

THE FERTILIZER AND PESTICIDES AGRO-INDUSTRY

VOLUME II: THE PESTICIDES SUB-SECTOR

A COMPONENT OF A CASE STUDY ANALYSIS OF AGRIBUSINESS INDUSTRY IN PAKISTAN

Submitted To

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and the
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Prepared By

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FOREWORD

In January 1989, at the request of the Government of Pakistan, the United States Agency for International Development (USAID) entered into a contract with the RONCO Consulting Corporation, which collaborated with AGRI-BI-CON International (Pvt.) Limited, a Pakistani consulting firm, to carry out the Analysis of Corporate Sector Constraints in Agriculture (ACSCA) project. The purpose of ACSCA is to identify policy and operational constraints, capabilities and opportunities affecting the formation and growth of private sector agribusiness in Pakistan.

This volume is the second part of one ACSCA agro-industry research report. Six such reports were prepared on different agro-industries in Pakistan. The results of these studies form part of the content of an overall **Agribusiness Industry Case Study Report** prepared by RONCO under the ACSCA Project.

The major findings and conclusions presented in the agro-industry research reports are included within the scope of the information and data presented in the **Assessment of the National Agribusiness Environment** report component of the ACSCA Project. Finally, the recommendations derived from the case study research were used to explain and support the agribusiness development concepts and policy initiatives proposed in the **ACSCA National Agribusiness Action Plan**.

This report describes the case study approach to agribusiness analysis, and provides a detailed review of the strengths and limitations affecting the growth of agribusiness investment in one agro-industry, and the current and potential role of the private sector in the industry.

Policy and regulatory issues unique to this industry are emphasized in the report. Government efforts to encourage new investment in chemical production plants to provide locally produced raw materials for pesticide manufacturing are examined in the light of government policies to restrain pesticide price increases in the market place. Market demand limitations and the lack of expertise and knowledge on appropriate pesticide usage at the farm level are also examined.

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We must also acknowledge the extraordinary effort put forth by the research team that carried out the field research in preparing this study. Messers Leonard Jordan, Industrial Economist and RONCO Team Leader, R.M.U. Suleman, Senior Economic Analyst, and Asad Khan, Director of Project Development, AGRI-BI-CON, applied themselves tirelessly, to this task and collaborated effectively in preparing the initial draft of this study and supplemental field notes. The importance and value of the operational and financial data they assembled and analyzed, in accord with the research design, helped us accomplish the objectives of the case study method of analysis employed in this component of the ACSCA Project.

The extraordinary efforts of Dr. Leon Hesser, former Chief of Party, RONCO/ACSCA Project and Constance Church, RONCO Financial Analyst, to organize the field research data and information and carry out a financial analysis of companies in the industry made the completion of this report possible. The quality of their work and discipline provided the focus required to clearly evaluate this important agribusiness sector.

The willing help and assistance of the AGRI-BI-CON and RONCO technical and administrative support staff was the source of the planning, management and creative effort that resulted in field research trips and meetings being accomplished, data being assembled, organized and analyzed in a systematic manner and a detailed research report being published. To Yasmin Syed, Alya Khalil, Waqas Mahmood, Haroon Abbasi, Mohammad Rafiq and Sohail Kyani of AGRI-BI-CON, we extend our sincere thanks.

Last but not least are our colleagues at USAID and the Ministry of Food, Agriculture and Cooperatives, who encouraged, facilitated and advised us in the conduct of our agro-industry research. To Dr. Patrick Peterson, Mr. Dick Goldman, Dr. Tom Olson, Mr. Ahsan Tayyab, and Dr. Gary Ender, USAID, and Dr. Imtiaz Husain, Agricultural Development Commissioner, we extend our special appreciation.

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I. EXECUTIVE SUMMARY

1.1 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of the study of the Farm Chemicals, or Pesticides, Agro-Industry is to determine the progress of the industry during the decade since the major responsibility for the industry was turned over to the private sector, to determine what the most important existing problems are, and to suggest ways of overcoming those problems.

1.2 MAJOR FINDINGS

1.2.1 Private Sector Agribusiness Development

In a major policy decision in February 1980, the Government of Pakistan turned over to the private sector the responsibility to import pesticides, including active ingredients, and to formulate and distribute pesticides. Prior to that, the import and distribution of pesticides were carried out by governmental agencies. Since 1980, the annual use of pesticides has increased many times, from 253 tons to 4,460 tons of active ingredients. Production of cotton, on which about 70 percent of the pesticides is used, has also increased dramatically.

In response to the government's policy to encourage the local formulation of pesticides, some 14 private companies have invested in formulation plants; some of these are quite modern and sophisticated, and others are little more than "garage-types" of operations. About 67 percent of the pesticides is handled by seven private-sector companies owned partly by foreign firms. Most of the remainder is distributed by eleven local companies, all of which are private except one: Ittehad Pesticides, which is 100 percent owned by the government.

With the objective of reducing outlays of foreign exchange for imports of basic chemicals for the formulation of pesticides, the policy of government is to encourage the local manufacture of such chemicals. Up to now, the overall market for pesticides in Pakistan has not been large enough that private sector entrepreneurs have been willing to make investments in manufacturing facilities for basic chemicals, although it is understood that one or two private companies are thinking about investing in facilities to produce selected basic materials. [Limited quantities of DDT and BIIC, which have been banned in many countries, are manufactured in governmental facilities.]

1.2.2 Governmental Policies, Regulations and Administrative Procedures

The basic thrusts of the government's policies, regulations and administrative procedures are: (a) to support private sector investment and operations in the pesticide agro-industry, and (b) for the government to remain responsible for regulating the industry in the interest of society as a whole. While the intent of the basic thrusts is commendable, there are anomalies and constraints which inhibit private sector initiative, and there are shortcomings in the government's ability to regulate the industry in the interest of society. Following is a brief description of the more important findings:

Generic Scheme: In 1989, the government introduced a generic scheme for the import of five types of pesticides. The scheme allows traders in these products to import unregistered brands into Pakistan, on the basis of laboratory tests, without having to undergo trials or the registration process. This is in contrast to the normal registration requirements wherein a manufacturer, or formulator, must submit a product for two years of field tests, as well as to provide detailed toxicological data to the registration authorities. As a result, "briefcase" companies are beginning to handle pesticides, with no service to customers. The policy discriminates against local formulation and, if allowed to continue, will contribute to the unsafe use of pesticides.

Price Controls: While there is no direct control by the government on pesticide prices, price "guidelines" on imported pesticides, and threats of reducing distributors' markup even more, constrain the further development of the industry.

Import Regulations: Import regulations, booking of foreign exchange cover, taxes, and duties are structured in such a way that pesticide formulators are penalized, in comparison to those who import finished pesticide products.

Sanctioning of Formulators: To put pressure on potential foreign investors who apply for licenses to formulate pesticides in Pakistan, the government issued an order requiring that the company commit to manufacture basic chemical ingredients in Pakistan within four years. This policy apparently is not being implemented, but the potential threat is likely to deter investors.

The Environment and Human Health: Although most private sector companies are actively helping to improve application practices on farms, the practices on many farms are very poor, due to widespread illiteracy among farmers, inappropriate labelling by some distributors to meet the illiteracy problem, poor extension, insufficient dealer training, and poor application equipment. The intended impact is frequently not what it should be, and unintended human health hazards exist.

Adulteration: There are reported cases of substandard pesticide products being sold to farmers. To the extent that this occurs, it most likely results from adulteration at the dealer or agent level, rather than at the company or distributor level. The one functioning laboratory in Pakistan has the capability to test only active ingredients, but not for impurities.

1.3 CONCLUSIONS AND RECOMMENDATIONS

1.3.1 The Private Sector

Within just a few years, the private sector companies have generally done a commendable job of building distribution systems for their products, including various kinds of training programs for dealers and farmers in the safe handling and safe and effective use of pesticides. Even so, more diligent efforts need to be made in two areas, in particular:

- o Safety and Human Health

Because the number of farmers in the country is so large, it is a herculean task for individual companies to take on the role of training farmers in the safe and effective use of pesticides. Because of the magnitude of the existing and potential problem of health hazards, it is recommended that the individual companies, through the Pakistan Agricultural Pesticides Association (PAPA), prepare a proposal for training large numbers of farmers (perhaps including agents and dealers) in the safe and effective use of pesticides. A well-prepared proposal would more than likely be considered favorably for financing by one or more potential donors.

- o Adulteration of Product

While it will add to the end-cost of the product, it is recommended that companies use tamper-proof seals and containers for the products which are most susceptible to adulteration.

1.3.2 The Government of Pakistan

A heavy burden for rationalizing the pesticides agro-industry in Pakistan falls on the Government. The Government made a wise decision in 1980 when it shifted the role of importing, formulating and distributing pesticides to the private sector. The remaining, legitimate role of Government in regulating the pesticides industry is extremely important. Some further changes and shifts in emphasis are needed:

- o Generic Scheme

It is recommended that the Government re-think the potentially serious adverse repercussions of the generic scheme and discontinue it. If needed to assist in making the decision, the Government may wish to commission a thorough study of the issue.

- o De facto Price Controls

It is recommended that the Government eliminate any attempt to control prices, by formula or otherwise; healthy competition among a fairly large number of private sector companies is the most efficient regulator of prices.

- o Import Regulations

It is recommended that the constraints imposed on imports of active ingredients and auxiliary chemicals, compared with the easier treatment for imported pesticides, be rationalized.

- o Sanctioning of Formulation Plants

It is recommended that the Government rescind the order that to obtain sanction to build and operate a formulation plant, the company must commit to the manufacture of active ingredients.

- o Health Hazards

It is recommended that the Government endorse and support the action program which resulted from the regional seminar on pesticides toxicology and safe use of pesticides, sponsored by the Food and Agriculture Organization in cooperation with the Department of Plant Protection, held in Karachi from May 2 to 7, 1990.

- o Adulteration

It is recommended that a system be set up to test for purity and reliability, on a regular basis, samples of all pesticides in the market, and to penalize companies or persons marketing substandard products.

1.3.3 The Agency for International Development

- o Health Hazards

It is recommended that USAID consider partial funding of a well-conceived program for training farmers, dealers and agents, if such a program is presented for funding.

II. INTRODUCTION

2.1 THE PESTICIDES INDUSTRY IN PAKISTAN

Compared with the fertilizer industry in Pakistan, which is a mature industry, the pesticides industry is embryonic. This is true even though pesticides have been in use by some farmers in Pakistan since the early 1950s. By 1980, consumption was 253 tons of active ingredients. A decade later, an estimated 4,500 tons of active ingredients per year are being used.

Until 1980, pesticide distribution was in the hands of the provincial extension services. In the early years, subsidies amounted to 100 percent. By 1980, they had been reduced to 50 percent (75 percent in the case of granules). Much of the application was carried out by government in large-scale aerial spraying programs. The public-sector distribution system had many disadvantages.

In 1980, subsidies were completely withdrawn (except for Baluchistan Province, which consumes only about 2 percent of the pesticides) and the responsibility for the import, distribution and marketing of pesticides was turned over to the private sector, which welcomed the change and began to set up distribution networks.

2.2 RATIONALE FOR THE STUDY

The Pesticide Agro-Industry is different from most other agro-industries in Pakistan in that the system for the import of materials, local processing and distribution of the products was radically changed a decade ago, from essentially complete handling by governmental agencies to turning virtually the entire responsibility over to the private sector. Given this fundamental change, how is the industry doing? What are the problems? What further changes in policy, regulations and administrative procedures are needed? What are the opportunities for further growth and development of the industry?

