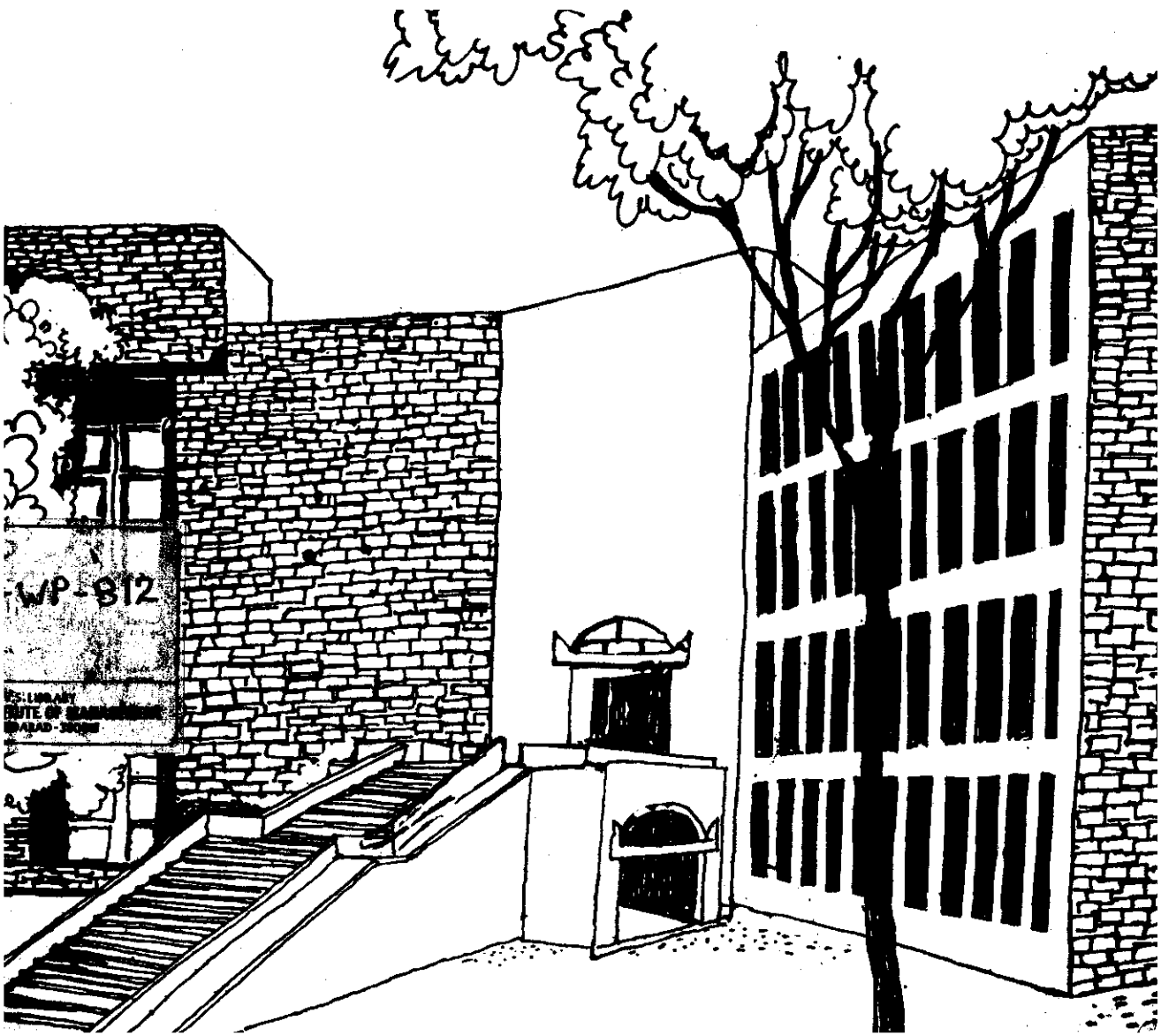
Working Paper



AN OVERVIEW OF PESTICIDES INDUSTRY AND MARKETING ENVIRONMENT

By

U. K. Srivastava

&

N. T. Patel

W P No. 812
July 1989

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 056
INDIA

UK Srivastava
NT Patel

Pesticides are broadly classified into 5 major groups: (1)Insecticides,(2)Fungicides, (3)Herbicides,(4)Rodenticides, and (5) Fumigants.The constituents of this industry include Technical Grade Material Manufacturers, Formulators, Dealers (sale points) and consumers.

This paper attempts to highlight the growth of the pesticides industry, changes in the product mix, market concentration, flow of materials, problem of various constituents and the emerging market scenario.

The paper comprises of seven parts. Part I analyses the growth of pesticides industry for the last 20 years. Part II studies use and spatial distribution of pesticides. Part III presents the structure of the pesticide industry. Part IV examines market development and sales promotion. Part V deals with the problems faced by the Technical Grade Material Manufacturers, Formulators, Dealers and Farmers. Part VI studies the role of manufacturers/formulators in education of dealers/farmers, and Part VII looks at the emerging marketing scenario.

I Growth of Pesticides Industry

Since inception, considerable emphasis has been given to self-reliance in the production of technical grade pesticides. The installed capacity increased from 19,280 tonnes in 1966 to

---

* This paper has been prepared for presentation in seminar on "Marketing of Agro Inputs" organised by Pesticide Formulators Association of India, Bombay on 1st July 1989 at Bombay.

