	0.369	2.314	50
DHAHAL	23540402	0.362	2.054	11
AL-'AINA	23530105	0.762	0.577	5
MUHAI	23530106	0.607	0.699	72
KHANZIRA	23530102	0.653	0.474	96
MANZIL	23530421	0.829	1.349	9
NAZAR	23530413	0.701	0.528	91
KARAK	23530504	0.708	0.438	100
AIY	23530104	0.695	0.452	84
QABR MADHA	23530505	0.754	0.442	5
RAKIN	23530501	0.727	0.511	96
AIN RISAS	23530502	0.729	0.460	98
HASA GAUGING ST.	23530608	0.507	0.931	22
TAFILE	23540201	0.625	0.480	91
QATRANA	23530411	0.721	1.469	82
EL-'AL	23511246	0.800	0.364	34
ABU ALANDA	23511243	0.703	0.485	50
NA'UR	23511403	0.829	0.396	91
ADASIYA JANOUBIYA	23511404	0.691	0.458	55
SAHAB	23530401	0.821	0.694	95
YADUDA	23530402	0.852	0.545	68
YADUDA FAHID ABU J.	23530424	0.901	0.616	45
UMM EL-KINDUM	23530432	0.952	0.665	32
WADI ES-SIR	23511402	0.797	0.321	81
EL-MUWAQQAR	23530403	0.843	1.013	93
UMM EL-AMAD	23530425	0.848	0.603	67
EZ-ZEITUNA EVP.ST.	23530426	0.878	0.641	66
JIZA	23530405	1.000	1.000	104
DHABA' NURSERY	23530415	0.908	0.939	64
UMM EL-RISAS	23530417	0.793	0.969	67
KHAN EZ-ZABEEB	23530418	0.770	1.091	65
SIWAQA EVP.ST.	23530420	0.810	1.470	62
MADABA	23530301	0.778	0.607	95
MA'IN	23530302	0.759	0.483	71
MULEIH	23530428	0.865	0.667	66
WADI WALA	23530406	0.811	0.625	94
JUDAYDA	23530416	0.717	0.635	75
DHIBAN	23530407	0.797	0.632	95
WADI EL-MUJIB	23530408	0.826	0.978	56
JADA'	23530419	0.810	0.469	77
SIRFA	23530429	0.749	0.386	60
QASR EVP.ST.	23530423	0.772	0.483	90
HEMUD	23530409	0.761	0.507	104
RABBA	23530410	0.755	0.483	103
GHOR MAZRA'A	23530101	0.582	1.693	56
GHOR ES-SAFI MET.ST.	23530606	0.107	3.433	23
GHOR ES-SAFI P.POST	23530601	0.615	1.594	50
BEIR ET-TUNEIB	23530404	0.894	0.765	48
EL-QASTAL	23530414	0.799	0.750	9
QATRANA EVP.ST.	23530434	0.749	1.469	34

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (7/23)

STATION :EL-MUWAQQAR CODE : 23530403

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.617	0.553	57
HASA EVP. ST.	23530607	0.442	2.223	50
HASA P.POST	23530605	0.527	2.119	43
BAYIR EVP.ST.	23600001	0.372	2.263	51
DHAHAL	23540402	0.504	1.621	10
AL-'AINA	23530105	0.730	0.518	7
MUHAI	23530106	0.579	0.631	76
KHANZIRA	23530102	0.592	0.411	96
MANZIL	23530421	0.738	1.174	10
MAZAR	23530413	0.714	0.481	100
KARAK	23530504	0.761	0.374	107
AIY	23530104	0.694	0.424	86
QABR MADHA	23530505	0.839	0.421	5
RAKIN	23530501	0.781	0.473	98
AIN RISAS	23530502	0.750	0.425	99
HASA GAUGING ST.	23530608	0.529	0.879	25
TAFILE	23540201	0.640	0.434	87
QATRANA	23530411	0.799	1.370	88
EL-'AL	23511246	0.738	0.380	39
ABU ALANDA	23511243	0.685	0.494	49
NA'UR	23511403	0.872	0.373	87
ADASIYA JANOUBIYA	23511404	0.666	0.436	58
SAHAB	23530401	0.831	0.596	99
YADUDA	23530402	0.877	0.551	73
YADUDA FAHID ABU J.	23530424	0.880	0.516	46
UMM EL-KINDUM	23530432	0.928	0.690	34
WADI ES-SIR	23511402	0.842	0.309	83
EL-MUWAQQAR	23530403	1.000	1.000	113
UMM EL-AMAD	23530425	0.782	0.529	72
EZ-ZEITUNA EVP.ST.	23530426	0.877	0.679	74
JIZA	23530405	0.847	0.857	97
DHABA' NURSERY	23530415	0.852	0.982	71
UMM EL-RISAS	23530417	0.813	0.930	65
KHAN EZ-ZABEEB	23530418	0.800	1.036	69
SIWAQA EVP.ST.	23530420	0.850	1.368	66
MADABA	23530301	0.767	0.549	93
MA'IN	23530302	0.784	0.485	73
NULEIH	23530428	0.796	0.610	67
WADI WALA	23530406	0.845	0.572	105
JUDAYDA	23530416	0.798	0.571	83
DHIBAN	23530407	0.732	0.573	102
WADI EL-MUJIB	23530408	0.864	0.925	54
JADA'	23530419	0.836	0.423	82
SIRFA	23530429	0.778	0.430	65
QASR EVP.ST.	23530423	0.827	0.489	98
HEMUD	23530409	0.794	0.476	106
RABBA	23530410	0.783	0.454	105
GHOR MAZRA'A	23530101	0.599	1.609	53
GHOR ES-SAFI MET.ST.	23530606	0.079	2.560	25
GHOR ES-SAFI P.POST	23530601	0.620	1.458	49
BEIR ET-TUNEIB	23530404	0.873	0.794	52
EL-QASTAL	23530414	0.920	0.904	10
QATRANA EVP.ST.	23530434	0.839	1.488	35

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (8/23)