2.3 SCOPE OF RESEARCH AND ANALYSIS

The issues in the pesticides industry are of two kinds: (a) those which have to do with the financial viability of the companies in the industry, and (b) those having to do with the safe and effective use of the products. The two sets of issues are interrelated, as the analysis will show, and some of the issues are important in both categories. Even so, it is useful for analytical purposes to separate them into the two sets:

- o Issues Regarding the Financial Viability of Pesticides Companies
 1. The Generic Scheme
 2. Price Controls
 3. Import Regulations and Taxes
 4. Sanctioning Procedures for Formulation Plants

- o Issues Regarding the Safe and Effective Use of Pesticides
 1. Use of Hazardous Materials by Untrained Applicators
 2. Adulteration of Materials
 3. Lack of Effective Regulation

III. PROFILE OF THE PESTICIDES AGRIBUSINESS INDUSTRY

3.1 DESCRIPTION AND SCOPE OF THE MARKET

Farmers in Pakistan began using pesticides in the early 1950s. The use of pesticides has grown in recent years, particularly since 1980-81, when pesticide subsidies were removed and the private sector was inducted into the pesticide business. The current market is something over \$150 million per year.

3.1.1. Domestic and Imported Product Lines

Initially, all the pesticides were imported. Today, except for relatively small quantities of BHC and DDT which are manufactured locally, all pesticide active ingredients and some of the finished pesticide products are imported, mainly from Switzerland, West Germany, Holland, Japan, USA and Italy. Of the imports, 14 percent were formulated locally in 1984-85 while 86 percent were imported as finished products. The local formulation of pesticides now amounts to more than half of total sales. The term "formulation" is used rather broadly to include adding either a liquid or an inert matter to the imported active ingredients in order to constitute a finished product, or it may mean simply repackaging an imported finished product from bulk into small packages for retail sales.

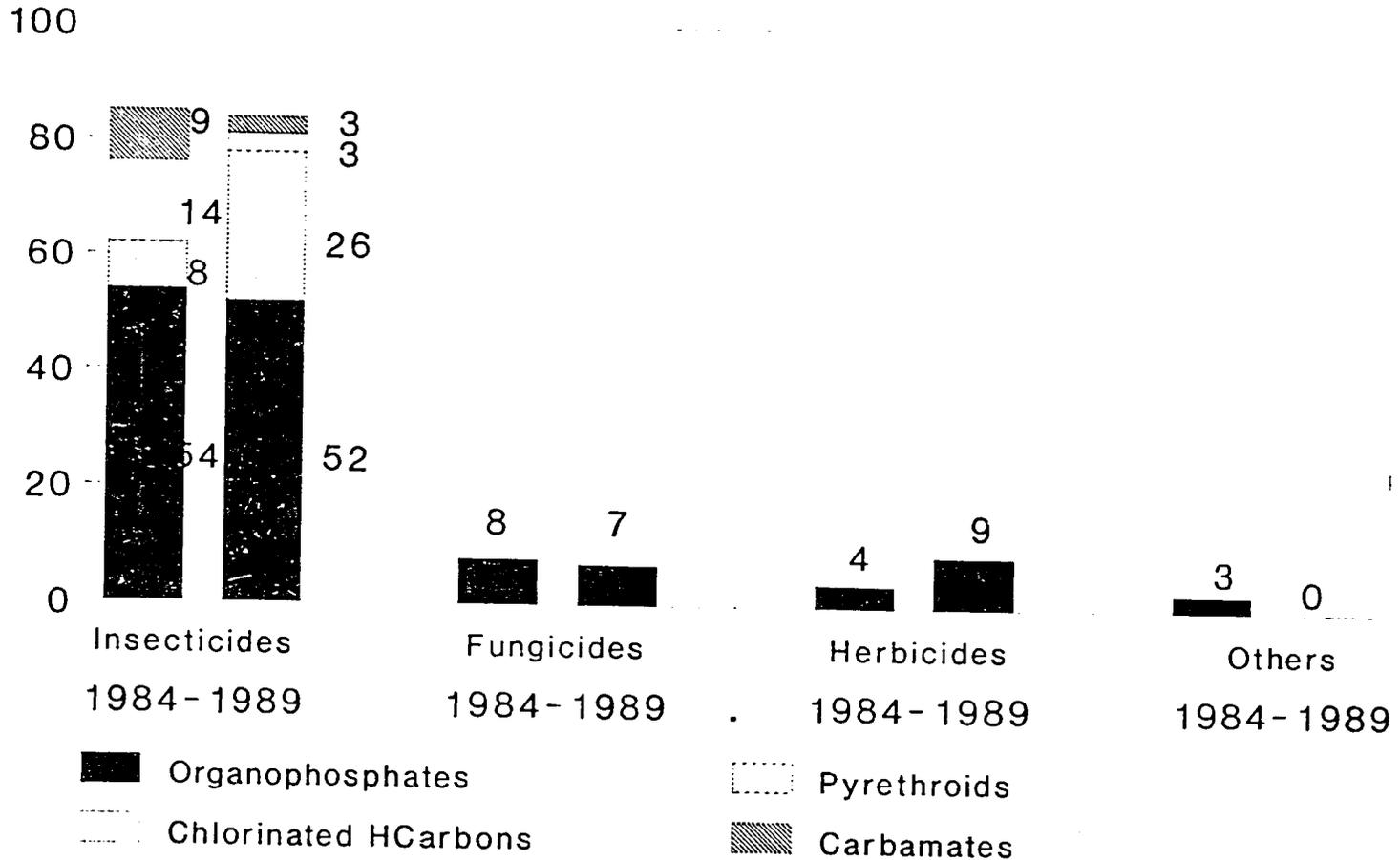
About 145 pesticides have been granted registration in Pakistan by common names. In all, some 200 brand names of pesticides are available to farmers.

Figure 1 shows the proportions of pesticides which are insecticides, fungicides, herbicides and other miscellaneous types, and indicates the changes in the proportions during a five-year period. The most striking change was the relative increase in pyrethroids and the decline in use of chlorinated hydrocarbons. An advantage is that pyrethroid compounds are effective at substantially lower quantities applied per hectare and, more importantly, they are more easily bio-degradable than the organo-chlorine and organo-phosphorus compounds, and they can be metabolized by mammals, which leads to a higher safety factor. Organic phosphorous compounds retained a relatively stable share of the market and still constitute the bulk of pesticides consumed in Pakistan, in terms of volume, although the pyrethroids have surpassed them in terms of value and hectarage. Figure 1 also indicates that the use of herbicides, while still relatively low, is increasing rapidly.

Fig 1

PERCENTAGES OF VARIOUS TYPES OF PESTICIDES USED IN PAKISTAN

III-2



3.1.2 Demand and Supply Trends

Figure 2 shows the trends over a 25-year period in "spray hectares" covered by ground operations and by aerial operations. (If a 50 hectare area is sprayed three times during a season, that would total to 150 "spray hectares.")

Total sprayed area increased sharply between 1970-71 and 1975-76 due to the heavily subsidized prices of the pesticides and to the growing recognition of the benefits in terms of increased crop production. The biggest increase during that period was in aerial application. In 1980-81, after subsidies were withdrawn in 1980, the area sprayed, especially by aerial application, dropped sharply. But by 1985-86, with the active involvement of private-sector distributors and dealers, and with the increased responsiveness of a newer variety of cotton (Niab 78), the ground application of pesticides had increased dramatically. Aerial operations have been phased down due to their apparent ineffectiveness and, more importantly, due to the inherent difficulties in collecting the user charges.

The areas of various crops sprayed by ground and aerial application in 1987-88 were:

Crop	Ground (thousand hectares)	Aerial	Total
Paddy	150	3	153
Cotton	1,626	1	1,627
Sugarcane	126	113	239
Fruits & vegetables	263	6	269
Others	229	-	229
Total	2,394	123	2,517

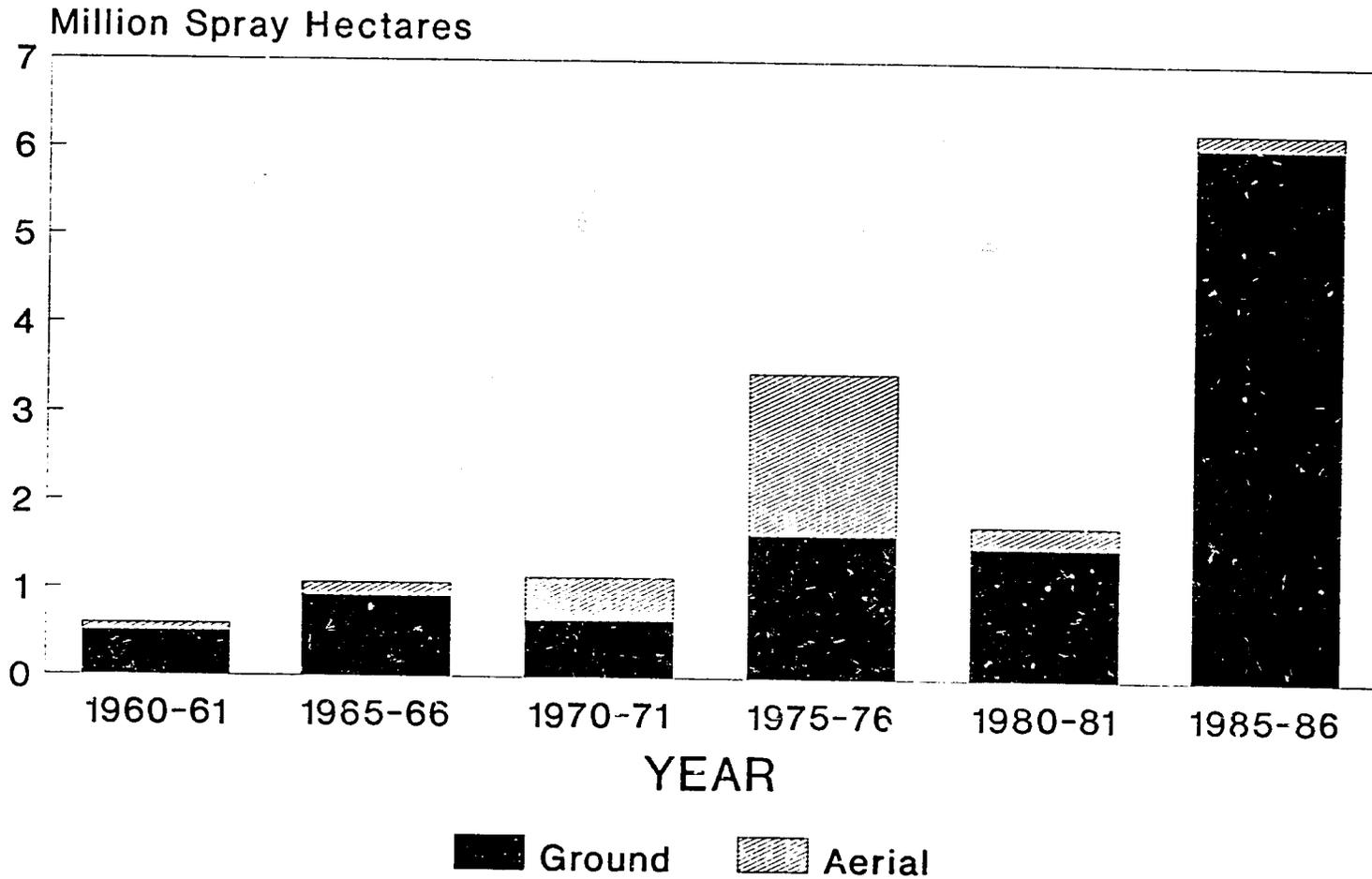
Source: Agricultural Statistics of Pakistan, 1988-89

Consumption of pesticides is currently increasing at an annual rate of about 10 percent. According to the Pakistan Agricultural Pesticides Association (PAPA), the growth rate is expected to taper off to about 5 percent per year within the next four to five years. Approximately 90 percent of the pesticides used in Pakistan are insecticides, of which around 80 percent is used on the cotton crop. Thus, cotton alone accounts for about 70 percent of the total consumption of pesticides in Pakistan.

