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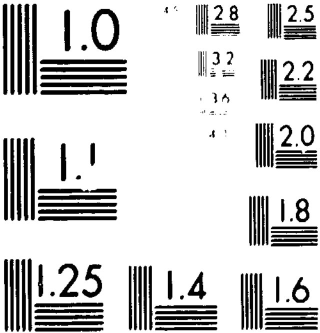

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LIMITED

UNIDO/IOD.353
19 May 1980

ENGLISH

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

REPORT ON THE USE OF PESTICIDES IN LATIN AMERICA*

by

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INTRODUCTION

The purpose of this report is to record, by country in Latin America:

- the estimated 1978 pesticide use and forecast for 1988, in volume.
- the important pesticide producers, their plant capacities and estimated 1978 production.
- the important pesticide formulators and their estimated capacities by type of product and formulation.
- the chemical intermediates and the pesticide formulation additives which are produced locally, and their selling prices.

Visits have been made to Venezuela, Brazil, Argentina, Colombia, Guatamala and Mexico.

1. SUMMARY

Pesticide sales within the Latin American region, at distributor prices, in 1978 are estimated at US $1110 million, or some 15% of world sales.

Little increase has taken place in the planted areas of the major pesticide consuming crops within the region during the past five years, except soya, and no significant increase is forecast over the next ten years, except soya.

Therefore, only a modest volume increase in the use of pesticides is forecast over the next ten years to accommodate the increased soya area, and that a greater part of the planted area of other crops will be treated with pesticides in the future, than hitherto, as a result of more information being available regarding the benefits of pesticide application.

Cotton, soya and rice are the more important crops on which insecticides are used. Rice, sugar cane and soya are the major crops on which herbicides are used, with an increasing volume forecast on pastures. Vegetables and bananas account for most of the fungicide use, with some on coffee, and on deciduous fruit in the south.

The detail of the estimated 1978 use and forecast for 1988, for pesticides in volume, may be seen in the summary tables Nos 1, 2 and 3 in Section 7.

There has been a recent surge in building pesticide plants in Brazil. These new plants are now on stream, using locally produced intermediates in part, but some are operating at a fraction of capacity, because the comparatively high costs of local intermediates and of production preclude them from competing on the international market, without assistance.

Meanwhile in Mexico, which has a longer history of pesticide production, a number of plants are either not operated now or operate at a fraction of capacity, for the same reasons as in Brazil and because of product obsolescence.

Pesticide production in Argentina is contracting for the same reasons. The plants in Venezuela closed in 1979 because it was not possible to make a profit selling at the local, Government controlled, selling prices. The plants in Colombia continue to operate, at reported profitable levels, due apparently to the multinational nature of the local producers, who transfer product to their subsidiaries in the other countries.

Some producing countries, such as Brazil, provide export subsidies, which materially assist the export sales of high cost pesticides (and intermediates), but these subsidies are forecast to be withdrawn so as to permit free market conditions to prevail.

Some chemical intermediates,from which some pesticides are produced, are made in the larger countries in this region. The local selling prices of these intermediates vary between countries, but are broadly higher than the international market prices. For example, while the international market price now is:

- US $1050 ton for phenol, the price in Argentina is $1550, $856 in Brazil and $1476 in Mexico.

- US $194 ton for chlorine, the price in Argentina is $360, $154 in Brazil, $370 in Central America, $650 in Colombia, $262 in Mexico and $600 in Venezuela.

The larger countries in the region all possess comprehensive and substantial formulation facilities, with capacities which in total are near three times that required. In these countries a preference in import duty and/or the import licencing legislation encourages local formulation, except in Argentina where no duty is levied on technical or formulated pesticides that are not made locally.

Either a nil duty, or the same duty, is levied on both technical and formulated pesticides in Bolivia, Chile, Ecuador, Paraguay and Uruguay, who all import ready formulated products, sometimes from the larger countries within the region. Only Peru impose a nil duty on formulated products and a 50% duty on technical pesticides, so naturally most pesticides are imported ready formulated although substantial formulation capacity exists, built when the duty differential was different.

Suitable fillers and solvents for pesticide formulation exist locally in the larger countries within the region.

Sufficient pesticide production capacity exists within the region to satisfy, and more, the requirements for a number of the major volume pesticides in the region. Yet substantial imports are made from outside the region, because broadly, local production costs are high and preclude competitiveness, freely, on the international market. Those countries producing pesticides, protect local producers. Those countries not producing seek to purchase at the lowest price.

Some preference exists for producers within the region, but generally this is insufficient to bridge the gap between local production costs/prices and the international market price, without further subsidy/preference.

2. CONCLUSIONS AND RECOMMENDATIONS

Pesticide production plants within the Latin American region possess sufficient capacity to satisfy the forecast requirements for the region of a number of the major volume pesticides. Yet substantial imports are made from outside the region, because of the non competitiveness of locally produced pesticides. Local duty preferences are insufficient to bridge the gap between the selling prices of local production and those of the international market.

In a further attempt to more fully utilise the production capacity within the region, it is proposed that agreement of the countries within the region be sought, in principle, to a transfer price system for pesticides, on a contra account basis.

