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STATUS OF THE FERTILIZER AND PESTICIDE INDUSTRIES IN YUGOSLAVIA 1/

by

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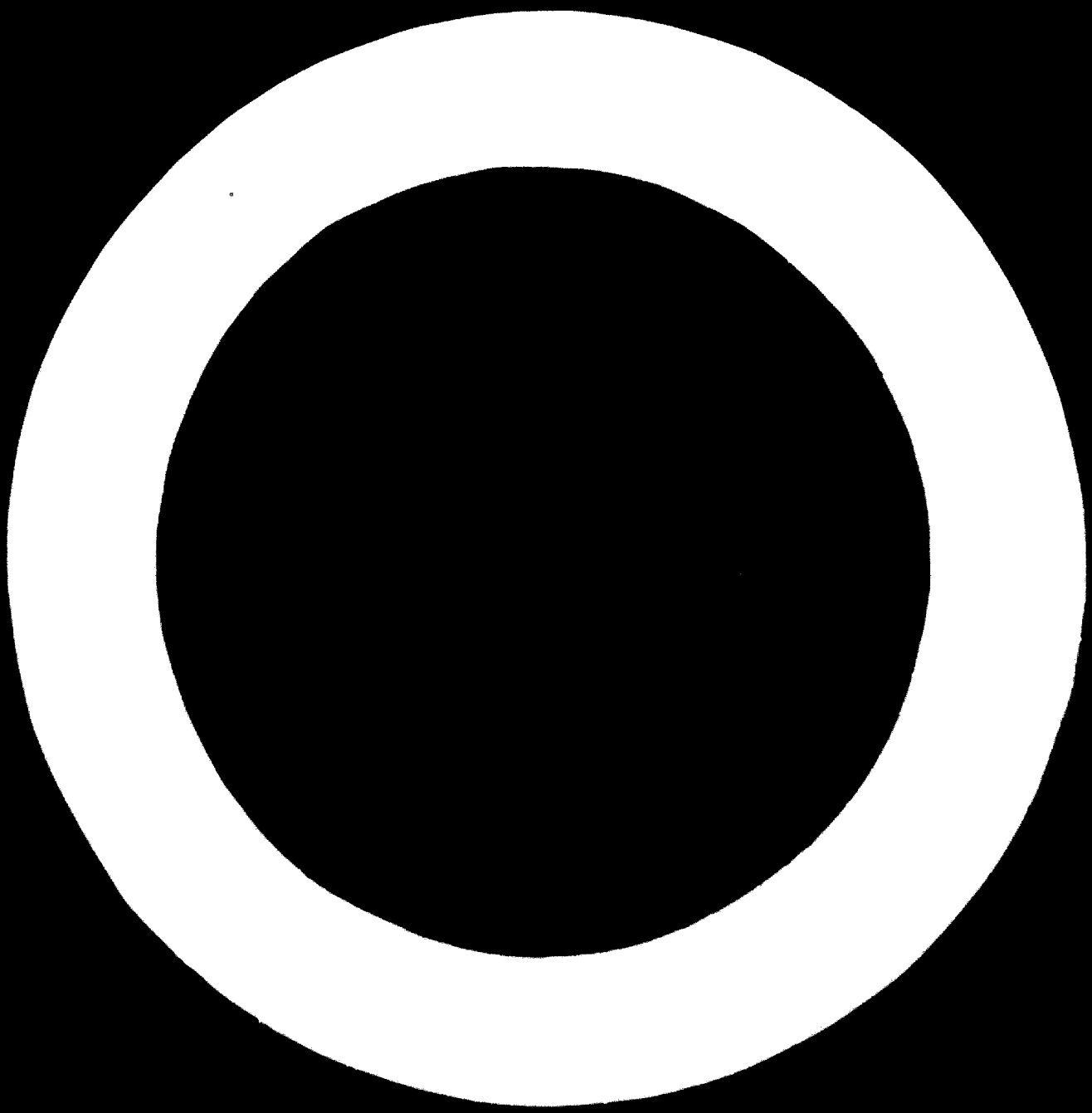


THE FERTILIZER INDUSTRY IN YUGOSLAVIA

Due to the fact that the recent situation has been described in report of Mr. Acimovic, I will just summarize his statements.