STATION :WADI WALA CODE : 23530406

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.693	0.926	67
HASA EVP. ST.	23530607	0.501	3.828	51
HASA P.POST	23530605	0.486	3.175	44
BAYIR EVP.ST.	23600001	0.332	3.120	50
DHAHAL	23540402	0.695	2.433	11
AL-'AINA	23530105	0.971	1.323	7
MUHAI	23530106	0.549	1.148	79
KHANZIRA	23530102	0.656	0.678	101
MANZIL	23530421	0.895	1.746	7
MAZAR	23530413	0.726	0.759	107
KARAK	23530504	0.838	0.632	112
AIY	23530104	0.749	0.690	95
QABR MADHA	23530505	0.977	1.065	6
RAKIN	23530501	0.823	0.777	103
AIN RISAS	23530502	0.863	0.691	103
HASA GAUGING ST.	23530608	0.577	1.501	22
TAFILE	23540201	0.691	0.688	95
QATRANA	23530411	0.796	2.214	90
EL-'AL	23511246	0.840	0.654	40
ABU ALANDA	23511243	0.748	0.791	59
NA'UR	23511403	0.876	0.563	96
ADASIYA JANOUBIYA	23511404	0.659	0.654	56
SAHAB	23530401	0.787	0.936	102
YADUDA	23530402	0.849	0.854	72
YADUDA FAHID ABU J.	23530424	0.891	0.817	47
UMM EL-KINDUM	23530432	0.963	1.080	35
WADI ES-SIR	23511402	0.873	0.472	90
EL-MUWAQQAR	23530403	0.845	1.508	101
UMM EL-AMAD	23530425	0.872	0.783	72
EZ-ZEITUNA EVP.ST.	23530426	0.917	1.124	79
JIZA	23530405	0.814	1.341	100
DHABA' NURSERY	23530415	0.904	1.639	73
UMM EL-RISAS	23530417	0.864	1.370	73
KHAN EZ-ZABEEB	23530418	0.820	1.630	66
SIWAQA EVP.ST.	23530420	0.870	2.114	64
MADABA	23530301	0.783	0.832	98
MA'IN	23530302	0.811	0.796	82
MULEIH	23530428	0.893	1.131	74
WADI WALA	23530406	1.000	1.000	116
JUDAYDA	23530416	0.843	1.001	84
DHIBAN	23530407	0.870	1.005	108
WADI EL-MUJIB	23530408	0.930	1.443	52
JADA'	23530419	0.890	0.715	85
SIRFA	23530429	0.910	0.692	74
QASR EVP.ST.	23530423	0.907	0.795	103
HEMUD	23530409	0.856	0.787	115
RABBA	23530410	0.881	0.747	108
GHOR NAZRA'A	23530101	0.643	2.411	57
GHOR ES-SAFI MET.ST.	23530606	0.134	3.108	26
GHOR ES-SAFI P.POST	23530601	0.620	2.462	52
BEIR ET-TUNEIB	23530404	0.912	1.291	51
EL-QASTAL	23530414	0.800	1.021	7
QATRANA EVP.ST.	23530434	0.759	2.386	39

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (9/23)

STATION :UMM EL-RISAS CODE : 23530417

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.644	0.624	43
HASA EVP. ST.	23530607	0.618	2.546	33
HASA P.POST	23530605	0.451	2.123	31
BAYIR EVP.ST.	23600001	0.138	1.472	33
DHAHAL	23540402	0.005	2.275	10
AL-'AINA	23530105	-	-	0
MUHAI	23530106	0.562	0.816	51
KHANZIRA	23530102	0.683	0.600	67
MANZIL	23530421	0.363	1.715	10
MAZAR	23530413	0.747	0.579	67
KARAK	23530504	0.838	0.476	69
AIY	23530104	0.683	0.534	62
QABR MADHA	23530505	-	-	0
RAKIN	23530501	0.860	0.557	66
AIN RISAS	23530502	0.788	0.512	66
HASA GAUGING ST.	23530608	0.784	1.133	18
TAFILE	23540201	0.766	0.657	68
QATRANA	23530411	0.690	1.471	57
EL-'AL	23511246	0.757	0.413	27
ABU ALANDA	23511243	0.680	0.585	41
NA'UR	23511403	0.789	0.371	65
ADASIYA JANOUBIYA	23511404	0.558	0.432	40
SAHAB	23530401	0.764	0.644	66
YADUDA	23530402	0.578	0.543	43
YADUDA FAHID ABU J.	23530424	0.880	0.494	33
UMM EL-KINDUM	23530432	0.896	0.584	28
WADI ES-SIR	23511402	0.801	0.303	62
EL-MUWAQQAR	23530403	0.797	0.912	59
UMM EL-AMAD	23530425	0.831	0.553	50
EZ-ZEITUNA EVP.ST.	23530426	0.790	0.663	45
JIZA	23530405	0.796	0.849	66
DHABA' NURSERY	23530415	0.785	1.024	48
UMM EL-RISAS	23530417	1.000	1.000	69
KHAN EZ-ZABEEB	23530418	0.751	1.153	49
SIWAQA EVP.ST.	23530420	0.855	1.414	46
MADABA	23530301	0.719	0.587	68
MA'IN	23530302	0.741	0.487	51
MULEIH	23530428	0.825	0.693	44
WADI WALA	23530406	0.855	0.641	65
JUDAYDA	23530416	0.768	0.595	60
DHIBAN	23530407	0.844	0.622	64
WADI EL-MUJIB	23530408	0.936	0.929	34
JADA'	23530419	0.911	0.485	58
SIRFA	23530429	0.777	0.442	41
QASR EVP.ST.	23530423	0.829	0.519	63
HEMUD	23530409	0.849	0.588	69
RABBA	23530410	0.827	0.528	68
GHOR NAZRA'A	23530101	0.537	2.227	46
GHOR ES-SAFI MET.ST.	23530606	-0.029	2.707	18
GHOR ES-SAFI P.POST	23530601	0.511	1.798	28
BEIR ET-TUNEIB	23530404	0.753	0.797	32
EL-QASTAL	23530414	0.705	0.595	8
QATRANA EVP.ST.	23530434	0.599	1.555	28

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (10/23)

STATION :DHABA' NURSERY CODE : 23530415

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.832	0.546	52
HASA EVP. ST.	23530607	0.519	2.486	40
HASA P.POST	23530605	0.605	2.387	24
BAYIR EVP.ST.	23600001	0.364	2.221	27
DHAHAL	23540402	-	4.933	1
AL-'AINA	23530105	-	-	0
MUHAI	23530106	0.601	0.783	65
KHANZIRA	23530102	0.779	0.585	67
MANZIL	23530421	-0.980	1.921	3
MAZAR	23530413	0.756	0.527	71
KARAK	23530504	0.827	0.365	73
AIY	23530104	0.837	0.494	66
QABR MADHA	23530505	-	-	0
RAKIN	23530501	0.879	0.519	66
AIN RISAS	23530502	0.890	0.461	71
HASA GAUGING ST.	23530608	0.553	0.876	18
TAFILE	23540201	0.813	0.561	59
QATRANA	23530411	0.807	1.302	62
EL-'AL	23511246	0.828	0.418	32
ABU ALANDA	23511243	0.839	0.567	48
NA'UR	23511403	0.888	0.361	57
ADASIYA JANOUBIYA	23511404	0.726	0.487	46
SAHAB	23530401	0.804	0.652	65
YADUDA	23530402	0.868	0.498	56
YADUDA FAHID ABU J.	23530424	0.904	0.627	20
UMM EL-KINDUM	23530432	0.909	0.670	30
WADI ES-SIR	23511402	0.845	0.293	58
EL-MUWAQQAR	23530403	0.861	0.899	70
UMM EL-AMAD	23530425	0.815	0.559	46
EZ-ZEITUNA EVP.ST.	23530426	0.839	0.644	69
JIZA	23530405	0.901	0.992	65
DHABA' NURSERY	23530415	1.000	1.000	77
UMM EL-RISAS	23530417	0.787	0.811	49
KHAN EZ-ZABEEB	23530418	0.861	1.061	46
SIWAQA EVP.ST.	23530420	0.934	1.397	37
MADABA	23530301	0.802	0.540	65
MA'IN	23530302	0.896	0.466	64
MULEIH	23530428	0.863	0.651	63
WADI WALA	23530406	0.900	0.560	72
JUDAYDA	23530416	0.808	0.566	52
DHIBAN	23530407	0.853	0.591	74
WADI EL-MUJIB	23530408	0.962	0.966	27
JADA'	23530419	0.865	0.477	59
SIRFA	23530429	0.851	0.435	56
QASR EVP.ST.	23530423	0.904	0.455	71
HEMUD	23530409	0.918	0.511	75
RABBA	23530410	0.894	0.483	75
GHOR MAZRA'A	23530101	0.822	2.088	35
GHOR ES-SAFI MET.ST.	23530606	0.425	2.683	7
GHOR ES-SAFI P.POST	23530601	0.666	1.610	34
BEIR ET-TUNEIR	23530404	0.857	0.818	40
EL-QASTAL	23530414	0.841	0.653	8
QATRANA EVP.ST.	23530434	0.862	1.472	32

