Pesticide Supplies and Consumption—1953-54

Despite wide variations in demand from year to year it is now possible to make reasonable advance estimates of minimum and maximum demands for pesticides

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DURING THE PAST several years pesticide manufacturers, along with the chemical industry as a whole, have undergone a period of rapid expansion. A number of pesticides formerly important have been largely superseded and many of the newer materials are more or less competitive. Producers of this changing list of pesticides, the requirements for which are seasonal and largely unpredictable, have had to adjust their operations in order to maintain an adequate production schedule and stock of each chemical ready for sudden outbreaks of insects or plant diseases and for an uncertain export trade, and yet to avoid the storage costs of excessive inventories.

Agricultural demand for pesticides reached an all-time peak in the U. S. in 1950 and early 1951. As a result production of these chemicals rose rapidly and continued to do so well into 1952. Requirements for pest control, however, decreased during mid-1951, and 1952 and 1953 were years of generally low infestations. By 1953 many manufacturers reduced or interrupted production until inventories could be reasonably lowered. In 1954 production was kept at a level (Table I) commensurate with stocks and probable requirements, being reduced when infestations did not materialize or the main season for domestic consumption was past.

Table I. Production and Sales of Organic Pesticidal Chemicals by Basic Manufacturers

Year	Production (1000 Lb.)	Sales (1000 Lb.)
1951	463,998	364,419
1952	417,624	331,315
1953	355,953	334,146
1954	...not yet available...	

SOURCE: U. S. Tariff Commission

Of the older materials, calcium arsenate, manufactured in the U. S. at over 40 million pounds a year in 1950 and 1951, has been produced in subsequent years at the rate of only 8 million pounds or less. Production of lead arsenate was 39 million pounds in 1950 and 25 million pounds in 1951. Because the latter insecticide is still used extensively for some purposes, especially in fruit orchards, nearly 15 million pounds have been made each year since 1951.

Copper sulfate has for many years been used chiefly as the base for making agricultural fungicides to control such diseases as late blight of potatoes which are prevalent in periods of moist weather. However, the dithiocarbamate and other organic fungicides have recently been used more and more in place of the coppers for this purpose. Copper salts serve to provide traces of copper to prevent exanthema of citrus trees in Florida and some other copper deficiency diseases of plants. In some instances when copper has been applied annually in fertilizer used in citrus areas, it has accumulated in injurious proportions and applications must be discontinued. These factors largely explain the present downward trend in shipments of copper sulfate for agricultural use. Annual production of copper sulfate from 1947 to 1950 inclusive averaged 176 million pounds. During the Korean emergency (1951 and 1952) the average was 201 million pounds. In 1953 production was only 145 million pounds and, based on the first 10 months of the year, it was probably only about 130 million pounds in 1954. The drop in the last year appears to have been owing to a reduction of about 15 million pounds in exports. Shipments of copper sulfate for agricultural use, as reported to the Bureau of Mines, were 88 million pounds in 1951 and only 40 million pounds in 1953.

Demand for the newer pesticidal chemicals is dependent upon the infestations against which these materials are useful. Some pesticides, such as DDT, have a broad use base, that is, they are effective against a wider range of pests than others. DDT production rose to

Table II. Preliminary Results of Survey of Stocks of 26 Principal Pesticidal Chemicals in U. S. at End of Growing Season (Sept. 30)

Pesticide	Number of Reports	Total Stocks (Technical plus Mixtures in Terms of Technical) 1953 (1000 lb.)	Total Stocks (Technical plus Mixtures in Terms of Technical) 1954 (1000 lb.)	Mixtures Only, Including Concentrates, Formulations, etc. (in Terms of Technical) 1953 (1000 lb.)	Mixtures Only, Including Concentrates, Formulations, etc. (in Terms of Technical) 19 4 (1000 lb.)
Aldrin (60% equivalent)	55	5,082	2,590	[a]	[a]
Benzene hexachloride (gamma, except lindane)	64	5,563	6,715	1,572	2,022
Calcium arsenate	39	6,381	5,255	670	770
Captan	22	[a]	[a]	[a]	[a]
Chlordan	68	1,307	1,594	586	703
CIPC	22	1,944	1,707	824	699
Copper sulfate	44	15,856	11,389	2,138	1,678
Cryolite	22	[a]	[a]	[a]	[a]
2,4-D (acid equivalent)	48	9,958	8,554	6,602	6,534
DDD (TDE)	48	3,411	2,230	[a]	[a]
DDT	90	20,497	24,933	7,950	8,718
Dieldrin	50	2,998	2,060	[a]	[a]
Dithiocarbamates	43	977	1,073	550	496
Heptachlor	30	1,338	963	[a]	[a]
Lead arsenate	38	9,163	6,297	2,683	1,338
Lindane	59	712	592	118	169
Malathion	59	167	1,571	74	337
Methoxychlor	49	160	269	110	209
Organic mercurials	13	[b]	[b]	[b]	[b]
Parathion	60	1,468	2,095	612	759
Sodium chlorate	12	[b]	[b]	[b]	[b]
Sodium TCA	33	1,216	2,207	[a]	[a]
Soil fumigants	17	[b]	[b]	[b]	[b]
Sulfur, ground	63	26,896	22,852	12,220	13,027
2,4,5-T (acid equivalent)	38	2,792	2,266	1,730	1,539
Toxaphene	65	14,858	9,360	3,467	4,033
Total		149,534	134,641	47,623	50,141

[a] Figures being maintained in confidence, but stocks reported are included in totals.
[b] Figures inadequate, but those reported are included in totals.

