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16605

DP/ID/SER.A/965
5 February 1988
ENGLISH

PESTICIDE DEVELOPMENT PROGRAMME IN INDIA

DP/IND/80/037

INDIA

Technical report: Market study*

Prepared for the Government of India
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of E.M. Godbold
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V.88-21230

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Abstract

Substantially influenced by recent poor monsoons, growth in the Indian market, in real terms, has been, perhaps, at a maximum of 6% per annum in the past five years, but may have been slightly negative. Arising from the disaster at Bhopal, the technical excellence of the synthetic pyrethroids, increasing awareness of the limitations of the chlorinated hydrocarbons and the value of fungicides and herbicides, significant changes have taken place in the importance of different products during this period. The rate at which the use of individual products grows can be several times the average, both in the conventional and expanding areas of the market.

Although it will continue to vary on a year to year basis, market growth may be better in the next five years, given better monsoons. Growth is likely, however, to continue to be constrained by lack of potential new products, severe competition and failure to maintain a generally adequate level of product quality, particularly in the small scale sector. There is likely to be less change in the relative importance of the different products in the next five years than in the last five.

A number of marketing strategies have been briefly examined and one based on 14 products proposed for detailed examination. The strategy is based initially on effective buying and marketing, working back to support manufacture, product differentiation by novel formulations and a long term effort to obtain novel chemicals at an early stage from international, small research organisations lacking development capability. Risk avoidance techniques are an important component of the marketing strategy.

Capturing tender business and selling on the basis of specification and price to independent formulators in developing countries is the most immediate and economical strategy for exports.

ACKNOWLEDGEMENT

I would like to thank the many members of Hindustan Insecticides Ltd, including those at PDPI, Gurgaon, who gave freely of their time and advice to provide most welcome help in carrying out the mission. I would also like to thank those who typed the first draft of this report.

Note Unless otherwise stated 1US $ = Rs12.95

INTRODUCTION

As part of its contribution to the Indian Pesticide Development Programme, now established at Gurgaon, with UNDP assistance, this organisation agreed to provide an expert to undertake a study of the Indian pesticide market. For this purpose the author made a second visit to India (the first took place in late 1982) from November 18 to December 18 1987 with the following remit:

"As Marketing Consultant in New Delhi (India), with travel to Gurgaon, he will be responsible for studying marketing practices in the pesticide field in the country and providing guidelines for improving pesticide sales in and outside the country. He will work under the the general direction of the UN project Manager. He will have to submit a report on his activities during the mission and his recommendations."

In the event the visit was mainly concerned with the development of a marketing strategy in agriculture for a company such as the Indian national pesticide company,Hindustan Insecticides Ltd. For this purpose the author studied the current HIL marketing strstegy and available background data, visited the pesticide industry associations and a number of commercial houses in New Delhi and Bombay.

This report is essentially a follow up of the previous visit. It describes the current background to the pesticide market, notes changes that have occurred since the previous visit and discusses the implications arising therefrom for the development of a marketing strategy.

RECOMMENDATIONS

1 The value of market informationn should be improved by expressing weights of pesticides in terms of 100% active ingredient equivalent.

2 Market studies should include detailed assessment in monetary terms including the correction of such data for inflation so as to measure real growth.

3 Whatever can be done by government and industry jointly and/or separately, should be done to ensure that a proper level of quality of pesticides is maintained in the market place.

4 A marketing strategy based on a range of 14 products (the insecticides acephate, dimethoate or phosphamidon,endosulfan,monocrotophos, a new synthetic pyrethroid, phorate and dicofol; the weedkillers butachlor, isoproturon,2,4 D and glyphosate and the fungicides carboxin, dodine and mancozeb) should be the subject of a detailed feasibility study.

5 The formulation of a Strategic Market Plan should pay particular attention to risk avoidance policies.

6 The strategy should be strengthened by in house manufacture of the most successful products and the product range itself be differentiated from similar products by the establishment of a strong brand image, marketing of special formulations, i.e. those being developed at PDPI, and, in the long term, by attempting to acquire development rights for new chemicals from international research organisations lacking develpoment capability.

7 The strategy for exports should concentrate on tender business and sales of technical materials to independent formulators in developing countries.

1. THE BACKGROUND TO PESTICIDE DEMAND AGRICULTURE AND THE SEVENTH FIVE YEAR PLAN

Under the Seventh Five Year Plan, agriculture is targetted to grow by 4% per annum with a substantial part of this growth coming from small and marginal farmers with (1) the aim of reducing the risk of low output in poor years by spreading agricultural production more widely and (2) improving the standard of living of the rural population.

A particular target for improvement is,for example, rice growing in the east. Production of this crop is expected to increase by 4.0 to 4.6% per annum. Other crops for which increases of 4.0% or more are expected include wheat,oilseeds, cotton, jute and mesta and rubber. Substantial increases are also planned for sugar cane (3.8% per annum) and tea (3.5%). (Annexure 1)

In view of the limited amount of additional land available to bring into cultivation, practically all the increases must come from improvements in yield. This is to be brought about by a combination of improvements including providing greater security of tenure, consolidating land reform, increased irrigation (+13m ha), better provision for the distribution of inputs and an enhanced extension service.

Inputs which are to be much increased include more use of improved seeds especially HYV and more fertiliser.

The main agricultural plan makes reference to to increasing pesticides from a base level of 50,000 t. technical grade to 75,000 t. (8.5% per annum) and that integrated pest management will be encouraged.

2 PLANT CAPACITY AND UTILISATION (Annexure 2)

Table 1 summarise the installed plant capacity at 1/10/1986 compared with 1/7/1982 and indicates the level of utilisation in 1986/87.