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (11/23)

STATION :DHIBAN CODE : 23530407

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.626	0.905	66
HASA EVP. ST.	23530607	0.587	3.841	49
HASA P.POST	23530605	0.534	3.021	37
BAYIR EVP.ST.	23600001	0.160	2.368	47
DHAHAL	23540402	0.854	2.272	8
AL-'AINA	23530105	0.973	1.431	7
MUHAI	23530106	0.430	0.937	85
KHANZIRA	23530102	0.646	0.614	106
MANZIL	23530421	0.844	1.698	11
MAZAR	23530413	0.722	0.673	110
KARAK	23530504	0.756	0.565	119
AIY	23530104	0.726	0.639	91
QABR MADHA	23530505	0.988	1.142	6
RAKIN	23530501	0.862	0.748	110
AIN PISAS	23530502	0.827	0.657	110
HASA GAUGING ST.	23530608	0.646	1.523	26
TAFILE	23540201	0.681	0.653	99
QATRANA	23530411	0.730	1.984	90
EL-'AL	23511246	0.814	0.705	42
ABU ALANDA	23511243	0.727	0.845	57
NA'UR	23511403	0.848	0.576	95
ADASIYA JANOUBIYA	23511404	0.576	0.624	63
SAHAB	23530401	0.748	0.953	107
YADUDA	23530402	0.714	0.695	83
YADUDA FAHID ABU J.	23530424	0.875	0.855	47
UMM EL-KINDUM	23530432	0.925	1.045	35
WADI ES-SIR	23511402	0.833	0.463	86
EL-MUWAQQAR	23530403	0.737	1.362	106
UMM EL-AMAD	23530425	0.775	0.803	71
EZ-ZEITUNA EVP.ST.	23530426	0.783	0.961	80
JIZA	23530405	0.796	1.317	104
DHABA' NURSERY	23530415	0.862	1.511	79
UMM EL-RISAS	23530417	0.850	1.382	72
KHAN EZ-ZABEEB	23530418	0.792	1.684	66
SIWAQA EVP.ST.	23530420	0.886	2.175	63
MADABA	23530301	0.766	0.843	103
MA'IN	23530302	0.829	0.811	84
MULEIH	23530428	0.926	1.104	75
WADI WALA	23530406	0.871	0.879	109
JUDAYDA	23530416	0.829	0.920	89
DHIBAN	23530407	1.000	1.000	122
WADI EL-MUJIB	23530408	0.927	1.437	62
JADA'	23530419	0.897	0.735	88
SIRFA	23530429	0.846	0.720	75
QASR EVP.ST.	23530423	0.866	0.718	103
HEMUD	23530409	0.814	0.728	119
RABBA	23530410	0.827	0.692	115
GHOR FAZRA'A	23530101	0.649	2.220	59
GHOR ES-SAFI MET.ST.	23530606	0.301	2.644	24
GHOR ES-SAFI P.POST	23530601	0.619	1.959	57
BEIR ET-TUNEIB	23530404	0.822	1.305	52
EL-QASTAL	23530414	0.803	0.855	11
QATRANA EVP.ST.	23530434	0.714	2.473	37

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (12/23)

STATION :WADI EL-MUJIB CODE : 23530408

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.770	0.701	26
HASA EVP. ST.	23530607	0.737	3.860	26
HASA P.POST	23530605	0.749	2.813	26
BAYIR EVP.ST.	23600001	0.487	2.833	28
DHAHAL	23540402	0.899	2.031	8
AL-'AINA	23530105	0.981	1.054	4
MUHAI	23530106	0.492	0.570	39
KHANZIRA	23530102	0.757	0.444	56
MANZIL	23530421	0.939	1.520	9
MAZAR	23530413	0.821	0.516	50
KARAK	23530504	0.921	0.445	55
AIY	23530104	0.861	0.469	42
QABR MADHA	23530505	0.998	0.867	3
RAKIN	23530501	0.928	0.501	55
AIN RISAS	23530502	0.940	0.490	54
HASA GAUGING ST.	23530608	0.674	0.975	24
TAFILE	23540201	0.790	0.471	56
QATRANA	23530411	0.946	1.571	50
EL-'AL	23511246	0.818	0.505	15
ABU ALANDA	23511243	0.833	0.581	23
NA'UR	23511403	0.903	0.407	53
ADASIYA JANOUBIYA	23511404	0.720	0.420	29
SAHAB	23530401	0.790	0.659	52
YADUDA	23530402	0.871	0.534	28
YADUDA FAHID ABU J.	23530424	0.858	0.587	38
UMM EL-KINDUM	23530432	0.942	0.697	20
WADI ES-SIR	23511402	0.887	0.337	44
EL-MUWAQQAR	23530403	0.866	0.941	50
UMM EL-AMAD	23530425	0.759	0.565	41
EZ-ZEITUNA EVP.ST.	23530426	0.892	0.699	27
JIZA	23530405	0.826	0.857	54
DHABA' NURSERY	23530415	0.958	0.995	26
UMM EL-RISAS	23530417	0.941	1.015	34
KHAN EZ-ZABEEB	23530418	0.911	1.177	37
SIWAQA EVP.ST.	23530420	0.971	1.542	47
MADABA	23530301	0.842	0.588	55
MA'IN	23530302	0.882	0.509	38
MULEIH	23530428	0.912	0.655	24
WADI WALA	23530406	0.928	0.643	48
JUDAYDA	23530416	0.876	0.592	40
DHIBAN	23530407	0.923	0.645	55
WADI EL-MUJIB	23530408	1.000	1.000	56
JADA'	23530419	0.924	0.479	44
SIRFA	23530429	0.915	0.538	26
QASR EVP.ST.	23530423	0.961	0.548	42
RENUD	23530409	0.932	0.499	55
RABBA	23530410	0.925	0.500	55
GHOR MAZRA'A	23530101	0.790	1.768	29
GHOR ES-SAFI MET.ST.	23530606	0.263	2.282	15
GHOR ES-SAFI P.POST	23530601	0.753	1.847	21
BEIR ET-TUNEIB	23530404	0.912	0.835	25
EL-QASTAL	23530414	0.963	0.936	4
QATRANA EVP.ST.	23530434	0.931	1.671	17