Fig 2

TRENDS IN CROP SPRAY HECTARES BY GROUND & AERIAL OPERATION

III-4



The five-year average annual values of imported pesticides, and the calculated unit values, were as follows:

Period	Total Value (million rupees)	Unit Value (rupees/ton)
1960-64	12.7	5,185
1965-69	9.1	5,070
1970-74	117.8	21,204
1975-79	276.4	26,825
1980-84	546.9	56,969

Source: Agricultural Statistics of Pakistan

The value of imports of pesticides during the most recent five-year period is reported by the Ministry of Industries to have been:

Crop Year	Imports of Pesticides		Unit
	('000 tons)	(million Rs)	Value (Rs/ton)
1984-85	15.9	1,196	75,311
1985-86	17.5	1,416	80,965
1986-87	20.6	1,878	90,955
1987-88	15.8	1,769	112,224
1988-89	11.3	1,382	122,094

Following are estimates of the percentages of various crop areas which were treated with pesticides during the crop year 1987-88:

Crop	Percentage of the crop area covered
Paddy	8
Cotton	63
Sugarcane	28
Fruits and vegetables	43
Maize	4
Oilseeds	2

Source: Agricultural Statistics of Pakistan, 1988-89

Out of about 6 million spray hectares in 1985-86 and 7.7 million in 1987-88,, the percentages which were attributed to various crops were:

Crop	Percentage of spray hectares	
	1985-86	1987-88
Paddy	2	4
Cotton	82	79
Sugarcane	4	7
Fruits and Vegetables	8	7
Others	4	3
Total	100	100

Punjab and Sind are the largest markets for pesticides, although the markets for use on selected crops is growing in Balochistan and NWFP.

3.1.3 Pesticides Price Data and Trends

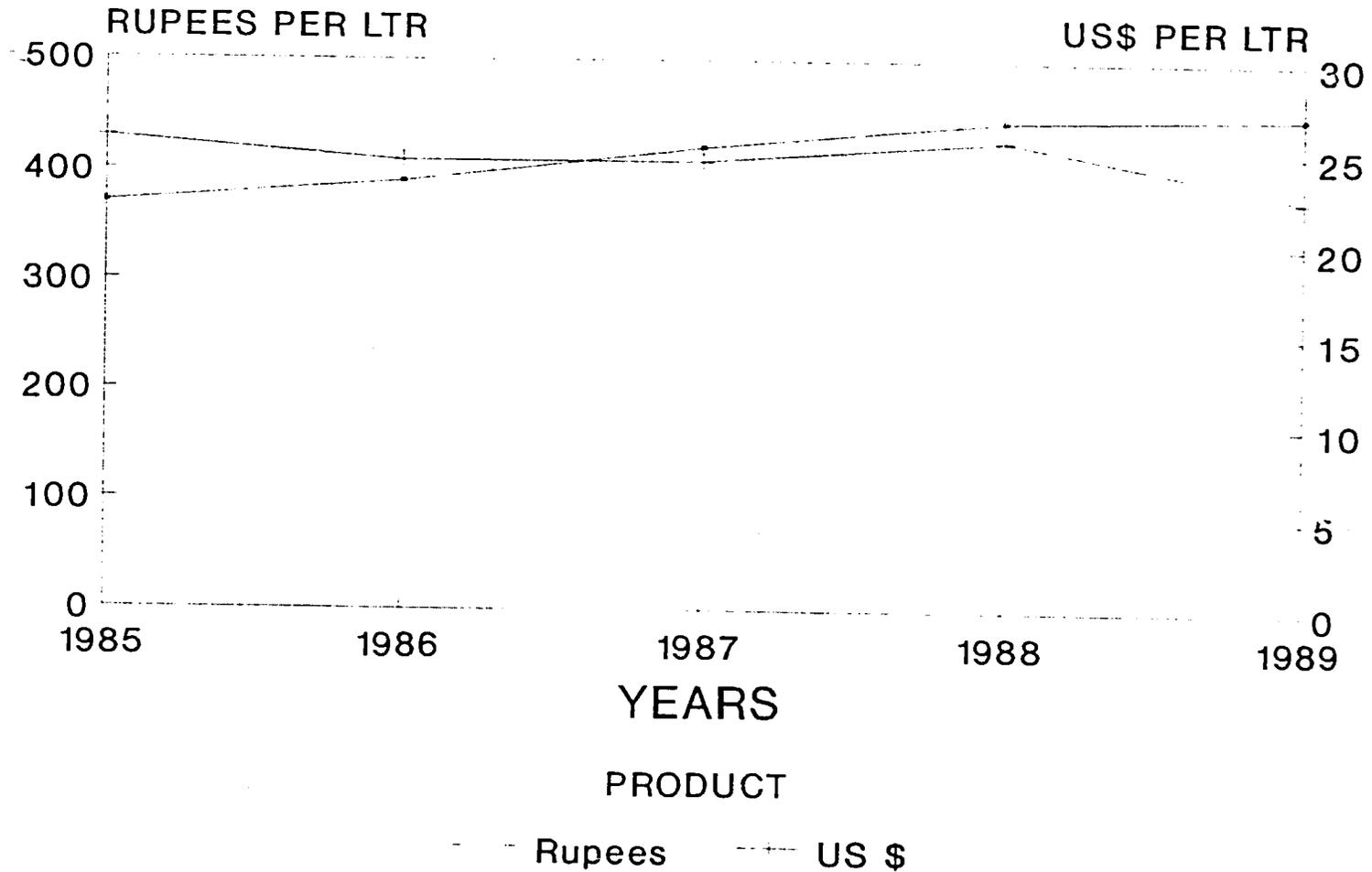
Plant protection service, as a function of government agricultural extension services, was started shortly after the creation of Pakistan, in 1948. Initially, it was essentially a free service to farmers. Nominal charges toward recovery of part of the cost of the pesticides were levied in the 1950s. Beginning in 1966, subsidies were gradually reduced until, in 1980, the GOP dismantled most of the subsidy programs for pesticides. Free aerial service was discontinued in the two major provinces--Punjab and Sind--and the subsidy in NWFP was phased out over a three-year period. However, the operational cost of aircraft has continued to be borne by the governments in those three provinces. Farmers in Balochistan Province continue to get aerial spray service free of charge.

While there is no direct control on pesticide prices by the government, considerable pressure exists against increases in prices. As a guideline, the government contends that prices should not exceed 80 percent of the C&F Karachi value.

The pesticides agro-industry is an import intensive industry and, therefore, it is affected by changes in exchange rates. The rupee cost per unit of imported pesticides has risen slightly during the past several years, from about Rs.370 per liter in 1985 to about Rs.450 per liter in 1989, due primarily to devaluation of the rupee (Figure 3). The foreign exchange cost of pesticides has actually declined, from \$25.77 in 1985 to \$22.63 in 1989 (Figure 3). Pesticide prices for 1-liter packages, based on the currency of the country of origin, have declined even more (Figure 4).

Fig 3

PRICES OF MAJOR AGRICULTURAL PESTICIDES IN PAKISTAN 1985-1989



Source of Data: Pakistan Agricultural Pesticide Association

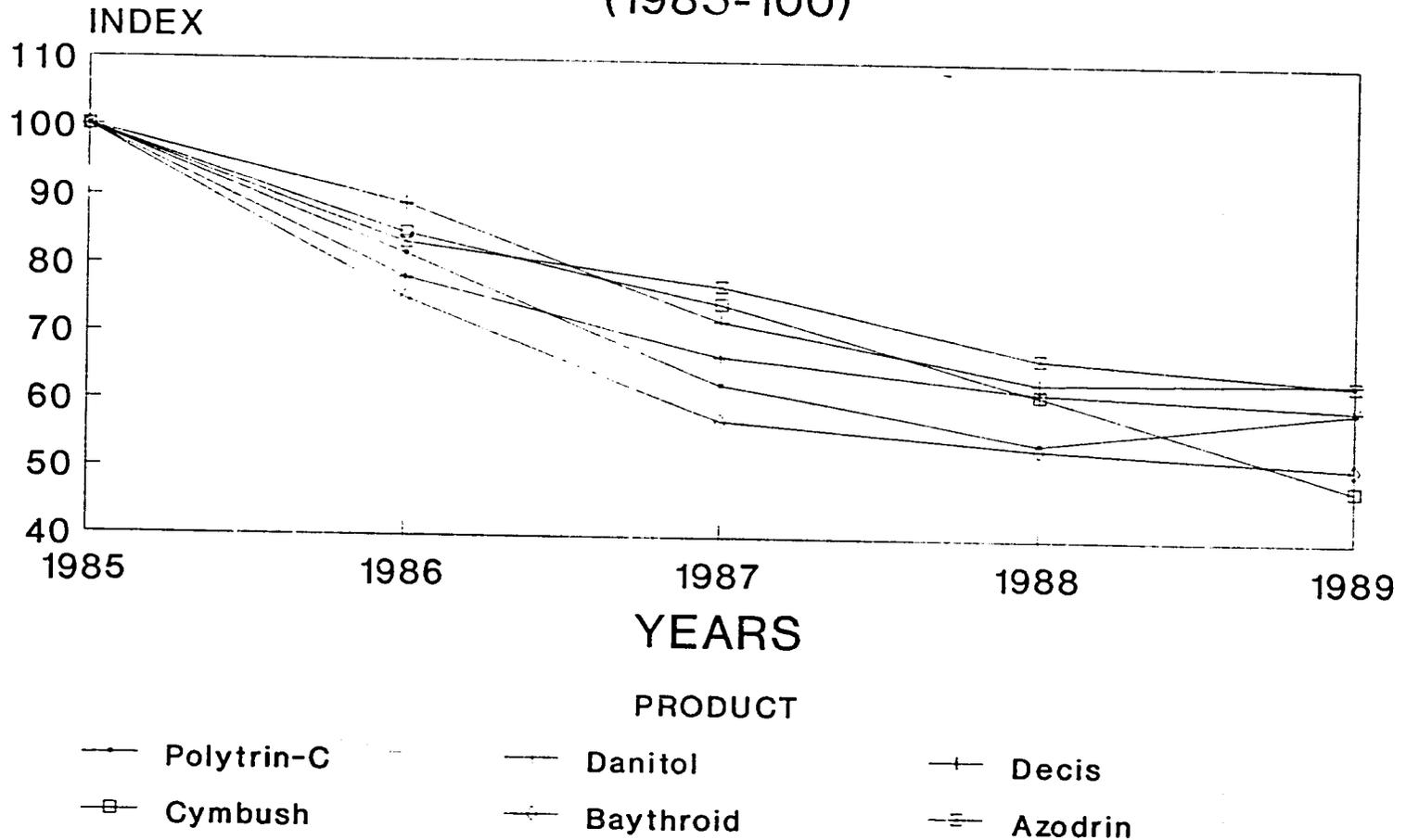
III-7

61.

Fig 4

EVOLUTION OF PESTICIDE PRICES FOR 1 LTR PACKS IN CURRENCY OF COUNTRY OF ORIGIN

(1985=100)



Source of Data: Pakistan Agricultural Pesticide Association

One of the main reasons for the "high" prices of pesticides is the demand, internationally, for quality and safe insecticides. The increasing number and complexities of the tests that are required to develop these new pesticides, and to get them registered, are both substantial and costly. Pesticides are thoroughly researched for their potential environmental effects before they are approved for sale, and the international criteria for environmentally safe use have become more stringent, so that the development costs of pesticides has risen.