Table 1

Installed Plant Capacity 1/7/82 and 1/10/86,
Production 1986/87 and Percentage Utilisation

	Installed capacity t		Change %	Production t	Utilisation %
	1/7/82	1/10/86		1986/87	
Insecticides/ acaricides	73,424	89,406	22	47,602	53**
Fungicides	12,810	12,934	1	4,552	
Herbicides/ PGRS	4,040	6,139*	52	2,151	
Rodenticides	1,294	1,334	3	429	32
Fumigants	2,378	2,378		1,452	53**
Total	92,946	112,201	21	56,186	50

* Now increased by 800/900t by extra capacity for butachlor, i.e. an increase of 72/74%.

** In the absence of data from some plants, these are underestimates.

Overall plant capacity has increased by 21%, the most significant being in herbicides. Taking into account that a propanil plant with a capacity of 1500t was said to have been installed in in 1982 but does not appear inthe 1986 data, the increase in herbicide capacity is, including the recent additions for butachlor, equivalent to 177%.

The increase in capacity for insecticides has stemmed from BHC (+13%), phosalone (0 to 1000t), malathion (+28%), phorate (0 to 1050t), monocrotophos (+545%), methyl parathion (+27%), phosphamidon (+27%), quinalphos (+100)%, and the introduction of the synthetic pyrethroids (fenvalerate 0 to 600t and cypermethrin 0 to 300t). The overall change in fungicides disguises a substantial reduction in copper oxychloride (down 26%) and the introduction of kitazin (capacity 200t), captan and difolatan (capacity 200t) and tridemorph (capacity 50t). There are no significant changes in fumigants or rodenticides.

Utilisation of plants is low, at average of something over 50% but there is wide variation between product groups. In some cases (phorate, fenthion, organo mercurials and the dithiocarbamates) production is above, sometimes much above, stated plant capacities. Also this observation does not take account of the fact that new plants, e.g.

isoproturon (42% utilisation) and, perhaps, cypermethrin (43% utilisation) were sized in the context of future demand rather tha current demand. Nevertheless, there appears to be substantial excess capacity for BHC, phosalone, fenitrothion, quinalphos, copper oxychloride, fluchloralin, cycocel and zinc phosphide. Capacity and current production are well balanced in the case of DDT, endosulfan, methyl demeton, monocrotophos and phosphamidon. There is capacity to cope with expansion of demand for all other products including methyl parathion, ethion, the synthetic pyrethroids, paraquat and isoproturon. The situation for butachlor is unclear because of lack of production data.

3 PRODUCTION FOR THE YEARS 1984/85, 1985/6 and 1986/87 (Annexure 3)

Table 2 summarises production data for the three years to 1986/87.

Table 2

Pesticide Production 1984/85, 1985/86 and 1986/87

t technical grade

	1984/85	1985/86	1986/87
Insecticides	51,468	47,885	47,602
Fungicides	3.946	3,828	4,552
Herbicides and PGRS	1,554	1,818	2,151
Rodenticides	335	283	429
Fumigants	1,202	1,106	1,452
Totals	58,565	54,910	56,186

These data indicate that total production was relatively stable over the three years with, perhaps a decline in insecticides and a steady increase in herbicides.

4 IMPORTS OF PESTICIDES (Annexure 4)

Table 3

Imports of Pesticides 1982/83 to 1986/87

t technical grade

	82/83	83/84	84/85	85/86	86/87
Insecticides	1,391	1,354	1,532	1,808	543
Acaricides	90	119	74	133	177
Fungicides	221	295	550	426	293
Herbicides and PGRS	1142	1584	1963	1421	909
Fumigants					17
Totals	2,844	3,352	4,129	2,256	1,933

After rising substantially up to 1984/85, imports in 1986/87 were about 900t below those of 1982/83 with only acaricides substantially above the base year for these data. Over the period imports of pesticides more than halved.

Imports include a wide range of products with little discernable pattern. The most consistent imports, in relatively small quantities, are the chlorinated hydrocarbons aldrin, chlordane and heptachlor plus dichlorvos ,phenthoate, propoxur (for non agricultural use) captan and ediphenphos. In larger quantities, benthiocarb, varying between 108 and 262t per annum, and dicofol, varying between 73 and 165t have been regularly imported over the period.

5 THE USE OF PESTICIDES IN AGRICULTURE 1975/76 to 1986/87

Available data of estimates of the use of pesticides in agriculture from 1975/76 to 1986/87 are shown in Table 4. Estimates for actual use for the years 1982/83 to 1985/86 are not avaible so pre season estimates of use are shown with subjective comments on the season itself. These indicate that consumption was below forecast.

Table 4

Estimates of the Use of Pesticides in Agriculture
1975/76 to 1986/87

Year	t	% change cf previous year
1975/76	58,314	
1976/77	37,713	(37.0)
1977/78	39,880	8.6
1978/79	53,000	32.9
1979/80	42,000	(20.8)
1980/81	40,600	(3.3)
1981/82	51,308	26.0
1982/83	(59,600)	Not very good
1983/84	(62,000)	Not too bad
1984/85	(59,670)	Not very good
1985/86	(66,000)	Not too bad
1986/87	51,995	4.21*

* Average for 1982/83 to 1986/87

Variability in year to year consumption of pesticides and the absense of a substantial amount of information make it impossible to examine the data statistically. Three year moving averages for 1975/76 to 1981/82 (Table 5) suggest steady underlying growth during the period whilst the difference between 1981/82 and 1986/87 suggest a similar phenomenon.

Table 5

Growth in Pesticide Consumption in Agriculture
1975/76 to 1981/82

3 year moving average

Average	t technical	% change
75/76 to 77/78	44,969	
76/77 to 78/79	43,197	(4)
78/79 to 80/81	44,960	4
78/79 to 80/81	45,200	1
79/80 to 81/82	48,302	7

Comparing the detailed data on the consumption of pesticides available to the author (1981/82 v 1986/87) shows significant differences in what has happened in the different product groups. (Table 6).