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (13/23)

STATION :KHAN EZ-ZABEEB CODE : 23530418

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.638	0.493	41
HASA EVP. ST.	23530607	0.583	2.300	40
HASA P.POST	23530605	0.571	1.988	38
HAYIR EVP.ST.	23600001	0.447	2.141	39
DHANAL	23540402	0.868	1.652	7
AL-'AINA	23530105	0.965	1.010	6
MUHAI	23530106	0.473	0.663	49
KHANZIRA	23530102	0.616	0.359	62
MANZIL	23530421	0.811	1.107	10
MAZAR	23530413	0.681	0.410	60
KARAK	23530504	0.743	0.336	61
AIY	23530104	0.738	0.381	58
QABR MADHA	23530505	0.984	0.810	5
RAKIN	23530501	0.733	0.373	62
AIN RISAS	23530502	0.760	0.385	59
HASA GAUGING ST.	23530608	0.684	0.719	18
TAFILE	23540201	0.691	0.373	62
QATRANA	23530411	0.868	1.185	54
EL-'AL	23511246	0.651	0.367	32
ABU ALANDA	23511243	0.600	0.444	38
NA'UR	23511403	0.783	0.325	59
ADASIYA JANOUBIYA	23511404	0.603	0.467	41
SAHAB	23530401	0.709	0.502	61
YADUDA	23530402	0.755	0.465	35
YADUDA FAHID ABU J.	23530424	0.664	0.405	35
UMM EL-KINDUM	23530432	0.809	0.535	26
WADI ES-SIR	23511402	0.772	0.261	56
EL-MUWAQQAR	23530403	0.795	0.799	63
UMM EL-AMAD	23530425	0.646	0.421	55
EZ-ZEITUNA EVP.ST.	23530426	0.747	0.561	40
JIZA	23530405	0.772	0.734	63
DHABA' NURSERY	23530415	0.853	0.820	42
UMM EL-RISAS	23530417	0.734	0.698	47
KHAN EZ-ZABEEB	23530418	1.000	1.000	63
SIWAQA EVP.ST.	23530420	0.897	1.224	48
MADABA	23530301	0.698	0.466	61
MA'IN	23530302	0.825	0.428	50
MULEIH	23530428	0.678	0.506	40
WADI WALA	23530406	0.806	0.511	58
JUDAYDA	23530416	0.723	0.464	52
DHIBAN	23530407	0.770	0.482	56
WADI EL-MUJIB	23530408	0.904	0.777	35
JADA'	23530419	0.727	0.351	59
SIRFA	23530429	0.726	0.415	38
QASR EVP.ST.	23530423	0.825	0.433	58
REIHD	23530409	0.811	0.398	62
RABBA	23530410	0.775	0.389	63
GHOR NAZRA'A	23530101	0.657	1.439	42
GHOR ES-SAFI MET.ST.	23530606	0.072	1.959	16
GHOR ES-SAFI P.POST	23530601	0.594	1.408	25
BEIR ET-TUNEIB	23530404	0.788	0.666	40
EL-QASTAL	23530414	0.877	0.622	9
QATRANA EVP.ST.	23530434	0.916	1.316	24

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (14/23)

STATION :SIWAQA EVP.ST. CODE : 23530420

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.753	0.399	31
HASA EVP. ST.	23530607	0.641	1.925	33
HASA P.POST	23530605	0.782	1.803	40
HAYIR EVP.ST.	23600001	0.498	1.816	37
DHAHAL	23540402	0.808	1.446	10
AL-'AINA	23530105	0.987	0.615	4
MUHAI	23530106	0.578	0.552	38
KHANZIRA	23530102	0.741	0.298	56
MANZIL	23530421	0.974	1.008	7
MAZAR	23530413	0.799	0.340	52
KARAK	23530504	0.887	0.286	53
AIY	23530104	0.850	0.311	52
QABR MADHA	23530505	0.974	0.475	4
RAKIN	23530501	0.879	0.320	55
AIN RISAS	23530502	0.905	0.323	52
HASA GAUGING ST.	23530608	0.594	0.584	22
TAFILE	23540201	0.780	0.309	55
QATRANA	23530411	0.942	0.980	51
EL-'AL	23511246	0.834	0.311	22
ABU ALANDA	23511243	0.795	0.400	30
NA'UR	23511403	0.828	0.262	53
AQASIYA JANOUBIYA	23511404	0.707	0.369	30
SAHAB	23530401	0.705	0.397	51
YADUDA	23530402	0.858	0.395	23
YADUDA FAHID ABU J.	23530424	0.742	0.328	40
UMM EL-KINDUM	23530432	0.883	0.447	25
WADI ES-SIR	23511402	0.817	0.211	48
EL-MUWAQQAR	23530403	0.840	0.631	52
UMM EL-AMAD	23530425	0.726	0.348	49
EZ-ZEITUNA EVP.ST.	23530426	0.841	0.467	32
JIZA	23530405	0.800	0.563	53
DHABA' NURSERY	23530415	0.928	0.670	30
UMM EL-RISAS	23530417	0.844	0.620	43
KHAN EZ-ZABEEB	23530418	0.896	0.745	45
SIWAQA EVP.ST.	23530420	1.000	1.000	56
MADABA	23530301	0.758	0.385	53
MA'IN	23530302	0.893	0.334	38
MULEIH	23530428	0.809	0.438	32
WADI KALA	23530406	0.862	0.413	52
JUDAYDA	23530416	0.774	0.375	44
DHIBAN	23530407	0.883	0.413	48
WADI EL-MUJIB	23530408	0.970	0.633	40
JADA'	23530419	0.849	0.300	50
SIREA	23530429	0.871	0.341	32
QASR EVP.ST.	23530423	0.910	0.355	51
HEMUD	23530409	0.903	0.326	55
RABDA	23530410	0.873	0.322	53
GHOR MAZRA'A	23530101	0.812	1.226	34
GHOR ES-SAFI MET.ST.	23530606	0.245	1.893	15
GHOR ES-SAFI P.POST	23530601	0.778	1.195	20
BEIR ET-TUNEIB	23530404	0.832	0.534	30
EL-QASTAL	23530414	1.000	0.501	2
QATRANA EVP.ST.	23530434	0.938	1.054	22

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (15/23)

