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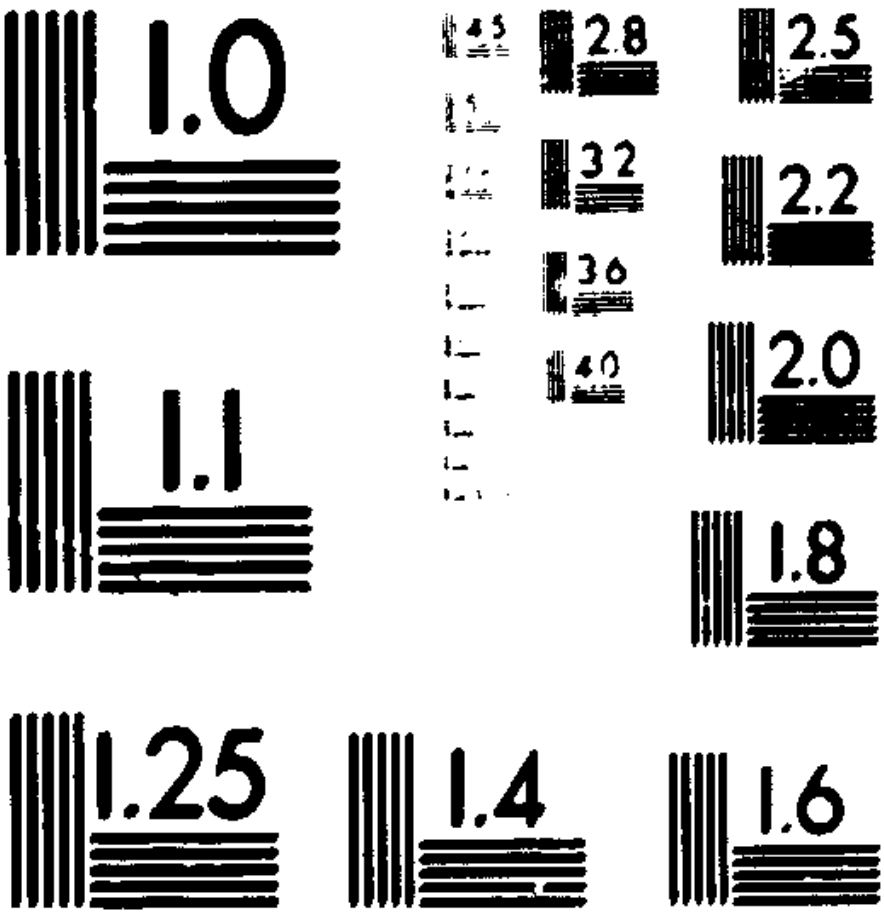

Consultation Meeting on Training and Manpower Development for the Fertilizer Industry in the Arab Region 84/125

14452

Study on
Training and Manpower
Development for the Fertilizer
Industry in the Arab Region

DP/RAB/78/021

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3424

Kuwait, December 1984

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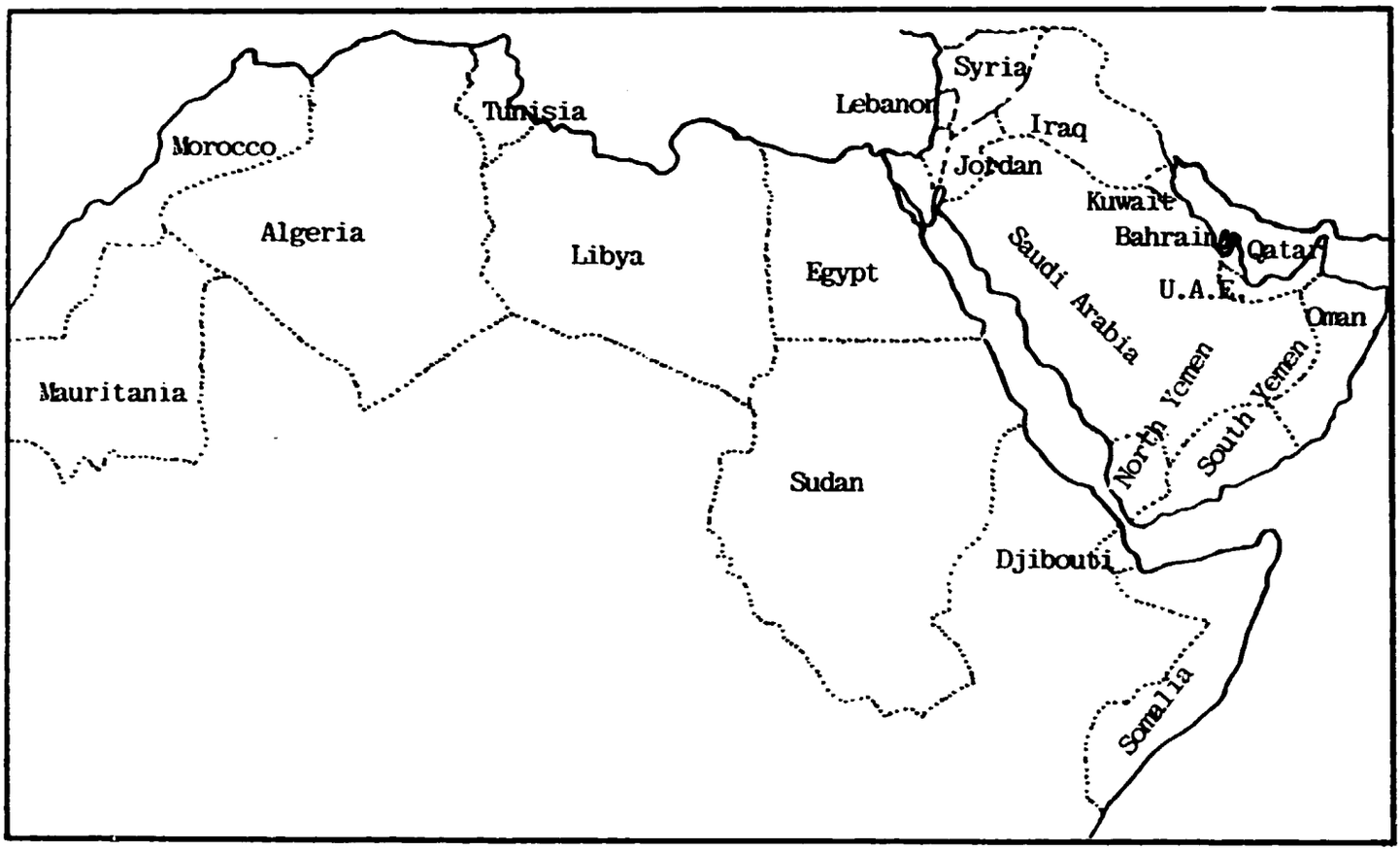

ARAB REGION

1. JORDAN	8. SUDAN	15. LEBANON
2. U.A.E	9. SYRIA	16. LIBYA
3. BAHRAIN	10. SOMALIA	17. EGYPT
4. TUNISIA	11. IRAQ	18. MOROCCO
5. ALGERIA	12. OMAN	19. MAURITANIA
6. DJIBOUTI	13. QATAR	20. NORTH YEMEN
7. SAUDI ARABIA	14. KUWAIT	21. SOUTH YEMEN

List of Fertilizer Companies

in th Arab Region

1- **Jordan:**

* Jordan Phosphate Mines Company	JMPC
* Jordan Fertilizer Industry Company	JFI
* Arab Potash Company	APC

2- **U.A.E:**

* Abu Dhabi National Oil Company	ADNOC
* Ruwais Ferrtilizer Industries	FERTIL

3- **Bahrain:**

* Gulf Petrochemical Industries Company	GPIC

4- **Tunisia:**

* Industries Chemiques Maghrebines	ICM
* Societe Industrielle D'Acide Phosphorique Et D'Engrais	STAPF
* Compagnie Des Phosphate Des Gafsa	GAFSA
* Societe Arabe Des Engrais Phosphate Et Azote	SAEPA
* Engrais De Gabes	EG
* Societe Tunisienne D'Engrais Chemiques	STEC
* Industrie Chemiques De Gafsa	ICG

5- **Algeria:**

* Enterprise Nationale Des Engrais Et Produits Phytos	ASMIDAL
* Enterprise Nationale De Fer Et Du Phosphate	ENFP

6- **Saudi Arabia:**

* Saudi Arabian Fertilizer Company	SAFCO
* Saudi Arabian Basic Industries Corporation	SABIC

7- **Sudan:**

* Sudan - Ren Chemicals & Fertilizers	S-Ren

8- **Syria:**

* General Organization For Chemical Industries	GOCI
* State Company For Fertilizers	FERT
* General Company For Phosphate and Mines	GECOPHAM

9- **Somalia:**

* Urea Production Project	UPP

10- **Iraq:**

* State Organization For Chemical Industries	SOCI
* State Enterprise For Fertilizers	SEF
* State Organization For Minerals	SOM
* State Enterprise For Phosphates	SEP
* State Enterprise For Mishraq Sulphur	SEMS

11- **Qatar:**

* Qatar Fertilizer Company	QAFCO

12- **Kuwait:**

* Petrochemical Industries Company	PIC

13- **Lebanon:**

* Lebanon Chemicals Company	LCC

14- **Libya:**

* National Petrochemical Company	NAPETCO

15- **Egypt:**

* Societe ElNasr D'Engrais Et D'Industries Chemiques	SEEIC
* ElNasr Company For Coke And Chemicals	ECCC
* Egyptian Chemical Industries Company	KIMA
* Abu-Quir Company For Chemicals And Fertilizers	AQCCF
* Societe Financiere Et Industrielle D'Egypt	SFIE
* Abu-Zaabal Fertilizers And Chemicals Company	AZFCC
* ElNasr Phosphate Company	EPC
* Misr Phospahte Company	MPC
* The Red Sea Phosphate Company	RSPC

16- **Morocco:**

* Groupe Office Cherifien Des Phosphates	OCP
* Societe Cherifienne D'Enrais	SEC

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1. General Background on the Fertilizer Industry in the Arab Region

The Arab Region is considered one of the major centers in the World in fertilizer production. The industry has developed very fast in the past twenty years and is expected to expand considerably during the coming fifteen years. The region possesses huge reserves of all the major fertilizer raw materials: natural gas, phosphate rock, sulphur and potash.

The phosphate fertilizer industry started in some of the Arab Countries in the beginning of this century, like Tunisia, Morocco and Algeria. On the other hand, the ammonia and the nitrogen fertilizer industry started in Egypt early 1950's.

1.1 Raw Materials:

The major fertilizer raw materials which will be considered are: phosphate rock, sulphur, natural gas and potash. The phosphate rock production started during the first half of this century in several Arab Countries and at present the region has the highest share in exports to the international market. Sulphur production started in the second half of this century. On the other hand, the natural gas collection and utilization in the ammonia industry started also in the second half of this century, in particular, after the huge expansion in the oil industry in several Arab Countries. The production of potash in the region has just recently started in 1982.

1.1.1 Phosphate Rock:

The phosphate rock reserves in the Arab Region is estimated to be 63 billion tonnes which is about 80% of the total world reserves. The 1983 production totalled 34 million tonnes

Phosphate Rock Reserves in the Arab Region - 1983

(Million Tonnes)

Country	Reserves
Jordan	1526
Tunisia	1300
Algeria	500
Saudi Arabia	190
Syria	859
Iraq	432
Egypt	1154
Morocco	57000
Mauritania	78
Total	63039

Phosphate Rock Production Capacities in the Arab Region Year 2000

(Million Tonnes)

Year / Country	1985	1990	2000
Jordan	6.5	10.5	15.0
Tunisia	7.6	10.0	20.0
Algeria	1.3	2.0	3.5
Syria	3.5	4.5	6.0
Iraq	1.7	1.7	1.7
Egypt	1.6	3.0	7.0
Morocco	32.5	42.6	72.9
Mauritania	-	0.2	0.25
Total	54.70	74.5	126.35

Phosphate Rock Production in the Arab Region (1979 - 1983)

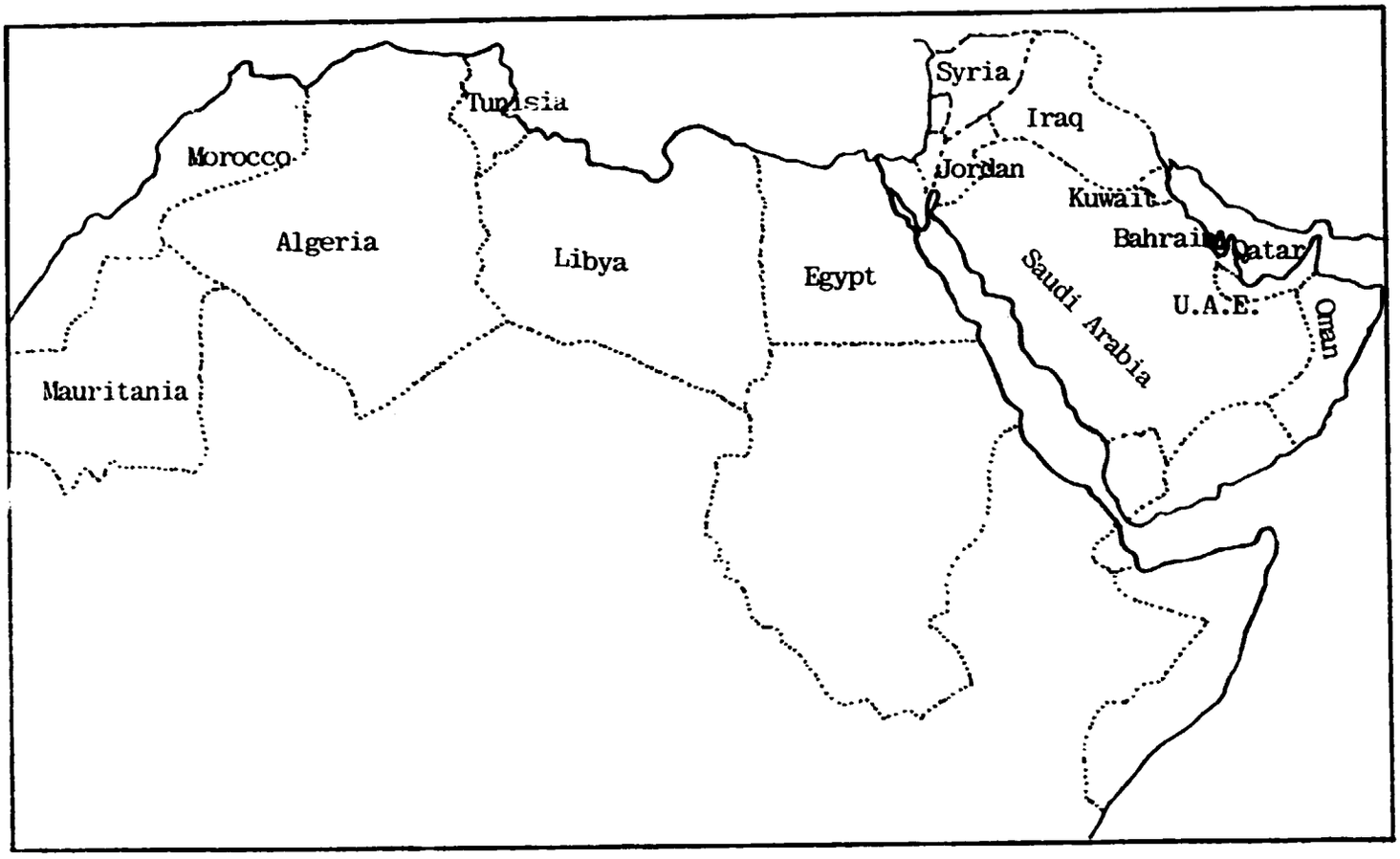
(Million Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	2.845	3.907	4.244	4.390	4.749
Tunisia	4.057	4.502	2.924	4.729	5.900
Algeria	1.100	1.036	0.916	0.947	0.893
Syria	1.170	1.319	1.320	1.455	1.229
Iraq	-	-	-	1.050	0.350
Egypt	1.000	1.319	1.320	0.708	0.900
Morocco	20.100	18.754	19.696	17.753	20.106
Total	30.272	30.837	32.420	31.032	34.127

Phosphate Rock Consumption in the Arab Region (1979 - 1983)

(Million Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	0.240	0.588
Tunisia	2.200	3.678	3.159	3.312	3.943
Algeria	0.270	0.255	0.215	0.245	0.283
Iraq	-	-	-	0.210	0.350
Lebanon	0.438	0.312	0.230	0.045	0.060
Egypt	0.850	0.317	0.300	0.393	0.420
Morocco	2.200	2.408	3.500	3.960	5.196
Total	6.058	7.005	7.539	8.612	11.017



RAW MATERIALS

1. JORDAN	6. SAUDI ARABIA	11. KUWAIT
2. U.A.E	7. SYRIA	12. LIBYA
3. BAHRAIN	8. IRAQ	13. EGYPT
4. TUNISIA	9. OMAN	14. MOROCCO
5. ALGERIA	10. QATAR	15. MAURITANIA

which is about 25% of the total world production. It is expected that the region will increase its share from the total World production to about 45% by the year 2000. The local consumption of phosphate rock in the production of phosphoric acid and phosphatic fertilizers showed considerable increase during the past ten years and reached in 1983 about 31% of the total production of phosphate rock, compared with only 10% in 1975.

Most of the Arab Countries have decided to exploit low-grade phosphate rock in local production of phosphoric acid and phosphate fertilizers and export the high-grade rock to the international market.

1.1.2 Sulphur:

The total sulphur reserves in all forms: frasch sulphur, associated with oil and gas, and pyrites is estimated to reach 2700 million tonnes, which is about 30% of the total world reserves. The 1983 production totalled 1.4 million tonnes brimstone which is about 4.2% of the total world production. The local consumption of sulphur in 1983 reached about 2.8 million tonnes, which is twice the total production of the region in the same year. It is expected that the total production of sulphur in the region by the year 2000 may reach 6.3 million tonnes while consumption may exceed 10 million tonnes

1.1.3 Natural Gas:

The estimated reserves of natural gas in both associated and non-associated forms is about 16500 billion cubic meter. The 1983 commercial production totalled 58 billion cubic meter, which is about 4% of the total world

Sulphur Production Capacities in the Arab Region Year 2000

(Thousand Tonnes)

Year / Country	1985	1990	2000
U.A.E	280	500	500
Bahrain	50	300	300
Saudi-Arabia	1840	2500	2500
Syria	60	60	100
Iraq	650	1250	2000
Qatar	120	150	150
Kuwait	300	650	650
Egypt	50	50	100
Total	3350	5450	6300

Sulphur Reserves in the Arab Region
1983

(Million Tonnes)

Country	Reserves
U. A. E.	48.0
Bahrain	0.4
Saudi Arabia	460.0
Syria	8.0
Iraq	233.0
Oman	5.0
Qatar	6.0
Kuwait	235.0
Egypt	4.0
Morocco *	1650.0
Total	2649.4

* In the form of Pyrrhotite.

Sulphur Production in the Arab Region

(1979 - 1983)

(Thousand Tonnes)

Year / Country	1979	1980	1981	1982	1983
Bahrain	25.5	32.6	40.0	35.0	40.0
Algeria	15.0	-	-	-	-
Saudi Arabia	149.0	900.0	853.0	871.0	782.0
Syria	4.0	-	8.0	15.0	20.0
Iraq	812.0	600.0	145.0	320.0	400.0
Qatar	-	-	8.8	12.4	13.0
Kuwait	100.0	155.0	109.0	120.0	150.0
Egypt	5.0	-	10.0	5.0	10.0
Morocco	56.0	-	-	-	-
Total	1247.2	1687.6	1173.8	1378.4	1415.0

Sulphur Consumption in the Fertilizer Industry in the Arab Region

(1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	65.0	168.0
Tunisia	572.2	719.0	761.0	785.0	900.0
Algeria	77.0	18.0	-	40.0	55.0
Saudi Arabia	5.7	9.3	13.3	16.8	21.0
Syria	4.0	35.0	28.0	40.0	45.0
Iraq	42.0	33.6	5.8	25.0	80.0
Kuwait	6.1	3.8	5.0	2.7	1.65
Lebanon	121.3	100.0	57.0	11.0	18.0
Egypt	151.1	61.0	120.0	60.0	167.5
Morocco	795.0	653.0	868.0	977.0	1379.0
Total	1774.4	1632.7	1858.1	2022.5	2835.2

Natural Gas Reserves in the Arab Region - 1983

(Billion Cubic Meter)

Country	Reserves*
U.A.E.	810
Bahrain	223
Tunisia	122
Algeria	3152
Saudi Arabia	3433
Sudan	50
Syria	36
Iraq	816
Oman	76
Kuwait	966
Qatar	6000
Libya	609
Egypt	203
Total	16497

* Proved Reserves

Natural Gas Commercial Production in the Arab Region (1979 - 1983)

(Billion Cubic Meter)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	-	-
U.A.E.	5.360	7.250	6.457	7.677	5.600
Bahrain	4.032	4.345	4.899	5.066	5.400
Tunisia	0.219	0.240	0.255	0.439	0.600
Algeria	25.940	19.350	32.536	23.460	20.000
Djibouti	-	-	-	-	-
Saudi Arabia	11.700	14.630	12.318	16.758	10.800
Sudan	-	-	-	-	-
Syria	0.220	0.200	0.240	0.238	0.240
Somalia	-	-	-	-	-
Iraq	2.200	1.760	2.000	0.648	0.580
Oman	0.980	1.200	1.540	2.140	2.500
Qatar	4.360	5.210	5.805	3.639	2.500
Kuwait	8.160	6.900	5.334	3.789	4.100
Lebanon	-	-	-	-	-
Libya	6.790	5.170	3.980	4.338	2.700
Egypt	1.815	2.943	2.430	2.447	2.900
Morocco	0.080	0.080	0.090	0.102	0.100
Muritania	-	-	-	-	-
North Yemen	-	-	-	-	-
South Yemen	-	-	-	-	-
Total	71.856	69.278	77.880	70.741	58.020

Natural Gas Consumption in the Fertilizer Industry in the Arab Region (1979 - 1983)

(Billion Cubic Meter)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	-	-
U.A.E.	-	-	-	-	0.030
Bahrain	-	-	-	-	-
Tunisia	-	-	-	-	-
Algeria	-	-	-	-	0.150
Djibouti	-	-	-	-	-
Saudi Arabia	0.339	0.374	0.388	0.392	0.792
Sudan	-	-	-	-	-
Syria	-	-	-	-	-
Somalia	-	-	-	-	-
Iraq	0.529	0.750	-	-	0.020
Oman	-	-	-	-	-
Qatar	0.630	0.810	0.910	0.880	0.990
Kuwait	0.518	0.402	0.600	0.500	0.538
Lebanon	-	-	-	-	-
Libya	0.185	0.090	0.080	0.350	0.650
Egypt	0.200	0.480	0.700	0.800	0.860
Morocco	-	-	-	-	-
Muritania	-	-	-	-	-
North Yemen	-	-	-	-	-
South Yemen	-	-	-	-	-
Total	2.401	2.906	2.678	2.922	4.030

production. The consumption of gas in the ammonia and nitrogen fertilizer industry during 1983 was about 4 billion cubic meters, and is expected to reach 14 billion cubic meters by the year 2000.

1.2 Ammonia and Nitrogen Fertilizers:

* Ammonia: The total ammonia plant capacities in the region during 1983 is 6 million tonnes. The production of ammonia in 1983 totalled about 3 million tonnes, while the consumption of ammonia in fertilizer production reached about 2.6 million tonnes in the same year. The total capacities is expected to exceed 11 million tonnes by the year 2000.

* Nitrogen Fertilizers: Several types of nitrogen fertilizers are produced in the region: urea, ammonium nitrates, ammonium sulphate and calcium nitrate. During 1983, the production of nitrogen fertilizers was as follows:

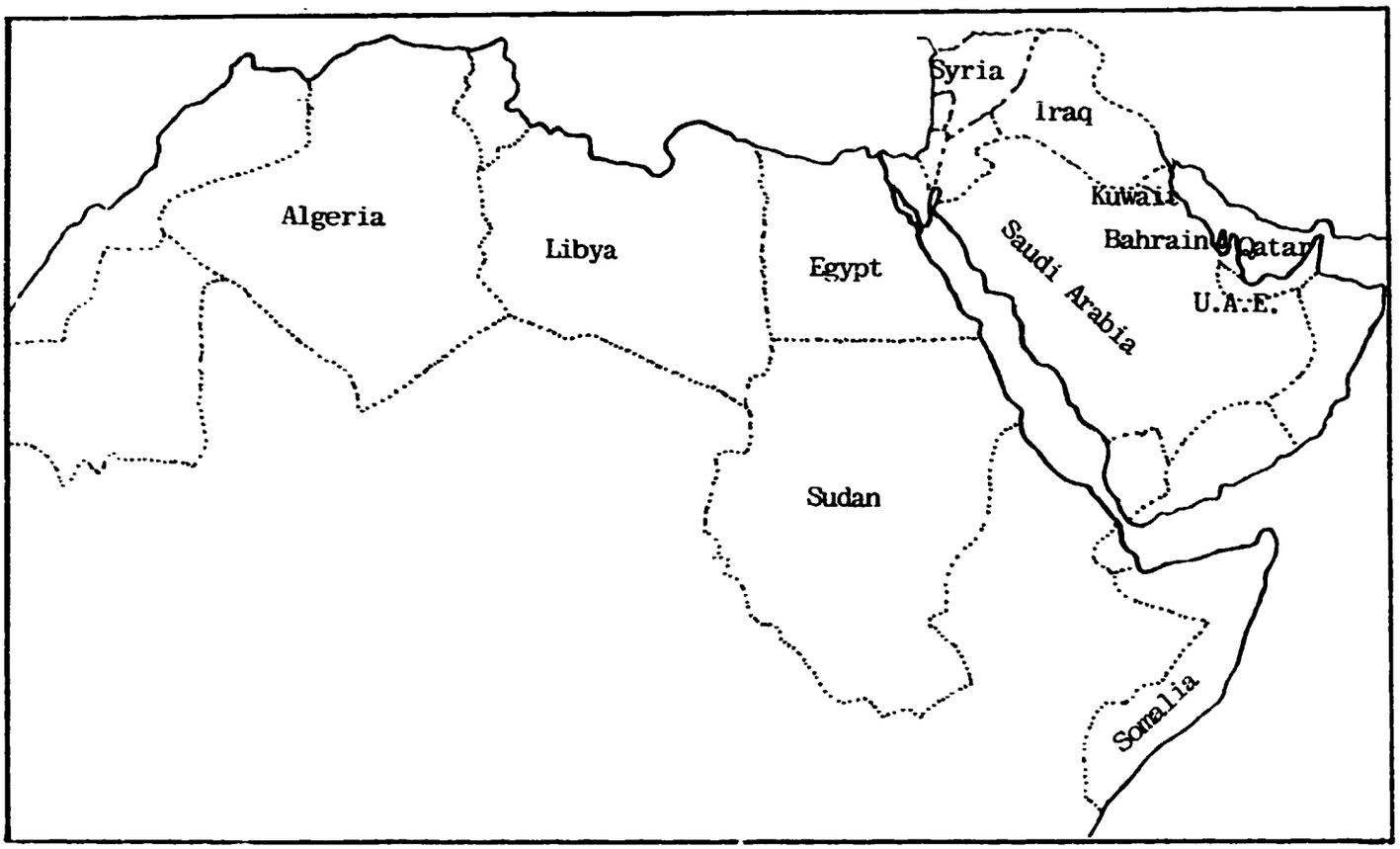
Urea	:	3 million tonnes
Ammonium Nitrates	:	1.0 million tonnes
Ammonium Sulphate	:	80000 tonnes
Calcium Nitrate	:	250000 tonnes

On the other hand, the consumption of nitrogen fertilizers during 1983 was as follows:

Urea	:	1.3 million tonnes
Ammonium Nitrate	:	1.3 million tonnes
Ammonium Sulphate	:	293000 tonnes
Calcium Nitrate	:	250000 tonnes

It is expected that, by the year 2000, the total plant capacities for nitrogen fertilizers may reach the following:

Urea	:	11 million tonnes
Ammonium Nitrate	:	3.6 million tonnes



AMMONIA / NITROGEN FERTILIZERS INDUSTRY

1. U.A.E	5. SUDAN	9. QATAR
2. BAHRAIN	6. SYRIA	10. KUWAIT
3. ALGERIA	7. SOMALIA	11. LIBYA
4. SAUDI ARABIA	8. IRAQ	12. EGYPT

Ammonia Capacities in the Arab Region (1983 - 2000)

(Thousand Tonnes)

Year / Country	1983	1985	1990	2000
U.A.E.	-	330	1105	1105
Bahrain	-	330	330	330
Tunisia	-	-	400	400
Algeria	990	990	990	1320
Saudi Arabia	528	528	528	1320
Sudan	66	66	132	462
Syria	350	350	350	366
Somalia	-	30	30	30
Iraq	955	1005	1055	1055
Oman	-	-	-	330
Qatar	592	592	922	1252
Kuwait	660	990	990	990
Libya	660	660	1551	1551
Egypt	1136	1136	1466	1146
Morocco	-	-	330	330
Total	5937	7007	10509	11987

Ammonia Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
U.A.E.	-	-	-	-	30.0
Algeria	-	-	80.2	200.4	154.0
Saudi Arabia	188.9	203.3	208.0	207.4	342.0
Syria	26.5	18.0	52.1	94.0	137.7
Iraq	486.0	370.0	-	-	20.0
Qatar	371.0	507.0	447.0	528.2	586.3
Kuwait	502.0	332.0	464.0	396.0	381.0
Libya	197.6	93.5	80.0	296.4	541.5
Egypt	320.0	500.0	718.4	805.7	785.8
Total	2092.0	2023.8	2049.7	2528.1	2578.3

Ammonia Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	30.4	81.5
U.A.E.	-	-	-	-	30.0
Tunisia	10.9	60.0	90.1	104.3	121.0
Algeria	27.0	40.0	30.0	71.7	70.0
Saudi Arabia	172.4	203.3	207.7	208.6	341.0
Syria	26.5	18.0	37.6	104.4	125.8
Iraq	485.7	370.0	-	-	20.0
Qatar	280.5	350.0	340.0	389.8	411.2
Kuwait	378.3	378.5	290.7	311.5	295.0
Libya	-	-	-	128.0	197.8
Egypt	320.0	500.0	718.9	806.3	785.8
Morocco	25.0	46.3	37.6	51.1	75.0
Total	1726.3	1961.0	1752.6	2206.5	2554.1

Urea Capacities in the Arab Region (1983 - 2000)

(Thousand Tonnes)

Country \ Year	1983	1985	1990	2000
U.A.E.	-	495	990	990
Algeria	132	132	132	627
Saudi Arabia	300	845	845	1535
Sudan	100	100	200	695
Syria	315	315	315	315
Somalia	-	50	50	50
Iraq	1480	1480	1480	1480
Oman	-	-	-	495
Qatar	660	660	660	1155
Kuwait	792	792	792	792
Libya	330	908	1482	1482
Egypt	1073	1073	1403	1403
Morocco	-	-	195	195
Total	5182	6850	8544	11214