Table 6

Comparison of Product Groups
1981/82 v 1986/87

t technical grade

	1981/82	1986/87	% Change
Insecticides/ Acaricides	38,962	29,550	(24)
Fungicides	11,233	17,125	52
Herbicides/ PGRS	1,113	3,660	229
Fumigants		1,305	
Rodenticides		305	
	51,308	51,945	1

The absence of data for fumigants and rodenticides for 1981/82 and the fact that the consumption of fungicides for 1986/87 exceeds stated production (Table 1) plus imports (Table 3) suggests these figures must be treated with some reserve. (The anomaly for fungicides may be explained by the fact that data for consumption in 1986/87 include 8000t sulphur dust which may have been excluded from the production data). Nevertheless they illustrate that both fungicides and herbicides particularly have grown substantially from an initial low base. Insecticide consumption has fallen markedly.

The outstanding changes in product use are shown in Table 7; many of them are very large.

Pesticide Use in Agriculture

Major Product Changes
1981/82 v 1986/87

t technical grade

	1981/82	1986/87	% change	% per annum
Insecticides				
BHC	20,000	12,000	(40)	(11)
Carbaryl	3,000	200	(93)	
Chlorpyrifos	120	200	67	11
Cypermethrin		120		
DDT	2,500	1,000	(60)	(17)
Endosulfan	1,700	3,200	88	13
Fenvalerate		400		
Monocrotophos	1,200	2,000	67	11
Phenthoate	200	50	(75)	(24)
Phosphamidon	600	1,400	33	18
Phorate	400	1,200	200	25
Acaricides				
Ethion	80	300	275	30
Dicofol	50	200	300	32
Fungicides				
Mancozeb	1,200	2,500	108	16
Sulphur dust	3,500	8,000	129	18
Sulphur WP	600	1,000	67	11
Ziram	80	200	150	20
Herbicides				
2,4 D	400	800	100	15
Butachlor	650	1,200	85	13
Isoproturon		900		
Paraquat		350		

The interesting feature of these data is that, whilst the total market may be growing at 4% per annum, those products which are growing well are all progressing at more than 10% per annum. Particularly high rates of growth have been achieved by acaricides with both fungicides and herbicides moving strongly upwards. The chlorinated hydrocarbons, DDT and BHC, have declined rapidly although they are reported to have regained some lost ground in the current (1987/88) season.

The changes in insecticides, in which monocrotophos and endosulfan have benefitted, are mainly due to the forced withdrawal of carbaryl from the market coupled with the rapid development of the synthetic pyrethroids due to their technical superiority for the control of bollworms on cotton. The increase in phorate is due to its use in granule form for control of plant hopper and gall midge on rice. Use of acaricides has increased particularly on tea whilst the decline in the use of chlorinated hydrocarbons is due, in the case of BHC, to falling popularity in the use of dusts particularly and, in the case of DDT and in spite of its effectiveness for control of American bollworm, to the fact its use is no longer encouraged by government officials.

In recent years the more sophisticated farmers have begun to move away from the traditional attitude of the essentially curative treatment of insects to include pro active treatment against disease. Control of apple scab, an increasingly important disease, has contributed substantially to this but control of diseases of cotton and rice as well as the traditional use of seed dressings have played a part.

The increase in herbicides results mainly from the well known treatment of wheat with isoproturon and rice with with butachlor. It is interesting that the amount of the, now old, product 2,4 D has risen substantially.

6 THE VALUE OF THE AGRICULTURAL MARKET 1981/82 v 1986/87

Firm data for the value of the agricultural market have not been gathered. It was estimated to have been worth Rs 3,343m (US $265m) in 1981/82 at farmer prices. Estimates for 1986/87 vary between Rs 4000m and Rs 6000m (US $310 to 465m) implying a growth rate of about 11% for the higher figure and 4% for the lower one. These figures do not take account of inflation. At best, after allowing for increases in the wholesale price index for pesticides of +2.6%, +7.5%, +1.1%, +2.6% and +6.2% respectively for the five years 1981/82 to 1986/87, market growth in real terms, is equivalent, at best, to 6.0% per annum at farmer level. At worst, in constant money terms, growth may have been negative (minus 0.5%).

The profitability of the industry is said to have fallen. There is some support for this view from the fall in farmer prices that has taken place in the case of several leading products. Whilst not claimed to be precisely accurate, the following examples were quoted to the author (Table 8).

Table 8

Approximate Farmer Prices
Selected Products

Rs per l or kg

Product	1982/83	Now	% fall
Fenvalerate	500	240	52
Cypermethrin	600	300	50
Decamethrin	800	300	63
Isoproturon	192	97/98	49
Butachlor	120/130	80	36
Monocrotophos	180	125/140	24
Malathion	45	40/42	9

In addition, the cost of raw materials has risen. Increases in duties have contributed substantially. For example, duties on imported raw materials for pesticides are now 147.5% compared with 99.4% in 1981/82 and 100% for imported finished products compared with 85%. One manufacturer suggested that the duties on imported raw materials cost the pesticide industry between Rs 150 and 300m (US $11.6 to 23.2m). Organophosphorus compounds have been particularly affected as illustrated in Table 8 which shows that the price for malathion has remained relatively stable whilst that for parathion has increased.

The main cause of the fall in prices is said to stem from the small scale sector where there is excess formulation capacity so that some firms, who in any case usually sell at low prices are often forced to reduce their inventories by unloading stocks on the market. In one case, at least, isoproturon was put on the market at less than the cost of the raw materials required to make it. Incidents of this kind lead to the suspicion that low price products of this kind contain less than the stated quantity of active ingredient.

7 OTHER ASPECTS OF THE MARKET 1981/82 v 1986/87

There have been no marked changes in several aspects of the market reviewed in the author's previous report (DP/ID/SER B/366). The distribution pattern remains essentially the same with 80% of products being distributed by the private sector and 20% by the public sector. Because of the build up of formulation capacity by the latter to excess, it now demands technical materials rather than finished products. Pesticides are still mainly used on cotton, rice and vegetables with some movement to fruit and plantation crops. The country wide location of the market has changed little being now

just over 40% in the south, 23% in the west, 21% in the north and 13% in the east. If any significant changes have occurred, the market share in the north is down slightly and up in the east and south with the west about the same as five years ago.

