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Fertilizer and Pesticide Industries in the
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**REPORT REGARDING THE DEVELOPMENT OF PESTICIDES PRODUCTION
AND USE IN THE SOCIALIST REPUBLIC OF ROMANIA**^{1/}

by

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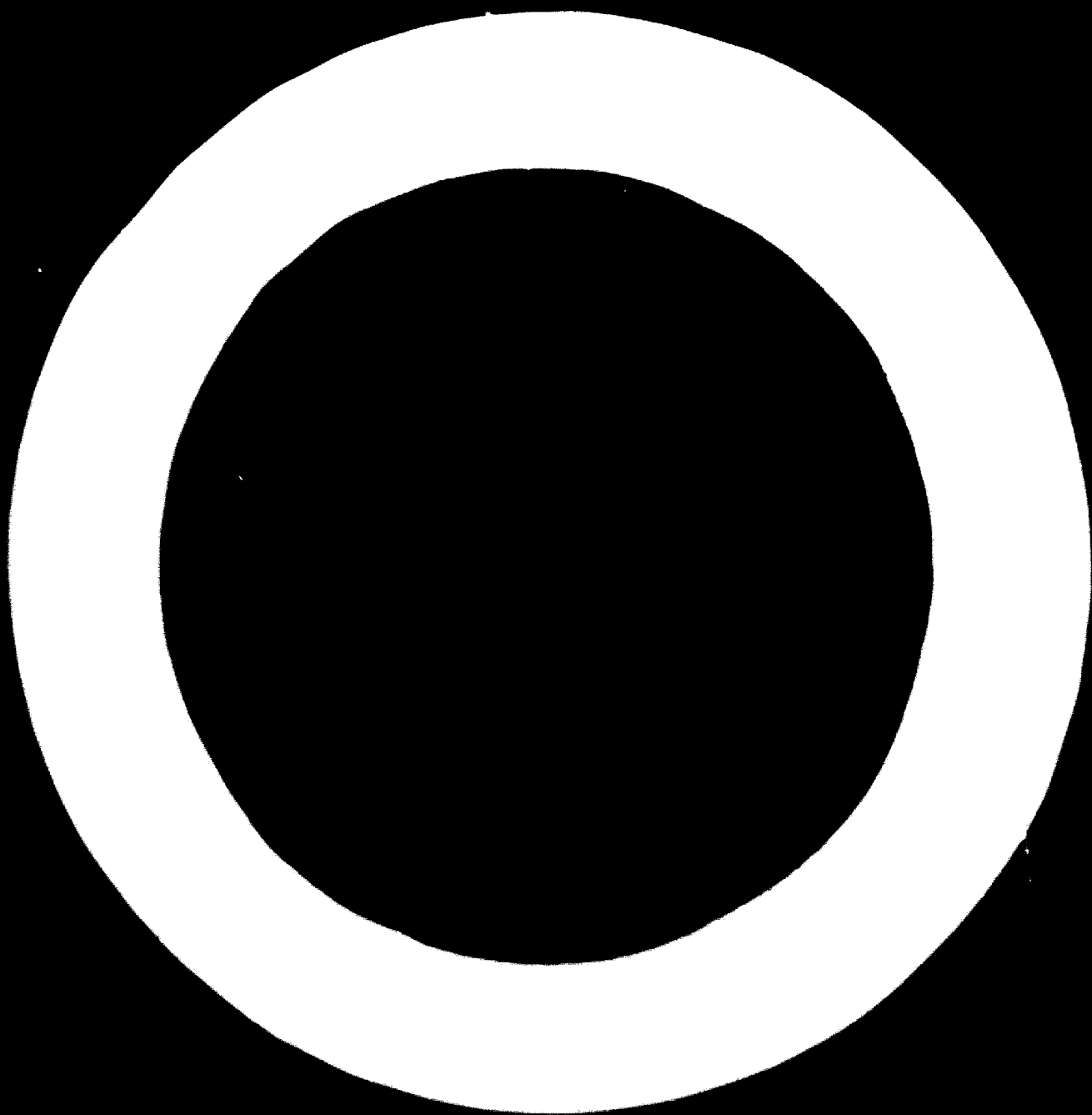
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R E P O R T

regarding the development of pesticides' production
and use in the Socialist Republic of Romania

Nowadays the importance of using pesticides in agriculture is recognized by the overwhelming majority of specialists' all over the world and a modern and efficient agriculture can not be conceived without the contribution of these products in spite of some inconveniences they may generate.