Several pesticide materials are candidates for production within the region, inter alia on a cooperative basis. The majority of them are reported to be in patent, and problems with intermediates may be encountered. Only Dalapon appears to be without problems, except that propionic acid would have to be imported, and like most other products more than half is used in Brazil.

The existing formulation capacity is near three times that required. The preferred method of more fully utilising the capacity within the region is to ensure that the formulations made are above reproach, so that the smaller countries who import formulations, will do so from within the region rather than from elsewhere.

No cooperative or complementary marketing schemes are proposed for pesticides between the independent minded countries comprising the Latin American region.

A number of schemes would be possible by changing legislation, import licencing, tariffs and subsidies. However, it is understood that this is not the purpose of this report.

It is therefore recommended that:

1. Agreement be sought in principle to a system of transfer prices for pesticides on a contra account basis, between countries in Latin America, in order to more fully utilise existing production facilities.

2. The viability be investigated of a Dalapon production unit on a cooperative basis between member countries, including Brazil and other Dalapon users.

3. Standards be examined, and agreed, regarding formulation facilities, procedures and finished products, in order to encourage an even higher standard within the region, particularly among producers, and so encouraging the purchase of pesticides formulated within the region by member countries.

3. USE OF PESTICIDES

Each country under study is dealt with separately in this Section.

Most insecticides can be, and are used over a broad crop spe ctrum. While pressure exists to reduce or stop the use of many organochlorine insecticides in some parts of the world, and to at least reduce the use of the more toxic organophosphates, there is little sign that this is taking place in Latin America, with the exception of Colombia and elsewhere with DDT/Toxaphene mixtures. Organochlorine insecticides continue to be the most economic materials to combat many cotton pests, and additionally they are produced in several countries. Local production of a pesticide tends to increase the local use of that pesticide, and once production has started it becomes unlikely that that product will be banned, or restricted to any extent. The one exception is that DDT production stopped in Argentina in 1976, whereas Toxaphene production has just started in Guatamala.

Among the important herbicides, the major crops uses are:

- the phenoxies in cereals and sugar cane
- Molinate, Benthiocarb, Propanil and Butachlor are used in rice.
- Diuron and Ametryne in sugar cane.
- Trifluralin and Alachlor in cotton and soya.
- Bentazone and Metribuzin in soya.
- Atrazine in maize and sorghum.

and the others in a variety of crops.

Among the important fungicides:

- Quintozene, Thiram, HCB and Captan are used in seed dressings, as are some of the amine derived materials, and the excellent Triadimefon.
- the inorganics are used in fruit and vegetables.
- Edifenfos and Kitazin in rice

with the others, including the dithiocarbamates, being used over a wide crop spectrum.

It will be noted from the appropriate crop statistics, that there has been no significant increase in the area planted to the important pesticide consuming crops during recent years, with the exception of soya, mainly in Brazil and to a lesser extent in Argentina, Mexico and Paraguay. No significant increase is forecast over the next ten years, on the basis of present performance.

For this reason, only modest increases in the volume use of pesticides are forecast.

Since there are several pyrethroid insecticides, with different dosage rates, the 1978 use and forecast 1988 volumes in this report are struck in terms of NRDC 149 and Fenvalerate, at 50 grms active/ha.

3.1. ARGENTINA

The estimated value of pesticide use in Argentina in 1978 at distributor selling prices in US $ millions, was:

- insecticides $54 million, of which more than 20% was used in deciduous fruit, near 15% in each of cotton and soya, and less than 10% in each of corn/sorghum, winter cereals, vegetables and tobacco.

- herbicides $32 million, of which more than 20% was used in each of rice and sugar cane, and less than 20% in each of cotton, soya and wheat, and near 5% in corn.

- fungicides $16 million, of which near 20% was used in each of deciduous fruit and potatoes, and near 10% in each of citrus, vines, tomatoes and other fruit.

- other pesticides $1 million, which included nematocides and plant growth regulators

with a total of US $103 million.

The economic climate in Argentina is the most important single factor influencing local forecasts of any kind. In the present circumstances, with planted areas and production near static, with little incentive to invest in agriculture:

- insecticide and fungicide use is forecast to increase 1% annually in volume.

- herbicide use is forecast to increase 2-3% annually in volume, especially in the more profitable soya and sunflower crops where a big increase in the use of Trifluralin is forecast.

These modest forecasts assume that:

- inflation becomes no worse than in 1979

- Government do not enforce price controls more than in 1979.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 1.1. for insecticides
- Table 1.2. for herbicides
- Table 1.3. for fungicides.

3.2. BOLIVIA

The estimated value of pesticide use in Bolivia in 1978 at distributor selling prices, in US $ millions, was:

- insecticides $5.6 million, of which near 80% was on cotton, and the remainder on rice, potatoes and sugar cane.

- herbicides $2 million, mainly on cotton, sugar cane and rice.

- fungicides $0.8 million, mainly on potatoes, rice and vegetables.

with a total of US $8.4 million.

A 3-5% annual increase is forecast for most pesticides, since:

- the cotton area is expected to increase, where an increased volume of insecticides and herbicides will be used.