Slowness in the registration system and constantly increasing demands for technical information on new products couple with the ease with which copy cat products can be registered without development costs are constant sources of complaint. As far as the author is aware, no significant new active ingredients have been registered which were not already registered or were not well on the way to being registered since his last report.

Although some progress has been made, illicit formulations, often sold in the packs of reputable products, poor formulation and dilution of existing products remain important quality problems and prevent the industry from maintaining a good reputation among farmers. Under-dosing, especially of granules, and poor application remain important problems. Sales in many cases continue to rely on the provision of credit but the use of this device, coupled with falling prices, has reached the point at which some attempt is being made to restrict its use. Sales promotion via product demonstration remains a key method of marketing and there is still need for improvement in the extension service, an issue which continues to be pursued supported by international aid.

8 FUTURE DEVELOPMENTS AND OPPORTUNITIES

An immediate problem requiring solution is the upsurge of white fly on cotton which has followed the widespread use of the synthetic pyrethroids.

Triazaphos is considered unsatisfactory for lack of residual activity whilst the Bayer product, methamidophos, is considered too toxic. The current leading contender is acephate. Plans for its manufacture are being considered. Because of rapid build up of resistance, products for the control of white fly tend to have a short life so it is desirable for other products to be developed. ICI has recently signed an agreement acquring the development rights in 50 countries for buprofezin, a product of Nichino, Japan but it is not known if India is included.

Other product needs include a less toxic replacement for phorate on rice and a chemical capable of controlling white grubs which are widespread, if sporadic, pests on solanaceous crops in Rajasthan, Andhra Pradesh, Haryana and Uttar Pradesh.

At least four new synthetic pyrethroids are under development including flucythrinate and fenpropathin. These are systemic and are claimed to control sucking pests including white fly. Bayer is said to be developing the chitin inhibitor, Bollstar.

On a general note, the product range for controlling white fly is chemically rather restricted and, from a long term point of view, it is desirable to break out of this restriction. The systemic pyrethroids may be good prospects but an additional product group is desirable.

With the increasing awareness of diseases of crops, the main opportunities for fungicides are for broad spectrum materials but, once the market has been more clearly defined, more specialist products will be needed. A possible exception to this general observation is apple scab, where more specialist products are already being developed.

The use of isoproturon and butachlor is thought likely to spread from the areas of initial usage (Haryana and the south respectively) to other parts of the country. Of potential long term interest to all product groups is the fact that the authorities are beginning to look favourably, in principle, on the use of mixtures. Herbicides are likely to be chosen for initial testing because these products tend to be among the least toxic of pesticides and, provided the mixtures do not enhance toxicity or increase residues or environmental hazards, may be allowed. There is considerable potential for development here.

Since increasing agricultural production will depend on more and more on improving yields, there is an awakening interest in plant growth regulators which may increase yield and, possibly, those that can improve product quality.

9 SIGNIFICANT COMPANIES

The three largest companies in the pesticide market in 1986/87 were Rallies (estimated sales Rs 530 to 540m or US $40m), Bayer (RS 510 to 520 or US $40m) and Ciba Geigy (Rs 390 to 400 or US $30 to 31m). In addition to HIL, other important companies include Cyanamid, Sandoz, (doing less well than hitherto), Hoechst, Coromandel, BASF, Pesticides India, IEL and Rhone Poulenc (May and Baker). Among the newcomers, Searle made good progress until 1986/87 whilst United Phosphorus has reached a significant position since starting to sell to farmers five years ago. Although adding up the sales of individual companies leads to a larger figure than the value of the total market due to inter company sales, it seems that the three top companies account for 20 to 25% of the market.

10 EXPORTS (Annexure 5)

Exports totalling Rs 213.7m, Rs 397.7m and Rs 349.2m (US $16.5m, 31m and 27m) were made in 1984/5, 1985/86, and 1986/87 respectively. Significant specified items include nicotine sulphate, aluminium phosphide and endosulfan. Unspecified pesticides, however, form the largest group. These are understood to include DDT, malathion and synthetic pyrethroids.

The main areas to which exports are made include the Eastern Block on a government to government basis but sales to thes countries depend on the availability of foreign exchange. Exports have also gone to Algeria, Liberia, Japan, Taiwan, Thailand, GFR, Greece, Italy, Spain and the UK. Areas of specific interest include the developing countries of Africa (for example endosulfan to Sudan) and Central and South America.

Problems encountered in establishing regular trade with exports include the need to obtain registration both in India and the recipient country, obtaining duty drawbacks in India to allow companies to compete on the basis of international prices and the need to provide long term credit. The Sudan is an example of the need to provide long term credit if exporting to that country is to succeed.

11 DISCUSSION AND IMPLICATIONS FOR MARKET STRATEGY

i) The Indian Market

The preparation of a Strategic Market Plan (SMP), a management tool now widely adopted throughout industry, involves a comprehensive review of the company in the context of the environment in which it operates, the establishment of targets and the preparation of detailed plans to achieve them, recognising that tactics will, from time to time, have to be changed to suit the situation of the moment. The essence of the technique is to determine realistically what can be achieved by the resources that can be made available to exploit discernable opportunities and to ensure that the operation is successful.

The comprehensive nature of the work required to prepare the SMP is illustrated in Annexure 6. The first requirement is that the plan must match the corporate objectives of the business. For the purpose of this discussion, it is assumed that the corporate objective is to establish a leading position in the Indian market as a supplier of pesticides, broadly defined as chemicals which can be used to prevent damage to crops by animal, insect, disease, weed or other organism or can be used to improve or control crop growth by acting on the growth mechanism of the plant,(i.e. excluding fertilisers).

As shown in Annexure 6, the later stages of the procedure require a statement of marketing objectives and a full scale assessment and, if necessary,modification of the marketing organisation for implementing and monitoring the plan. These elements are, of necessity , outside the author's remit but are mentioned here to emphasise that they are key issues in achieving success. The task of this discussion is to focus on the physical, economic and political environment in which the pesticide industry operates and the pesticide marketing environment itself, concentrating on those factors which are special to the Indian situation.