On the world level the problem of pro of against pesticides is overpassed, the focus and efforts of specialists being directed towards the promotion of new products having a reduced acute toxicity, a short remanence and a satisfactory degree of selectivity as well as towards their use with maximum economic efficiency and with minimum secondary effects. Although as it is known, this wish is not easily accomplished, the results obtained in the last years allow us to believe that progress will further continue on this line.

Production and use of pesticides on a large scale in our country started after the 2-nd world war and were intensified in the last 5-7 years. The promotion of pesticide production and use was based on the permanent and steadfast interest showed by the agricultural sector on one hand and by the setting up of a powerful petrochemical and basic organic chemicals industry, capable of supplying the required raw materials and intermediate products.

Further on we will set forth significant aspects regarding the production and use of pesticides in our country.

1. Main factors that require and influence the use of pesticides in the Socialist Republic of Romania

Our country, crossed by parallel 45 is situated near the Black Sea and has an extreme continental climate,

characterized in general by dry summers and cold winters sometimes with small quantities of snow. Another characteristic is the existence of variable forms of relief, which on their turn, determine differentiated climatic conditions from one area to another.

At the same time, the high organic content soil in many areas of the country and especially in the South-East area (the so called Bărăgan) requires, in most cases, the use of higher rates of pesticides as compared with other countries.

The structure of the cultivated surface for the main crops and groups of crops is shown in Table no.1

Table no. 2 presents the main pests to be met in our agriculture.

Due to the diversity of crops and of pests existing in our country as well as to the various climatic conditions, a large range of pesticides capable to answer all these conditions is required. At the same time they must assure the rotation, asked by the appearance of resistance phenomena towards insecticides and the prevalence of certain weed species as a consequence of repeated herbicide treatment.

The same considerations also require the use of various formulation forms, suitable to the differentiated conditions encountered in Romania.

Obviously, the use of pesticides in our country as well as in other countries is imperiously necessary in order to ensure a highly economic efficiency, for reducing to a larger extent the quantitative and qualitative losses brought about by pests.

2. Actual status of pesticides production in the Socialist Republic of Romania

Practically speaking, we can not say that there was a production of pesticides in Romania before 1938, small quantities of imported inorganic insecticides were formulated

in rudimentary workshops. The only product applied on a large scale was copper sulphate, under the form of Bordeaux mixture for the prevention of downy mildew of vine.

After the 2nd world war in the 1946, the production of BHC, in relatively small quantities started. In 1956 began the production of D.D.T., of 2-4,D herbicide and of AKTU rodenticide. The production of these pesticides covered only to a small extent the domestic requirements steadily growing, so that new production capacities of DDT and BHC were put into operation in 1960 and in 1962 mercury-ethyl chloride, used for the wheat seeds treatments started to be manufactured.

During this period of time our chemical industry begins to deliver the first quantities of Dibutox, an insecticide on dinoseb basis, used for winter spraying against San-José scale in pomiculture.

As a consequence of the important developments in our chemical industry, the pesticides production enriched its palette after 1965, capacities for manufacturing 2-4,D herbicide, of organo-phosphorous Fosfotox, Carbetox and Ethion, of Lindane, of Pinatox insecticide and of atrazin herbicide for maize were put in production at short intervals.

Table no. 3 shows the pesticide production of Romania in year 1965 and year 1971, expressed in active ingredient.

The major part of pesticide units mentioned above was erected on the basis of our own researches, carried out in the frame of the Central Institute for Chemical Research of the Ministry of Chemical Industry.

As it is shown in Table no.3, during 1965-1971 period a substantial progress in the production of pesticides was recorded the active ingredient assortment increasing from 7 to 14, and the tonnage from 9755 t/y to 15,340 t/y.

It is observed that the weight of organic chlorinated insecticides referred to the total production decreases to

a certain extent in 1971 as compared to 1965, although in absolute weight an increment takes place. As it will be further on mentioned, the use of these products will diminish in the following years, taking into account the necessity to limit or even to remove chlorinated insecticides residuals from crops.

OP insecticides production, having a good biological efficiency and a short remanence is at the present moment as shown in Table no.3 of 800 t/y, and it will be largely increased in the following 7-8 years.

At present the domestic production ensure more than half of our country's demands, the procentage continuing to be increased further on.