Urea Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Year / Country	1979	1980	1981	1982	1983
U.A.E.	-	-	-	-	50.0
Saudi Arabia	298.9	330.4	342.4	346.5	579.0
Syria	-	-	31.3	84.0	150.0
Iraq	783.0	800.0	-	-	-
Qatar	497.0	622.0	575.0	662.4	685.3
Kuwait	662.1	465.0	463.0	509.0	485.9
Libya	-	-	-	231.7	330.1
Egypt	76.0	283.0	606.0	739.0	700.0
Total	2317.0	2500.4	2011.7	2572.6	2980.3

Urea Consumption in the Arab Region
(1979 - 1983)

(Thousand Tonnes)

Year / Country	1979	1980	1981	1982	1983
Jordan	5.440	5.000	0.850	6.000	8.800
U.A.E	3.000	0.750	2.500	1.800	2.500
Bahrain	-	0.020	0.010	0.004	0.149
Djibouti	1.550	1.740	1.850	1.960	2.000
Saudi Arabia	21.300	35.000	45.700	63.200	136.900
Sudan	168.900	107.200	162.000	171.700	180.000
Syria	26.800	17.000	17.400	59.700	117.300
Somalia	8.700	4.700	8.000	8.700	9.000
Iraq	115.900	114.400	131.500	131.900	96.200
Oman	0.070	-	-	0.120	0.316
Qatar	1.300	1.500	1.650	1.300	1.000
Kuwait	0.070	0.300	0.500	1.000	1.100
Libya	4.000	11.000	11.100	30.000	9.871
Egypt	369.600	471.700	600.000	652.200	600.000
Morocco	84.900	86.500	61.300	65.200	90.000
Mouritania	2.390	2.390	2.520	2.720	2.850
North Yemen	17.400	18.030	21.400	22.000	27.500
South Yemen	2.390	4.000	3.800	3.910	4.300
Total	833.710	881.230	1072.080	1223.414	1290.786

Ammonium Nitrate Capacities in the Arab Region (1980 - 2000)

(Thousand Tonnes)

Country \ Year	1980	1983	1985	1990	2000
Tunisia	-	300	300	300	600
Algeria	165	825	825	825	825
Syria	-	-	-	165	165
Lebanon	22	22	22	22	22
Libya	-	-	-	330	330
Egypt	879	879	974	1300	1300
Morocco	-	-	-	330	330
Total	1066	2026	2121	3276	3576

Ammonium Nitrates Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Algeria					
Amm. Nitrate	34.000	40.000	44.000	130.000	106.000
Tunisia					
Amm. Nitrate	-	-	-	-	11.000
Egypt					
Amm. Nitrate	582.300	704.500	700.000	835.800	800.000
Calcium Nitrate	200.000	200.000	279.000	258.000	250.000
Syria					
Calcium Amm.Nitrate	80.000	49.100	59.600	116.500	116.000

Ammonium Nitrate Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

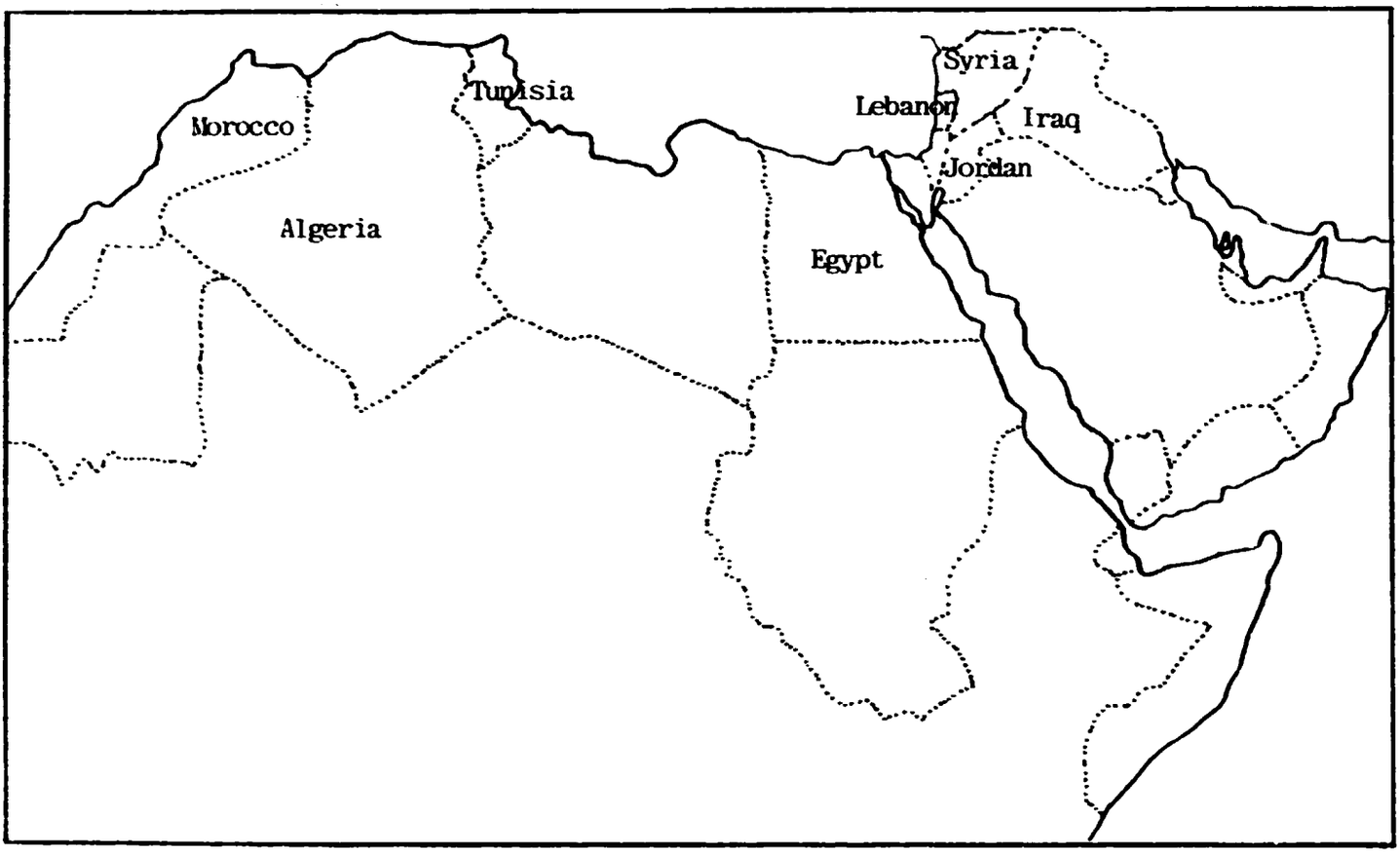
Country \ Year	1979	1980	1981	1982	1983
1. Ammonium Nitrate					
Jordan	2.100	1.500	1.361	8.745	-
Tunisia	70.500	74.700	86.700	107.800	97.900
Algeria	153.000	196.000	149.000	101.000	135.000
Saudi Arabia	4.800	-	-	-	-
Syria	116.000	122.400	152.000	112.300	48.300
Lebanon	17.900	28.600	18.000	29.000	20.000
Libya	0.600	0.500	1.400	-	-
Egypt	761.500	776.400	698.500	835.500	840.000
Morocco	59.800	61.000	43.300	80.600	64.000
North Yemen	3.000	0.600	0.300	-	-
2. Calcium Ammonium Nitrate					
Syria	74.000	64.000	61.800	93.200	115.900
3. Calcium Nitrate					
Egypt	193.500	200.000	279.000	258.000	250.000

1.3 Phosphoric Acid and Phosphate Fertilizers:

The Arab Countries which possess phosphate rock deposits have developed a phosphatic fertilizer industry. Actually this industry started early in the beginning of this century in some of the Arab Countries like: Tunisia, Algeria, Egypt and Morocco.

* Phosphoric Acid: The total phosphoric acid plant capacities in the region during 1983 is 3.7 million tonnes. The production of phosphoric acid in 1983 totalled 2.5 million tonnes, while consumption was about 1.1 million tonnes. The total capacities is expected to reach 11.0 million tonnes by the year 2000. The major phosphoric acid expansion projects are in Morocco and Tunisia.

* Phosphate Fertilizers: The superphosphates production in the region was about 1.6 million tonnes of TSP and 0.85 million tonnes SSP in 1983, while consumption was 0.65 million tonnes and 0.87 million tonnes of TSP and SSP respectively.



PHOSPHORIC ACID / PHOSPHATE FERTILIZERS INDUSTRY

1. JORDAN
2. TUNISIA
3. ALGERIA
4. SYRIA
5. IRAQ
6. LEBANON
7. EGYPT
8. MOROCCO

Phosphoric Acid Capacities in the Arab Region (1980 - 2000)

(Thousand Tonnes P2O5)

Country \ Year	1980	1983	1985	1990	2000
Jordan	-	410	410	410	820
Tunisia	811	971	1121	1451	1451
Algeria	165	165	165	330	330
Syria	-	165	165	330	330
Iraq	-	400	400	400	400
Lebanon	100	100	100	100	100
Egypt	-	-	60	406	406
Morocco	825	1485	2805	4290	7425
Total	1901	3696	5226	7717	11262

Phosphoric Acid Production in the Arab Region

(Thousand Tonnes P205)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	65.4	188.5
Tunisia	437.0	663.0	661.0	757.0	900.0
Algeria	50.5	30.0	30.0	25.0	55.0
Syria	-	-	23.4	40.5	45.0
Lebanon	70.0	50.0	56.0	10.0	15.0
Morocco	477.0	574.0	738.7	1009.6	1235.0
Total	1034.5	1317.0	1509.1	1932.5	2513.5

Phosphoric Acid Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes P205)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	55.0	170.0
Tunisia	198.7	336.0	400.0	413.0	435.0
Algeria	30.0	19.0	30.0	44.0	60.0
Syria	-	-	23.4	54.0	45.0
Iraq	-	-	-	23.5	75.0
Lebanon	70.0	50.0	30.0	10.0	15.0
Morocco	112.0	154.0	152.0	268.2	303.0
Total	410.7	559.0	635.4	867.7	1109.0

Triple Superphosphate Capacities in the Arab Region (1980 - 2000)

(Thousand Tonnes)

Country \ Year	1980	1983	1985	1990	200
Jordan	-	-	-	-	264
Tunisia	630	630	1030	1030	1030
Algeria	290	290	290	570	570
Syria	-	450	450	450	450
Iraq	-	600	600	600	600
Lebanon	300	300	300	300	300
Egypt	-	-	150	150	150
Morocco	396	396	530	530	530
Total	1616	2666	3350	3630	3894

Triple Superphosphate Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Tunisia	568.0	566.0	616.9	595.7	633.0
Algeria	83.0	16.6	-	81.8	69.0
Syria	-	-	55.8	110.4	125.0
Iraq	-	-	-	12.0	150.0
Lebanon	196.0	200.0	100.0	15.0	5.0
Morocco	210.9	183.9	266.0	335.6	630.0
Total	1057.9	966.5	1038.9	1150.5	1612.0

Triple Superphosphate Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	10.200	10.502	1.400	5.464	9.801
U.A.E.	0.440	0.230	0.200	0.200	0.500
Tunisia	42.100	64.600	65.600	78.800	68.500
Algeria	113.000	146.000	107.000	98.000	121.000
Djibouti	0.290	0.330	0.330	0.350	0.390
Saudi Arabia	1.300	9.200	10.000	25.600	30.000
Sudan	1.300	3.200	1.000	1.100	1.500
Syria	63.300	41.300	69.000	110.400	120.000
Somalia	-	0.900	-	-	-
Iraq	49.800	22.000	21.900	23.300	76.200
Lebanon	32.600	2.500	4.400	5.200	4.800
Libya	-	4.500	4.400	-	10.000
Egypt	25.200	22.800	69.600	69.600	140.000
Morocco	38.200	22.800	23.500	25.600	25.000
Mouritania	1.300	1.300	1.590	1.940	1.720
North Yemen	1.110	0.620	0870	1.200	0.595
South Yemen	0.300	0.400	0.170	0.650	0.800
Total	380.710	353.212	381.000	447.564	647.446

Single Superphosphate Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Tunisia	60.0	63.0	52.0	40.0	32.0
Syria	-	-	7.5	-	-
Lebanon	50.0	60.0	31.3	15.0	15.0
Egypt	482.4	579.4	593.8	656.3	700.0
Morocco	118.8	111.0	120.0	94.7	102.0
Total	711.2	813.4	804.6	806.0	849.0

Single Superphosphate Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	7.8	-	-
Tunisia	56.8	33.4	32.3	24.1	37.5
Syria	-	-	6.9	7.1	-
Lebanon	25.0	30.0	12.5	15.0	15.0
Libya	11.3	6.6	6.3	8.8	10.0
Egypt	625.0	637.0	593.8	656.3	700.0
Morocco	120.0	125.0	114.4	115.0	102.0
Total	838.1	833.5	774.0	828.3	865.5

1.4 Potash and Potassic Fertilizers:

Potash is available in the Arab Region in the Dead Sea in Jordan and is present in small quantities in Tunisia and Libya. Production of potash started in Jordan in the fourth quarter 1982, and the production totalled 287 thousand tonnes during 1983. It is expected that the production capacity of potash may reach (2) million tonnes by the year 2000. On the other hand, the consumption of K_2O in the region during 1983 was about 115 thousand tonnes and may reach 230 thousand tonnes by the year 2000.

Total K2O Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes K2O)

Country \ Year	1979	1980	1981	1982	1983
Jordan	2.100	1.400	1.000	1.099	1.074
U.A.E.	0.600	0.600	0.300	0.400	1.200
Bahrain	0.013	0.030	0.031	0.006	0.117
Tunisia	4.000	4.600	4.300	3.900	3.900
Algeria	27.600	35.800	33.400	15.500	29.300
Djibouti	1.000	1.100	1.200	1.300	1.400
Saudi Arabia	0.400	1.400	2.300	2.200	3.500
Sudan	0.020	0.040	0.030	-	0.300
Syria	2.500	2.500	5.000	4.700	5.850
Somalia	-	0.300	0.680	0.740	0.750
Iraq	2.000	4.500	0.700	0.500	2.600
Oman	0.260	0.600	0.160	0.180	0.700
Qatar	-	0.010	0.010	0.050	0.080
Kuwait	0.200	0.100	0.050	0.080	-
Lebanon	6.000	6.600	6.000	13.600	11.000
Libya	1.400	3.600	4.000	2.400	4.100
Egypt	6.700	7.500	7.700	8.300	9.000
Morocco	44.500	40.800	34.400	33.100	38.700
Mauritania	0.200	0.200	0.200	0.220	0.280
North Yemen	0.800	0.500	0.600	2.750	0.915
South Yemen	0.050	0.100	-	0.150	-
Total	100.343	112.280	102.061	91.180	114.766

1.5 Compound Fertilizers:

The production of compound fertilizers started in the region in mid sixties in Algeria and Morocco. On the other hand, the consumption of this type of fertilizers increased during the past fifteen years and at present has a high percentage share in the total nutrients consumption. In 1983 the percentage share in total nutrients consumption in the form of compound fertilizers was as follows:

$$N = 10\%, \quad P_2O_5 = 28\%, \quad K_2O = 58\%$$

Compound Fertilizers Capacities in the Arab Region (1980 - 2000)

(Thousand Tonnes)

Type	Year / Country	1980	1983	1985	1990	2000
1- Diammonium Phosphate (D A P)	Jordan	-	740	740	740	1070
	Tunisia	330	330	660	660	660
	Algeria	132	132	132	132	132
	Syria	-	-	-	330	330
	Kuwait	-	-	-	330	330
	Libya	-	-	-	330	330
	Egypt	-	-	-	330	330
	Morocco	-	-	528	1000	1000
D A P	Total	462	1202	2060	3852	4182
2- Monoammonium Phosphate (M A P)	Tunisia	100	100	100	100	100
	Iraq	-	250	250	250	250
	Morocco	396	396	396	396	396
M A P	Total	496	746	746	746	746
3- Ammonium Sulphate Phosphate (A S P)	Morocco	132	132	132	330	330

Continued.

(Thousand Tonnes)

Type	Year / Country	1980	1983	1985	1990	2000
4- N P K : 15:15:15	Jordan	-	-	-	330	330
15:15:15	Bahrain	-	-	-	330	330
17:17:17	Tunisia	-	-	-	500	500
12:18:18	Algeria	150	150	150	150	150
4:20:25		75	75	75	75	75
15:15:15	Saudi Arabia	-	-	250	250	500
18:18:18	Iraq	-	272	272	272	272
15:15:15 17:17:17 18:18:	Lebanon	100	100	100	100	100
15:15:15	Libya	-	-	-	330	330
15:15:15	Egypt	-	-	-	330	330
14:28:14	Morocco	132	132	132	264	264
T o t a l		457	729	979	2931	3181

Compound Fertilizer Production in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Type	Year / Country	1979	1980	1981	1982	1983
M A P 10:55:0	Tunisia	58.2	67.0	57.0	68.2	80.0
	Iraq	-	-	-	-	50.0
	Morocco	12.6	-	30.4	137.8	221.0
	Total	70.8	67.0	87.4	206.0	351.0
D A P 18:46:0	Jordan	-	-	-	118.0	337.4
	Tunisia	14.0	224.0	350.0	360.0	405.0
	Total	14	224.0	350.0	478.0	742.4
A S P 19:38:0	Morocco	52.1	108.3	85.6	85.0	100.0
N P K 12:18:18	Algeria	83.7	84.0	54.0	62.0	86.0
4:20:25		49.8	50.0	65.0	-	30.0
14:28:14	Morocco	52.5	112.0	47.8	65.7	100.0
18:18:5	Iraq	-	-	-	-	7.7
27:27:0		-	-	-	-	43.8
15:15:15		-	-	-	-	14.4
20:20:0		-	-	-	-	8.1

Compound Fertilizers (NPK) Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	10.000	12.000	8.000	5.400	6.000
U.A.E.	3.300	1.600	5.300	6.800	7.000
Bahrain	0.087	0.200	0.208	0.040	0.781
Tunisia	-	-	6.000	10.000	10.000
Algeria	133.500	190.000	167.500	86.000	147.000
Saudi Arabia	20.400	47.300	72.100	96.500	100.000
Sudan	0.800	0.010	-	-	-
Somalia	-	2.000	4.500	4.900	5.000
Iraq	19.300	15.000	17.000	18.500	73.900
Oman	0.360	1.900	1.630	1.500	4.500
Qatar	-	0.560	0.400	0.300	0.500
Kuwait	1.330	1.000	0.300	0.530	-
Lebanon	26.700	53.300	26.700	51.000	55.000
Libya	15.000	26.000	25.000	20.000	30.000
Morocco	80.000	97.100	66.100	73.850	99.000
Mauritania	1.000	1.000	1.010	1.100	1.400
North Yemen	2.200	0.020	3.300	0.030	6.100
Total	313.977	448.990	406.048	386.450	546.181

Diammonium Phosphate (DAP) Consumption in the Arab Region (1979 - 1983)

(Thousand Tonnes)

Country \ Year	1979	1980	1981	1982	1983
Jordan	-	-	-	-	2.400
Tunisia	0.0138	-	-	0.018	-
Algeria	7.000	34.000	26.000	19.000	2.000
Saudi Arabia	-	-	2.300	0.100	21.000
Syria	35.000	52.000	29.300	6.600	-
Libya	68.900	75.000	76.000	80.000	85.000
Morocco	51.700	99.500	84.000	86.000	106.000
Total	162.6138	260.500	217.600	191.718	216.400

* Ammonium Sulphate Phosphate (19:38:0)

2- Organizational Structure

of the Fertilizer Industry in the

Arab Region

The fertilizer industry projects in the Arab Courties can be classified into three categories:

* Public Sector
* Private Sector
* Joint Projects

The majority of the fertilizer projects in the Arab Countries are state-owned (Public Sector) because of the strategic importance of this industry and its relation to the exploitation of the mineral and raw materials resources of the country and the development of the agricultural sector.

On the other hand, several projects are mixed between the public and the private sector, while the number of private sector projects are indeed limited.

The joint projects between two or more countries whether Arab or International have increased recently, like those in Qater, Saudi Arabia, U.A.E, Tunisia and Jordan. The main reasons for this trend are:

* Strengthening cooperation among the Arab Countries.
* Fertilizer Industry is a capital-intensive industry and needs high investment.

* Marketing strategy.

* Technicel know-how and Manpower.

The structure of the fertilizer industry in the Arab Countries vary considerably from one another, therefore the subject will be discussed country by country.

1- **Jordan:**

There are three companies in Jordan :

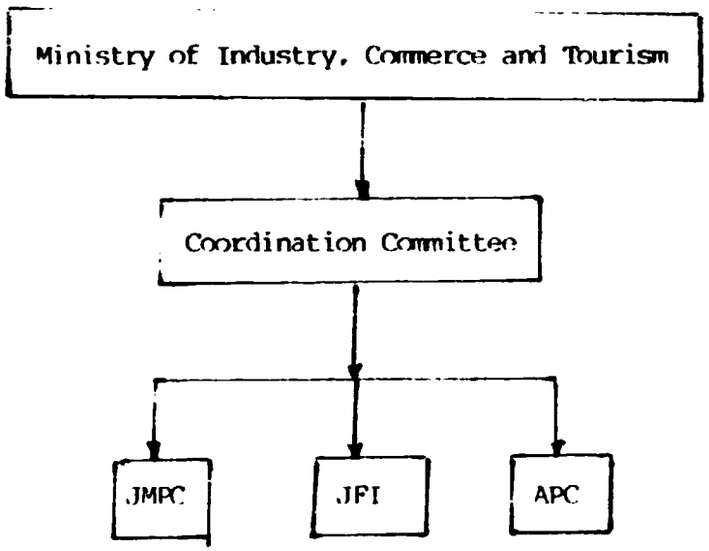
* **Jordan Phosphate Mines Co. (JMPC):** It was established in 1953 for the mining and beneficiation of phosphate rock deposits in Jordan. the company has three mines in operation: Ruseifa, Elhassa, and Wadi AlAbiadh.

* **Jordan Fertilizer Industry Co. (JFI):** It was established in 1975 for the utilization of phosphate rock to produce phosphoric acid and phosphatic and compound fertilizer. Its Aqaba Complex consists of :

  - 2 units Sulphuric Acid = 1800 tpd each.
  - one unit Phosphoric Acid = 1250 tpd.
  - 2 units Diammonium Phosphate = 1200 tpd each.

* **Arab Potash Company (APC):** The company was established as an Arab Joint Project in 1956 to exploit the salts of the Dead Sea in Jordan. It is the only company in the Arab Region to produce potash with a capacity of about 1.2 million tonnes.

These companies are under the umbrella of the Ministry of Commerce and Industry and each of the three companies has a board of directors and General Manager. The three companies are at present coordinating their activities through a coordination committee comprised of the chairmen and General Managers chaired by the Minister of Commerce and Industry.

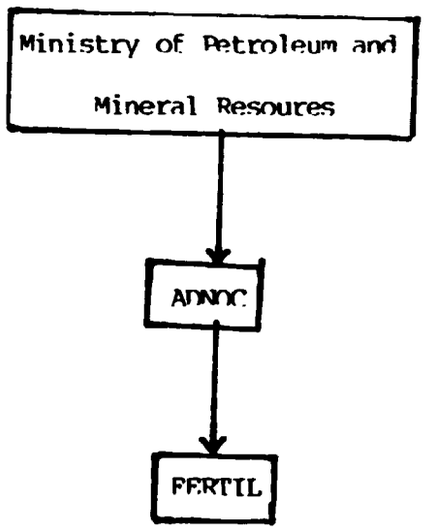


2- **United Arab Emirates:**

There are two companies in the country involved in the fertilizer industry:

* **Abu Dhabi National Oil Company (ADNOC):** Which is concerned with the development of industrial projects for the utilization of natural gas and crude oil.

* **Ruwais Fertilizer Industries (FERTIL):** It is one of the industrial projects of ADNOC and the company was established in 1980 to produce ammonia (1000 tpd) and urea (1500 tpd). It is a joint project with the French Petroleum Company having 33% of the shares.



3- **Bahrain:**

* **The Gulf Petrochemical Industries Company (GPIC):** It was established in 1980 as a joint project with equal shares for Bahrain, Kuwait and Saudi Arabia. The company will exploit the natural gas to produce ammonia (1000 tpd) and methanol (1000 tpd). The company is connected to the Ministry of Industry.

4- **Tunisia:**

The companies involved in the phosphate and fertilizer industry in Tunisia are:

* **Compagnie Des Phosphates Des Gafsa**: This company was established in 1899 to mine and beneficiate the phosphate rock deposits in Tunisia. At present the company has six mines: Metlawi, Redeyef, Moulares, M'Dilla, Suhaib and Kalaa' Khasba. The company is connected to the Ministry of Industry, Energy and Mines.

* **Industrie Chemiques Maghrebines (ICM)**: It was established in 1962 and at present Kuwait owns 49% of shares. The company has the following plants in Gabes:

- Sulphuric Acid	=	1,750,000 tpy.
- Phosphoric Acid	=	400,000 tpy.
- TSP	=	100,000 tpy.
- Dicalcium Phosphate	=	60,000 tpy.

* **Socite Industrielle D'Acid Phosphorique et D'Engrais (SIAPE)**: The company was established in 1947 in Sfax and Kuwiat at present owns 49% of the shares. The company has the following plants:

- Sulphuric Acid	= 580,000 tpy.
- Phosphoric Acid	= 194,000 tpy.
- TSP	= 536,000 tpy.

* **Societe Arabe Des Engrais Phosphate et Azotes (SAEPA)**: It is a joint project with Abu Dhabi owns 40% of the shares and the company has the following plants:

- Sulphuric Acid = 1000,000 tpy.
- Phosphoric Acid = 330,000 tpy.
- DAP = 450,000 tpy.
- Nitric Acid = 230,000 tpy.
- Ammonium Nitrate = 330,000 tpy.

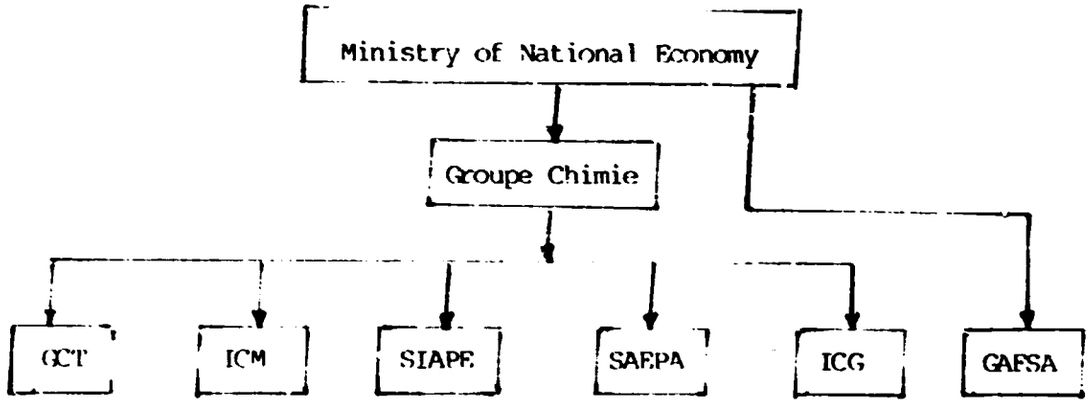
* **Engrais De Gabes (EG)**: It is a project owned by ICM and produces Monoammonium Phosphate 100,000 tpy in Gabes.

* **Industries Chemiques De Gafsa (ICG)**: The company was established recently and its plants in M'Dilla produce:

- Sulphuric Acid = 495,000 tpy.
- Phosphoric Acid = 165,000 tpy.
- TSP = 400,000 tpy.

* **Societe Tunisienne Des Engrais Chimiques (STEC)**: The company produces SSP (60,000 tpy), and at present undertaking a project for storage and distribution of fertilizers in Tunisia. It is connected to the Ministry of National Economy.

The fertilizer companies in Tunisia form togather the "Groupe Chimie": ICM, SIAPE, SAEPA and ICG, which is connected to the Ministry of National Economy. Each Company has chairman/General Manager and the Group Chimie has also a Chairman/General Manager, and one General Manager Marketing. The Two main fertilizer Complexes are in Gabes and Sfax.



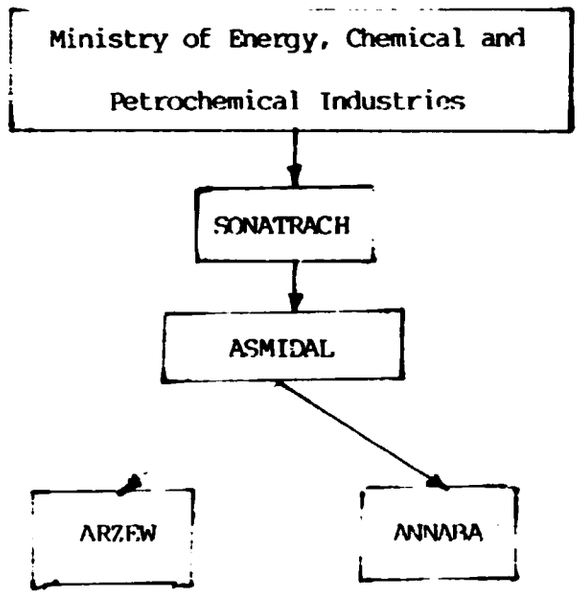
5- **Algeria:**

* **SONAREM:** It takes care of the mining and beneficiation of phosphate rock deposits in Algeria in DJEBEL ONK mine. At present a new company was formulated : Enterprise Nationale de Fer et du Phosphate. It is connected to the Ministry of Industry.

* **SONATRACH:** It takes care of all projects on fertilizers and Petrochemicals. It has two major Complexes: one in Arzew and one in Annaba. The nitrogen and phosphate fertilizer plants are as follows:

- Ammonia	= 990,000 tpy.
- Urea	= 132,000 tpy.
- Nitric Acid	= 658,000 tpy.
- Ammonium Nitrate	= 825,000 tpy.
- TSP	= 290,000 tpy.
- DAP	= 132,000 tpy.
- NPK	= 225,000 tpy.

Recently, a new company was formed to take care of the fertilizer projects: Enterprise Nationale Des Engrais et Produits Phytosanitaire (ASMIDAL) with headquarters in Annabe. The company has a General Manager. It is connected to the Ministry of Energy and Petrochemical Industries.



6- **Saudi Arabia:**

There are two companies in Saudi Arabia exploiting the natural gas to produce Ammonia/Urea.

