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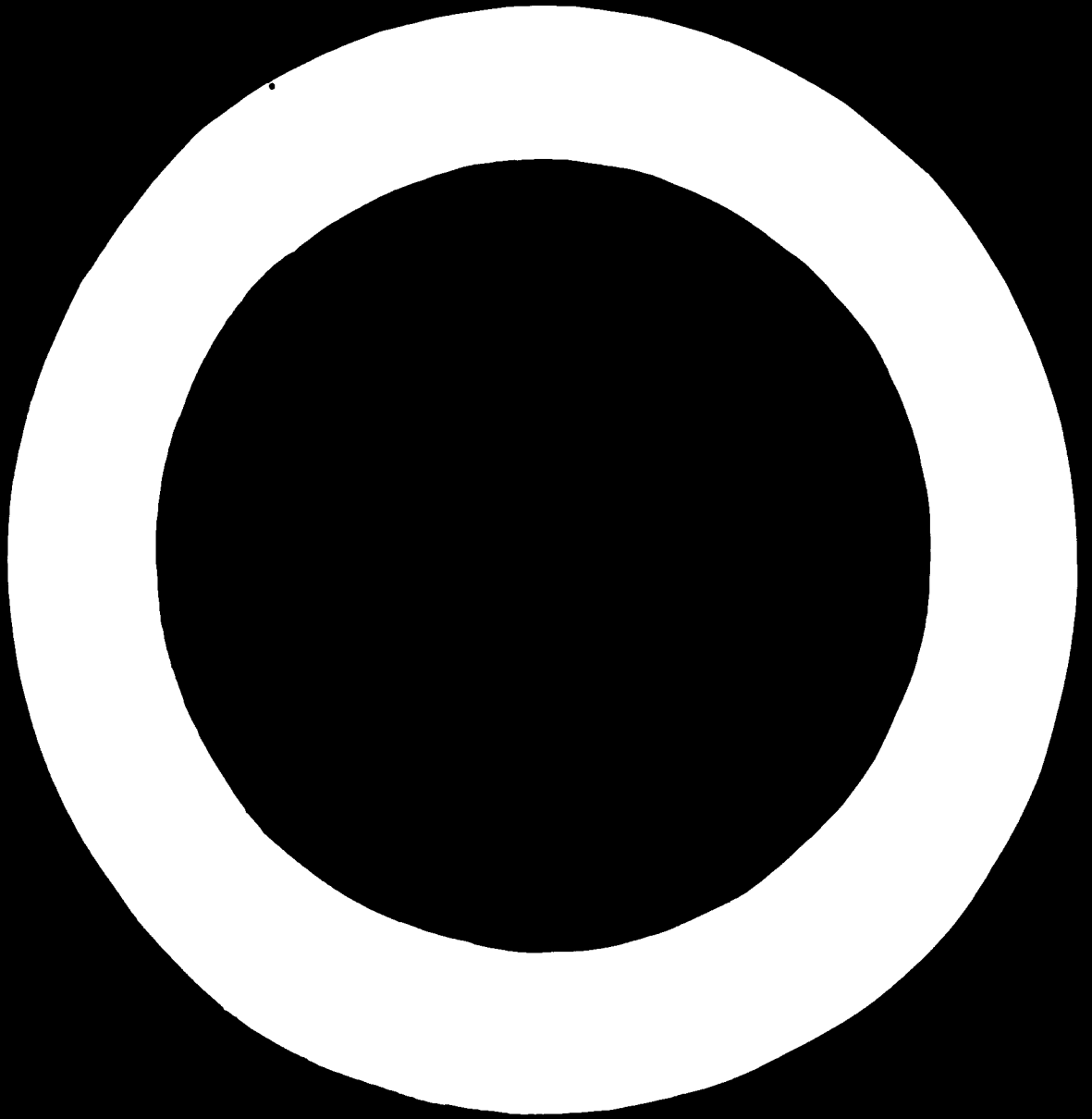


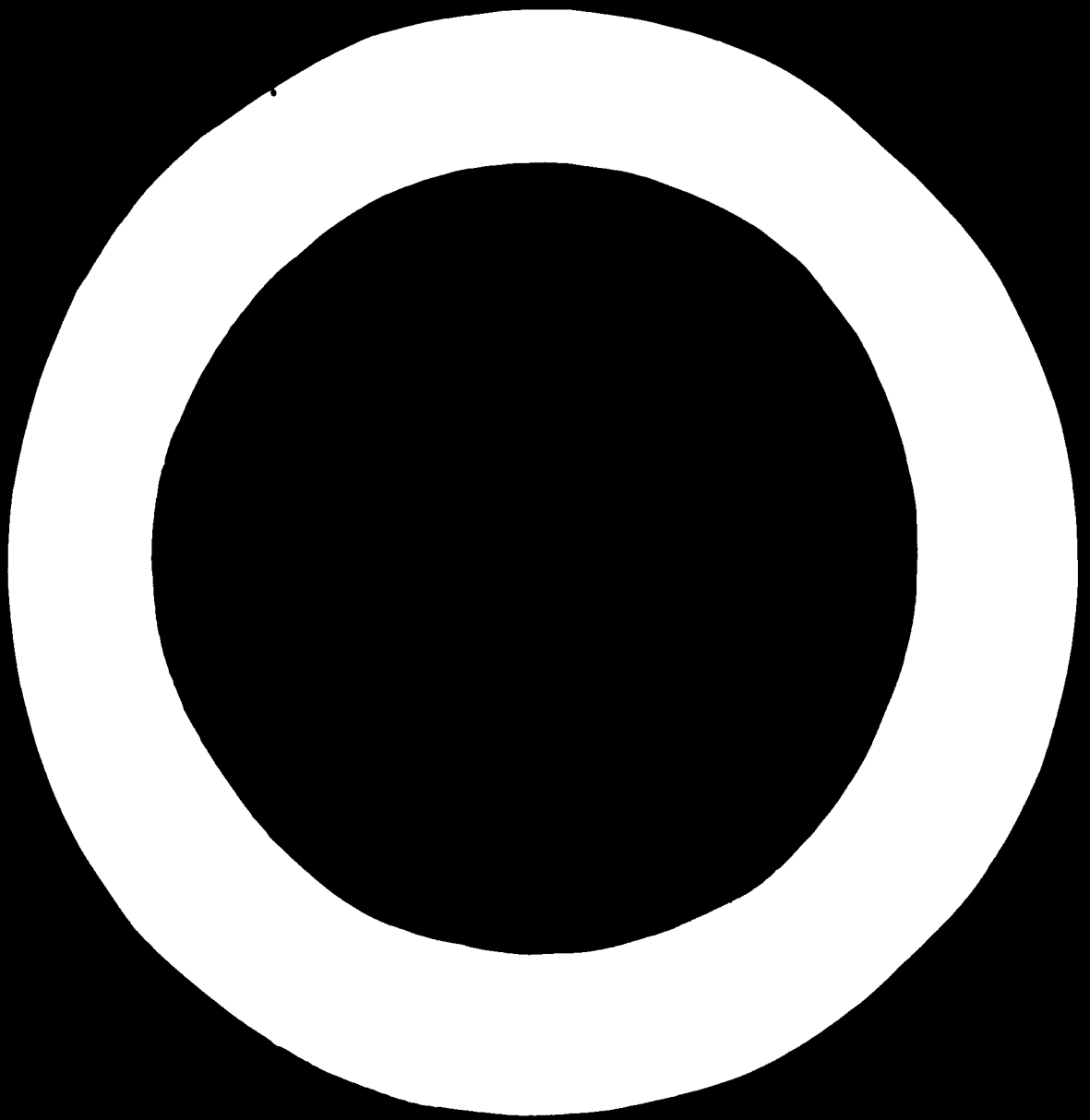
**/ DIRECTORY OF
FERTILIZER PRODUCTION
FACILITIES**

PART III / ECE COUNTRIES¹



¹ Part I dealing with Africa was issued in 1972.
Part II dealing with Asia was issued in UNIDO/ITD. 272.





PREFACE

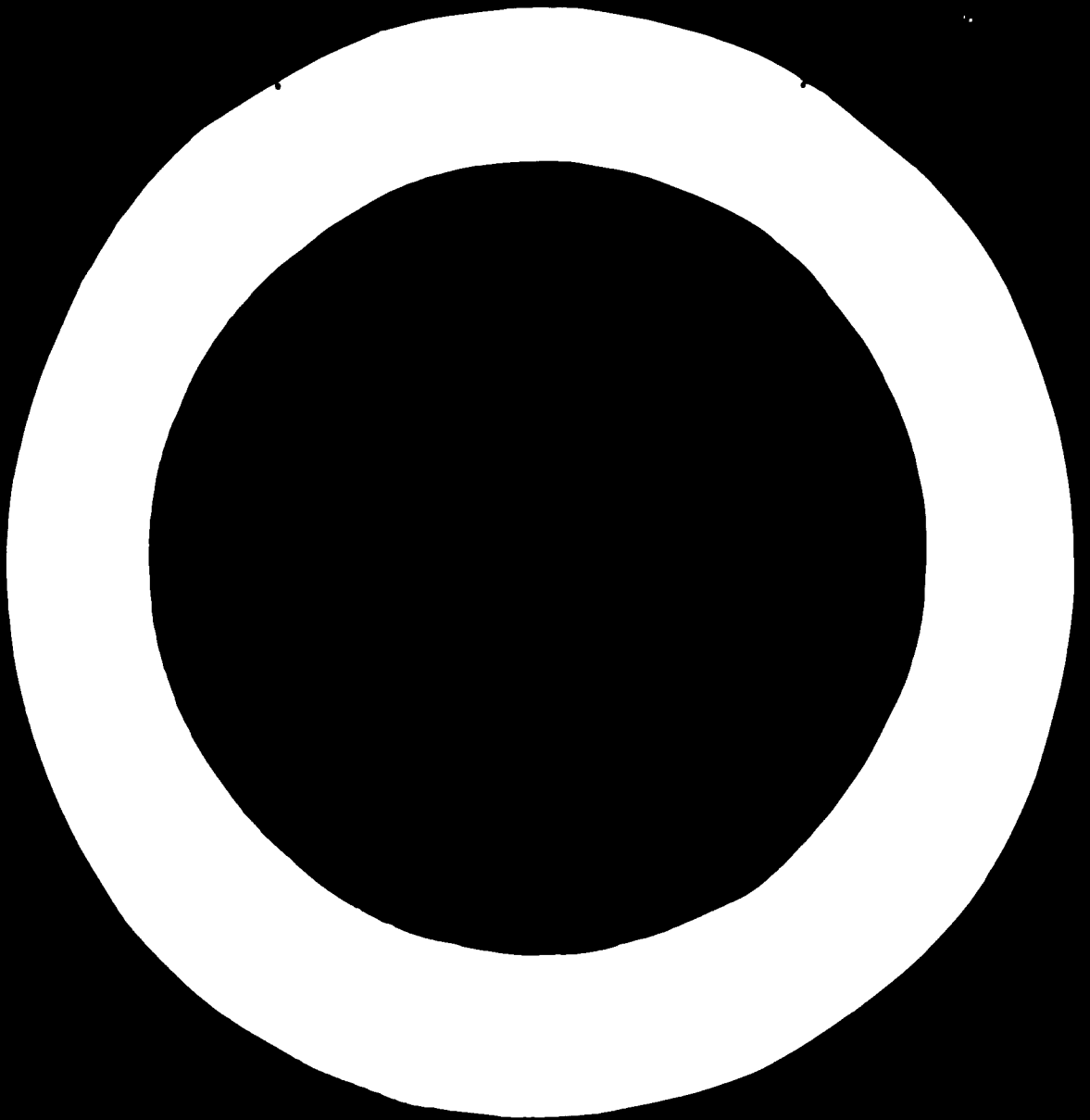
The purpose of this directory is to provide developing and developed countries with a concise, factual and accurate source of information in the field of fertilizer production facilities of the various regions of the world, which can be of value in long-range planning to develop fertilizer industries wherever appropriate without the wasteful duplication of effort within each subregion.

The present volume is the third part of the directory and deals with the region covered by the Economic Commission for Europe. None of the countries in this region belongs to the group identified as the least developed on a global basis, and all are relatively advanced in the field of modern technology, having qualified and trained personnel in the fertilizer industry.

The directory contains information concerning the present and projected fertilizer demand and production; existing fertilizer production facilities; and projects being implemented or in the planning stage. It also contains information on the availability and production of fertilizer raw materials and fuels, and other relevant data briefly illustrating the state of development of the fertilizer industry. Further volumes of the directory are in the course of preparation, covering Latin America and the Middle East regions.

Information from a variety of sources has been used in the preparation of the directory, including data published by the Food and Agriculture Organization of the United Nations, various national organizations, and intergovernmental and private organizations as well as information from experts in the field and that collected by staff members of the United Nations Industrial Development Organization while on mission. The data have been verified by a number of Governments, the Economic Commission for Europe and the Food and Agriculture Organization of the United Nations, to whom drafts of the directory were referred for comments.

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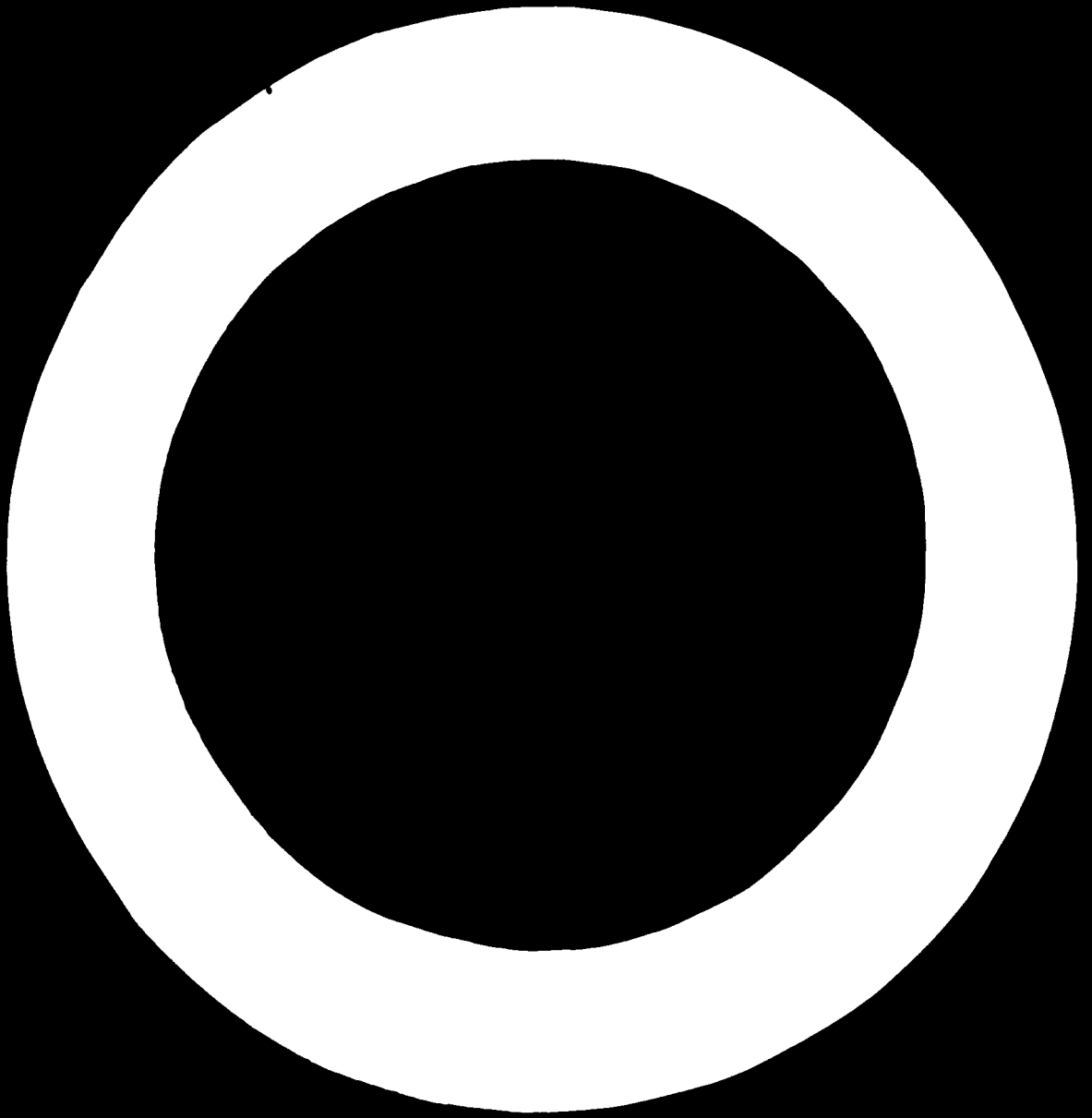


CONTENTS

EXPLANATORY NOTES	vii
SUMMARY	viii
COUNTRY DATA	ix
Albania	1
Bulgaria	12
Cyprus	13
Czechoslovakia	14
Greece	15
Hungary	16
Malta	17
Poland	18
Romania	19
Spain	20
Turkey	21
Yugoslavia	22
General references for all countries	23
General references for specific countries	24

LIST OF TABLES

1. Area and population of countries in EEC region	1
2. Irrigated and area under main crops of countries in EEC region	2
3. Production and consumption of fertilizer nutrients in countries in EEC region in 1960, 1965 and 1970	3
4. Production and consumption of nitrogen, phosphate and potassium fertilizer nutrients in countries in EEC region: Estimated for 1975 and 1980	4



EXPLANATORY NOTES

The term "billion" signifies a thousand million.

Reference to dollars (\$) is to the United States dollar.

Ton refers to metric ton (1,000 kg), unless otherwise specified.

Bbl refers to a barrel of crude oil or of liquid petroleum products - (1 barrel = 42 US gallons = 0.15899 cubic metres).

Per cent N refers to the percentage of nitrogen in fertilizers.

Per cent P_2O_5 refers to the percentage of:

- (a) The total phosphorus in phosphate rock;
- (b) The available phosphorus in phosphate fertilizers, expressed as phosphorus pentoxide (P_2O_5).