- more pesticides will be used on a greater part of the planted area of rice, soya, sugar cane and vegetables.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 2.1. for insecticides
- Table 2.2. for herbicides
- Table 2.3. for fungicides

3.3. BRAZIL

The estimated value of pesticide use in Brazil in 1978 at distributor selling prices in US $ million, was:

- insecticides $220 million, of which near 30% was used in each of cotton and soya, 11% in vegetables, and some in each of fruits, bananas, sugar cane, coffee, wheat, cocoa and tobacco.

- herbicides $158 million, of which over 30% was used in soya, 25% in rice, just over 10% in each of sugar cane and pastures, and less than 10% in coffee and cotton.

- fungicides $72 million, of which 30% was in vegetables, 26% in wheat, 15% in coffee, 11% in fruit, and near 5% in each of rice and cocoa.

- other products $21 million, including fumigants, nematocides and plant growth regulators.

with a total of US $471 million.

Three years ago forecasts for pesticide use in Brazil tended toward a 30-35% annual increase in volume. Now forecasts are more conservative and tend toward:

- maximum 1% annual volume increase for insecticides (soya) and fungicides (wheat).

- 3-5% annual volume increase for herbicides, mainly in soya, of which a vastly increased planted area is still forecast. Local production of a product stimulates local sales of that product.

An 80% annual inflation, a rising cost of local intermediates already much higher than international prices which has lifted the selling prices of locally produced pesticides, and the fact that the more obvious pesticide markets have now been secured, have slowed down the hitherto explosive growth of pesticide sales.

Even these modest forecasts assume that:

- Government price control attitudes toward pesticides will not harden.

- export rebates will not be withdrawn.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 3.1. for insecticides

- Table 3.2. for herbicides

- Table 3.3. for fungicides.

3.4. CENTRAL AMERICA

The estimated value of pesticide use throughout Central America in 1978 at distributor selling prices in US $ millions, was:

- insecticides $130 million, of which 82% was used in cotton, and 6% in rice, and the balance in other crops.
- herbicides $20 million, of which 32% was used in sugar cane, 25% in rice, 18% in cotton, 14% in bananas and 10% in coffee.
- fungicides $15 million, of which 62% was used in bananas, near 10% in coffee, and near 5% in each of rice, potatoes, other vegetables and tobacco

with a total of US $165 million. Sales fell in 1979 by near 20%, largely due to the problems in Nicaragua.

No significant increase in cultivated area is forecast in Central America during the next ten years, and only a natural growth of 1% increase annually in volume is forecast for each of insecticides, herbicides and fungicides, on the base year of 1978. This forecast assumes that Nicaragua plants and harvests cotton in the future, as in the past, and excludes any possible political upheavals in Central America in the next ten years.

The area planted to bananas is falling, but other crops will be substituted on this area. In 1979 there was a near 600% increase in the use of Chlorothalonil, particularly in bananas, and this volume is forecast to be sustained throughout the ten year period. Similarly the use of pyrethroid insecticides will increase, since they were used in greater volume in 1979, when some 30 tons were used, at the equivalent of the NRDC 149/Fenovalerate dosage rates. The use of organochlorine insecticides will fall, with the rise of pyrethroids, and there will be an increased use of organophosphate insecticides.

The estimated 1978 use, and forecast use in 1983, by volume, is shown separately in:

- Table 4.1. for insecticides
- Table 4.2. for herbicides
- Table 4.3. for fungicides.

3.5. CHILE

The estimated value of pesticide use in Chile in 1978 at distributor selling prices, in US $ millions, was:

- insecticides, including miticides $10 million, mainly in deciducus fruit, citrus and wheat.
- herbicides $2.8 million, mainly in cereal small grains, rice, vegetables and fruit.
- fungicides $6 million, mainly in apples and pears, vines, tomatoes, other fruit and sugar beet.

with a total of US $18.8 million.

A 2-3% annual increase in volume use is forecast of most pesticides, since, although no substantial increase in planted area is foreseen, pesticides will be used on a greater part of the planted area, as the economic situation improves.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 5.1. for insecticides
- Table 5.2. for herbicides
- Table 5.3. for fungicides.

3.6. COLOMBIA

The estimated value of pesticide use in Colombia in 1978 at distributor selling prices in US $ millions, was:

- insecticides $75 million, of which more than 60% was used in cotton, 13% in rice, 6% in each of corn/sorghum and vegetables, and less than 3% in each of soya and fruit.

- herbicides $42 million, of which 35% was used in rice, near 20% in each of cotton and pasture, and near 5% in each of sugar cane, soya, sorghum and corn.

- fungicides $15 million, of which more than 40% was used in potatoes, near 15% in each of bananas and rice, and near 5% in each of barley, beans and other vegetables.

- other products $1 million, including nematocides, fumigants and plant growth regulators.

with a total of US $133 million.

There is no real sign that the cultivated area will be increased over the next ten years. For this reason only a 1% annual increase in volume of insecticides and fungicides is forecast. The most significant change in the use of insecticides will be a marked decrease in the use of the organochlorines, with an increase in the use of organophosphates and of the pyrethroids. A 2% annual increase in the use of herbicides is forecast, particularly in cotton, in rice where more than one application is being made, in pasture and in soya, where a greater part of the planted area will be treated in the future as labour costs continue to rise.