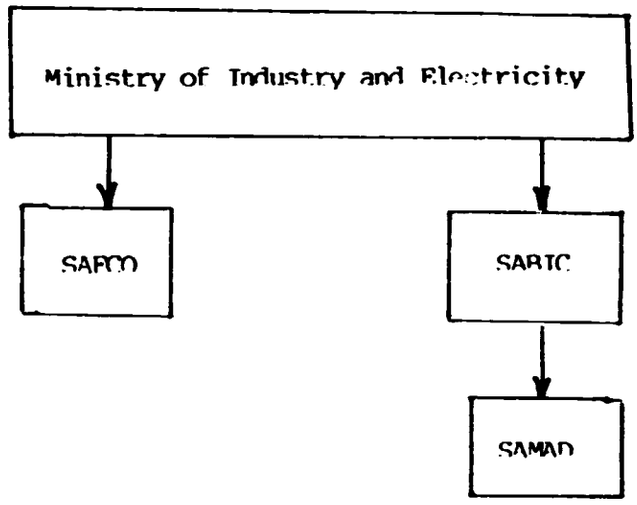
* **The Saudi Arabian Fertilizer Company (SAFCO):** It was established in 1967 and has its fertilizer plants in Dammam. The private sector has 59% of the sharesand 41% of the shares for SABIC. It has a board of directors and General Manager.

- Sulphuric Acid = 100,000 tpy.
- Ammonia = 200,000 tpy.
- Urea = 300,000 tpy.

* **The Saudi Arabian Basic Industries Company (SABIC)**: One of its projects in Al-Jubail is the SAMAD project as a joint project with Taiwan.

- Ammonia	= 330,000 tpy.
- Urea	= 528,000 tpy.

On the other hand, Sulphur is produced in Saudi Arabia by extraction from natural gas and oil by PETROMIN.



It is worth mentioning that the marketing of urea for both SAFCO and SAMAD is done by the marketing department of SAFCO.

7- **Sudan:**

* **Sudan - Ren for Chemicals and Fertilizers:** Is a joint project between Sudan and N-Ren Company, established in 1975, and it produces:

- Ammonia = 66,000 tpy.
- Urea = 100,000 tpy.

The plant site is south of Khartoum, and the company is connected to the Ministry of Industry.

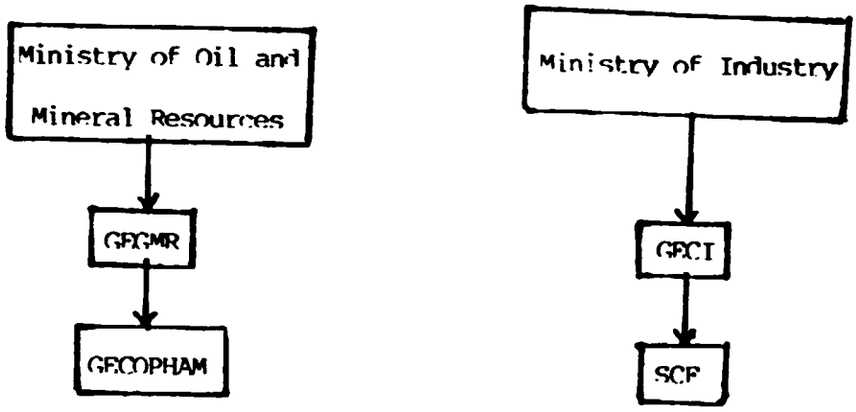
3- **Syria:**

There are two companies in Syria concerned with the fertilizer industry owned by the Public Sector.

* **General Company for Phosphates and Mines (GECOPHAM):** The company takes care of the mining and beneficiation of phosphate rock deposits in Syria. The two major mines: Khneifis and Sahrqia (A & B) near Homs. The company was established in 1970 and it is connected with the General Organization for Geology and Mineral Resources of the Ministry of Oil and Mineral Resources.

* **State Company for Fertilizers:** It is one of the companies of the General Organization for Chemical Industries of the Ministry of Industry. The plants in Homs produces:

- Ammonia = 350,000 tpy.
- Urea = 315,000 tpy.
- Ammonium Nitrate = 148,000 tpy.
- Nitric Acid = 92,000 tpy.
- Sulphuric Acid = 560,000 tpy.
- Phosphoric Acid = 165,000 tpy.
- TSP = 450,000 tpy.



9- **Somalia:**

* The **Urea Production Project (UPP):** Is connected to the Ministry of Industry to produce (Ammonia 30,000 tpy and Urea 50,000 tpy).

10- **Iraq:**

The companies involved in the fertilizer industry in Iraq are:

* **State Enterprise for Mishraq Sulphur (SEMS):** It was established in 1969 to mine and beneficiate sulphur deposits of Al-Mishraq, North of Iraq. Itis connected to the State Organization for Minerals (SOM) of the Ministry of Industry and Minerals.

* **State Enterprise for Fertilizers (SEF):** It was established in 1969 to exploit the natural gas to produce nitrogen fertilizers. The plants near Basrah in Khor El-Zubair and Abu-Flus produce:

- Ammonia = 985,000 tpy.
- Urea = 148,000 tpy.
- Sulphuric Acid = 110,000 tpy.
- Ammonium Sulphate = 140,000 tpy.

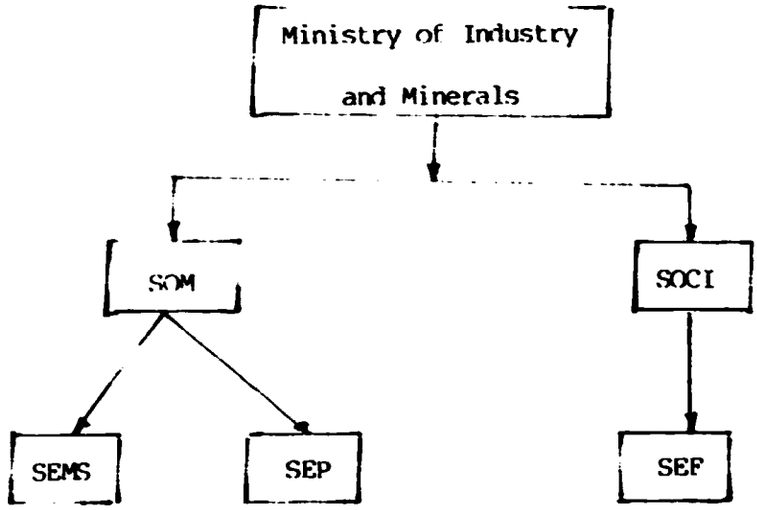
The company is connected to the State Orgaization for Chemical Industries (SOCI) of the Ministry of Industry and Minerals.

* **State Enterprise for Phosphates (SEP):** The company was established in 1976 to exploit the phosphate rock deposit in Akashat Area. The fertilizer complex in Al-Qaim inculde:

- Phosphate rock Calcium = 1,700,000 tpy.
- Sulphuric Acid = 1,500,000 tpy.
- Phosphoric Acid = 400,000 tpy.
- MAP = 250,000 tpy.
- TSP = 600,000 tpy.
- NPK = 272,000 tpy.
- Ammonia = 50,000 tpy.

The company is connected to the State Organization of Minerals of the Ministry of Industry and Minerals.

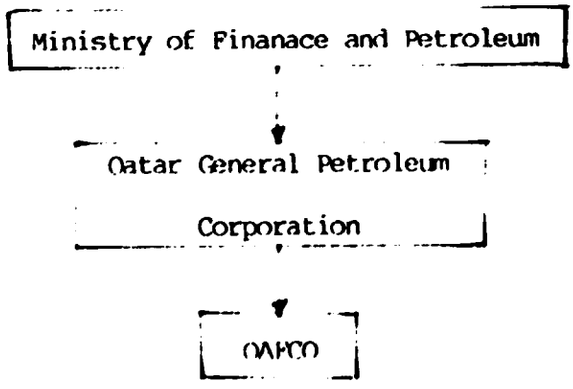
Each enterprise has a General Manager and each Organization has a Chairman.



II- **Qatar:**

The company concerned with fertilizer production in Qatar is **Qatar Fertilizer Company (QAFCO)**. It is a joint project with 70% Government shares and 30% for foreign partners established in 1969 and at present 75% Government shares and 25% Norsk Hydro. The company is one of the Projects of Qatar General Petrolium Corporation which is connected to the Ministry of Finance and Oil. The plants in Umm Said include:

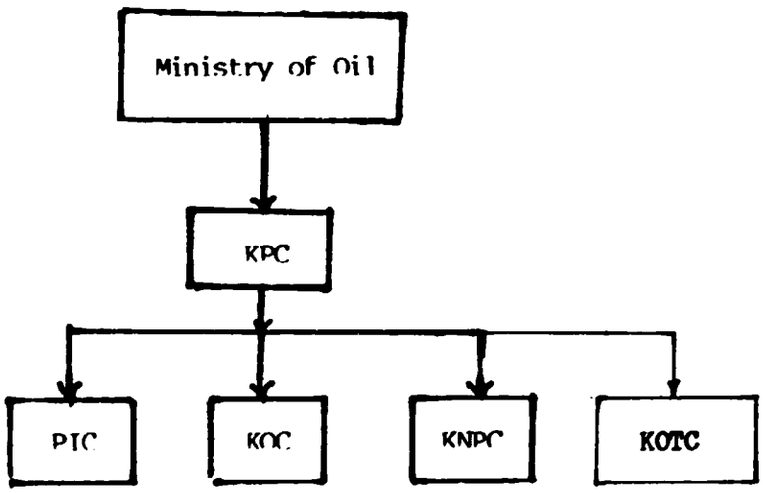
- Ammonia = 596,000 tpy.
- Urea = 660,000 tpy.



12- **Kuwait:**

The Petrochemical Industries Company (PIC), was established in 1963 to exploit the natural gas for the production of fertilizers and petrochemicals. The company is one of the sister companies of the Kuwait Petroleum Corporation (KPC) which is connected to the Ministry of Oil. The plants in Shuaibah include:

- Ammonia = 990,000 tpy.
- Urea = 792,000 tpy.
- Sulphuric Acid = 132,000 tpy.
- Ammonium Sulphate = 165,000 tpy.



13- **Lebanon:**

The fertilizer Industry in Lebanon is owned by the private sector. **Lebanon Chemicals Company** was established in 1955 and its plants in Salaata include:

- Sulphuric Acid = 346,000 tpy.
- Phosphoric Acid = 100.000 tpy.
- Nitric Acid = 18,000 tpy.
- TSP = 300,000 tpy.
- SSP = 120,000 tpy.
- Ammonium Nitrate = 22,000 tpy.
- Ammonium Sulphate = 75,000 tpy.
- NPK = 100,000 tpy.

14- **Libya:**

The fertilizer projects in Libya are connected to **Amanat Al-Sinaat Al-Thaqila. The National PetroChemical Company (NAPETCO)** in Mersa Al-Brega has at present Ammonia/Urea plants:

- Ammonia = 660,000 tpy.
- Urea = 908,000 tpy.

15- **Egypt:**

There are several companies in Egypt working in the field of fertilizer production. Three companies are mining and beneficiating phosphate rock deposits in various parts of Egypt: El-Nasr Phospahte Company, Misr Phosphate Company, and The Red Sea Phospahte Company. On the other hand, the companies which produce fertilizers are:

- **Societe ElNasr D'Engrais Et D'Industries Chemiques (SIMANCO):** It was established in 1946 and has plants in Suez and Talkha:

- Suez Plants:

- Ammonia	= 75,000 tpy.
- Nitric Acid	= 150,000 tpy.
- Calcium Nitrate	= 250,000 tpy.
- Ammonium Sulphate	= 100,000 tpy.
- Sulphuric Acid	= 100,000 tpy.

- Talkha Plants:

- Ammonia	= 525,000 tpy.
- Urea	= 578,000 tpy.
- Nitric Acid	= 310,000 tpy.
- Ammonium Nitrate	= 380,000 tpy.

* **ElNasr Company for Coke and Chemicals (CHEMICOKE):** It was established in 1961 and its plants in Helwan include:

- Ammonia	= 56,000 tpy.
- Nitric Acid	= 172,000 tpy.
- Ammonium Nitrate	= 120,000 tpy.
- Sulphuric Acid	= 12,000 tpy.
- Ammonium Sulphate	= 18,000 tpy.

* **Egyptian Chemical Industries Company (KIMA):** It was established in 1956 and its plants in Aswan include:

- Ammonia = 150,000 tpy.
- Nitric Acid = 510,000 tpy.
- Ammonium Nitrate = 380,000 tpy.

* **Societe Financiere Et Industrielle D'Egypt:** It was established in 1936 and has plants in Kafr El-Zayat and Asyout which include:

- Kafr El-Zayat Plants:

  - Sulphuric Acid = 200,000 tpy.
  - SSP = 231,000 tpy.

- Asyout Plants:

  - Sulphuric Acid = 180,000 tpy.
  - SSP = 395,000 tpy.

* **Abu-Ouir Company for Chemicals And Fertilizers:** It was established in 1976 and its plants in Abu-Ouir include:

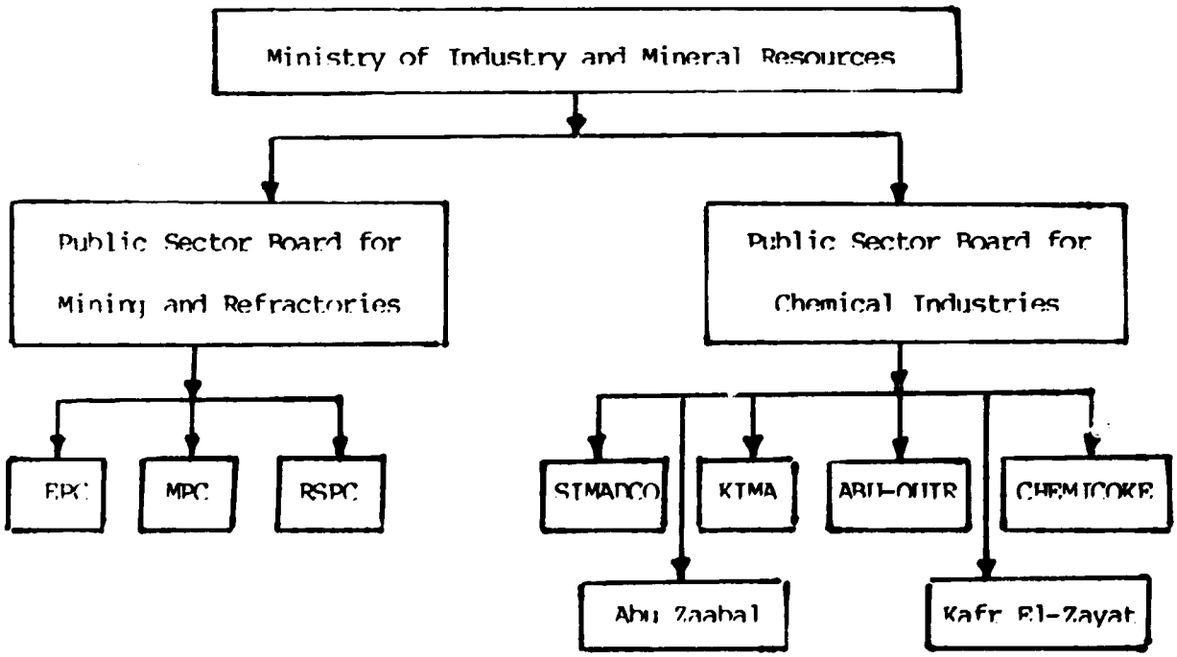
  - Ammonia = 330,000 tpy.
  - Urea = 495,000 tpy.

* **Abu-Zaabal Company for Fertilizers and Chemicals:** It was established in 1945 and its plants in Abu-Zaabal includes:

- Sulphuric Acid = 280,000 tpy.
- SSP = 200,000 tpy.
- Phosphoric Acid = 60,000 tpy.
- TSP = 150,000 tpy.

The fertilizer companies in Egypt are Connected to the Ministry of Industry and Mineral Resources.

Coordination among these companies takes place through the Public Sector Board for Chemical Industries which comprises the Chairmen of these companies chaired by an appointed chairman.



16- **Morocco:**

* **Groupe Office Cherifien Du Phosphate (OCP):** Is a Government Body established in 1920 and takes care of mining and beneficiation of phosphate rock deposits in Morocco. It has three major operations (Mines) at present in Khouribga, Yousefia and Ben Jarir. On the other hand the fertilizer production plants are located in Safi. There are two major complexes: Maroc Chimie and Maroc Phosphore, which include:

- Maroc Chimie:

- Sulphuric Acid	= 891,000 tpy.
- Phosphoric Acid	= 330,000 tpy.
- TSP	= 390,000 tpy.
- ASP	= 132,000 tpy.
- MAP	= 396,000 tpy.
- NPK	= 132,000 tpy.

- Maroc Phosphore:

- Sulphuric Acid	= 3,713,000 tpy.
- Phosphoric Acid	= 1,150,000 tpy.

At present Groupe OCP comprises several companies concerned with the Phosphate Rock and Fertilizer Industry in all fields.

On the other hand, **Societe Cherifeinne des Engrais** is a company owned by the private sector produces sulphuric acid, SSP, and complex and mixed fertilizers. It is connected to the Ministry of Commerce and Industry.

- Sulphur Acid = 60,000 tpy.
- SSP = 120,000 tpy.
- Mixed Fertilizer = 200,000 tpy.

3- Manpower Resources for the Fertilizer Industry in the Arab Region

Taking into consideration the various categories of manpower working in a fertilizer plant to be: Management and Administration, Technical Staff, Skilled Labourers, and Unskilled Labourers. The resources of manpower for this industry can be best discussed on a regional level. The fertilizer industry, on the other hand, requires highly skilled labourers and specialized technical staff, because it involves complicated operations and advanced technology. Therefore, it is a difficult job to secure the required manpower for a fertilizer complex from the local market in a country starting this industry, in particular during the first two to three years, while the case is quite easy in countries with a well-established fertilizer sector, like Tunisia, Morocco, and Egypt.

In general terms, the major sources of manpower are:

1- Educational and Technical Institutes and Universities.

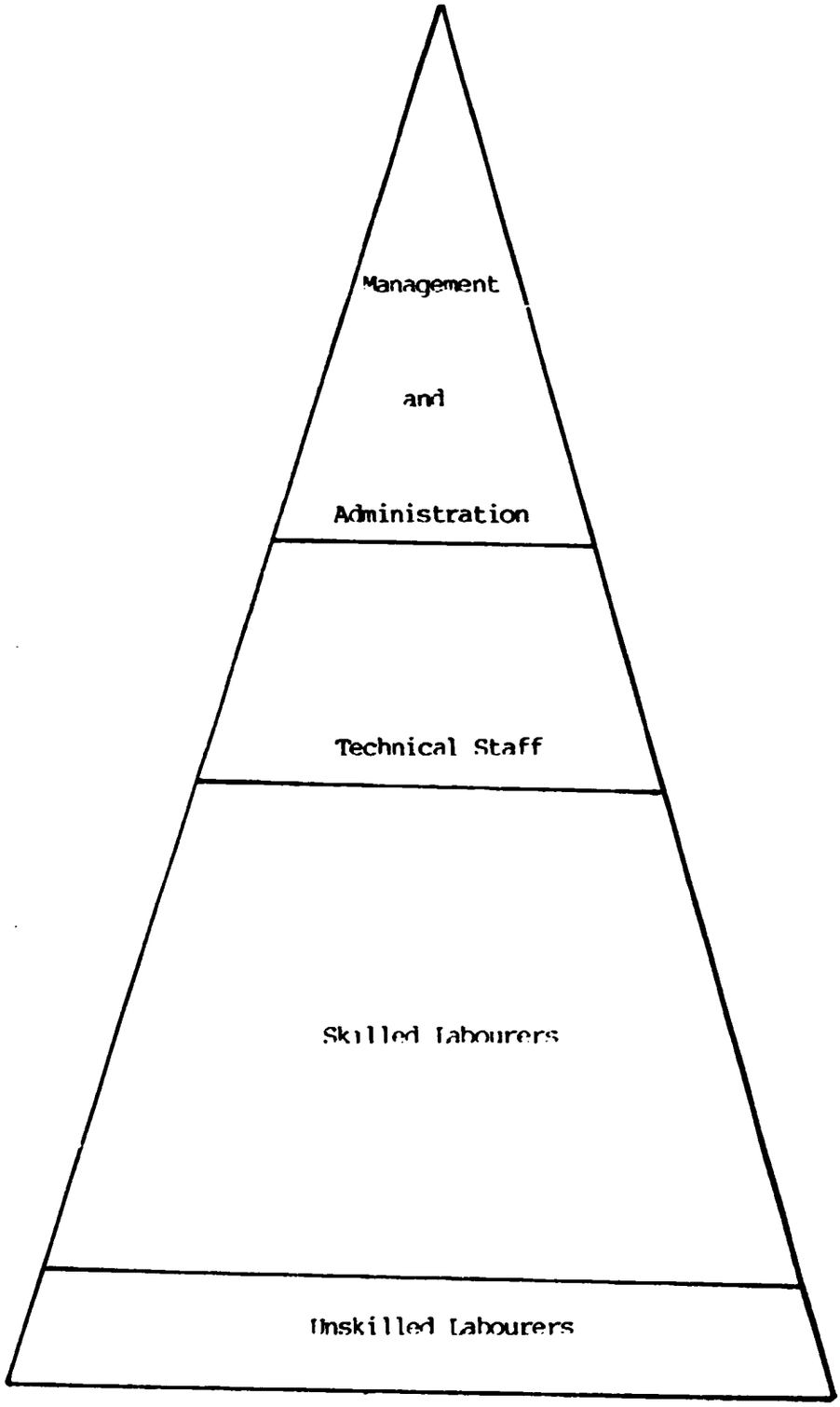
2- Vocational and Polytechnic Schools.

3- Industrial Training Centers and Institutes.

4- Local Market (Nationals).

5- Arab Region Market.

6- Open Market recruitment, in particular, for management and specialized technical staff.



Manpower Categories in a Fertilizer Company

The Arab Countries vary considerably from one another with regard to the recruitmentof the required manpower for the fertilizer industry. The main reasons for this are:

* Difference in population.
* Difference in the degree of development of the industrial sector and Infrastructure.
* Difference in Gross National Product or Financial Resources.

* **Management and Administration:**

In general, most of the Arab Countries can secure all the mangement and administration staff for a fertilizer project from the local market as nationals. In a small number of countries especially those with small population, like: Bahrain, Kuwait, Qatar, U.A.E., Libya, and Saudi Arabia, a certain percentage of this category is secured from expatriats. This percentage actually depends on the degree of industrialization of the country. But, the general policy in those countries is to reduce this percentage gradually by replacing the expatriats with nationals. At all stages of the development of the project, the management and administration manpower is secured through open market recruitments, in particular from similar chemical and petrochemical industries in the country.

* **Technical Staff:**

This category which includes engineers, technical and specialized graduates of universities and technical institutes, is usually secured easily from the local market in several Arab Countries like: Egypt, Tunisia, Morocco, Jordan,

Algeria, Syria, Iraq, Sudan, and Somalia. But, in the Arab Gulf States, a high percentage of this category is usually secured from expatriats.

* **Skilled Labourers:**

This category which includes technicians specialized in mechanical or electrical or other related fields necessary for operation and maintenance of the fertilizer plant are usually secured from vocational and polytechnic schools and training centers and institutes. In several Arab Countries, like Egypt, Tunisia, Morocco, Algeria, Syria, Jordan, Iraq and Sudan, this category is obtained from the local market, while in Arab Gulf States, this category of manpower is usually brought from other Arab Countries or from Asian Countries.

* **Unskilled Labourers:**

In several Arab Countries, this category is usually a burden, because the industry has to employ a high number of unskilled or semi-skilled labourers from the nationals in the nearby towns and villages to the fertilizer plants. On the other hand, this category is hundred percentage expatriats in some Arab Gulf States.

1- **Educational and Technical Institutes and Universities:**

This source constitutes the main source for the second cataegory, that is to say, (Tecnical Staff). Several studies showed that on national level there is a high number of graduates in the market and more than the industry needs in

several specializations in almost all the Arab Countries. Certainly, training is needed for such manpower and usually starts with the inception of the project.

2- **Vocational and Polytechnic Schools:**

Several Arab Countries have started this type of education long time ago and it is at present well-established. This source supplies the industry with all its needs of Skilled Labourers and technicians and in some cases and after experience and training can become a source for Technical Staff category.

3- **Industrial Training Centers and Institutes:**

This is another source for Skilled Labourers and Technicians. In several Arab Countries, the fertilizer industry, chemical and petrochemical industry have established industrial and technological centers and institutes with a wide spectrum of specialization: mechanical, electrical, chemical, and other fields of interest to the chemical industry. This source of manpower can be the best source for skilled labourers when the educational and training programmes and courses offered are done with close cooperation with the industry and according to its needs.

4- **Local Market (Nationals):**

AS we mentioned before, the manpower available in the Arab Countries on national level for the fertilizer industry vary widely from country to another depending on several factors, especially, the degree of industrialization, and financial resources. But certainly the Management and Administration, in most of the Arab Countries come from the local market.

5- **Arab Region Market:**

In several Arab Countries, the fertilizer industry employ, and at all levels of manpower, a big number of Arab nationals. Egyptians, Jordanians, Syrians, Iraqis and Sudanees are the Arab nationals who move alot in the Arab Region. The movement of manpower in the Arab Region, especially from densely-populated countries to other countries like the Arab Gulf States, Libya and Algeria when the industrial sector is considered, in the sense of it, an accumulation of experience such that experience can return back to its original country to join new projects.

6- **Open Market Recruitment:**

In some Arab Countries, the fertilizer companies employ experts, engineers, technicians, skilled and unskilled labourers from various nationalities. In some cases, 40 - 50 % of the staff of the fertilizer company are foreign nationals. But, the general policy of all the Arab Countries is to make all the staff after a certain period of time from their nationals.

4- Manpower Classification and Structure

in the Fertilizer Industry in the

Arab Region

The organizational structure in fertilizer comapnies and job titles and description differ considerably from one company to another in the Arab Countries. On the other hand, classification of manpower according to nationality, age or education would certainly show several aspects in each company, and the stage of development of the manpower in the country working in the ferilizer industry at all levels.

The fertilizer industry includes:

* Raw Materials Sector.
* Ammonia / Nitrogen Fertilizers Industry.
* Phosphoric Acid / Phosphate Fertilizers Industry.

Therefore the manpower classification will be discussed for the various categories according to the above sectors during 1983 and for the period (1970-1983) at the company, country and regional levels.

4.1. Manpower in the Fertilizer Industry (1970-1983):

The manpower in the fertilizer industry and its raw materials has increased considerably during the seventies (table 4), and the total number has reached

about 96 thousand in 1983 which is about double that in 1970. The average annual increase was about 7 % for the period (1970-1983). This shows clearly that several fertilizer projects were implemented during this period in the Arab Countries. in addition to the considerable increase in production of phosphate rock.

* The raw materials sector (phosphate rock, frasch sulphur and potash) has a total manpower of about 51 thousand which is about 53 % of the total manpower in the fertilizer industry in the Arab Region in 1983 (table 1). The total manpower in the raw materials sector has increased by 76 % during the period (1970-1983).

* The Ammonia / Nitrogen fertilizer industry has a total manpower of about 28 thousand in 1983 and comes second after the raw materials. This is about 29 % of the total manpower in the fertilizer industry in the Arab Region. Compared with 1970, the total manpower in the Ammonia / Nitrogen fertilizer industry in 1983 is about three-fold, which clearly shows that the majority of the Ammonia / Urea plants in the Arab countires were established during the seventies (table 2).

Taking into consideration the facts that the Ammonia / Nitrogen fertilizer industry is a capital-intensive industry which requires highly skilled workers, the average ratio of Investments to manpower is about 0.2 million dollar/person. This ratio is quite low when compared with known values for an Ammonia / Urea plant (1000/1500 tpd) with an investment of 300 million dollars and manpower of 500. Several Arab Countries employ high number of manpower because of the policy of the government to secure jobs for their nationals.

* The Phosphoric Acid / Phosphate Fertilizer industry has a total manpower in 1983 about 17 thousand (table 3) which is about 18 % of the total manpower in the fertilizer industry in the Arab Region. The total manpower in this sector in 1983 is more than three times that in 1970.

On the other hand, tables 5,6 and 7 show the total Manpower for the three sectors and for each company in 1983.

Table (1): Total Manpower in the Raw Materials Sector in the Arab Region in the Period (1970 - 1983)

Country	1970	1975	1980	1983
1- **Jordan**	930	1800	3000	4423
2- **Tunisia**	12000	12200	12600	14000
3- **Algeria**	500	975	1500	1500
4- **Syria**	1000	1500	2000	2250
5- **Iraq**	----	----	1500	3000
6- **Egypt**	2000	2500	3000	3000
7- **Morocco**	13000	17500	23250	24312
Total	29430	36475	46850	52485

Table (2): Total Manpower in the Ammonia/Nitrogen

Fertilizers Plants in the Arab Region

(1970 - 1983)

Country	1970	1975	1980	1983
1- **U.A.E**	----	----	80	330
2- **Bahrain**	----	----	30	200
3- **Tunisia**	----	----	50	418
4- **Algeria**	950	950	1500	2200
5- **Saudi Arabia**	600	574	669	1001
6- **Sudan**	----	----	20	200
7- **Syria**	500	600	1550	2861
8- **Somalia**	----	----	----	200
9- **Iraq**	700	900	3262	2569
10- **Qatar**	50	759	1099	990
11- **Kuwait**	1000	1250	1250	1239
12- **Libya**	----	150	1100	1521
13- **Egypt**	7500	9000	14500	14500
Total	9500	14183	25110	28229

Table (3): Total Manpower in the Phosphoric Acid/ Phosphate Fertilizers Plants in the Arab Region (1970 - 1983)

Country	1970	1975	1980	1983
1- **Jordan**	---	---	260	806
2- **Tunisia**	1083	1817	3000	3810
3- **Algeria**	---	500	500	1460
4- **Syria**	---	---	500	500
5- **Iraq**	---	---	400	650
6- **Lebanon**	200	300	360	450
7- **Egypt**	3191	3430	3600	4350
8- **Morocco**	1000	2350	3963	5031
Total	5474	8397	12583	17057

Table (4): Total Manpower in the Fertilizer Industry

in the Arab Region

(1970 - 1983)

Country	1970	1975	1980	1983
1- **Jordan**	930	1800	3000	5229
2- **U.A.E**	---	---	80	330
3- **Bahrain**	---	---	30	200
4- **Tunisia**	13083	14017	15650	18228
5- **Algeria**	1450	2425	3500	5160
6- **Saudi Arabia**	600	754	669	1001
7- **Sudan**	---	---	20	200
8- **Syria**	1500	2100	4050	5611
9- **Somalia**	---	---	---	200
10- **Iraq**	700	900	5162	6219
11- **Qatar**	50	759	1099	1239
12- **Kuwait**	1000	1250	1250	1299
13- **Libya**	---	150	1100	1521
14- **Lebanon**	200	300	360	450
15- **Egypt**	10891	14930	21100	21850
16- **Morocco**	14000	19850	27213	29343
Total	44404	59055	84283	97771

Table (5): Total Manpower in the Raw Materials Sector in the Arab Region * 1983

	Country	Company	Total Manpower
1-	**Jordan**	* Arab Potash Company	889
		* Jordan Phosphate Mines Company	3534
2-	**Tunisia**	* Company Des Phosphate Des Gafsa	14000
3-	**Algeria**	* Enterprise Nationale De Fer Et Du Phosphate	1500
4-	**Syria**	* General Company for Phosphate and Mines	2250
5-	**Iraq**	* State Enterprise for Phosphats (Akashat Mine)	1500
		* State Enterprise for Mishraq Sulphur	1500
6-	**Egypt**	* Elnasr Phosphate Company	1000
		* Misr Phosphate Company	1000
		* The Red Sea Phosphate Company	1000
7-	**Morocco**	* Office Cherifien Du Phosphate	24312
	Total		52485

* Manpower working in Natural Gas and Sulphur extraction plants are not included because they belong to the Oil Sector.