Per cent K_2O refers to the percentage of water-soluble potassium, expressed as potassium oxide (K_2O) in potassium fertilizers.

Cultivated area refers to the area of arable land and land under permanent crops and excludes areas under permanent meadows and pastures.

Three dots (...) indicate that data are not available or are not separately reported.

A dash (-) indicates that the amount is nil.

A blank in a table indicates that the item is not applicable.

Dates divided by a slash (e.g. 1970/71) indicate a crop or financial year.

Dates divided by a hyphen (e.g. 1970-1980) indicate the full period involved, including the beginning and end years.

An asterisk (*) indicates an unofficial figure, quoted from FAO publications.

The following abbreviations are used in this publication:

AS	ammonium sulphate
bbl/d	barrels per day
c.i.f.	cost, insurance, freight
CAN	calcium nitrate
COMEA	Council for Mutual Economic Assistance
DAP	diammonium phosphate
EIU	Economist Intelligence Unit
FIAC	Fertilizer Industry Advisory Committee
GDP	gross domestic product
GNP	gross national product
ha	hectare
MAP	monoammonium phosphate
NH_3	ammonia

NP nitrogen-phosphate fertilizers
NPK nitrogen-phosphate-potassium fertilizers
SSP single superphosphate
TSP triple superphosphate

United Nations bodies and specialized agencies

ECAFE Economic Commission for Asia and the Far East
FAO Food and Agriculture Organisation of the United Nations
IBRD International Bank for Reconstruction and Development
UNDP United Nations Development Programme
UNIDO United Nations Industrial Development Organization

SUMMARY

The data presented in this directory are summarized below:

Table 1 shows areas and populations of the countries, and the average rates of population growth over the past few years. The average growth rate is about 1 per cent per annum, the notable exceptions being Hungary and Turkey (0.3 and 2.7 per cent, respectively).

Table 1. Areas and populations of countries in ECE region

Country	Area (thousand square kilometres)	Population	
		Millions	Average annual growth rate (percentage)
Albania	28.7	2.2	...
Bulgaria	110.0	8.5	1.0
Cyprus	9.3	0.6	...
Czechoslovakia	128.0	14.5	0.8
Greece	132.0	9.0	0.7
Hungary	93.0	10.4	0.3
Malta	0.3	0.3	...
Poland	313.0	32.6	1.0
Romania	238.0	20.5	1.0
Spain	505.0	34.1	1.1
Turkey	781.0	35.7	2.7
Yugoslavia	255.8	20.5	1.1

Table 2 illustrates the production of some of the more important crops. Cereals, potatoes and sugar-beet are major crops in most of the countries. The importance of other crops, e.g. rice, cotton, tobacco, citrus fruits and other fruits, tomatoes etc., varies according to climatic conditions for the most part, while some countries have one very specialized cultivation, for example, roses (for attar) in Bulgaria, olives in Cyprus and hops in Czechoslovakia.

Tables 3 and 4 show the past, present and estimated projected production and consumption of the primary fertilizer nutrients (N, P₂O₅ and K₂O) from 1960 to 1980. Over the region as a whole, consumption of these nutrients rose by a factor of about 3 during the decade 1960-1970.

To date, potash salts are mined in only one country of the area, namely, Spain. Although output rose from an estimated 264,966 tons K₂O in 1960 to 524,927 tons in 1970, the over-all deficit increased in the same period from 448,497 tons to 1,820,618 tons K₂O. The balance was provided by imports mainly from the Federal Republic of Germany, France and the Union of Soviet Socialist Republics.

Greece, Malta and Spain report their fertilizer statistics on the fertilizer-year basis (namely, over a period from 1 July to 30 June); the remainder of the countries in the study report all their fertilizer statistics on a calendar-year basis. Data for the countries are stated under the split year to which its first part corresponds to the calendar year.

Increase in the production of synthetic phosphate fertilizers has been hampered in some countries by difficulties in obtaining supplies of phosphate ore and by shortages of sulphuric acid. Production did not keep pace with the increased rate of consumption. The total output of all the countries increased from 877,000 tons P_2O_5 in 1960 to 2,354,173 tons in 1970. The over-all deficit (taking surpluses into account) rose from 73,623 tons in 1960 to 22,926 tons in 1969, and 255,755 tons in 1970. However, this rapid increase in consumption was largely attributable to stimulation of demand from farmers. As several new factories come into operation over the next few years import requirements are expected to fall sharply.

Throughout the region, the most impressive achievements have been in the production and consumption of nitrogen fertilizers. In the decade 1960-1970 total consumption rose from just over 1 million to almost 4 million tons N per annum, but production increased even more rapidly, so that in the same period a deficit of almost 343,000 tons N per annum was converted to a surplus of 335,004 tons N per annum. All countries displayed a consciousness of developments in other parts of the world and a preparedness to implement these locally wherever possible, for example, in the installation of high-capacity ammonia plants, using the most economically available raw material.

Table 2. Cultivated land area and main crops of countries in EC member

Country	Cultivated land area, as percentage of total area	Main crops (thousand tons)									
		1970	1971	1970/71	1971	1972	1973	1974	1975	1976	1977
Albania	19.33	567	150	130	6	12.5	15	178	4	-	-
Bulgaria	69.81	7 151	300	1 754	17	125.0	66	-	-	635	-
Greece	66.70	211	200	-	...	1.1	-	178	-	25	-
France	41.71	6 046	5 600	1 644	-	6.0	...	-	-	104	-
Germany	27.52	3 521	700	1 344	11.8	89.5	100	620	-	920	-
Italy	60.13	10 085	1 550	2 174	-	26.0	55	-	-	293	-
Spain	50.68	4	18	-	-	-	-	-	-	6	-
Portugal	69.01	19 224	50 300	12 742	-	78.0	...	-	-	355	-
Ireland	64.26	13 522	3 000	3 175	-	30.0	70	-	-	720	-
Spain	69.81	13 372	4 750	6 745	34	2.3	165	2 337	-	1 560	-
France	34.63	19 500	1 970	4 244	679	140.0	241	655	-	1 810	-
Portugal	32.07	13 762	3 000	2 348	5	47.6	35	-	-	313	-

Table 3. Production and consumption of fertiliser nutrients in countries in the region in 1960, 1965 and 1970 (Tons per annum)

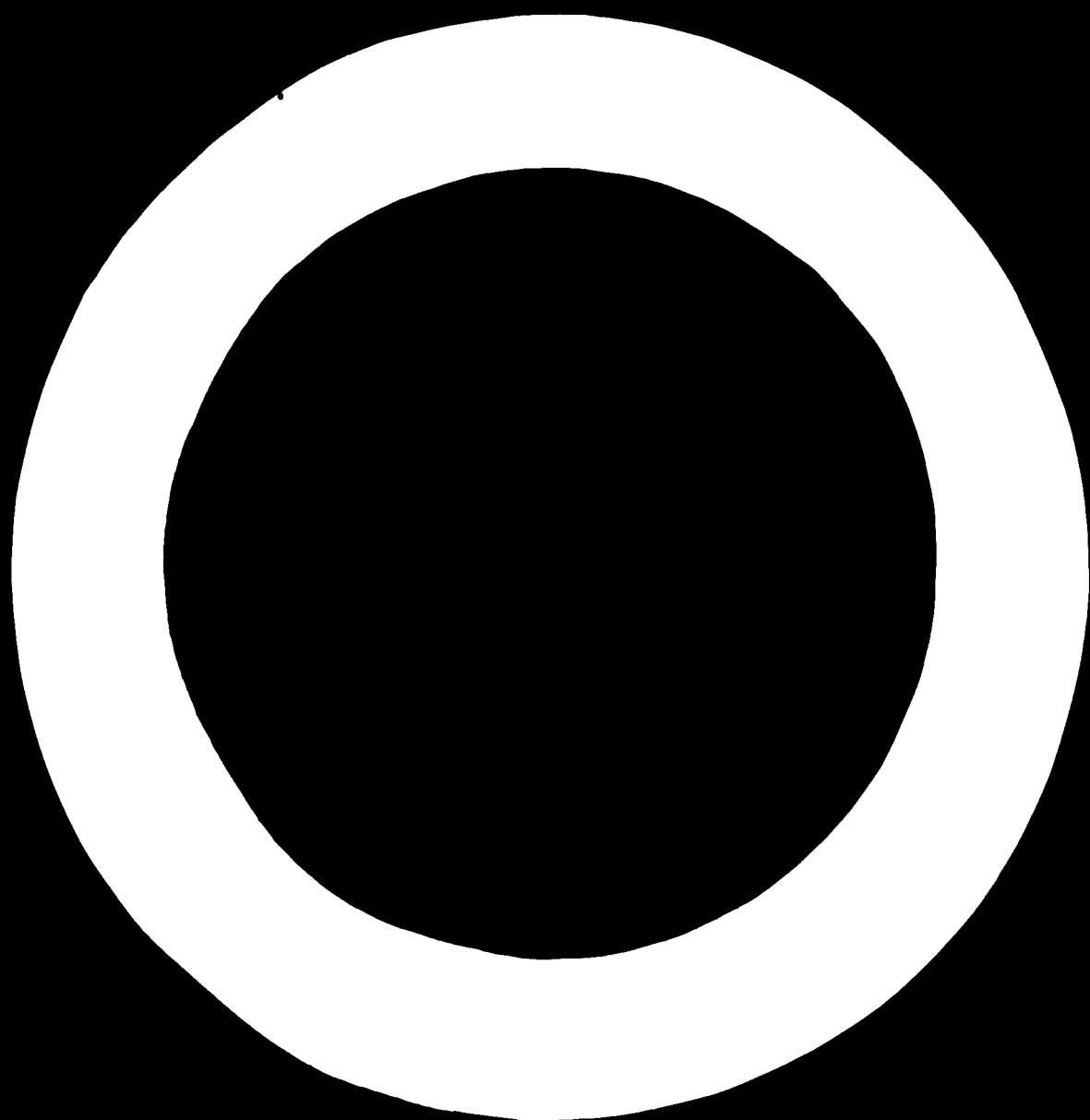
Nutrient		1960	1965	1970
N	Consumption	1 093 365	1 970 984	3 758 619
	Production	750 059	1 692 487	4 093 623
	Deficit	343 306	278 497	-
	Surplus	-	-	335 004
P ₂ O ₅	Consumption	951 069	1 565 419	2 609 928
	Production	877 466	1 479 493	2 354 173
	Deficit	73 623	85 926	255 755
	Surplus	-	-	-
K ₂ O	Consumption	713 463	1 202 209	2 345 545
	Production	264 966	404 011	524 927
	Deficit	448 497	798 198	1 820 618
	Surplus	-	-	-

Table 4. Production and consumption of nitrogen, phosphate and potassium fertiliser nutrients in countries in the region: (Tons per annum)

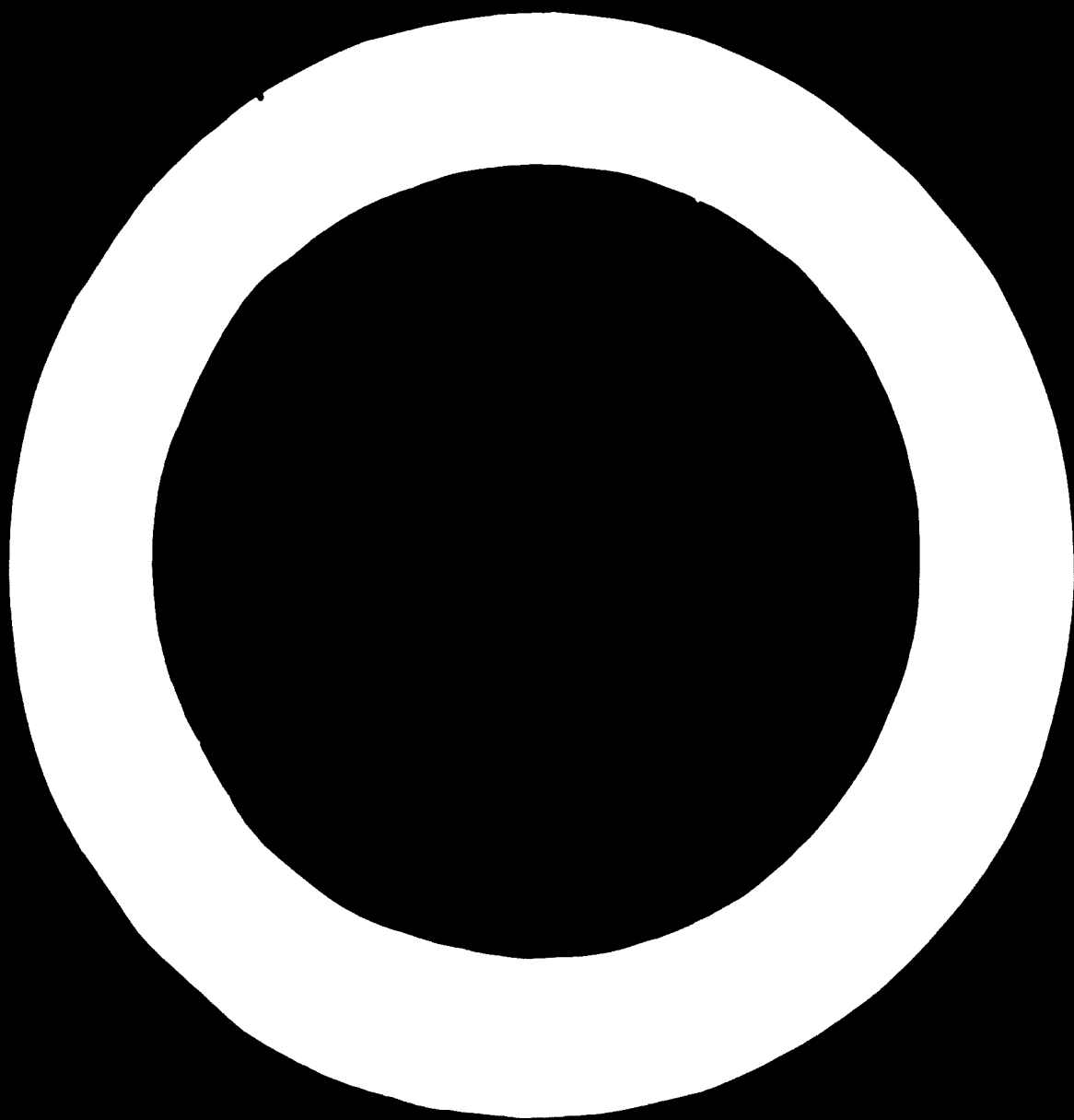
Country	Year	Production	Consumption	Deficit	Surplus
Nitrogen					
Albania	1975	...	...	...	...
	1980	...	...	...	...
Bulgaria	1975	860 000	...	...	...
	1980	...	...	...	...
Cyprus	1975	-	15 300	15 300	-
	1980	-	20 000	20 000	-
Czechoslovakia	1975	616 000	...	...	...
	1980	878 000	...	...	...
Greece	1975	...	250 000	...	...
	1980	...	310 000	...	...
Hungary	1975	503 000	545 000	42 000	-
	1980	740 000	690 000	-	50 000
Malta	1975	-	...	...	-
	1980	-	...	...	-
Poland	1975	1 526 000	1 250 000	-	276 000
	1980	1 700 000	1 500 000	-	200 000
Romania	1975	1 921 800	1 419 800	-	502 000
	1980	2 500 000	1 900 000	-	600 000
Spain	1975	...	826 000	...	...
	1980	...	925 000	...	...
Turkey	1975	319 500	579 900	260 400	-
	1980	643 300	830 000	186 700	-
Yugoslavia	1975	557 000	475 000	-	82 000
	1980	697 000	592 000	-	105 000

Table 4. (continued)

Country	Year	Production	Consumption	Deficit	Surplus
<u>Phosphat</u>					
Albania	1975	...	...	...	...
	1980	...	...	...	...
Bulgaria	1975	460 000	...	...	...
	1980	...	...	...	...
Cyprus	1975	-	12 000	12 000	-
	1980	-	15 000	15 000	-
Czechoslovakia	1975	427 000	...	...	...
	1980	454 000	...	...	...
Greece	1975	...	140 000	...	...
	1980	...	160 000	...	...
Hungary	1975	235 000	380 000	145 000	-
	1980	500 000	520 000	20 000	-
Malta	1975	-	...	...	-
	1980	-	...	...	-
Poland	1975	982 000	1 000 000	18 000	-
	1980	...	1 250 000	...	...
Romania	1975	726 000	726 000	-	-
	1980	1 000 000	1 000 000	-	-
Spain	1975	...	590 000	...	...
	1980	...	640 000	...	...
Turkey	1975	331 900	475 500	143 600	-
	1980	529 900	662 000	132 100	-
Yugoslavia	1975	276 000	290 000	14 000	-
	1980	276 000	353 000	77 000	-
<u>Potash</u>					
Albania	1975	-	...	...	...
	1980	-	...	...	...
Bulgaria	1975	-	200 000	200 000	...
	1980	-	...	...	...
Cyprus	1975	-	3 000	3 000	-
	1980	-	5 000	5 000	-
Czechoslovakia	1975	-	...	...	-
	1980	-	...	...	-
Greece	1975	-	22 000	22 000	-
	1980	-	27 000	27 000	-
Hungary	1975	-	440 000	440 000	-
	1980	-	590 000	590 000	-
Malta	1975	-	...	...	-
	1980	-	...	...	-
Poland	1975	-	1 550 000	1 550 000	-
	1980	-	1 750 000	1 750 000	-
Romania	1975	75 000	150 000	75 000	-
	1980	170 000	330 000	160 000	-
Spain	1975	1 640 000	371 000	-	1 269 000
	1980	...	415 000	...	...
Turkey	1975	-	115 000	115 000	-
	1980	-	150 000	150 000	-
Yugoslavia	1975	-	252 000	252 000	-
	1980	-	324 000	324 000	-



COUNTRY DATA



ALBANIA

Consumption and production of fertilizers Nutrients (tons per annum)

		Actual		Projected	
		1960/61 ^{a/}	1966/67 ^{b/}	1970/71 ^{c/}	1970/80 ^{c/}
N	Consumption	4 548	2 000*	27 000*	...
	Production	-	-	27 000*	...
	Deficit	4 548	2 000*	...	...
	Surplus	-	-	1 000	...
P ₂ O ₅	Consumption	2 245	1 000*	17 000*	...
	Production	-	-	17 000*	...
	Deficit	2 245	1 000*	-*	...
	Surplus	-	-	-*	...
K ₂ O	Consumption	721	1 000*	2 500*	...
	Production	-	-	-	...
	Deficit	721	1 000*	2 500*	...
	Surplus	-	-	-	...