The variability of the monsoon imposes variability on the productivity of Indian agriculture and this, above all, explains the annual fluctuations in the amounts of pesticide used. But it is important to remember that Indian agriculture does not depend entirely on the monsoon and that, being a large country, the effect can vary markedly from one area to another.

The present year (1987/88) provides a good example. Although, due to the poor monsoon, pesticide use for the kharif season was well down, subsequent good rains in the South have increased demand for pesticides to the extent that the sales of one company had caught up with the level of the previous years sales by December 1.

Nevertheless the fact of the influence of the monsoon requires that company organisation and operation be flexible and that risk avoidance techniques be built into marketing plans to minimise the danger of sales and profits falling to undesirable levels in poor years.

The emphasis in the current five year plan on improving yields is helpful to the prospect of demand for pesticides. For example, yields of cotton and rice are expected to increase by 18% and 23% respectively. The plan to increase rice production in the East is also helpful. But past experience suggests that the plan to increase consumption of pesticides from the presumed base level of 50,000t to 75,000t is unlikely to be achieved by 1989/90.

In fact, one of the most important elements in providing the background data for forecasting the future, namely previous market growth, is difficult to assess. In the first place there is a lack of recent data on demand which is the arbiter of supply requirements.

Data on the weight of pesticides is expressed in India in terms of technical grade material, the concentration of which can vary widely within and between products so adding up such information is not especially meaningful. It would be better to express the weight of pesticides in terms of 100% active ingredient but this is not totally satisfactory because of variation in activity between different pesticides, a situation exacerbated by the introduction of the highly active synthetic pyrethroids. Weight data would, therefore, be much more valuable if augmented by reasonably reliable estimates of the size of the market in monetary terms expressed both in rupees of the year and also corrected for changes due to inflation so as to measure real rates of growth.

The absence of much change in the weight of material used in the last five years and the relatively modest rate of growth in the market was much influenced by the recent poor monsoons and it is reasonable to assume that growth may be better in the next five years due, hopefully to a more stable physical environment. If the move away from high dosage rate, low priced products such as BHC and DDT continues, growth will be greater in monetary terms than in weight terms.

Important impediments to stable and sustained growth remain for a company wishing to improve its position in the market to overcome. Chief among these is the often severe price competition which seems likely to continue. However, the long term outcome may be that the weaker companies fail unless heavily subsidized. Some of the ability to sell at low prices stems from the ease with which poor quality products can be sold and it is to be hoped that stronger steps will be taken to eliminate this abuse of the situation, perhaps by a properly enforced formulator licencing system and, as has already been suggested, by making major companies responsible for ensuring adequate quality from products made from the technical grade material supplied by them to formulators.

Other features of th market which must influence strategic marketing decisions are that the large companies of five years ago have been remarkedly successful in retaining their pre eminent position. The top three may well continue to exclude the rest from cutting into the segment they dominate. There has, however, been marked changes in the importance of various products.

This has been much stimulated by the disaster at Bhopal so change in the next five years is likely to be less dramatic than in the last five. Since this report was drafted the author has learned that insect resistance to the synthetic pyrethroids is said to have to have occurred. It has also been suggested that the reported failure of these products to give satisfactory control is due to poor quality active ingredient. The causes need to be resolved and, until this is done , an element of doubt about the possible degree of change in the future remains. However, given the slowness with which new products are registered and increased demands for pollution control it is likely that a company seeking a major and sustained presence in the market, will have to rely almost entirely on existing products in existing markets while exploiting certain growth areas. These include establishing a broad tereitorial base of outlets and expansion into acaricides, fungicides and herbicides where product sales can expand at up to several times the market average.

The marketing strategies that have been successful in the past both in India and abroad include the probably most successful of all, namely, dependence primarily on products discovered by company research. Under the strict anti monopolist regulations of India, this has had to be coupled with a rapid and strong establishment of a brand image before the establishment of competitive manufacture. This strategy is increasingly difficult to sustain under Indian conditions and is not available to Indian companies as they do not have the necessary research base.

Among Indian companies, the most successful strategy has been to establish a strong presence in the pesticide market with a broad range of products through an existing market wide, competent distribution system and then to integrate backwards into a production operation. There is a recent example of the reverse process where a company has integrated forwards into supplying products to farmers based on the particular resources and skills available in the organisation. Yet another strategy which appears to have been successfully used recently has been to to remain somewhat quiescent until a new and particularly useful product became available and then to establish its brand image rapidly and aggressively but still retaining a limited presence in the market. This technique involves having a distribution system in which wholesalers play an important part.

It has been possible to be successful with the foregoing strategies because of an identifiable initial advantage. This is not to suggest that other strategies are not possible. This review suggests that a starting point could be from establishing a range of products to appeal to all major segments of the market without necessarily

having the initial capability for manufacture. Because it would ultimately increase the economic strength of the company, the policy would have to be linked with one of developing production technology. In fact the market led, broad range, orientation would have several advantages. It would allow the company to succeed with distributors via special bonuses for large sales, keep the sales force occupied through the selling season, identify with reasonable certainty those products worth manufacturing and, with demand established, enable plant occupancy to be at a relatively high level from commissioning. However, because of the need to buy in supplies, profit margins will, initially, be modest. Thus a skilful buying operation would be essential plus a well managed marketing operation with a risk avoidance policy. Essential components of the latter should include:

1 Not being over ambitious with sale forecasts but to base them on previous performance and a realistic assessment of future possibilities in the light of competition. It would be wise to keep some outlets in reserve each year for exploitation should the main forecasts start to go wrong.