Table (6): Total Manpower in the Ammonia/Nitrogen Fertilizers Plants in the Arab Region

1983

	Country	Company	Total Manpower
1-	**U.A.E.**	* Ruwais Fertilizer Industries	330
2-	**Bahrain**	* Gulf Petrochemical Industries Company	200
3-	**Tunisia**	* Societe Arabe Des Engrais Phosphte Et Azotes (SAEPA - 2)	418
4-	**Algeria**	* Enterprise Nationale Des Engrais Et Produits Phytos	2200
5-	**Saudi Arabia**	* Saudi Arabia Fertilizer Company	560
		* Saudi Arabian Basic Industries Corporation (SAMAD)	441
6-	**Sudan**	* Sudan-Ren Chemicals And Fertilizers	200
7-	**Syria**	* State Company for Fertilizers	2861
8-	**Somalia**	* Urea Production Plant	200
9-	**Iraq**	* State Enterprisefor Fertilizers	2569
10-	**Oatar**	* Oatar Fertilizer Company	990
11-	**Kuwait**	* Petrochemical Industries Company	1239
12-	**Libya**	* National Petrochemical Company	1521
13-	**Egypt**	* Societe ElNasr D'Engrais ET D'Industries Chemiques	7900
		* Egyptian Chemical Industries	2500
		* ElNasr Company for Coke and Chemicals	2500
		* Abu-Ouir Company for Chemicals and Fertilizers	1600
	Total		28269

Table (7): Total Manpower in the Phosphoric Acid/Phosphate Fertilizer Plants in the Arab Region - 1983

	Country	Company	Total Manpower
1-	**Jordan**	* Jordan Fertilizer Indusries Company	806
2-	**Tunisia**	* Industries Chemiques Maghrebines	900
		* Societe Arabe Des Engrais Phosphate Et Azotes (SAEPA - 1)	582
		* Societe Industrielle D'Acid Phosphoric Et D'Engrais (STAPE - A,B)	1424
		* Engrais DE Gabes	84
		* Industrie Chemique De Gafsa	660
		* Societe Tunisienne D'Engrais Chemique	160
3-	**Algeria**	* Enterprise Nationale Des Engrais Et Produits Phytos	1460
4-	**Syria**	* State Company for Fertilizers	500
5-	**Iraq**	* State Enterprise for Phosphates	650
6-	**Lebanon**	* Lebanon Chemicals Company	450
7-	**Egypt**	* Societe Financiere Et Industrielle D'Egypt	2350
		* Abu-Zaabal Fertilizers and Chemicals Company	2000
8-	**Morocco**	* Maroc Chemie] * Maroc Phosphore]	4611
		* Societe Cherifienne D'Engrais	420
	Total		17057

The manpower classification according to the four categories:

* Management and Administration (M A).
* Technical Staff (T S).
* Skilled Labourers (S L).
* Unskilled Labourers (USL).

For the fertilizer industry in the Arab Region during 1983, (table 8) shows that the percentage distribution is as follows:

Category	Pecentage
Management and Administration	12.9
Technical Staff	17.9
Skilled Labourers	53.5
Unskilled Labourers	15.7
Total	100 %

It is quite clear that the highest percentage of staff is the Skilled Labourers (53.5%) which includes the technicians for operation and maintenance in the plants. This percentage differs from company to another, but it seems that it ranges from 40 to 60 %.

On the other hand, the Technical Staff category is about 18 % of the total manpower and this includes: university graduates (degree holders) at all levels for all specializations, working in different departments in the plants:

Technical Dept., Production Dept., Maintenance Dept., Quality Control Dept., ... etc. The percentage of Technical Staff category in companies vary considerably and it may range from 4 % to 30 %.

Company	% Technical Staff	% skilled labourers
GECOPHAM	4	67
JMPC	14	45
GAFSA	20	50
PIC	19	58
SAFCO	28	44
OAFCO	13	60
JFI	9	52
ICM	25	50

Table (8): Distribution of Manpower in the Fertilizer Industry in the Arab Region According to the Various Categories 1983

Country / Company	M A	T S	S L	USL	Total
1- **Jodan:**					
* Jordan Phosphate Mines Company	717	490	1587	740	3534
* Jordan Fertilizer Industries Company	140	76	420	170	806
* Arab Potash Company	67	143	552	127	889
2- **U.A.E:**					
* Ruwais Fertilizer Industries	20	70	210	30	330
3- **Bahrain:**					
* Gulf Petrochemical Industries Company	20	35	115	30	200
4- **Tunisia:**					
* Industries Chemique Maghrebines	90	225	450	135	900
* Societe Industrielle Phosphorique Et D'Engrais	142	285	712	285	1424
* Companie Des Phosphate Des Gafsa	725	2800	7000	3475	14000
* Societe Arabe Des Engrais Phosphate Et Azote	100	200	500	200	1000

M A = Management and Administration T S = Technical Staff

S L = Skilled Labourers USL = Unskilled Labourers

Country / Company	M A	T S	S L	USL	Total
* Engrais De Gabes	10	32	42	12	96
* Societe Tunisienne D'Engrais Chemiques	16	32	80	32	160
* Industrie Chemique De Gafsa	30	70	300	260	660
5- **Algeria:**					
* Enterprise Nationale De Fer Et Du Phosphate	75	300	750	375	1500
* Enterprise Nationale Des Engrais Et Produits Phytos	365	740	1825	730	3660
6- **Saudi Arabia:**					
* Saudi Arabian Fertilizer Company	117	159	248	36	560
* Saudi Arabian Basic Industries Corporation	57	114	250	20	441
7- **Sudan:**					
* Sudan - Ren Chemicals and Fertilizers	20	40	100	40	200
8- **Syria:**					
* State Company for Fertilzers	291	357	2528	185	3361
* General Company for Phosphate and Mines	219	81	1500	450	2250
9- **Somalia:**					
* Urea Production Project	20	40	100	40	200

M A = Management and Administration

T S = Technical Staff

S L = Skilled Labourers

USL = Unskilled Labourers

Country / Company	M A	T S	S L	USL	Total
10- **Iraq:**					
* State Enterprise for Fertilizers	280	351	1538	400	2569
* State Enterprise for Phosphates	150	430	1075	495	2150
* State Enterprise for Mishraq Sulphur	75	300	750	375	1500
11- **Qatar:**					
* Qatar Fertilizer Company	124	129	600	137	990
12- **Kuwait:**					
* Petrochemical Industries Company	179	230	720	110	1239
13- **Lebanon:**					
* Lebanon Chemicals Company	45	90	225	90	450
14- **Libya:**					
* National Petro-chemical Company	245	287	739	250	1521
15- **Egypt:**					
* ElNasr Company for Coke and Chemicals	500	500	1250	250	2500
* Egyptian Chemical Industries Company	500	500	1250	250	2500
* Abu-Quir Company for Chemicals and Fertilizer	450	320	500	330	1600
* Societe Financiere Et Industrielle D'Egypt	470	470	1175	235	2350

M A = Management and Administration T S = Technical Staff

S L = Skilled Labourers USL = Unskilled Labourers

Country / Company	M A	T S	S L	USL	Total
* Abu-Zaabal Fertilizers and Chemicals Company	400	400	1000	200	2000
* Societe ElNasr D'Engrais Et D'Industrielle Chemiques	1580	1580	3950	790	7900
* ElNasr Phosphate Company	50	80	620	250	1000
* Misr Phosphate Company	50	80	620	250	1000
* The Red Sea Phosphate Company	50	80	620	250	1000
16- **Morocco:**					
* Groupe Office Cherifien Des Phosphate	4110	5303	16140	3370	28923
* Societe Cherifienne D'Engrais	20	80	220	100	420
Total (Arab Region)	12519	17487	52261	15504	97771
Percentage (%)	12.9	17.9	53.5	15.7	100

M A = Management and Administration

T S = Technical Staff

S L = Skilled Labourers

USL = Unskilled Labourers

4.2 Manpower Classification and Structure in the Fertilizer Industry - 1983:

The fertilizer industry started recently during the seventies in several Arab Countries which possess raw materials resources, like phosphate rock, sulphur, natural gas, and potash. Some of these countries do not have the required technical staff, skilled labourers, and specialists to operate their fertilizer plants, and therefore a certain percentage of the required manpower was recruited from the Arab Region, Asian Countries or developed countries. On the other hand, in some Arab Countries, the fertilizer industry is well-established like in Tunisia, Morocco and Egypt and therefore the manpower is sometimes 100% national.

* Manpower Structure and Classification according to Nationality, Education and Age:

According to information received from several fertilizer companies, the manpower structure according to Nationality, Education and Age showed the following results:

1- **Nationality:** Table (9) shows the percentage distribution of the manpower in several fertilizer companies according to nationality. Considering three categories: Nationals, Arabs, and Foreigners, it is clear that this distribution vary considerably such that in some comapnies the highest percentage is that for the nationals like in case of Morocco, Iraq, Syria and Jordan, while in some companies the highest

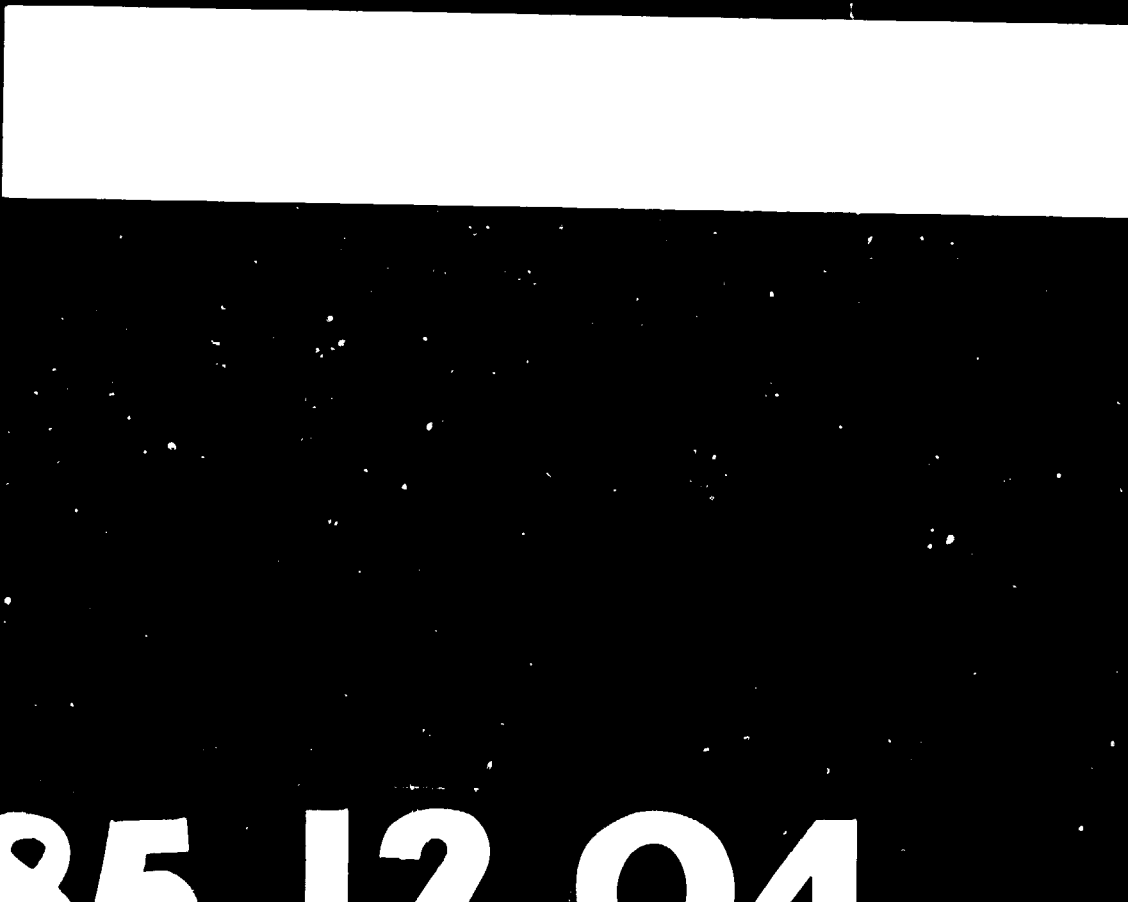
percentage is that of the Arab Nationalities like in Kuwait and U.A.E. The third case is that the highest percentage is that of Foreign Nationalities like in case of Qatar. The fourth case is that the percentage of the Nationals and Foreign Nationalities are about equal like in case of Libya.

Table (9): Manpower Distribution in some Fertilizer Companies in the Arab Region According to Nationality 1983

	Country/Company		Nationals	Arabs	Foreigners
1-	**U.A.E**	* FERTIL	2.4%	52.0%	45.6%
2-	**Qatar**	* QAFCO	19.5%	15.5%	65.0%
3-	**Libya**	* NAFETCO	47.0%	6.5%	46.5%
4-	**Iraq**	* SEF	99.5%	0.43%	0.07%
5-	**Kuwait**	* PIC	20.4%	68.9%	10.7%
6-	**Saudi Arabia**	* SAFCO	46.4%	11.3%	42.3%
		* SAMAD	55.6%	2.0%	42.4%
7-	**Syria**	* FERT	99.1%	0.9%	--.-
8-	**JOrdan**	* JFI	76.3%	13.2%	10.5%
9-	**Morocco**	* OCP	99.6%	0.04%	0.36%

2- **Education**· Table (10) shows the percentage distribution of manpower in some fertilizer companies according to education and qualifications. It is clear that the highest percentage is that of the high school graduates while in some cases the highest percentage is that of the primary school education. The percentage of the staff with university degree or diploma varies widely and it ranges from 5% to 50%.

3- **Age:** Table (11) shows the percentage distribution of manpower in some fertilizer companies in the Arab Region according to Age. It is quite clear that the highest percentage of manpower is that of the category 30-40 years old, except in SAMAD in Saudi Arabia where category 20-30 years old is the highest. Therefore, this shows that the highest number of staff in these companies are from young graduates of universities and technical institutes and this confirms the importance of training, in particular, specialized trairing workshops.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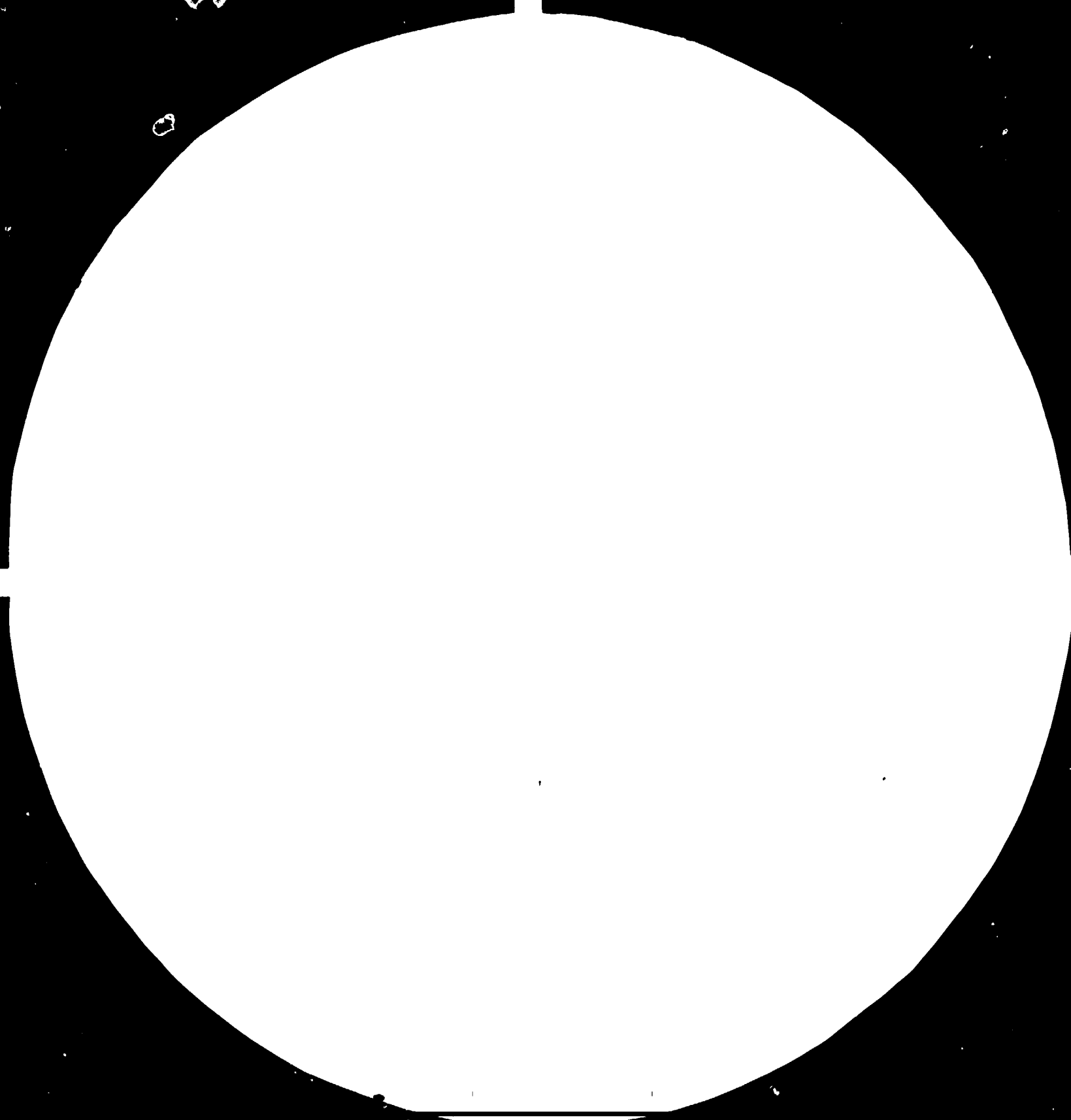


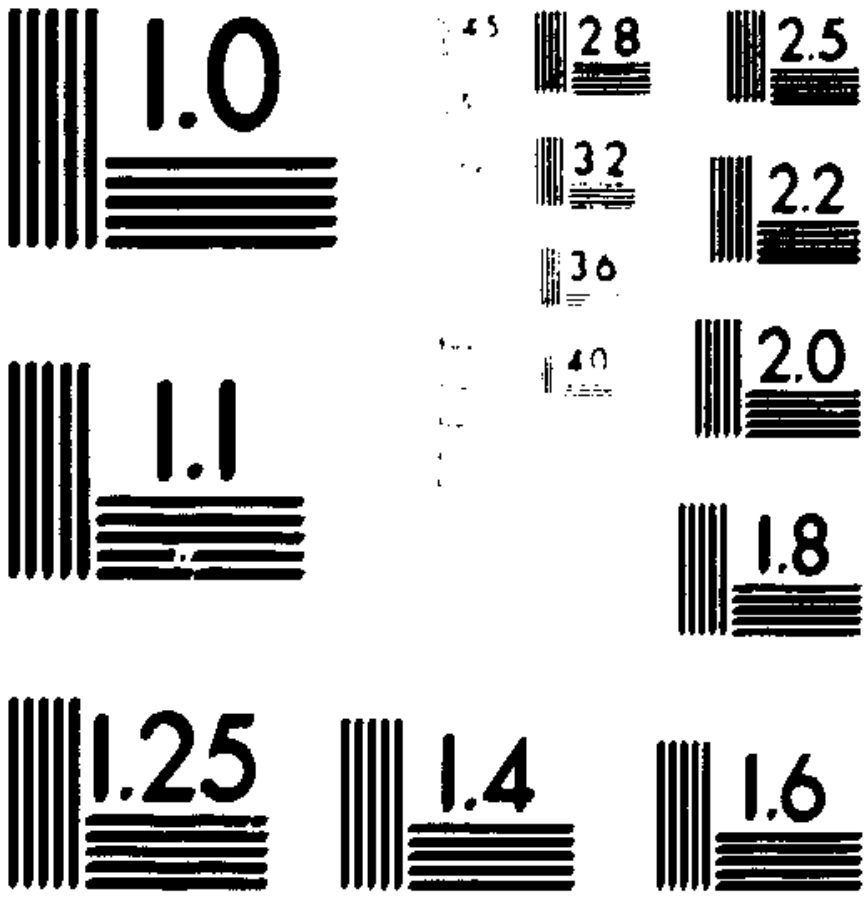


Table (10): Manpower Distribution According to Education in some Fertilizer Companies in the Arab Region

1983

Country/Company		1	2	3	4
1- **U.A.E**	* FERTIL	58.0%	39.0%	3.0%	—
2- **Qatar**	* QAFCO	29.0%	41.0%	21.0%	9.0%
3- **Libya**	* NAFETCO	28.0%	39.0%	27.0%	6.0%
4- **Iraq**	* SEF	5.0%	16.5%	69.5%	9.0%
5- **Kuwait**	* PIC	24.0%	61.0%	11.0%	4.0%
6- **Saudi Arabia**	* SAFCO	32.0%	37.0%	23.0%	18.0%
	* SAMAD	20.0%	77.0%	3.0%	—
7- **Syria**	* FERT	6.0%	25.0%	69.0%	—
8- **Jordan**	* JFT	25.06%	45.03%	24.19%	5.72%
9- **Morocco**	* OCP	5.8%	68.1%	8.4%	17.7%

1- University Degree or Diploma Holders.

2- High School Graduates.

3- Primary School Education.

4- Do not read or write.

Table (11): Manpower Distribution According to Age in Some Fertilizer Companies in the Arab Region

1983

Country/Company		1	2	3	4	5
1- **U.A.E**	* FERTIL	—	23.0%	62.0%	14.0%	1.0%
2- **Qatar**	* QAFCO	0.4%	15.8%	48.8%	28.0%	7.0%
3- **Libya**	* NAFETCO	0.5%	35.8%	42.9%	16.0%	4.8%
4- **Iraq**	* SEF	—	26.3%	51.0%	18.5%	4.2%
5- **Kuwait**	* PIC	0.8%	26.9%	39.1%	26.1%	7.2%
6- **Saudi Arabia**	* SAFCO	2.5%	16.4%	42.3%	29.7%	9.1%
	* SAMAD	1.8%	49.7%	27.4%	15.9%	5.2%
7- **Jordan**	* JFI	—	18.73%	51.13%	25.19%	4.95%
8- **Morocco**	* OCP	—.	35.0%	52.0%	11.0%	2.0%

1- less than 20 years old.

2- 20-30 years old.

3- 30-40 years old.

4- 40-50 years old.

5- More than 50 years old.

* **Organizational Chart in Fertilizer Companies:**

The job titles and description in the organizational chart as well as the lines along which orders may be given differs from one company to another in the Arab Region and depend on various factors:

1. Type of the sector: raw materials, Ammonia/Urea or Phosphoric Acid/ Phosphate Fertilizers industry.

2. Social and Economic System in the country.

3. Organizational Structure of the industry in the country.

4. Ownership of the company, whether private or public or mixed sector.

5. Population and Education system and structure in the country.

6. Size and type of operations of the company.

The main objective of an organizational chart for a company is to determine the responsibilities and authorization as well as the determination of the lines along which oreders may be given. This organizational chart may have one of the following forms:

- Line Organization:

This System is very simple and can be applied in small plants. The main disadvantage of this system is the fact that the staff from middle and senior managers onwards must have detailed knowledge in order to be able to solve all problems.

- Functional Organization:

This sytem was developed for larg plants with complicated process. It uses specialists such as mechanical engineers, electrical engineers, chemists ... etc. The disadvantage of this system is the fact that the middle and senior managers or the chiefs of departments can get orders from diffirent persons with the possibility of receiving, contradicting orders.

- Staff and Line Organization:

In this system the advantages of the line organization are kept and the disadvatages of the functional organization are removed by placing the specialists in an advising and consulting positions.

According to the attached organizational charts for a number of fertilizer companies in the Arab Region the staffing pattern differs widely from company to another. In most of these organizational charts, there is a Board of Directors with a Chairman. Under the Board of Directors there is a General Manager who implements the policy of the Board sometimes the chairman and the General Manager positions can be

occupied by one person. In companies where there is no Board of Directors, the company is under the control of the General Manger who is normally assited by a consulting committee.

The General manger has under his control the main departments of the complex: Production (or operations) department, maintenance department, finance department, administration department, marketing department, planning and new projects department. Each department is headed by a manager assisted by superintendents. Usually the production department and maintenance department are under the control of the plant operations manager (works manager).

Other departments like laboratories and qaulity control, environmental control, fire fighting and safety, materials, technical department can belong also to the operations Manager (works manager).

The production department has a number of production units or sections in addition to utilities and bagging and shipping sections. Each section is headed by a supertintendent.

The maintenance department also is divided to sections such as, general maintenance, workshops, electrical maintenance, instrument maintenance ... etc. Each section is headed by a superintendent, who is usually assisted by a few staff of engineers.

The administration department is headed by a manager who has under his control sections for puplic relations. employee welfare and relations. security. hospital and medical services ... etc. Each section is headed by a superintendent.

The marketing department as well as the finance department is each headed by a manager and the various sections are headed by superintendents.

The organizational chart ofany company can be changed or extended to include other departments such as research and development. international relations. ... etc. Such departments or sections are usually created in the organizational chart when the volume of work and the activities of the company increases and expands.

The Inter-relations between the various departments and sections in an organizatioal chart of a fertilizer company certainly differs from one company to another but all would aim at securing the best and smooth plants operation and production.

* Remarks on the Staffing Patterns in the Fertilizer Companies in the Arab Region:

The work force of a fertilizer plant is a highly specialized one.This work force is consisting of the top management (managers), middle and Senior managers, supervisors, specialists and skilled labourers. All these categories are vital for the success of operation of the fertilizer plant. Therefore atmost care should be exercised to select the work force for all levels. The weakness

in any one level could affect the effectivness of operation. The following are some remarks on the main categories of the work force of a company.

1. Managers:

Managers for top and middle management represent about 5% of the total manpower in many of fertilizer companies in the Arab Region. This category is very important for the success of the fertilizer plant operation. Managers are the desicision makers, therefore all fertilizer companies in the Arab Region insist that managers should have practical experience and general knowledge of the fertilizer business. They should have a broad knowledge of industry with leadership and motivational skills.

2. Supervisors:

This Category represents about 10-15% of the total manpower in many fertilizer companies in the Arab Region. The supervisor is on the first level of management, he has to supervise the implementation of work orders and to control the production process on a daily basis through skilled, semi-skilled and unskilled operators. Supervisors have to report to the middle managers, therefore supervisors need to have practical experience together with leadership skills.

3. Specialists:

This Category include scientists, engineers, chemists, and others with high practical experience and high degree of education. The production process depends mainly on this category for research and development, trouble

shooting and improving the quality of products. This category represents about 5-10% of the total manpower in many of the fertilizer plants. Usually this category represents more than 10% in the well-esthlished companies.

4. Skilled Labourers:

This Category includes mainly the skilled technicians, operators and craftsmen concerned with maintenance and operation of the plant. They represent more than 50% of the total manpower in all fertilizer companies in the Arab Region. Skilled labourers perform a vital function between specialists to whom they provide technical assistance and semi-skilled operators whom they may supervise.

5. Unskilled Labourers:

This Category of manpower is concerned with carrying out general work requiring minimal skills like general services, cleaning, painting, bagging... etc. In many fertilizer plants this category represents about 10-20% of the total manpower. A part of this category is usually used on temporary basis in many of fertilizer companies in the Arab Region.