1,02,328 tonnes in 1985-86 (Table 1) showing a 8.3% annual rate of growth. The production of technical grade pesticides has increased from 13,948 tonnes in 1966 to 54,918 tonnes in 1985-86. Actual production as percentage of installed capacity has declined from 72.34 percent in 1966 to 53.67 percent in 1985-86. The rates of growth of actual production in quantity terms and in value terms are shown in the following estimated equations:

$$(1)\quad \text{Log } Y = 9.636 + \underset{(15.99)*}{0.076}\ t, \qquad R^2 = 0.93$$

Growth rate = 7.6%
(In quantity term)

$$(2)\quad \text{Log } Y = 7.384 + \underset{(15.16)*}{.1261}\ t, \qquad R^2 = 0.97$$

Growth rate = 12.61
(In Value term)

* Figures in bracket indicate t-values

As per above computation, the growth rate in production in quantity and value terms between 1966 and 1985-86 has been 7.6 percent and 12.61 percent, respectively. The growth rate of production in value terms is about 1.66 times of that in quantity terms. A more important feature is that the weightage of BHC and DDT has come down from 52.7 percent in 1966 to 11.5 percent in 1985-86 in value terms (Table 2). The weightage of other products has increased from 7.7 percent in 1966 to 43.8 percent in 1985-86 in quantity terms and from 47.3 percent to 88.5 percent in value terms. This indicates a structural shift from low value products to high value products over the years. Because of this growth of industry in value terms has been 66 per cent higher than that in quantity terms. Imports contributed only Rs. 7.9 crores in 1984-85, out of the total industry turnover of Rs.600 crores. Also 3.9 per cent of the production was exported in 1985-86.

Among the five groups of pesticides, insecticides dominate both in quantity and value terms (Table 3). In 1981-82 the share of insecticides was 89.9 percent but declined to 84.7 percent in 1986-87. In value terms it was 69.7 percent in 1981-82 and rose to 74.8 percent in 1986-87. The share of herbicides and fungicides in terms of quantity has increased from 2.2 percent and 6.1 percent in 1981-82 to 3.8 percent and 8.1 percent in 1985-86 respectively (Table 3). But the share of herbicides and fungicides in value terms has declined from 18.3 percent and 8.5 percent in 1981-82 to 13.3 percent and 5.6 percent in 1985-86 respectively. This indicates herbicides and fungicides have become cheaper between 1981-82 and 1986-87. In all the six years, among the five groups of pesticides, the share of fungicides in the total production of technical grade pesticides in quantity terms remained second and that of herbicides remained third but in value terms it was vice versa.

II Spatial Distribution of Pesticides Use in Agriculture

The percentages of consumption of pesticides in agricultural and non-agricultural sectors are presented in Table 4. Upto 1971, the major portion of the pesticides production was consumed for non-agricultural purposes but this was reversed from 1972 onwards. In 1975-76, 1980-81 and 1983-84 more than 58 percent of the total consumption of pesticides was in the agricultural sector. This indicates that there was rapid growth in the consumption of pesticides in the agricultural sector from 1966 onwards. From 1966 to 1983-84 the average use of pesticides is

about 62.3 percent in the agricultural sector and 37.7 percent in the non-agricultural sector.

The total estimated consumption of pesticides in the agricultural sector for different crops was about Rs. 556.6 crores in 1984-85 (Table 5). Cotton and paddy accounted for 67.3 percent of it. The share of jowar, fruits and vegetables , wheat, arhar and groundnut was 8.9 percent, 7.0 percent, 6.4 percent, 2.8 percent and 2.5 percent in the total consumption of pesticides respectively. The average share of the remaining crops is not more than 0.5 percent.

The data on spatial distribution of consumption of pesticides in agricultural sectors for 1984-85 are presented in Table 6. The consumption of pesticides is very high in Andhra Pradesh accounting for 33.6 per cent of the total pesticides consumption in India. The share of Karnataka, Gujarat and Punjab is about 16.2 percent, 15.2 percent and 11.4 percent respectively. The share of Maharashtra, Haryana and Tamil Nadu is 5.1 percent, 4.7 percent and 3.6 percent respectively. The average share of the remaining states accounts for 1.1 percent only.

III Structure of the Pesticide Industry

The total number of insecticides including fungicides and herbicides in the schedule to the Insecticides Act,1968 was 385 upto July 1987. Out of them 123 had been approved by the registration committee. During the last five years only 42 products are in actual production.

The pesticides produced by technical grade pesticides manufacturers are used as raw materials by formulators and the formulated products are sold through wholesalers and retailers to the farmers (Figure 1). The profile of each of the constitutents of pesticide industry is presented below.

Technical Grade Material Manufacturers

About 79 technical grade materials manufacturers are registered in India. Of them only 51 have been active in recent years. According to the data presented in Table 7, of these 51 companies, 10 companies account for 80 percent of the production of technical grade material in quantity terms and 52.5 percent in value terms. The remaining 41 companies account for 20 percent in quanitity terms and 47.5 percent in value terms.

In quantity terms, among the first 10 top companies Kanoria Chemicals has the highest share (27.3 percent) and Rallis India the lowest share (2.3 percent). But in value terms, Kanoria Chemicals ranks 7th (3.34 percent) and Rallis India 5th (5.68 percent). In value terms, Ciba-Geigy has the highest share (9.82 percent) and Mico farm has the lowest share (1.43 percent). But in quantity terms, Ciba-geigy ranks 6th (4.2 percent) and Mico farm 8th (2.6 percent). This indicates that Karnoria Chemicals, Mico Farm and Tata Chemicals are producing low value products while Ciba-Geigy, Excel and Bayer India are producing high value products.

Information presented in Table 8 indicates that except BHC, Malathion, Ethion, Fenvalerate, Cypermethrin and Aluminium Phospide, most other products have a very marked market concentration in the sense that a company has very predominant share. About 84.5 percent of the total production is concentrated with 16 companies only. Of these 16 companies, 13 have the bulk of the market share of the products group dealt by them. Bayer accounts for the entire production of Parathion Methyl, Metasystox and Fenthion, while HIL, Ciba-Geigy, Travencore Chochin, Indofil and Indian Expo. Ltd. (ACCI) account for the entire production of DDT, DDVP, Copper Oxychloride, Dithion and Paraquat respectively.