Sources: a/ FAO, Fertilizers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 27, 17 and 20.

b/ FAO, Annual Fertilizer Review 1971 (Rome, 1970), pp. 15, 19 and 20.

c/ FAO, Annual Fertilizer Review 1971 (Rome, 1970), pp. 15, 19 and 20.

Note: Calendar year referring to the first part of the split year.

General

Albania is a small, mountainous country bounded on the west by the Adriatic Sea. It covers 28,748 km² in area, of which 155,000 ha comprises arable and 62,000 ha pasture land. In 1971 the population was estimated to be 2.3 million. The climate is of the Mediterranean in type.

Agriculture

The cultivated areas are restricted mainly to the Adriatic coast and the valley of the Koritsa river. The main crops are grain (maize, wheat, barley and rye), potatoes, cotton, tobacco, sugar-beet, fruit and rice.

Natural resources and industry

Albania has considerable mineral resources but their exploitation is only just beginning. Oil (about 1.3 million tons crude in 1970) is produced and refined at Pylas Station, which is connected by pipeline to the port of Vlora (Valona). Coal, chromite, copper, iron, nickel, salt and bitumen are mined.

The main industries are the processing of agricultural products, textile manufacturing and the manufacture of cement, but all are operated on a rather small scale. An integrated steel works, with a capacity of 100,000 tons per annum, is being built at Elbasan.

Fertilizer manufacture and consumption

A small superphosphate plant at Laci, near the port of Durrës, and a nitrogen fertilizer works at Fier, near Valone, have been in operation for over five years. New capacities for nitrogen and phosphorus fertilizers are also to be built, but as yet no locations have been specified for these plants.

It has been estimated that, for the present, the fertilizer consumption needs of Albania will be met by home production.

Status and capacity of fertilizer plants

Location and status	Start-up	Ownership	Capacity		Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Product	thousand tons per annum		
Lect, near Durrie	1967	...	Sulphuric acid	...	...	...
Pier, Valome	1967	...	Ammonia Nitric acid Ammonium nitrate CAN	49.5 ... 112...	............	............
...	...	...	New capacities for nitrogen and phosphorus fertilisers unspecified			
Unspecified						

BULGARIA

Consumption and production of fertilizers
Nutrients (tons per annum)

	Actual			Projected	
	1960/61 ^{a/}	1965/66 ^{b/}	1970/71 ^{b/}	1975/76 ^{c/}	1980/81
N	Consumption	100 560	219 070	430 000 ^a	...
	Production	83 594	260 472	586 800	880 000
	Deficit	16 966	-	-	...
	Surplus	-	41 402	156 800	...
P ₂ O ₅	Consumption	50 004	131 539	271 600	...
	Production	40 853	93 672	141 600	460 000
	Deficit	9 151	37 867	130 000	...
	Surplus	-	-	-	...
K ₂ O	Consumption	5 900	10 111	26 000	200 000
	Production	-	-	-	...
	Deficit	5 900	10 111	26 000	200 000
	Surplus	-	-	-	-

^{a/} Sources: ^{a/} FAO, Fertilizers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 93, 97, 112, 125 and 150.

^{b/} FAO, Annual Fertilizer Review 1971 (Rome, 1971), pp. 66, 73, 103, 109 and 136.

^{c/} From development plans of the Government of Bulgaria.

Note: Calendar year referring to the first part of the split year.

General

Bulgaria covers an area of 110,000 km² and is situated in south-eastern Europe. It is bounded on the north by the River Danube and on the east by the Black Sea; the Balkan Mountains cut across the country from east to west. In 1971 the population was 8.54 million, with a growth rate of 1.4 per cent per annum.

Before 1940 the economy of the country was almost entirely agrarian; however, since then industrial development has proceeded at a fast rate. About 50 per cent of the population is still engaged in agriculture, but this proportion is steadily declining.

It is now official economic policy to increase foreign trade, which, in 1939, accounted for only 4 per cent of the national income; in 1960 it accounted for 14 per cent; and in 1969 for 22 per cent.

Agriculture

Agricultural land occupies about 52 per cent of the total area, 40.81 per cent being arable land and 11 per cent pasture land. This agricultural land lies in two main sectors in the north and south of the main chain of the Balkan Mountains.

The climate is warm and temperate with an average rainfall of 60 to 65 cm annually. However, periods of drought occur quite frequently, so that irrigation is important. About

20 per cent of the farm land is already irrigated and it is hoped to increase this proportion to 50 per cent. The farm land, apart from 1 per cent, is worked by State or co-operative enterprises. A new system is being introduced under which about 1,000 farms, of an average size of 4,000 ha, will be converted into 180 "agro-industrial areas", ranging between 25,000 and 45,000 ha.

Agricultural output has increased enormously over the past 20 years and Bulgaria is now a large exporter of fresh and canned fruit and vegetables to other CMEA countries and western Europe. A particularly noticeable feature during the past 10 years has been the introduction of large areas for glasshouses, which are used especially for tomato growing.

The main crops are grain, sugar-beet, fruit, vegetables, some cotton and tobacco. Bulgaria is the world's chief supplier of attar of roses.

Natural resources and industry

There are some deposits of hard coal, but until recently the main fuel was low-grade lignite with a high sulphur content. Oil deposits were discovered in 1951 at Tulenovo, in the Balchik district near the Black-Sea coast, and in 1962 at Gigen and Dolna Dubnik. However, production is still only some 300,000 - 400,000 tons per annum and the refineries at Burgas and Pleven mainly process imported crude, which came originally almost exclusively from the Union of Soviet Socialist Republics, but which now comes on an increasing scale from other sources.

The large gas-condensate deposit at Chiren was discovered in 1963. Production began in 1965. Current output of the gas, which contains approximately 92 per cent methane, 4 per cent of other hydrocarbons and 5 per cent nitrogen, is about 500 billion m³ per annum. The gas is used mainly as fuel at the nearby Wilhelm Pieck cement works, and as raw material for the chemical plant at Vratsa.

Large deposits of metallic sulphides, lead and zinc blends and cupreous pyrites, are distributed in the mountains. The major mines are at Gorubac, Burgas, Panagyurs and Nedet. Zinc-beneficiation plants are in operation at Luki, Gyushar, Vratsa and Madzharov. In 1970 output was 179,000 tons of 20-per-cent copper concentrate, 123,200 tons of 70-per-cent lead concentrate, 122,000 tons of 52-per-cent zinc concentrate, and 156,000 tons of 40-per-cent pyrites concentrate.

To date, the sulphur supply has been sufficient for the local production of sulphuric acid. However, imports of pyrites will begin with the start-up of the new fertilizer plant at Povelianovo. It also seems very likely that in the next few years the ore supply will not keep pace with domestic demand for non-ferrous metals - in particular copper - and it may be necessary to import concentrates.

Bulgaria has no indigenous resources of phosphate or potassium.

Refining capacity, which was approximately 7 million tons per annum in 1970, is increasing rapidly. By 1975 it is expected to reach 15 million tons per annum.

Besides the non-ferrous metal-smelting industry, and a large iron-and-steel industry at Kremikov, the main industry is food processing. There are also two kraft pulp mills, at

Kricim and Bukiovti, and a caustic-soda works at Devnya Reka. The production of several types of man-made fibre - acrylic, polyester, nylon and viscose - began recently.

Fertiliser manufacture

Fertilizer manufacture is carried out at the following plants:

Dimitrovgrad Chemical Combine

This was the first fertilizer plant. It came on stream in 1951 and is still the only producer of phosphate fertilizers in the country. Plants for the production of sulphuric and phosphoric acid are included, based on native pyrites and imported rock, respectively, and superphosphates. The present output is about 28,000 tons per annum P_2O_5 , as single superphosphate; 110,000 tons per annum P_2O_5 , as triple superphosphate; and 30,000 tons per annum P_2O_5 as dicalcium phosphate, feed grade.

The nitrogen fertilizer section of this combine has several streams, with a total output of approximately 120,000 tons N per annum, almost entirely in the form of prilled ammonium nitrate.

Stara Zagora Nitrogen Fertiliser Factory

This plant began production in 1963. The output is just over 200,000 tons N per annum at present, including approximately 30,000 tons N per annum of 'technical' urea. The fertilizer is in the form of prilled ammonium nitrate, except for a small amount of by-product ammonium sulphate from acrylo-nitrile and caprolactam plants.

Feedstock for both the Dimitrovgrad Chemical Combine and the Stara Zagora Nitrogen Fertilizer Factory has been upgraded from lignite to oil, and natural gas feed will be introduced upon completion of the pipeline from the USSR, which is under construction at present.

Vratsa Chemical Combine

This combine started production in 1967 and is based on the natural gas deposits at Chiren. The final products are urea and a very small amount of aqueous ammonia, the output in 1971 being approximately 290,000 tons N.

Bevelianovo Fertilizer Combine

This combine is now under construction near Varna on the Black-Sea coast, where it will have its own harbour to facilitate the import of raw materials. For the first three years of operation the feedstock of the nitrogen section will be fuel oil, but subsequent conversion to natural gas, to be imported from the USSR, is envisaged. The combine will produce mainly complex fertilizers. Products will include ammonium sulphate, triple superphosphate and nitrophosphate. At first mainly 1:1:0 and 1:1:10 formulations will be made; however, it is planned to incorporate up to approximately 200,000 tons K_2O per annum into the mixes later on, which will bring the total output of the combine to over 1 million tons of fertilizer per annum. About 40,000 tons P_2O_5 per annum in the form of "technical" phosphates for use mainly in detergents, will also be manufactured here.

The development of the fertiliser industry is illustrated below:

Production of nitrogen fertilizers
(Thousand tons N)

Year	Total	Ammonium sulphate	Urea	Ammonium nitrate	CAN	Aqueous ammonia	Sodium nitrate	Complexes	Other nitrogen fertilizers
1950	-	-	-	-	-	-	-	-	-
1955	30	-	-	-	30	-	-	-	-
1960	83.6	2.5	-	-	80.1	-	-	-	-
1965	260.4	3	14.6	-	240.8	1	1	-	-
1970	586.8	9.5	300	268.3	-	7	2	-	-
1975 ^{a/}	880	10	330	300	-	-	-	240	-

^{a/} Plan figures.

Production of phosphate fertilizers
(Thousand tone P₂O₅)

Year	Total	Single super-phosphate	Triple super-phosphate	Complexes	Other phosphate fertilizers
1950	-	-	-	-	-
1955	-	-	-	-	-
1960	40.9	40.9	-	-	-
1965	93.7	93.7	-	-	-
1970	147.6	28.0	110	-	9.6
1975 ^{a/}	460	40	180	240	-

^{a/} Plan figures.

Present and projected fertiliser consumption

Fertiliser consumption has increased very rapidly over the past 15 years and this trend is expected to continue. The restricting factors at present are (a) insufficient production of the right type of material, and (b) high labour requirements for distribution. A large proportion of the phosphate requirement is imported at present, and although nitrogen fertilizer output is high, it is largely in the form of urea, which is not yet readily accepted by local farmers and so has to be exported in considerable quantities. So far, only single-nutrient fertilizers are available, but towards the end of 1973 the provision of complexes helped to reduce the manpower needed for spreading. Aerial application (by helicopter) is already fairly important in some areas.

Once the new plant at Fovelianove is in full production an estimated extra 300,000 tons N and 350,000 tons P₂O₅ will be available annually. Part of this material may be exported at first, but within a short time it should all be absorbed by the home market.

State and capacity of fertilizer plants

Location and status	Start-up	Ownership	Product	Capacity		Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
				Thousand tons per annum	Nutrient		
Bamrungred	1951	Chemical Combine	SR	...	P	120	150
			Phosphoric acid	...	P	...	...
			TP	...	P	...	...
			Ammonia	...	N	...	...
			Nitric acid	...	N	...	...
			Ammonium nitrate	...	N	...	...
DAP	...	P	...	...	
Sara Sengere	1963	Nitrogen Fertiliser Factory	Ammonia	...	N	200	-
			Nitric acid	547.5	N	...	...
			Ammonium nitrate	...	N	...	...
			Ammonium sulphate	...	N	...	...
			Urea	...	N	...	...
Ponies	1967	Chemical Combine	Ammonia	675	N	300	...
			Urea	967	N	...	...
			Complex fertilisers	912	N P K	...	...
					

Table (continued)

Plants under construction or in the planning stage

Location and status	Start-up	Ownership	C.A.P.A.C.I.T.Y.				Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Thousand tons per annum	Nutrient	Thousand tons per annum	Nutrient		
Pondicherry	1973	Chemical Combine	Ammonia	N	300	350
			Nitric acid Compound	N	...	...
			Fertilisers	P	750	...		
			TSP Compound	P	150	...		
			Fertilisers	N	150	...		
				K	150	...		
Bihar Derris (approved by the Government)		Bihar Derris Soda Works	Ammonium chloride Compound	N
			Fertilisers	N	...	...
				P	...	...
				K	...	...
				P	...	...
				K	...	...

CYPRUS

Consumption and production of fertilizers
Nutrients (tons per annum)

		Actual			Projected	
		1960/61 ^{a/}	1965/66 ^{b/}	1970/71 ^{c/}	1975/76 ^{c/}	1980/81 ^{c/}
N	Consumption	6 047	9 568	14 789	15 300	20 000
	Production	-	-	-	-	-
	Deficit	6 047	9 568	14 789	15 300	20 000
	Surplus	-	-	-	-	-
P ₂ O ₅	Consumption	6 541	8 239	10 014	12 000	15 000
	Production	-	-	-	-	-
	Deficit	6 541	8 239	10 014	12 000	15 000
	Surplus	-	-	-	-	-
K ₂ O	Consumption	568	1 254	2 644	3 000	5 000
	Production	-	-	-	-	-
	Deficit	568	1 254	2 644	3 000	5 000
	Surplus	-	-	-	-	-

Sources: a/ FAO, Fertilizers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 98, 126 and 151.

b/ FAO, Annual Fertilizer Review 1971 (Rome, 1972), pp. 80, 114 and 141.

c/ Government of Cyprus (1973).

General

Cyprus, the third largest island in the Mediterranean Sea, covers an area of 9,250 km² and lies about 100 km south of Turkey. The population in 1971 was estimated at 640,000.

Agriculture

About 35 per cent of the population are engaged in agriculture, which is mainly of the smallholding type. The main crops are wheat, barley, vegetables, citrus fruits and grapes.

Natural resources and industry

Cyprus has some valuable mineral deposits, which supply about 20 per cent in value of the total exports. The most important minerals are cuprous and iron pyrites, asbestos and gypsum. For 1968, 1969 and 1970 the exports of cuprous and iron pyrites were as follows:

Year	CUPROUS PYrites (thousand tons)	IRON PYrites (thousand tons)
1968	141.1	882.4
1969	84.7	834.1
1970	94.5	885.2

There is no heavy industry on the island, manufacture being limited to light industries such as textiles and garment manufacture, food processing, foot-wear, wines and spirits and wood-work.

Fertiliser manufacture

At present no fertilisers are manufactured. A project has been proposed by the Hellenic Mining Co. for a fertiliser complex with facilities for producing a wide range of NPKs, super-phosphates, sulphate of ammonia and sulphuric and phosphoric acids. It has been suggested that the complex incorporate a plant to produce 120,000 - 140,000 tons of sulphuric acid per annum, using indigenous iron pyrites. This project is at present under review by the Government.

Fertiliser consumption^{1/}

The main products used on the island's calcareous soils have been ammonium sulphate and triple superphosphate. All fertilisers used are imported from overseas countries by the Co-operative Central Bank and various private commercial firms. Practically no mixing of fertilisers is practised by the Cypriot farmers and most of the mixed or compound fertilisers used are imported as such.

Approximately 40 per cent of the nitrogenous fertilisers used during 1971 was in the form of ammonium sulphate, 40 per cent in the form of calcium ammonium nitrate and urea, and 20 per cent in the form of mixed or compound fertilisers, such as 7:11:0, 14:22:0, 14:22:9, 6:8:8, and others. Urea consumption is expected to rise shortly due to its low per nutrient unit cost, its high concentration of nitrogen, and low handling and storage costs.

^{1/} P. Markou, A. H. Papachristou and J. Ph. Lygas, "Status of the fertilizer and pesticide industries in Cyprus", paper presented at the Meeting for Identification and Development of the Fertilizer and Pesticide Industries in the Developing Countries served by ECE, Bucharest, Romania, 10-14 July 1972 (ID/88.127/11).

Status and capacity of fertilizer plants

Location and State	Start-up	Ownership	C a p a c i t y			Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Product	thousand tons per annum	Nutrient			thousand tons per annum
...	Under consideration by the Government	Malleic Mining Co.	NPK fertilizers	...	N	...	...
			Super-phosphates	...	P	...	...
			Salphate of ammonia	...	K	...	...
			Salphauric acid	...	P	...	...
			Phosphoric acid	...	P	...	...

Plants in the planning stages or under construction

CZECHOSLOVAKIA

Consumption and production of fertilisers
Nutrients (tone per annum)

		Actual			Projected	
		1960/61 ^{a/}	1965/66 ^{b/}	1970/71 ^{b/}	1975/76 ^{c/}	1980/81 ^{c/}
N	Consumption	146 151	246 404	428 000	...	...
	Production	139 881	219 784	352 141	616 000	878 000
	Deficit	6 270	26 620	75 859	...	...
	Surplus	-	-	-	...	...
P ₂ O ₅	Consumption	158 961	254 519	349 600*	...	...
	Production	126 990	245 808	313 240	427 000	454 000
	Deficit	31 971	8 711	36 360*	...	...
	Surplus	-	-	-	...	...
K ₂ O	Consumption	190 988	394 704	514 200*	...	...
	Production	-	-	-	-	-
	Deficit	190 988	394 704	514 200*	...	...
	Surplus	-	-	-	...	...