Another factor in the basic cost of pesticides is that insects develop resistance to specific insecticides, which requires that research to develop new ones is a continuing, and costly, exercise.

3.1.4 Impact of the Pesticides Market on the Economy

Pakistan is predominately a cotton insecticide market. Roughly 90 percent of the total pesticides market is made up of insecticides, and about 80 percent of the insecticides are used on cotton.

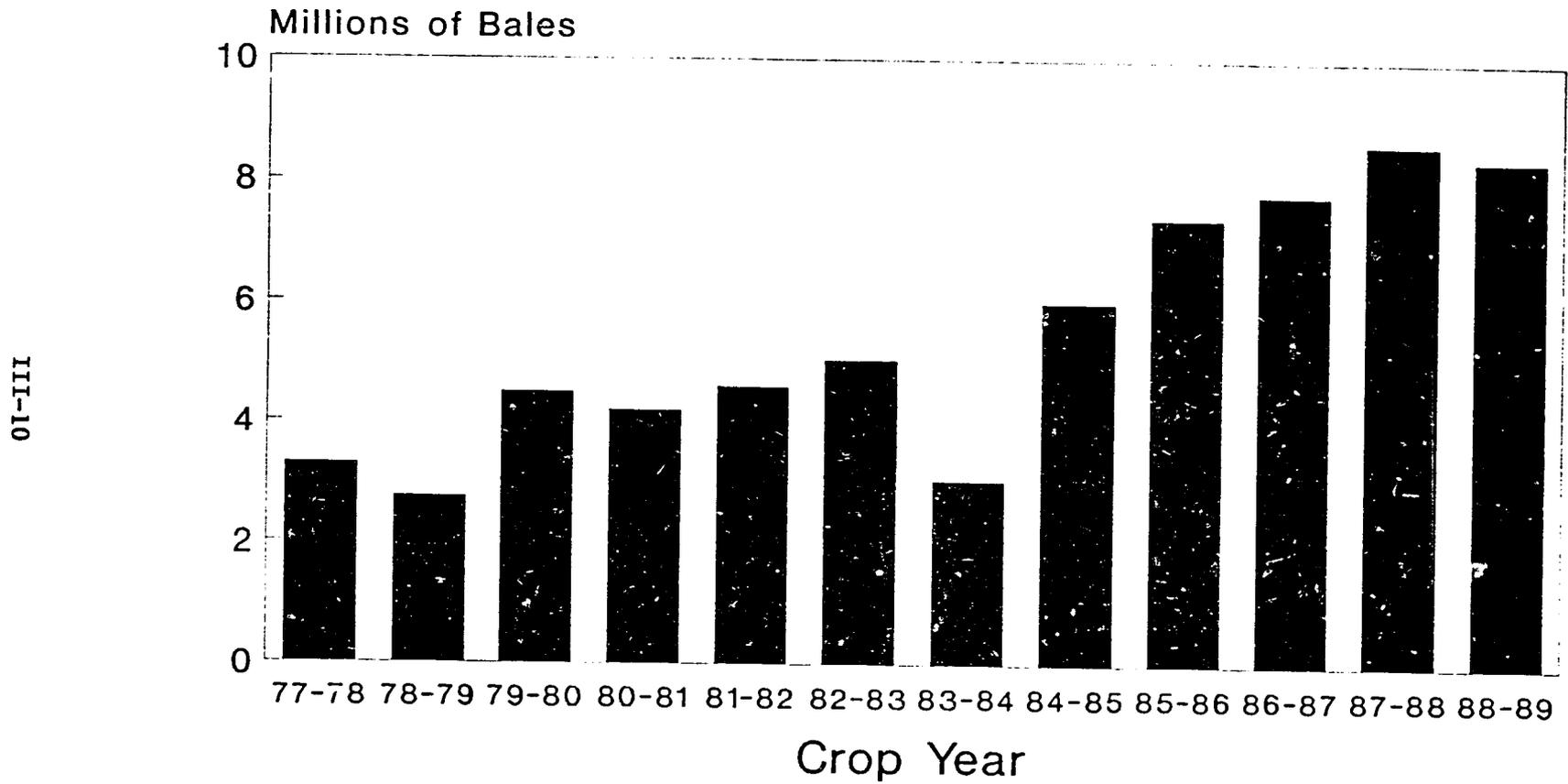
Cotton is a major crop in Pakistan, and cotton insect pests play a dominant role in limiting cotton yields. Cotton yields and production have increased dramatically during the past decade, due to a large extent from increased and more effective use of insecticides, together with improved varieties, more fertilizer and better agronomic practices (Figure 5).

While it is difficult to say precisely how much of the increase in cotton production can be attributed to pesticides, the pesticides trade has figures to back up a claim that the benefit-cost ratio from a full-insecticide spraying program in the cotton crop is from 2:1 to 4:1. Most certainly, without pesticides, production is curtailed substantially.

Therein lies a paradox. Although the use of pesticides is necessary in order to achieve sustained increases in agricultural production, human health and environmental hazards associated with the use of pesticides are a major concern. Very large numbers of small farmers, in particular, are using pesticides without being fully aware of the health hazards and without proper protective equipment and clothing. While the pesticide companies are actively carrying out campaigns to train farmers, the numbers of small farmers are so large that it is impractical for the companies to reach the majority of them. This issue requires more attention.

Fig 5

COTTON PRODUCTION IN PAKISTAN 1977-78 to 1988-89



3.1.5 Governmental Policies, Regulation and Administrative Procedures

A substantial change in policy and deregulation took place in February, 1980. The new policy transferred responsibility for distribution of pesticides to the private sector and removed most of the subsidies. The new policy also was to encourage local formulation and manufacture of pesticides.

The government still exercises considerable control on pesticides trade and on the industry. There is a legitimate regulatory role for government; the challenge is for government to pursue the regulatory function in a professional, unbiased and fair manner.

The pesticide industry is regulated under the Agricultural Pesticides Ordinance, 1971, as amended and extended by the Agricultural Pesticides Rules 1973. Inter alia, these require that all pesticides be registered with the Government of Pakistan. Following are some of the major areas of policy, regulation and administrative procedure.

Legal Controls: Legal controls regulate the registration, import and sale of pesticides. No pesticide can be marketed in the country unless it is registered under the Agricultural Pesticides Ordinance 1971. Elaborate procedures are laid down for getting a pesticide registered. Certain conditions (which are, if anything, less stringent than those which exist in developed countries) must be fulfilled before one can apply for registration. Once the conditions are met, the pesticide "can be registered in about two years." In practice, it is reported that "no request for registration is ever turned down," but that it usually requires three years to get it.

Label Requirements: A detailed set of label requirements is to be met on each package or container of pesticides offered for sale.

Control on Imports: Import licenses are issued by the Chief Controller of Imports and Exports.

Restrictions on Sale of Pesticides: Distributors and dealers must be registered with the Provincial Agriculture Department before being allowed to market pesticides in the Province. A dealer who sells the pesticides of more than one distributor must be registered separately for each distributor.

Quality Control: Government inspectors are appointed with powers to enter any premises in which pesticides are kept and to take samples. The samples are then to be transmitted to government analysts for examination. After the sample is analyzed, the analyst is to transmit to the inspector, in triplicate, a signed report of the result of the test or analysis.

Import Duties: Until 1987, finished pesticide products were exempted from all import tariffs, whereas the imported technical materials used in local formulation were subjected to import duties. When the latter duties were removed, it reduced a disadvantage that the local formulators had experienced. However, a remaining anomaly is that the technical materials used in local formulation can only be imported by a formulator. This restriction precludes a company which has a registered product from contracting with a local formulator with excess formulation capacity to prepare the product for the company on a toll, or custom, basis.

Generic Scheme: In 1989, the government introduced a generic scheme for the import of five types of pesticides (dimethoate, monochrotophos, methamidophos, triazophos and cypermethrin). The scheme allows traders in these products to import unregistered brands into Pakistan, on the basis of laboratory tests, without having to undergo trials or the registration process. This is in contrast to the normal registration requirements wherein a manufacturer has to submit a product for two years of field trials, as well as to provide detailed toxicological data to the registration authorities.

The implications of some of the above policies are discussed in section IV of this report.

3.2 PRODUCTION AND DISTRIBUTION OF PESTICIDES

Until 1980, pesticide distribution was mainly in the hands of the provincial extension services, although some private sector companies were allowed to distribute as well. Initially, all the pesticides were imported. Since the new policy was introduced in 1980, private-sector companies are permitted to import, formulate and distribute if they meet the established criteria and are granted the proper licenses. Except for DDT and BHC, which are manufactured by government-owned entities, there is as yet no manufacture of basic, or active, ingredients locally.

3.2.1 The Number of Companies and Products in the Industry

About 18 companies are the most active in the business of selling pesticides in Pakistan--10 partly foreign-owned companies and 8 Pakistani companies (Table 1).

Table 1
Pesticide Companies and Market Shares
in Pakistan (1989)

<u>Name of Company</u>	<u>Market Share (percent)</u>
Partly Foreign-Owned Companies	
1. Ciba-Geigy (Pakistan) Limited	35.8
2. Hoechst Pakistan Limited	8.1
3. ICI Pakistan Limited	7.6
4. Chemdyes Pakistan (Private) Ltd.	6.2
5. Pakistan Burmah Shell Ltd.	4.2
6. Sandoz Pakistan Limited	3.6
7. Rhone Poulence Pakistan (Pvt) Ltd.	1.8
Locally-Owned Companies	
8. Granulars (Pvt) Ltd. [Distribute for Sumitomo]	11.1
9. United Distributors (Pvt) Ltd. [Distribute for FMC International SA]	7.9
10. Jaffer Brothers (Pvt) Ltd. [Distribute for Cyanamide and other foreign co's.]	4.1
11. Pakistan Agro Chemicals (Pvt) Ltd.	2.6
12. BAPCO (Pvt) Ltd.	2.1
13. Alintco (Private) Limited	2.1
14. Charania International Trades & Services Agencies (Pvt) Ltd.	1.8
15. Agricides (Private) Limited	0.7
16. Ittehad Pesticides	0.1
17. Farm Services Syndicate	0.1
18. R. B. Avari & Co. (Pvt) Ltd.	0.1

Source: Pakistan Agricultural Pesticides Association

The Pakistan Agricultural Pesticides Association (PAPA), which was established in 1968, represents the companies who market more than 95 percent of Pakistan's consumption of pesticides. In 1983, PAPA became an associate member of the International Group of National Associations of Manufacturers of Agro-Chemical Products (GIFAP), which has headquarters in Brussels. A major goal of GIFAP is the establishment of uniformly high standards in the manufacture, formulation, packaging, and the safe distribution and use of pesticides in the developing countries. Members of PAPA are obligated to follow the code of conduct framed by FAO and accepted by GIFAP. The FAO Code of Conduct is attached as Appendix A.