From statistical data we see that Yugoslavia's fertiliser industry really developed in last 5 years. Large single train capacities of ammonia and nitric acid were built, the production of urea was started at Kutina, the concentration of nutrients in mixed fertiliser was increased, and the proportion of nutrients in total fertiliser production was increased also. Liquid ammonia started to be used for complex fertilizer production instead of ammonium sulphate.

Large sulphuric acid plants were built for production of phosphoric fertilizers, to use off-gases from existing and new copper, zinc and lead smelters. The sulphidic ores represented only a part of the raw material for sulphuric acid production. The production of phosphoric acid is being introduced, large quantities of triple superphosphate are produced and DAP is finalized in the form of concentrated complex fertilizers. Imported rock phosphates are used as starting material for phosphoric component. Capacities for phosphoric acid are 160.000 tons/year.

Potassium salt is entirely imported.

The main raw material for nitrogen plants is domestic natural gas, but there exist plants also bases on coke oven gases, coupled with coke plants, and plants producing nitrogen on the basis of coal, coupled with

production of heating gas for steel works.

There are two ammonia single train units in operation as large as 650 tons/day, with corresponding nitric acid plants. Production of urea takes place in two plants, with capacity of 100,000 tons/year each.

There are in operation several large units for production of mixed and complex fertiliser production with a total capacity of 1,300.000 tons, but with varying water solubility of P_2O_5 components. In this production producers with sulphuric plants use the ammonium phosphate route and the nitrogen producers use the nitrate phosphate route.

The production capacities reach about 500,000 N/year, 300,000 tons P_2O_5 / year. The domestic consumption in 1971 is estimated to be about 350,000 tons N/year and 220,000 tons P_2O_5/year.

These figures show that there is a positive difference between capacities and consumption and Yugoslavia appears also as exporter of these fertilizers.

The use of fertilizers is still beyond the expected rates as is stated in paper of Prof. Popovici. In future development the use of fertilizers must be brought in good correlation with established capacities, but producers of fertilizers will have to produce the really best needed program of fertilizers for crops in the region they have to cover.

PRODUCTION OF PESTICIDES IN YUGOSLAVIA

The production of pesticides has a very good tradition and before the war there was the production of copper sulphate, calcium and lead arsenate, calcium sulphide lye, barium polysulphides, mercury compounds and pyrethium dust. After the war new synthetic products have been introduced and in co-operation with NRRA, the production of DDT was started in early 50. The development of pesticide industry was strictly bound on development of the production of organic chemicals and intermediates and even now we have no basic synthesis but synthesis of different compounds on basis of imported intermediates or some raw materials. Especially in the period of 1960-1966 we had a very dynamic growth and from that time we have established production of following pesticides: copper suboxide, copper oxychloride, lead arsenate, zinc phosphide, phenyl Hg acetate, methoxymethyl Hg chloride and acetate, Zineb, Ziram, DNOC, DDT, Lindane, tetremethyl-thiurame, disulphide and aminotriazines. Total production without copper sulphate was in 1966 3,430 tons, with copper-sulphate 11,900 tons, makes 15,330 tons. Yet we consider that the amount of copper sulphate used in agriculture is diminishing due to increased use of organic compounds. In 1970 we had the increase in the group withou copper sulphate to 6,000 tons and 14,900 tons of copper sulphate, but only 8,000 tons were used in agriculture.

Production of derivatives phenoxiacetic acid like 2,4 D and MCP was started but later stopped due to insolved problems

of river polution with phenolic waste waters.