To ensure proper distribution of pesticides at reasonable cost to the farmers, a scheme has been introduced under which 50 percent of the total production of technical grade pesticides have to be supplied by the manufacturers to non-associated formulators.

In 1988, to provide important 15 pesticides at lower prices to the farmers, the Goverment of India has allowed the import of these pesticides under the Open General Licence (OGL) Policy. Under this policy, the import duty on these 15 pesticides was reduced from 105 percent to 70 percent. But only IFFCO, KRIBHCO and State Agro Industries Corporations can import these pesticides and that too from specified sources. According to the experience of one of these three agencies, suppliers as specified by the CIB have not been able to fulfill their commitments either in terms of volume or in terms of prices. For example the price

of technical monocrotophos available from Ciba-Geigy, Switzerland before the OGL Policy announcement, ranged from US $ 4.60 - 4.80 with 180 days credit. After the OGL Policy was announced, no credit is available to Indian buyers and the prices have been hiked to US $ 5.60.

From March 1989, the Government of India has raised the import duty on three widely used pesticides namely, monocrotophos, butachlor and methyl parathion technicals from 70 percent to 105 percent. This has again raised the prices of these three technical pesticides.

Some observations on Operations of Technical Grade Material Manufacturers

a) Almost all the companies have been established with foreign financial and technical collaborations. Not a single technical pesticide has been developed in India. The time lag between the development of a technical grade material and its introduction in India is about 5 years.

b) Most companies started with the production of dyestuffs, pharmaceuticals and other products. Later on they took up manufacturing of technical grade pesticides.

c) Most technical grade pesticides manufacturers also formulate pesticides, particularly those materials where it extends their market concentration.

d) The cost of a plant to produce technical grade pesticides varies from Rs.3 to Rs.4 crores. Once a product becomes

obsolete, the existing plant can be converted, with minor changes, to produce another technical grade pesticide.

e) The utilisation of installed capacity to produce technical grade pesticides ranges from 20 to 60 percent. This shows under utilisation of installed capacity.

f) The product range of a company is 2 to 6 because the cost of the plant to produce technical grade pesticides is very high.

g) Some companies produce intermediate products and also use them as raw materials to produce technical grade pesticides.

h) It has been observed that on an average the cost of raw materials, processing cost and gross profit is about 60.5 percent, 20.5 percent and 19 percent of the price per kg of technical grade pesticides.

B.Formulators

The pesticides in its original form are highly concentrated. They, therefore cannot be applied directly to the plant/target organism. Formulators convert these pesticides into an applicable form by using suitable solvents. The commonly used formulations can be grouped under the following headings.

Formulations applied after the dilution with water:

a) Soluable Concentrates (S.C)

b) Emulsifiable Concentrates (E.C)

c) Wettable Powders (W.P)

Formulations applied as such

a) Dusts

b) Granules

The total number of registered formulators are about 800. Out of them 160 formulators are associated formulators and the remaining 640 are non-associated formulators. The associated formulators are associated with technical grade material manufacturers and hence get credit and raw materials easily even in the peak season. Not only that, their products receive promotion and market support from the big companies.

Observations on the operations of formulators:

a) No formulator produces all the products registered by him. On an average about 29.5 percent of the total registered products are produced by the formulators of Gujarat and 33 percent by the formulators of Andhra Pradesh.

b) Per unit fixed investment of the Gujarat formulators is about Rs. 11,16,250 and that of the Andhra Pradesh formulators is about Rs. 8,65,000. The average ratio of working capital to total fixed investment is 9.19 for Gujarat formulators and 3.7 for Andhra Pradesh formulators.

c) In this industry 20 percent utilisation of installed capacity is break even point and 35 percent is optimum point.

d) The plants for pesticides formulation are installed for more than required capacity with the assumption that demand for their products will double in the near future. The variation

between the installation costs of high capacity plants and low capacity plants is not linear (proportionate) and there are scale economies.

e) Variation in the price per litre between 250 ml. and 5 litre packs ranges from 0 percent to 16 percent in the case of Gujarat formulators and from 7.0 percent to 29 percent in the case of Andhra Pradesh formulators.

f) One litre packing size is the most common constituting 51.2 percent of the total sale of liquid pesticides for Gujarat formulators and 47.1 percent of that for Andhra Pradesh Formulators.

g) The net return on total investment was 17.4 percent for Gujarat formulators and 11.3 percent for Andhra Pradesh formulators.

h) The average rate of commission given by the formulators to the distributors was 15.5 percent in both the states.

i) Almost all formulators get credit from technical grade material manufacturers on bank guarantee for about 30 days in any season. The rate of cash discount on the purchase of technical grade pesticides was 1.5 percent.

j) Most of the formulators provide credit to their distributors for 30 to 60 days. The rate of cash discount was 1.5 percent per month.

C. Dealers

The end users of pesticides are farmers and households but, except in few cases, formulated products are not sold by formulators directly to them, These products normally reach the

end users via wholesalers/distributors and retailers. Many local formulators sell their products to the distributors and also to the retailers. So such formulators pass on a small percentage of their profits from direct sales to retailers to the concerned area distributors.

The retailing of the pesticides is done by state departments, cooperatives and private dealers. According to the information presented in Seventh Plan Working group report on pesticides , there are 77,080 distribution points of pesticides operated by various agencies. Of them 6.4 percent points are operated by State department, 21.2 percent by cooperatives and 72.4 percent by private traders.

About 52.2 percent of the total sale points of pesticides are located in Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Gujarat and West Bengal.