STATION :JADA' CODE : 23530419

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.642	1.088	55
HASA EVP. ST.	23530607	0.500	4.350	44
HASA P.POST	23530605	0.613	4.327	40
HAYIR EVP.ST.	23600001	0.158	3.546	44
DHAHAL	23540402	0.845	4.716	9
AL-'AINA	23530105	0.720	1.070	5
MUHAI	23530106	0.595	1.558	69
KHANZIRA	23530102	0.805	0.893	85
MANZIL	23530421	0.922	3.417	11
MAZAR	23530413	0.885	1.001	87
KARAK	23530504	0.909	0.882	88
AIY	23530104	0.870	0.925	81
QABR MADHA	23530505	0.841	0.853	4
RAKIN	23530501	0.941	1.011	85
AIN RISAS	23530502	0.898	0.903	87
HASA GAUGING ST.	23530608	0.700	1.997	26
TAFILE	23540201	0.808	0.910	79
QATRANA	23530411	0.787	2.775	74
EL-'AL	23511246	0.802	0.848	38
ABU ALANDA	23511243	0.784	1.037	52
NA'UR	23511403	0.793	0.740	78
ADASIYA JANOUBIYA	23511404	0.643	0.872	53
SAHAB	23530401	0.739	1.213	81
YADUDA	23530402	0.784	1.017	53
YADUDA FAHID ABU J.	23530424	0.842	1.064	47
UMM EL-KINDUM	23530432	0.916	1.246	36
WADI ES-SIR	23511402	0.844	0.570	72
EL-MUWAQQAR	23530403	0.834	1.990	85
UMM EL-AMAD	23530425	0.762	1.083	70
EZ-ZEITUNA EVP.ST.	23530426	0.821	1.315	61
JIZA	23530405	0.814	1.760	84
DHABA' NURSERY	23530415	0.864	1.860	61
UMM EL-RISAS	23530417	0.916	1.891	66
KHAN EZ-ZABEEB	23530418	0.747	2.213	65
SIWAQA EVP.ST.	23530420	0.859	2.872	63
MADABA	23530301	0.795	1.144	84
MA'IN	23530302	0.799	0.956	66
MULEIH	23530428	0.909	1.357	60
WADI WALA	23530406	0.891	1.245	86
JUDAYDA	23530416	0.891	1.226	75
DHIBAN	23530407	0.894	1.211	86
WADI EL-MUJIB	23530408	0.919	1.912	48
JADA'	23530419	1.000	1.000	91
SIRFA	23530429	0.927	0.914	62
QASR EVP.ST.	23530423	0.923	1.059	84
HEMUD	23530409	0.900	1.014	91
RABDA	23530410	0.925	0.978	88
GHOR MAZRA'A	23530101	0.839	3.411	48
GHOR ES-SAFI MET.ST.	23530606	-0.160	3.517	18
GHOR ES-SAFI P.POST	23530601	0.798	2.986	35
BEIR ET-TUNEIB	23530404	0.805	1.547	51
EL-QASTAL	23530414	0.650	1.165	10
QATRANA EVP.ST.	23530434	0.781	2.884	35

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (16/23)

STATION :HEMUD CODE : 23530409

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.785	1.103	66
HASA EVP. ST.	23530607	0.591	4.474	50
HASA P.POST	23530605	0.713	4.701	43
BAYIR EVP.ST.	23600001	0.384	4.196	53
DHAHAL	23540402	0.894	5.484	11
AL-'AINA	23530105	0.992	1.570	6
MUHAI	23530106	0.554	1.099	89
KHANZIRA	23530102	0.856	0.928	114
MANZIL	23530421	0.921	4.071	11
MAZAR	23530413	0.837	0.957	113
KARAK	23530504	0.886	0.757	121
AIY	23530104	0.884	0.918	100
QABR FADHA	23530505	0.977	1.224	5
RAKIN	23530501	0.919	0.956	114
AIN RISAS	23530502	0.931	0.918	114
HASA GAUGING ST.	23530608	0.698	1.555	25
TAEILE	23540201	0.888	0.981	105
QATRANA	23530411	0.839	2.711	94
EL-'AL	23511246	0.876	0.763	40
ABU ALANDA	23511243	0.747	0.906	58
NA'UR	23511403	0.799	0.663	102
ADASIYA JANOUBIYA	23511404	0.654	0.710	63
SAHAB	23530401	0.678	1.060	111
YADUDA	23530402	0.803	1.028	82
YADUDA FAHID ABU J.	23530424	0.756	0.960	50
UMM EL-KINDUM	23530432	0.921	1.166	37
WADI ES-SIR	23511402	0.850	0.516	91
EL-MUWAQQAR	23530403	0.794	1.683	107
UMM EL-AMAD	23530425	0.723	0.997	75
EZ-ZEITUNA EVP.ST.	23530426	0.841	1.126	78
JIZA	23530405	0.769	1.533	110
DHABA' NURSERY	23530415	0.919	1.817	77
UMM EL-RISAS	23530417	0.858	1.491	77
KHAN EZ-ZABEEB	23530418	0.824	2.061	70
SIWAQA EVP.ST.	23530420	0.903	2.760	68
MADABA	23530301	0.762	0.998	107
MA'IN	23530302	0.842	0.879	83
MULEIH	23530428	0.870	1.133	75
WADI WALA	23530406	0.852	1.085	113
JUDAYDA	23530416	0.828	1.152	88
DHIBAN	23530407	0.809	1.127	116
WADI EL-MUJIB	23530408	0.929	1.841	61
JADA'	23530419	0.898	0.884	88
SIRFA	23530429	0.850	0.781	75
QASR EVP.ST.	23530423	0.894	0.928	107
HEMUD	23530409	1.000	1.000	126
RABBA	23530410	0.951	0.924	120
GHOR MAZRA'A	23530101	0.814	3.651	62
GHOR ES-SAFI MET.ST.	23530606	0.169	3.785	29
GHOR ES-SAFI P.POST	23530601	0.753	3.402	57
HEIR ET-TUNEIB	23530404	0.886	1.403	53
EL-QASTAL	23530414	0.842	1.162	10
QATRANA EVP.ST.	23530434	0.843	2.759	39

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (17/23)