Table (12): Manpower Distribution According to Job in Some Fertilizer Companies in the Arab Region (1983)

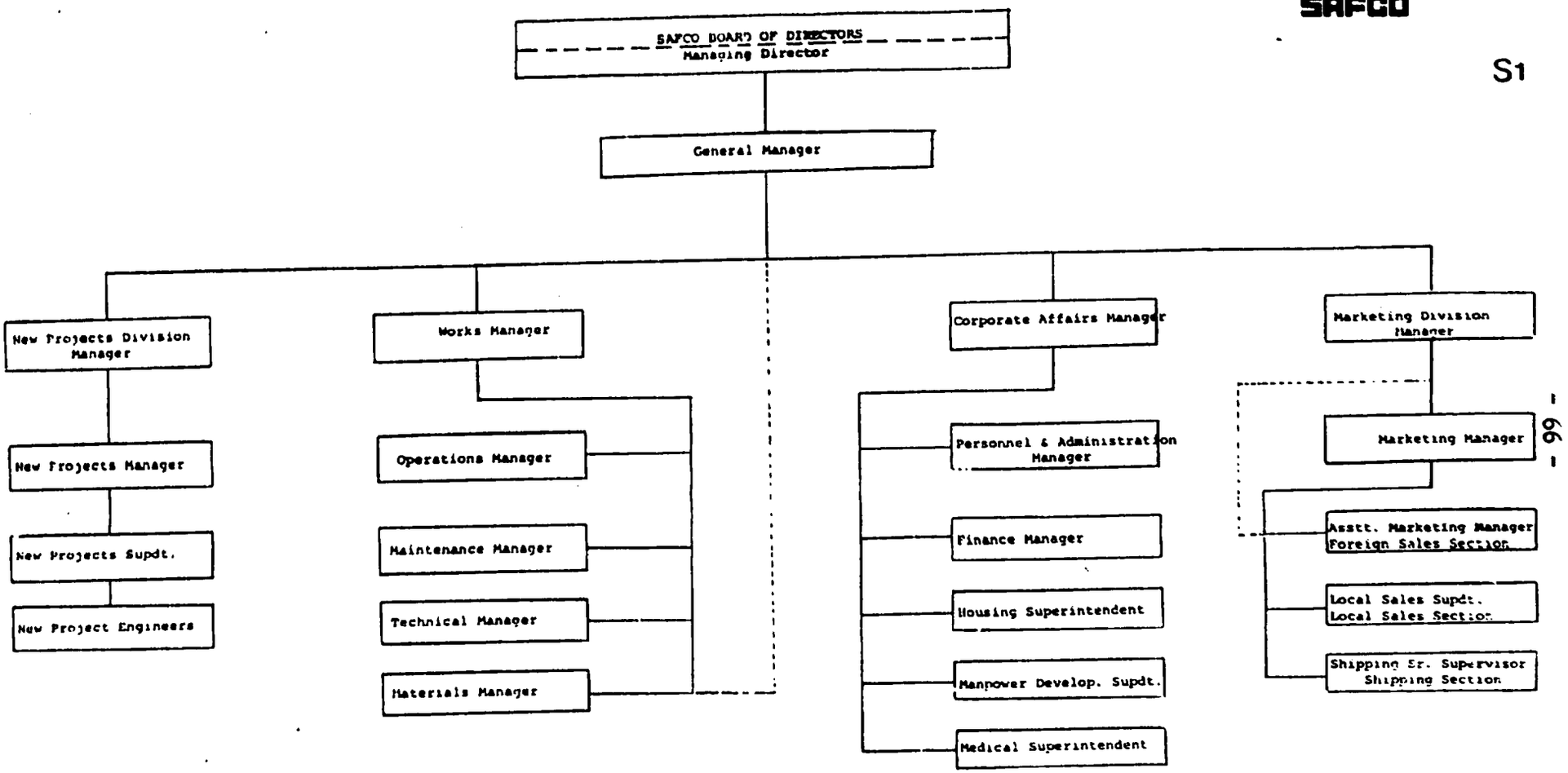
Category \ Company	J F I	SAFCO	SABIC (SAMAD)	S E F	P I C	NAPETCO	O C P
Managers (Top and Middle Managers)	29	27	14	11	36	30	33
Specialists	19	37	88	101	191	132	599
Supervisors	57	132	26	250	192	155	4704
Skilled Labourers	471	248	293	1807	715	739	20217
Semi-Skilled and Unskilled Labourers	230	126	20	400	165	465	3370
Total	806	560	441	2569	1299*	1521	28923

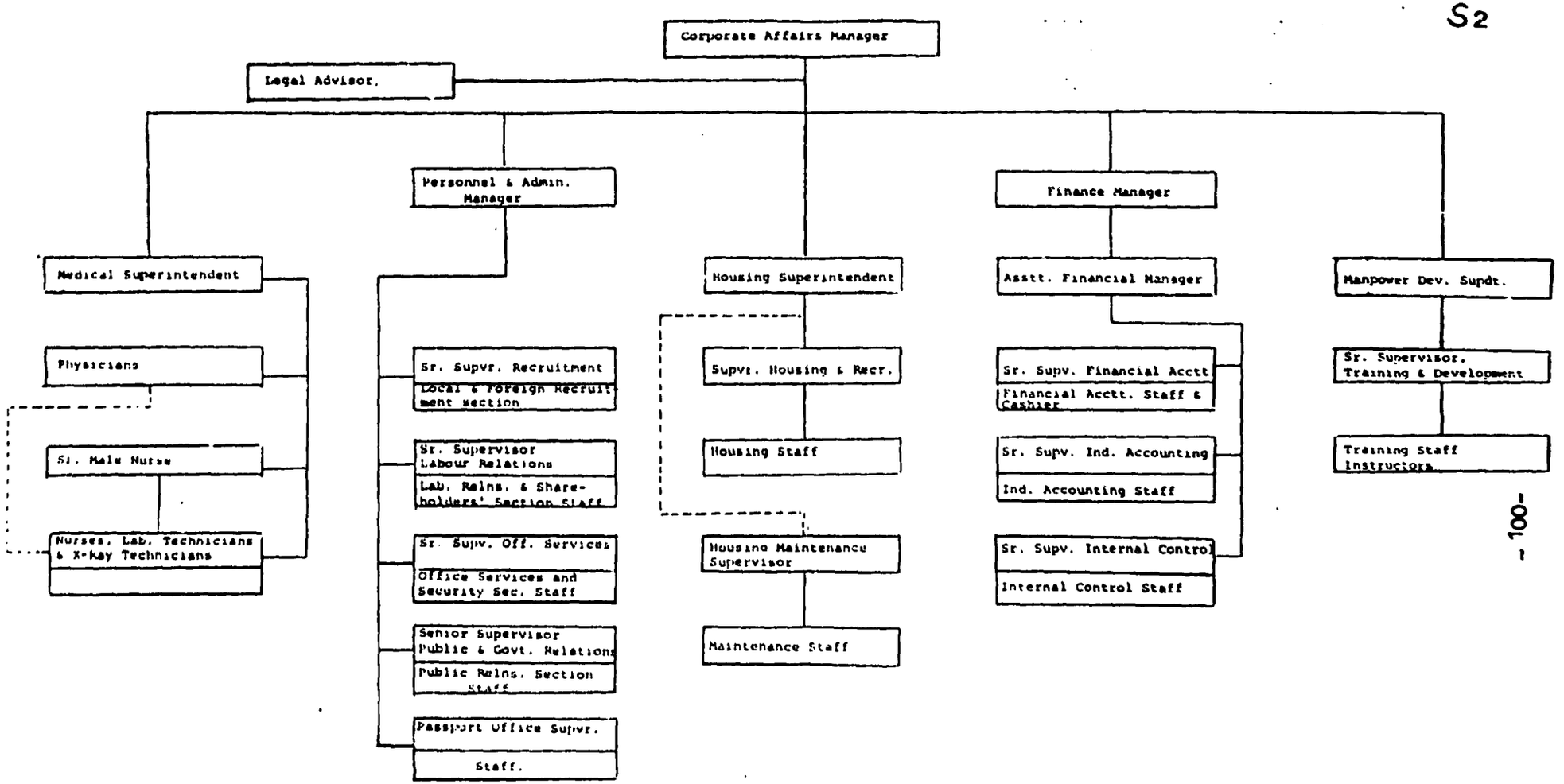
* This total does not include the administrative staff and trainees which equal to 488 employees

Table (13): Manpower Distribution According to Division and Section in Some Fertilizer Companies in the Arab Region (1983)

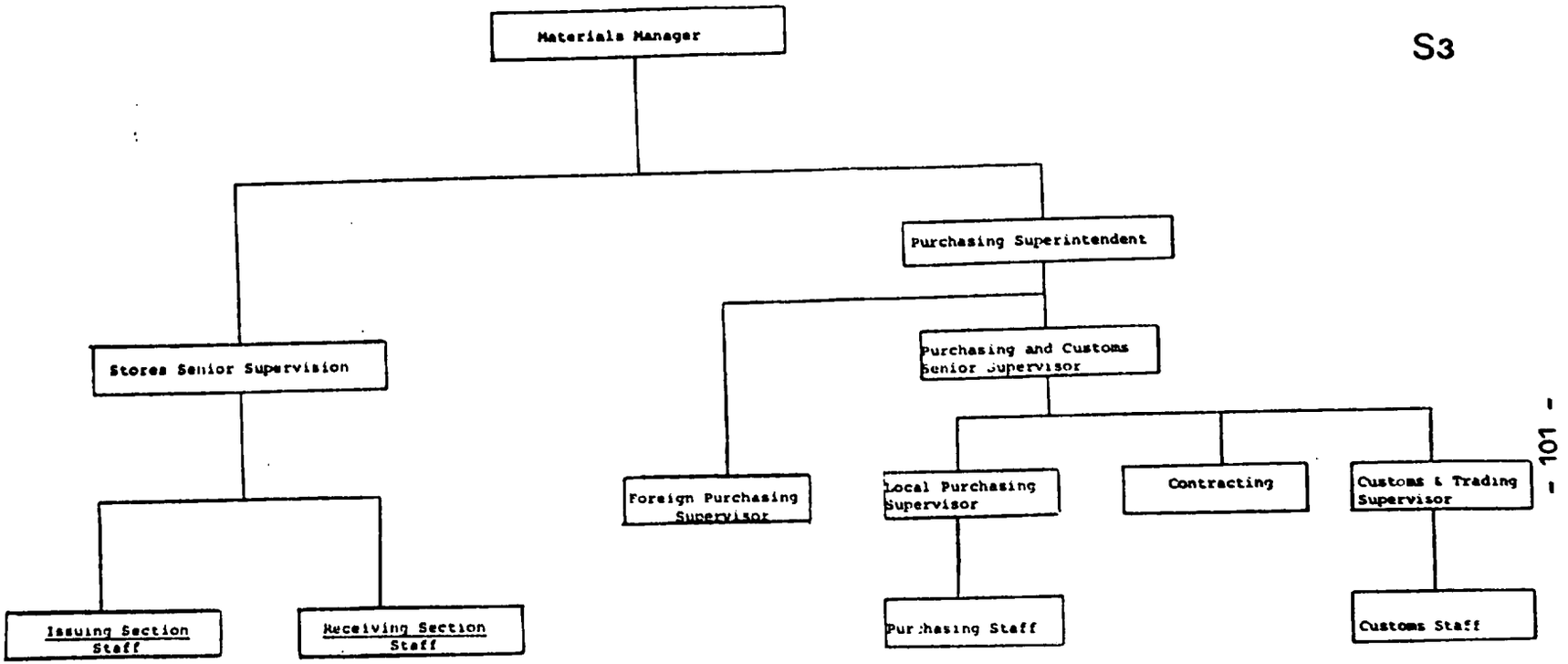
Department \ Company	J F I	SAFCO	SABIC (SAMAD)	S E F	QAFCO	P I C	NAPETCO
Managing Director Office	7	-	1	1	-	19	9
General Manager Office	71	4	5	2	4	6	-
Operation Manager Office	3	15	2	1	1	15	3
Operation Division	259	117	129	702	227	465	448
Maintenance Division	186	137	109	612	360	347	329
Laboratories Division	25	11	18	62	17	67	65
Bagging and Shipping Division	58	58	59	294	78	193	269
Technical Division	included in G.M.O	18	21	5	19	46	68
Projects and Planning Division	"	9	16	76	2	64	26
Marketing Division	"	17	2	22	6	30	18
Stores and Materials Handling	27	31	9	95	27	72	68
Finance Division	29	25	10	58	45	44	92
Personnel and Administration	141	55	59	524	204	187	88
Others	-	63	-	300	-	232	38
Total	806	560	441	2754	990	1787 *	1521

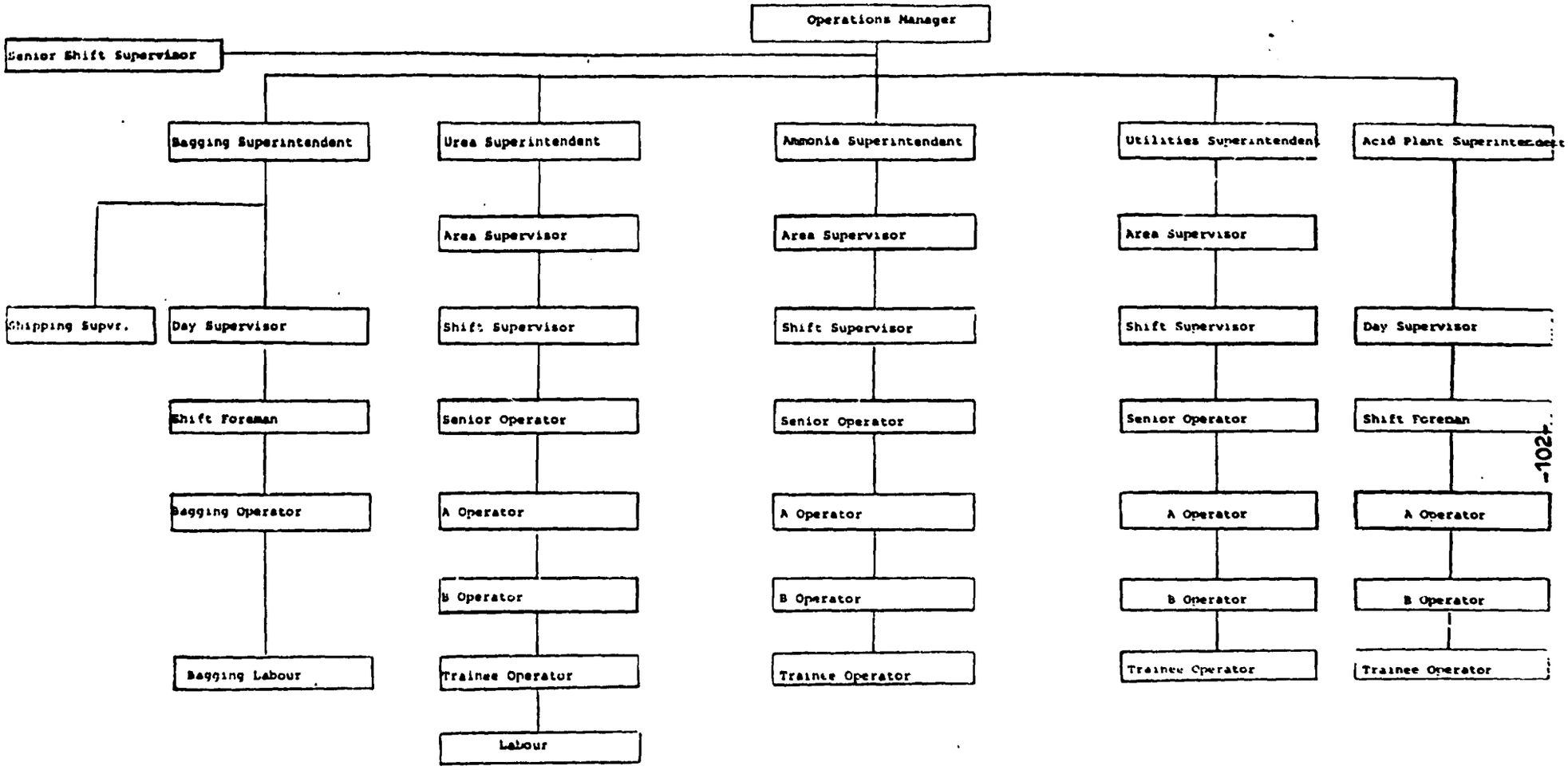
* Include Manpower in Salt And Chloride Division.


SAFCO BOARD OF DIRECTORS
Managing Director
General Manager
New Projects Division Manager
New Projects Manager
New Projects Supdt.
New Project Engineers
Works Manager
Operations Manager
Maintenance Manager
Technical Manager
Materials Manager
Corporate Affairs Manager
Personnel & Administration Manager
Finance Manager
Housing Superintendent
Manpower Develop. Supdt.
Medical Superintendent
Marketing Division Manager
Marketing Manager
Asstt. Marketing Manager Foreign Sales Section
Local Sales Supdt. Local Sales Section
Shipping Sr. Supervisor Shipping Section

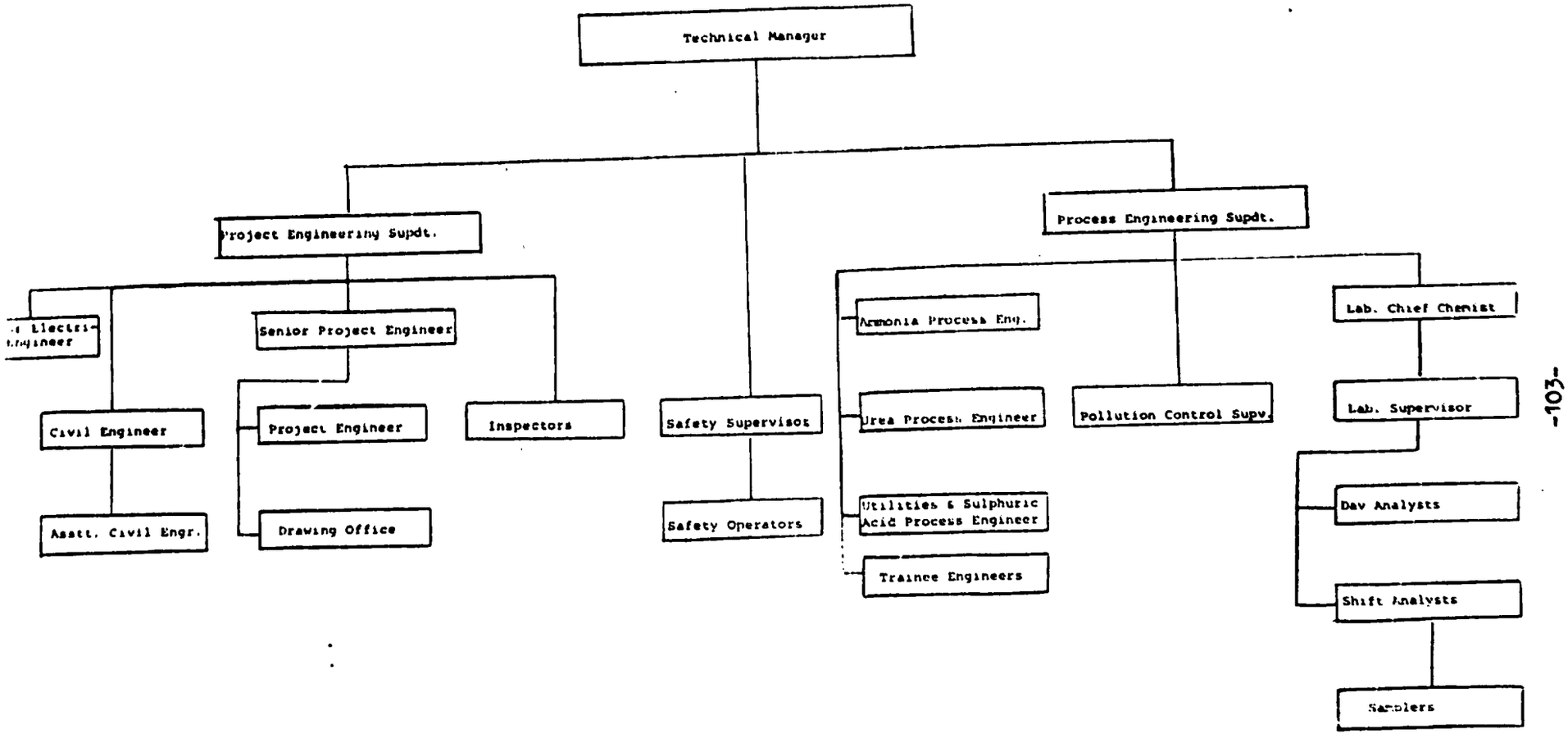

Corporate Affairs Manager
Legal Advisor.
Personnel & Admin. Manager
Finance Manager
Medical Superintendent
Housing Superintendent
Asstt. Financial Manager
Manpower Dev. Supdt.
Physicians
Sr. Male Nurse
Nurses, Lab. Technicians & X-Ray Technicians
Sr. Supvr. Recruitment
Local & Foreign Recruitment Section
Sr. Supervisor Labour Relations
Lab. Relns. & Shareholders' Section Staff
Sr. Supv. Off. Services
Office Services and Security Sec. Staff
Senior Supervisor Public & Govt. Relations
Public Relns. Section Staff
Passport Office Supvr.
Staff.
Supvr. Housing & Recr.
Housing Staff
Housing Maintenance Supervisor
Maintenance Staff
Sr. Supv. Financial Acctt
Financial Acctt. Staff & Cashier
Sr. Supv. Ind. Accounting
Ind. Accounting Staff
Sr. Supv. Internal Control
Internal Control Staff
Sr. Supervisor, Training & Development
Training Staff Instructors

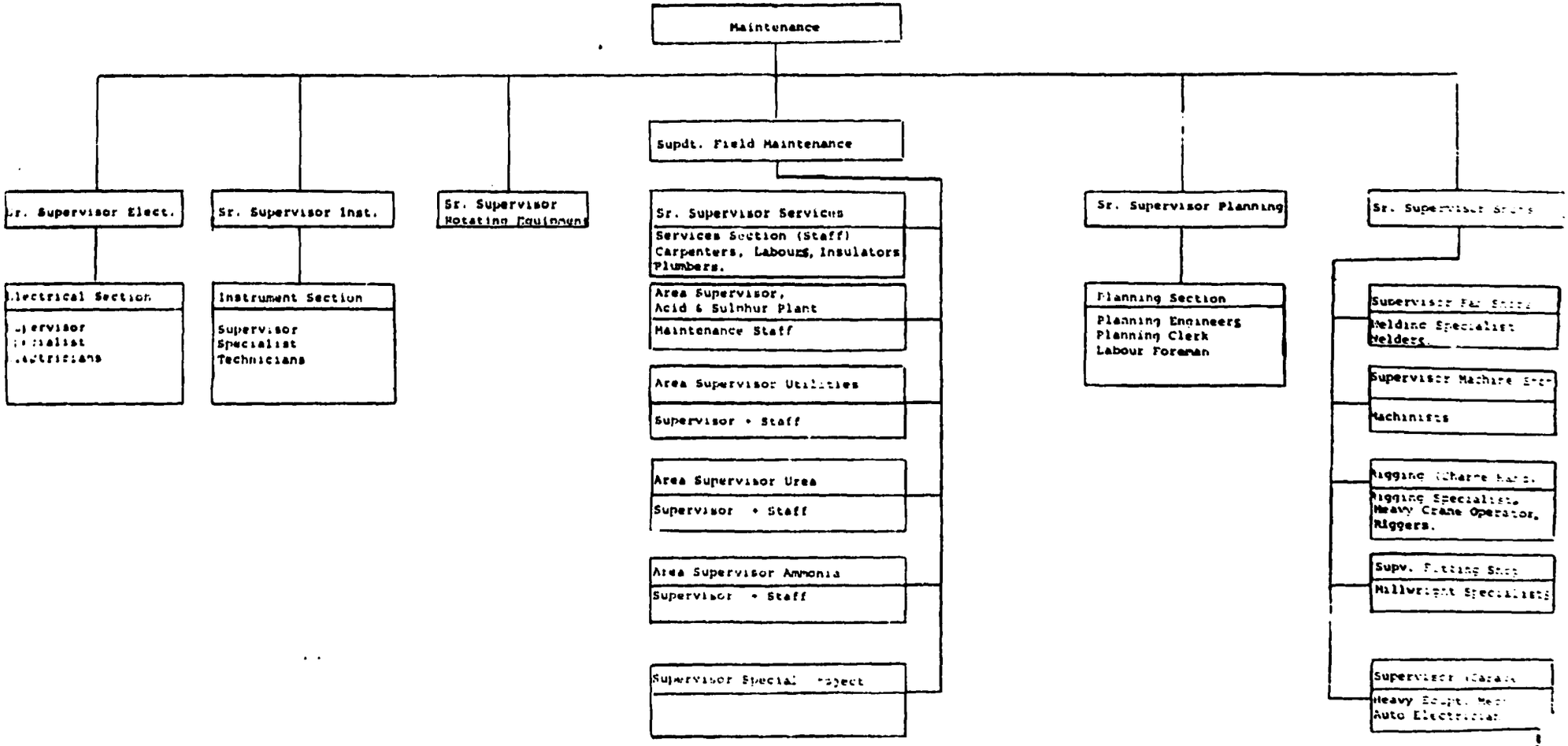
S3


Materials Manager
Purchasing Superintendent
Stores Senior Supervision
Purchasing and Customs Senior Supervisor
Foreign Purchasing Supervisor
Local Purchasing Supervisor
Contracting
Customs & Trading Supervisor
Issuing Section Staff
Receiving Section Staff
Purchasing Staff
Customs Staff


Operations Manager
Senior Shift Supervisor
Bagging Superintendent
Urea Superintendent
Ammonia Superintendent
Utilities Superintendent
Acid Plant Superintendent
Area Supervisor
Area Supervisor
Area Supervisor
Shipping Supvr.
Day Supervisor
Shift Supervisor
Shift Supervisor
Shift Supervisor
Day Supervisor
Shift Foreman
Senior Operator
Senior Operator
Senior Operator
Shift Foreman
Bagging Operator
A Operator
A Operator
A Operator
A Operator
B Operator
B Operator
B Operator
B Operator
Bagging Labour
Trainee Operator
Trainee Operator
Trainee Operator
Trainee Operator
Labour

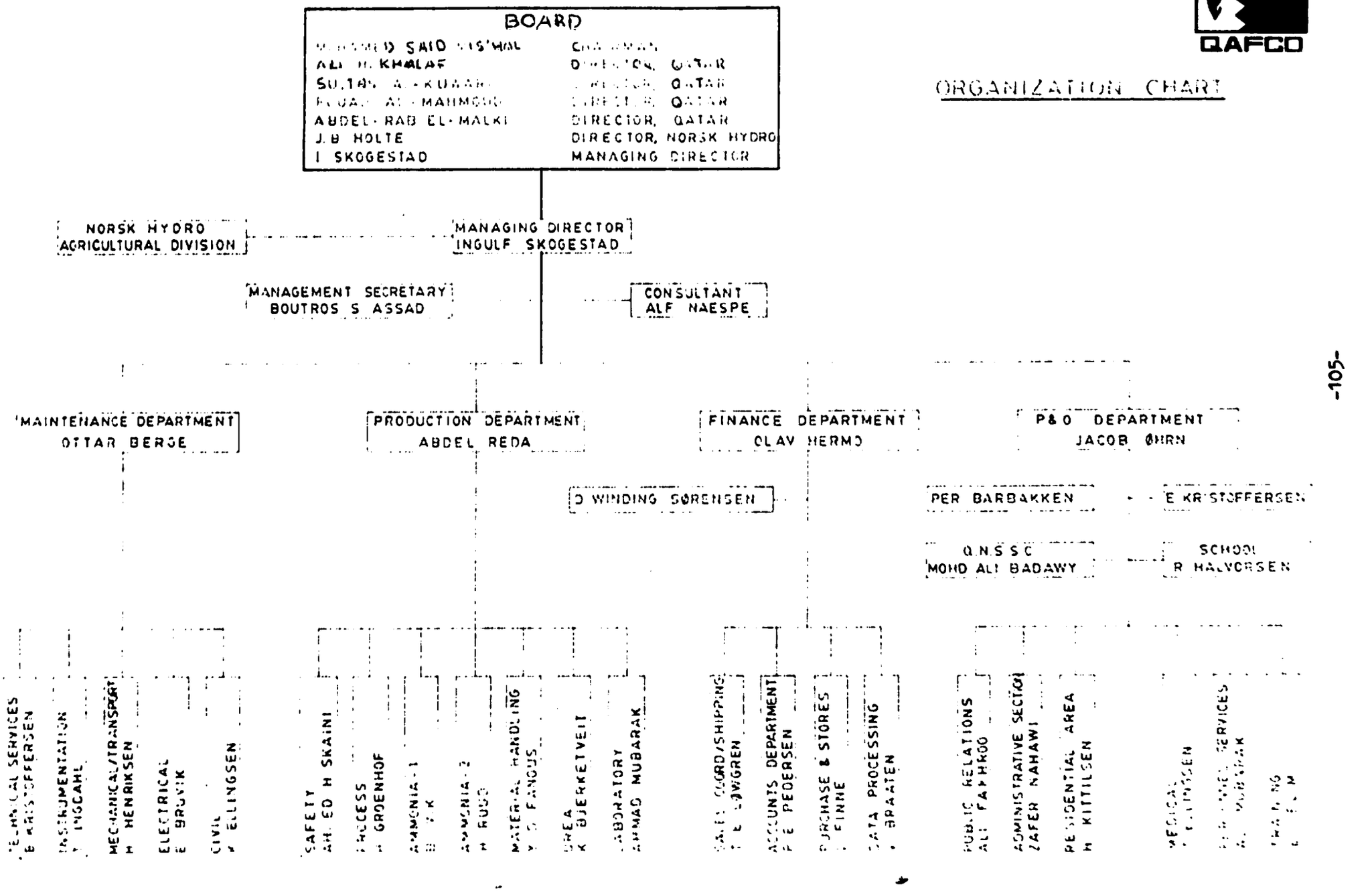
S5

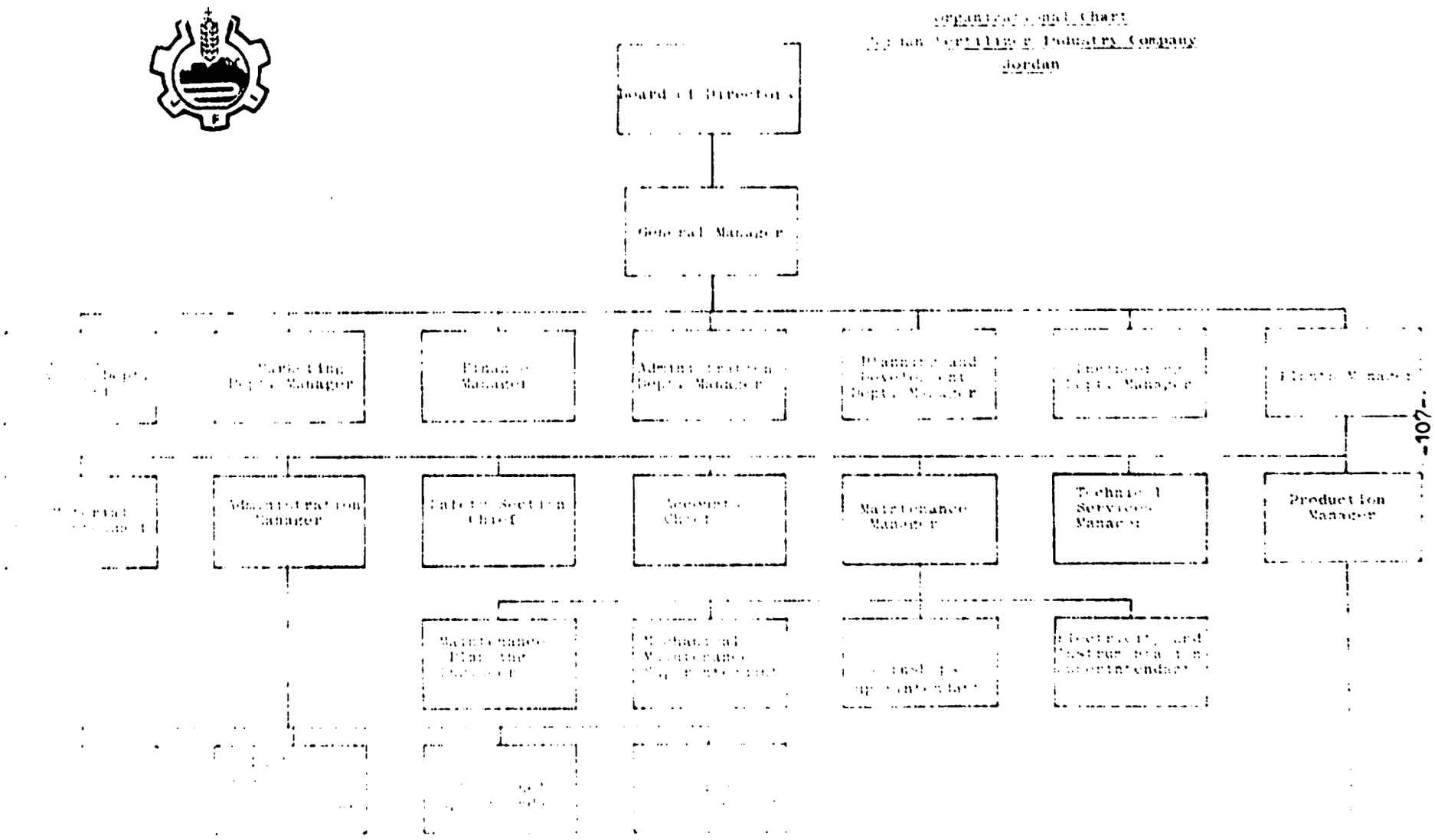

Technical Manager
Project Engineering Supdt.
Process Engineering Supdt.
Electri-
Engineer
Senior Project Engineer
Civil Engineer
Project Engineer
Inspectors
Safety Supervisor
Ammonia Process Eng.
Urea Process Engineer
Pollution Control Supv.
Utilities & Sulphuric Acid Process Engineer
Trainee Engineers
Lab. Chief Chemist
Lab. Supervisor
Dav Analysts
Shift Analysts
Samplers
Asstt. Civil Engr.
Drawing Office
Safety Operators