Observations on the Distributors/Dealers

a) Almost all the distributors of pesticides have retail outlets. Thus they are distributors-cum-retailers.
b) In Gujarat about 30 percent and in Andhra Pradesh 60 percent of the total pesticide dealers are dealing exclusively with pesticides. The remaining have other business besides pesticides. None of the dealers are exclusive dealers of any particular company.
c) One litre packing size is in high demand, as it accounts for 31.59 percent of the total sales of liquid pesticides in

Gujarat and 56.85 percent in Andhra Pradesh.

d) The average sales of pesticides and working capital deployed by Andhra Pradesh dealers are significantly higher than those of Gujarat dealers.

e) As per information presented in Table 9, the variation in the selling price of pesticides per litre between two extreme packing sizes ranges from 3 to 70 percent. Part of this variation is justified because of difference in cost of packaging. Smaller size packings cost more than the larger sizes.

f) The rate of commission received by the distributors on the purchase of pesticides of different formulators varied from 5 to 23 percent and the rate of commission given by the distributors to the dealers varied from 2.5 to 18 percent. Generally, the distributors pass on 5 percent less commission to the dealers (Table 10) in Gujarat. But in Andhra Pradesh the rate of commission received by the dealers varies from 1.0 to 7.5 percent. They believe that profit should be increased by increasing the volume of business.

g) The rate of return on the investment for working capital is about 29.7 percent in the case of Gujarat dealers and 23.5 percent in the case of Andhra Pradesh dealers.

D. Share of various constituents of pesticide Industry in Consumer's Rupee / Overall Turnover

The total turnover of pesticides in India at the final consumption level is about Rs. 556 crores (1984-85). Figure 2

shows the share of various constituents of pesticide industry and Government in the total turnover of pesticides in 1984-85. The technical grade material manufacturers account for Rs. 314 crores, the formulators account for Rs. 66.7 crores, the distributors account for Rs.27.55 crores and the retail outlets account for Rs.55.60 crores in the total turnover of pesticides. Government realised about Rs. 64.9 crores.

In practice, some functionaries performed more than one task. For example, some technical grade material manufacturers also own formulating facilities and distributors and wholesalers also generally maintained a retail outlet in their shops. So the shares of each constituent need to be adjusted for such overlapping functions.

IV Market Development and Sales Promotion

Almost all the technical grade material manufacturers deal directly with formulators. So, there is no marketing channel for technical grade pesticides. The companies have depots in different regions of the country. The supply of technical grade pesticides is made from these depots. Most of these depots are located in the cities where excise duty is nil or minimum.

Market development and sales promotion efforts are needed for the formulated pesticides. The formulators can be grouped in four categories on the basis of their product range and area of market as below:

Ist Category of Formulators Producing more products and marketing at All India Level	IInd Category of Formulators Producing few products and marketing at All India Level
IVth Category of Formulators Producing few products and marketing at district level (Within the State)	IIIrd Category of Formulators Producing more products but marketing at Region or State Level

The different strategies for market development and sales promotion adopted by the formulators of the above four categories are as below:

a) It has been observed that major product promotion efforts are undertaken by category I and II formulators and others tag along the products of the leaders and compete in the market on the basis of prices and commission.

b) Generally, the formulators of the first three categories market their products through distributors/stockists. But the formulators of the last category sell their products to distributors and also to retailers. Sometimes they also deal with big farmers to increase their sales.

c) The rate of commission given by the formulators of the first two categories (maximum 15 percent) is lower than that of the last two categories (maximum 22 percent). The formulators of the last two categories feel that the small formulators can compete with the big formulators by giving higher rate of commission to the distributors and retailers.

d) The price of the products of the formulators of first two categories is comparatively higher (by about 5 percent) than that of the last two categories.

e) To increase the sales of the pesticides, the formulators of the first two categories have area offices in the country. Each area office has one area officer, one or two sales officers, some sales representatives, one field officer and some field assistants. But the formulators of categories 3 and 4 have only sales representaives.

f) It was observed that a few formulators of the last two categories give some percentage of their sales of pesticides to the regulatory machinery at the grass root level to force the dealers to increase the sales of their products.

g) The media for sales promotion adopted by the formulator of the first two categories are newspaper advertisements, pamphlets, leaflets, wall printing, posters, audio cassettes, cinema slides etc. But the media for sales promotion adopted by the formulators of the last two categories are newspaper advertisement,pamphlets and leaflets.

h) The credit provided by the formulators of the first two categories is for 30 days. But the formulators of last two categories provide credit to their customers of 30 to 90 days to compete with the formulators of the first two categories.

i) As the farmers are not well aware about the quality of the products and weight of the packs, some formulators of the last two categories produce substandard quality products and prepare even underweight packs. They do this so

that they can fix low prices and give more commission to their customers. The formulators of the first two categories maintain the quality of their products and generally maintain correct weight in their packs. So, their products are popular among the users.

j) Most of the technical grade manufacturers cum formulators and other formulators do not have any interface with the farmers. Everyone depends on the dealers to push their products.

V Major Problems Faced by Various Constituents of Pesticides Industry

A. Problems faced by Technical Grade Pesticides Manufacturers

The major problems faced by the technical grade material manufacturers are :

a) Registration procedure is very lengthy and costly

b) The high technology involved in the manufacturing process tends to be hazardous requiring special precautions against fire, explosion and toxicity making quality control a critical factor. The products are fundamentally toxic and in some cases dangerous.

c) The demand for pesticides is highly seasonal and so the capacity utilization is low.

d) The pesticide industry is a very high - risk industry. The risks arise in three ways. i) from failure of monsoon and hence of crops; ii) product obsolescence; and iii) obsolescence following development of new and more effective pesticides.

e) The formulators do not lift technical grade pesticides allotted to them under the 50 percent allocation scheme. So, the technical grade material manufacturers not only bear the inventory costs but also face the problem of disposing the stocks.

f) Import duty on intermediates is about 147 percent which is very high.

g) The excise duty on intermediates which are produced and used by the company itself is imposed without any transaction taking place.

h) In the case of some technical pesticides (butachlor) the price of imported product is lower than that of the local product. In this case, it is very difficult for Indian companies to compete in the market in their own country.

i) The data on the technical grade pesticides generated by the company for registration purpose does not enjoy any protection.