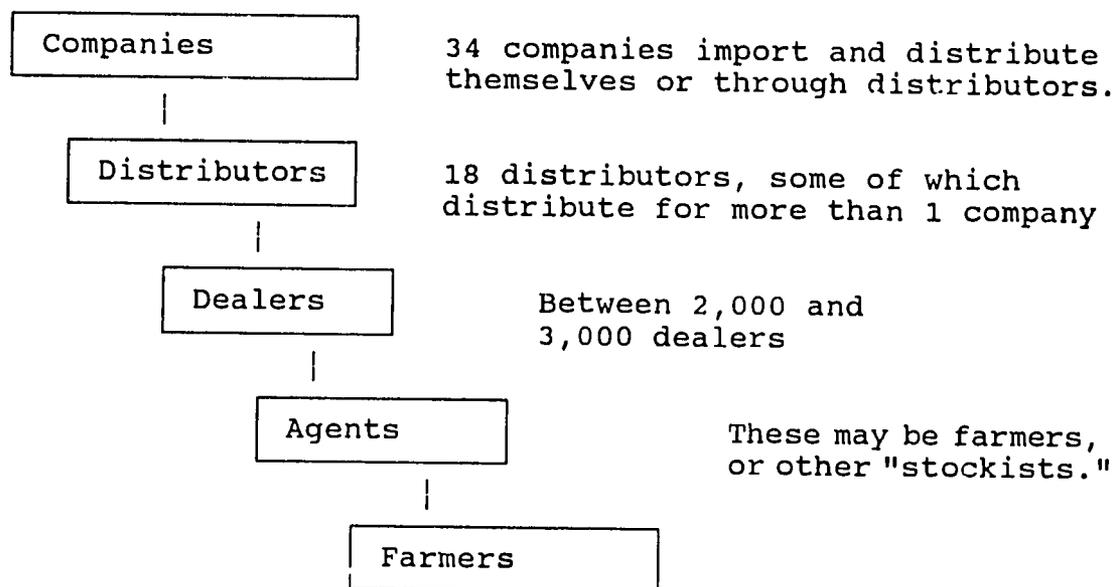
There are 14 formulation plants in Pakistan, some of which are quite modern and some of which are "garage-type" plants. Companies in Pakistan which formulate and which are members of PAPA include the following:

- Agrochemicals (Pvt) Ltd, Karachi
- Farm Chemicals Ltd, Karachi
- Granulars (Pvt) Ltd, Karachi
- Ittehad Pesticides, Lahore
- National Insecticides Co., (Pvt) Ltd, Karachi
- A.G. Services and Supplies, Karachi
- Pakistan Burmah Shell Ltd, Karachi
- Sandoz (Pakistan) Ltd, Karachi
- Agricides (Pvt) Ltd, Karachi
- Hoechst Pharmaceutical Pakistan Ltd, Karachi

3.2.2 TRANSPORTATION, STORAGE AND DISTRIBUTION SYSTEM

Historically, the transportation, storage and distribution system has been imperfect, at best. In some cases, unused pesticides have been in "storage" for up to 30 years. Under the public-sector distribution system, it was common for pesticides to be carried over for two to three years before being used. Besides the possible deterioration of the products, this practice enhanced the danger of contamination. The situation has improved substantially since 1980, when the private sector was given responsibility for transportation, storage and distribution. Because of the costs of maintaining inventories, companies attempt to keep on hand only the necessary supply of commodities to meet current demands.

Basically, the distribution system for pesticides is as represented in the following schematic:



Distributors have storage points in strategic locations around the country from which the demand of dealers is met. Many, if not most, farmers get their supplies from dealers. In some cases, agents such as farmers or "stockists" provide neighboring farmers with needed supplies.

Particularly at the level of the Agents, it is reported to be common practice for pesticides to be stored along with other articles, sometimes including food items. Also, shopkeepers or their employees may sit in the same premises in which pesticides are kept for sale, which enhances the risk of slow poisoning.

3.2.3 TRADE PRACTICES

PAPA reports that since the distribution of pesticides was turned over to the private sector in 1980, the companies have stepped up efforts to promote the safe and effective use of pesticides. Technical literature sheets in the local language, explaining the correct use of pesticides and the dosage rates for different crops, are provided free. Promotion is organized through television, radio, newspapers, demonstration plots and farmer gatherings. In 1989, it is estimated that pesticide companies conducted 300 dealer training programs and held 4,500 farmer training programs in which 250,000 farmers received instructions on the proper use of pesticides.

Historically, pesticides were only available in packages so large that it was not feasible for small farmers to procure them. Many of the private-sector companies now offer pesticides in packs as small as 100 ml, which brings the use of pesticides within reach of small farmers.

From the early until the late 1980s, a high percentage of sales by many companies was on unsecured credit, in order to increase volume of sales. The cost to the companies of this practice turned out to be high. According to PAPA, bad debts in 1986 were about 13 percent of sales; in 1987, they ran about 20 to 25 percent. Most of the companies then turned to sales for cash only, or on secured credit.

3.2.4 Extent of Market Competition

The farm chemicals agro-industry has become highly competitive since the import, formulation and distribution of pesticides was turned over to the private sector in 1980. The Annual Reports of the companies describe "severe competitive pressures," "cut throat competition," and "fierce competition."

According to the Pakistan Agricultural Pesticides Association, "Due to competition among the private sector, representatives of different companies are using all possible tactics to push their products for sale to the growers."

Benefits to farmers and to the economy of the competition include better service to farmers in terms of "extension," or teaching farmers about the proper, safe and effective use of pesticides on various crops. In addition, pesticides prices are undoubtedly lower than they would be without competition. One company's annual report indicated that "market forces compelled us to restrict our pesticide price increases to a minimum." Another company's report indicated that "fierce competition did allow us to make only marginal price increases which could not compensate fully for inflation, let alone the deep gap in respect of exchange rate differences."

While they are not believed to be widespread, possible adverse effects of the competition that should be monitored include: (a) agents' recommending low doses of insecticides, to reduce the farmer's expense (it is alleged that "the under-dosing will bring relief to the farmer when he sees that the pest has reduced but it brings havoc for the grower when he sees after few days that the pests had resurged in a big way, a typical phenomenon of under-dosing of pesticides"), and (b) unethical practices in order to sell products.

3.3 THE COMPANIES IN THE INDUSTRY

This section provides a summary description of those companies for which data and information were available to the research team, either from annual reports of the companies or from other sources. All the firms described are private-sector companies except Ittehad Pesticides, which is 100 percent owned by a government corporation.

3.3.1 Ciba-Geigy (Pakistan) Limited

Ciba-Geigy (Pakistan) Limited is a public limited company listed on the Karachi and Lahore Stock Exchanges. The company is owned 60 percent by Ciba-Geigy Limited, Basle, Switzerland, and 40 percent by Pakistani shareholders. Trading operations in Pakistan date to 1951. The parent company is a leading chemical group with affiliates in some 60 countries.

Ciba-Geigy (Pakistan) Limited owns controlling interest in a subsidiary company, Farm Chemicals (Private) Limited, which formulates most of the plant protection products that Ciba-Geigy markets in Pakistan. The subsidiary formulates mainly emulsifiable concentrate (EC) and WSL products. The company is moving away from granules toward more liquids (EC), and to smaller quantities of ULV. The subsidiary is located in the SITE area of Karachi. Ciba-Geigy (Pakistan) Limited employs about 800 persons.

The Agricultural Division of Ciba-Geigy (Pakistan) Limited handles the company's sales of plant protection and animal health products, which together account for about three quarters of the company's sales. The company has 1,200 active dealers, to which it sells mainly for cash. About one-fifth of total sales are made against secured credit and to farmers by the dealers on credit.

Among all companies in Pakistan in the Pesticides business, Ciba-Geigy clearly leads in sales, with about a 36 percent share of market value in 1989. Table 2 shows the financial operating results for the company's Agricultural Division from 1984 through 1988.

3.3.2 Granulars (Private) Ltd.

Granulars (Private) Ltd., organized in 1975, is a distributor for Sumitomo. It imports, formulates and distributes agro chemicals. The company has established 21 area offices in the cotton and rice belt of the Punjab and Sind. It also has one area office each in Balochistan and NWFP, to service fruit orchards, sugarcane and other crops. The company has 270 dealers in the Punjab and 135 in the Sind. Some supplies are sold directly to farmers.

Table 2

Ciba-Geigy Agricultural Division
(Rupees in millions)

	Operating Results				
	1984	1985	1986	1987	1988
Sales - local	277.5	502.5	719.9	951.3	990.6
- foreign	0.0	0.0	0.0	0.0	0.0
Total sales	277.5	502.5	719.9	951.3	990.6
Less discounts and commissions	37.4	70.8	105.9	83.6	88.3
Net sales	240.1	431.7	614.0	867.7	902.3
Cost of goods sold	174.3	363.8	534.4	716.7	733.4
Gross Margin	65.8	67.9	79.6	151.0	168.9
Admin & Mktg exp	30.5	47.1	62.6	95.8	113.5
Indent commission	0.0	0.2	0.0	0.0	0.3
Operating profit	35.3	21.0	17.0	55.2	55.7
Total assets	271.4	383.9	586.1	754.9	735.1
% Assets employed					
agric. division(1)	48%	56%	58%	70%	62%
Assets employed					
agric. division	130.3	215.0	339.9	528.4	455.8
Total equity	48.0	49.6	31.9	27.3	22.9
Equity employed					
agric. division(2)	23.0	27.8	18.5	19.1	14.2
Asset turnover	213.0%	233.7%	211.8%	180.0%	217.4%
(sales/assets)					
Gross margin	27.4%	15.7%	13.0%	17.4%	18.7%
Return on assets	27.1%	9.8%	5.0%	10.4%	12.2%
(op. profit/assets)					
Return on sales	12.7%	4.2%	2.4%	5.8%	5.6%
(op. profit/sales)					
Return on equity	153.2%	75.6%	91.9%	288.9%	392.3%
(op. profit/equity)					

(1) Percentage of assets employed in agriculture division for 1984 not given in annual report. Percentage used is percent which gives average asset turnover ratio based on known percentages for following four years.

(2) Assumption that agriculture division equity is the same percentage as total assets employed percentage given in annual reports.

Source: Ciba-Geigy annual reports. Percentages, except assets employed percentage, derived from annual report numbers.

3.3.3 Hoechst Pakistan Limited

Hoechst Pakistan Limited is a subsidiary of Hoechst Aktiengesellschaft, which owns 50.1 percent of the shares, and which is incorporated in West Germany. Hoechst Pakistan Limited has three divisions: Agriculture, Pharmaceutical and Chemicals. The Agriculture Division handles sales of pesticides. In 1989, sales by the Agriculture Division were 27 percent of gross sales by the company. Table 3 shows the Agriculture Division's financial operating results for 1985 through 1989.

While the increase in sales in 1988 was only 4 percent higher than the previous year's sales, the company considered this to be "rather satisfactory . . . in view of the fact that from April 1988 onwards all sales were made on cash or secured credit basis as against our liberal credit policy of the previous years . . ." which had resulted in substantial bad debts. For one year, 1986, sales and profits of the Agriculture Division were higher than for either of the other two Divisions; sales exceeded 350 million rupees, but this performance had apparently been built to a large extent on "liberal credit." At least since 1983, the Agriculture Division is the only division which has shown losses, and those were for the two years 1987 and 1988. Interpreting from a chart in the 1989 Annual Report, 1987 showed a small loss (about Rs. 10 million) and 1988 a larger one (about Rs. 25 million). In discussing the future outlook for the company, the 1989 Annual Report states that "In the pesticides field, the period of uncertainty of previous years and its related problems on current business is more or less over . . . A strong edifice has now been built on which we hope to develop a higher market share and improve profitability." [The report indicates that the company started basic manufacturing of certain pharmaceutical products in 1989.]

3.3.4 FMC International SA, Pakistan Branch

United Distributors (Pvt) Ltd., a distributor for FMC, has an Agro Chemical Division which handles the sales of pesticides.

