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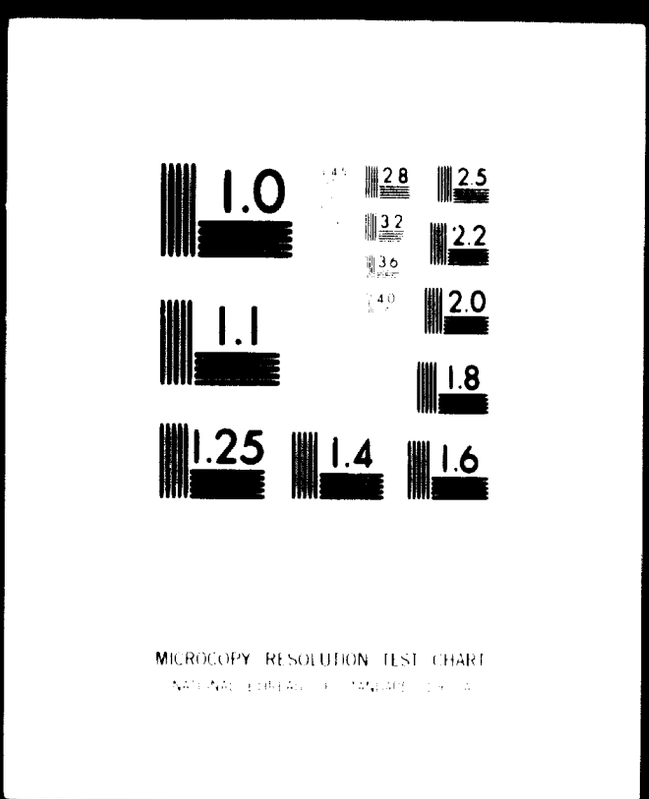