STATION :QATRANA CODE : 23530411

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.648	0.377	46
HASA EVP. ST.	23530607	0.642	1.711	39
HASA P.POST	23530605	0.788	1.713	38
BAYIR EVP.ST.	23600001	0.547	1.693	42
DHAHAL	23540402	0.888	1.490	9
AL-'AINA	23530105	0.992	0.646	4
MUHAI	23530106	0.506	0.424	60
KHANZIRA	23530102	0.711	0.286	77
MANZIL	23530421	0.964	1.119	8
MAZAR	23530413	0.751	0.316	78
KARAK	23530504	0.770	0.244	79
AIY	23530104	0.800	0.288	71
QABR MADNA	23530505	0.996	0.506	4
RAKIN	23530501	0.778	0.310	76
AIN RISAS	23530502	0.800	0.284	75
HASA GAUGING ST.	23530608	0.540	0.524	20
TAFILE	23540201	0.758	0.305	71
QATRANA	23530411	1.000	1.000	82
EL-'AL	23511246	0.733	0.324	25
ABU ALANDA	23511243	0.574	0.328	38
NA'UR	23511403	0.678	0.215	70
ADASIYA JANOUBIYA	23511404	0.447	0.279	41
SAHAB	23530401	0.602	0.354	71
YADUDA	23530402	0.758	0.366	50
YADUDA FAHID ABU J.	23530424	0.702	0.297	38
UMM EL-KINDUM	23530432	0.842	0.449	24
WADI ES-SIR	23511402	0.663	0.173	64
EL-MUWAQQAR	23530403	0.780	0.590	75
UMM EL-AMAD	23530425	0.614	0.301	52
EZ-ZEITUNA EVP.ST.	23530426	0.715	0.392	54
JIZA	23530405	0.697	0.506	75
DHABA' NURSERY	23530415	0.788	0.627	54
UMM EL-RISAS	23530417	0.668	0.498	53
KHAN EZ-ZABEEB	23530418	0.854	0.729	51
SIWAQA EVP.ST.	23530420	0.934	0.956	50
MADABA	23530301	0.579	0.315	73
MA'IN	23530302	0.712	0.295	59
MULEIH	23530428	0.662	0.373	48
WADI WALA	23530406	0.790	0.364	79
JUDAYDA	23530416	0.741	0.382	60
DHIBAN	23530407	0.720	0.385	76
WADI EL-MUJIB	23530408	0.946	0.604	43
JADA'	23530419	0.766	0.286	60
SIRFA	23530429	0.667	0.271	44
QASR EVP.ST.	23530423	0.801	0.305	73
HEMUD	23530409	0.831	0.311	82
RABBA	23530410	0.789	0.287	78
GHOR MAZRA'A	23530101	0.763	1.207	47
GHOR ES-SAFI MET.ST.	23530606	0.243	1.417	21
GHOR ES-SAFI P.POST	23530601	0.775	1.195	35
BEIR ET-TUNEIB	23530404	0.770	0.525	35
EL-QASTAL	23530414	0.353	0.599	5
QATRANA EVP.ST.	23530434	0.934	1.072	31

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (18/23)

STATION :JUDAYDA CODE : 23530416

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.736	0.982	50
HASA EVP. ST.	23530607	0.447	3.501	38
HASA P.POST	23530605	0.579	3.234	36
BAYIR EVP.ST.	23600001	0.105	2.830	40
DHAHAL	23540402	0.856	3.004	10
AL-'AINA	23530105	0.932	0.920	5
MUHAI	23530106	0.699	1.357	64
KHANZIRA	23530102	0.723	0.629	81
MANZIL	23530421	0.902	2.314	9
MAZAR	23530413	0.778	0.726	84
KARAK	23530504	0.845	0.637	90
AIY	23530104	0.785	0.662	78
QABR MADHA	23530505	0.993	0.740	4
RAKIN	23530501	0.882	0.756	81
AIN RISAS	23530502	0.845	0.680	85
HASA GAUGING ST.	23530608	0.727	1.968	20
TAFILE	23540201	0.765	0.696	75
QATRANA	23530411	0.743	2.059	70
EL-'AL	23511246	0.802	0.705	35
ABU ALANDA	23511243	0.719	0.879	46
NA'UR	23511403	0.810	0.548	73
ADASIYA JANOUBIYA	23511404	0.771	0.858	49
SAHAR	23530401	0.685	0.888	82
YADUDA	23530402	0.808	0.810	55
YADUDA FAHID ABU J.	23530424	0.794	0.797	44
UMM EL-KINDUM	23530432	0.899	1.002	28
WADI ES-SIR	23511402	0.831	0.436	68
EL-MUWAQQAR	23530403	0.803	1.489	82
UMM EL-AMAD	23530425	0.723	0.846	60
EZ-ZEITUNA EVP.ST.	23530426	0.784	0.955	60
JIZA	23530405	0.732	1.234	81
DHABA' NURSERY	23530415	0.827	1.523	58
UMM EL-RISAS	23530417	0.781	1.369	64
KHAN EZ-ZABEEB	23530418	0.749	1.717	55
SIWAQA EVP.ST.	23530420	0.814	2.207	55
MADABA	23530301	0.759	0.847	79
MA'IN	23530302	0.860	0.731	60
MULEIH	23530428	0.883	1.017	59
WADI WALA	23530406	0.848	0.865	87
JUDAYDA	23530416	1.000	1.000	92
DHIBAN	23530407	0.830	0.918	86
WADI EL-MUJIB	23530408	0.885	1.503	43
JADA'	23530419	0.893	0.726	76
SIRFA	23530429	0.837	0.701	59
QASR EVP.ST.	23530423	0.834	0.728	85
HEMUD	23530409	0.830	0.729	89
RABBA	23530410	0.817	0.679	88
GHOR MAZRA'A	23530101	0.717	2.437	47
GHOR ES-SAFI MET.ST.	23530606	-0.283	2.950	21
GHOR ES-SAFI P.POST	23530601	0.849	2.176	40
BEIR ET-TUHEIB	23530404	0.746	1.144	40
EL-QASTAL	23530414	0.779	0.880	8
QATRANA EVP.ST.	23530434	0.710	2.277	29

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (19/23)

STATION :KARAK CODE : 23530504

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.803	1.324	67
HASA EVP. ST.	23530607	0.488	4.459	49
HASA P.POST	23530605	0.701	4.942	45
BAYIR EVP.ST.	23600001	0.215	3.839	53
DHAHAL	23540402	0.871	5.575	11
AL-'AINA	23530105	0.941	1.609	7
MUHAI	23530106	0.493	1.317	87
KHANZIRA	23530102	0.869	1.025	113
MANZIL	23530421	0.946	3.927	10
MAZAR	23530413	0.902	1.171	114
KARAK	23530504	1.000	1.000	129
AIY	23530104	0.917	1.057	97
QABR MADHA	23530505	0.903	1.238	5
RAKIN	23530501	0.896	1.165	118
AIN RISAS	23530502	0.977	1.075	117
HASA GAUGING ST.	23530608	0.823	2.183	25
TAFILE	23540201	0.879	1.067	107
QATRANA	23530411	0.779	3.283	93
EL-'AL	23511246	0.856	0.951	40
ABU ALANDA	23511243	0.757	1.162	58
NA'UR	23511403	0.762	0.750	103
ADASIYA JANOUBIYA	23511404	0.633	0.851	62
SAHAR	23530401	0.662	1.222	112
YADUDA	23530402	0.745	1.168	84
YADUDA FAHID ABU J.	23530424	0.773	1.118	51
UMM EL-KINDUM	23530432	0.851	1.315	36
WADI ES-SIR	23511402	0.803	0.588	92
EL-MUWAQQAR	23530403	0.761	2.085	110
UMM EL-AMAD	23530425	0.750	1.198	77
EZ-ZEITUNA EVP.ST.	23530426	0.802	1.451	81
JIZA	23530405	0.721	1.723	110
DHABA' NURSERY	23530415	0.835	2.340	79
UMM EL-RISAS	23530417	0.851	1.821	77
KHAN EZ-ZABEEB	23530418	0.769	2.350	69
SIWAQA EVP.ST.	23530420	0.893	3.158	69
MADABA	23530301	0.765	1.157	110
MA'IN	23530302	0.815	1.064	83
MULEIH	23530428	0.873	1.455	78
WADI WALA	23530406	0.840	1.343	115
JUDAYDA	23530416	0.845	1.351	90
DHIBAN	23530407	0.758	1.359	120
WADI EL-MUJIB	23530408	0.918	2.064	62
JADA'	23530419	0.910	1.030	92
SIRFA	23530429	0.864	0.993	76
QASR EVP.ST.	23530423	0.881	1.146	109
HEMUD	23530409	0.890	1.171	127
RABBA	23530410	0.939	1.049	121
GHOR MAZRA'A	23530101	0.816	3.935	62
GHOR 'ES-SAFI MET.ST.	23530606	0.135	4.101	29
GHOR ES-SAFI P.POST	23530601	0.823	4.000	58
BEIR ET-TUNEIB	23530404	0.767	1.612	53
EL-QASTAL	23530414	0.903	1.113	11
QATRANA EVP.ST.	23530434	0.657	3.235	38