The estimated 1978 use of pesticides, and forecast use in 1988, by volume, is shown separately in:

- Table 6.1. for insecticides

- Table 6.2. for herbicides

- Table 6.3. for fungicides.

3.7. ECUADOR

The estimated value of pesticide use in Ecuador in 1978 at distributor selling prices, in US $ millions, was:

- insecticides $5 million and nematocides $4 million, mainly in cotton, rice, corn, bananas and vegetables.
- herbicides $8 million, mainly in cotton, sugar cane, rice, corn and wheat.
- fungicides $2.5 million, mainly in potatoes, bananas, rice, tomatoes and other vegetables

with a total of US $19.5 million.

A 3-5% annual increase is forecast for all pesticides due to increased plantings of cotton, rice and vegetables, and an increased pesticide use on the areas planted to other crops due to the local enlightened attitude to the benefits available from the use of pesticides.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 7.1. for insecticides and nematocides
- Table 7.2. for herbicides
- Table 7.3. for fungicides.

3.8. MEXICO

The estimated value of pesticide use in Mexico in 1978 at distributor selling prices in US $ millions, was:

- insecticides $79 million, of which near 50% was used in cotton, 15% in vegetables, 10% in corn/sorghum, 5% in soya, and near 1% in fruit and rice.

- herbicides $26 million, of which 24% was used in corn, near 15% in each of sugar cane and rice, and near 10% in each of pasture, cotton, wheat and sorghum.

- fungicides $13 million, of which near 20% was used in each of wheat and tomatoes, near 10% in cucurbitacae, and near 5% in each of potatoes, cotton and strawberries.

- other pesticides $3 million, which included nematocides, fumigants and plant growth regulators

with a total of US $121 million.

In Mexico there are no significant signs of an increase in planted area or increased exports of primary agricultural produce to the USA (on which a substantial volume of pesticides are used). The protective policy toward local industry continues, and although there may be some change in import licence policy, protection will continue in the form of high import duties. There is no sign of any decrease in the use of organochlorine insecticides, which are produced by the State owned Fertimex (previously Guanomex), although the use of pyrethroid insecticides is expected to increase, at the expense mainly of the organochlorines.

Therefore, an annual increase of 1% involume is forecast for insecticides and fungicides, and 2% for herbicides, over the next ten years.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 8.1. for insecticides
- Table 8.2. for herbicides
- Table 8.3. for fungicides.

3.9. PARAGUAY

The estimated value of pesticide use in Paraguay in 1978 at distributor selling prices, in US $ millions, was:

- insecticides $1.2 million, mainly on cotton and soya, with some used on wheat and tobacco.

- herbicides $0.6 million, mainly used on cotton and soya and wheat.

- fungicides $0.4 million, mainly on wheat and tomatoes

with a total of US $2.2 million.

A substantial increase in pesticide use is forecast of most pesticides because:

- Government supports the vastly increased use of fungicides tc control mildew and rust in wheat, hence the greatly increased volume forecast of Triadimefon and the amine derived products.

- a greater volume of herbicides is expected to be used in soya and cotton, hence the increase forecast for Trifluralin, and also more insecticides in these two crops.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately, in

- Table 9.1. for insecticides

- Table 9.2. for herbicides

- Table 9.3. for fungicides.

3.10. PERU

The estimated value of pesticide use in Peru in 1978 at distributor selling prices, in US $ millions, was:

- insecticides $7.5 million, mainly in cotton, rice, potatoes, other vegetables, corn and coffee.
- herbicides $3.6 million, mainly in sugar cane, rice, corn, potatoes, cotton and coffee.
- fungicides $4.7 million, mainly in potatoes, rice, vegetables (tomatoes, peppers and cucurbits), cotton and beans.
- nematocides $3.2 million, mainly in potatoes and sugar cane

with a total of US $19 million.

A comparatively small increase is forecast in the use of pesticides in Peru, largely because of the severe financial constraints.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 10.1. for insecticides
- Table 10.2. for herbicides
- Table 10.3. for fungicides.

3.11. URUGUAY

The estimated value of pesticide use in Uruguay in 1978 at distributor selling prices, in US $ millions, was:

- insecticides $2.6 million, mainly on soya, sunflowers, vines, citrus, wheat, rice, apples and pears, and sugar beet.

- herbicides $1.6 million, mainly in small cereal grains, soya, sunflowers, sugar beet and sugar cane.

- fungicides $2.2 million, mainly in apples and pears, citrus and other fruit, vines, potatoes and sugar beet

with a total of US $6.4 million.

A 5% annual increase in insecticide and fungicide use, and 10% for herbicide use, is forecast in volume, since:

- increase in cropped areas is forecast, especially of cereals now that constraints have been removed, as well as of the more profitable soya and sunflower crops.

- more of the planted area of most crops will be treated now that free market conditions exist.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 11.1. for insecticides

- Table 11.2. for herbicides

- Table 11.3. for fungicides.