106 million pounds in 1951 and has remained at nearly that rate in succeeding years. Benzene hexachloride production in 1951 was 17 million pounds on the basis of gamma content, but dropped to 10 to 11 million pounds a year in 1953 and 1954. Benzene hexachloride is used extensively in mixtures applied for cotton insect control, the requirements for which fluctuate widely with weather conditions.

Numerous other organic chemicals are now important as pesticides. Of these, toxaphene and parathion had a comparatively good season in 1954, and demand for malathion exceeded expectations. Methoxychlor sales were greater than in 1953. Aldrin, dieldrin, endrin, chlordan, TDE, and perhaps others also enjoyed increased consumption in 1954. Demand was good for weed and brush control chemicals. Of the botanicals, pyrethrum was in satisfactory supply. Rotenone (cube root) supplies, however, were rather tight throughout most of the year, but imports being much heavier than for any year since 1951 it is expected that the situation will have eased in 1955.

Preliminary results of a survey of pesticide inventories undertaken by the U. S. Dept. of Agriculture in cooperation with the National Agricultural Chemicals Association are shown in Table II. Carry-over stocks of 26 major pesticidal chemicals were reported by both basic producers and mixers, formulations being given separately but in terms of the technical ingredients. Stocks in the hands of dealers and growers were not taken into consideration since it is believed large amounts are generally not held over by them from one season to another. The survey indicated that over-all inventories, including both technical chemicals and the chemical content of formulations, were 10% lower on Sept. 30, 1954, than on the same date in 1953. Stocks of technical grades of these 26 chemicals in the hands of all reporting manufacturers, including mixers, at the end of the 1954 season amounted to 84 million pounds, a reduction of about 17% from the previous year. These figures are believed to represent between 90 and 95% of actual total inventories in the U. S. at the end of each of the crop years for which reports were made. Over-all stocks on Sept. 30, 1954, were probably about "normal," although inventories of some individual chemicals would be somewhat up or down from normal.

The average annual domestic consumption of agricultural pesticides is higher now than 10 or 15 years ago, in part because chemicals have become available to make practical the control of more pests, in part because more growers have found that they can use pesticides profitably on their crops. However, the rate of growth in pesticide consumption is obscured by annual variations due to fluctuating infestations (Table III). By way of illustration, fertilizers may be applied at about the same rate each year or in increasing quantities, while insecticides are used in enormous amounts in some seasons but little in other years. Such peak years are especially true in the cotton South in contrast to fruit-growing areas where regular spray schedules of a preventive nature are followed.

Sufficient historical data have been collected in recent years upon which to base estimates of minimum requirements of some pesticides for the coming season with a good degree of precision (Table IV). These quantities would be used even if conditions were not generally favorable for the development of insects and plant diseases. Figures stated to be the probable maximum requirements are the quantities not likely to be exceeded in a year of heavy infestations. However, not all of the materials would be consumed at the maximum level in any particular year because all pests do not occur in epidemic numbers in a single season. Stocks and productive capacity are such that all requirements can be met if sufficient warning of infestations is given so that the needed chemicals can be distributed adequately. Only those estimates of requirements are published which will not reveal the operations of individual manufacturers, hence the list in Table IV is relatively short.

The export picture for pesticides during the 1953–54 crop year was dominated by the rise in DDT shipments to foreign countries which amounted to 42,743,000 pounds, an increase of more than 10 million pounds over the previous crop year. Export shipments of copper sulfate were down about 15 million pounds. The basket classification (Bureau of the Census export code B820,590) for agricultural insecticides and similar materials not reported under specific code numbers in the first nine months of 1954 was 77,000,000 pounds compared to 48 million pounds in the same period in 1953. Further export data are shown in Table V.

Table III. Cash Expenditures for Cotton Poison and for Fertilizer and Lime on Commercial Family-Operated Farms in Representative Areas

Region	1947–49 (Average)	1950	1951	1952	1953[a]
Cotton poison:					
Cotton farms, Texas black prairie	$ 69	$168	$240	$ 77	$ 55
Cotton farms, Texas high plains	22	276	492	276	29
Fertilizer and lime:					
Cotton farms, south Piedmont	453	435	460	471	469
Hog-dairy farms, Corn Belt	160	175	193	233	269

[a] Preliminary

SOURCE: USDA Agriculture Information Bulletin 128.

Table IV. Production in Crop Year 1953–54 and Domestic Requirements for Consumption of Some Major Pesticidal Chemicals in 1954–55

Material	1953–54 Production (1000 Lb.)	1954–55 Agricultural Requirements[a] Minimum (1000 lb.)	1954–55 Agricultural Requirements[a] Probable maximum (1000 lb.)
Benzene hexachloride (gamma basis)	9,700	8,000	10,000
Calcium arsenate	...	5,000	10,000
Copper sulfate[b]	133,568	40,000	65,000
2,4-D (acid basis)	25,000	23,000	25,000
DDT	90,712	65,000	70,000
Lead arsenate	14,700	16,000	20,000
Parathion	...	3,000	3,500
Pyrethrum (flowers only)[c]	6,762	7,000	7,500
Rotenone (roots)[c]	6,428	5,000	6,000
2,4,5-T (acid basis)	2,500	3,000	3,500

[a] Revised estimates.
[b] Includes trace element used in plant nutrition.
[c] Imports; considerable imports of pyrethrum extracts are not included.

Table V. Pesticide Exports from January to September Inclusive in 1953 and 1954

Material	1953 (1000 Lb.)	1954 (1000 Lb.)
Benzene hexachloride (gamma basis)	1,533	1,771
Copper sulfate	52,634	44,493
DDT	23,784	35,117
Formulations of 20% or more sulfur	26,260	9,677
Agricultural sulfur	19,211	22,375
Weed killers	10,840	12,307

SOURCE: U. S. Department of Commerce.