Sources: a/ FAO, Fertilisers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 93, 97, 119, 125 and 150.

b/ FAO, Annual Fertiliser Review 1971 (Rome, 1972), pp. 66, 73, 103, 109 and 136.

c/ From Development Plans of the Government of Czechoslovakia.

Note: Production refers to calendar year. Production and consumption of phosphate include ground-rock phosphate.

General

Situated in the middle of the European land mass, Czechoslovakia covers an area of 128,000 km², 52,000 km² of which comprises arable land and 18,000 km² pasture land; in 1971 it had a population of 14.5 million, with a growth rate of 0.8 per cent per annum.

Before 1939 the country was already developing an industrial economy, with many well-known enterprises such as glass and porcelain factories, and engineering works. However, due to the lack of natural resources the rate of post-war reconstruction and development was rather slow. Until 1961 investment in heavy industry took precedence, but under the third five-year development plan (1961-1965) greater stress was placed on light industry; the fourth plan (1966-1970) aimed in particular at developing the power and chemical industries and improving consumer services.

Agriculture^{2/}

Czechoslovakia is situated on the boundary of the oceanic and continental climates, between the moderate and northern zones. The average annual temperature in the agricultural

^{2/} Information supplied by the Government of Czechoslovakia (9 October 1973).

regions is 6° - 8° C and the average annual rainfall is 570 mm. Most of the arable land is from 200 to 700 m above sea level. Central-European grey-brown podsollic soils and podsolised soils prevail. Plant production is concerned mainly with the production of cereals - 54 per cent on arable land; 75 per cent of the cereals is composed of winter wheat and spring barley. Root crops, especially potatoes and sugar-beet, cover 12-14 per cent of the area under crops and the share of annual and perennial fodder crops is 25-30 per cent of the total area under crops. In the period 1970-1972 the average yields of wheat and spring barley per hectare ranged from 3.0-3.5 tone, sugar-beet from 30-40 tons and potatoes from 14-17 tone.

The growth of yields, particularly after 1965, was due mainly to an increase in the use of commercial fertilizers, the introduction of new cereal varieties, and better utilisation of soil. The consumption of commercial fertilizers in 1973 was approximately 200 kg N, P_2O_5 and K_2O per 1 ha of agricultural land; in 1975 it will reach 220 kg/ha. The use of herbicides, applied to 2.5-3.0 million hectares, has increased considerably. Animal husbandry is concerned mainly with pork, beef, milk, egg and slaughter-poultry production. Cattle stocks reach approximately 4.3 million heads; there are 1.9 million cows, and 5.5-6.0 million pigs. Only a small part of the protein substrate and grain has been imported so far to meet feed-stuff requirements and to supply raw material for feed mixture production.

The economics and character of agricultural production are determined by large enterprises of the co-operative and state sector farming on 90 per cent of the total area of agricultural land. The average size of an agricultural enterprise is 700 ha in co-operatives and 4,000-5,000 ha in state farms. Further concentration of land is now under way; this process is based on co-operation and specialisation in production and on the further fusion of enterprises. High-performance machines are used in the technological processes in plant and animal production. The development of agriculture is planned and directed by the State.

Since 1948 considerable development has taken place in the services, particularly in the processing of farm products, in chemicalisation, in seed production as well as in expert advisory services. Further rationalisation and intensification, with further savings in the labour force, are planned for agriculture.

Natural resources and industry

Czechoslovakia has no hard coal. Its thermal-power stations are fuelled by a poor lignite of high sulphur and low carbon content. Small oil deposits in Slovakia and Moravia have been worked since the mid-1960s, but the maximum output so far obtained (in 1967 and 1968) has only been approximately 200,000 tons per annum. There are two fields producing natural gas in the areas of Bratislava and Ostrava, with combined estimated reserves of 15 billion m^3 and an annual output of 1.7 billion m^3 .

Czechoslovakia has no deposits of sulphur, phosphate or potassium. A seam of very lean pyrites (near Hvalečice) was mined for a few years during a recent shortage of world sulphur. The beneficiation process was extremely difficult and the operation has since been closed down. Sulphur is imported from Poland, phosphate rock mainly from North Africa, and potassium from the German Democratic Republic and the USSR.

Industry plays an important role in the economy; it employs approximately 34 per cent of the working population and produces about 65 per cent of the national income. The production of cars and bicycles is considerable. Other important industries are glass, ceramics, textiles and beer.

Fertiliser manufacture

The oldest ammonia factory still in operation is the Moravian Chemical Works at Ostrava, which is based on coke gas. This factory produces approximately 30,000 tons N per annum, as calcium ammonium nitrate (25 per cent N) and calcium nitrate (synthetic), as well as ammonium sulphate.

The Zaluží (Zaluziu Mostu) Petrochemical Works has two naphtha-based ammonia plants, recently constructed, with a combined capacity of over 500,000 tons N per annum. A urea plant, with a capacity of 170,000 tons N per annum, came into operation in the middle of 1972.

Part of the ammonia produced at Zaluží is transported by road tanker to the North Bohemian Chemical Works at Lovosice, where it is converted mainly to calcium ammonium nitrate (30 per cent N) and nitrogen solution. This plant also has a small unit manufacturing complex fertilisers (mainly 17:17:17) by its own process. A possibility at present under investigation is the modification of the process to produce superphosphoric acid. Also at Lovosice are three sulphuric-acid production lines and a large SSP factory.

The Dúlsko (Sala) Nitrogen Fertiliser Combine began production in 1965. Its current capacity is approximately 500,000 tons N per annum, based on natural gas, both indigenous and imported from the USSR. A urea plant, of nominal capacity 100,000 tons N per annum, came on stream in 1969. Some complexes are also manufactured here, but considerable processing difficulties have been encountered. The plant is still in the course of expansion and by 1974 the production of ammonia, urea, nitric acid and complex fertilisers should have commenced.

At Chemko (Stránské) about 110,000 tons N ammonia is produced each year, based on natural gas, but only a small proportion is for fertiliser use. Some complex fertilizers are manufactured here and at Semín.

Large sulphuric-acid and superphosphate works are in operation at Prerov and Bratislava. Nitrogenous and phosphatic fertilisers are produced at Pardubice.

It is foreseen that the production of synthetic calcium nitrate and ammonium sulphate at the Moravian Chemical Works will cease within the next few years, as enough materials become available as byproducts from the manufacture of nitrophosphates from coking works, and from the production of organic chemicals and synthetic fibres.

It is also generally admitted that there is an urgent need for the production of phosphoric acid. A final decision as to the process to be adopted and the location of the plant appears to be proving very difficult to reach. It seems probable, therefore, that over the next few years considerable imports of phosphoric acid will be necessary.

Present and future fertiliser consumption

Traditionally, the consumption of fertiliser has kept pace with production, but in the current five-year plan the production of fertilisers will meet only two thirds of the demand foreseen. While output is to rise from 646,300 tons (1970) to 1,043,000 tons (1975) (pure nutrients), the use of chemical fertilisers by farmers should increase from 1,273,000 tons (1970) to 1,560,000 tons (1975).

In the short term phosphoric acid may be imported and urea exported.

The production of nitrogen and phosphate fertilisers from 1950 to 1980 is shown below:

Production of nitrogen fertilisers
(Thousand tons)

Year	Total	UAN	Ammonium nitrate	Calcium nitrate	Urea	Calcium cyanamide	Ammonium sulphate	Complexes	Other N fertilisers
1950	34.5	16.0	-	7.5	-	6.0	5.0	-	-
1955	60.4	21.1	-	8.9	-	6.4	21.1	-	2.9
1960	139.9	88.8	-	10.4	-	6.1	30.3	3.6	0.7
1965	219.5	153.4	6.1	11.1	1.2	5.1	34.1	3.0	5.5
1970	323.9	150.0	17.0	20.0	31.7	-	55.2	45.0	12.0
1975 ^a	616.0	-	207.0	-	56.0	-	70.0	213.0	70.0
1980 ^a	878.0	-	296.0	-	80.0	-	76.0	325.0	101.0

^a/ Plan figures.

Production of phosphate fertilisers
(Thousand tons)

Year	Total	Single superphosphate	Triple superphosphate	Ground rock	Basic slag	Complexes	Other P fertilisers
1950	55.7	55.5	-	-	0.2	-	-
1955	98.3	57.1	-	11.7	26.0	3.5	-
1960	140.0	101.3	-	11.8	23.1	3.7	0.1
1965	257.9	217.8	-	12.1	24.5	3.5	-
1970	322.4	246.6	-	16.5	3.7	55.5	0.1
1975 ^a	427.0	38.0	137.0	-	12.0	240.0	-
1980 ^a	454.0	33.0	121.0	-	12.0	298.0	-

^a/ Plan figures.

Status and capacity of fertilizer plants

Location and status	Start-up	Ownership	Capacity			Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Product	Thousand tons per annum	Nutrient			Thousand tons per annum
Břežan Chemical Works, Ostrava	1884	Moravian Chemical Works	Ammonia	...	N	...	...
			Nitric acid	...	N	...	...
			Calcium nitrate	...	N	...	...
			(synthetic)	...	N	...	...
			CAN (25%)	...	N	...	...
			Ammonium sulphate	...	N	...	...
Záviš u Mostu	1954 } 1972 }	Brno Chemical Combine	Ammonia	...	N	500	-
			Urea	...	N	170	-
Lovecice	...	North Bohemian Chemical Works	Ammonium nitrate	...	N	...	150
			(36%)	...	N	...	...
			CAN (30%)	...	N	...	...
			"Nitrogen solution"	...	N	...	...
			Nitrophosphates	...	N	...	...
			Calcium nitrate	...	N	...	...
			SSP	...	P	...	...
			Complex fertilizers	...	N	...	...
			(17:17:17)	200	P	...	...
			Sulphuric acid	...		...	...

Table (continued)

Location and status	Start-up	Ownership	Capacity			Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Product	Thousand tons per annum	Nutrient			Thousand tons per annum
Sala nad Vahon	1965 Expansion 1969	Duslo Combine	Ammonia	...	N	272	...
			Nitric acid	231	N	...	500
			CAN	...	N	...	
			Urea	...	N	100	
			Nitro-phosphates	...	P	...	
Strážske	1968	Chemko	Ammonia	...	N	110	...
			Nitro-phosphates	...	N	...	
			Technical ammonium nitrate	....	N	...	
Semia	1972	Synthesis Works	Complex fertilisers	205	N	...	...
			Nitro-phosphates	...	P	...	
Prerov	...	...	SSP	...	P	150	150
			Salphuric acid	...			
Bratislava	...	Georgi Dimitrov Works	SSP	...	P	150	150
			Urea	20	N	...	
Most	1972	...	NP fertilisers	200	N	...	-
			Urea	...	P	...	...
Parabice	1972/73	...	<u>Plants under construction or in the planning stages</u>				
			Complex fertilisers	365	N	...	...
Sala nad Vahon	Expansion 1974	Duslo Combine	Ammonia	330	N	...	...
			Urea	200	N	...	...
			Nitric acid	230	N	...	...
			Urea	...	N	...	...

GREECE

Consumption and production of fertilizers
Nutrients (tons per annum)

	Actual			Projected		
	1960/61	1965/66	1970/71	1975/76	1980/81	
N	Consumption	69 000 _a /	133 929 _b /	201 000 _c /	250 000 _a /	310 000 _a
	Production	20 000 _a /	58 000 _a /	165 000 _a/	...	...
	Deficit	49 000	75 929	36 000	...	...
	Surplus	-	-	-	...	...
2 ⁰ 5	Consumption	55 000 _a /	101 759 _b /	118 472 _b /	140 000 _a /	160 000 _a
	Production	54 569 _a /	61 000 _a /	114 000 _a/	...	...
	Deficit	431	40 759	4 472	...	...
	Surplus	-	-	-	...	...
K ₂ O	Consumption	8 000 _a /	14 980 _b /	17 540 _b /	22 000 _a /	27 000 _a
	Production	-	-	-	-	-
	Deficit	8 000 _a /	14 980 _b /	17 540 _b /	22 000 _a	27 000 _a
	Surplus	-	-	-	-	-

Sources: a/ Government of Greece (1973). Statistics given are on a fertilizer-year basis.

b/ FAO, Annual Fertilizer Review 1971 (Rome, 1972), pp. 109 and 116.

c/ N. Popovici. (ID/WG.127/8). See: "General references for all countries", p. ...

d/ Based on FAO estimates.

e/ FAO, Fertilizers, Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), p. 119.

Note: Statistics given are on a fertilizer-year basis.

General

Greece is composed of a mountainous peninsula and numerous off-shore islands. It lies in south-eastern Europe between the Mediterranean and Aegean Seas. In area it is 132,000 km², 28,000 km² being arable and 52,000 km² pasture land. The population is approximately 9 million, with a growth rate of 0.7 per cent per annum; in 1970 the GNP was estimated at 282,000 million drachmas. Industrialisation has increased considerably over the past 15 to 20 years, and in 1970, 31.1 per cent of the national income was derived from industry, compared to 18.6 per cent from agriculture.

Agriculture

Agriculture is the traditional occupation in Greece, with its warm Mediterranean climate. The principal crops are cereals, tobacco, sugar-beet and fruit. In 1970 agricultural products accounted for more than half of the total exports. However, the available agricultural land is broken up into over one million holdings so that farms are small and fragmented, most of them being worked by only three or four people.

Natural resources and industry

The mineral deposits exploited at present include brown coal, iron, lignite, chromite and zinc. Work is being carried out to increase the production of pyrites by opening up the Kassandra and Ermioni deposits. Some sulphur is also recovered from the oil refineries (based on imported crude) at Megara and Asprokyrgos. All phosphorus and potassium ore are imported. The principal industries are food processing, textiles and shipbuilding.

Fertiliser production

The Hellenic Chemical Products and Fertiliser Co. Ltd., (SA), established in 1909, is a privately owned company with a factory at Drapetsona Lipasmata, near Piraeus. The capacities of the various sections of the plant (in terms of products) have been given as: sulphuric acid - 500,000 tons per annum; single superphosphate - 260,000 tons per annum; mixed fertilisers - 100,000 tons per annum; and complex fertilisers - 130,000 tons per annum. Indigenous pyrites is used as raw material for the manufacture of sulphuric acid; ammonia (for conversion to nitric acid and for use in complex fertilisers) is purchased from the Esso-Pappas Company in Salonica. A new unit is being added to the sulphuric-acid section and contracts have been signed for the replacement of a small, old phosphoric-acid plant by a new one with a capacity of 160-200 tons per day. At the same time a new NPK plant with a capacity of 750 tons per day (product) is to be installed, which is due to begin production during 1973.

The Phosphoric Fertilisers Industry Ltd. is a company that was established in 1965 by the Commercial and Popular Banks Group; it has a factory at Née Karvali, designed for the production of 350,000 tons per annum of a product 16:20:0. Several types of ammonium phosphate and nitrophosphate formulation are now produced for home consumption and export. Ammonia, nitric acid, sulphuric acid and phosphoric acid are all made on site.

The Nitrogenous Fertiliser Industry (SA) (Aeval) company was founded by the Hellenic Bank for Industrial Development; production at its factory in Ptolemaie began in 1965. Ammonia manufacture is based on lignite; considerable controversy has been aroused by recent proposals to erect further units, using the same raw material. The final products are ammonium nitrate, calcium ammonium nitrate, or ammonium sulphonitrate, and ammonium sulphate. From 1965 the company has also produced ammonium nitrate and sulphuric acid.

Chemical Industries of Northern Greece (SA) was established in 1962 jointly by the National Bank of Greece, the Hellenic Chemical Products and Fertilisers Co. Ltd. and Pechinay-St. Gobain. Production began at Thessaloniki in 1966 and the factory was expanded in 1969. Nitric acid, ammonium nitrate, sulphuric acid, phosphoric acid and complex fertilisers are produced. Anhydrous ammonia is supplied by the Esso-Pappas factory.

Present and future fertiliser consumption

From 1960 to 1970 fertiliser consumption increased rapidly and, as irrigated areas are extended, the trend seems likely to continue during the next few years. The production of phosphoric and nitrogenous fertilisers is at present slightly higher than consumption and surplus is exported. Ammonia production is limited by difficulties in the supply of raw materials and the methods for meeting future demand are under discussion.

Status and capacity of fertilizer plants

Location and status	Start-up	Ownership	Capacity			Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)	
			Thousand tons per annum	Nutrient	Thousand tons per annum			
Bhopal Lipnate (Dr. Pirrama)	1909	Selleme Chemical Products and Fertilizer Co. Ltd. (SI)	SSP	260	P	...	50	
			Mixed fertilisers	100	N	...	...
	1965	Thosphoric Fertilisers Industry Ltd.	Complex fertilisers	130	P	...	...
			Sulphuric acid	500	K	...	...
			Ammonium phosphate	274	N	...	...
			...	...	N	...	70
	Solms	1965	Nitrogenous Fertiliser Industry SA Ave.	Ammonia	...	N
				Nitric acid	87.6	K
				Phosphoric acid	66	N
				Ammonium phosphate	250	N
Phates				...	N	...	...
Sulphuric acid				313	N	...	...
Ammonia				137	N	...	...
Nitric acid				199	N	...	...
Ammonium nitrate				185	N	...	...
AN				141	N	...	...
Ammonium sulphate nitrate	57	N	...	...		
Sulphuric acid	137	N	...	...		

are listed below

Location and State	Start-up	Ownership	Availability		Estimated total N (thousand tons per annum)	Estimated total P ₂ O ₅ (thousand tons per annum)
			Per annum	Nutrient		
Thomsonville	1962 (expansion 1967)	East Carolina Industries of Northern District	Ammonia	N	...	...
			Nitric acid	N	145	...
			Ammonia Nitrate	N	16	...
			Phosphoric acid	P	43.8	...
			Ammonium phosphate	P	...	...
			Sulphuric acid	S	335	...
Dayton	(planned)	Agri Chem Chemical Corporation (Livestock group)	Ammonia	N	365	...
			Nitric acid	N	247.5	...
			Ammonium Sulphate Nitrate	N	165	...
			Ammonium Nitrate	N	115.5	...
			Complex Fertilizers	F	594	...
			Phosphoric acid	P	58.4 to 73.0	...
Proctorville (Br. Pines)	planned 1974	Hollman Chemical Products and Fertilizer Co. Ltd. (S)	Phosphoric acid	P	...	...