3.12. VENEZUELA

The estimated value of pesticide use in Venezuela in 1978 at distributor selling prices in US $ millions, was:

- insecticides $15 million, of which the majority was used in cotton, and some in rice, tobacco, maize, potatoes and tomatoes.

- herbicides $22 million, mainly in sugar cane and rice, with some in cotton and maize.

- fungicides $6 million, mainly on potatoes, rice and vegetables.

with a total of US $43 million.

A 2-5% annual increase is forecast for most pesticides, because:

- the cotton, rice and sugar cane areas are forecast to increase.

- a higher proportion of the area planted to cash crops will be treated with pesticides, than in 1978.

These forecasts assume that Government price control will be less punitive than in 1979.

The estimated 1978 use, and forecast use in 1988, by volume, is shown separately in:

- Table 12.1. for insecticides

- Table 12.2. for herbicides

- Table 12.3. for fungicides.

4. PRODUCTION OF PESTICIDES

The plants producing technical pesticide materials, in each country, are noted in this Section, the producer identified, as well as the estimated plant capacity, and the estimated production in 1978.

The chemical intermediates required to produce some of the important pesticide technical materials, that are produced in each country, are listed in this Section.

By reference to this data, by country, and to Section 8., it may be seen which locally produced intermediates are used to produce the pesticides manufactured in each country, and also which intermediates are available from local sources which could be utilised to extend the local pesticide production, should such action be considered useful.

The local selling prices of the intermediates made in each country are listed in US dollar equivalent per ton.

4.1. ARGENTINA

Table 1.4. lists the pesticide production plants in Argentina, the estimated plant capacities and the estimated production in 1978.

Points relevant to production include:

- Cia. Quimica and Sintesis Quimica esterify 2,4-D acid, which they normally purchase from Atanor.
- in late 1979 the main Sulphur mine in Argentina closed, so that Basso y Tonnelier and Cia. Quimica reduced production of their Sulphur dust and wettable powder, importing the necessary Sulphur lump.
- Quimel is part owned by each of Elanco who supplied the Trifluralin production technology, and by Cia. Quimica who formulate and distribute this product.
- Duperial have an HCB production facility but have not worked it since 1970.
- Electroclor, a Duperial subsidiary, have a PCP production facility but have not worked it since 1970.
- Cia. Quimica have an 800 ton capacity BHC production plant, but have not worked it since 1974.
- Atanor planned to build a 1500 ton capacity plant to produce Maneb and Zineb, but this project has been shelved until at least 1983, and probably until 1984/85.
- the capacities listed for the Estrella plants are those given by the company. Some doubt must exist as to the quality of the products and to the actual volume produced, on their old Government munitions plant.

The most important chemical manufacturer, Atanor, part Government owned, is pessimistic regarding the competitiveness of local production, since production costs are rising faster, as is inflation, than Peso devaluation against the US dollar. This situation has meant that for 2,4-D and TCA (for example) their production costs are as high as the international market price. For this reason, Atanor have cut back on 2,4-D production, planning to export only a minimal volume in 1980, and are reviewing the viability of the TCA plant, believing it may be economic to close it. This TCA plant is Atanor's old DDT plant, which they converted when they ceased DDT production in 1976.

Table 1.4.1. lists the chemical intermediates, which are suitable for pesticide production, which are made in Argentina, with their local selling prices.

Reference to this list, and to the data in Section 8. of this report, will indicate the local pesticide production plants in which the locally produced chemical intermediates are used.

There is a project to make Maleic anhydride.

4.2. BOLIVIA

No pesticide technical materials are produced in Bolivia.

Within the Andean Pact countries, Bolivia was allotted the right and responsibility to produce insecticides.

Originally, Aquila S.A. La Paz, financed by:

- Y.P.F. Buenos Aires
- Cooperativa Fomento Boliviana. La Paz

planned to erect a plant at Oruro to produce:

-	Malathion	2000 tons capacity
-	ethyl and methyl Parathion	5000 tons capacity
-	Fenitrothion	500 tons capacity

No intermediates were available, and although Sumitomo sought to supply one intermediate, no progress was made.

A new proposal was made by the Junta of the Cartagena agreement that Aquila should erect the plant at Oruro with the following capacities:

-	Monocrotophos	940-1040 tons
-	Parathion	7500-8500 tons
-	Dimethoate	270-350 tons
-	Trichlorfon	50-56 tons

No progress is known to have been made on this project.

No intermediates suitable for production of pesticide technical materials are known to be available locally in Bolivia.

4.3. BRAZIL

Table 3.4. lists the pesticide production plants which were on stream in 1978, the estimated plant capacities and the actual production in 1978.

Subsequent and planned increase in capacities to these plants are:

- Matarazzo have increased the capacity of their Toxaphene plant to 11500 tons.

- Shell sought Ciba-Geigy's interest in doubling their plant capacity for Monocrotophos and Dicrotophos, but Ciba-Geigy have opted to erect their own 2000 ton capacity plant for production in 1981/82.

- Bayer plan to increase the capacity of their M-Parathion plant to 7360 tons, and their E-Parathion plant to 2260 tons.