3.3.5 ICI Pak Manufacturers (Pvt) Ltd.

This company is the largest private sector company listed on the Karachi Stock Exchange in terms of issued capital. Agrochemicals is only one of several lines of products, including polyester staple fibre, soda ash, paints and specialty chemicals, in addition to agrochemicals. No breakout of the agrochemical portion of the business is available in the annual reports. An agrochemicals formulation plant at Sheikhpura is scheduled to start up in 1991.

Table 3

Hoechst Agriculture Division
(Rupees in millions)

	Operating Results				
	1985	1986	1987	1988	1989
Sales - local	146.4	357.5	167.0	173.8	229.2
- foreign	0.0	0.0	0.0	26.8	0.0
Total sales	146.4	357.5	167.0	200.6	229.2
Less discounts and commissions	25.1	63.3	27.4	44.5	48.8
Net sales	121.3	294.2	139.6	156.1	180.4
Cost of goods sold	82.7	217.1	91.8	124.6	118.8
Gross Margin	38.6	77.1	47.8	31.5	61.6
Admin & Mktg exp	21.7	39.6	54.9	55.2	51.7
Operating profit	16.9	37.5	(7.1)	(23.7)	9.9
=====					
Total assets	390.5	494.4	500.0	477.7	459.8
% Assets employed agric. division	21%	39%	44%	34%	22%
Assets employed agric. division	82.0	192.8	220.0	162.4	101.2
Total equity	79.8	92.7	93.6	51.9	75.4
Equity employed agric. division*	16.8	36.2	41.2	17.6	16.6
Asset turnover (sales/assets)	178.5%	185.4%	75.9%	123.5%	226.6%
Gross margin	31.8%	26.2%	34.2%	20.2%	34.1%
Return on assets (op. profit/assets)	20.6%	19.4%	-3.2%	-14.6%	9.8%
Return on sales (op. profit/sales)	11.5%	10.5%	-4.3%	-11.8%	4.3%
Return on equity (op. profit/equity)	100.8%	103.7%	-17.2%	-134.3%	59.7%

*Assumption that agriculture division equity is the same percentage as total assets employed percentage given in annual reports.

Source: Hoechst Company annual reports. Percentages, except assets employed percentage, derived from annual report numbers.

3.3.6 Chemdyes Pakistan (Private) Ltd.

Chemdyes Pakistan (Private) Ltd. was incorporated in 1953. It is 45 percent owned by Bayer AG, West Germany. The company has four divisions, including an Agro Chemicals Division that was formed in 1954 and which has responsibility for research and development, formulation, market analysis and marketing of pesticides.

3.3.7 Sandoz (Pak) Ltd.

Sandoz (Pak) Ltd. is owned 75 percent by the Swiss parent company: Sandoz, Bazle, Switzerland. Sandoz (Pak) has been in operation for a little more than 25 years. It has activities in dyes and chemicals and pharmaceutical as well as in agro chemicals. The Agro Division was added in early 1984 to market Sandoz agro chemicals. Sandoz (Pak) Ltd. pioneered in locating in an underdeveloped area: Jamsboro, Sindh.

Consolidated data for the company indicate that inspite of growth in turnover, the profitability of the total operations decreased during 1988, due largely to (a) price controls resulting essentially in a price freeze over pharmaceutical products, (b) lower sales of agro products due to a change in the company's sales policy from credit to cash sales (due to a history of defaults in accounts receivable), (c) higher discounts on account of fierce competition in the agro market, and (d) substantial provision for old outstandings, against agro chemical sales. Another difficulty was that the company could not launch a new product, Mavrik B, during the year because of the delay in registration by Government Registration Authorities.

Table 4 shows the financial operating results for the Agro Division for 1984 through 1988. Based on sales of Rs. 65.98 million, the Division contributed an operating loss in 1988 of Rs. 32.87 million (including Rs. 10 million provided against doubtful old outstanding debts) compared with a loss the previous year of Rs. 0.42 million.

3.3.8 Jaffer Brothers (Pvt) Ltd.

To market American Cyanamid pesticide products in Pakistan, Jaffer Brothers (Pvt) Ltd. is a distributor.

3.3.9 Ittehad Pesticides

Ittehad Pesticides is a subsidiary of the Federal Chemicals and Ceramics Corporation Limited (FCCCL), established in 1973. It is wholly owned by the Federal Government.

Table 4

Sandoz Agro Division
(Rupees in millions)

Operating Results

	1984	1985	1986	1987	1988
Sales - local	34.2	70.2	92.1	90.2	66.0
- foreign	2.9	0.0	0.0	0.0	0.0
Total sales	37.1	70.2	92.1	90.2	66.0
Less discounts and commissions	5.3	11.9	14.1	11.1	17.8
Net sales	31.8	58.3	78.0	79.1	48.2
Cost of goods sold	23.8	43.5	59.7	62.6	50.6
Gross Margin	8.0	14.8	18.3	16.5	(2.4)
Admin & Mktg exp	6.1	10.7	14.4	16.9	30.5
Operating profit	1.9	4.1	3.9	(0.4)	(32.9)
Total assets	237.1	328.0	473.7	609.9	702.2
% Assets employed					
agric. division(1)	15%	16%	19%	21%	15%
Assets employed					
agric. division	35.6	52.5	90.0	128.1	105.3
Total equity	31.8	41.3	44.8	47.4	52.7
Equity employed					
agric. division(2)	4.8	6.6	8.5	10.0	7.9
Asset turnover (sales/assets)	104.3%	133.8%	102.3%	70.4%	62.7%
Gross margin	25.2%	25.4%	23.5%	20.9%	-5.0%
Return on assets (op. profit/assets)	5.3%	7.8%	4.3%	-0.3%	-31.2%
Return on sales (op. profit/sales)	5.1%	5.8%	4.2%	-0.4%	-49.8%
Return on equity (op. profit/equity)	39.8%	62.0%	45.8%	-4.0%	-416.2%

(1) Percentage of assets employed in agriculture division for 1984 not given in annual report. Percentage used is estimate based on performance in following two years.

(2) Assumption that agriculture division equity is the same percentage as total assets employed percentage given in annual reports.

Source: Sandoz annual reports. Percentages, except assets employed percentage, derived from annual report numbers.

According to the annual publications of the Federal Ministry of Finance, "Government Sponsored Corporations," Ittehad Pesticides consistently had negative profits before taxes for the three years ending 1987-88, as follows:

	1985-86	1986-87	1987-88
	(million rupees)		
Profits Before Taxes	-9.100	-3.624	-2.406

3.4 FINANCIAL PROFILES OF THREE COMPANIES

Three of the companies marketing pesticides in Pakistan break out the operating results for the agricultural (pesticide) divisions in their annual reports: Ciba-Geigy, Hoechst, and Sandoz. In one case the company's seed sales are also included in the division; any distortions caused by the seed sales have been ignored for purposes of this analysis since the proportion of seed sales is small.

3.4.1 Ciba-Geigy

Ciba-Geigy has by far the largest market share of the companies marketing pesticides in Pakistan. Its sales are more than five times that of Hoechst and fifteen times that of Sandoz. In 1988 its agriculture division had approximately 75% of total sales for the company and 129% of the company's operating profit. However, the profits generated by this division were not sufficient to make up both the loss in the pharmaceutical division and the heavy financial charges due to the large proportion of short term financing used by the company.

In the Agriculture Division Ciba-Geigy has had consistent asset turnover ratios above 1.8, with a high of 2.3 in 1985. Its gross margin and return on sales and consequently its return on assets, however, have been low. The highest return on sales it achieved was in 1984 (12.7%); in every year since then the return on sales has been less than half that. The gross margin was 27% in 1984, but ranged between 13 and 17% in the ensuing four years. The return on assets (operating profit/total assets of the division) averaged a little over 9% over the years 1985-88, going from a low of 5% in 1986 to a high of 12.2% in 1988. Considering that the borrowing cost of capital is approximately 15% in Pakistan and that finance charges and taxes still had to be paid out of these returns, the returns are clearly inadequate.

3.4.2 Hoechst

In recent years the Agriculture Division has accounted for approximately one third of Hoechst's sales. Its proportion of sales, however, and its operating results have been anything but steady. Its 1986 sales were two and a half times its 1985 sales and twice

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the amount of its 1987 and 1988 sales. Its asset turnover ratio has been as low as .76 in 1987 and as high as 2.26 in 1989. Its gross margin has varied between 20% and 35%; in three of the five years (1985-1989) it was higher than 30%. In 1987 and 1988 the division had operating losses of Rs 7.1 million and Rs 23.7 million. In 1985 and 1986, the division's contribution to corporate operating profit was higher than its share of total assets. In 1987 the division lost money while the company as a whole made money; in 1988 its losses were one and one half times the profits of the other divisions. By 1989 the division had returned to profitability, but not in proportion to its share of the assets.

In its best years, 1985 and 1986, the division's operating profit was around 20% of total assets, better than the cost of borrowed capital but insufficient to provide adequate returns to compensate for risk, inflation and entrepreneur's profit. After the two loss years, return on assets was back up to only 10% in 1989.

Hoechst's gross margins have been consistently better than Ciba-Geigy's. They have been insufficient, however, to cover its administrative and marketing expenses, which are a much higher proportion of net sales than Ciba-Geigy's; these expenses at Hoechst have been as high as 39% of net sales (1987) while Ciba-Geigy's highest was 13% of net sales in 1984.

3.4.3 Sandoz

The agro division at Sandoz is the smallest of its three divisions and the poorest performer. With 21 and 15% of the company's assets it achieved only 14% and 9% of the company's sales in 1987 and 1988, losing money in both years. Its performance in the three prior years was slightly better, achieving sales and operating profit commensurate with its proportion of company assets.

The company began production of pesticides in 1984; its trends have been opposite what would be expected. Sales grew the first three years and have declined in the past two. Its asset turnover and gross margin have steadily declined from their peaks in 1985. Asset turnover reached a low of 63% in 1988; gross margin was negative that year when sales were down and were insufficient to cover the fixed costs. Its administrative and marketing costs have steadily increased, doubling from 1987 to 1988 as the company tried to reverse its declining sales trend.

The return on assets (operating profit/total assets) reached a peak of 8% in 1985, clearly inadequate to cover the costs of borrowed capital, inflation, and risk.

3.4.4 Summary

Ciba-Geigy has the lowest gross margin, on average, of the three companies; it makes up for a low gross margin by being able to spread its administrative and marketing costs over its larger sales.

All three companies depend heavily on short term loans for financing. Ciba-Geigy has no long term loans; the two other companies have very small amounts, less than 14% of their total debt. Debt/equity ratios range from a high 6:1 (Hoechst) to a higher 8:1 (Sandoz) to an astronomical 16:1 (Ciba-Geigy). All three companies sustained losses in 1988 and two of the three had losses in 1987; even when profits are substantial, they cannot offset the large financial charges. Ciba-Geigy and Sandoz each paid more in financial charges in 1988 than their total equity. All three companies had negative working capital in 1988.

The operating returns on pesticides have been less than the cost of the borrowed capital on which these companies depend. It would appear that the companies cannot continue to market pesticides given the pressure to keep prices down and the rising costs (because of a devaluing rupee) for the imported chemicals necessary to formulate their products.

IV. SUMMARY OF OPPORTUNITIES AND CONSTRAINTS AFFECTING THE PESTICIDES INDUSTRY

4.1 MARKET

In a major policy decision in February 1980, the Government of Pakistan turned over to the private sector the responsibility to import pesticides, including active ingredients, and to formulate and distribute pesticides. Prior to that, the import and distribution of pesticides were carried out by governmental agencies. Since 1980, the use of pesticides has increased rapidly.