Plants in the planning stages or under construction

HUNGARY

Consumption and production of fertilizers
Nutrients (tons per annum)

	Actual			Projected	
	1960/61 ^a	1965/66 ^b	1970/71 ^c	1975/76 ^d	1980/81 ^d
N					
Consumption	81 608	179 971	391 191	545 000	690 000
Production	56 991	148 800	350 286	503 000	740 000
Deficit	24 617	31 171	40 905	42 000	-
Surplus	-	-	-	-	50 000
P ₂ O ₅					
Consumption	71 891	124 655	217 015	380 000	520 000
Production	44 519	117 100	167 219	235 000	500 000
Deficit	27 372	7 555	49 796	145 000	20 000
Surplus	-	-	-	-	-
K ₂ O					
Consumption	13 547	52 813	228 951	440 000	590 000
Production	-	-	-	-	-
Deficit	13 547	52 813	228 951	440 000	590 000
Surplus	-	-	-	-	-

SOURCE: a/ FAO, Fertilizers, Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965) pp. 93, 97, 119, 125 and 150.

b/ FAO, Annual Fertilizer Review 1971 (Rome, 1972), pp. 67, 74, 104, 110 and 137.

c/ FAO, Annual Fertilizer Review 1971 (Rome, 1972), pp. 67, 74, 110 and 137; and information from FAO (1974) based on Government figures.

d/ Government of Hungary (1973).

Note: Calendar year referring to the first part of the split year.

General

Hungary, situated in the centre of the European continental land mass, comprises an area of 93,000 km² of which 51,000 km² comprises arable land and 13,000 km² pasture land. The population in 1971 10.35 million and the growth rate 0.3 per cent per annum.

During the past 20 years there has been a general trend towards more flexibility within the planned economy and a measure of decentralization was introduced in 1968 by the "new economic mechanism". The aim of this is the evolution of a socialist market economy in which industries largely decide for themselves what to produce, engage in competition in domestic and foreign markets, and share the profits among their workers.

AGRICULTURE

In Hungary, as in several neighbouring countries, output from the co-operatives has increased considerably over the past 10 to 25 years, although the proportion of the population engaged in agriculture is falling continually. The main crops are cereals, vegetables and fruit, but during the 1966-1970 Plan period particular emphasis was placed on livestock

farming. Pasturage was increased at the expense of the area under cereals, but the cereal crop was maintained by the use of high-yielding varieties and by an increased rate of application of fertilisers.

Natural resources and industry

Hungary is very poor in mineral resources. The only ones of any value being exploited at present are fairly recently discovered deposits of oil, natural gas and bauxite.

There are no phosphate, potassium salt or sulphur ore deposits. Phosphates are imported mainly from North Africa and the USSR, and potash from the German Democratic Republic and the USSR. During the most recent period of world sulphur shortage considerable difficulties were experienced in maintaining supplies, but recently a long-term sulphur agreement was signed with Poland.

Notwithstanding the lack of indigenous raw materials, light- and heavy-engineering industries have been established. The specific aims of the current economic plan (1971-1975) include the increased use of oil and natural gas as power sources, and of computers in industry. There are also plans to make Hungary one of the largest exporters of bauxite in Europe.

Fertiliser manufacture

There are three primary ammonia factories, all based on natural gas; these are the Pet nitrogen works, the Borsod Chemical Combine at Kocsinborsika, near Miskolc and the TVK at Leninváros.

The Pet Nitrogen Works, near Várpalota, with a capacity of 150,000-160,000 tons N per annum produces urea, nitrophosphates, calcium ammonium nitrate and some "technical" ammonium nitrate. During 1970, plans were confirmed for the expansion of this factory and contracts were signed for the erection of an ammonia plant to produce 300,000 tons N per annum, a urea plant, which will use about one third of the ammonia, and a nitrophosphate plant, which will use the remainder.

Also under construction is a complex at Pétváros (Péti Nitrogénművek), which will produce ammonia, urea, nitric acid and NPK fertilisers.

The Borsod Chemical Combine is at Kocsinborsika; it produces urea and prilled calcium ammonium nitrate.

The TVK (Tisza Chemical Combine) is situated beside the Tisza River at a location previously called Tiszapalkonya, but renamed Leninváros (Lenin City) in 1970. Prilled ammonium nitrate and some technical urea are produced there.

At the Budapest Chemical Works sulphuric acid and some single superphosphate are produced and at the Industrial Employees Works at Peremrét sulphuric acid and single superphosphate (about 250,000 tons per annum of 16-per-cent P_2O_5 material) are produced. At the latter works a plant for the manufacture of complexes by ammoniation - granulation of acid ammonium nitrate, single superphosphate and potassium chloride - was recently installed.

The largest phosphate fertilizer unit in Hungary is at the Tisza Chemical Works at Szolnok, where four sulphuric-acid plants are in operation, one with a capacity of 100,000 tons per annum (based on pyrites) and three with respective capacities of 110,000, 140,000 and 200,000 tons per annum (based on elemental sulphur). The total single superphosphate capacity is 500,000 tons of product per annum, in granular form; also, since 1969, about 75,000 tons per annum of a mixture of ammonium sulphate, 8:8:8, single superphosphate and potassium chloride has been produced. From 1972 the plant has manufactured mixed fertilizers (PK) - ratios 10:24.

Present and future fertilizer consumption

To date, fertilizer demand in Hungary has consistently exceeded output, but the planned additional capacity for higher-grade material should make possible further increases in consumption and a reduction in imports. The precise direction of future developments will depend on the results of negotiations among the CMEA countries.

STATUS AND CAPACITY OF FERTILIZER PLANTS

Location and status	Start-up	Ownership	Product	N P K			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				Thousand tons per annum	Element	Thousand tons per annum		
Bot, near Mariposa	...	Felt Nitro-Gen Works (old plant)	Ammonia	185	N	152	160	20
			Ammonium nitrate (technical)	10	N	3		
			Nitrophos-phates	110	P	22		
			CAS (27%)	200	N	60		
			Urea	100	N	46		
			Nitric acid	170	N			
Kasimbareika near Maholic	...	Borody Pevyi Kombinat	Ammonia	160	N	131	150	-
			Nitric acid	175	N			
			CAS (27%)	200	N	60		
			Urea	100	N	46		
Kasimbareika expansion	...	Borody Pevyi Kombinat	Ammonium sulphate	30	N	6		
TK, Leningrad	...	Tiens Chemical Combine	Ammonia	240	N	198	200	-
			Nitric acid	430	N			
			Ammonium nitrate	400	N	164		
			Urea	12	N	5		
Budepost	...	Budepost Chemical Works	SNP	250	P	45	-	30
			Salphuric acid	50				
Permyrton	...	Industrial Employees Works	SNP (10%)	250	P	45	-	45
			Mixed fertilizers	250	NPK	75		
			Salphuric acid	...				

Table (continued)

Location and status	Start-up	Ownership	C.A.P.A.C.I.T.Y.		Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
			Product	thousand tons per annum		
Seolmok	...	Tisse Chemical Works	SSP (granulated)	500	3	90
			Mixed fertilizers	75	NPK	22
			Sulphuric acid	550		
<u>Plants under consideration of construction</u>						
P&Gardo, near Pet (Pet Rea h.)	1975-1977	Peti Nitrogen Mixek (new plant)	Ammonia	330	N	270
			Urea	200	N	92
			Nitric acid NPK	400	N	
			(2 : 1 : 1)	900	N	176
			(1 : 1 : 1)		K	80
						90

MALTA

Consumption and production of fertilisers
Nutrients (tons per annum)

		Actual			Projected	
		1960/61 ^{a/}	1965/66 ^{b/}	1970/71 ^{b/}	1975/76	1980/81
N	Consumption	545	323	539	...	...
	Production	-	-	-	-	-
	Deficit	545	323	539	...	...
	Surplus	-	-	-	-	-
P ₂ O ₅	Consumption	-	27	27	...	...
	Production	-	-	-	-	-
	Deficit	-	27	27	...	...
	Surplus	-	-	-	-	-
K ₂ O	Consumption	-	23	23	...	...
	Production	-	-	-	-	-
	Deficit	-	23	23	...	...
	Surplus	-	-	-	-	-

Sources: a/ FAO, Fertilizers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), p. 100.

b/ FAO, Annual Fertilizer Review, 1971 (Rome, 1972), pp. 75, 110 and 137.

Note: Statistics given are on a fertiliser-year basis.

General

Malta, with an area of 320 km², is situated in the central Mediterranean Sea and enjoys a warm and equable climate. Its population in 1971 numbered about 330,000 inhabitants. Mineral resources are few. An intensive programme of industrial development was introduced recently. Products now being exported include textiles, foot-wear, chemicals and plastics.

Fertilizer production

No chemical fertilizers are manufactured.

Fertilizer consumption

Present and future requirements of fertilizers, which are not large, are all met by imports; these include ammonium sulphate, ammonium nitrate, single superphosphates and complex fertilizers.

In 1971/72 approximately 1,911 tons N, 15 tons P₂O₅ and 226 tons of other kinds of fertilizer were consumed.

During the last few years efforts have been made to extend the area of arable land available - which at present amounts to 16,000 ha, including land under permanent crops^{1/} - and to persuade the farmers to use more concentrated and complex fertilizers instead of ammonium sulphate. These efforts are already showing results.

^{1/} FAO Production Yearbook, 1971, vol. 23 (Rome, 1972), p. 3.

POLAND

Consumption and production of fertilizers
Nutrients (tons per annum)

		Actual			Projected	
		1960/61 ^{a/}	1965/66 ^{b/}	1970/71 ^{b/}	1975/76 ^{c/}	1980/81 ^{c/}
N	Consumption	274 000	433 200	823 100	1 250 000	1 500 000
	Production	270 000	394 478	1 029 879	1 526 000	1 700 000
	Deficit	4 000	38 722	-	-	-
	Surplus	-	-	206 779	276 000	200 000
P ₂ O ₅	Consumption	209 200	353 789	635 800	1 000 000	1 250 000
	Production	206 073	334 753	599 238	982 000 ^{d/}	...
	Deficit	3 127	9 036	36 562	18 000	...
	Surplus	-	-	-	-	...
K ₂ O	Consumption	311 400	515 832	1 115 000	1 550 000	1 750 000
	Production	-	-	-	-	-
	Deficit	311 400	515 832	1 115 000	1 550 000	1 750 000
	Surplus	-	-	-	-	-

Sources: a/ FAO, Fertilizers. Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 93, 97, 119, 125 and 150.

b/ FAO, Annual Fertiliser Review 1971 (Rome, 1972), pp. 68, 75, 104, 110 and 137.

c/ J. Sigonides and S. Byrdy. (ID/WG.127/14). See: General References for all countries. ^{d/}Including ^{d/} provided by the Government of Poland.

Note: Production refers to calendar year. Consumption of phosphate includes ground-rock phosphate.

General

Poland is situated in Eastern Europe and is bordered by Czechoslovakia, the German Democratic Republic and the USSR; its northern coastline is on the Baltic Sea. The country covers an area of 313,000 km², of which 150,000 km² comprises arable land and 42,000 km² pasture land. The population is 32.6 million and the growth rate 1 per cent per annum.

Agriculture

The organisation of its agriculture distinguishes Poland from the other CMEA countries. There has been some consolidation of small, inefficient holdings; however, 86 per cent of agricultural land is still privately held. Agricultural education and services are good. The main crops are cereals, potatoes and sugar-beet; considerable quantities of meat products are exported.

Natural resources and industry

There are good reserves of high-grade coal and natural gas and some oil is produced, although much larger amounts are imported. Other valuable ores are non-ferrous metals, especially copper and sulphur. Phosphate rock, for direct application to the soil after grinding, is produced indigenously but all the ore required for the manufacture of synthetic phosphate fertilizers is imported, mainly from North Africa. All the potassium for fertilizers is also imported, mainly from the USSR. A deposit of potassium at Klodawa has been the subject of considerable study for several years but it is not likely to be exploited in the foreseeable future owing to difficulties encountered in processing the ore.

The main industries are textiles, engineering, steel, cement, chemicals and foodstuffs.

Fertiliser manufacture

At Torzów a small lignite-based works, which produces calcium cyanamide, is in operation. The total capacity is about 60,000 tons of nitrolime (bulk) per annum and most of the output is used industrially.

The Nitrogen Fertilizer Works, at Mosice, near Łódź, has a total capacity of about 1,000,000 tons N per annum and is based on indigenous natural gas. The present capacity of the Jedzierzyn Nitrogen Fertilizer Works is about 250,000 tons N per annum (430,000 tons NH_3). Both of these works produce ammonium nitrate, calcium ammonium nitrate and urea.

Pulawy Nitrogen Fertilizer Works, also based on indigenous natural gas, is claimed to be the world's largest producer of fertilizer-grade ammonium nitrate. Pulawy I has five ammonia and urea lines, with a capacity of about 2,000,000 tons N per annum each; Pulawy II has three lines of ammonia for processing into saltpetre. The total output of fertilizer, expressed in N_2 as NH_3 , is 1,000,000 tons.

At the beginning of June 1967 the ground was broken at Włocławek for the country's fifth nitrogen factory, to be based on natural gas imported from the USSR. The start-up was originally planned for 1967, but there were serious construction delays and difficulties, so that production did not begin until 1972.

The national output of nitrogen fertilizers rose from less than 80,000 tons N in 1950 to over 1 million tons N in 1967. The chief products were ammonium nitrate and calcium ammonium nitrate.

The relative importance of urea and complexes is now increasing rapidly, and these products will probably account for the major part of the planned 1,700,000 tons N output in 1980. Minor products of decreasing importance are calcium and sodium nitrates. Ammonium sulphate will probably continue to be obtained at the present rate (about 60,000 tons N per annum) or higher, as a byproduct of coking operations and the manufacture of caprolectan.

Poland has old established superphosphate factories at Lubon, Torun, Szciescin and Gdansk, but the largest and most modern is at Łódź (Silesia), the centre of the sulphur-mining industry, where the capacity is about 160,000 tons P_2O_5 per annum. All these plants include on-site sulphuric acid plants.

At Gdansk, a completely new factory for the manufacture of sulphuric acid, phosphoric acid and triple superphosphate has been built and was started up in 1969. Commissioning of the phosphoric-acid plant was especially difficult, but all the units are now operating satisfactorily.

Sulphuric-acid and phosphoric-acid plants also came on stream during 1971 at the new Police Works, near Szczecin, where Poland's first ammonium phosphate plant is now in operation. The ammonia used is brought from other works.

Present and future fertilizer consumption

The consumption of all types of fertilizer has risen rapidly during the past 20 years and this trend is expected to continue in the foreseeable future. The output of nitrogen fertilizer is rising rapidly and official plans allow for an exportable surplus of about 300,000 tons N in 1975. The production of phosphate fertilizers is not increasing as quickly and a small deficit is envisaged for 1975. The subsequent structure of the phosphate industry will depend largely on the results of Poland's efforts to valorize her sulphur resources as advantageously as possible.

Status and capacity of fertilizer plants

Location and status	Start-up	Ownership	Product	Capacity		Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				Thousand tons per annum	Nutrient		
Borsbe, near Katowice	1922	Nitrogen Fertiliser Works	Calcium cyanamide	...	N	60	-
			Ammonia Nitric acid CAN	... ... ...	N N N	... 54 ...	-
Kedzierzyn	1954	Nitrogen Fertiliser Works	Ammonia Nitric acid CAN (25%)	430	N N N	250	-
			Ammonium nitrate Urea	... ...	N N	... ...	-
Pulawy I	1966/67	Nitrogen Fertiliser Works	Ammonia Urea	547.5 912.5	N N	650	-
			Ammonia Nitric acid Ammonium nitrate (33-34.8%)	547.5 ... 1 204.5	N N N	... ... ...	-
Pulawy II	1968/69	Nitrogen Fertiliser Works	Ammonia Nitric acid Ammonium nitrate (33-34.8%)	547.5 ... 1 204.5	N N N	...	-
			Technical nitrogen	...	N	...	-
Omskica, near Katowice	1958	Nitrogen Fertiliser Works	Technical nitrogen	...	N	...	-
Tarnobrzeg	...	Chemical Mining Complex	SSP Sulphuric acid	... ...	P	... 160	-

Table (continued)

Location and status	Start-up	Ownership	Product	C A P A C I T Y			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				thousand tons per annum	Nutrient	thousand tons per annum		
Erivassie near Wloclawek	1966-1971	Nitrogen Fertiliser Works	Ammonia	...	N	408.3	-	
			Nitric acid	594	N	...	400	
Luben	...	...	Ammonium nitrate	772.6	N	...	60
			Aqua ammonia	...	N	...	60	
Torun	...	...	SSP	...	P	...	100
			SSP	...	P	...	...
Police, near Sucecisia	1971	Chemical Works	SSP	...	P	...	...
			Complex fertilisers	110	N	...	...
Zelenka	1969	...	Phosphoric acid	220	P	...	136	
			Ammonium phosphate (1962 and 45SP)	110	N	...	...
Krasno	...	Bomarka Works	Salphuric acid	400	P	...	80	
			SSP	...	P	...	...
Krasno	...	Bomarka Works	Phosphoric acid	...	P	...	...
			TSF	297	P	...	...
Krasno	...	Bomarka Works	Salphuric acid	400	P	...	...
			"Superton-adyra"	...	P	...	...