B. Problems Faced by the Formulators

The major problems faced by the formulators are :

a) The formulators do not get credit from technical grade materials manufacturers without bank guarantee.

b) Technical grade material manufacturers create short supply of some technical grade pesticides in peak season, so, that they themselves can formulate more and more products and sell in the market. This way they try to reduce competition and create monopoly in the market during the peak season.

c) The tax structure is not uniform throughout the country. This creates problems in fixing prices of raw materials and hence of formulated products.

d) Ban on import of some technical grade pesticides has created a monopoly situation for indigenous manufacturers.

e) Electricity rates are not uniform in this country. For example, the rates in Gujarat are very high. This creates a difference in the cost of formulation of pesticides.

f) There is cut-throat competition in the formulated pesticides market. Therefore, the newer and local formulators produce substandard quality products and keep the price low to survive in the market. This affects the volume of sales of the quality formulators.

g) The lifetime of formulated products is short (one year).

h) Registration procedure is very lengthy, tedious and takes too much time.

i) There is no encouragement from Government to the small formulators. For example, the Government purchases pesticides and distributes it to the farmers at subsidised rates under some schemes. Such purchases are normally made from companies like Ciba, Bayer etc. and not from small formulators.

j) The 50 percent allocation of technical grade material scheme is not helpful to the formulators as they get a letter from the Government about the technical grade pesticides allotted to them in the off-season and not in the peak season.

k) Because of the existance of spurious products in the market , genuine formulators face a lot of problems.

1) In the name of quality control, a lot of harassment from pesticide inspectors takes place.

C. Problems Faced by Dealers

The problems faced by the dealers are:

a) Period of credit (maximum 3 months) is not enough because the farmers are in need of credit for six months, i.e for one complete crop season.

b) The life time of the formulated pesticides is about one year for almost all the products. Once the quantity of pesticides is purchased by the dealer, it is his responsibility to sell before its expiry date. The company is not bound to replace the unsold quantity of pesticides. Thus, the dealer has to either bear the loss or try to sell the outdated stock at a low price.

c) The dealers are not fully trained in the use of appropriate type of pesticides for different crops and for different types of pests attacks.

d) A few local formulators produce substandard quality products and their packings are underweight. This becomes a major problem for dealers. Some dealers have lost their licences because of this.

e) In the name of quality control, pesticide inspectors frequently visit dealers' shops and ask them to sell more of certain products in which they get their commission from the

companies.

f) Some dealers have reported that on an average they had to write-off on an average Rs. 5,000 annually because some farmers were not able to pay back money because of crop failure.

D. Problems Faced by Farmers

The major problems faced by the farmers are:

a) Some farmers have complained about the quality of the products available in the market, because they get sub-standard quality of the products of local formulators.

b) Non-availability of credit is a major problem for farmers. Dealers get credit from the distributors and companies. But they do not give credit to all the farmers as there is no guarantee about repayment. A few well to do farmers get credit.

c) The period of credit is one month in peak and 3 months in the off season. But from the farmers point of view, the normal period of credit should be six months.

d) Most of the farmers are illiterate so they are not able to read the expiry date written on the label in English. Many times, farmers are cheated by dealers who are under pressure to sell all the stock held by them.

e) Farmers lack knowledge about the method of application of pesticides. They are also not able to recognise the pests attack and type of diseases in their crops.

f) The smaller packing size is comparatively costlier than the bigger sizes. Most farmers are small farmers and their

requirement of pesticides is also small at a time. So. every time they have to pay more in relative terms.

g) There is a lot of confusion about the usage of the type and quantity of pesticides to control pests. This is because, for the same pest attack on the same crop, some pesticides which are recommended by the companies are not recommended by the agricultural universities and research institutions. Not only that, there is also significant variation between the dosages recommended by the manufacturers and by the institutions.

VI. Role of Manufacturers/Formulators in Education of Dealers/Farmers

Realising the vital need and special responsibility in this important task of training in the safe and judicious use of pesticides, the manufacturers/formulators, both individually and through their associations have taken up a number of educative steps. These efforts are in two directions . (a) The statutory requirements; and (b) Voluntary efforts.

a. Statutory Provision

As per the Insecticides Act, 1968 and the Insecticides Rule, 1971, the manufacturer has to generate and submit a lot of information on the toxicity and safety of each pesticide in addition to the efficacy data. Such information includes acute,subacute and chronic toxicity data on mammals; toxicity to birds, fish; beneficial species; livestock toxicity; human volunteer exposure studies; persistence/metabolism in soil, water and plant, toxicity of metabolities; and residues on each crop on

which the particular pesticide is used.

However, this information does not reach the common man and he may not be able to understand the implications of such data. Therefore, more important from the consumers' point of view, is the label and leaflet which go along with each package of pesticides. These should include most of the consumer educative information such as: correct use directions, waiting periods, precautions for use, storage, toxicity, symptoms of poisoning, first aid measures, antidotes, disposal of containers and unused chemicals etc. in addition to warning like 'POISON','DANGER','KEEP OUT OF REACH OF CHILDREN' etc. These consumer educative information should be printed on labels and leaflets not only in English but also in a few regional languages.

b. Voluntary efforts

Recognising the industry's social responsibilities in the important task of education of consumers and the users, the manufacturers and their association have organised training programmes for officials of the Agricultural Departments, extension Workers, Village Level Workers, Dealers and Farmers.

The Pesticides Association of India has been imparting specialised training on the safe and judicious use of pesticide to the agricultural extension officers of various states since 1985. The curriculum includes handling, storage, transport and safe use of pesticides, which form a major part of the programme. Much more efforts need to be undertaken to educate the extension workers, village level workers, dealers, and farmers in safe and

judicious use of pesticides in Agriculture.