By far the largest percentage of pesticides in Pakistan is used on cotton. An opportunity exists in the future to substantially increase total agricultural production through the effective use of herbicides and other pesticides on such crops as rice, sugarcane, maize, fruits, vegetables, tobacco and pulses.

Punjab and, secondly, Sind are the largest markets for pesticides, and likely always will be. However, the fruit and vegetable industry in Baluchistan and tobacco in NWFP are potentially major users and offer scope for market development.

One of the main constraints in stimulating market demand for pesticides is the extent to which proper pesticide use can be conveyed to a largely illiterate farming population. Provincial extension services are largely unsuccessful in reaching the mass of farmers with effective messages about pesticide selection and use. Only a few of the private companies have a limited number of trained and qualified field workers; several companies employ field advisory staff. The relatively small number of field advisors makes it difficult to service even the dealers, let alone farmers. (Some dealers complain that they have never seen a technical advisor from the company.) On balance, it is very difficult for large numbers of farmers to obtain sensible information about pesticides and their use.

4.2 PRODUCTION AND TECHNOLOGY

In response to the government's policy to encourage the local formulation of pesticides, some 14 private companies have invested in formulation plants; some of these are quite modern and sophisticated, and others are little more than "garage-types" of operations. About 90 percent of the pesticides is handled by 10 partly foreign-owned private-sector companies. Most of the remainder is distributed by 8 local companies, all of which are private except one: Ittehad Pesticides, which is 100 percent owned by the government.

With the objective of reducing outlays of foreign exchange for imports of basic chemicals for the formulation of pesticides, the policy of government is to encourage the local manufacture of such chemicals. Up to now, the overall market for pesticides in Pakistan has not been large enough that private sector entrepreneurs have been willing to make investments in manufacturing facilities for basic chemicals, although it is understood that one or two private companies are thinking about investing in facilities to produce selected basic materials. [Limited quantities of DDT and BHC, which have been banned in many countries, are manufactured in governmental facilities.]

The existing 14 pesticide formulation plants in Pakistan have an annual capacity of 58,000 tons. In 1987, capacity utilization was only 9.5 percent, although it is said to be higher now. According to the importers, local formulation could save 30 percent to 40 percent of the foreign exchange cost of pesticides, if policies were more conducive to local formulation.

In due course, the local manufacture of selected active ingredients may offer attractive investment opportunities, but the size of the market and other conditions are not yet favorable to much, if any, local manufacture.

4.3 INVESTMENT

As a condition for a formulation plant license, the government had issued an order which would require foreign entrepreneurs within four years of start-up of local pesticides formulation, to start backward integration into manufacture of basic chemical ingredients. Apparently, the order has not been implemented. It is premature in Pakistan to push for local manufacturing of basic technical materials, or active ingredients. As the market for pesticides grows, private entrepreneurs will sense when it will be opportune to begin to invest in selective aspects of basic manufacturing of chemicals. The best policy is to leave it to the discretion of the private sector as to when and for which chemicals it makes sense to begin basic manufacture of active ingredients. To try to force private investors into basic manufacture, as a pre-condition for a license to formulate pesticides, will only cause delay in what would otherwise be useful investments in formulation facilities.

There is scope for increased investments in modern formulation facilities and, eventually, for selective investments in facilities for manufacture of basic ingredients. But, existing policies, regulations and administrative procedures tend to discriminate against local manufacture or formulation.

4.4 GOVERNMENT POLICIES, REGULATIONS AND ADMINISTRATIVE PROCEDURES

The basic thrusts of the government's policies, regulations and administrative procedures are: (a) to support private sector investment and operations in the pesticide agro-industry, and (b) for the government to remain responsible for regulating the industry in the interest of society as a whole. While the intent of the basic thrusts is commendable, there are anomalies and constraints which inhibit private sector initiative and, therefore, are detrimental to society. Among them are the following:

4.4.1 Generic Scheme

In 1989, the government introduced a generic scheme for the import of five types of pesticides. The scheme allows traders in these products to import unregistered brands into Pakistan, on the basis of laboratory tests, without having to undergo trials or the registration process. This is in contrast to the normal registration requirements wherein a manufacturer, or formulator, must submit a product for two years of field tests, as well as to provide detailed toxicological data to the registration authorities. The policy discriminates against local formulation.

The issue of generic labelling is one of the more important issues facing the pesticides agro-industry. The possible gain to society in terms of reduced cost of pesticides, which is likely to be relatively small, will undoubtedly be more than offset by losses in safety in the use of pesticides, lower investment by the private sector in pesticides development and manufacture, and in quality control.

Safety: In the case of the generic pesticides, who will be responsible for training farmers in the safe and effective use of these pesticides? Certainly, it will not be in the interest of the private companies who have built up a capacity for training farmers in the use of their branded products. The safety hazard will likely increase.

Private-Sector Investment: The generic-labelling policy will discourage investment in the development and introduction through qualified field staff and dealer networks of new and safer products. In this sense, the generic-labelling policy is diametrically opposed to those established in the Pesticides Ordinance 1973 and in the February 1980 policy to encourage private-sector investment in pesticide formulation and manufacturing facilities.

Quality Control: Most of the private companies operating in the pesticides business in Pakistan have an international image to maintain; they have a vested interest to ensure the safety, quality and consistency of their products. With the generic pesticides, the responsibility for quality control will fall entirely on

understaffed, underqualified and ill-equipped governmental bodies. While existing regulations allow for a system of quality control through sampling by inspectors, it appears that nothing has been done to enforce this part of the regulations.

4.4.2 De Facto Price Control

While there is no direct control by the government on pesticide prices, price "guidelines" on imported pesticides, and threats of reducing distributors' markup even more, constrain the further development of the industry.

4.4.3 Import Regulations and Taxes

Import regulations, the booking of foreign exchange forward cover, taxes, and duties are structured in such a way that pesticide formulators are penalized, in comparison to those who import finished pesticide products. Even registered pesticides go through a cumbersome import procedure. Each province has set up "expert committees" consisting of various officials of the government and representatives of trade and industry, to scrutinize the indents of the distributors and to make recommendations to the Chief Controller of Imports for issuance of the necessary pesticide import license.

4.4.4 Sanctioning Procedure for Formulation Plants

Formulation is the process whereby active ingredients are put into forms that can be conveniently and safely applied by farmers. Plants for the manufacture of active ingredients of pesticides are located mainly in North America, Western Europe, and Japan, where the major world agrochemical markets exist, where the necessary complex chemical intermediates and skilled manpower are readily available, and where the plants can share the infrastructure and technological support of existing manufacturing locations. In the early phases of the use of pesticides, most countries import finished products. The next, intermediate, stage is to import active ingredients to be formulated in local formulation plants. The final stage, which very few countries achieve, is to manufacture active ingredients locally.

There is need and opportunity for additional, modern formulation plants in Pakistan. The pesticides market is still too small, the local chemical industry is at a rudimentary stage, and infrastructure is not yet developed enough to provide the requisite facilities to make the basic manufacture of active ingredients economically viable.

4.4.5 Malpractices in the Pesticide Trade

Because of concern over malpractices in the pesticide trade, including reported problems of quality of pesticides sold to farmers, it was announced in January 1990 that the Federal Government has constituted a permanent committee to check and control the practices. The committee, which is to meet quarterly, is chaired by the Director, Plant Protection Institute, Faisalabad. An implementation problem that the committee will face is that there is no well-defined set of standards and criteria for quality.

4.5 THE ENVIRONMENT AND HUMAN HEALTH

Although most private sector companies are actively helping to improve application practices on farms, the practices are often very poor, due to widespread illiteracy among farmers, inappropriate labelling by some distributors to meet the illiteracy problem, poor extension, insufficient dealer training, and poor application equipment. The intended impact is frequently not achieved, and unintended human health hazards exist.

Some of the larger companies conduct farmer training programs. In addition, the Pakistan Agricultural Pesticides Association (PAPA), in collaboration with GIFAP, conducts "train-the-trainer" courses on the safe and effective use of pesticides. A dealer training course has also been started by PAPA.

PAPA is working with GIFAP to design protective clothing to be used in the hot climates of Pakistan. [Traditional protective clothing is claimed by applicators to be too hot for their comfort, and such clothing is often not used, even if it is available.]

There is no well-defined set of safe residual limits for the application of different pesticides for various crops in Pakistan.

V. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

5.1 THE CURRENT AND POTENTIAL ROLE AND IMPACT OF PRIVATE SECTOR PESTICIDE OPERATIONS AND INVESTMENT

Within the decade since February 1980, the private sector companies have generally done a commendable job of building distribution systems for their products, including training programs for dealers and farmers in the safe handling and safe and effective use of pesticides. Even so, more diligent efforts need to be made in two areas, in particular:

o Safety and Human Health

Because the number of farmers in the country is so large, it is a herculean task for individual companies to take on the role of training farmers in the safe and effective use of pesticides. Because of the magnitude of the problem of health hazards, it is recommended that the individual companies, through the Pakistan Agricultural Pesticides Association (PAPA), prepare a proposal for training large numbers of farmers (perhaps including agents and dealers) in the safe and effective use of pesticides. A well-prepared proposal would more than likely be considered favorably for financing by one or more potential donors.

o Adulteration of Product

Farmers are sometimes sold products which have been "adulterated." It is more than likely that the adulteration takes place at the dealer or agent level, rather than at the distributor level. The farther down the distribution chain the adulteration takes place, the more difficult it is for companies to police. While it will add to the end-cost of the product, it is recommended that companies use tamper-proof seals and containers for the products which are most susceptible to adulteration, or for which the potential adverse implications are greatest. [The Government of Pakistan will need to recognize that carrying out these safeguards will add to the real cost of the product].

5.2 THE ROLE AND IMPACT OF PUBLIC POLICY ON DEVELOPMENT OF THE PRIVATE SECTOR PESTICIDES INDUSTRY

A heavy burden for rationalizing the pesticides agro-industry in Pakistan falls on the Government. The Government made a wise decision in 1980 when it shifted the role of importing, formulating and distributing pesticides to the private sector. The

remaining, legitimate role of Government in regulating the pesticides industry is extremely important. Some further changes and shifts in emphasis are needed:

- o Generic Scheme

It is recommended that the Government re-think the potentially serious adverse repercussions of the generic scheme and discontinue it. If needed to assist in making the decision, the Government may wish to commission a thorough study of the issue.

- o De facto Price Controls

It is recommended that the Government eliminate any attempt to control prices, by formula or otherwise; healthy competition among a fairly large number of private sector companies is the most efficient regulator of prices.

- o Import Regulations

It is recommended that the constraints imposed on imports of active ingredients, compared with the easier treatment for imported pesticides, be rationalized.

It is further recommended that the procedures for importing auxiliary chemicals for pesticide formulation be greatly simplified.

- o Sanctioning of Formulation Plants

Policies are needed which encourage, not discourage, pesticide formulation within Pakistan, with a goal of reducing and eventually eliminating imports of finished pesticides.

It is recommended that, to eliminate any ambiguity, the Government rescind the order that to obtain sanction to build and operate a formulation plant, the company must commit to the manufacture of active ingredients.

- o Health Hazards

Pesticide distributing companies must be given incentive and encouragement to train their dealers who, in turn, train farmers in the effective and safe use of pesticides.

More specifically, it is recommended that the Government endorse and support the action program which resulted from the regional seminar on pesticides toxicology and safe use of pesticides, sponsored by the Food and Agriculture Organization in cooperation with the Department of Plant Protection, held in

Karachi from May 2 to 7, 1990. Among other things, the seminar laid out a program of training for 3,000 pesticides dealers and for training rural doctors in detoxification techniques.