(expanded to 1 million tons in 1972)

Table (continued)

Location and status	Start up	Ownership	Capacity			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
			Product	thousand tons per annum	Nutrient		
Machine, near Tarapur	1927-1929	State Nitrogen Works	Ammonia	...	N	...	160
<u>Plants planned or under implementation</u>							
Kedsteriya-expansion	1974-75	Nitrogen Fertiliser Works	Ammonia	...	N	206	206
Tolice-expansion	1975	Chemical Works	Phosphoric acid	110	P	...	...
			Complex fertilisers (8:24:24)	450	N P K	...	...
			Ammonium phosphate	250	N P	...	...
			DAP	496	N P	...	...
Chemical-expansion	1975	...	NPK fertilisers (high analysis)	150	N P K	...	...
Chemical, near Tarapur-expansion	1975	State Nitrogen Factory	UAN	...	N	...	...

ROMANIA

Consumption and production of fertilizers
Nutrients (tons per annum)

	Actual			Forecast	
	1960/61 ^a	1965/66 ^b	1970/71 ^c	1975/76 ^c	1980/81 ^c
N					
Consumption	27 500 ^a	144 500	366 900	1 419 800	1 930 000
Production	18 900	166 307	646 917	1 921 800	2 500 000
Deficit	8 560 ^a	-	-	-	-
Surplus	-	21 807	280 017	502 000	600 000
P₂O₅					
Consumption	52 100 ^a	110 100	203 200	126 000	1 000 000
Production	52 081	126 465	244 176	726 000	1 000 000
Deficit	19 ^a	-	-	-	-
Surplus	-	16 365	40 976	-	-
K₂O					
Consumption	4 000	11 800	24 000	150 000	130 000
Production	-	-	-	75 000	170 000
Deficit	4 000	11 800	24 000	75 000	160 000
Surplus	-	-	-	-	-

Source: ^a FAO, Fertilizers: Annual Review of World Production, Consumption, Trade and Prices, 1965 (Rome, 1965), pp. 93, 97, 119, 125 and 150.

^b FAO, Annual Fertilizer Review 1971 (Rome, 1972) pp. 69, 75, 104, 111 and 118.

^c Government of Romania.

Note: Calendar year referring to the first part of the split year.

General

Romania is a country situated in south-east Europe with a short coastline on the Black Sea. The total area is about 238,000 km², of which 9,600 km² (980,000 ha) comprise arable land and 1,400 km² (140,000 ha) pasture land. In 1971 the population was 20.7 million, with a growth rate of 1 per cent per annum.

Agriculture

Until 1965 Romania was essentially a country of peasant agriculture, but in the last years great efforts have been made, by chemization and mechanization, to reduce the proportion of the population employed in farming, and to increase productivity.

More than 90 per cent of the agricultural land is occupied by:

(a) State agricultural enterprises which, in 1971, totalled 200 and covered over 8 million ha of farm land;

(b) Agricultural production co-operatives which, in 1971, totalled 4,604 and covered an area of over 9 million ha.

About 9.3 per cent of the total agricultural area, in mountainous regions where mechanization would be difficult, is still occupied by individual farmers.

The precipitation is plentiful and is high for Europe. In the whole continent Romania has the fourth largest arable area, the fourth highest wheat production and the second highest maize production. The climate tends to be continental, with hot summers and cold winters, and is also rather unevenly distributed. For several years considerable emphasis has been placed on the construction of irrigation installations but this, along with much other work, has been a very setback in the disastrous floods of 1970. However, very high capital investments in agriculture (15% of GDP) are budgeted in the current national plan (1971-1975).

The main crops are cereals, potatoes, sugar-beet, sunflower seeds and fruit, especially apples.

Natural resources and industry

Romania has the largest deposits of oil in the world to be exploited industrially and the second largest deposits of natural gas were discovered. The present output is over 10 million tons of oil and 10 billion cubic meters of gas.

There are also large deposits of iron pyrites and non-ferrous metal sulphides, but especially phosphates and some sulphur deposits have been located in the Carpathian Mountains and in the Transylvania. Reeds from the Danube Delta are harvested and used in the production of cellulose.

The main industries include oil and natural gas extraction and processing, mining and metallurgy, mechanical engineering, the production of chemicals, the processing of timber and agricultural products, and consumer goods.

Fertilizer manufacture

At present there are six nitrogen fertilizer works in operation, all based on natural gas. A further six nitrogen and sulphur fertilizer works are expected to come on stream by 1975. These are to be built at Craiova, Turco Magurele, Figea Barce and Arad.

Production of calcium nitrate at the Victoria Chemical Combine began in 1969, but this is a very small works. The Victoria Chemical Combine includes units for nitrogen fertilizers (calcium, ammonium and urea), especially as calcium nitrate.

The Petro-Nitrogen Fertilizer Combine has a production capacity of about 4,000 tons N per annum in the form of ammonium nitrate and technical-grade urea. A further ammonia plant with a capacity of 20,000 tons N per annum came into operation in the middle of 1970.

At Turco Magurele, 10,000 tons N per annum in the form of AN and urea are produced.

A further ammonia plant is to be built in phosphite line, with a capacity of 20,000 tons N per annum, which is to be built and is due to be on stream by 1974. This factory will also produce 4,000 tons P₂O₅ per annum and 1,000 tons K₂O per annum.

The total capacity of the Craiova factory is 10,000 tons N per annum. The final products are calcium nitrate and urea. A nitrophosphate plant, to produce 20,000 tons N per annum, is planned to be created by 1975. This will be similar to the one at Figea Barce.

The factory at Turnu Magurele, on the banks of the Danube, was one of the first producers of ammonium phosphate in a country of the COMECON. Urea and ammonium nitrate are also manufactured, the total capacity being about 375,000 tons N per annum. The whole output of three phosphoric-acid plants, producing 100,000 tons per annum each, is used in the production of phosphate acid. A nitrophosphate plant, producing 250,000 tons N per annum, and similar to the one under construction at Tirgu Mures, is planned to be erected by 1975.

A new nitrogen fertiliser factory was due to be commissioned in the middle of 1973 at Sibovia. The capacity of this factory in the first section is to be 240,000 tons N per annum in the form of ammonium nitrate and urea.

At Ired an ammonia/nitric acid/nitrophosphate project, with a capacity of 270,000 tons N per annum, is planned for 1975. This plant, similar to the one at Tirgu Mures, may be doubled in size later.

Preliminary plans are now being made to erect a new project at Tecuci after 1975.

One of the three phosphate fertiliser factories at present in operation, namely Turnu Magurele, has already been mentioned. The other two, at Valca Calugareasca and Navdaru, produce sulphuric acid and some quantities of single superphosphate. Valca Calugareasca has a small phosphoric-acid plant producing 14,000 tons P_2O_5 per annum. The output is used in the manufacture of technical salts. At both factories further phosphoric-acid capacities of about 10,000 tons P_2O_5 per annum were on stream by the end of 1972, the product being used to make triple superphosphate.

Present and Future Fertiliser Consumption

Although the consumption of fertilisers in Romania has risen rapidly over the past 20 years it has not yet reached the target levels set by the Ministry of Agriculture. The consumption rate, in kilograms per hectare, is restricted by inefficiency in production and by inadequate storage and distribution facilities; it is also subject to very wide variation, the average difference between State and co-operative farms, for example, being 2.5:1.0.

However, as stated above, massive capital investments in agriculture are to be made in the current five years, and a continuous increase in consumption seems assured.

STATUS AND CAPACITY OF FERTILIZER PLANTS

Location and status	Start-up	Ownership	A.P.A.C.A.I.F.			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
			Thousand tons per annum	Nutrient	Thousand tons per annum		
Victoria	1973	Chemical Combines	...	N	...	20	
			...	N	...		
Paraguay	1960	Chemical Combines	100	N	82	60	
			165	N	60		
Plata River	1963 1973	Integrates Fertilizer Combines	432	N	365	284	
			250	N	86		
			300	N	138		
Uruguay	1964 1969	Chemical Combines	500	N	410	389	
			590	N	205		
			600	N	384		
Tripa River	1965 1968	Chemical Combines	690	N	600	398	
			750	N	260		
			300	N	138		
Paraná Regional	1964 1966 1969	Chemical Combines	500	N	490	385	
			300	N	303		
			500	N	230		
				P	120	120	
			600	N	52		
				P	120		

Table (continued)

Location and status	Start-up	Company	Estimated total P (thousand tons per annum)					Estimated total P (thousand tons per annum)
			Product	Estimated per annum	Estimated	Estimated	Estimated	
Bales Chalchicomula	1970 1972	Chemical Oxidation	SP Phosphoric acid	120	P	22	97	
			TP Sulphuric acid	150	P	60		
				430	P	75		
Boulders	1962 1972	Chemical Oxidation	SP Phosphoric acid	250	P	65	150	
			TP Sulphuric acid	120	P			
				385	P	153		
			600					
Phosphoric acid plants under construction								
El Estero	1973	Chemical Oxidation	Ammonia Ammonium nitrate plant	300	H	267	260	
				300	H	102		
				300	H	138		
Areal	1975	...	Ammonia Nitrophos- phates	300	H	250	100	
				600	P	100		
					K	35		
Teruel	after 1974	...	Ammonia Sulphur fertil- izers (nitrophos- phates)	300	H	250	100	
				500	K	100		
					K	35		

Table (continued)

Location and status	Start-up	Ownership	Product	C.A.P.A. C.I.T.Y.			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				thousand tons per annum	Nitrate	thousand tons per annum		
Oralovo	1975	Chemical Combine	Nitrophosphates	250	N P	250	100	
Tirgu Mures	1974	...	Nitrophosphate	800	N P K	250	100	
Burma Magarele	1975	Chemical Combine	Ammonia Complex fertilizers (nitrophosphates)	300	N	247	100	
				800	N P K	250	100	
						35		

SPAIN

Consumption and production of fertilizers
Nutrients (tons per annum)

		Actual			Projected	
		1960/61 ^{a/}	1965/66 ^{b/}	1973/74 ^{c/}	1975/76 ^{d/}	1977/78 ^{e/}
N	Consumption	275 206	324 720	540 100	826 000	925 000
	Production	109 653	322 611	579 600	...	...
	Deficit	165 553	62 109	-	...	...
	Surplus	-	-	39 500	...	...
P ₂ O ₅	Consumption	279 381	305 522	428 600	580 000	640 000
	Production	299 115	316 615	487 000	...	...
	Deficit	-	-	-	...	...
	Surplus	19 734	11 093	58 400	...	...
K ₂ O	Consumption	95 042	92 117	205 975	371 000	415 000
	Production	264 966	404 011	524 927	1 640 000	...
	Deficit	-	-	-	-	...
	Surplus	169 924	311 894	318 952	1 269 000	...

Sources: a/ FAO, Fertilizers, Annual Review of World Production, Consumption, Trade and Prices, 1964, (Rome, 1965) pp. 93, 97, 119, 125, 148 and 150.

b/ FAO, Annual Fertilizer Review 1971 (Rome, 1972) pp. 68, 75, 111, 134 and 135.

c/ FAO, Annual Fertilizer Review 1971, pp. 68, 75, 111, 134 and 135; and revised FA figure (1974).

d/ J. N. Chavarría, "Previsiones Técnicas y Económicas sobre la Industria Española de Fertilizantes en la Década 70", Ingeniería Química (Bajío, México, Mar. 1974) pp. 1-10.

Note: Statistics given are on a fertilizer-year basis.

General

Spain occupies the greater part of the Iberian Peninsula in south-west Europe. It is a mountainous country which with the Balearic and Canary Islands, covers 505,000 km²; of this area, 199,000 km² comprises arable land and 210,000 km² pasture land. In 1971 the population was estimated at approximately 34.13 millions, with a growth rate of 1.1 per cent per annum. In 1970 the GNP was estimated at 2,258 billion pesetas. The climate is continental, with hot summers and at times very cold winters, especially in the hilly interior of the Peninsula.

Agriculture

Farming is the traditional way of life for 30 per cent of the active population. It was typified until recently by very small plots, mainly in the north, which could not be worked efficiently, and large plots in the south.

However, in 1971 two Land Reform Laws were passed that (a) impose sanctions against landowners who do not improve their estates, as prescribed by the Ministry of Agriculture, and (b) provide credit for tenant farmers who wish to buy or improve their holdings.

Topography, climate and traditions vary widely in different parts of the country; for example, the Valencia district has a temperate climate and well irrigated soil, while in the north the climate is extreme and water is scarce; the north and north-west are characterized by a wet climate and frequent rainfall. Fertilizer application rates vary according to area.

The main crops are cereals, fruits, vegetables, olives and cork.

Natural resources and industry

Mineral deposits exploited in Spain include coal, iron and non-ferrous metal ores; offshore, near Tarragona, oil started flowing in 1973. The large pyrites deposits provide all the raw material required for the country's manufacture of sulphuric acid - over 2 million tons per annum - which also provide a considerable surplus for export. There are no exploitable oil or gas deposits, but variable quantities of sulphur are recovered at the oil refineries.

Large potash deposits are worked in Barcelona and Navarra provinces and Spain is a major exporter of potash. Potassium sulphate is manufactured at seven plants.

Two domestic phosphate deposits have also been investigated. At Extremadura, on the border with Portugal, the ore is very hard - perhaps suitable for road-building. At Sierra de Espuña, in Murcia province, the ore, though more friable, has a low phosphate content but is high in calcium carbonate, iron and aluminium. A high-grade phosphate-rock deposit discovered in the neighbourhood of BuCraa, in the Spanish Sahara, now beginning to be exploited, is expected to revolutionize the Spanish phosphate fertilizer industry. Most of this industry is in private hands, but a publicly owned corporation, the Instituto Nacional de Industria (INI), finances and administers quite a large number of undertakings in the national interest. This corporation owns all the shares of Fosfatos de BuCraa SA, the company expected to valorize the Spanish Sahara phosphate. It is expected that about 1 million tons of concentrate will be produced during the first year of operation and that output will rise to 6 or 8 million tons per annum.

The main industries are building, chemical and mechanical industries, and especially ship-building. Tourism also makes a considerable contribution to the national economy.

Fertiliser manufacture

In the past few years a certain amount of rationalization of the Spanish nitrogen fertilizer industry has taken place, with the closing down of some small, old plants based on light or electrolytic hydrogen. Coke-oven gas and coal, treated by partial oxidation or gasification processes, are still used, but 80-85 per cent of the feed is now naphtha.

Phosphate-fertilizer production is still carried out, mainly in a large number of small, single superphosphate works, but the industry is gradually being restructured to consist of fewer and larger factories. More concentrated and complex products are also being produced, and all of these trends will surely be increased by the development of Fosfatos de BuCraa.

Most of the works are located in several well-defined groups, mainly around the coast, as shown below:

Barcelona-Tarragona area

In this area there are two small factories, the Hidro Nitro Española SA and Industrias Químicas de Tarragona SA, which produce mainly ammonium sulphate and complex fertilizers.

Three companies also own single superphosphate and complex fertilizer works in the area, namely, SA Cros, in Badalona, is one of the major producers, with several works in different parts of the country, and Establecimientos Gaillard SA, and Barrau y Cía, both in Mongat.

Recently, Hidro Nitro Española, SA, Gaillard SA and Barrau y Cía were integrated in a single company named Catalana de Abonos SA, 66 per cent of which is owned by Unión Explosivos Río Tinto SA (ERT), the main fertilizer and chemical-producing company in Spain - itself formed by amalgamation between Unión Española de Explosivos and Cía Española de Minas de Río Tinto. It was announced late in 1972 that Catalana de Abonos had signed a contract for the erection in this area of a 99-per-cent nitric-acid plant to produce 1,000 tons per day. All the output from this plant is to be used for fertilizer manufacturing. The start-up was scheduled for the end of 1973.

Castellón de la Plana

A factory of Fertilizantes Iberia SA (FERTIBERIA) exists here. This is owned jointly by the Banco de Bilbao and the Gulf Oil Company. It produces nitric acid, ammonium nitrate and complex fertilizers. There is also a single superphosphate plant belonging to Industrias Químicas Canarias SA.

Valencia

SA Cros and Industrias Químicas Canarias own single superphosphate and potassium-sulphate factories in this region. The second company produces complex fertilizers and dicalcium phosphate at the same location.

Cartagena

At Cartagena the Refinería de Petróleos de Escombreras (REPESA), 50 per cent of which is owned by INI, has a refinery and a nitrogen fertilizer works with a capacity of 218,000 tons per annum. The final products are ammonium sulphate and urea. Nearby is the factory of Abonos Complejos del Sureste SA (ASUNSA), a joint subsidiary of REPESA and ERT. This works receives intermediates (ammonia and sulphuric acid) from the two parent companies and manufactures nitric acid, ammonium sulphate-nitrate and nitrosulphates, as well as complex fertilizers.

In the same area Unión Explosivos Río Tinto has another factory which produces single superphosphate, dicalcium phosphate, potassium sulphate and a sulphuric-acid plant is planned with a capacity of 250,000 tons per annum.

Málaga

Ammoníaco Español SA (AMONESA), formerly owned by Esso and recently bought by Repsol, produces ammonia, ammonium sulphate, nitric acid and calcium ammonium nitrate, with a total capacity of 200,000 tons per annum.

In the same area Proquiter, owned by ERT and SA Cros, operates a plant for the production of simple superphosphate.

Seville

Abonos Sevilla SA, now integrated into the ERT group, has a factory at Tablada, near Seville, which produces simple superphosphate, triple superphosphate, nitric acid, ammonium nitrate, CAN, ammonium sulphate and complex fertilizers.

Indián Explosivos Río Pinto (ERT) has awarded contracts for an ammonia-urea complex to be constructed at Seville and to be completed in 1975. The capacities will be 100,000 tons per annum of ammonia and 165,000 tons per annum of urea.

Nearby is the San Jerónimo works of SA Cros, which, in 1961, was the first factory in Spain to produce phosphoric acid. Its capacity is about 18,000 tons P_2O_5 per annum; the whole output is used captively in the manufacture of triple superphosphate.