2 Having a good market intelligence system capable of detecting as early as possible potential changes in demand.

3 Spreading risks by, for example:

i) stocking up distributors before the selling season;

ii) using local formulators to reduce initial investment requirements and have the point of manufacture and the point of use as close as possible. This would reduce distribution costs and allow rapid supply of the market

4 Having a flexible distribution system:

i) by limiting the number of stocking points and relocating stocks by road in case of need;

ii) storing products in bulk to permit rapid adjustment for demand for different package sizes;

iii) standardising on packages which can be separately labelled for different products and

iv) avoiding small packs wherever possible.

5 Having a flexible and mobile sales force employed substantially on a seasonal basis which can be switched to sales campaigns in different areas.

6 Protecting product quality by examining every case of selling at lower than expected prices and/or poor performance.

A representative, candidate product range, selected from almost entirely from materials currently available, is shewn in Table 9.

Table 9

A Product Range for Comprehensive Market Cover

	Cotton	Rice	Vegetables	Wheat	Apples	Tea	General
Acephate	*						
Dimethoate or phosphamidan	*		*				
Endosulfan	*		*				
Monocrotophos	*	*	*				
New synthetic pyrethroid	*		*				
Phorate		*					
Dicofol					*	*	*
Isoproturon				*			
2,4 D				*			
Glyphosate						*	
Carboxin				*			
Dodine					*		
Mancozeb	*				*		*

The 14 products listed would cover almost all the main outlets for pesticides in India. Of the insecticides , dimethoate would be preferred to phosphamidan from a marketing point of view but it is recognised that the latter may be more suitable for production. Methyl parathion is widely used on rice and is, as such, a candidate. It has, however, been excluded because it is now a fading product of high toxicity for which reason alone it is undesirable. Edifenphos would be a useful addition for control of rice diseases but technology for production is not currently available. Mancozeb would be used in the marketing strategy to identify needs for specialist fungicides once the market had been established.

The foregoing proposals are concerned almost entirely with the immediate future. They permit the presentation to the market of a comprehensively useful solution to the present situation. However, they lack the ability to differentiate the range in the market place. For this, marketing would require to establish a strong brand image. This could be strongly reinforced by taking advantage of the formulations being developed at PDPI, as well as providing formulation processes which would be difficult, if not impossible to counterfeit.

In the longer term, the pursuit of providing the company with a distinct identity in the market place as well as providing an alternative the base for fundamental research that India lacks, a policy of liaison with the smaller research oriented companies in the world that do not have the capacity to develope the products of their research with the object of obtaining developement rights at an early stage is suggested. This is a policy that has been adopted by several multinationals in recent years with evident success.

It should be possible to present an attractive proposition to such companies on the grounds that India is a large market backed by a burgeoning research and development capability and a strong production base. With the successful implementation of the suggested marketing strategy the case would be strengthened by showing that prod. ts can be successfully sold.

ii) The Export Market

In the export market there are three main channels through which products may be sold:

i) the finished product, either ready packed or for filling ou locally into smaller packs;

ii) the provision of technical material to local formulators for sale under a local brand name or as the initial sellers brand and;

iii) supply of either finished product or technical material by tender to central buying organisations or on a government to government to government basis.

Option (i) usually requires local registration which can be time consuming and expensive. Appointment of a good local agent, capable of dealing with the registration process is to be preferred, at least in the initial stages.

Selling technical materials to local formulators for sale under their own brand names avoids these problems but the potential market may be restricted because the plants may be owned by the multinationals or their agents and used mainly for their own products. But this sector is not entirely closed to companies who can offer formulation products additional to those already available to the companies concerned. In the latter case, supply of product carefully matched to the required specification is essential. There remains an increasing, but small, number of independent formulators who are open to the purchase of technical material against price and quality but they may need advice on formulation technology.

Tender and government to government business may be large but it is subject to severe price competition and is irregular but selling expenses are relatively low.

Thus the main initial attack on the market, involving least expense and effort, must be through tenders and sales to formulators, the former for the amount of business that can be obtained and the latter for regularity of sales. Adherence to specifications, a competitive price, assured delivery and, perhaps, the provision of formulation advice will be the basis for success.

Annexure 1

7th Five Year Plan

Ouput Projections : Agricultural Commodities

Commodity	Unit	1984/85	1989/90	Compound Annual Growth Rate %
Rice	Million tonnes	60	73/75	4.0/4.6
Wheat	do	45	56/57	4.5/4.8
Coarse cereals	do	32	34/35	1.2/1.8
Pulses	do	13	15/16	2.9/4.9
All foodgrains	do	150	178/183	3.5/4.1
Oilseeds	do	13	18	6.7
Sugar cane	do	180	217	3.8
Cotton	Millions bales of 170kg each	7.5	9.5	4.8
Jute and Mesta	Million bales of 180kg each	7.5	9.5	4.8
Tea	Million kg	645	766	3.5
Coffee	do	165	180	1.8
Rubber	Thousand tonnes	187	265	7.2

Annexure 1 Cont

Estimates of Area and Output
1984/85 and 1989/90

Area in million hectares
Yield in kg/ha

Crop	Output Unit	1984/85			1989/90		
		Area	Output	Yield	Area	Output	Yield
Rice	Million tonnes	41.2	60.0	1,456	44.0	73/75	1,659/1,705
Wheat	do	24.6	45.0	1,829	28.0	56/57	2,000/2,036
Coarse cereals	do	41.0	32.0	780	40.1	34/35	848/873
Pulses	do	23.5	13.0	553	25.7	15/16	584/623
Foodgrains	do	130.3	150.0	1,151	137.8	178/183	1,292/1,328
Oilseeds	do	18.8	13.0	691	20.3	18	887
Sugar cane	do	3.2	180.0	56,240	3.3	217	65,758
Cotton	Million bales of 170kg each	8.0	7.5	160	8.5	9.5	190
Jute and mesta	Million bales of 180kg each	1.1	7.5	1,226	1.2	9.5	1,425
Other crops		18.6			18.9		
All India		180.0			190.0		

Annexure 2

Installed Production Capacity (t) 1.7.82 v 1.10.86,
Production 1986/87 (t) and Plant Utilisation (%).