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (20/23)

STATION :NAZAR CODE : 23530413

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.779	0.967	63
HASA EVP. ST.	23530607	0.451	3.535	47
HASA P.POST	23530605	0.707	4.309	44
BAYIR EVP.ST.	23600001	0.366	3.814	54
DHAHAL	23540402	0.921	5.724	11
AL-'AINA	23530105	0.816	0.944	7
MUHAI	23530106	0.540	1.039	86
KHANZIRA	23530102	0.880	0.871	109
MANZIL	23530421	0.966	4.021	11
NAZAR	23530413	1.000	1.000	119
KARAK	23530504	0.901	0.768	111
AIY	23530104	0.876	0.830	97
QABR MADHA	23530505	0.695	0.692	5
RAKIN	23530501	0.902	0.949	109
AIN PISAS	23530502	0.952	0.795	111
HASA GAUGING ST.	23530608	0.762	1.703	25
TAFILE	23540201	0.924	0.924	100
QATRANA	23530411	0.762	2.445	92
EL-'AL	23511246	0.793	0.692	39
ABU ALANDA	23511243	0.682	0.858	56
NA'UR	23511403	0.683	0.584	96
ADASIYA JANOUBIYA	23511404	0.647	0.671	63
SAHAB	23530401	0.578	0.991	102
YADUDA	23530402	0.713	0.948	78
YADUDA FAHID ABU J.	23530424	0.711	0.930	49
UMM EL-KINDUM	23530432	0.864	0.996	36
WADI ES-SIR	23511402	0.774	0.454	91
EL-MUWAQQAR	23530403	0.723	1.529	106
UMM EL-AMAD	23530425	0.646	0.934	74
EZ-ZEITUNA EVP.ST.	23530426	0.757	1.028	77
JIZA	23530405	0.721	1.398	102
DHABA' NURSERY	23530415	0.771	1.527	76
UMM EL-RISAS	23530417	0.760	1.373	73
KHAN EZ-ZABEEB	23530418	0.705	1.737	69
SIWAQA EVP.ST.	23530420	0.818	2.391	68
MADABA	23530301	0.689	0.946	102
MA'IN	23530302	0.748	0.730	83
MULEIH	23530428	0.811	1.084	72
WADI WALA	23530406	0.729	0.978	108
JUDAYDA	23530416	0.767	1.086	79
DHIBAN	23530407	0.722	1.087	109
WADI EL-MUJIB	23530408	0.832	1.584	58
JADA'	23530419	0.885	0.879	87
SIREA	23530429	0.821	0.748	70
QASR EVP.ST.	23530423	0.794	0.841	102
HEMUD	23530409	0.843	0.874	116
RABBA	23530410	0.871	0.823	113
GHOR MAZRA'A	23530101	0.866	3.406	61
GHOR ES-SAFI MET.ST.	23530606	0.130	3.352	29
GHOR ES-SAFI P.POST	23530601	0.894	3.426	48
BEIR ET-TUNEIB	23530404	0.778	1.150	51
EL-QASTAL	23530414	0.820	0.936	12
QATRANA EVP.ST.	23530434	0.704	2.325	39

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (21/23)

STATION :MUHAI CODE : 23530106

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.752	0.526	53
HASA EVP. ST.	23530607	0.595	1.886	43
HASA P.POST	23530605	0.565	1.870	29
BAYIR EVP.ST.	23600001	-0.072	1.912	33
DHAHAL	23540402	-	8.222	1
AL-'AINA	23530105	0.971	0.641	4
MUHAI	23530106	1.000	1.000	83
KHANZIRA	23530102	0.533	0.627	79
MANZIL	23530421	-0.168	3.474	6
MAZAR	23530413	0.507	0.576	78
KARAK	23530504	0.413	0.425	78
AIY	23530104	0.592	0.432	68
QABR MADHA	23530505	0.971	0.500	4
RAKIN	23530501	0.451	0.513	73
AIN RISAS	23530502	0.435	0.476	79
HASA GAUGING ST.	23530608	0.244	0.694	22
TAFILE	23540201	0.453	0.605	72
QATRANA	23530411	0.410	1.414	67
EL-'AL	23511246	0.800	0.385	32
ABU ALANDA	23511243	0.668	0.457	49
NA'UR	23511403	0.614	0.390	69
ADASIYA JANOUBIYA	23511404	0.777	0.696	57
SAHAR	23530401	0.580	0.702	71
YADUDA	23530402	0.632	0.712	54
YADUDA FAHID ABU J.	23530424	0.603	0.455	26
UMM EL-KINDUM	23530432	0.808	0.510	28
WADI ES-SIR	23511402	0.540	0.312	69
EL-MUWAQQAR	23530403	0.555	1.032	71
UMM EL-AMAD	23530425	0.546	0.486	47
EZ-ZEITUNA EVP.ST.	23530426	0.631	0.500	60
JIZA	23530405	0.558	0.951	72
DHABA' NURSERY	23530415	0.501	0.914	62
UMM EL-RISAS	23530417	0.543	0.798	53
KHAN EZ-ZABEEB	23530418	0.411	0.934	52
SIWAQA EVP.ST.	23530420	0.500	1.234	44
MADABA	23530301	0.536	0.603	74
MA'IN	23530302	0.288	0.409	71
MULEIH	23530428	0.740	0.541	62
WADI WALA	23530406	0.480	0.526	73
JUDAYDA	23530416	0.634	0.546	56
DHIBAN	23530407	0.391	0.556	77
WADI EL-MUJIB	23530408	0.417	0.965	39
JADA'	23530419	0.530	0.415	61
SIRFA	23530429	0.798	0.389	55
QASR EVP.ST.	23530423	0.674	0.414	68
HEMUD	23530409	0.501	0.553	81
RABBA	23530410	0.467	0.480	81
GHOR MAZRA'A	23530101	0.266	2.118	39
GHOR ES-SAFI MET.ST.	23530606	0.038	3.698	17
GHOR ES-SAFI P.POST	23530601	0.633	1.696	28
BEIR ET-TUNEIB	23530404	0.699	0.635	42
EL-QASTAL	23530414	0.188	0.922	9
QATRANA EVP.ST.	23530434	0.573	1.270	35