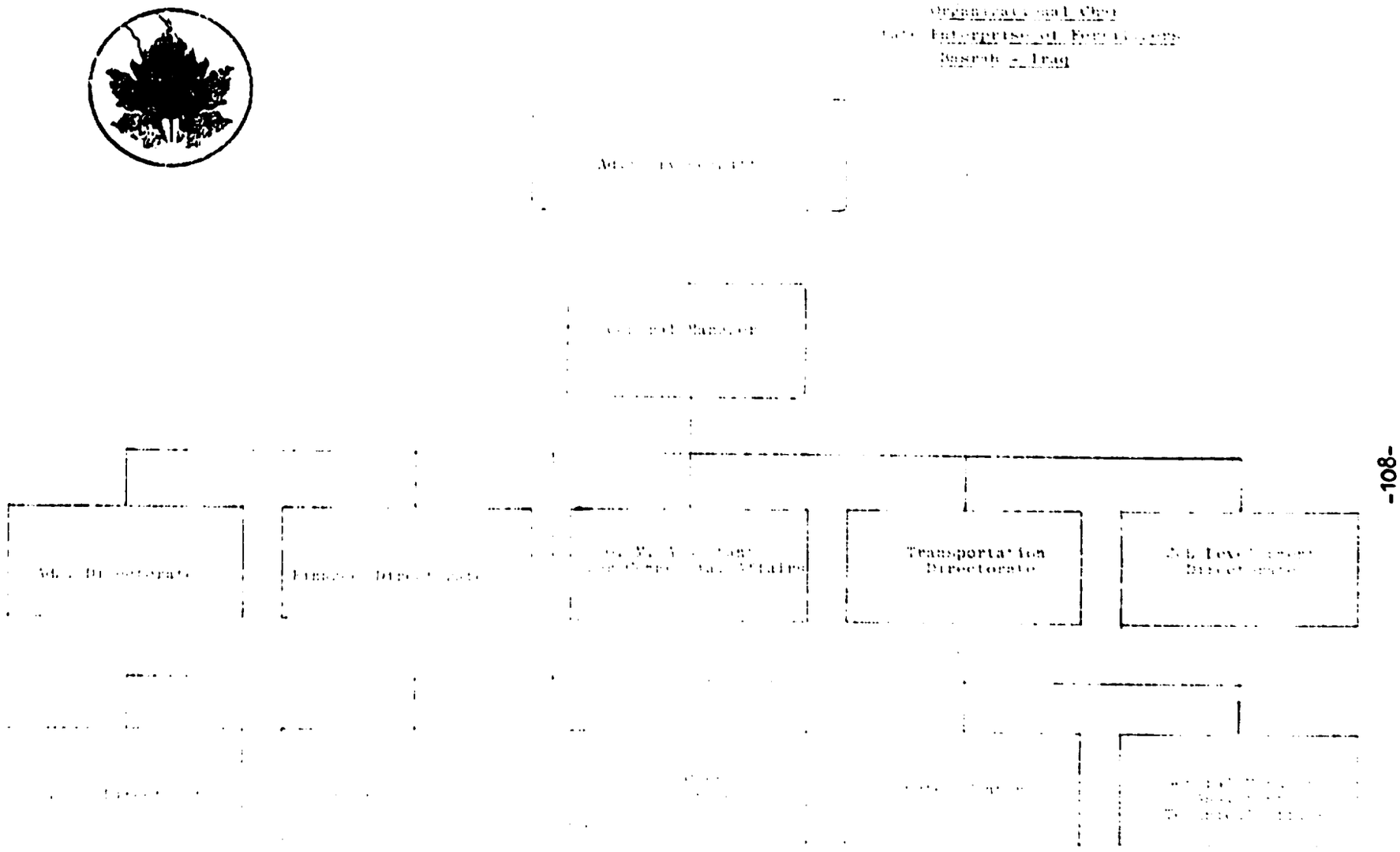

Maintenance
Sr. Supervisor Elect.
Sr. Supervisor Inst.
Sr. Supervisor
Supdt. Field Maintenance
Sr. Supervisor Planning
Sr. Supervisor Services
Services Section (Staff)
Carpenters, Labours, Insulators
Plumbers.
Area Supervisor,
Acid & Sulphur Plant
Maintenance Staff
Area Supervisor Utilities
Supervisor + Staff
Area Supervisor Urea
Supervisor + Staff
Area Supervisor Ammonia
Supervisor + Staff
Instrument Section
Supervisor
Specialist
Technicians
Planning Section
Planning Engineers
Planning Clerk
Labour Foreman
Welding Specialist
Welders.
Machinists
Rigging Specialists
Heavy Crane Operator,
Riggers.
Millwright Specialists
Heavy Equipt. Mech
Auto Electrician

QAFCO

ORGANIZATION CHART



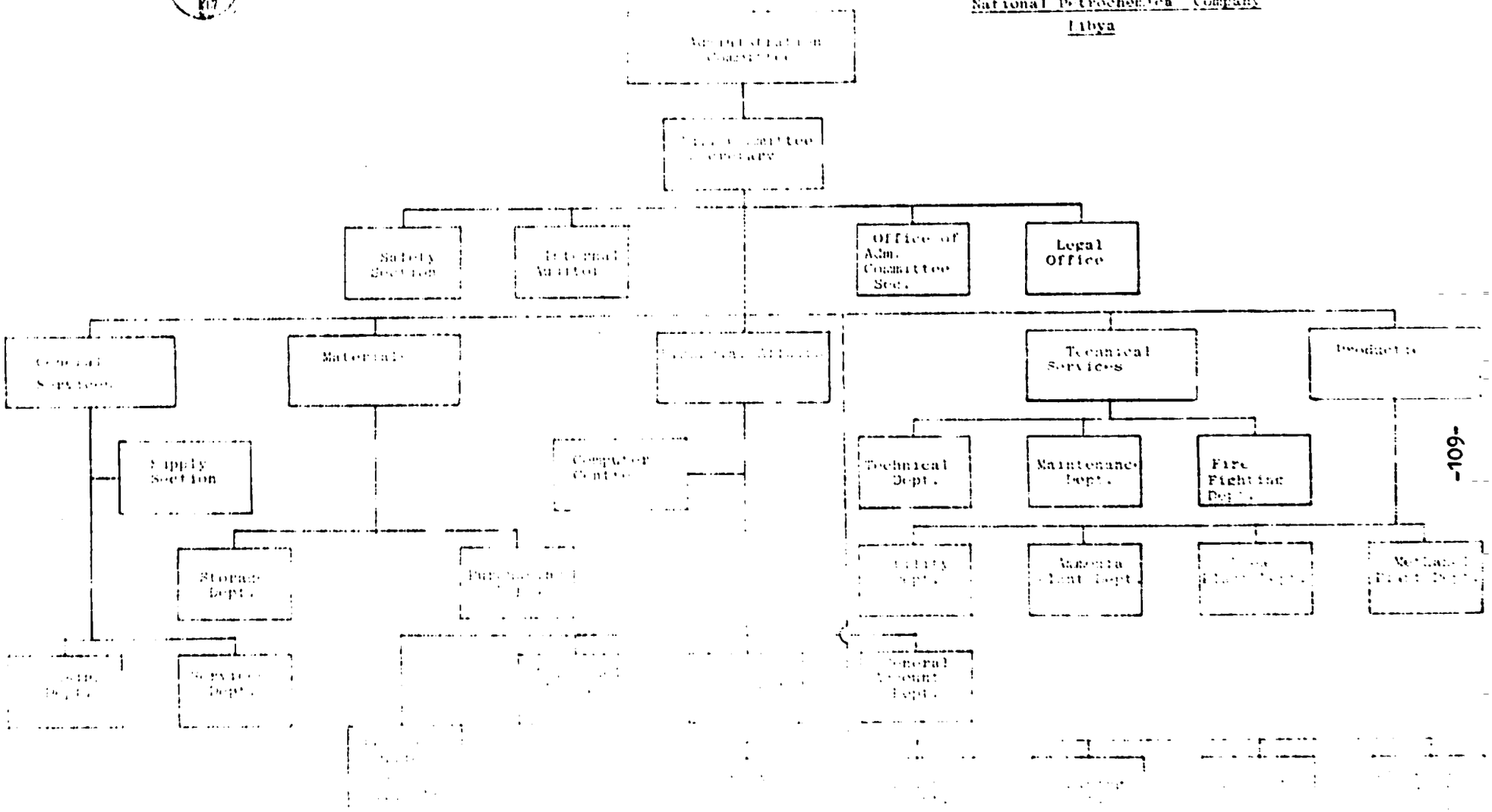

Board of Directors
General Manager
Marketing Dept's Manager
Finance Manager
Administration Dept's Manager
Planning and Projects Dept's Manager
Technical Dept's Manager
Production Manager
Administration Manager
Safety Section Chief
Maintenance Manager
Technical Services Manager
Production Manager

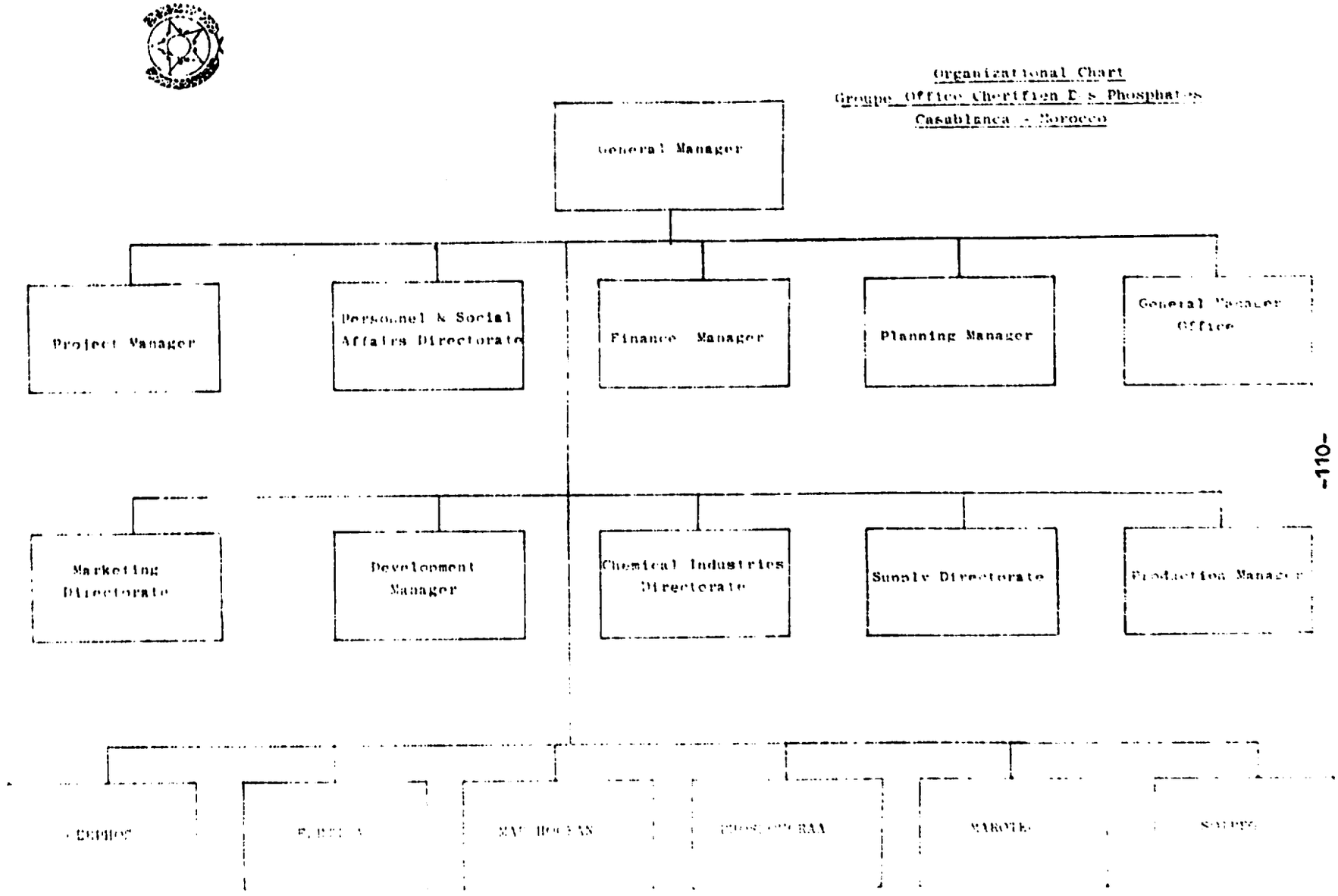

Transportation
Directorate

Organizational Chart

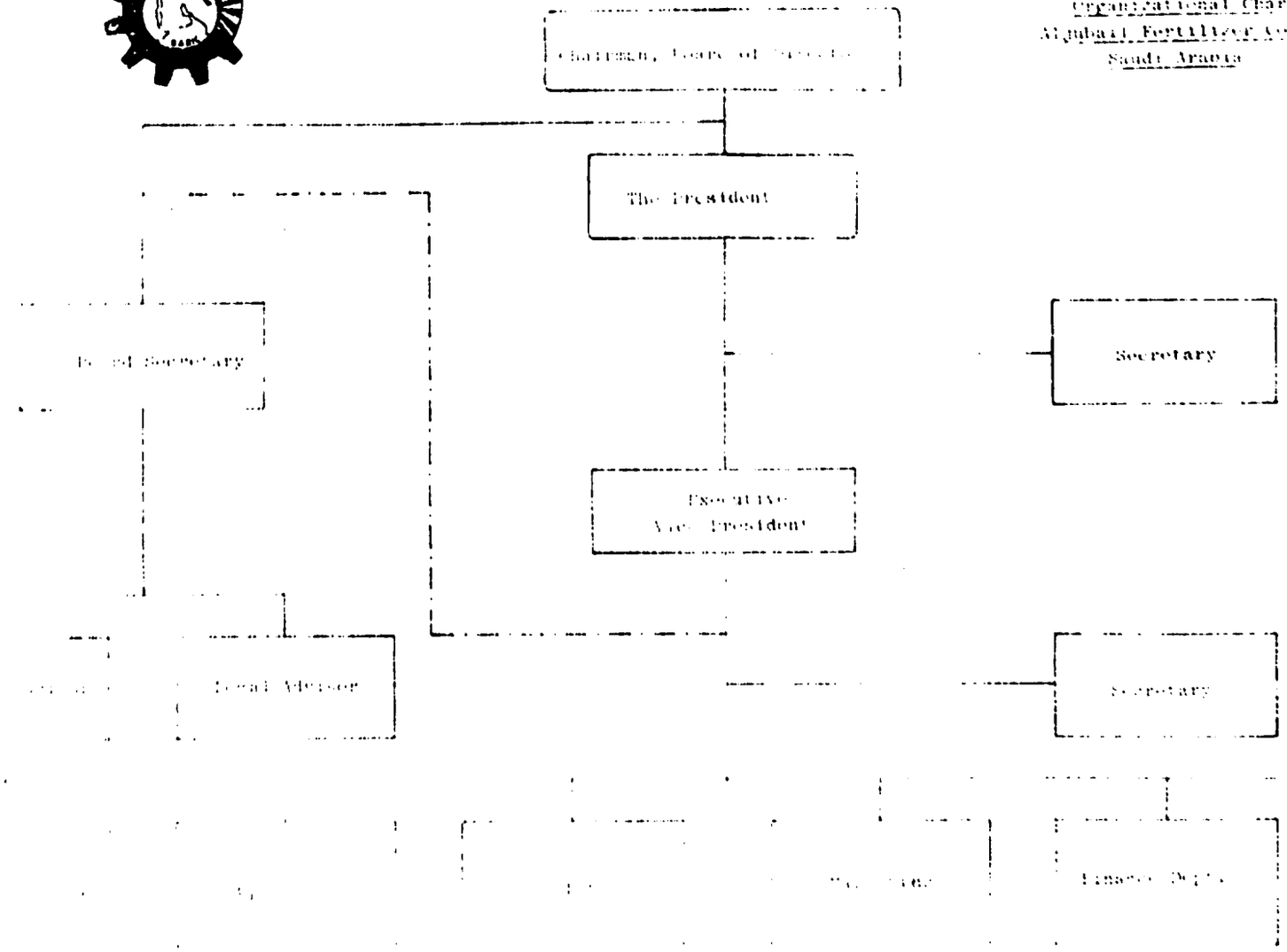
National Petrochemicals Company

Libya




Organizational Chart
Groupe Office Cherifien Des Phosphates
Casablanca - Morocco
General Manager
Project Manager
Personnel & Social Affairs Directorate
Finance Manager
Planning Manager
General Manager Office
Marketing Directorate
Development Manager
Chemical Industries Directorate
Supply Directorate
Production Manager
MAROC

Organizational Chart
Al Jubail Fertilizer Company (AMIAD)
Saudi Arabia



5- Present Status of Training and Manpower Development in the Fertilizer Industry in the Arab Region

All Fertilizer Companies in the region give the subject of training and manpower development considerable attention. While in some countries which have recently established a fertilizer industry, the training process is still in the early stages, some other countries are well developed in this field and have their own specialized training centers. Therefore, the present status of training and manpower development in fertilizer companies in the Arab Region will be discussed country by country. Actually this chapter of the study will be covered in detail by the country reports to be submitted by participants in the consultation meeting.

1- Jordan:

* Jordan Phosphate Mines Company:

The company has a training section in the Mines attached to the Technical Department in Ruseifa and El-Hassa Mines. This section undertakes several training programmes, in particular for operation and maintenance labourers.

* Jordan Fertilizer Industries Company:

The company has a training section with a training superintendent and two training officers and this section is attached to the Administration

Department in the plant in Aqaba. This section undertakes and implements training programmes for maintenance and operation workers. The section has training facilities and aids, like models, training manuals, and audio-visual aids. the training section can train about 100 trainees every year.

* Arab Potash company:

The company has established a training center at Ghor Safi Potash Project Site. The objectives of the center are:

1. To train people with little or no experience to a standard of ability to enable them to take their place in a team with the capability to run the refinery.

2. To upgrade people with some experience to the required standards to enable them to take their place in a team with the capability to run the refinery.

3. Develop leadership to enable people to accept positions of reponsibility.

4. Continually upgrade all employees where possible.

5. To encourage Universities, Polytechnics and Technical Schools to cooperate and avail themselves by participation in the training and work experience programmes.

6. To assist the local communities in developing programmes for the training of young people for the improvement and development of their own surroundings.

The center has given :

1) Classroom-lecture group training covering all fields from machine tools to operation of various production units.

2) "Hands On" Training

As an ongoing training taking place in the Workshops, Refinery, Harvesters and pans and power plant.

3) University Training Programme

For students from Universities, Polytechnics and Technical Schools.

4) Ghor Safi Community Training Programme

Sixteen (16) students from Ghor Safi, aged 15-19 years, commenced a six months training programme to qualify as technicians for the following trades: Plumber, House Electrician, Welder,and Mechanic.

2- **U.A.E:**

* Ruwais Fertilizer Industries Company:

The company has a training section attached to the technical manager. 30 trainees can be trained every year. General maintenance and in-plant

training workshops are organized. There are no industrial or technological institutes in the country.

3- **Bahrain:**

* Gulf Petrochemical Industries Company:

The company is at present constructing its plant which is expected to come on stream next year.

4- **Tunisia:**

* Industries Chemiques Maghrebines:

The fertilizer industry in Tunisia is a well-established industry and the training in the country is connected with the governemnt office for Manpower Development and Employment which takes care of the training programmes and employment in the companies. The training center in Gabes of ICM undertakes every year a training programme approved by the OMMDE. The training in the center includes:

1. Theoretical and practical training for new employees for a period 6-12 months.

2. Re-training programmes for existing technical staff and skilled workers.

3. Training programmes for technical staff and skilled labourers from other companies through in-plant training.

4. Summer training workshops for students of industrial and technological institutes.

5. Training of graduates of preparatory schools for 2-3 years as skilled labourers and technicians.

6. Training of engineers and technical staff from Arab and foreign countries.

The center can undertake about 200 trainees every year. There are industrial schools and technological institutes in Tunisia which supply the companies with their needs.

5- **Algeria:**

* Enterprise Nationale Des Engrais Et Produits Phytos:

The company has a training center in its fertilizer complex in Arzew and a training center in the fertilizer complex in Annaba.These training centers undertake several types of training workshops, in particular for skilled labourers and technicians in addition to the training programmes for technical staff (fresh graduates). These centers are equipped with audio-visual aids and simulators. The budget of the training department reaches about 3-5 % of the budget of the fertilizer complex.

6- **Saudi Arabia:**

* Saudi Arabian Fertilizer Company:

It is one of the well-established Ammonia/Urea companies in the Arab Region. The training department in the company has a superintendent with a training specialist and two training officers for maintenance and operation. The department is equiped with all necessary training aids: video, television, overhead and slide projectors, models, and a simulator. It can train 50 trainees every year. The policy of the company is that to accept Saudi graduates of schools, institutes and universities and give them the required training programme and become effective staff in the work force of the company. The budget of training during 1983 exceeded 3.788 million Riyals.

On the other hand, the company gives the technical staff and middle management specialized training abroad in their fields of speciality.

* Saudi Arabian Basic Industries comapny:

SAMAD is one of the companies of SABIC. The company has a training department equiped with modern training aids. It has two supervisors and two training officers. The department undertake the training of Saudi graduates and labourers in operation and maintenance . In addition the company sends the university graduates for training abroad.

7- **Sudan:**

* Sudan-Ren Chemicals and Fertilizers Company:

It is a newly established company. It has a small Ammonia/Urea plant based on naphta.

8- **Syria:**

* State Company for Fertilizers:

The company has a training section which undertakes the training of graduates from technical and industrial schools who join the company as operators and skilled labourers.

9- **Somalia:**

The Urea Production Project is a small Ammonia/Urea based on fuel oil. The production started in August 1984.

10- **Iraq:**

* State Enterprise for Fertilizers:

The company has a well-established Ammonia/Urea plants and the company has a training department which undertakes the training programmes every

year. The department is equiped with models. Audio-Visual Aids. and necessary training materials. The company depends on graduates from technical and industrial schools in Iraq and the training centers. The Training Center for Chemical. Petrochemical. Mechanical and Mining Industries in Basrah provides the industry in Iraq with skilled operators and technicians. The center takes about 300 students every year and the study takes three years. The center also undertakes special training workshops for the workers in the industry.

11- **Qatar:**

* Qatar Fertilizer Company:

The company is well-established and has a training department which undertakes training of new workers and summer training programmes in cooperation with institutes and universities in Qatar. The department is equiped with modern training equipment and materials· Audio-visual Aids. Projectors. Video set. models. micro computer. and simulator. The department can undertake training of 25 trainees every year.

12- **Kuwait:**

* Petrochemical Industries Company·

The comapany is well-established and has a training and career development department concerned with training and manpower development in the company. The department is equippedwith all modern equipment and training materials and undertakes every year a training programme in

cooperation with all other department in the company. The department undertakes about 100 trainees every year. the company cooperates with its sister companies· KOC and KNPC in the field of training. On the other hand. the company allocates a training budget every year which exceeded two million dollars in 1983.

13- **Libya**·

* National Petrochemical Company:

The company is well-established and has a training department concerned with manpower development. It undertakes the training of graduates of schools as operators and technicians.

14- **Egypt**:

The fertilizer companies in Egypt are all well-established and they have training departments to undertake training of graduates of technical and industrial schools as operators and technicians. Recently, in 1979. a training center was established by the Societe ElNasr D'Engrais Et D'Industries Chemiques near its complex in Talkha in cooperation with StamiCarbon. It is a modern training center wich can undertake training workshops and programmes for technical staff and operators. The center is well equiped with several types of measuring and control equipment, and technical equipment, small and large, to facilitate theoritical and practical studies of process operations. The center offers several courses for staff in the fertilizer industry in the various fields and undertakes training programmes for operators and technicians.

15- **Morocco:**

* Groupe Office Cherifien Des Phoshates.

It is a well-established company and it has several training centers to train skilled and semi-skilled workers and supervisors for the mines and plants operations. These centers are equiped with all necessary training materials and Audio-Visual Aids. These centers can undertake up to 600 trainees (workers) and 250 supervisors. In addition, the company sends trainees outside Morocco to technological schools (40-50) trainees every year.

The training centers undertake training workshops in mechanical, electrical, and mining, in addition to operation. The budget of training in 1983 exceeded 30 million dirhams.

6- Quantitative and Qualitative Manpower Requirements for the Fertilizer Industry in the Arab Region (1985 - 2000)

During the coming fifteen years, several fertilizer projects are expected in the raw materials sector, Ammonia/Nitrogen Fertilizers Industry, and the Phosphoric Acid/Phosphate Fertilizers Industry. Table (14) shows the expected new projects in the Arab Countries, date of start-up and the manpower requirements. On the other hand, Tables (15), (16), (17), and (18) show the quantitative and qualitative manpower requirements for these new projects.

It is quite clear that these new projects expected to come on stream during the period (1985-2000), require about 64,400 employees of which about 74% are required for the raw materials sector. The total manpower requirements is distributed as follows:

*	Management and Administration	: 9647	15%
*	Technical Staff	: 12882	20%
*	Skilled Labourers	: 32205	50%
*	Unskilled Labourers	: 6976	15%
	Total	64410	100%

By the year 2000, the total manpower in the fertilizer industry and its raw materials is expected to reach about 160,000 employees. These figures reflect clearly the importance of training in the coming fifteen years for the existing staff and the new manpower for the new projects.