- Dupont, and Rohm and Haas plan to increase the capacities of their Maneb/Mancozeb plants by 5500 tons.

- Guilini and Sandoz plan to increase the capacities of their copper product plants by 9000 tons, up to a total of 15000 tons capacity.

- C.N.D.A. (Rhodia) plan to increase the capacity of their Thiram/Ziram plant by a further 1250 tons.

Table 3.4.1. lists the additional production plants which were approved by Government to end 1979, the planned capacities and planned date of production.

Other points relevant to production plans are:

- Montedison planned to erect a Dimethoate plant, on which Fenthoate would also be made, with a capacity of 3000 tons. However it appears that Nortox plan to increase the capacity of their plant to 1500, from which they will supply Montedison's local requirements.

- Sumitomo planned a Fenitrothion plant, but this plan appears to have lapsed.

- Union Carbide planned a plant to produce both Carbaryl and Aldicarb, but there has been no published confirmation, and their plan is pending.

- Bayer's Propanil plant started production in early 1979, but shut down in mid 1979.

- Dupont report they started Diuron production in 1979, probably from DCPI, as in Colombia and Mexico.

- Makhteshim are involved in several plans to erect production plants:

    - with Fercotrigo, a wheat and soya Cooperative in Rio Grande do Sul, as Defensa, to produce Trifluralin. No product has been manufactured and only bought-in technical material formulated.

    - with Formiplac, Herbitecnica and others, as Formiquimica, to make Diuron, the triazines, Dicofol and other pesticides. At early 1980 no known action had been taken, nor land purchased.

    - Monsanto are reported to be considering building a plant for Alachlor, although it is not clear if this is for formulation only, or for actual production.

The huge losses sustained by several multinational companies with pesticide divisions in Brazil, at end 1979, which were compounded by the 30% devaluation, has influenced would-be producers to review their plans.

The facts are that:

- all local intermediates cost minimum 25% above the international market price to produce. If an intermediate is produced locally, no import licences are granted, or only to the producer if local production falls short of local demand.

- the cost of production of pesticides in Brazil is higher, sometimes substantially higher, than production costs in Europe/North America/Japan.

- while some pesticides are exported with the help of the currently available export subsidy, should this subsidy be removed and free market conditions prevail, as Government now propose, substantial losses would be incurred on exports until the cost of the new large local plants have been amortised, but perhaps no greater than if these plants are operated at a small percentage of capacity sufficient only to supply local needs.

Table 3.4.2. lists the chemical intermediates made in Brazil which are suitable for pesticide production, and their selling prices in the local market.

The local selling prices are reported to be as much as three times the international market prices of some intermediates.

Plans are being developed for production of more intermediates suitable for pesticide production, inter alia at the new complex at Camacari. Bahia, and include:

- phosgene
- diethylamine and dimethylamine
- 3,4-dichloraniline
- Cyanuric chloride
- ethylamine and isopropylamine
- methyl chloride
- methylamine
- ethylene diamine

4.4. CENTRAL AMERICA

Table 4.4. lists the pesticide production plants in Central America, the estimated plant capacities and the estimated production in 1978.

Points relevant to production include:

- Sintesis import Camphene for their Toxaphene (Strobane, since this is the old Tenneco plant, which was dismantled and brought to Guatamala), and in 1980 plan to produce 4000 tons on this plant.

- Hercules contract to draw all the Camphene produced in Honduras.

- in 1979 Sintesis produced near 150 tons Trifluralin from imported intermediates.

- the original rated capacity for the Dequisa Chlordimeform plant was 1000 tons, but it has been found that by producing a 84/86% material the throughput to each reactor can be doubled, hence the stated capcity now of 1800 tons, which is served by imported intermediates.

Table 4.4.1. lists the chemical intermediates, which are suitable for pesticide production, which are made in Central America, with their local selling prices.

The Fertica plants in Guatamala and Salvador for Sulphuric acid are closed now, but while they operated all product was used captively by Fertica.

4.5. CHILE

Table 5.4. lists the pesticides which are made in Chile, and the estimated plant capacities and actual production. No plant extensions or new plants are known to be planned.

Both Copper and Sulphur are available locally in Chile.

No other suitable intermediates for pesticide production are known to be available locally in Chile, although low density polyethylene and PVC are produced.

4.6. COLOMBIA

Table 6.4. lists the pesticide production plants in Colombia, the estimated plant capacities and the estimated production in 1978.

Local Propanil production is dependent upon imported 3,4-DCA and propionic acid. Celamerk are reported to possess a local Propanil production facility, but have not operated it, preferring to purchase technical material from Rohm and Haas. Crystal, contrary to some reports, do not produce Propanil locally, but import a 50% concentrate from the USA. It is not clear if Bayer have actually produced Propanil in Colombia in 1979, or if they imported Propanil technical and merely formulated it locally.

No plans are known to extend these plants, or to erect new pesticide production plants.

The Colombian Government prefers the operation of free market conditions, in support of the local important agricultural interests. For this reason, while they are a party to the Bolivian production project, they oppose its operation with any greater protection than 10% ad valorem, although it is clear that the Bolivian project would be viable only with a minimum 35% protection.