VII Emerging Marketing Scenario

As brought out above, the pesticides industry has grown rapidly during the last 20 years. It has also undergone structural change from low value products to high value speciality products. Despite this, the use of pesticides is concentrated in selected districts of a few states like Andhra Pradesh, Karnataka, Gujarat and Punjab. Even in Andhra Pradesh only Guntur and Prakasham districts account for bulk of pesticides use. States like Assam, Bihar, Madhya Pradesh and Rajasthan each account for one percent or less of the total pesticides used in the country.

It was also observed that bulk of the pesticides used in agriculture were accounted for by crops like paddy and cotton. The crops which account for less than one percent of the use are sugarcane, barley, rape and mustard, tobacco, gram etc. Plantation crops like rubber, topioca, coconut and spices more or less have remained untapped crops as far as pesticides are concerned.

The pesticides use pattern is very similar to that of fertilisers which also display geographical and crop concentrations. This is understandable because marketers usually tap the markets with more potential and easier access first. This pattern, however, has to undergo a major change during the next

decade of agricultural development.

During the VIIIth Plan the emphasis is going to be on the acceleration of agricultural growth in rainfeed areas, eastern regions and crops like oilseeds and pulses which have recieved much less attention. This process has already begun with the identification of 66 districts for intensive development. Efforts have also been made to deleniate 15 agro-climatic regions for promotion of optimal cropping mix. This scenario opens up new opportunities and challenges for the pesticides industry.

The industry will have to generate guidelines for economical use of pesticides to crops grown in disadvantaged regions. This has to be supplemented by development of crop specific products, pricing and promotion of these products in relation to the crop profitabilities in the disadvantaged regions. All these amount to a challenge to industry to participate in the national effort by lending a helping hand in developing the market for pesticides among the target regions and crops hitherto untapped.

Market development efforts are time consuming and cost intensive. As the industry is presently dependent on distributors and dealers to push their products, a challenge may not be automatically taken up because the turnover per outlet in disadvantaged regions is going to be much smaller than the traditional pesticide used intensive regions. Similarly, the promotional cost is also going to be high. Perhaps the pesticides industry also needs governmental support for market development, as in the case of fertilizer industry which has recently been

given such support by the Government.

To sum up, there is vast scope for accelerating consumption of pesticides by diversifying to hitherto untapped regions and crops but this calls for a major market development effort on the part of industry. The above analysis also indicates the problems faced by various constituents of pesticides industry and these have to be resolved so that the industry can take up the challenge and the opportunities in more effective ways. The initiative for resolving these problems need to be taken up by various constituents of the industry itself.

Table 1 : INSTALLED CAPACITY AND PRODUCTION OF TECHNICAL GRADE PESTICIDES

(Quantity in Tonnes)
(Value in Lakhs)

Year	Installed Capacity	Production Qty. in Tonnes	Capacity Utilization (%)	Value of Production in lakhs *
1966	19280	13948	72.34	3161.14
1971	42973	24908	57.96	5411.77
1975-76	50050	35036	70.00	8244.58
1980-81	74850	43281	57.82	14726.42
1981-82	81640	49414	60.53	24795.25
1982-83	90940	57926	63.70	28791.36
1983-84	96890	59730	61.65	31554.42
1984-85	99122	58416	58.93	30433.40
1985-86	102328	54918	53.67	34135.60

Source: Indian Chemicals Statistics, 1986-87, Department of Chemicals and Petrochemicals, Ministry of Industry, Government of India, New Delhi. Page 96.

* The value of the production is computed at the constant prices prevailing in 1985-86/1986-87.

Table 2 : PRODUCTION OF TECHNICAL GRADE PESTICIDES

(Quantity in Tonnes)
(Value in Lakhs)*

Year	BHC and DDT Production		Other Products Production		Total Production	
	Qty.	Value	Qty.	Value	Qty.	Value
1966	9911 (82.3)	1665.69 (52.7)	4037 (7.7)	1495.45 (47.3)	13948 (100)	3161.14 (100)
1971	20365 (81.8)	2799.00 (51.7)	4543 (18.2)	2612.77 (48.3)	24908 (100)	5411.77 (100)
1975-76	28345 (80.9)	3498.20 (42.4)	6691 (19.1)	4746.38 (57.6)	35036 (100)	8244.58 (100)
1980-81	32761 (75.7)	3706.14 (25.2)	10520 (24.3)	11020.28 (74.8)	43281 (100)	14726.42 (100)
1985-86	30887 (56.2)	3933.69 (11.5)	24032 (43.8)	30201.91 (88.5)	54918 (100)	34135.60 (100)

Source: Monitoring and Evaluation (Chem.) Cell, Department of Chemicals and Petrochemicals, Ministry of Industry, Government of India, New Delhi.

* Value is computed at the constant prices prevailing in 1985-86/1986-87. Figures in bracket indicate percentage to total.

Table 3 : PERCENTAGE SHARE OF DIFFERENT GROUP OF TECHNICAL GRADE PESTICIDES IN TOTAL PRODUCTION

(Percentage)

Year		Total Production Qty.- Tonnes Value- lakhs	Percentage Share of Insecticides	Herbicides/ Wredicides	Fungicides	Fumigants	Rodenticides & others
1981-82	Qty.	49733	89.9	2.2	6.1	1.2	0.6
	Value	24795.25	69.7	18.3	8.5	2.8	0.7
1982-83	Qty.	58471	91.3	1.8	5.1	1.2	0.6
	Value	28791.36	76.2	13.4	6.9	2.0	1.5
1983-84	Qty.	60254	90.4	2.2	5.0	1.8	0.6
	Value	31554.42	74.6	13.7	6.8	4.2	0.7
1984-85	Qty.	58609	87.9	2.7	6.7	2.0	0.7
	Value	30433.40	76.0	8.6	9.5	4.8	1.1
1985-86	Qty.	54918	87.2	3.3	7.0	2.0	0.5
	Value	34135.60	77.0	9.7	8.8	3.9	0.6
1986-87	Qty.	56186	84.7	3.8	8.1	2.6	0.8
	Value	30597.57	74.8	13.4	5.6	5.4	0.8

Table 4 : CONSUMPTION OF PESTICIDES IN AGRICULTURAL AND NON-AGRICULTURAL SECTORS

(in percentage)

Year	Percentage of Consumption of Pesticides to total Consumption	
	For Agri.	For Non-Agri.
1966	45.5	54.5
1971	41.6	58.4
1975-76	73.8	26.2
1980-81	58.4	41.6
1983-84	61.5	38.5
Overall	62.3	37.7

Source: Indian Chemicals Statistics, 1986-87, Department of Chemicals and Petrochemicals, Ministry of Industry, Government of India, New Delhi, p.96.