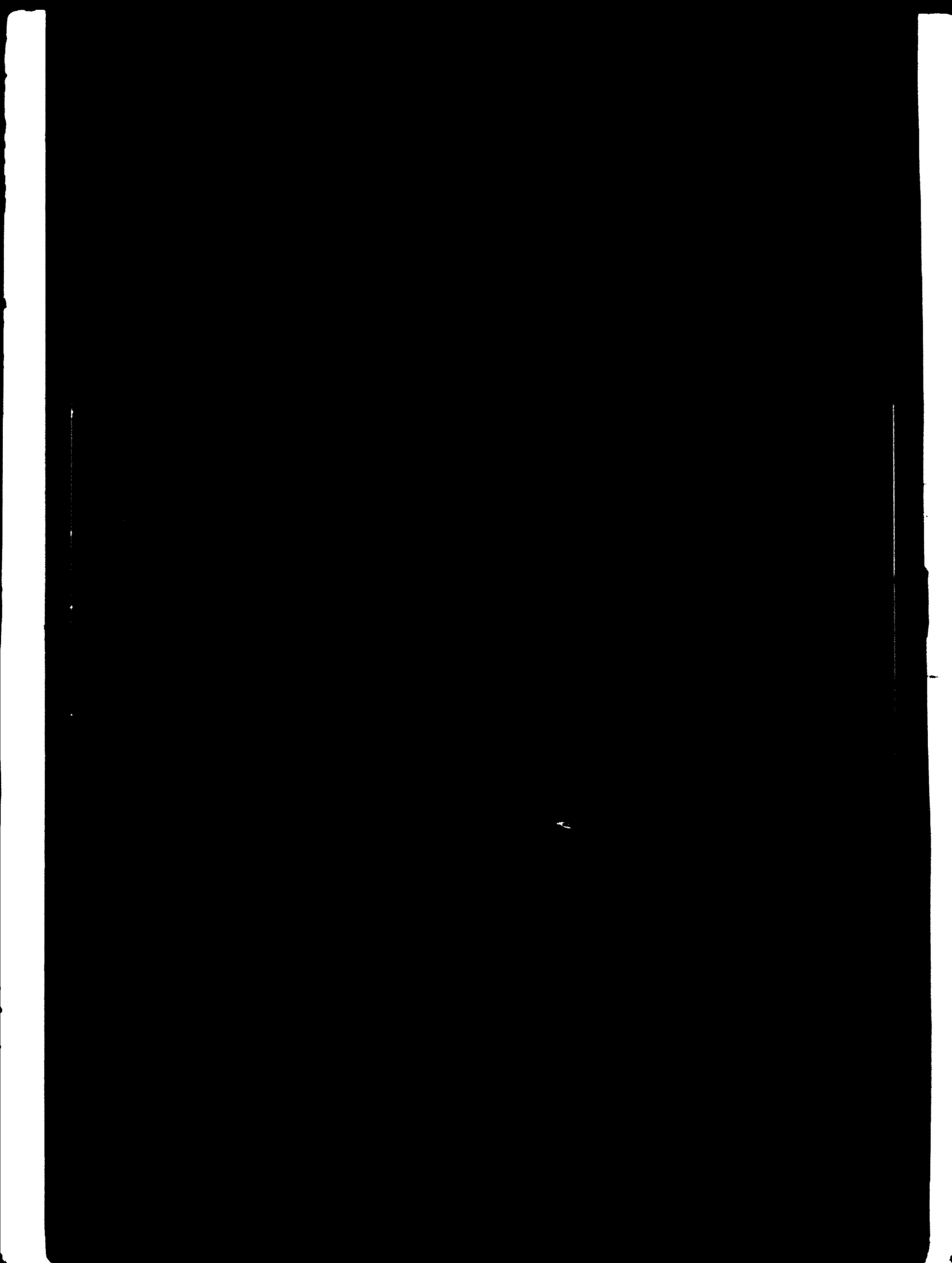

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THE CURRENT SITUATION AND PROSPECTS ON PESTICIDE SUPPLY AND DEMAND AND INVESTMENTS REQUIRED FOR ADEQUATE PESTICIDE PRODUCTION IN DEVELOPING COUNTRIES[1/]

prepared by
the Secretariat of UNIDO

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It is estimated that loss of food grains in the field and in storage owing to insects, rodents, fungus attack and other plant diseases[1/] amounts to about 35 per cent of the total output in developing countries. By the judicious and careful use of plant and grain protection chemicals, this loss could be substantially reduced. Sales of pesticides in the developing countries are still low, they accounted for only about 7 per cent of the total world production, estimated at US $ billion in 1970 and more than US $ 7 billion in 1974. Unfortunately, there are no detailed and reliable statistics available on the use of pesticides and on crop response in different regions of the world. Generally, it is fair to assume that a five-fold return can be expected from the expenditure of applying pesticides judiciously. The higher the yields attained by using high-yielding crop varieties, increasing quantities of fertilizers and irrigation, the more important it is to protect the crops during both the cultivation and storage periods.

For the sake of illustration, 14 developing countries of the ESCAP region, recently covered by UNIDO or UNIDO/FAO joint survey missions, have been listed in table 1 to demonstrate the current and projected pesticide use and production figures in developing countries. (For the purposes of comparison, Japan has been added at the bottom of the table.)

These estimates indicate that pesticide requirements should increase about three and a half times in the region within seven to eight years. Although the great variety of potential formulations renders it almost impossible to estimate the total active material required, this may be put at 140,000 tons[2/] in 1978, based on certain still valid analogies, compared with 29,400 tons per year in 1973. Many countries, such as India, Indonesia, Iran, Malaysia, Pakistan and the Philippines, could start to produce or could increase existing production of active material. The anticipated undercapacity in pesticide formulation of about 100,000 tons will primarily affect those countries which do not possess adequate facilities at the moment (e.g. Afghanistan, Bangladesh, Burma, Indonesia, Nepal and Sri Lanka). In anticipating the need for additional formulation capacities, the possibility of changing use patterns (e.g. granular and microgranular formulations) should be born in mind.