Table (14): Manpower Requirments for the new Projects in the Fertilizer Industry in the Arab Region

Country/Company	New Projects	Date of Start-up	Manpower Requirements
1- **Jordan**			
* JPMC	- Production of Calcined Phosphate rock in Ruseifa		
	- Increase the capacity of ElHassa Mine to 3.5 Million tpy of rock Phosphate	1985	500
	- Increase the capacity of Wadi Al-Abiadh Mine to 2 million tpy of rock Phosphate	1985	500
	- Shidiya Project (First Stage) to produce 4 million tpy of rock Phosphate	1990	3000
	- Shidiya Project (Second Stage) to produce 4 million tpy of roch Phosphate	1990	3000
* APC	- Potasium Sulphate Project 150,000 tpy	1985	50
	- Expansion of Potash Project to double its capacity	2000	500
	- The Second Potassium Sulphate Project 150,000 tpy	2000	50
* JFI	- The Second Fertilizer Complex at Aqaba:	1988-1996	780
	* Sulphuric Acid 1.2 million tpy	1996	
	* Phosphoric Acid 410,000 tpy	1996	
	* Diammonium Phosphate 330,000 tpy	1996	
	* Triple Superphosphate 264,000 tpy	1996	
	* Single Superphosphate 50,000 tpy	1988	
	* Compound Fertilizers 330,000 tpy	1988	
	* Nitric Acid 50,000 tpy	1990	
	* Ammonium Nitrate 50,000tpy	1990	

Country/Company	New Projects	Date of Start-up	Manpower Requirements
2- **U.A.E.**			
* FERTIL	- The Second line for Ammonia 330,000 tpy	1988	150
* Sharjah Project	- Ammonia Plant 330,000 tpy	1988	250
	- Urea Plant 495,000 tpy	1988	250
3- **Tunisia**			
* GAFSA	- Production of 2.5 million tpy of Phosphate rock from Moulares Redeyef and Masta Mines	1986	2500
* Sera Al-Wartan Project	- Production of 10 million tpy of Phosphate rock		7500
* STAPE	- Superphosphoric Acid Project at Sfax: * Sulphuric Acid 990,000 tpy * Phosphoric Acid 330,000 tpy	1986	150
* SAEPA	- The Second Project for DAP: * Sulphuric Acid 1.0 milliontpy * Phosphoric Acid 330,000 tpy (P2O5) * DAP 330,000 tpy	1986	500
	- The Ammonia Project 414,000 tpy	1990	200
* EG	- Compound Fertilizer Project 495,000 tpy	1986	150
* Chemical Industries Development Company for the South	- Potasium Sulphate Project at Zarsis 150,000 tpy	1986	200
4- **Algeria**			
* ENFP	- Increase the Production of Phosphate rock from D'Jebel Onk Mine by 2.2 million tpy	2000	1500
* ASMIDAL	- Phosphate Fertilizer Complex at Tebessa: * Sulphuric Acid 495,000 tpy * Phosphoric Acid 165,000 tpy * Triple Superphosphate 280,000 tpy	1989	450

Country/Company	New Projects	Date of Start-up	Manpower Requirements
	- Ammonia/Urea Complex at Skikda: * Ammonia Plant 330,000 tpy * Urea Plant 495,000 tpy	1994	500
5- Saudi Arabia			
* SAFCO	- Ammonia/Urea Project at Dammam: * Ammonia Plant 330,000 tpy * Urea Plant 495,000 tpy	1990	500
* SAMAD	- Compound Fertilizr at Al-Jubail 250,000 tpy	1986	150
	- The Second Ammonia Project at Al-Jubail 330,000 tpy	1988	200
	- The Second Project for Compound Fertilizer at Al-Jubail 250,000 tpy	2000	150
6- Sudan			
* S-REN	- The Second Ammonia/Urea Project to double the existing capacity	1990	200
	- Ammonia/Urea Project on the Red Sea: * Ammonia 330,000 tpy * Urea 495,000 tpy	2000	500
7- Syria			
* OFCOPHAM	- Increase the Production of Phosphate rock to reach 3.0 million tpy and establish of washing units with capacity of 2.0 million tpy		4000
* FERT	- The Second complex for Fertilizers at Homs: * Sulphuric Acid 560,000 tpy * Phosphoric Acid 165,000 tpy * Diammonium Phosphate 330,000 tpy * Ammonium Sulphate 100,000 tpy	1990	450
8- Iraq			
* SEMS	- Increasing the Production capacity of Sulphur to 1.5 million tpy	1990-2000	500

Country/Company	New Projects	Date of Start-up	Manpower Requirements
* SEP	- New Fertilizer Complex at the North * Ammonia 50,00 tpy * Sulphuric Acid 165,000 tpy * Ammonium Sulphate 198,000 tpy * Ammonia 660,000 tpy * Urea 1.0 million tpy	1995	950
* SEP	- Doubling the existing capacity of the Fertilizer complex at Al-Qaim	2000	1650
9- **Oman**	- Ammonia/Urea Complex * Ammonia 330,000 tpy * Urea 495,000 tpy	1996	650
10- **Qatar** * QAFCO	- The third line for Ammonia 330,000 tpy at Umm-Said	1990	100
	- New Fertilizer Complex at Ras Laffan: * Ammonia 330,000 tpy * Urea 495,000 tpy	2000	650
12- **Kuwait** * PIC	- Diammonium Phosphate Project 330,000 tpy	1987	130
13- **Libya** *NAPETCO	- Sirt Complex: * Ammonia two lines 891,000 tpy * Urea 574,000 tpy * Nitric Acid 264,000 tpy * Ammonia Nitrate 330,000 tpy * Compound Fertilizers 330,000 tpy	1990	1000
	- Ras Lanouf Project: * Sulphuric Acid 165,000 tpy * Ammonium Sulphate250,000 tpy	1990	200
	- Potash Project 25000 tpy	1990	100

Country/Company	New Projects	Date of Start-up	Manpower Requirements
14- **Egypt**			
* AOCCF	- Ammonium Nitrate Project:	1985	150
	- Nitric Acid 100,000 tpy		
	- Ammonium Nitrate 95,000 tpy		
* EPC	- Increasing the production of Phosphate rock to 1.5 million tonnes	1985-2000	1500
* MPC	- Increasing the production of Phosphate rock to 1.5 million tonnes	1985-2000	1500
* RSPC	- Increasing the production of Phosphate rock to 1.5 million tonnes	1985-2000	1500
* Safaja Project	- Fertilizer Complex at Safaja:	1990	1500
	* Ammonia 330,000 tpy		
	* Urea 330,000 tpy		
	* Sulphuric Acid 1 million tpy		
	* Phosphoric Acid 346,000 tpy		
	* compound Fertilizers 330,000 tpy		
	* Diammonium Phosphate 330,000 tpy		
15- **Morocco**			
* OCP	- Increasing the production of Phosphate rock from Kourihga Mines, Ben Guerir Mines, Yousofia Mines, Sidi-Hagqag Mines and Miskala Mines to reach about 70 million tonnes by year 2000	1985-2000	18000
	- Maroc Phosphore 3 & 4 at Jorf Lasfar:	1985/1988	1450
	* Sulphuric Acid 4.0 million tpy		
	* Phosphoric Acid 1.3 million tpy		
	* Diammonium Phosphate 726,000 tpy		
	- Maroc Phosphore (5) at Nadour:	1986	700
	* Sulphuric Acid 2.0 million tpy		
	* Phosphoric Acid 660,000 tpy		
	- Al-Oyoun Project:	1990	1000
	* Sulphuric Acid 4.0 million tpy		
	* Phosphoric Acid 1.3 million tpy		

Country/Company	New Projects	Date of Start-up	Manpower Requirements
	- Ras Seem Project: * Sulphuric Acid 5.0 million tpy * Phosphoric Acid 1.7 million tpy	1986/1996	1100
	- Nitrogen Fertilizer Complex: * Ammonia 330,000 tpy * Urea 198,000 tpy * Nitric Acid 264,000 tpy * Ammonium Nitrate 330,000 tpy	1995	750
16- **Mauritania**	- Production of Phosphate rock: 250,000 tpy	1990	250
	- SSP Project: * Sulphuric Acid 160,000 tpy * SSP 330,000 tpy	1990	250

Table (15): Quantitative and Qualitative Manpower Requirements for the New Projects in the Raw Materials Sector (1985 - 2000)

Country	MA	TS	SL	USL	Total
Jordan	1140	1520	3800	1140	7600
Tunisia	1530	2040	5100	1530	10200
Algeria	225	300	750	225	1500
Syria	600	800	2000	600	4000
Iraq	220	290	725	215	1450
Libya	15	20	50	15	100
Egypt	675	900	2250	675	4500
Morocco	2700	3600	9000	2700	18000
Mauritania	35	50	125	40	250
Total	7140	9520	23800	7140	47600

MA = Management and Administration

TS = Technical Staff

SL = Skilled Labourers

USL = Unskilled Labourers

Table (16): Quantitative and Qualitative Manpower Requirements for the New Projects in the Ammonia/Nitrogen Fertilizers Industry in the Arab Region

(1985 - 2000)

Country	MA	TS	SL	USL	Total
Jordan	23	30	75	22	150
U.A.E.	95	130	325	100	650
Tunisia	30	40	100	30	200
Algeria	75	100	250	75	500
Saudi Arabia	105	140	350	105	700
Sudan	105	140	350	105	700
Syria	5	10	25	10	50
Iraq	140	190	475	145	950
Oman	95	130	325	100	650
Qatar	110	150	375	115	750
Libya	150	200	500	150	1000
Egypt	135	180	450	135	900
Morocco	110	150	375	115	750
Total	1178	1590	3975	1207	7950

MA = Management and Administration

TS = Technical Staff

SL = Skilled Labourers

USL = Unskilled Labourers

Table (17): Quantitative and Qualitative Manpower Requirements for the New Projects in the Phosphoric Acid/Phosphate Fertilizers Industry in the Arab Region (1985 - 2000)

Country	MA	TS	SL	USL	Total
Jordan	94	126	315	95	630
Tunisia	120	160	400	120	800
Algeria	65	90	225	70	450
Saudi Arabia	45	60	150	45	300
Syria	60	80	200	60	400
Kuwait	20	26	65	19	130
Iraq	105	140	350	105	700
Libya	30	40	100	30	200
Egypt	110	150	375	115	750
Morocco	640	850	2125	635	4250
Mauritania	40	50	125	35	250
Total	1329	1772	4430	1329	8860

MA = Management and Administration

TS = Technical Staff

SL = Skilled Labourers

USL = Unskilled Labourers

Table (18): Quantitative and Qualitative Manpower Requirementsfor the New Projects and Expansions in the Fertilizer Industry and its Raw Materials in the Arab Region

(1985 - 2000)

Country	MA	TS	SL	USL	Total
Jordan	1257	1676	4190	1257	8380
U.A.E.	95	130	325	100	650
Tunisia	1680	2240	5600	1680	11200
Algeria	365	490	1225	370	2450
Saudi Arabia	150	200	500	150	1000
Sudan	105	140	350	105	700
Syria	665	890	2225	670	4450
Iraq	465	620	1550	465	3100
Oman	95	130	325	100	650
Qatar	110	150	375	115	750
Kuwait	20	26	65	19	130
Libya	195	260	650	195	1300
Egypt	920	1230	3075	925	6150
Morocco	3450	4600	11500	3450	23000
Mauritania	75	100	250	75	500
Total	9647	12882	32205	9676	64410

MA = Management and Administration

TS = Technical Staff

SL = Skilled Labourers

USL = Unskilled Labourers

7- Training Needs for the Fertilizer Industry in the Arab Region (1985 - 2000)

The training needs of the fertilizer industry during the coming fifteen years (1985-2000) was estimated as follows:

* 50% of the manpower in the existing plants.
* 100% of the total manpower for the new projects.
* 20% of the total manpower requirements for the new projects for replacements.

Accordingly the training needs is estimated to reach 125,000 employees, as follows:

* About 48,000 employees from existing plants.
* About 77,000 employees for new projects.

These figures can be qualitatively distributed as follows for the varoius categories:

* Management and Administration	= 17,800	14.2 %
* Technical Staff	= 24,100	19.3 %
* Skilled Labourers	= 64,400	51.5 %
* Unskilled Labourers	= 18,700	15.0 %
Total	= 125,000	100.0 %

Table (19) shows the training needs of the fertilizer industry in the Arab Region during the period (1985-2000).

Table (19): Training Needs for the Fertilizer Industry in the Arab Region (1985 - 2000)

Category	Training Needs		
	Existing Plants	New Projects	Total
* Management & Administration	6223	11576	17799
* Technical Staff	8600	15458	24058
* Skilled Labourers	25770	38646	64416
* Unskilled Labourers	7567	11160	18727
Total	48160	76840	125000

8. Training Opportunities at the International Level

Training and Manpower Development is a subject which concerns the industry worldwide, and therefore international cooperation in this field among developed and developing countries has reached an advanced stage. Fertilizer Companies in the Arab Region can make use of training facilities and workshops in International Training Centers, developing and developed countries in addition to the training programmes with Engineering Companies.

1. Developing Countries:

AFCFP has good relation with the Fertilizer Association of India (FAI) which has avery good experience in organizing training workshops at all levels for various subjects concerning the fertilizer industry. The following workshops are well-established:

* FAI Marketing Management Development Workshop.
* FAI Specialized Workshop on Logistics of Fertilizer Distribution.
* FAI Orientation Programmes for Extension Officers.
* FAI Programme for Senior Maintenance Engineers.
* FAI Programme on Management Development for Senior Plant Managers.

2. Developed Countries:

The relation of AFCFP with International Engineering Companies in developed countries would be of great help to arrange for training workshops in the field

of the fertilizer industry. Observer members of AFCFP in developed countries concerned with the fertilizer industry are:

Company	Country
CHIYODA	Japan
SANDVIK	Sweden
C.F. BRAIN CO	U.S.A.
SNAMPROGETTI S.P.A.	Italy
HALDOR TOPSOE A/S	Denmark
NORSK HYDRO	Norway
LURGI GMBH	West Germany
MITSUBISHI HEAVY INDUSTRIES	Japan
KEMIRA ENGINEERING	Finland

AFCFP looks forward to the help and support of its members to formulate and implement a long-term training programme for the fertilizer industry in the Arab Region for the period (1985-1988).

3. International Centers, Institutes and Organizations:

AFCFP has established good relations with all international organizations and centers concerned with the development of the fertilizer industry. UNDP, UNIDO, FAO, IFA, IFDC, ILO Turin Center and others could support the formulation of a long-term training programme for the fertilizer industry in the Arab Region. These organizations and centers have a long experience in implementation of training workshops.

IFDC as an international center has a long experience worldwide in organizing and implementing training workshops whether in U.S.A. or abroad. The following are examples of some workshops organized by IFDC:

* Maintenance and Production Management Training Programme.
* Fertilizer Marketing Management Training Programme.
* Ammonia/Urea Plant Operation Workshop.
* Fertilizer Production Economics Process Training Programme.

Training and Manpower Development

Programme

1985 - 1990

INTRODUCTION

The Regional Cooperation Programme for the development of Fertilizer Production and Utilization in the Arab States (RAB/78/021) which extended for the period (1980-1984) sponsored by UNDP and AIDO terminates at the end of this year. The programme contained a component on industrial group training which comprised the following:

a. Training Workshops in the form of consultation meetings and seminars for a group of specialized staff from fertilizer companies on a certain subject, like modern management techniques, marketing, investments, corrosion, pollution, maintenance ... etc.

b. In-plant Training Workshops in operation techniques in the nitrogen fertilizer industry and phosphate fertilizer industry.

c. Study Tours for top managers of fertilizer plants in the Arab countries to see the fertilizer industry in the developed countries.

d. Workshops on Training methods in the nitrogen and phosphate fertilizer industries for training managers in the fertilizer companies.

On the other hand, the project document contained in page 11, para-14, the preparation of a report on recommended training programmes for the fertilizer industry in the Arab Region identified by various consultation meetings and seminars implemented. The presented proposal therefore, takes into consideration

the needs of fertilizer companies identified by AFCFP through contacts with member companies and the recommendations of the various activities of the programme implemented during the period (1980-1984), and the comments and reports of participants in the various workshops received by AFCFP.

The cooperation and support of Arab and International Organizations, Associations, Centers and Engineering companies is essential for the success of this programme. Therefore, AFCFP Secretariate will make contacts to get support for each workshop whether in kind or in cash.

The success of a long term regional programme on training and manpower development actually depends on the support and cooperation of all parties involved in this programme, and the programme management.

OBJECTIVES OF THE PROGRAMME

The training and manpower development programme for the fertilizer industry in the Arab Region aims at upgrading the professional skills of engineers, technicians and working staff of fertilizer companies in the region. But, the major objectives of the programme are:

1. To improve the productivity of existing fertilizer plants in the Arab Countries through upgrading the technical capabilities and skills of engineers and technicians to solve technical problems facing these plants.

2. To familiarize engineers and technical staff of fertilizer plants in the Arab Countries with modern methods of production and technological developments in the fertilizer industry, especially the use of computer in production operations.

3. To improve the skills of technical staff of fertilizer plants in the field of maintenance and operation, in particular, modern methods and equipment used in maitenance, and the use of computer in maitenance programming and inventories.

4. To acquaint the technical staff of fertilizer companies with the modern techniques and methods of quality control and instrumentation.

5. To improve the knowledge and experience of staff in AFCFP member companies

involved in the field of marketing, distribution, use and application of fertilizers.

6. To acquaint staff in AFCFP member companies with modern methods of industrial safety, precautions against hazards, accidents and risks in fertilizer plants.

7. To improve the skills of staff working in the information and documentation sections involved in the collection, analysis, storage and distribution of statistics and information, in particular, the use of micro computer.

8. Exchange of experience between well-established and new fertilizer companies in the region, especially in solving technical problems.

9. To improve the capabilities of AFCFP Secretariate in implementing training workshops in the region through the cooperation of fertilizer member companies in this field.

10. Strengthen relationship between AFCFP and international companies, institutes, organizations, associations and training and developent centers in the field of training in the fertilizer industry.

TRAINING PROGRAMME COMPONENTS

A- Technical and Management Training Library:

The setting up of a technical and management training library is essential for any organization concerned with training and manpower development. Such library will include:

- Training Programmes Manuals.
- Training Guides.
- Video Cassattes.
- Training Aids.
- Training Materials.

The budget for this component is estimated at about 50000 U.S. Dollars.

B- Studies:

1. A field study on the training capabilities existing in the Arab Countries related to the fertilizer industry with the objective to issue a guide for the Arab Region on the subject.

Venue : AFCFP Headquarters

Date : The fourth quarter of 1986

Duration: 3 months

Budget :	Preparation and Contacts	1000	U.S.D.
	Field Survey	20000	U.S.D.
	Office Work	4000	U.S.D.
	Printing and Distribution	15000	U.S.D.
	Total	40000	U.S.D.

2. A field study on the relation between the Industrial Training and the Education Systems in the Arab Countries and the various regulations, laws and incentives which promote training.

Venue : AFCFP Headquarters

Date : The fourth quarter of 1987

Duration: 3 months

Budget :			
	Preparation and Contacts	1000	U.S.D.
	Field Survey	20000	U.S.D.
	Office Work	4000	U.S.D.
	Printing and Distribution	15000	U.S.D.
	Total	40000	U.S.D.

3. A field study on the productivity of the training process in the fertilizer companies in the Arab Countries based on actual experience of these companies in training.

Venue : AFCFP Headquarters

Date : The fourth quarter of 1988

Duration: 3 months

Budget :			
	Preparation and Contacts	1000	U.S.D.
	Field Survey	20000	U.S.D.
	Office Work	9000	U.S.D.
	Printing and Distribution	15000	U.S.D.
	Total	45000	U.S.D.

4. A field study on the use and application of micro computers in the field of training in the fertilizer companies in the Arab Region.

Venue : AFCFP Headquarters

Date : The fourth quarter of 1989

Duration: 3 months

Budget :			
	Preparation and contacts	1000	U.S.D.
	Field survey	20000	U.S.D.
	Office work	9000	U.S.D.
	Printing and distribution	15000	U.S.D.
	Total	45000	U.S.D.

C- **Training Workshops:**

The Following workshops which will be considered cover the following subjects:

1. Production Management and Technology.
2. Maintenance and Operation Management.
3. Ouality Control and Instrumetation.
4. Fertilizer Marketing and Distribution Management.
5. Statistics and Information Proccessing: collection, analysis, storage and dissemination.
6. Fertilizer use and Application.
7. Industrial Project Analysis.
8. Industrial safety and Pollution Control.

1. Production Management and Technology:

The following workshops can be considered in this field:

a- Workshop on fertilizer production and technology in Ammonia / Nitrogen Fertilizers plants.

b- Workshop on fertilizer production and technology in Phosphoric Acid/Phosphate Fertilizers Plants.

c- Workshop on computer use and application in fertilizer industry.

d- Workshop on advanced techniques for open cast mining and benificiation of phosphate deposits.

e- Training programmes for upgrading trainers and instructors capabilities.

f- Study Tours for training managers.

g- Consultation meeting for training managers.

h- Working groups meetings in the field of Ammonia and Phosphoric Acid.

a- Ammonia/Nitrogen Fertilizer Production and Technology Workshop:

* Objective of the Workshop: To familiarize production engineers and managers with modern production management techniques and new technological developments in ammonia/nitrogen fertilizer plants.
* Venue of the Workshop: To be decided (SAFCO, OAFCO, or PIC Plant).
* Date of the Workshop: First quarter of the year.
* Duration of the Workshop: Three weeks.
* Number of Participants: 15 participants.

* Level of Participants: Production engineers with at least 2-3 years experience in an ammonia/urea plant or ammonia/ammonium nitrate plant.

* Workshop Programme: The programme of the workshop will be defined in detail after discussions with the host company, but in broad terms, the programme may include:

  - Lectures by the management staff of the host company.
  - Lectures by experts from international companies, centers or organizations.
  - In-plant training in the production units for at least one week.
  - Panel discussions on production problems through presentations by the participants from their experience, supervised by the workshop supervisor.
  - Reports by the participants on the workshop.

* Workshop Budget:

- Travel (Economy Class Tickets):	15 * 500 =	9000 U.S.D.
- Daily Allowance:	15 * 21 * 120 =	37800 U.S.D.
- Four lecturers (experts form inside the region)		
Tickets:	4 * 1000 =	4000 U.S.D.
Allowance:	4 * 200 =	3200 U.S.D.
- Group Life Insurance	=	1000 U.S.D.
- Implementation, follow up and reporting	=	5000 U.S.D.
- Miscellaneous and Contingency	=	5000 U.S.D.
Total	=	65000 U.S.D.

b- **Phosphoric Acid/phosphate Fertilizer Production and Technology Workshop:**

* Objective of the Workshop: To familiarize production engineers with modern production management techniques and new technological development in phosphoric acid and phosphatic fertilizer plants.
* Venue of the Workshop: to be decided (Tunisia, Morocco, Jordan, Syria and Iraq).
* Date of Workshop: Second quarter of the year.
* Duration of Workshop: Three weeks.
* Number of Participants: 15 participants.
* Level of Participation: Production engineer with at least 2-3 years experience in phosphoric acid and phosphatic fertilizer plants.
* Workshop Programme: The programme of the workshop will be defined in detail after discussions with the host company: but in broad terms, the programme may include:
  - Lectures by the management staff of the host company.
  - Lectures by experts from international companies centers or organizations.
  - In-plant training in the production units for at least one week
  - Panel discussions on production problems through presentations by the participants from their experience, supervised by workshop supervisor.
  - Reports by the participants on the workshop.
* Workshop Budget:
  - Travel (Economy Class Tickets): 15 * 600 = 9000 U.S.D.
  - Daily Allowance: 15 * 21 * 120 = 37800 U.S.D.

- Four lecturers (experts from inside or outside the region)

Tickets:	4 * 1000	=	4000 U.S.D.
Allowance:	4 * 200 * 4	=	3200 U.S.D.

- Group Life Insurance: = 1000 U.S.D.
- Implementation, followup and Reporting = 5000 U.S.D.
- Miscellaneous and Contingency = 5000 U.S.D.

Total 65000 U.S.D.

c- **Workshop on Computer use and Application in Fertilizer Industry:**

* Objective of the Workshop: To familiarize participants with modern techniques of production control and productivity measurements by the use of computer.
* Venue of the Workshop: OAFCO/QATAR.
* Date of Workshop: The First quarter of the year.
* Duration of Workshop: One week.
* Number of Participants: 15 participants.
* Level of Participants: Engineers & economists with some experience in fertilizer industry.
* Workshop Programme:
  - Lectures on the economic effectiveness of control of a process variables.
  - Lectures on the application of computer in different fields related to fertilizer industry.
  - Visits to different production units controled by computer.
  - Panel discussions.

* Workshop Budget:

- Travel (Economy Class Tickets)	15 * 600	= 9000 U.S.D.
- Daily Allowance:	15 * 7 * 120	= 12600 U.S.D.
- Two Lecturers from outside the region:		
Tickets	2 * 1000	= 2000 U.S.D.
Daily Allowance	2 * 200 * 4	= 1600 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implemetation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and contingency:		= 3800 U.S.D.
Total		35000 U.S.D.

d- **Workshop on Advanced Techniques for Open Cast Mining and Benificiation of Phosphate Deposits:**

* Obejctive of the Workshop: To provide a forum for production engineers of Phosphate Mines in the Arab Region to exchange their experience in techniques for open cast mining and to familiarize them with modern and advanced techniques applied in this field.
* Venue of the Workshop: To be decided (Jordan, Tunisia, Morocco).
* Date of the Workshop: The third quarter of the year.
* Duration of the Workshop: One week.
* Number of Participants: 15 participants.
* Level of Participants: Production engineers with five years experience in mining of phosphate.
* Workshop Programme:
  - Lectures on the occurrences and deposits of Phosphate Rock.
  - Lectures on the quality and composition of Phosphate Rock.

- Lectures on methods of extraction, mining and benificiation of the Phosphates.
- Lectures on benificiation process efficiences (crushing and grinding, washing, sizing, flotation, magnetic seperation, density seperation, selective seperation, electrostatic seperation, calcination).
- Lectures on the modern and new advanced techniques in open cast mining.
- Visits to mines and units of production of Phosphate Rock.
- Panel discussion.

* Workshop Budget:

- Travel (Economy Class Tickets):	15 * 600	= 9000 U.S.D.
- Daily Allowance:	15 * 7 * 120	= 12600 U.S.D.
- Two Lecturers:		
Tickets:	2 * 1000	= 2000 U.S.D.
Daily Allowance:	2 * 200 * 4	= 1600 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implemetation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contengency:		= 3800 U.S.D.
Total		35000 U.S.D.

e- Workshop for Upgrading Trainers and Instructors Capabilities:

* Objective of the Workshop: To arrange exchange of experience and information and to familiarize Trainers and Instructors with the modern and advanced techniques in training and teaching of group or individual trainees in the on-job of off-job training.

* Venue of the Workshop: To be decided.

* Date of the Workshop: The second quarter of the year.

* Duration of the Workshop: One week.

* Number of Participants: 20 participants.

* Level of Participants: Training Managers.

* Workshop Programme:

  - Lectures on the process of determination of training needs and formulation of training plans.
  - Lectures on the process of training and implemention.
  - Lectures on the process of evaluation and control of training.
  - Lectures on the training function and the role of training officers.
  - Lectures on training methods, aids and devices.
  - Lectures on training through simulation and computer use.
  - Visits to one or more of the modern training centers in the region.

* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	= 12000 U.S.D.
- Daily Allowance:	20 * 7 * 120	= 16800 U.S.D.
- Three Lecturers:		
Tickets:	3 * 1000	= 3000 U.S.D.
Daily Allowance	3 * 200 * 2	= 1200 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, follow up and Reporting		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 4000 U.S.D.
Total		43000 U.S.D.

f- **Study Tour for Training Managers:**

* Objective: To familiarize training managers with training systems and new techniques applied in training and manpower development in developed countries.
* Venue : To be decided (one or more of the training centers in developed countries like Italy, Austria, and U.S.A.).
* Date : July 1987.
* Duration: 10 days.
* Number of Participants: 10 participants.
* Level of Particpants: Training managers.
* Study Tour Programme:
  - Visit to the training centers.
  - Lectures on modern systems and methods of training applied in these centers.
  - Panel discussions.
* Budget:

- Travel (Ecnomy Class Tickets):	10 * 1000	= 10000 U.S.D.
- Daily Allowance:	10 * 10 * 120	= 12000 U.S.D.
- Four Lecturers during the visit:	4 * 500	= 2000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5000 U.S.D.
Total		35000 U.S.D.

g- **Consultation Meeting for Training Managers:**

* Objective: To provide a forum for training and manpower development managers of fertilizer companies in the Arab Region to exchange

experience and views regarding training and manpower development and to discuss matters of mutual interest and to review ways and means of cooperation between them to strengthen the process of training and manpower development in the fertilizer sector in the Arab Region.

* Venue: To be decided (SAFCO).
* Date: The second or fourthquarter of the year.
* Duration: 6 days.
* Number of Participants: 25 particpants.
* Level of Participants: Training Managers.
* Programme: The contents of the programme will be defined in detatil after discussion with the host company.
* Budget:

- Travel (Economy Class Tickets):	25 * 600	= 15000 U.S.D.
- Daily Allowance:	25 * 6 * 120	= 18000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5000 U.S.D.
Total		44000 U.S.D.

h- **Working Groups meeting in the Field of Ammonia and Nitrogen Fertilizer or Phosphric Acid and Phosphatic Pertilizer Industry:**

* Objective: To provide a forum to exchange information, experience and views on production problems of the fertilizer industry.
* Venue: To be decided (PIC of Kuwait or ICM of Tunisia).
* Date: Feb. 1987 if in Kuwait and may 1987 if in Tunisia.

* Duration: 6 days.

* Number of Participants: 25 participants.

* Level of Participants: Production Managers or production superintendents.

* Programme: Lead papers to be prepared for such meeting can be defined later.

* Budget:

- Travel (Economy Class Tickets):	25 * 600	= 15000 U.S.D.
- Daily Allowance:	25 * 6 * 120	= 18000 U.S.D.
- Preparation of 5 lead papers:	5 * 1000	= 5000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscenllaneous and Contingency:		= 5000 U.S.D.
Total		48000 U.S.D.

2. **Maintenance and Operation Management:**

The following workshops can be included:

a- Ammonia/Urea plant maintenance management workshop.

b- Phosphoric Acid/Phosphate fertilizer maintenance management workshop.

c- Plant operation and maintenance workshop.

d- Rotating equipment (pumps and compressors) training workshop.

e- Corrosion workshop.

f- Operation and maintenance of heavy equipment used in phosphate mining and transportation.

a- **Ammonia/Urea Plant Maintenance Manangement Workshop:**

* Objective of Workshop: To exchange experiences among participants in maintenance management, and acquaint them with modern methods of maitenance scheduling, spare parts control, and the use of modern tools and techniques used in maintenance of plant equipment.
* Workshop Venue: Any of AFCFP member companies can host the workshop (Ammonia/Urea Plant).
* Date of Workshop: First half of the year.
* Duration of the Workshop: Two weeks.
* Number of participants: 15 participants.
* Level of Participants: Maintenance Manangers or Assistant maintenance Managers with at least 5 years experience in fertilizer plants.
* Workshop Programme: The programme of the workshop has to be detailed in collaboration with the host company, but in broad terms, the programme will include:
  - Presentations by the plant management of the host company on the maintenance system and plant operations.
  - Lectures by experts on modern methods of maintenance management, spare parts and inventory systems, and tools and modern techniques used in maintenance of plant equipment.
  - Panel discussions on plant maintenance and operation through presentations by participats supervised by the workshop supervisor.
* Workshop Budget:
  - Travel (Economy Class Ticket): 15 * 600 = 9000 U.S.D.
  - Daily Allowance: 15 * 120 * 15 = 27000 U.S.D.

- Four Lecturers (experts from inside and outside the region):

Tickets:	4 * 1000	=	4000 U.S.D.
Allowance:	4 * 200 * 4	=	3200 U.S.D.

- Group Life Insurance: 1000 U.S.D.
- Implementation, followup and Reporting: = 5000 U.S.D.
- Miscellaneous and Contingency: = 4800 U.S.D.

Total 54000 U.S.D.

b- **Phosphoric Acid/Phosphatic Fertilizer Plant Maintenance Management Workshop:**

* Objective of the Workshop: To exchange experiences among particpants in maintenance management and acquaint them with modern methods of maintenance scheduling, spare parts control, and the use of modern tools and techniques used in maintenance ofplant equipment.
* Workshop Venue: Any of AFCFP member companies can host the workshop (phosphoric acid/phosphatic fertilizer plant).
* Date of the Workshop: Second half of the year.
* Durationn of the Workshop: Two weeks.
* Number of Participants: 15 participants.
* Level of Participants: Maintenance manager or assistant maintenance manager with at least 3 years experience in fertilizer plants.
* Workshop Programme: The programme of the workshop has to be detatiled in collaboration with the host company, but in broad terms, the programme will include:

- Presentations by the plant management of the host company on the maintenance system and plant operations.
- Lectures byexperts on modern methods of maintenance management, spare parts and inventory systems, and tools and modern techniques used in maintenance of plant equipment.
- Panel discussions on plant maintenance and operation through presentations by participants supervised by the workshop supervisor.

* Workshop Budget:

- Travel (Economy Class Ticket):	15 * 600	=	9000 U.S.D.
- Daily Allowance:	15 * 120 * 15	=	27000 U.S.D.
- Four Lectureres (experts from inside and ouside the region):			
Tickets:	4 * 1000	=	4000 U.S.D.
Allowance:	4 * 200 * 4	=	3200 U.S.D.
- Group Life Insurance:		=	1000 U.S.D.
- Implementation, follwup and Reporting		=	5000 U.S.D.
- Miscellaneous and Contingency:		=	4800 U.S.D.
Total			54000 U.S.D.

c- **Plant Operation and Maitenance Workshop:**

This workshop will be held outside the region in cooperation with one of the international engineering comapnies in Europe.

* Objective of the Workshop: The workshop aims at broadening the trainees knowledge about plant operations and maintenance by:

- Providing in-plant project work related to process and plant operations, energy consumption, de-bottlenecking ... etc.

- Methods of efficient use of materials and quality control.
- Practice of efficient plant management and maintenance.

* Workshop Venue: To be decided.
* Date of Workshop: Second half of the year.
* Duration of the Workshop: Four weeks.
* Number of Participants: 15 participants.
* Level of Participants: Engineers and technical staff with at least 5 years experience in plant operation and maintenance.
* Workshop Programme: The workshop of the programme will be detailed in cooperation with the host company, but in broad terms the programme may cover lectures and practice in the following fields:
  - Process Operation and Control.
  - Analytical and Ouality Control.
  - Utilities: Operation and maintenance.
  - Safety and Environmental Control.
* Workshop Budget:

- Travel (Economy Class ticket):	15 * 1200	= 18000 U.S.D.
- Daily Allowance:	15 * 30 * 120	= 54000 U.S.D.
- Training Fees:		= 18000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implenetation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 4000 U.S.D.
Total		100000 U.S.D.

d- **Training Workshop on Rotating Equipment Pumps and Compressors in the Ammonia/urea Plants:**

* Objecive: To strengthen the knowledge of production engineers and technicians in the opeeration and maintenance of pumps and compressors in fertilizer industry and to helpin the creation of specialists in this field.
* Venue: Any member company of AFCFP.
* Date: Winter time if any Arab Gulf Country, Summer if in other countries.
* Duration: One week.
* Number of Participants: 15 participants.
* Level of Participants: Technicians of 5 years maintenance experience or engineers - mechnical or chemical with 2 years experience.
* Programme:
  - Lectures on pumps types and applications.
  - Lectures on pump design and performance.
  - Lectures on mechanical parts of the pump (construction, assembly, diassembly, alignment, inspection ... etc).
  - Simillar lectures on compressors.
  - Panel discussions.
  - Visit to host company's plant to see types of pumps and compressors used there and their application.
* Budget:
  - Travel (Economy Class Tickets): 15 * 600 = 9000 U.S.D.
  - Daily Allowance: 15 * 7 * 120 = 12600 U.S.D.