The production of pyrethrum dust was increased in that period and we had also local production of pyrethrum extract Due to the competition of imported pyrethrum extract the growth of pyrethrum was neglected in Dalmatia and there is at time being no more local production of extracts, even if pyrethrum gain again an importance due to the change in the use of chlorinated organic pesticides. This change on the other side brought difficulties in the control of forest and soil pests. Beside the underdeveloped production in organic chemicals there is also a problem in economic capacities. Small capacities are in many cases uneconomic and imports of raw materials are cheaper, but as soon as there is an overproduction the problems exist in exports to western countries, due to patents and different market regulations. In the last years an increased trend goes to joint capital investments even in this brench of industry, that is now possible due to newest regulations.
The second problem is the steady change in the use of pesticides. There are only few pesticides which could have such position as copper sulphate and DDT. In Yugoslavia triazins seem to get similar importance and one can expect an essential expansion in this production. With the beginning of this year the use of organochlorinated compounds was strongly limited and partially prohibited and if we assure the complete capitalisation of DDT production, it is not the case in Lindane production. These companies have to change the production in very next future.
Third problem are severe regulations in last years due to sollution. Such regulations make new capacities much more expensive not only due to changes in processes and waste treatment, but also due to the choice in location. In most highly

developped countries these problems had not such an importance in the past and new differences in prices of active materials are evident.

There is also another, yet minor reason for slow development of pesticide production in our country - this industry has relatively law labor consumption in comparison to capital investment and worth of final products.

I briefly tuched here the production of active materials and some problems connected with it. Yugoslavia has a rather good developped capacity for formulation of pesticides. The production of raw materials is in 8 factories, but the formulation in 12 factories, mostly due to transportation problems and needs of agriculture in different regions.

These companies formulate about 450 different final products and use for this production beside active materials from local synthesis mostly imported active materials. It would be waste of time to enumerate them, there are about 110. We have a local production of some surface active agents and solvents and there is a choice of good fillers or carreers dust and WP formulations and for the production of granular pesticides.

Statistics in this production should give the use in A.M., but is based in Yugoslavia on the production and use of final products. Such data can not give the real situation. All formulators produced in:

1965 118.000 t. of final products

and in 1970 33.800 t. of final products.

The difference is due to exports of different dust formulations and to the repid change in the use of simple dust formulations to wettable powders with high percentage of active

ingredients.

Pesticides are formulated in all needed forms as ducts, wettable powders, granules, microgranules, solutions and liquid or concentrates. The change from ducts to WP granules and microgranules asks for renovations also these industries to meet high quality standards for these products known from other countries and improved also through new application techniques. The change here is slow due to lack of experience and due to cost for mostly entirely imported equipment, but is nevertheless much easier than in synthesis of action materials and today capacities of formulating industries are about 45.000 t. of products/year. The future trend will be only in modernization of existing factories and no new capacities are planed.

Statistical data show that we used 21 kg pesticides per ha. in 1965 and 2.7 kg in 1970 and that we are behind our neighbours Bulgaria, Hungary and Romania. This is due to differences in structure of agriculture and in differences in development of some regions in Yugoslavia. The strongest use is in plains in nothern part of the country. The future growth will depend on intensivity of agricultural production, where it is necessary to consider not only higher yields but also proper equipment for application and just that was a problem with the small farmer, who nevertheless a very important factor in the structure of Yugoslave agriculture. I think that in some developing countries problems on availability of proper equipment for application must be considered with the same attention as the production of pesticides.

If we classify pesticides producing countries in different groups, for example countries producing mainly for exports, like Switzerland and Federal Republic of Germany,