Product	Installed Capacity 1982	Installed Capacity 1986	Production 1986/87	% Utilisation 1986/87
Insecticides				
BHC	37,900	45,200	25,406	56
Carbaryl	7,000	7,000	53	1
DDT	9,144	9,088	8,133	89
Endosulfan	2,400	2,400	2,183	91
DDVP	276	451	433	96
Dicofol	?	?	3	
Phosalone		1,000	70	
Lindane	30	30		
Dimethoate	1,300	1,550	1,145	74
Fenitrothion	600	1,100	79	7
Malathion	8,830	11,340	2,653	23
Methyl demeton	250	250	230	92
Phorate		1,050	1,470	140
Monocrotophos	300	1,935	1,900	98
Methyl parathion	1,850	2,350	1,223	52
Phosphamidan	636	1,122	1,090	97
Quinalphos	700	1,400	568	41
Phenthoate	600	600		
Thanite	150			
Nicotine sulphate	40	40	?	
Tetradifon	18			
Ethion		400	237	59
Pyrethrums	1,200			
Fenthion	200	200	271	136
Fenvalerate		600	346	58
Cypermethrin		300	129	43
Totals	73,424	89,406	47,602	53

Licences have been issued for the manufacture of diazinon (550t), temephos (25t), carbofuran (800t)and chlorpyrifos (100t)

Fungicides				
Copper oxychloride	3,660	2,700	1,202	45
Copper sulphate	3,000	3,000	?	
Nickel chloride	300	300		
Organo mercurials	95	92	185	
Zineb, maneb, mancozeb	2,500	2,500	2,884	106
Thiram, ziram, ferbam	1,059	1,232		
Metham sodium	25	25	?	
Carbendazim	135	635	Nil	22
Sulphur	2,040	2,000	?	

Annexure 2 cont.

Product	Installed Capacity 1982	Installed Capacity 1986	Production 1986/87	% Utilisation 1986/87
Fungicides cont.				
Carboxin			?	
Tridemorph		50		
Kitazin		200	?	
Calixin			3	
Captan, difolatan		200	124	62
Total	12,810	12,934	4,552	?
Herbicides and Growth Regulators				
2,4 D	2,035	2,058	813	40
Dalapon		250	3	1
Paraquat		500	250	50
Fluchloralin	200	200	25	13
Diuron	200	200	143	72
Alpha napthyl acetic acid	5	20	?	
Propanil	1,500			
Butachlor		500*	?	
Cycocel	100	231	?	
Isoproturon		2,180	917	42
Total	4,040	6,131	2,151	?
*Now 1300 to 1400t				
Rodenticides				
Coumafuryl	50	50	3	6
Zinc phosphide	1,194	1,244	426	34
Warfarin	50	50	?	?
Total	1,249	1,344	429	32
Fumigants				
Aluminium phosphide	1,820	1,820	1,343	74
Ethylene dibromide	258	258	43	17
Methyl bromide	300	300	66	22
Total	2,378	2,378	1,452	62
Grand Total	92,946	112,201	56,186	53

Annexure 3

Production of Technical Pesticides in India
1984/85, 1985/86 and 1986/87 and usage 1986/87

(t)

	1984/85	1985/86	1986/87	Usage 1986/87
Insecticides				
BHC	28,646	24,669	25,406	12,000
DDT	7,337	5,218	8,113	1,000
Malathion	3,377	4,372	2,653	1,000
Parathion	2,110	1,510	1,223	2,300
Metasystox	133	324	230	400
Fenitrothion	82	99	79	150
Fenthion	233	215	271	150
Dicofol	6	1	3	?
Phenoate	Plant not in operation			
Dimethoate	709	1,147	1,145	1,200
DDVP	500	514	433	?
Quinalphos	659	861	568	600
Monocrotophos	1,074	1,861	1,900	2,000
Carbaryl	1,265	45	53	200
Phosphamidon	955	1,130	1,090	1,400
Lindane				?
Phosalone		198	70	?
Thimet/phorate	1,208	1,168	1,470	1,200
Ethion	253	353	237	300
Endosulfan	2,669	2,565	2,183	3,200
Fenvalerate	236	504	346	?
Cypermethrin	26	155	129	120
Total	51,468	47,855	47,602	?
Fungicides				
Captafol	11	62	73	?
Captan	126	50	51	?
Copper oxychloride	1,184	871	1,202	1,000
Thiocarbamates	2,272	2,418	2,884	3,170
Nickel chloride				30
Organo mercurials	143	191	170	100
Carbendazim	193	194	141	200
Calixin	17	36	31	10
Total	3,946	3,828	4,552	?

Annexure 3 cont

	1984/85	1985/86	1986/87	Usage 1986/87
Herbicides				
2,4 D	767	830	813	800
Isoproturon	441	727	917	900
Paraquat	125	174	250	350
Dalapon	90	25	3	50
Basalin	8	2	25	25
Diuron	123	60	143	25
Total	787	988	2,115	2,150
Plant Growth Regulants				
Cycocel/Lithocin	35	2		
Alpha napthyl acetic acid				
Total	35	2	-	-
Rodenticides				
Ratafin	5	4	3	
Zinc phosphide	350	279	426	
Total	355	283	429	-
Fumigants				
Aluminium phosphide	1,091	996	1,343	700
Methyl bromide	57	56		70
Ethylene dibromide	54	54	43	
Total	1,202	1,106	1,452	?
Antibiotic (Agro)				
Aureofungin				
Streptocycline				
Total	55,505	54,919	56,186	?