3. Development of pesticides production in the period 1976-1980.

In the next years the pesticide production in Romania will continue its upward line; the following considerations have determined the direction to be observed :

3.1. Strong reduction of orgo-chlorinated insecticides application.

It is forecast an important reduction of orgo-chlorinated insecticides in the following period, as a result of the restrictions imposed by the Ministry of Health; DDT and BHC are the products that will be affected while the use of Lindane and of Pinetox will remain constant.

3.2. Increment of OP insecticides production

Concurrently with the production of organic chlorinated insecticides, the sortiment and quantity of OP insecticides, products which advantageous properties are well known (strong biological action, reduced acute toxicity and short remanence) will be increased. In this way, until 1975, three new products - trichlorphon, fenclorphos and bromophos will be added to the existing ones.

3.3. Beginning of carbamate insecticides production

In the following 2-3 years carbaryl production based on a Romanian technology will start.

3.4. Increase of organic and inorganic fungicide production

In the future captan, folpet, mercuryphyl acetate, copper oxychloride, wettable sulphur, dust sulphur, thiuram, ziram and other fungicides will be produced. The production of fungicides will strongly increase.

3.5. Increment of herbicides production

The production and assortment of herbicides (especially sim-triazine derivatives) will substantially increase, in order to meet the lack of labour power in agriculture to be encountered in the next years and the increase of irrigated surfaces.

3.6. Introduction of economic forms of formulation

Great emphasis will be laid on the production of granulated insecticides and the weight of concentrated solutions for air treatments of low volume (LV) and ultra low volume (ULV) will also increase. The production of insecticide dusting powders will be strongly reduced, the application of pesticides mixtures (insecticide + insecticide, insecticide + fungicide, fungicide + fungicide, herbicide + herbicide) will be increased in order to enlarge their biological activity spectrum, reducing in this way the treatment costs.

x

x

x

The major goals of the development of pesticide production in our country in the next 7-8 years are:

- complete covering of domestic demands for controlling pests in the basic crops

- reduction of undesirable secondary effects to the minimum

- export availabilities

In Table no.4 - pesticides production at the level of 1975 as well as informative figures for year 1980 that are to be finalised together with the agricultural sector are presented.

4. Romania's capabilities to participate in the development of pesticides production in other countries.

In accordance with FAO prognosis, the annual growth rate of food demands - in the world - will be of 2.3 - 2.7% until 1985; while for the developing countries an annual growth rate of 2.8 - 3.6% is forecast.

These figures clearly illustrates the necessity of rapidly increasing the agricultural production, to which an important contribution is brought by the pesticides

In this respect, a larger demand of pesticides coming from a great number of developing countries can be predicted.

Romania is able and wishes to be considered among the countries which contribute to the promotion of pesticides production and application in the interested countries, being ready to offer its assistance, based on the experience it has in this field as follows :

- 4.1. Elaboration of projects for pesticides manufacturing and formulation plants
- 4.2. Building and erection work
- 4.3. Technical assistance during investment and starting up
- 4.4. Personnel training in similar plants operating in our country.

The pesticides for which our country possesses the necessary technological experience are the following :

- a) Insecticides - Dimethoate
- Malathion
- Ethion
- Dinoseb
- Fimeton
- DDT
- BHC

- b) Herbicides - 2-4.D (Sodium salt, esters,
Dimethyl-amine salt)
- atrazine

In addition, our country is capable to grant, through the experts in plant protection working in the agricultural research and production sector technical assistance in the biological screening and in the application of pesticides.

In connection with this, we want to mention that pesticides registration in Romania is done by the Interdepartmental Committee for pesticides, and is based on the biological screening carried on in laboratories in greenhouses and in field.

For the promotion of new pesticides to be produced in our country the research sectors and the manufacturing units permanently collaborate with the concerned departments of the Ministry of Agriculture.

Our ministry is willing to give careful consideration to any proposals that will be suggested.

TABLE 1

The structure of the cultivated area of Romania
given on main crops and groups of crops (1970)

Name of crop	Surface - 1000 hectares
Cereals for grains - total	5,900.9
of which :	
- wheat	2,321.1
- maize	3,084.0
- barley	288.4
Technical plants - total	1,004.7
of which :	
- sunflower	604.1
- white beet	169.9
Potatoes	286.2
Vegetables for grains - total	237.5
of which :	
- pea	106.5
- soia	79.1
Vegetables - total	224.6
of which :	
- tomatoes	56.0
- onions	40.0
Forage plants	1,423.1
Orchards	350.0
Vineyards	229.8

Obs. To these a forest area is to be added having 6,315
thousands ha.