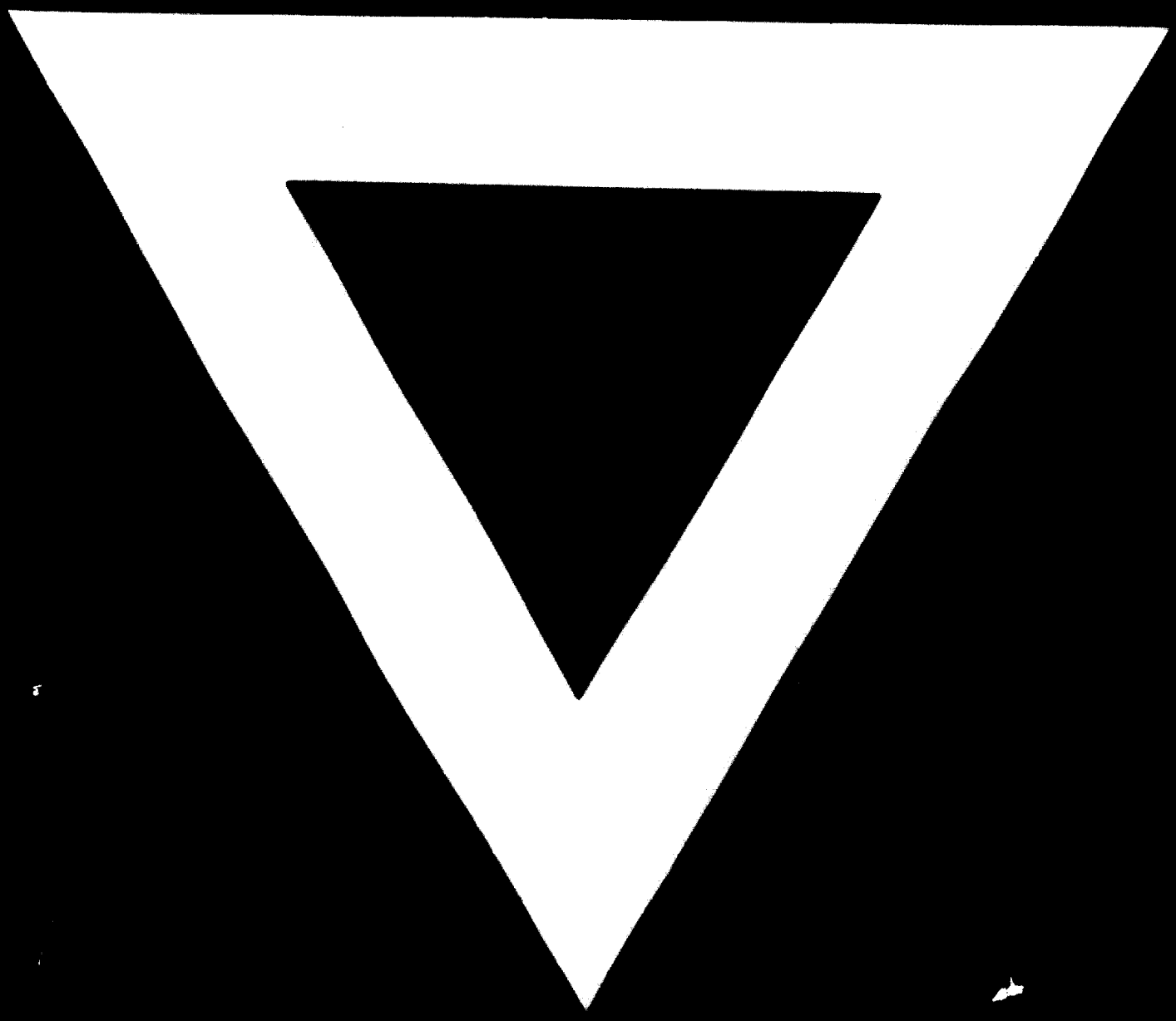
Great Britain, in countries producing for exports beside very high local needs, like USA, Japan, France, Italy, Israel, and in countries where the whole orientation is to cover local needs without high exports, I think we must classify Yugoslavia in this group even if we had or have exports in copper sulphate, DDT, mercury compounds, DNOC and triazines. Future trends in development of pesticide industry in our country will depend strongly on progress in agriculture, on profitability of agricultural production, on possible arrangements for exports to other countries and on further improvement in living standard.

APPROXIMATE FIGURES OF THE PRODUCTION AND USE OF MAJOR (250 tons/year) PESTICIDES

Country : YUGOSLAVIA

Active Material	Domestic Production Capacity (Active Material)	Current Use tons/year A.M.	Projected Demand for 1975 tons/year A.M.
1. AMINOTRIAZINES	3.000	1.000	2.000
2. COPPER SULPHATE	30.000	14.000	14.000
3. OTHER COPPER COMPOUNDS	700	300	300
4. DDT	1.500	400	600
5. DNOC	400	150	200
6. COLLOIDAL SULPHUR	2.000	1.000	1.000
7. ZINEB	1.200	1.000	1.500
8. ARSENATES	300	20	-
9. MALATHION	-	300	300
10. 2-4-D	-	400	500

Does the country have a pesticide formulation industry ? YES.



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