1/ Weeds excluded

2/ One ton = 1000 kg

TABLE 1

Estimates of pesticide use and production in the ESCAP region
(tons per year)

Country	Pesticide consumption 1971/72	Pesticide consumption 1977/78 estimated	Formulation capacity, existing 1973	Active material production capacity 1973
Afghanistan	1,100	2,000	.....	.....
Bangladesh	10,000	40,000	10,000	2,400 sanctioned
Burma	3,460	5,000	.....	.....
India	35,160	77,420	52,000	24,000
Indonesia	4,700	16,300	20,000	.....
Iran	7,000	18,000	8,000	.....
Malaysia	9,354	12,000	10,500	only simple operation e.g. neutralization
Nepal	810	1,500	.....	.....
Pakistan	4,500	16,000	22,000	3,000 sanctioned
Philippines [b/]	15,000	50,000	52,000	.....
Republic of Korea [b/]	3,355	5,000	excess	.....
Republic of Viet Nam [c/]	3,000	8,000	5,000	.....
Sri Lanka [a/]	450	5,000	.....	.....
Thailand	2,820	18,360	12,600	.....
Total for developing countries of Asia	98,710	282,580 [d/]	182,100	29,400
Japan	75,500	35,000	excess [e/]	100,000 (500,000 formulated)

Note : One ton = 1000 kg

a/ From the FAO Production Yearbook, 1972, vol. 26 (Rome, 1973)
b/ Based on active material import figures and future estimates
c/ Based on published national import statistics and future estimates
d/ This increase would be required for a stipulated 50 per cent increase in food production in Asia President's Science Advisory Committee, The World Food Problem, vol III, (Washington, D.C., U.S. Government Printing Office, 1967)
e/ For an industrialized country such as Japan ample capacity that can be readily adapted exists throughout industry.

Increasing pesticide requirements usually result in a change in the pattern of usage of the various pesticide classes, as indicated in table 2. Although these patterns may vary among different developing countries, the general trends may serve as a basis in planning pesticide industries.

TABLE 2

Total pesticide requirement (g/ha)	Pesticide class	Distribution (%)
100	Insecticides	80
	Fungicides	18
	Rodenticides	2 total 100
1000	Insecticides	43
	Fungicides	32
	Herbicides	21
	Fumigants	2
	Rodenticides etc	2 total 100
10000	Insecticides	24
	Fungicides	40
	Herbicides	26
	Fumigants	8
	Rodenticides, etc.	2 total 100

The production of some technical-grade (active material) pesticides is relatively simple using raw materials available in developing countries. Unfortunately, the number of this group is rather limited (e.g. benzene hexachloride, DDT, chlorinated insecticides, phenoxy herbicides, malathion and a few others). For pesticides requiring more sophisticated technology and raw materials, difficulties tend to arise because pesticide manufacturers are sometimes reluctant to release relevant information and know-how.

According to 1970 USA estimates the fixed capital investment for the construction of technical-grade production plant varied from $US 500 to $US 5,000 per ton of product, a good average being about $US 1,500 per ton. The working capital requirement also widely varied from about $US 150 to $US 1,100 per ton, averaging about $US 500 per ton. (All these figures are estimates made in 1970 under United States of America conditions) On the basis of these estimates, the total capital requirement for the above mentioned ESCAP countries to achieve self-sufficiency by 1978 in the production of technical-grade pesticides have been calculated as shown in table 3.

TABLE 3

1973 capacity (ton/yr)	Estimated requirement (1978) (ton/yr)	Increase (ton/yr)	Fixed capital	Working capital	Total capital
			(US million)		
29,400	140,000	111,000	166,5	66.6	233

In pesticide formulation the shortage of capacity by 1978 will reach about 100,000 tons per year in the countries surveyed. Contrary to the case for the production of pesticide technical materials international companies are normally ready to provide the know-how to developing countries in pesticide formulation

Local formulation would lead not only to substantial savings in foreign exchange but also to the use of local raw materials, such as mineral carriers, other diluents and solvents.

The capital requirement is substantially lower in the pesticide formulation industry.