Badajoz

This is a major centre for mining pyrites and for the sulphuric-acid and fertilizer industries. A Badajoz plant produces ammonia, urea, phosphoric acid and monoammonium phosphate (MAP), while Fósforic Español SA (a joint subsidiary of ERT and SA Cros) has a sulphuric acid plant with a capacity of 200,000 tons P_2O_5 per annum. A contract was signed recently for the construction of a third plant to produce 100,000 tons P_2O_5 and to become on stream in 1974. This will take the form of concentrated phosphoric acid to be used in the production of MAP and DAP. The plant is expected to start up in 1974 and will include a rock-grinding unit, production units for weak and concentrated phosphoric acid, and sulphuric acid storage units.

In the meantime the actual capacity of MAP will be 300,000 tons per annum. A new unit for the production of DAP (capacity 120,000 tons per annum) is under construction at present. The start-up date is expected to be the end of 1973.

Fósforic Español is also planning a sulphuric acid plant with a capacity of 380,000 tons per annum at Badajoz. Its start-up was scheduled for the end of 1973.

Recently, the Indían Explosivos Río Pinto announced the erection of two new plants for the production of ammonia and urea, both to be located in this area.

Valencia

An ammonia plant, situated in the Refinería and owned by Fertilizantes Inter SA, is located here. Nearby is a plant, owned by SA Cros, for the production of simple superphosphate.

Empres Nacional de Sales S.A. (ENAS), 60 per cent of which is owned by the Instituto Tecnológico de Valencia, has a small plant that manufactures ammonia from lignite

and ammonium nitrate and CAN at Fuentes de G. Rodriguez in La Coruña Province. The total output of the complex is about 21,000 tons N per annum.

FERTIBERIA is also considering building a plant at La Coruña to produce 180,000 tons per annum of ammonia.

Asturia Province

Empresa Nacional Siderúrgica de Avilés SA (ENSIDESA), 91% owned and controlled by INI, has two coke-oven gas-based plants with capacities of 90,000 tons N each per annum at Avilés. The final product is CAN.

ENSIDESA is installing a plant at Avilés to produce 43,000 tons of ammonia per annum.

The Sociedad Ibérica del Nitrógeno SA (SIN) had a small, coke-oven gas-based ammonia plant that started up in 1968. This was closed down in 1970. Ammonia is now brought in for the works at La Felguera. There are three lines here for the production of nitric acid and one for sulphuric acid; the final products are ammonium sulphate, ammonium nitrate, CAN and complex fertilizers (mainly 15:15:15).

Real Compañía Asturiana de Minas and ERT also have a superphosphate plant in this region.

Bilbao

The Sociedad Española de Fabricaciones Nitrogenadas (SEFANITRO) has a nitrogen works at Luchana, in the Bilbao area, based on coke-oven gas from the Altos Hornos de Vizcaya plant. The final products are ammonium sulphate and ammonium sulphate nitrate. SEFANITRO has awarded a contract for the construction of a plant at Bilbao to produce 118,000 tons per annum of nitric-acid. It is expected that in the near future a second contract will be awarded for a plant to produce 182,500 tons per annum of CAN; this is to be completed about the middle of 1974.

The ERT has a superphosphate and complex fertilizer plant here and Industrias Químicas Canarias owns a superphosphate and potassium sulphate plant in the area.

Valladolid

To serve this major cereal-growing area a private company, Nitratos de Castilla SA (NICAS), was founded and a nitrogen fertilizer works built. Based on naphtha, it has a capacity of about 45,000 tons N per annum, mainly in the form of CAN.

Puertollano

The NICAS has a nitrogen works here, which is adjacent to its own refinery and petrochemical complex. Its capacity is about 165,000 tons N per annum. The final products are ammonium sulphate, ammonium nitrate and urea.

Industrias Químicas Canarias has several superphosphate plants on the Canary Islands and on the mainland, while its joint subsidiary with Compañía Española de Petróleos and SA Cros - the Compañía Insular del Nitrógeno SA (CIISA) - has a plant in Las Palmas for the manufacture of ammonia, sulphuric acid, ammonium sulphate and mixed fertilizers.

Present and future fertiliser consumption

It appears that the rate of growth of fertilizer consumption in Spain will increase quite markedly over the next few years, in accordance with the increased general prosperity in the country. Combined with the large tourist influx, food requirements will increase considerably; rationalization of the fertilizer industry will result in greater efficiency and economy. The availability of large amounts of high-grade phosphate rock from the Spanish Sahara will also be a great asset to the fertilizer industry in Spain.

Status and Capacity of Fertilizer Plants

Location and status	Start-up	Ownership	Product	Capacity			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				thousand tons per annum	Nutrient	thousand tons per annum		
Barcelona/Tarragona area	...	Hidro Nitro España SA	Ammonium sulphate	...	N	...	...
			Complex fertilisers	...	N	...	...
Barcelona/Tarragona	...	Industrias Químicas de Tarragona SA	Ammonium sulphate	...	P	...	...
			Complex fertilisers	...	K	...	...
Badalona	...	SA Oros	Superphosphates	...	N	...	...
			Complex fertilisers	...	K	...	...
Borçat	...	Establecimientos Tallard SA	Superphosphates	...	N	...	...
			Complex fertilisers	...	K	...	...
Borçat	...	Barran y Cia	Superphosphates	...	N	...	...
			Complex fertilisers	...	K	...	...
Barcelona/la Plana	...	Fertilizantes Iberia SA	Nitric acid	...	N	...	...
			Ammonium nitrate	...	N	...	...
Barcelona/la Plana	...	Industrias Químicas Anarias SA	Complex fertilisers	...	N	...	...
			Single superphosphate	...	K	...	...
Barcelona/la Plana	...	SA ROS	Superphosphates	...	N	...	...
			Complex fertilisers	...	K	...	...
Barcelona/la Plana	...	Industrias Químicas Anarias SA	Complex fertilisers	...	N	...	...
			Single superphosphate	...	K	...	...
Barcelona/la Plana	...	Industrias Químicas Anarias SA	Complex fertilisers	...	N	...	...
			Single superphosphate	...	K	...	...

Location and status	Start-up year	Company	C.A.F.A. C.I.T.Y.			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
			Product	Thousand tons per annum	Nutrient		
Baelve	1966-1970	Fertilizantes Iberia SA	Ammonia	...	N	35	...
			Urea	75	N	...	...
			Phosphoric acid	41.9	P	...	...
			Ammonium phosphate (11:5:1)	...	P	...	...
			Complex fertilizers	122	N	...	...
Nueva	1972	Fosfórico Espanol SA	Phosphoric acid	...	N	32	305
			Ammonium phosphate	...	N	...	...
La Zarza	...	Fertilizantes Iberia SA	Ammonia	1.8	N	12	...
			Superphosphates	...	N	...	...
La Zarza	...	SA Urea	Ammonia	...	N	...	...
			Ammonium nitrate	...	N	21	...
Puentes de J. Rodriguez	...	Empres Nacional Salvo Sotelo SA	Ammonia	...	N	...	...
			Ammonium nitrate	...	N	...	...
Arriba, Asturias Province	1964-1971	Empres Nacional Siderurgica de Asturias SA	Ammonia	4.8	N	14	...
			Complex fertilizers	120	N	...	...
La Polguera	1969	Sociedad Iberia de Fertilizantes SA	Ammonia	...	N	...	...
			Nitric acid (70% min)	...	N	...	...
			Superphosphate	...	P	...	...
			Ammonium sulphate	...	N	...	...
			Ammonium nitrate	...	N	...	...
Las Pias Asturias Province	...	Sociedad Iberia de Fertilizantes SA	Ammonia	...	N	...	...
			Complex fertilizers	...	N	...	...

Notes: ...
 ...
 ...

Table A - continued

Location and status	Start-up year(s)	Product	C.A.S.A.S.I.L.L.			Estimated total, in thousand tons per annum	Estimated total, in thousand tons per annum
			Per annum	Duration	Per annum		
Chicago	1974	American Republics, Urea SI	100	1	100	100	
Boston	1974	Perchloric acid Manufacture SI	1	1	1	1	
		phosphate SI	1	1	1	1	
		Phosphate SI	1	1	1	1	
Los Angeles near Bilibis	1974	Soledad Española S. P. de C. de Fabricaciones Nitrogenadas	100	1	100	100	
Los Angeles near Bilibis	1974 and 1974	Soledad Española S. P. de C. de Fabricaciones Nitrogenadas	100	1	100	100	
Berlitz	1974	Union Española de Fertilizantes	100	1	100	100	
Boston	1974	Union Española de Fertilizantes	100	1	100	100	
Los Angeles near Bilibis	1974	Soledad Española S. P. de C. de Fabricaciones Nitrogenadas	100	1	100	100	
Los Angeles	Planned	Fertilizantes Iberia S.	100	1	100	100	
Atlanta	Planned	Empresas de Fertilizantes	100	1	100	100	

TURKEY

Consumption and production of fertilizers
Nutrients (tons per annum)

	Actual			Projected		
	1960/61 ¹	1965/66 ²	1970/71 ³	1975/76	1980/81	
N	Consumption	24 800	72 299	243 000*	579 900g/	830 000g/
	Production	1 000	32 035	82 000*	319 500g/	643 300g/
	Deficit	23 800	40 264	161 000*	260 400g/	186 700g/
	Surplus	-	-	-	-	-
P ₂ O ₅	Consumption	12 166	69 270	175 900*	475 500g/	662 000g/
	Production	1 166	38 080	63 000*	331 900g/	529 900g/
	Deficit	11 000	31 190	112 900*	143 600g/	132 100g/
	Surplus	-	-	-	-	-
K ₂ O	Consumption	0	7 475	12 700*	115 000g/	150 000g/
	Production	-	-	-	-	-
	Deficit	0	7 475	12 700*	115 000g/	150 000g/
	Surplus	-	-	-	-	-

Source: 1. FAO, Fertilizers, Annual Review of World Production, Consumption, Trade and Prices, 1964 (Rome, 1965), pp. 93, 96, 119, 126 and 151.

2. FAO, Annual Fertilizer Review 1971 (Rome, 1972) pp. 71, 82, 107, 116 and 142.

3. Government of Turkey.

4. "Review of world production, consumption and international trade in fertilizers with projections to 1977 and 1980", Second Interregional Fertilizer Symposium, Kiev, USSR, 1-7 September-October 1971 and New Delhi, India, 7-12 October 1971 (ID 00.49.4 Rev.1).

Note: Calendar year referring to the first part of the split year.

General

Turkey forms the link between Europe and Asia at the Bosphorus, the strait connecting the Sea of Marmara with the Black Sea. The country covers an area of 781,000 km², of which 400,000 km² are arable land and 261,000 km² are pasture land. In 1970 the population numbered 19.2 million, with a growth rate of 2.7 per cent per annum. In coastal regions the climate is Mediterranean, but in the interior conditions can be extreme.

Agriculture

The main occupation is agriculture, which engages 62 per cent of the population. However, it has not progressed much beyond the level of subsistence farming; holdings are small, rainfall is irregular and much of the country is mountainous, barren and subject to earthquakes. The main cash crops are cereals, tobacco, cotton and fruit. The Five-Year National Development Plan 1960-64 budgeted for major investments to modernize agriculture and teach modern techniques with the aim of increasing yields.

Natural Resources and Industry

Crude oil is produced mainly in the south-east and provides 74 per cent of the national refinery throughput. The wells are operated by the Shell Oil Co. and the W.M.P. Co., the State-owned Turkish Petroleum Co. (Türkiye Petrolleri Anonim Ortaklığı), and a private Turkish company, Ertel. The output in 1970 was 2.1 million tonnes. The country's major refineries are Anadolu Tasfiyehanesi AA, at Mersin, with a crude capacity of 33,000 bbl/d; Istanbul Petrol Rafinerisi AS, at Izmit, with a crude capacity of 16,000 bbl/d; and Petrolileri AO, at Batman and Izmir, with respective crude capacities of 20,000 bbl/d and 6,000 bbl/d. This makes a total crude capacity of 69,000 bbl/d.

Other minerals exploited are iron, chrome and copper ores, and lignite. No phosphate or potash deposits have been found but sulphur is produced at a rate of about 35,000 tonnes per annum. Studies are under way for phosphate deposits found in the south-west of the country.

The chief industries are iron and steel, textiles, sugar and cement.

Fertiliser manufacture

In Turkey there are four companies that produce fertilizers, namely:

Turkish Fertilizer Industries Inc. (Türki Gübreleri T.A.Ş.)

This nationalised concern, controlled by the Ministry of Industry, has factories at three locations: Kütahya, Samsun and Elazığ. At Kütahya there are Kütahya I and Kütahya II, lignite-based nitrogen works, with joint capacity of 1,000,000 tons nitrogen. These works produce ammonium sulphate, ammonium nitrate and calcium ammonium nitrate as final products.

The Samsun I factory makes sulphuric acid (capacity 10,000 tons per annum, 100% based), phosphoric acid (PP (22,000 tons per annum), and diammonium phosphate (14,000 tons per annum). At Elazığ there is a single superphosphate plant with a capacity of 40,000 tons P_2O_5 per annum.

The company has plans for the expansion of diammonium phosphate production at Samsun II (capacity 41,000 tons N and 104,000 tons P_2O_5 per annum). It also has in the erection of a new CAN plant at Gazik (capacity 100,000 tons N per annum).

Fertilizer Plants Incorporated (Ülke Gübre Fabrikaları)

This company produces TP at Iskenderun I, using imported phosphate rock. The present capacity is approximately 15,000 tons P_2O_5 per annum and expected to be increased to some 46,000 tons P_2O_5 per annum after start-up, which is planned for 1974.

At Yarıca the company has Ismit I, a single superphosphate plant, with a capacity of about 21,000 tons P_2O_5 per annum, which it plans to convert to triple superphosphate (220,000 tons P_2O_5 per annum).

Endüstriyel Gübreleme Şirketi (Endüstriyel Gübre Şirketi A.Ş.)

A factory at Mersin includes plants for the production of sulphur (20,000 tons per annum), phosphoric acid, nitric acid, ammonium nitrate, and diammonium phosphate. The ammonia is imported.

Karabük Steel and Iron Industries Incorporated

There is a pyrites-based sulphuric acid line producing 20,000 tons per annum that feeds small ammonium sulphate and SSP plants.

Bandirma Fertilizer Company (Bandirma Gübre).

Production was announced in 1972 of the company's pyrites-based sulphuric-acid plant that produces 120,000 tons per annum. All the acid is intended for captive use in the manufacture of SSP.

İSİKS (İstanbul Gübre Sanayii Anonim Şirketi) was formed by TPAO (Türkiye Petrolleri Anonim Şirketi, the state-owned Turkish petroleum company) and İPRAS (İstanbul Petrol Rafinerisi Anonim Şirketi) to construct at İzmit (İzmit IV) an ammonia/urea plant, with World Bank aid. It will be adjacent to the İPRAS refinery, and will be supplied with refinery off-gases, sulphur and fuel oil from the refinery as raw materials.

It is planned to use about half of the ammonia captively in the production of urea, and to supply the remainder to Turkish Nitrogen Industries (Asot Sanayii T.A.Ş.) for DAF production at their Samsun plant (Samsun II), and to Petkim (the Turkish state petrochemical company) for production of caprolactam in a plant to be constructed at İzmit (İzmit III) which will also yield approximately 100,000 tons AS per annum as a by-product.

The production of nitrogenous and phosphatic fertilizers for 1974 and estimates for 1975 and 1980 are shown below. The assumption is operation at capacity at all plants except KİTİS, where an operating rate of 80 per cent is assumed, and a gradual build-up in production capacity at new plants during the first three years of operation of 65 per cent, 80 per cent and 90 per cent, respectively.

Nitrogenous Fertilizers (Thousand tons)

Location	Production	Projected production	
	1974	1975	1980
<u>Existing plants</u>			
Karabük Steel and Iron Industries Inc.	1.4	1.4	1.7
KİTİS (I)	30.0	24.0	29.0
KİTİS (II)	49.0	38.0	48.0
Borsin	-	181.1	181.1
Samsun I ^a	-	11.1	11.1
<u>New plants</u>			
Samsun I	-	11.3	41.0
İSİKS (İzmit IV)	-	-	126.0
Petkim (İzmit III)	-	11.3	21.0
Petkim	-	-	154.4
Total	80.4	312.8	643.3

Source: Government of Turkey.

^a This plant can produce DAF or DAF. It is assumed that it will produce DAF only in 1980.

Phosphatic Fertilisers
(Thousand tons)

Location	Production		Projected production	
	1970	1975	1975	1980
Ismit I } Yarıma	20.0	-	-	-
Ismit II }	-	27.4	90.0	
Samsun I	-	83.0	83.0	
Samsun II	-	31.3	104.5	
Iskenderun I	43.0	58.5	90.0	
Nersis	-	68.3	68.3	
Elâzığ	-	39.6	54.7	
Karabük	-	0.5	0.5	
Bafra	-	23.7	39.6	
Total	63.0	331.9	509.9	

Source: Government of Turkey.

Present and future fertiliser consumption

The rate of fertiliser application varies greatly between different areas in Turkey, but is generally rather low. However, the total used is much higher than the national output.

The manufacturing industry is experiencing problems with the supply of raw materials, intermediates and spare parts, and is also hampered by the low differential between ex-works costs and the retail prices of its products. The companies claim that higher margins would enable them to engage in more extensive information and education programmes for the farmers.

Administration is concentrated in four ministries, namely, Industry, Commerce, Agriculture and Village Affairs, all of which are concerned with the co-ordination of fertiliser production, delivery and consumption.

If some of these difficulties can be overcome there is clearly potential for a substantial increase in fertiliser consumption in the future.