- Two Lecturers (Experts):

Tickets:	2 * 1000	=	2000 U.S.D.
Allowance:	2 * 200 * 3	=	1200 U.S.D.

- Group Life Insurannce: = 1000 U.S.D.
- Implementation, Followup and Reporting: = 5000 U.S.D.
- Miscellaneous and Contingency = 4200 U.S.D.

Total 35000 U.S.D.

e- **Corrosion Workshop:**

* Objective: To familiarize participannts with modern technologies of corrosion protection and the application of different construction mateirials.
* Venue: To be decided (inside or outside the region).
* Date : Any time of the year, taking care of the weather conditions in the host country.
* Duration: 5 days.
* Number of Participants: 25 particpants.
* Level of Participants: Chemical, Mechanical or corrosion engineers with some experience.
* Programme:
  - Lectures on materials of construction and the choice of proper material.
  - Lectures on corrosion causes, types and mechanisms, effects of different ions.
  - Lectures on corrosion protection - cathodic protection, anodic protection ... etc.
  - Lectures on uses of coatings, paints and lining.

- Lectures on corrosion testing and lab work.
- Panel discussions on corrosion problems encountered in fertilizer industry.
- Visit to inspection section of the host company.

* Budget:

- Travel (Economy Class Tickets):	25 * 600	= 15000 U.S.D.
- Daily Allowance:	25 * 5 * 120	= 15000 U.S.D.
- Two lecturers (experts):		
Tickets:	2 * 1000	= 2000 U.S.D.
Allowance:	2 * 200 * 5	= 2000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5000 U.S.D.
Total		45000 U.S.D.

f- **Workshop on Operation and Maintenance of Heavy Equipment used in Mining and Transportation of Phosphate:**

* Objective: To improve the skills of engineers and technicians in the field of operation and maintenance of heavy equipment used in the field of mining, processing and transportation of phosphate rock.
* Venue: Any member company of AFCFP producing phosphate rock.
* Date: To be decided.
* Duration: One week.
* Number of Participants: 15 participants.
* Level of Participants: Engineers - Mining or Mechanical with 3 years experience and/or technicians with 6 years experience.

* Programme:

- Lectures on mining operations: open cast mining, underground mining, nature and quality of phosphate rock, geological considerations ... etc.
- Lectures on the fundamentals of equipments used in mining and reclamation.
- Lectures on the processing of phosphate rock and the main features of the main equipment used (crushers, mills, seperators, cyclones, filters ... etc.
- Lectures on the transportation of phosphate rock (ground, dry, moist) and the main features of equipment used for transportation and loading and unloading (pneumatic unloading and mechanical unloading).
- Lectures on the fundamentals of operation and maintenance of the main equipment used in transportation, loading and unloading (cranes, belt conveyors and elevatores, ... etc.
- Panel discussions.
- Visit to the host company's mines, processing plant and shipping port.

* Budget:

- Travel (Economy Class Tickets):	15 * 600	= 9000 U.S.D.
- Daily Allowance:	15 * 5 * 120	= 9000 U.S.D.
- Two Lecturers (experts):		
Tickets:	2 * 1000	= 2000 U.S.D.
Allowance:	2 * 200 * 5	= 2000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementaion, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5000 U.S.D.
Total		33000 U.S.D.

3. Quality Control and Instrumentation Techniques:

Three Workshops can be arranged in this field:

a- Workshops on quality control and materials specifications in Ammonia/Nitrogen Fertilizer plants.

b- Workshops on quality control and materials specifications in Phosphoric Acid/Phosphate fertilizer plants.

c- Workshops on instrumentation techniques in fertilizer plants.

a- Workshop on Quality Control and materials Specifications in Ammonia/Nitrogen Fertilizer Plants:

* Objective of the Workshop: Exchange of experiences among participants on methods of quality control, analysis, and materials specifications.
* Workshop Venue: Any of AFCFP member companies can host the workshop (Ammonia/Urea Plant).
* Workshop Date: First half of the year.
* Workshop Duration: Two weeks.
* Number of Participants: 15 participants.
* Level of Participants: Engineers and technical staff with experience in quality control and materials analysis and specifications.
* Workshop Programme: The programme of the workshop will be detailed in cooperation with the host company, but in general terms, it will include:
  - Presentation by the host plant staff on the various functions of the quality control and materials analysis section in the plant.

- Lectures by experts (from outside and inside the region).
- In-plant practice on quality control and methods of analysis of raw materials, intermediates and products for at least one week.
- Panel discussions among participants through presentations from their experiences supervised by the workshop supervisor.
- Reports by participants on the workshop.

* Workshp Budget:

- Travel (Economy Class Tickets):	15 * 600	= 9000 U.S.D.
- Daily Allowance:	15 * 120 * 15	= 27000 U.S.D.
- Experts (Lecturers):		
Tickets:	4 * 1000	= 4000 U.S.D.
Allowance:	4 * 200 * 4	= 3200 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5800 U.S.D.
Total		54000 U.S.D.

b- **Workshop on Quality Control and meterials Specifications in Phosphoric Acid/Phosphatic Fertilizer Plants:**

* Objective of the Workshop: Exchange of experiences among participants on methods of quality control, analysis, and materials specifications.
* Workshop Venue: Any of AFCFP member companies can host the workshop (Phosphoric Acid/Phosphate Fertilizer Plant).
* Workshop Date: First half of the year.
* Workshop Duration: Two weeks.
* Number of Participants: 15 participants.
* Level of Participants: Engineers and technical staff with experience

in quality control and materials analysis and specifications.

* Workshop Programme: The programme of the workshop will be detailed in cooperation with the host company, but in general terms, it will include:
  - Presentation by the host plant staff on the various functions of the quality control and materials analysis section in the plant.
  - Lectures by experts (from outside and inside the region).
  - In-plant practice on quality control and methods of analysis of raw materials, intermediates and products for at least one week.
  - Panel discussions among participants through presentations from their experiences supervised by the workshop supervisor.
  - Reports by participants on the workshop.

* Workshop Budget:

- Travel (Economy Class Tickets):	15 * 500	= 9000 U.S.D.
- Daily Allowance:	15 * 120 * 15	= 27000 U.S.D.
- Experts (Lecturers):		
Tickets:	4 * 1000	= 4000 U.S.D.
Allowance:	4 * 200 * 4	= 3200 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5800 U.S.D.
Total		54000 U.S.D.

c- **Workshop on Instrumentation Techniques:**

* Objective of the Workshop: To improve the skills of engineers and technicians in the operation and maintenance of measuring tools and instruments used in the fertilizer plants through lectures, experience exchange and field visit.

* Workshop Venue: Any member company of AFCFP.

* Workshop Date: To be decided.

* Workshop Duration: One week.

* Number of Participants: 20 participants.

* Level of Participants: Engineers mechanical, electrical with 3 years experience and/or technicians with 6 years experience.

* Workshop Programme:

  - Lectures on the fundamentals of measuring and controlling of process variables (temperature, presure, heat, flow rates ... etc).
  - Lectures on the organization of the instrumentation department.
  - Lectures on measuring and controlling tools and instruments (types, applications).
  - Lectures on cromotographic methods for gas analysis.
  - Lectures on new and advanced techniques for maintaining and reparing the instruments used in the fertilizer plants.
  - Panel discussions.
  - Field visits.

* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	=	12000 U.S.D.
- Daily Allowance:	20 * 120 * 7	=	16800 U.S.D.
- Experts (Lecturers):			
Tickets:	2 * 1000	=	2000 U.S.D.
Allowance:	2 * 200 * 5	=	2000 U.S.D.
- Group Life insurance:		=	1000 U.S.D.
- Implementation, followup and Reporting:		=	5000 U.S.D.
- Miscellaneous and Contingency:		=	4200 U.S.D.
Total			43000 U.S.D.

4. Pertilizer Marketing and Distribution:

Workshop in this field can be held inside or outside the region in developing or developed countries, so that one workshop will be conducted every year. IFDC and FAI have a good experience in these workshop.

a- Pertilizer Marketing Manaement Workshop in Collaboration with FAI (India):

* Objective of the Workshop: To familiarize participants with methods of fertilizer marketing and distribution, both on the theoritical and practical aspects.
* Workshop Venue: FAI - India.
* Workshop Date: First half of the year.
* Workshop Duration: Two weeks.
* Number of Participants: 21 participants (one from each country).
* Level of Participants: Officers working in the field of fertilizer marketing and distribution in AFCFP member companies or government establishments or Ministries of Agriculture in the Arab countries.
* Workshop Programme: FAI has a very good experience in this field.The programme of the workshop held every year on the subject is quite satisfatory.
* Workshop Budget:

- Travel (Economy Class Tickets):	21 * 1000	= 21000 U.S.D.
- Daily Allowance:	21 * 70 * 15	= 22000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 2000 U.S.D.
Total		= 50000 U.S.D.

b- **Fertilizer Marketing Management Workshop in Collaboration with IFDC (U.S.A.):**

* Objective of the Workshop: To familiarize participants with methods of fertilizer marketing and distribution, both on the theoritical and practical aspects.
* Workshop Venue: IFDC - Muscle Shoals, Alabama, U.S.A.
* Workshop Date: First half of the year.
* Workshop Duration: Two weeks.
* Number of Participants: 21 participants (one from each country).
* Level of Participants: Officers working in the field of fertilizer marketing and distribution in AFCFP member companies or government establishments or Ministries of Agriculture in the Arab Countries.
* Workshop Programme: IFDC workshop in this field is very good and satisfactory.
* Workshop Budget:

- Travel (Economy Class Tickets):	21 * 1500	= 31500 U.S.D.
- Daily Allowance:	21 * 120 * 15	= 37800 U.S.D.
- Training Fees:	21 * 1000	= 21000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 4700 U.S.D.
Total		=100000 U.S.D.

5. **Statistics and information Processing Workshop:**

(Collection, Analysis, Storage and Distribution)

a- **Inside the Arab Region:**

This workshop is an important one, because it relates to the information

unit at AFCFP headquarters and its relation with documentation and information units in member companies and regional and international organizations.

* Objective of the Workshop: To acquaint and familiarize officers working in documentation and information units in member companies on the methods of information collection, analysis, storage and distribution in order to create a common understanding on the subject.
* Workshop Venue: AFCFP Headquarters.
* Workshop Date: First half of the year.
* Workshop Duration: Two weeks.
* Number of Participants: 21 participants (one from each country).
* Level of Participants: Officers incharge of documentation and information units in AFCFP member companies or government bodies with at least 2 - 3 years experience.
* Workshop Programme:
  - Introductory lectures by AFCFP Secretariate Staff on the Fertilizer Industry in the Arab Region and Worldwide, in particular, fertilizer statistics.
  - Lectures on information collection, analysis, storage, and distribution with practical exercises.
  - Panel discussions on the problems of information collection in the countires of the trainees supervised by the workshop supervisor.
  - Reports by the workshop participants
* Workshop Budget:
  - Travel (Economy Class Tickets): 21 * 600 = 12600 U.S.D.
  - Daily Allowance: 21 * 120 * 15 = 37800 U.S.D.

- Experts (Lecturers):

Tickets:	4 * 1000	=	4000 U.S.D.
Allowance:	4 * 200 * 4	=	3200 U.S.D.
- Implementation, followup and Reporting:		=	5000 U.S.D.
- Miscellaneous and Contingency:		=	2400 U.S.D.
Total			65000 U.S.D.

b- **Outside the Arab Region:**

A workshop can conducted in cooperation with FAI in India or IFDC in United States.

* In case of FAI: A budget of about 50,000 U.S.$. is needed.
* In case Of IFDC: A budget of about 100,000 U.S.$. is needed.

6. **Fertilizer Use and Application:**

Workshops in this field are best conducted in collaboration with AOAD and FAO. A workshop can be arranged once a year during the period 1986-1991.

* Objective of the Workshop: To raise the level of scientific and technical knowledge of participants and to familiarize them with the latest development in the field of agricultural sciences. meanwhile, the workshop will impart knowledge and skills of trainees so that they could in turn organize suitable training programmes in their countries.
* Workshop Venue: Any Arab Country.
* Workshop Date: To be decided.
* Workshop Duration: One week.
* Number of Participants: 25 participants.

* Level of Participants: Agronomists or agricultural engineers with some experience.

* Workshop Programme:

  - Lectures on the agricultural scene and fertilizer use research in the Arab Region.
  - Lectures on the soil Fertility evaluation and fertilizer recommendations.
  - Lectures on the importance of plant nutrients: major, secondary and micronutrients (straight and complex fertilizers).
  - Lectures on manures and organic fertilizers.
  - Lectures on the importance of promotion in stimulating fertilizer consumption.
  - Lectures on the economic aspects of fertilizer use.
  - Panel discussions.
  - Field visits.

* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	= 12000 U.S.D.
- Daily Allowance:	20 * 120 * 7	= 16800 U.S.D.
- Four Lecturers:		
Tickets:	4 * 1000	= 4000 U.S.D.
Allowance:	4 * 200 * 4	= 4000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 4200 U.S.D.
Total		47000 U.S.D.

7. Industrial Project Analysis - Workshop:

* Objective of the Workshop: To improve skills of the participants in the financial and economic analysis of the industrial projects and help them making proper project appraisal.
* Workshop Venue: To be decided (inside or outside the Arab Region)
* Workshop Date: To be decided.
* Workshop Duration: One week.
* Number of Participants: 20 participants.
* Level of Participants: Engineers and economists with 5-10 years experience.
* Workshop Programme:
  - Lectures on the following subjects:
    - Project cycles
    - Financial and economic analysis including:
      . Income statement
      . Cash flow
      . Balance sheet
      . Internal rate of return
      . Use of shadow prices
      . Sensitivity analysis
      . Panel discussions
      . Field visits
* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	= 12000 U.S.D.
- Daily Allowance:	20 * 120 * 7	= 16800 U.S.D.

- Four Lecturers:

Tickets:	4 * 1000	=	4000 U.S.D.
Allowance:	4 * 200 * 4	=	4000 U.S.D.
- Group Life Insurance:		=	1000 U.S.D.
- Implementation, followup and Reporting:		=	5000 U.S.D.
- Miscellaneous and Contingency:		=	4200 U.S.D.
Total			43000 U.S.D.

8. Industrial Safety and Pollution Control:

Two workshops can be arranged in this field:

a- Industrial safety in fertilizer plants.

b- Environment and pollution control.

a- Workshop on Industrial Safety in fertilizer Plants:

* Objective of the Workshop: To complement the knowledge of safety officers and plant engineers in the field of industrial safety and help them in obtaining a high level of safe work.
* Workshop Venue: Any member company of AFCFP.
* Workshop Date: To be decided.
* Workshop Duration: 5 days.
* Number of Participants: 20 participants.
* Level of Participants: Safety officers and/or plant engineers with some experience.

* Workshop Programme:

- Lectures on the following topics:

  . General means and measures of safety.

  . Safe handling of flamable and combustible materials.

  . Investigation and registration of industrial accidents.

  . Accident reporting, prevention and statistics.

  . Industrial hygiene.

  . Safety guidlines for the engineers.

  . Plant safety programmes and practices.

  . Panel discussions

  . Field visit.

* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	= 12000 U.S.D.
- Daily Allowance:	20 * 120 * 5	= 12000 U.S.D.
- Two Lecturers:		
Tickets:	2 * 1000	= 2000 U.S.D.
Allowance:	2 * 200 * 5	= 2000 U.S.D.
- Group Life Insurance:		= 1000 U.S.D.
- Implementation, followup and Reporting:		= 5000 U.S.D.
- Miscellaneous and Contingency:		= 5000 U.S.D.
Total		39000 U.S.D.

b- **Environment and Pollution Control in Fertilizer Plants:**

* Objective of the Workshop: To help participants to understand pollution problems in fertilizer industry and their effects on the quality of the environment and to familiarize them with the recent developments in pollution control and environment protection.

* Workshop Venue: Any member company of AFCFP.

* Workshop Date: To be decided.

* Workshop Duration: 5 days.

* Number of Participants: 20 participants.

* Level of Participants: Production engineers and chemists with some experience.

* Workshop Programme:

  - Lectures on the following topics:

    . Sources of pollution in fertilizer industry (gaseous emissions, liquid effluents and solid wastes).

    . Methods of treatment of pollutants and recent developments in pollution control techniques.

    . Pollution regulations and legislations in fertilizer industry.

    . Economic aspects for pollution control in fertilizer industry.

    . Hazards of pollutants in gas and liquid effluents.

    . Panel discussion.

    . Field visits.

* Workshop Budget:

- Travel (Economy Class Tickets):	20 * 600	=	12000 U.S.D.
- Daily Allowance:	20 * 120 * 5	=	12000 U.S.D.
- Two Lecturers:			
Tickets:	2 * 1000	=	2000 U.S.D.
Allowance:	2 * 200 * 5	=	2000 U.S.D.
- Group Life Insurance:		=	1000 U.S.D.
- Implementation, followup and Reporting:		=	5000 U.S.D.
- Miscellaneous and Contingency:		=	5000 U.S.D.
Total			39000 U.S.D.

D- **Training Materials and Aids:**

An estimated amount of 50000 U.S.Dollars will be required to purcahse training aids and materials for the implementation of the proposed workshops included in the training programme (1985-1990). In addition, purchase of certain necessary training aids and equipment for the training departments in the fertilizer companies in some cases is also needed.

* PROGRAMME SCHEDULE

With the assumption that the programme will be finalized and approved by all parties involved during 1985 so that it can start January, 1986, the workshops will be distributed during five years (1986-1990). Four workshops can be conducted every year such that two workshops are conducted in the first half and another two workshops are conducted in the second half. AFCFP member companies and intenational companies and institutions will be contacted for hosting the workshops and establishing the workshops programmes.

On the other hand, the setting up of a technical and management training library will be started as soon as possible. The four proposed field studies can be carried out during the period (1986-1990) such that one study can be carried out every year.

Programme Schedule

Workshops	1986	1987	1988	1989	1990
- Ammonia/Nitrogen Fertilizer Production and Technology					
- Phosphoric Acid/Phosphatic Fertilizers Production and Technology.					
- Computer Use and Application in Fertilizer Industry.					
- Advanced Techniques for Open Cast Mining of Phosphate.					
- Training of Trainers and Instructors.					
- Study Tour for Training Managers.					
- Consultation Meeting for Training Managers.					
- Working Group Meeting.					
- Ammonia/Nitrogen Fertilizer Plant Maintenance Management.					
- Phosphoric Acid Phosphate Fertilizer Maintenance Management.					
- Plant Operation and Maintenance.					
- Rotating Equipment Pumps and Compressors.					

Workshops	1986	1987	1988	1989	1990
- Corrosion in Fertilizer Industry. - Operation and Maintenance of Heavy Equipment used in Phosphate Mining and Transportation. - Quality Control and Material Specifications in Ammonia/Nitrogen Fertilizer Plants. - Quality Control and Material Specifications in Phosphoric Acid/Phosphate Fertilizer Plants. - Instrumentation Techniques in Fertilizer Plants. - Fertilizer Marketing Management in Collaboration with FAI. - Fertilizer Marketing Management in Collaboration with IFDC. - Statistics and Information Processing inside the Arab Region. - Statistics and Information Processing Outside the Arab Region.					

Workshops	1986	1987	1988	1989	1990
- Fertilizer Use and Application. - Industrial Project Analysis. - Industrial Safety in fertilizer Plants. - Environment and Pollution Control in Fertilizer Plants.					

PROGRAMME BUDGET

The programme budget can be visualised as follws:

1. Adminstration Component: This covers the cost of programme management, secretarial services, and other expenditures needed for the success of the programme, especially travel of programme management staff to visit the contributing agencies and attend follow up meetings of the programme. This component would be estimated at 50000 U.S.$. per year, and it will be taken care of by AFCFP.

2. Workshop Component: By considering the various proposed workshops, the estimated amount needed for this component is as follows:

- Ammonia/Nitrogen Fertilizer Production and Technology ..... 65000 U.S.Dollars.
- Phosphoric Acid/Phosphate Fertilizers Production and Technology ..... 65000 U.S.Dollars.
- Computer Use and Application in Fertilizer Industry ..... 35000 U.S.Dollars.
- Advanced Techniques for Open Cast Mining of Phosphate ..... 35000 U.S.Dollars.
- Training of Trainers and Instructors ..... 43000 U.S.Dollars.
- Study Tour for Training Managers ..... 35000 U.S.Dollars.
- Consultation Meeting for Training Managers ..... 44000 U.S.Dollars.
- Working Group Meeting ..... 48000 U.S.Dollars.

- Ammonia/Nitrogen Fertilizer Plant

  Maintenance Management ..... 54000 U.S.Dollars.

- Phosphoric Acid/Phosphate Fertilizer

  Maintenance management ..... 54000 U.S.Dollars.

- Plant Operation and Maintenance ..... 100000 U.S.Dollars.

- Rotating Equipment Pumps and Compressors Workshop .. 35000 U.S.Dollars.

- Corrosion in FErtilizer Industry ..... 45000 U.S.Dollars.

- Operation and Maintenance of Heavy Equipment used

  in Phosphate Mining and Transportation ..... 33000 U.S.Dollars.

- Quality Control and material Specifications

  in Ammonia/Nitrogen Fertilizer Plants ..... 54000 U.S.Dollars.

- Quality Control and Material Specifications

  in Phosphoric Acid/Phosphate Fertilizer Plants ..... 54000 U.S.Dollars.

- Instrumentation Techniques in Fertilizer Plants .... 43000 U.S.Dollars.

- Fertilizer Marketing Management in

  Collaboration with FAI ..... 50000 U.S.Dollars.

- Fertilizer marketing Management in

  Collaboration with IFDC ..... 100000 U.S.Dollars.

- Statistics and Information Processing

  inside the Arab Region ..... 65000 U.S.Dollars.

- Statistics and Information Processing

  outside the Arab Region ..... 150000 U.S.Dollars.

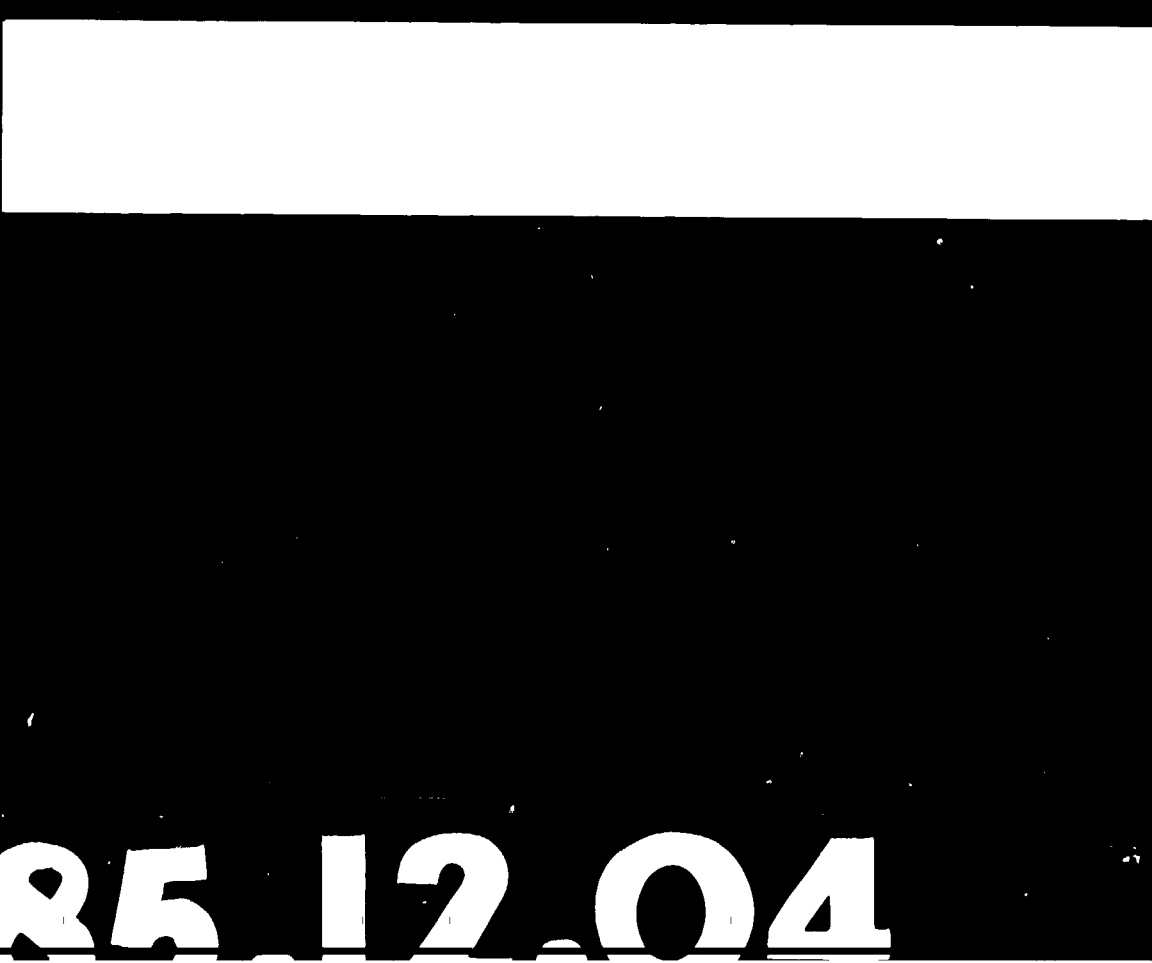
- Fertilizer use and Application ..... 47000 U.S.Dollars.

- Industrial Safety in Fertilizer Plants ..... 39000 U.S.Dollars.

- Environ ment and Pollution control

  in Fertilizer Plants ..... 39000 U.S.Dollars.

TOTAL 1375000 U.S.Dollars.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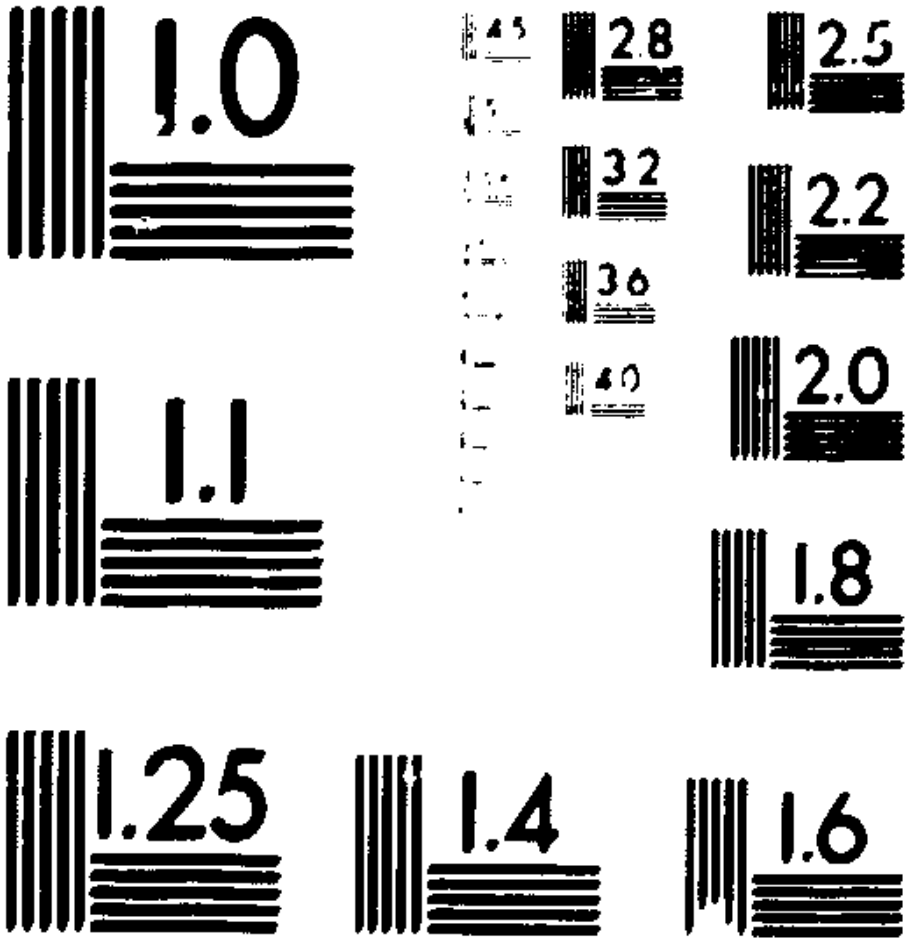

3. Field Studies:

- Training Capabilities in the Arab Region ..... 40000 U.S.Dollars.
- Industrial Training and Education Systems ..... 40000 U.S.Dollars.
- Productivity of the Training Process ..... 45000 U.S.Dollars.
- Use and Application of Micro Computers in Training ..... 45000 U.S.Dollars.

TOTAL 170000 U.S.Dollars.

4. Technical Training Library: 50000 U.S.Dollars.

Project Budget:

The total budget of the programme for the period (1986-1990) including the administrative and management cost can reach 1,845,500 U.S. Dollars.

CONTRIBUTING AGENCIES

The agencies which can contribute to the programme budget are:

1. Arab Federation of Chemical FErtilizer Producers:

   a- In Cash: The cash contribution to the programme could reach U.S.Dollars.

   b- In Kind: The contribution in kind cover the cost of programme management in the form of staff, secretarial work, and other administration costs. This could reach about 50000 U.S.Dollars every year.

2. Arab Industrial Development Organization (AIDO):

   The contribution of AIDO to this programme in cash may reach U.S. Dollars.

3. United Nations Industrial Development Organization (UNIDO):

   UNIDO may contribute in cash to this programme an amount of U.S. Dollars.

4. Arab and International Organizations:

   APCFP Secretariate will contact some Arab Organizations and Funds like Arab Organization for Labour and The Arab Fund for Social and Economic Development. On the other hand, some International Organizations like FAO and OPEC Fund will be contacted for support.

5. International Engineering Companies (Members of APCFP):

   APCFP Secretariate will contact Obsever Members of APCFP to support the

programme, in particular, when workshops are ogranized in cooperation with any of them.

6. Other Contributing Agencies:

AFCFP in cooperation with IFDC may sponsor jointly some training workshops through joint effort.