The capital requirement for equipment and physical plant varied from $US 27 per ton to $US 269 per ton of formulated technical material in 1970. Using an average figure of $US 55 per ton, it would require an investment of only about $US 5 5 million to make the region self-sufficient in pesticide formulation and distribution. Considering that value added by formulation amounts to 50 to 70 per cent, local formulation plants seem to be a worthwhile investment even if due to inflationary changes the true capital requirement is 1.5 to 2 times higher today

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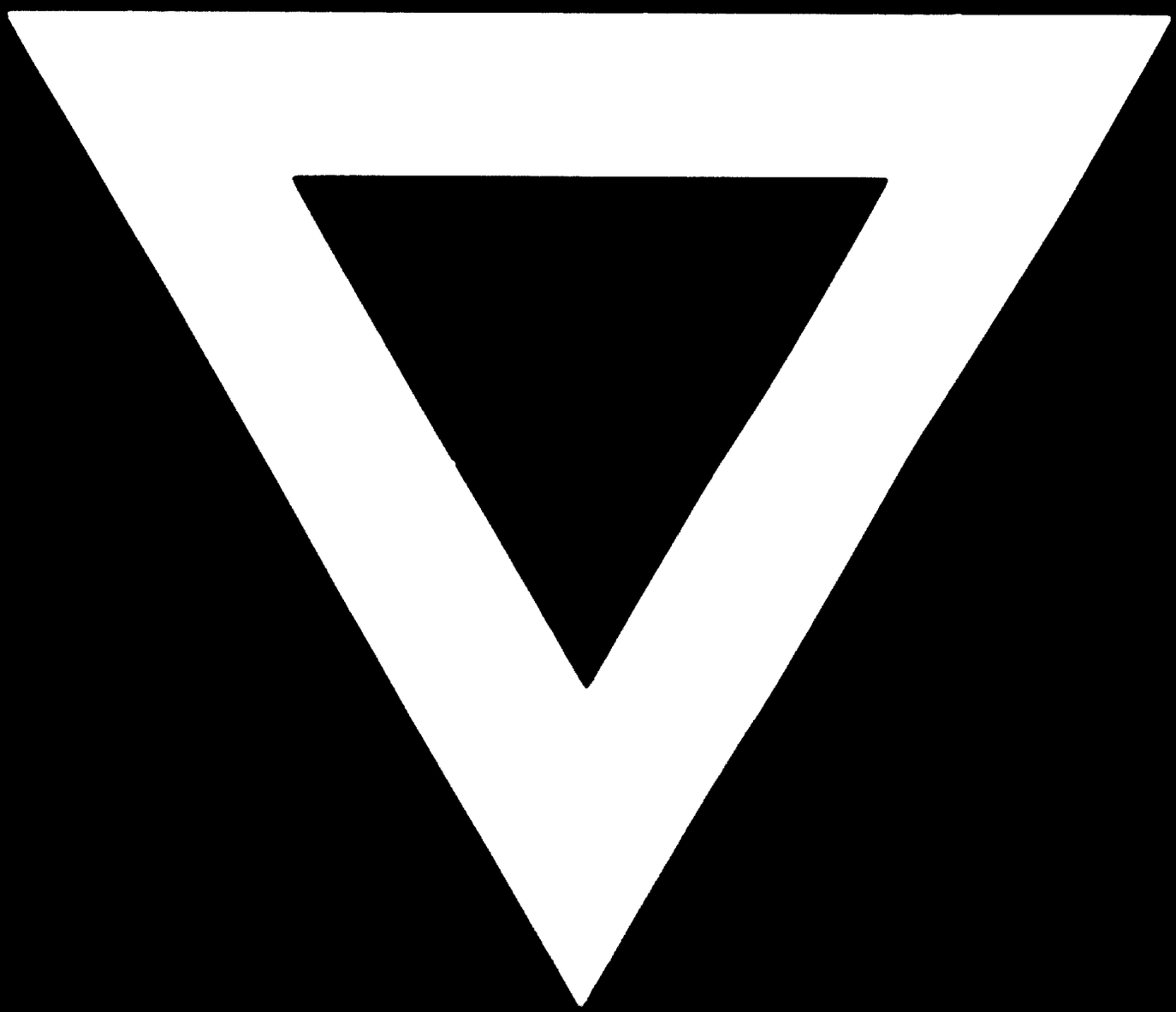

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