Table 2. Capacity of fertilizer plants

Plant name	Year of operation	Manufacturer	Product	Capacity		Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
				Thousand tons per annum	Nutrient		
Eltekye	1971	Azot Sanayii T.A.S.	AS 21% N DAP 21% N AN	20 50 ...	N N N	29.8	-
İsmet Paşa Fabrike	1971	Tiibre Fabrikalari	SSF 18% P	21	P	-	21
İskenderun I	1971	Tiibre Fabrikalari	TSF 46% P	...	P	-	55
KÜltür II	1971	Azot Sanayii T.A.S.	AN 26% N	33P	N	88	-
Bursa I	1971	Azot Sanayii T.A.S.	SSF 46% P or DAP (18-46-0)	20 140	P N N P	-	-
Elazığ	1971	Azot Sanayii T.A.S.	SSF 18% P	220	P	-	40
Kandıra	1971	Vanilina Tiibre	SSP 18% P	220	P	-	40
Bursa	1972	Ardeniz Tiibre, Sanayii A.Ş.	AN 26% N DAP (18-46-0)	594 150	N N P	181	69
Karşı	...	Steel and Iron Industries Inc.	AS 21% N SSP 18% P	8 3	N P	1.68	0.54
<u>Plants under construction and/or proposed</u>							
İsmet Paşa Fabrike	1974	Tiibre Fabrikalari (under construction)	TSF 46% P	200	P	-	75
Samsun II	1974	Azot Sanayii T.A.S. (under construction)	DAP (18-46-0)	227	N P	41	104
İsmet III	1975	Hekim (under construction)	AS 21% N	100	N	21	-
İsmet IV	1975	İSİS (under construction)	Tiibre 46% P	274	N	126	-
Gemlik	1976	Azot Sanayii T.A.S.	AN 26% N	594	N	155	-
İskenderun II	1974	Tiibre Fabrikalari	TSF 46% P	...	P	-	46
Bursa	1977	Ardeniz Tiibre Sanayii A.Ş.	Ammonia	290		-	46

YUGOSLAVIA

Consumption and production of fertilisers
Nutrients (tons per annum)

		Actual			Projected	
		1960/61	1965/66	1970/71	1975/76	1980/81
N	Consumption	83 400	145 000	293 000	475 000	592 000
	Production	50 000	90 000	273 000	557 000	697 000 ^a
	Deficit	33 400	55 000	20 000	-	-
	Surplus	-	-	-	82 000	105 000
P ₂ O ₅	Consumption	53 600	101 000	182 000	280 000	353 000
	Production	47 100	136 000	207 000	276 000 ^a	276 000 ^a
	Deficit	6 500	-	-	4 000	77 000
	Surplus	-	35 000	25 000	-	-
K ₂ O	Consumption	82 900	100 100	196 000	252 000	324 000
	Production	-	-	-	-	-
	Deficit	82 900	100 100	196 000	252 000	324 000
	Surplus	-	-	-	-	-

Source: Government of Yugoslavia.

a/ Estimate of capacity.

General

Yugoslavia is a mountainous country in southern Europe, with a long coastline on the west to the Adriatic Sea. Its total area is 255,800 km², of which 75,000 km² comprises arable land and 64,000 km² pasture land. The climate is Mediterranean in the coastal regions and continental in the hilly interior of the country. The population in 1970 numbered 20 million with a growth rate of 1.1 per cent per annum.

Agriculture

Agriculture in Yugoslavia is divisible into two sectors. Soon after 1945 a number of state farms and large co-operatives were established; these are now flourishing, having been able to rationalise production and make considerable capital investments. However, about 85 per cent of the arable land is still farmed privately, in small and often fragmented holdings so that, notwithstanding the difference in area occupied, market deliveries from the two sectors are almost the same.

The main crops are cereals, sugar-beet, potatoes and fruit.

Natural resources and industry

Minerals, which are now being exploited on an increasing scale, are coal and natural gas, pyrites, copper, zinc and lead sulphides, and bauxite.

A phosphate deposit has been discovered in the eastern part of the country and, although the ore contains only 14-17 per cent P_2O_5 , a 30-33-per-cent concentrate can be obtained fairly easily by flotation. However, the deposit is in a remote and inaccessible area and as yet there are no plans for its exploitation.

Fertiliser manufacture

The Bakovo chemical plant by Nis is based on coke-oven gas from the adjacent works of the Kikinda. The capacity is approximately 100,000 tons of calcium ammonium nitrate per annum.

The Siska Industrijska Banjevo, near Belgrade, began production in 1952 and has since been steadily enlarged. There are two ammonia lines, with capacities of about 45,000 tons N per annum each, and a third line with a capacity of 180,000 tons N per annum. The final products are calcium ammonium nitrate, urea, and nitrophosphate-type complex fertilisers.

Near Kikinda, Mitrovica, at Pristina, a lignite-based plant, with a rated capacity of 100,000 tons N per annum, has been under construction for the last few years.

The Srebarna Works, at Zrenjanin, have three lines with a total capacity of 100,000 tons N per annum, based on lignite and gas from the gasifier. Part of the gas is used in the on-site production of sulphuric acid.

The Srebarna Works at Zrenjanin have comparatively small sulphuric-acid and single-superphosphate lines, but a new factory is being constructed nearby at Apatin that will produce 100,000 tons of sulphuric acid.

The Srebarna Works, at Zrenjanin, has three sulphuric-acid lines, two based on pyrites and one on lignite gasifier gas. The total capacity is 100,000 tons per annum. Single-superphosphate, phosphoric acid - capacity 100,000 tons per annum - and triple superphosphate, ammonium phosphate and complex fertilisers are also manufactured at this factory.

At Kikinda there is a fertilizer plant associated with the Bor Mining Complex. Numerous sulphuric-acid lines are used for the production of sulphuric acid - capacity about 400,000 tons per annum - which is used in the manufacture of single superphosphate, phosphoric acid - capacity 100,000 tons per annum - and triple superphosphate. Some ammonium phosphate is also produced, and for making plans to produce about 100,000 tons per annum each of double and triple superphosphate have been installed. One is at Srebarna itself and the other is at Novi Sad.

The Srebarna Works at Kikinda Mitrovica, based on ore from the Topča Mines, have capacity for 235,000 tons per annum of sulphuric acid, 235,000 tons per annum (pre-oxidation) of single superphosphate and 100,000 tons per annum of complex fertilisers. It has been announced that a new sulphuric-acid line with a capacity of about 100,000 tons per annum, at Srebarna, is probably at this station.

A new factory has been under consideration for some time, and that seems likely to be a small-scale one, as the installation of a lead-sulphuric acid line with associated sulphuric acid plant and other fertilizer plants at Titov Veles in Macedonia.

Present and future fertilizer consumption

Although the consumption of all types of fertilizer in Yugoslavia approximately quadrupled between 1960 and 1970, there is still potential for further large increases. At present the average rate of application on State and co-operative farms is about seven times that on private farms, and indeed many of the small farmers still use no fertilizers at all.

Purchases of fertilizers are closely related to their prices and to farm incomes. Steps taken officially in recent years to help private farmers include the introduction of rebates, the provision of credits for the purchase of the fertilizers and increases in the controlled prices of many agricultural products.

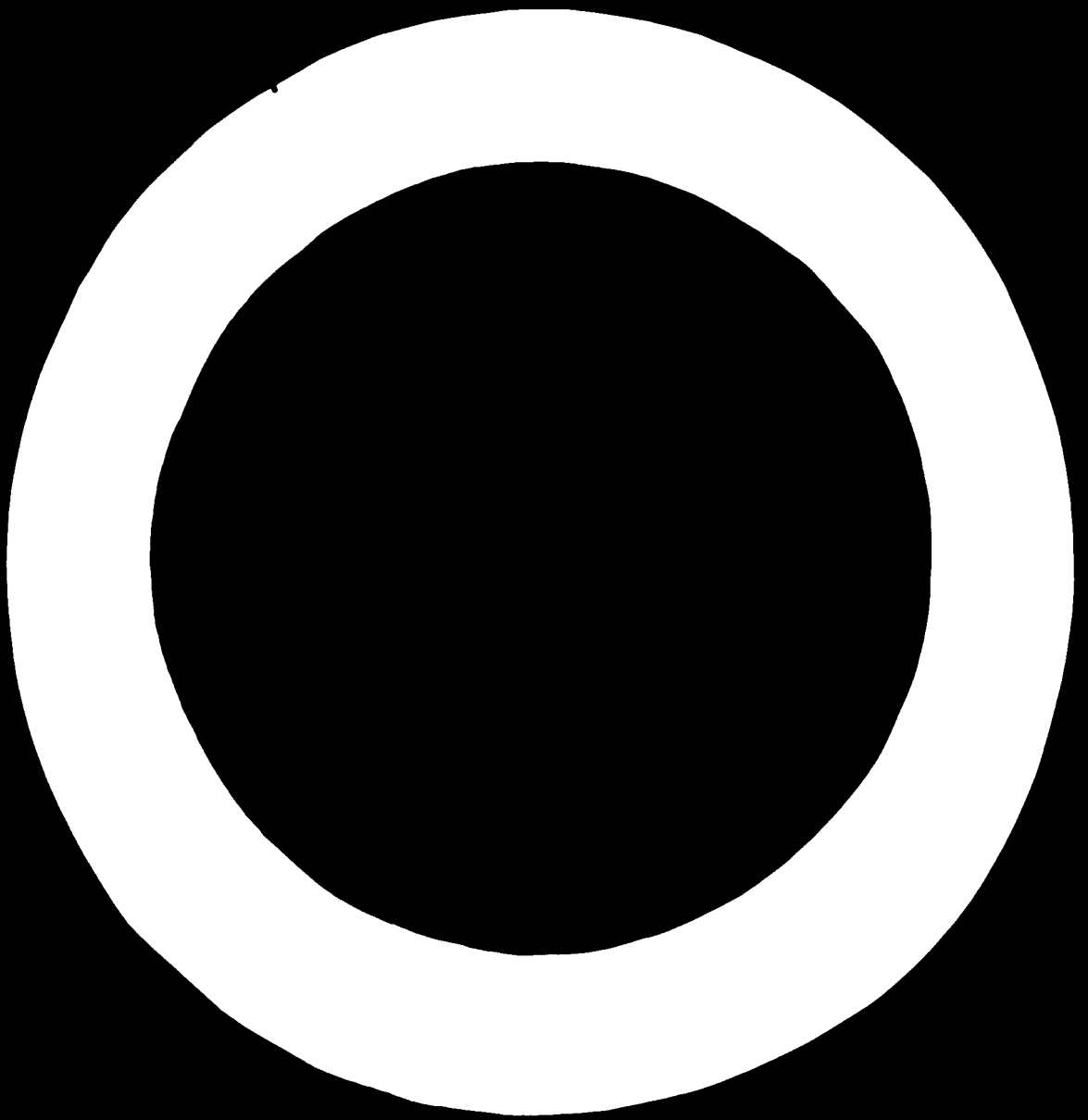
States and capacity of fertilizer plants

Location and status	State or area	Fertilizer plant	Capacity		Estimated total N thousand tons per annum	Estimated total P thousand tons per annum
			Thousand tons per annum	Nutrient		
Luzna	Yugoslavia	Ammonia	32.0	N	49.7	...
		Nitric acid	...	N	...	...
		UAN (25%)	100	N	49.7	...
		Ammonium Nitrate	...	N	...	...
Pan'ev	Yugoslavia	Ammonia	...	N	300	30
		Nitric acid	...	N	...	...
		UAN	168.8	N	...	...
		CAU	36	N	...	...
		Urea	108.9	N	...	...
		Nitrophosphates	...	N	...	...
Kutina	Yugoslavia	Complex fertilizers	...	P	...	...
		Ammonia	...	N	...	...
		Nitric acid	...	N	...	...
		UAN	(267.3)	N	176.5	20
		Urea	25	N	...	...
		Nitrophosphates	...	N	99	...
		Complex fertilizers	...	P	...	...
		Ammonia	...	N	...	...
		Nitric acid	...	N	89.6	...
		UAN (26%)	280.5	N	...	...
Cepje	Yugoslavia	SSP	...	P	...	10
		Sulphuric acid	150	P	...	...
		Sulphuric acid	250	P	...	...
		SSP	...	P	50	90
Šabac	Yugoslavia	Phosphoric acid	...	P	...	...
		TSP	...	P	...	...
		Ammonium phosphate	...	N	...	...
		Complex fertilizers	...	P	...	...
		Complex fertilizers	25	N	...	...
		Complex fertilizers	...	P	...	...
Prishtina	Yugoslavia	Ammonia	...	N	...	...
		Nitric acid	...	N	...	...
		UAN (26%)	...	N	...	...
Cepje	Yugoslavia	SSP	...	P	...	...
		Sulphuric acid	...	P	...	...
		Sulphuric acid	...	P	...	...
		SSP	...	P	...	...
Šabac	Yugoslavia	Phosphoric acid	...	P	...	...
		TSP	...	P	...	...
		Ammonium phosphate	...	N	...	...
		Complex fertilizers	...	P	...	...

Table (continued)

Location and status	Start-up	Ownership	C A P A C I T Y			Estimated total N (thousand tons per annum)	Estimated total P (thousand tons per annum)
			thousand tons per annum	Nutrient	thousand tons per annum		
Apatim, Sabotim	1973	Kamajaha Indu- trija Sorika	Complex fertilizers	N	...	...	20
			SP	P	...	...	...
			Sulphuric acid	K	...	...	...
			Phosphoric acid	P	...	...	...
			Calcium phosphate	P	3	...	...
Prebore	1968	Badaraki Topioa- Sarakai Basom Bor	Sulphuric acid	P	400	...	200
			SP	P	...	...	...
			Phosphoric acid	P	...	100	...
			TP	P	...	...	...
			MP	N	118.8	...	...
Devi Sad	...	Badaraki Topioa- Sarakai Basom Bor	NPK fertilizers	P	105.6	...	...
			Complex fertilizers	N	100	...	...
			Complex fertilizers	P	...	...	...
			Complex fertilizers	K	...	...	...
			Complex fertilizers	K	...	...	...
Korvaha Bha- rovia (M of Tribhuv)	...	Panas Works	SP	P	...	...	40
			Sulphuric acid	N	...	...	...
			Complex fertilizers	P	...	...	...
			Complex fertilizers	N	...	...	...
			Complex fertilizers	K	...	...	...
Sankoo Bepo- sion	...	Kamajaha Indu- trija Sarika Pabrika Apotaha Dutrawa-Kamajaha Industrija	Ammonia	N	...	...	...
			Nitric acid	N	190	...	...
			AI	N	101.4	...	...
			Area	N	211.2	...	...
			Area	N	...	...	...
Korvaha Bha- rovia (M of Tribhuv)	after 1972	Panas Works	Ammonia	N	...	...	...
			AI	N	140	...	...
			Fea	N	1-2	...	114
			AI	N
			AI	N

Fertilizer plants in the planning stages or under construction



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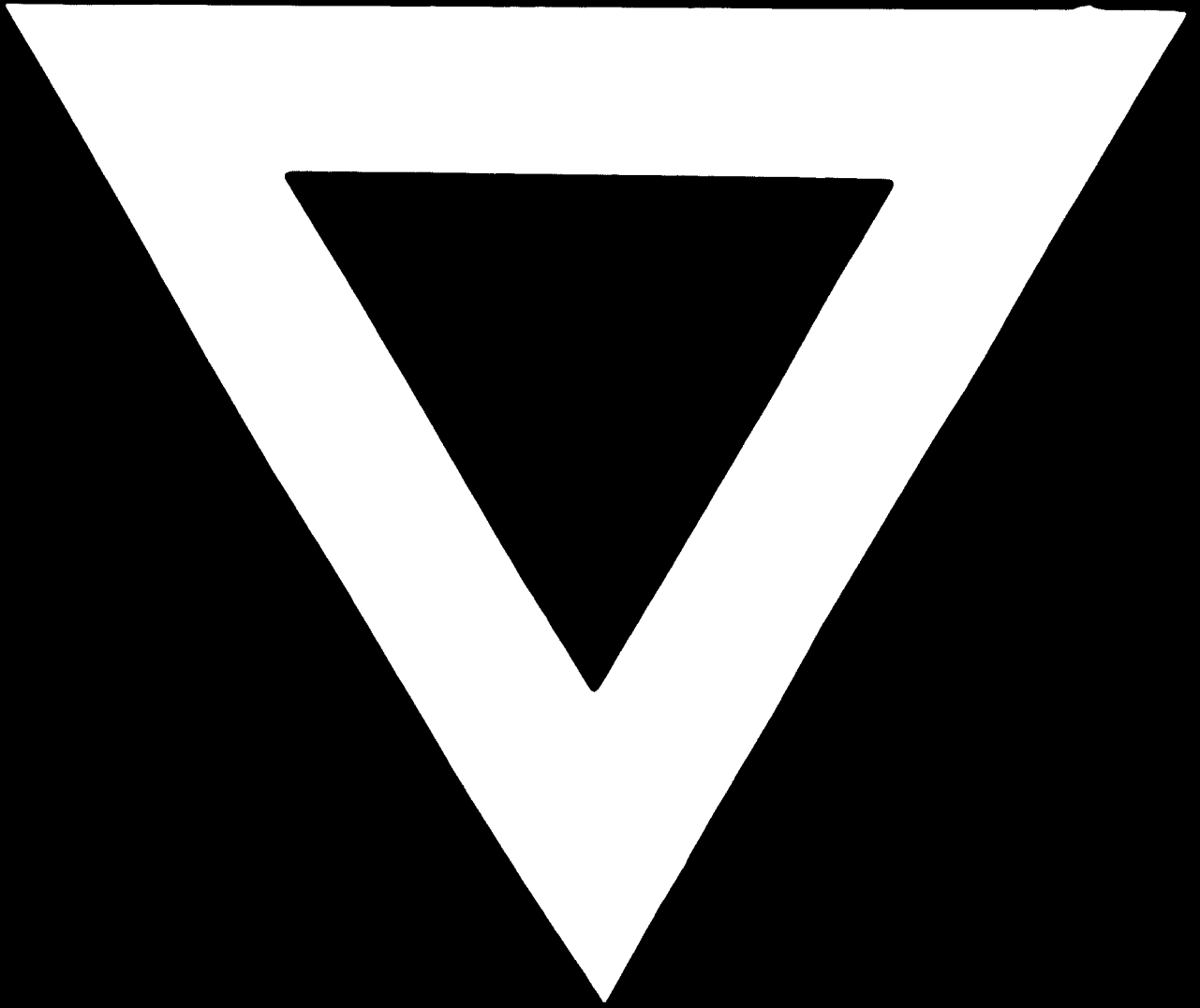
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