Table 5 : CROPWISE CONSUMPTION OF PESTICIDES FOR 1984-85

Crop	Estimated Pesticides Consumption in Million Rs.	Percentage to total Pesticides Consumption
1. Cotton	2472.13	44.5
2. Paddy	1272.05	22.8
3. Jowar	495.40	8.9
4. Wheat	354.18	6.4
5. Fruits & Vegetables	387.38	7.0
6. Arhar	155.20	2.8
7. Groundnut	136.84	2.5
Sub Total	5272.74	94.9
8. Other Crops	283.63	5.1
Total	5556.37	100.0

Note: Cropwise Consumption of pesticides is estimated on the basis of data collected on per hactare use of pesticides for different crops in different states. The source of these data is Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, New Delhi.

Table 6 : STATEWISE CONSUMPTION OF PESTICIDES FOR 1984-85

State	Estimated Pesticides Consumption in Million Rs.	Percentage to total Pesticides Consumption
1. U.P.	96.28	1.7
2. Bihar	46.67	0.8
3. Assam	15.28	0.3
4. West Bengal	163.58	2.9
5. Madhya Pradesh	56.24	1.0
6. Orissa	108.23	2.0
7. Karnataka	899.73	16.2
8. Tamil Nadu	197.45	3.6
9. Punjab	633.91	11.4
10. Andhra Pradesh	1865.03	33.6
11. Haryana	257.82	4.7
12. Himachal Pradesh	7.10	0.1
13. Rajasthan	7.13	0.1
14. Maharashtra	285.24	5.1
15. Gujarat	842.71	15.2
16. Kerala	73.97	1.3
Total	5556.37	100.0

Note: Statewise Consumption of Pesticides is estimated on the basis of data collected on per hectare use of pesticides for different crops in different states and the area under cultivation of different crops in different states. The source of data is Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India, New Delhi.

Table 7 : MARKET CONCENTRATION IN TOTAL PRODUCTION OF TECHNICAL GRADE MATERIALS IN TERMS OF QUANTITY AND VALUE (1985-86)

Company	% Share of the company (in terms of Qty.)	Company	% share of the company (in terms of value)
1. Kanoria Chemicals	27.3	1. Ciba Geigy	9.82
2. Hindustan Insecticides Ltd.	16.6	2. Excel	8.80
3. Tata Chemicals	12.4	3. Hindustan Insecticides Ltd.	8.40
4. Excel	4.4	4. Bayer	6.80
5. Indofil	4.2	5. Rallis India	5.68
6. Ciba-Geigy	4.2	6. Indofil	3.66
7. Bayer	3.9	7. Kanoria Chemicals	3.34
8. Mico Farm	2.6	8. Cynamid	2.93
9. Cynamid	2.4	9. Tata Chemicals	1.66
10. Rallis India	2.3	10. Mico Farm	1.43
Total of 10 Companies	80.3		52.52
Remaining Companies	19.7		47.48
Total Production	54918 Tonnes		Rs.34135.61 lakhs

Table 8 : MARKET CONCENTRATION (1985-86) FOR IMPORTANT TECHNICAL GRADE MATERIALS

Sl. No.	Technical Grade Material	Name of Company	Market Concentration % share of market
1.	BHC	Kanoria Chemicals	58%
2.	DDT	Hindustan Insecticides Ltd.	100%
3.	Malathion	FICOM Organics	28%
4.	Parathion Methyl	Bayer	99.8%
5.	Metasystox	Bayer	100%
6.	Fenthion	Bayer	100%
7.	Dimethoate	Rallis India	77.4%
8.	DDVP	Ciba-Geigy	100%
9.	Quinalphos	Sandoz	84.5%
10.	Monocrotophos	Ciba-Geigy	45.1%
11.	Phosphamidon	Ciba-Geigy	75.5%
12.	Thimet Phorate	Cyanamid	62.9%
13.	Ethion	Shaw Wallance	39.4%
14.	Endosulphan	Excel	70.1%
15.	Fenvalerate	Gujarat Insecticides Ltd.	31.3%
16.	Cypermethrin	Bharat Pulverising	38.7%
17.	Copper Oxychloride	Travan Chochin	100%
18.	Dithon	Indofil	100%
19.	Paraquat	Indian Expo. Ltd. (ACCI)	100%
20.	Aluminium Phosphide	United Phos. Pvt.Ltd.	54.4%
	Total Production of 20 products = 51811 tonnes		
	Total production of remaining products = 3037 tonnes		
	Grand Total 54918 tonnes		
	Share of 20 products in Total Production 84.5%		

Source: Monitoring and Evaluation (Chem.) Cell, Department of Chemicals and Petrochemicals, Ministry of Industry, Government of India, New Delhi.