Source : Department of Chemicals and Petrochemicals

Annexure 4

Import of Pesticides 1982/83 to 1986/87
Information Supplied by Importers
Technical Grade t

Pesticides	1982/83	1983/84	1984/85	1985/86	1986/87
Insecticides					
Acephate	45	79			16
Aldrin	54	80	89	25	59
Chlordane	16	28	22	22	19
Carbofuran	36	20	50		
Carbaryl					16
Chlorpyriphos	134	151	90	27	70
Diazinon	7	7	65	2	18
Dichlorvos	37	39	74	59	27
Dimethoate	46	37	29		
Endosulfan	249		249		
Ethion	55	55			
Formothion					10
Heptachlor	18	12	33	3	26
Methyl parathion		22	210	35	108
Monocrotophos	545	546	428	30	10
Phorate	117	149	103	7	
Phosalone	5				
Phenthoate	25	55	57	33	93
Propoxur	20	26	27	33	56
Synthetic pyrethroids	17	48	6		0.34
Thiometon					15
Total	1391	1354	1532	1808	543.34
Fungicides					
Benomyl	2				
Captan	73	49	116	29	57
Carbendazim	5		20		
Captafol		80	15		10
Dinocap	16	22			9
Dithianon					0.13
Ediphenphos	25	55	122	82	61
Kitazin			45		15
Mancozeb	14	24	49	217	
Sulphur	56	37	125	95	126
Thiophanate methyl			10	3	15
Thiram	28	12	48		
Zineb	2	16			
Total	221	295	550	426	293.13

Annexure 4 cont

	1982/83	1983/84	1984/85	1985/86	1986/87
Herbicides					
Atrazine	50	40	5		40
Alachlor			8		
Butachlor	933	859	1317	1231	706
Benthiocarb	133	178	262	108	123
Dalapon		32	42	37	10
Diuron			2		2
Dicamba			287		
Isoproturon	19	470			
Paraquat	5	5	35	13	17
Simazine			2	11	5
Propanil				20	
Total	1180	1584	1960	1420	903
Plant Growth Regulators					
Ethephon	2		3	1	6
Fumigants					
EDB					17
Acaricides					
Dicofol	87	118	73	122	165
Tetradifon	3	1	1	11	12
Total	90	119	74	133	177
Grand Total	2844	3352	4129	2256	1933.47

Annexure 5

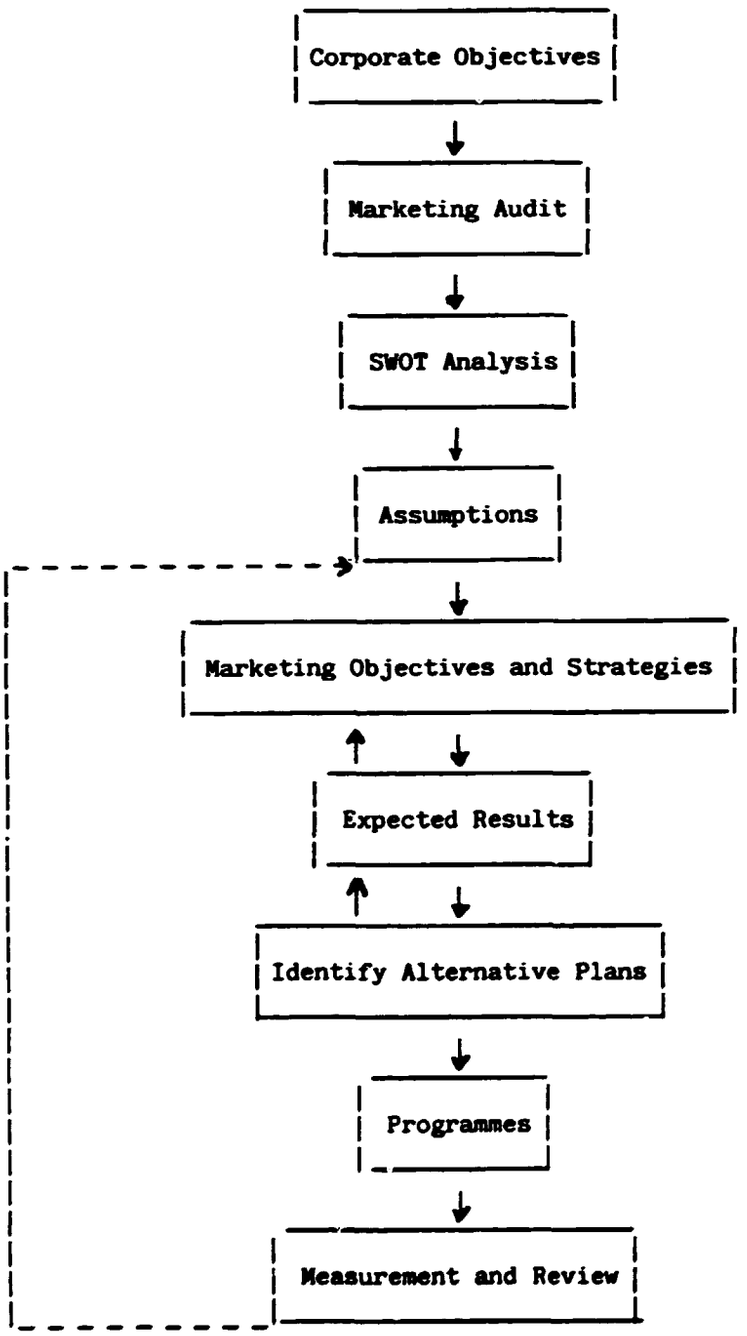
Value of Exports of Pesticides 198435, 1985/86 and 1986/87

000's Rs

	1984/85	1985/86	1986/87
Nicotine alkaloids	1986.5	611.2	2,004.1
Nicotine sulphate	18,339.2	31,242.6	42,101.0
Aldrin		9,644.2	
Aluminium phosphide	21,562.4	10,719.6	8,409.7
Pesticides other, insecticides n.e.s.	128,876.8	277,825.1	289,000.0
Zinc phosphide	8,737.6	2,922.8	3,949.1
Endosulfan technical	34,147.6	28,433.8	3,771.4
Quiralphos		36,331.0	21.0
Total	213,650.0	397,740.3	399,165.3

Annexure 6

The Market Planning Planning Process



Note SWOT = Strengths, Weaknesses, Threats and Opportunities.

Source: Michael J. Baker "Marketing Strategy and Management" Macmillan Publishers Ltd, Hampshire and London, UK.