- o Product Adulteration

It is recommended that a system be set up to test on a regular basis samples of all pesticides in the market for purity and reliability, and for penalizing companies or persons who market substandard products.

5.3 THE ROLE AND IMPACT OF FOREIGN ASSISTANCE ON STIMULATING PRIVATE SECTOR PESTICIDES INDUSTRY DEVELOPMENT

Given the right set of policies, private investors will more than likely build on the existing investments in the pesticides industry with little need for donor assistance, although the industry will stand to gain a great deal in terms of technology if private, foreign investors are encouraged to participate in ventures in Pakistan. However, there is believed to be a role for donors to participate in a program designed to:

- o educate farmers on the safe and effective use of pesticides, and
- o provide innovative protective gear for spraying toxic products.

Specifically, it is recommended that USAID consider partial funding of a well-conceived program for training farmers, dealers and agents, if such a program were presented for funding.

F.A.O CODE OF CONDUCT ON THE DISTRIBUTION AND USE OF PESTICIDES

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INTRODUCTION

The need to improve international standards of registration, production, storage, marketing, handling and applications of potentially hazardous agrochemicals has become increasingly apparent in recent years. Industry's reputation and image have been tarnished by serious incidents such as Bhopal and Basle and a growing awareness of the extent of poisoning cases through misuse of products.

The medium of the FAO Code of Conduct provides a suitable framework for closer collaboration between relevant Government Departments and Industry members individually, and collectively through GIFAP (International Association of National Associations of Pesticide Manufacturers) and National Trade Associations with a view to raising pesticide distribution and use standards thus reducing or eradicating unacceptable damage to health and the environment.

Although the FAO Code is voluntary in nature, leading chemical companies regard the Code as mandatory in practice and are working with GIFAP to comply with the Code and committing resource to rectify substandard procedures.

The Code was adopted in 1986 by FAO member countries, but only came into effect in mid-'86. Its adoption is particularly important to countries with less developed systems of registration, distribution and use.

OBJECTIVE SUMMARY

1. Guide public and private sector parties engaged in pesticide regulatory, production, marketing, distribution and use work.
2. Encourage the need for collaboration between Governments of importing and exporting countries to ensure benefits from agrochemical use are not cancelled out by adverse effects on human health, wildlife and the environment as a whole.
3. Emphasise the need for safety in handling and use techniques to prevent undesirable poisoning occurrences amongst farmers.
4. Encourage countries which have yet to establish effective regulatory procedures to do so with the aid of pertinent training programmes.

FAO CODE IMPLEMENTATION INDUSTRY OBLIGATIONS GIFAP INITIATIVES

1. GUIDE

Although responsibility rests jointly with Governments and Industry, it is important that Industry members comprehend what is expected of themselves. Accordingly, GIFAP has published a useful guide to implementation together with a series of *Check Lists* on the following topics :-

1. Management.
2. Product Safety & Registration, Product Development & Technical Service.

3. Production, Formulation, Packaging.
4. Marketing, Distribution and Sales.
5. Advertising and Promotion.

The Code should of course be studied carefully, but the *Check Lists* provide a handy series of ready references.

2. BOOKLETS

GIFAP has also published a series of illustrated guidelines in booklet format entitled :-

1. Guidelines for the safe handling of pesticides during their formulation, packing, storage and transport.
2. Guidelines for emergency measures in cases of pesticide poisoning.
3. Guidelines for Quality Control of Pesticides.
4. Guidelines for the safe and effective use of pesticides.
5. Guidelines for the avoidance, limitation and disposal of pesticide waste on the farm.
6. Guidelines for the safe transport of pesticides.

The Guideline series offers practical advice in an easily understood way. If you need copies of the booklets PAPA can obtain supplies for you.

3. TRAINING

Other GIFAP initiatives include the sponsorship of Training Courses for dealers in the proper handling of pesticides. A trainers.

manual for Agrochemical Retailers Courses has been published following pilot training programmes in Thailand and elsewhere. Training courses for Government Extension officers and Industry representatives on the train-the-trainer principle have also begun. These courses, one of which took place in Faisalabad last year will, facilitate farmer education in product use. A training manual will be released later in the year.

4. PROTECTIVE CLOTHING

In accordance with the objective of reducing potential health hazard, GIFAP sponsored work is underway to discover suitable clothing for tropical use. A comfortable, durable and inexpensive fabric sensibly designed for tropical use is sought.

5. LABELLING

GIFAP has assisted FAO in the development of PICTOGRAMS to facilitate comprehension of handling and use instructions. The aim is now to encourage individual industry members to adopt the symbols.

a. GIFAP ROLE

A booklet describing GIFAP'S international role has been published and copies are available for those interested in the organisation's work. National Trade Association membership is now 45 in number representing 1000 companies plus, accounting for 90% of world agrochemical business valued currently in excess of US\$17 billion at main distributor price level.

Broadly speaking the principal objective is to encourage optimum production of food, fibre and other commodities through prudent use of agrochemicals with minimal hazard to human health and the environment.

INDUSTRY ACTIVITY EXAMPLE

ICI Agrochemicals (formerly ICI Plant Protection) has, along with other leading industry mem-

bers, pledged to implement the Code.

A series of initiatives within the framework of a global business stewardship programme have been launched. These are outlined below :-

1. FAO CODE - AWARENESS

In 1986 ICI published and distributed to its National Selling Companies (NSC's) 3 documents designed to facilitate compliance entitled :-

- AN ACTION CHECKLIST
- OBLIGATIONS OF INDUSTRY
- RULES ON ADVERTISING AND PROMOTION.

The action checklist required each selling company to report to Group HQ at Fernhurst on its activities compared to each Code article, enabling us to decide on a programme of measures to bring about Code compliance where necessary.

The obligations and A&P Rules documents facilitated Code interpretation.

2. AGROCHEMICAL PRODUCTION

Safety to health and the environment (SHE) minimum standards have been laid down and are being implemented throughout the ICI International Agrochemicals Group.

Standards cover active ingredient manufacture, quality assurance, formulation, filling and packing activities including the following items :

- ORGANISATION AND MANAGEMENT
- ENGINEERING DESIGN AND MAINTENANCE
- OCCUPATIONAL HEALTH AND HYGIENE
- ENVIRONMENTAL CONTROLS
- PRODUCTION
- FIRE PREVENTION, CONTROL AND EMERGENCY MEASURES

3. STORAGE AND TRANSPORTATION

Minimum standards are being introduced following an audit of

ICI owned and rented warehouses.

A special booklet entitled "Safe Storage of Crop Protection chemicals" has been circulated to our national companies for guidance.

A dealers store audit procedure has been introduced in Malaysia, and other countries are encouraged to follow this example.

Hauliers are required to use a simple TREMCARD system when carrying ICI Malaysia agrochemicals, and the use of TREMCARDS elsewhere is recommended.

4. MARKETING AND DISTRIBUTION

Initiatives include work on the following topics.

- a. User training courses on product handling and application in key markets.
- b. Dealer training courses on handling and storage of potentially toxic chemicals. For example, in Malaysia, Dealers are required to attend a half day course for which they receive a Certificate of Attendance. Tuition is given by technical, marketing and medical personnel.
- c. Review of product formulations. Where appropriate we have included alerting and vomit inducing safening agents in our formulations, and also modified recipes.
- d. Review of product labels. Each pack size and each product in each country is being examined to improve standards. A Guide to writing and reviewing labels has been distributed to our companies and special attention is being paid to print size, precautionary and first aid statements, accuracy of biological recommendations and overall label design.
- e. Review of packs and seals. Eradication of seal tampering and product imitation and adulteration are primary objectives in markets where these problems are widespread. Better quality devices and holo-

grams are being introduced.
f. Review of advertising material. The inclusion of simple safety messages such as "Always read the label before use" and "Pesticides can be harmful if misused" is now recommended in each market.

Strict compliance with FAO Advertising Guidelines is advocated.

g. Issue of product monographs. A series of informative publications emphasising safety to health and the environment factors has been published and distributed widely.

h. Use of illustrated safety posters.
i. Video and Radio Safety Messages.

The use of radio has long been a favoured medium for reaching farmers albeit for reasons other than conveyance of safety messages. We are now stressing safe handling, storage and use. The use of videos is fast growing, and ICI has produced a series of health and environmentally related promotions for its' leading products and about its' activities.

j. Medical Consultancy Services provision.

We have appointed consultants to undertake educational training work, monitor health of factory and field workers, and provide information on poison-

ing prevention and treatment to Poisons Centres, hospitals and Estate Staff in each significant market.

k. Distribution of product antidote supplies and treatment instructions to hospitals and estate staff handling poisoning cases.

5. FIELD USE

a. Protective clothing studies - in Malaysia (ICI/HARRISONS) & Thailand (GIFAP/BAYER/SHELL/ICI)

b. Spraying equipment suitability studies - UK (Cooper Pegler/ICI).

c. Independent market survey work to establish customer awareness levels respecting safety and product use methods - Malaysia and Indonesia.

d. Launching of CARBO-FLO liquid effluent treatment plant - UK (ICI/ALLMANS)

6. COLLABORATION WITH OTHER ORGANISATIONS

The improvement of standards within and throughout the global crop protection industry calls for a responsible, collaborative exchange of information and ideas between organisations with a genuine interest in the well being of all concerned. ICI is seeking to develop productive relationships or establish useful dialogue with a number of establishments inclu-

ding :-

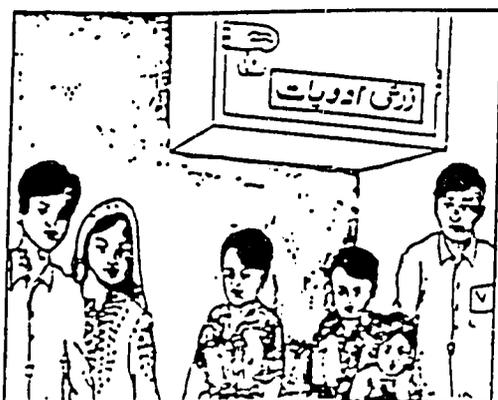
- a. GIFAP
- b. NATIONAL TRADE ASSOCIATIONS
- c. RENPAP (UNIDO/UNDP)
- d. NGO's
- e. UN/ESCAP/PESTNAP
- f. ODNRI
- g. IPARC
- h. FAO ROME/AP REGION
- i. ADB MANILA
- j. CRANFIELD I OF T
- k. WORLD BANK WASHINGTON.
- l. NATIONAL POISONS CENTRES

AGROCHEMICALS BENEFITS INFORMATION

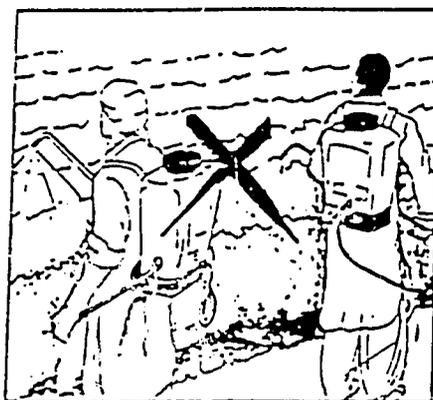
Too often only the negative side of agrochemicals use is discussed or promoted. Without chemicals, crop yields and quality would deteriorate with serious consequences in the majority of crop situations.

IPM practices such as biological control, resistant varietal selection and shrewd cultural methods are to be welcomed, but most crops will require prudent use of chemicals too. That means selection of the right product to control a given target species allied to choice of correct equipment, rate and timing of application.

Let us work together to achieve safe and effective agrochemical use.



زرعی ادویات: بچوں کو پست سے دور رکھنا
سے رکھیں۔



ناقیس اور ریسے والے اسپرے سے
بچیں۔