The main pests (insects and plant diseases)
encountered in Romania's crops

<u>Crop</u>	<u>Insect</u>	<u>Plant disease</u>
<u>Wheat-rye</u>	Zabrustenebrioides Euxoa segetum Eurygaster segetum	Tilletia tritici Tilletia nonifera Ustilago tritici
<u>Rye</u>		Ustilago horae Ustilago avenae
<u>Maize</u>	Tanymecus dilaticolis Pyrausta nubilalis Euxoa segetum Anoxia villosa	Sorosporium holci serghi
<u>Sunflower</u>	Tanymecus dilaticolis	Plasmopara helianthi Sclerotinia sclerotio- rum
<u>White beet</u>	Botynoderes puncti- ventris Tanymecus palliatus Aphididae	Cercospora beticola
<u>Potatoes</u>	Leptinotarsa deceru- lineata	Phytophthora infestans
<u>Orchards</u>		
<u>Apples-pears</u>	Quadraspidiotus perniciosus Anthonomus pomorum Hoplocampa testudinea Carpocapsa pomonella Aphididae Acarinae	Endostigma inaequalis Endostigma pyrina Podosphaera leucotricha
<u>Plums</u>	Quadraspidiotus per- niciosus Hoplocampa minuta Aphididae Acarinae	Monilia sp. Polystigma rubrum

Apricots-pesches

Quadraspidiotus
perniciosus
Anarsia lineatella
Aphididae
Acarinae

Clasterosporium sp.
Taphrina deformans
Monilia sp.

Sweet and ^{low}
cherries

Quadraspidiotus
perniciosus
Rhagoletiscerasi
Acarinae

Monilia sp.
Polystigma rubrum

Vineraria

Polychrosis botrana
Acarinae

Plasmopara viticola
Uncinula necator
Botryotinia fuckeliana

THE PESTICIDES PRODUCTION OF THE R.S.R.
(as active ingredient)
-tons -

<u>N a m e</u>	<u>1965</u>	<u>1971</u>	<u>Formulation</u>
A. <u>INSECTICIDES</u>			
a) <u>Organic chlorinated compounds</u>			
1. DDT (as p-p'isomer)	4,500	4,500	dusting powders 5 and 10% EC - 25%
2. BHC (as gamma isomer)	1,500	2,500	dusting powders 1,5 and 3% (based on gamma isomer)
3. Lindane	-	800	EC-20%; dusting powder 3%
4. Pinetox (chlorinated terpenes)	-	600	EC-65%; conc. solution 3% for IV application; dusting powders 1% and 2%.
b) <u>CP - compounds</u>			
1. Fosfotox (dimethoate)	-	400	EC-50
2. Carbetox (malathion)	-	300	EC-50
3. Ethion	-	100	EC-50
c) <u>Other insecticides</u>			
1. Dibutox (dinoseb)	500	500	EC-25
2. Mineral oil - for winter sprays	3,000	3,000	EC
B. <u>FUNGICIDES</u> (copper sulphate not included)			
1. Mercury ethylchloride	25	25	Dusting powder - 2% for seed treatment
C. <u>HERBICIDES</u>			
1. 2-4.D (acid equiv.)	150	525	As Na-salt; in 1972 the production of esters and dimethyl-amine salt was started
2. Argezin (atrazine)	-	2,000	
D. <u>OTHER PRODUCTS</u>			
1. Antan (alfo-raftil-thiourea)	80	80	Dusting powder 40%
2. Methyl bromide	-	10	-