Table 6.4.1. lists the chemical intermediates, which are suitable for pesticide production, which are made in Colombia, with their local selling prices.

There are projects to produce both phenol and Maleic anhydride in Colombia.

4.7. ECUADOR

No pesticides are manufactured in Ecuador.

A company named Fitochim, registered in Quito, reported to have connections in Madrid and associated with Hungarian interests, have applied for an industrial licence to produce Carbofuran and Trichlorfon. No such licence is known to have been granted.

No intermediates suitable for the production of pesticide technical materials are known to be available locally in Ecuador.

4.8. MEXICO

Table 8.4. lists the pesticide production plants in Mexico, the estimated plant capacities and the estimated production in 1978.

Points relevant to pesticide production include:

- both Hoechst and Retzloff possess production facilities for Propanil, but neither company makes it. Hoechst possess production facilities for 3,4-dichloraniline but their cost of production is unattractive to local buyers who continue to import it.

- Fertimex plan to extend the capacity of their ethyl Parathion plant by 750 tons.

It may be seen from Table 8.4. that many pesticide production plants exist in Mexico, many of which operate at a fraction of capacity, or not at all. This is due in part to the fact that the high cost of local intermediates and production precludes their competitiveness on the international market.

Table 8.4.1. lists the chemical intermediates, which are suitable for pesticide production, which are made in Mexico, with their local selling prices.

Pemex, the Government owned chemical producer, makes most of the chemical intermediates which are manufactured in Mexico, and sets the prices for them. Therefore, normally, most sources of information indicated similar purchase prices for the locally produced intermediates, except for two materials, where one substantial buyer reported purchasing at the following prices, which are lower than those shown in Table 8.4.1., which may be due to their buying in volume:

- No 17. Acetone at US $590 ton
- No 62. Methanol at US $170 ton.

4.9. PARAGUAY

No pesticides are manufactured in Paraguay, nor are any plans known to do so in this small market.

No intermediates suitable for production of pesticide technical materials are known to be available locally in Paraguay.

4.10. PERU

Table 10.4. lists the pesticides which are made in Peru, the estimated plant capacities and the 1978 actual production. No plans are known to extend any of these plants.

Copper sulphate is produced mainly by:

- Sulfato de Cobre S.A.
- Sulfaco Productos Quimicos S.A.

as well as by six other small producers. All Copper sulphate is exported.

Both Copper and Sulphur are mined in Peru. Lead oxide, Arsenic anhydride and Calcium chloride are reported as available in Peru.

Recently Government have attempted to persuade local industry to erect:

- another plant to produce Copper oxychloride, using local copper, for export, to earn foreign exchange, so far without success.
- another plant to produce Calcium and Lead arsenates, using local materials (as above) for export, to earn foreign exchange, with no success as yet.
- a plant to produce 2,4-D to supply the Andean Pact countries, using Chlorine and Acetic acid which are reported to be available locally from the Government owned Paramonga company. No headway is known to have been made with this project.

No other intermediates are known to be available in Peru.

4.11. <u>URUGUAY</u>

Table 11.4. lists the pesticides which are made in Uruguay, the estimated plant capacities and the 1978 actual production. A new project is reported, which plans to produce Copper oxychloride of a quality similar to the imported product.

Both Copper and Sulphur are available locally in Uruguay.

No plans for plant extensions, or other new plants, are known.

No other suitable intermediates for pesticide production are known to be available locally in Uruguay.

4.12. VENEZUELA

Table 12.4. lists the pesticides which are made in Venezuela, the estimated plant capacities and the 1978 actual production. No plans are known to extend any of these plants. PENCO's Propanil plant capacity was more than tripled in 1978.

Government controls pesticide selling prices, rigidly. Because the level of retail prices was so low in 1979, local production yielded no sales margin, so that local Propanil and Atrazine production virtually ceased, and these products were imported. The pesticide industry has made renewed proposals to Government in early 1980 to lift the retail selling prices of some pesticides in an effort to restart local production on a profitable basis.

No new production plants are known to be planned at present.

Table 12.4.1. lists the chemical intermediates which are suitable for pesticide production, and their selling prices in the local market. Most of these intermediates are produced by the Government controlled Petroleos de Venezuela C.A., and sold domestically at prices reported to be much in excess of the international market price. Some exports are made at international prices, with Government subsidising the shortfall below cost.

5. FORMULATION OF PESTICIDES

In this Section may be found a list of pesticide formulators in each country, and their estimated capacities by type of product and formulation.

Additionally, the locally available fillers and solvents for agricultural pesticide formulation, are listed, by country, as well as their local selling prices in US dollar equivalent per ton/1000 litres. Where emulsifiers are produced locally, this fact is noted as well as their price.

3.1. ARGENTINA

Table 1.3. lists the pesticide formulators in Argentina, and their formulation capacities, by type of product and formulation, operating on a ten hour shift for 300 days annually.

There is no duty now on either imported technical materials or on imported formulated products, except on those made in Argentina. Nevertheless, the majority of insecticides and herbicides are imported as technical materials, and formulated locally.