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL AT THE STATIONS (22/23)

STATION :HASA P.POST CODE : 23530605

STATION	CODE	CO-EFFI.	A	POPULATION
ARUR	23540202	0.502	0.188	22
HASA EVP. ST.	23530607	0.693	0.911	24
HASA P.POST	23530605	1.000	1.000	33
DAYIR EVP.ST.	23600001	0.699	1.149	25
DHAHAL	23540402	0.909	0.998	6
AL-'AINA	23530105	0.557	0.249	5
MUHAI	23530106	0.493	0.406	22
KHANZIRA	23530102	0.781	0.165	33
MANZIL	23530421	1.000	0.735	2
MAZAR	23530413	0.723	0.179	32
KARAK	23530504	0.701	0.159	31
AIY	23530104	0.784	0.164	32
QABR MADHA	23530505	0.907	0.192	4
RAKIN	23530501	0.682	0.174	32
AIN RISAS	23530502	0.763	0.169	30
HASA GAUGING ST.	23530608	0.575	0.276	9
TAFILE	23540201	0.782	0.166	32
QATRANA	23530411	0.788	0.471	28
EL-'AL	23511246	0.680	0.191	14
ABU ALANDA	23511243	0.554	0.245	19
NA'UR	23511403	0.403	0.123	33
ADASIYA JANOUBIYA	23511404	0.181	0.224	16
SAHAB	23530401	0.338	0.219	30
YADUDA	23530402	0.668	0.236	13
YADUDA FAHID ABU J.	23530424	0.419	0.172	21
UMM EL-KINDUM	23530432	0.407	0.191	16
WADI ES-SIR	23511402	0.308	0.090	31
EL-MUWAQQAR	23530403	0.471	0.307	31
UMM EL-AMAD	23530425	0.522	0.237	29
EZ-ZEITUNA EVP.ST.	23530426	0.347	0.192	20
JIZA	23530405	0.439	0.271	33
DHABA' NURSERY	23530415	0.634	0.323	18
UMM EL-RISAS	23530417	0.417	0.303	24
KHAN EZ-ZABEEB	23530418	0.529	0.350	31
SIWAQA EVP.ST.	23530420	0.740	0.458	30
MADABA	23530301	0.479	0.225	32
MA'IN	23530302	0.513	0.144	24
MULEIH	23530428	0.403	0.216	21
WADI WALA	23530406	0.428	0.184	33
JUDAYDA	23530416	0.562	0.225	25
DHIBAN	23530407	0.500	0.212	27
WADI EL-MUJIB	23530408	0.711	0.281	19
JADA'	23530419	0.618	0.164	30
SIRFA	23530429	0.630	0.185	20
QASR EVP.ST.	23530423	0.570	0.170	30
HEMUD	23530409	0.740	0.163	33
RAUDA	23530410	0.679	0.162	32
GHOR MAZRA'A	23530101	0.845	0.693	24
GHOR ES-SAFI MET.ST.	23530606	0.415	1.129	8
GHOR ES-SAFI P.POST	23530601	0.931	0.687	12
BEIR ET-TUNEIB	23530404	0.283	0.219	20
EL-QASTAL	23530414	1.000	0.454	2
QATRANA EVP.ST.	23530434	0.771	0.463	15

RAINFALL : MORE THAN 5.0 MM/MONTH

TABLE.B-1. CORRELATION OF MONTHLY RAINFALL
AT THE STATIONS (23/23)

STATION :BAYIR EVP.ST. CODE : 23600001

STATION	CODE	CO-EFFI.	A	POPULATION
ABUR	23540202	0.482	0.168	17
HASA EVP. ST.	23530607	0.642	0.809	16
HASA P.POST	23530605	0.694	0.751	21
BAYIR EVP.ST.	23600001	1.000	1.000	36
DHAHAL	23540402	0.729	0.542	7
AL-'AINA	23530105	-0.663	0.494	3
MUHAI	23530106	0.087	0.162	25
KHANZIRA	23530102	0.367	0.109	35
MANZIL	23530421	0.596	0.415	3
MAZAR	23530413	0.353	0.131	33
KARAK	23530504	0.234	0.122	34
AIY	23530104	0.467	0.117	29
QABR MADHA	23530505	-	0.894	2
RAKIN	23530501	0.236	0.138	35
AIN RISAS	23530502	0.409	0.130	35
HASA GAUGING ST.	23530608	0.166	0.757	6
TAFILE	23540201	0.353	0.113	36
QATRANA	23530411	0.610	0.395	32
EL-'AL	23511246	0.594	0.196	13
ABU ALANDA	23511243	0.117	0.186	15
NA'UR	23511403	0.279	0.113	33
ADASIYA JANOUBIYA	23511404	0.090	0.139	22
SAHAB	23530401	0.319	0.202	31
YADUDA	23530402	0.491	0.179	24
YADUDA FAHID ABU J.	23530424	0.367	0.152	16
UMM EL-KINDUM	23530432	0.614	0.226	11
WADI ES-SIR	23511402	0.147	0.089	32
EL-MUWAQQAR	23530403	0.429	0.268	33
UMM EL-AMAD	23530425	0.271	0.177	27
EZ-ZEITUNA EVP.ST.	23530426	0.497	0.219	16
JIZA	23530405	0.407	0.241	35
DHABA' NURSERY	23530415	0.369	0.283	19
UMM EL-RISAS	23530417	0.087	0.329	20
KHAN EZ-ZABEEB	23530418	0.470	0.315	24
SIWAQA EVP.ST.	23530420	0.536	0.371	26
MADABA	23530301	0.114	0.174	33
MA'IN	23530302	0.346	0.126	23
MULEIH	23530428	0.045	0.239	15
WADI WALA	23530406	0.383	0.189	33
JUDAYDA	23530416	0.296	0.201	24
DHIBAN	23530407	0.168	0.192	30
WADI EL-MUJIB	23530408	0.501	0.236	20
JADA'	23530419	0.198	0.119	25
SIRFA	23530429	0.181	0.166	15
QASR EVP.ST.	23530423	0.575	0.153	28
HEMUD	23530409	0.452	0.125	36
RABBA	23530410	0.385	0.130	33
GHOR FAZRA'A	23530101	0.566	0.456	22
GHOR ES-SAFI MET.ST.	23530606	0.067	0.919	11
GHOR ES-SAFI P.POST	23530601	0.692	0.449	16
BEIR ET-TUNEIB	23530404	0.547	0.240	16
EL-QASTAL	23530414	-0.234	0.370	6
QATRANA EVP.ST.	23530434	0.878	0.442	7

RAINFALL : MORE THAN 5.0 MM/MONTH