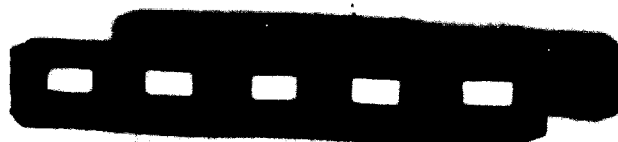
TABLE 4

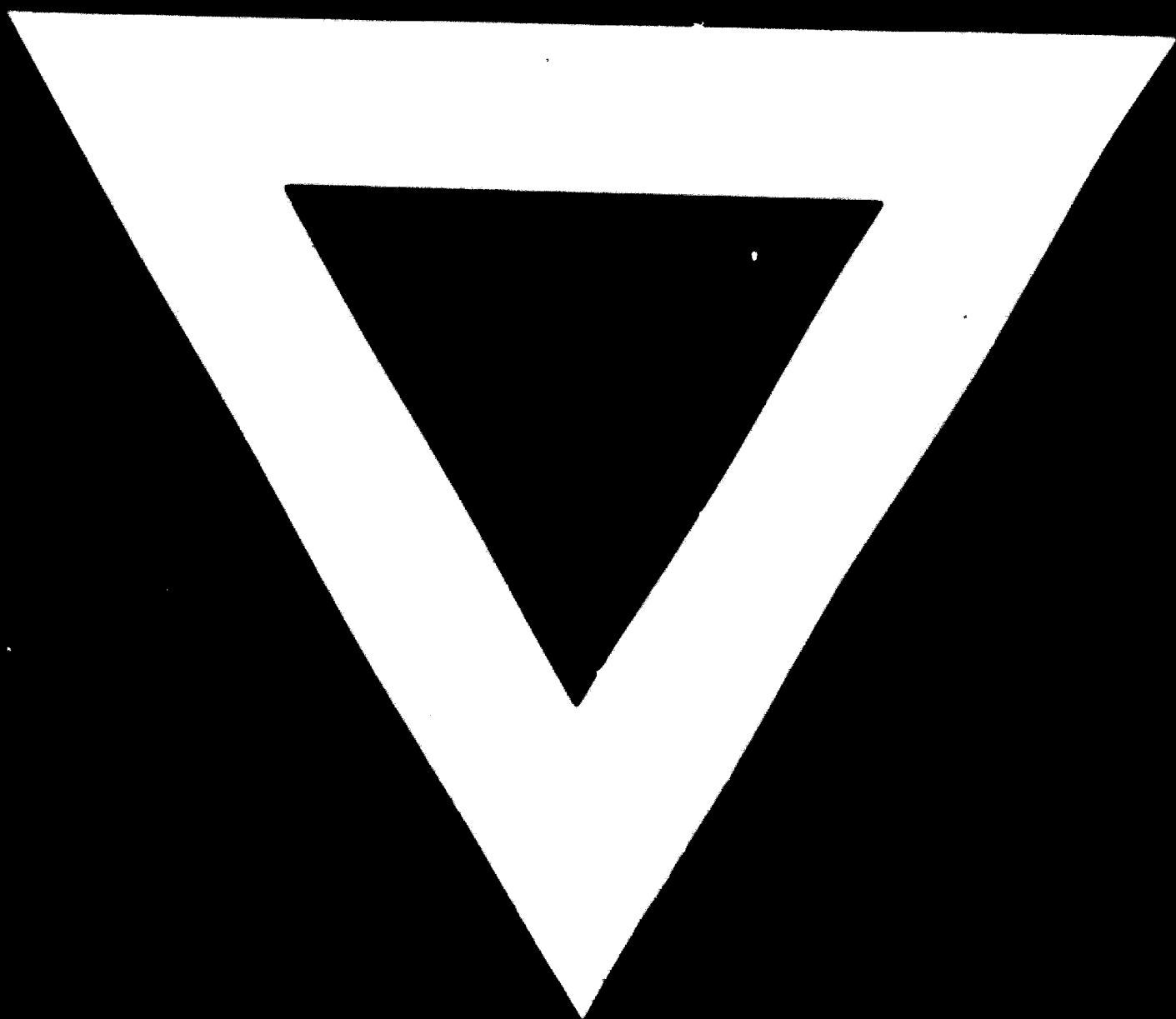
THE DEVELOPMENT OF PESTICIDES PRODUCTION
IN THE R.S.R.

(forecasts for 1975 and 1980 - given as active ingredient)
- tons -

Name	1975	1980
A. Insecticides		
a) Organic chlorinated compounds	5,400	2,000
b) OP-compounds	5,750	6,160
c) Carbamates	2,000	2,000
d) Dibutox (dinosob)	2,000	4,000
e) Barium polysulfide	3,000	6,000
f) Others	50	1,000
T o t a l	18,200	21,160
B. Fungicides		
a) Inorganic compounds	8,300	12,000
b) Organic compounds	4,925	9,800
T o t a l	13,225	21,800
C. Herbicides		
a) 2-4.D (acid equivalent) (esters and dimethylamine salt)	1,000	1,000
b) sim-triazine derivatives	6,000	8,660
c) Carbamates	-	4,650
d) Quaternary dipiridil compounds	-	1,500
e) Others	-	2,400
T o t a l	7,000	18,210
D. Other products	160	1,265
Grand Total :	38,585	62,435

Obs.: forecasts for 1980 are informative only.





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