Table 9 : PRICE VARIATION BETWEEN TWO EXTREME PACKING SIZES OF DIFFERENT PESTICIDES

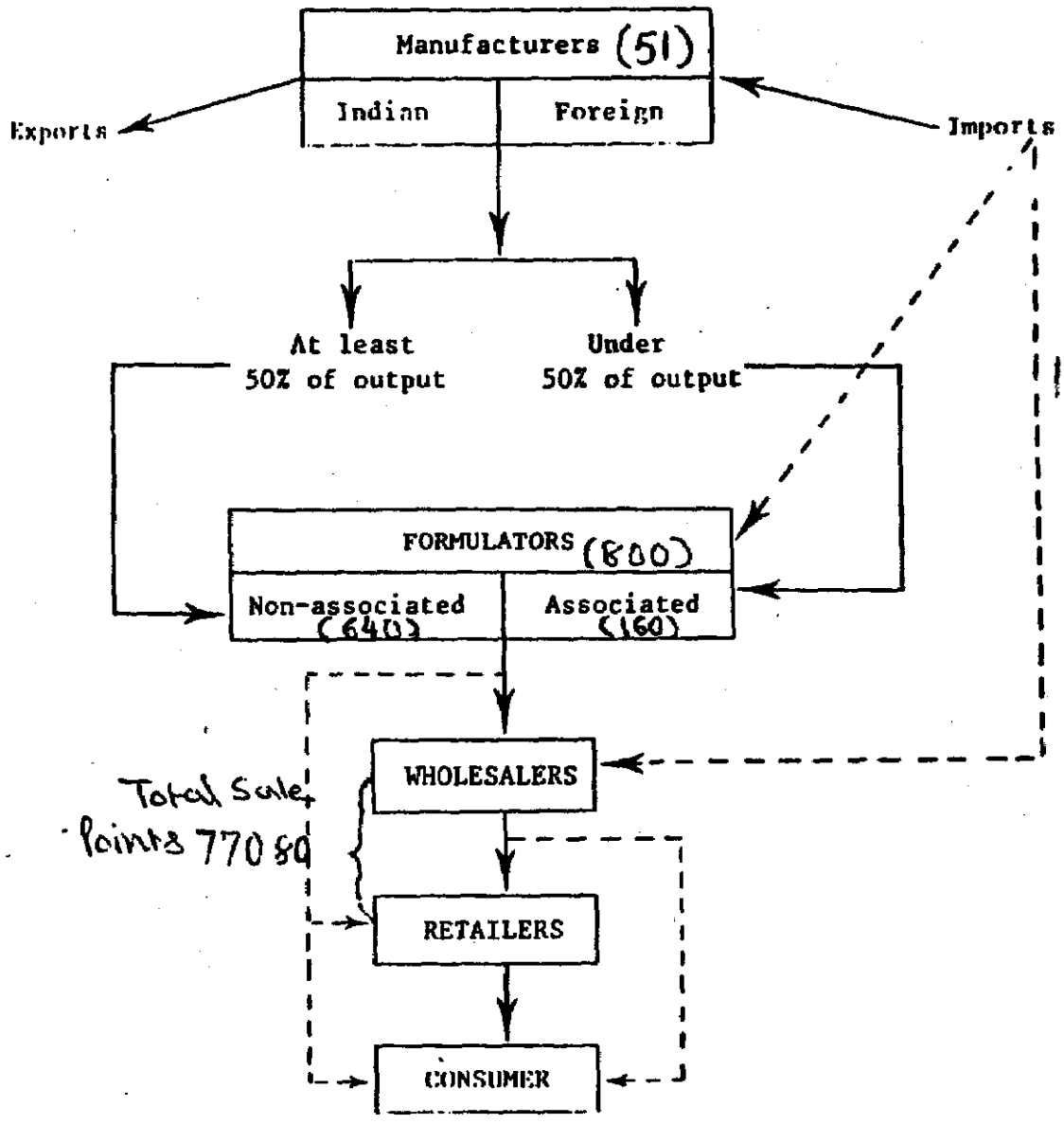
Name of the Pesticides	Range of the price variation Gujarat	Andhra Pradesh
1. Aldrin 30% EC	15% - 70%	--
2. Endosulfan 35% EC	20% - 70%	10% - 70%
3. DDVP 76% EC	10% - 20%	3% - 15%
4. Monocrotophos 36% EC	10% - 50%	5% - 70%
5. Cypermethrin 10% EC	3% - 30%	3% - 15%
6. Cypermethrin 25% EC	15% - 40%	3% - 15%
7. Fenvalerate 20% EC	5% - 70%	3% - 30%
8. Dimethoats 30% EC	40% - 70%	15% - 50%
9. Quinalphos 25% EC	25% - 70%	3% - 40%
10. Phosphamidon 85% EC	25% - 70%	10% - 40%
11. Methyl Parathion 50% EC	15% - 70%	15% - 50%
12. Decamethrin 2.8% EC	25% - 30%	3% - 15%
13. Ethion 50% EC	3% - 25%	10% - 15%
14. Chloropyrifos 20% EC	20% - 25%	5% - 20%
15. Oxydemeton Methyl 25% EC	--	10% - 20%
16. Phosalone 35% EC	--	20% - 30%
17. Dicofil 18.5% EC	20% - 25%	15% - 50%
18. Dimethyl-O-Demetone 25% EC	20% - 40%	---
19. Malathion 50% EC	50% - 70%	---

Table 10 : RATE OF COMMISSION RECEIVED BY DISTRIBUTORS ON THE PURCHASE OF PESTICIDES OF DIFFERENT COMPANIES

Company	Rate of Commission Received from Company	Rate of Commission Given to the Dealer
1. Kundan Pesticides	22%	16%
2. Devidayal	20%	15%
3. Rallis India	15%	10%
4. United Phosphurus	17%	12.5%
5. I.C.I.	23%	18%
6. Wockhardt Ltd.	22%	17%
7. Sudarsan	17.5%	12.5%
8. Imkemex	5%	2.5%
9. Hindustan Antibiotic	20%	15%
10. Gujarat Agro Chemicals	15%	12%

Figure: 1: **PESTICIDE INDUSTRY**

The scheme of manufacture and distribution is as follows:



Primary route

Secondary route

FIGURE 2 : SHARE OF VARIOUS CONSTITUENTS OF PESTICIDES INDUSTRY IN CONSUMER'S RUPEE