The total reported formulation capacity of near 90000 tons is three times the required capacity.

Hoechst started formulating liquid insecticides in 1979.

Table 1.3.1. lists the additives for pesticide formulation which are produced locally in Argentina.

In addition to the alcohol solvent listed, the following alcohols are produced locally:

- ethyl
- methyl
- isopropyl
- butyl

but their selling prices are not known.

Cyclohexanone is not made locally, and is imported.

No suitable emulsifier for agricultural pesticide formulation is wholly made in Argentina. Those emulsifiers used are sophisticated emulsifiers and are all locally formulated from a mixture of locally produced and imported raw materials, designed for specific purposes, and sell at an average price of $3636 ton.

The locally produced benzene sulphonate wetting agents of 75% purity, are atomised, and are of good quality.

The fillers are all milled to 325 mesh. The Kaolin is suitable for pesticide formulation, is the most important filler used in Argentina, and the price listed is the delivered price from Mendoza.

The dolomite is too alkaline, and therefore antagonises organophosphates, and is not often used.

The diotomaceous earth is a Sodium and Magnesium silicate, and is of good quality.

5.2. BOLIVIA

All pesticides are imported into Bolivia ready formulated. There is no local formulation of any pesticide.

No formulation facility is known to exist in Bolivia.

No suitable materials for pesticide formulation are known to be available locally in Bolivia.

3.3. BRAZIL

Table 3.5. lists the pesticide formulators in Brazil, and their formulation capacities, by type of product and formulation.

Increasingly patent lapsed products are imported as technical materials, since less import licences are issued for formulated products.

The formulation capacity reported to exist of near ½ million tons is vastly in excess of that required.

Table 3.5.1. lists the additives for pesticide formulation which are produced locally in Brazil.

Wetting agents are not made in Brazil.

The non-ionic polyoxyethylated emulsifiers made locally are of inferior quality, and most formulators import their requirements. It was not clear if the sulphonated emulsifiers are produced locally or not, however formulators import their requirements.

5.4. CENTRAL AMERICA

Table 4.5. lists the pesticide formulators in Central America, and their formulation capacities, by type of product and formulation, operating on a ten hour shift daily 300 days annually. However, normally these plants, particularly those for formulating liquid insecticides are operated only 175 days annually.

The large volume patent lapsed insecticides are all imported as the technical materials, and formulated locally.

The total reported formulation capacity of near 140000 tons is more than twice the required capacity.

The Fertica formulation plant in Salvador has closed, as has that of Quinonez in Salvador.

Table 4.5.1. lists the additives for pesticide formulation which are produced locally in Central America.

Points relevant to local production of formulation additives, include:

- aromatic type H.H.A., which is similar to xylene, is produced by Essochem in Nicaragua.
- Atlas (ICI) in Nicaragua make Sulphonic acid, and mix it with imported alcohols and imported non-ionic emulsifiers to produce some emulsifiers locally.
- Sintesis, using Retzloff technology, produce alkylated benzene sulphonate emulsifiers.
- Quimicas Dinant in Honduras, using Stephan technology, make Sulphonic acid, and mix it with imported materials to produce emulsifiers.
- Calcium carbonate and pumice are used to produce granules.
- Diatomaceous earth is used to formulate dusts and wettable powders.

5.5. CHILE

Table 5.5. lists the pesticide formulators in Chile, and their capacities, by type of product and formulation. No satisfactory wettable powder facility exists.

A large proportion of pesticides are imported ready formulated, even of liquid formulations, since no real incentive exists to formulate locally as a 10% import duty is levied on both formulated pesticides and on the technical materials.

Emulsifiers and wetting agents are imported.

Usually the phenoxy herbicides are imported ready formulated.

Local fillers are available, of which several are reported to be suitable for formulation purposes. It is not known if suitable local solvents are available.

6.6. COLOMBIA

Table 6.5. lists the pesticide formulators in Colombia, and their formulation capacities, by type of product and formulation.

Most patent lapsed pesticides are imported as the technical material and formulated locally, since an import duty of 1% is levied on technical materials and 10% on formulated products.

Cyanamid no longer formulate locally, and their products are formulated and distributed by Proficol.

Velsicol no longer formulate locally, and their products are formulated and distributed by BASF.

In 1979 both Shell and Ciba-Geigy are reported to have increased their formulation capacity by 50%.

The total reported formulation capacity of near 110000 tons is near three times that required.

Table 6.5.1. lists the additives for pesticide formulation which are produced locally in Colombia.

Kaolin is the most important local filler.

All wetting agents are imported.

5.7. ECUADOR

All pesticides are imported into Ecuador ready formulated. There is no local formulation of pesticides. No import duty is levied on either formulated or technical pesticides.

Nevertheless, the following formulation facilities exist, but are not utilised:

- Kruger possess a facility of an estimated 500 tons for liquid insecticides and 2000 tons for granular insecticides annual capacity.

- Agripac possess a facility of an estimated 1000 tons for liquid insecticides (which is occasionally used for filling domestic packs) and 1000 tons for granular insecticides annual capacity.

Fitochim (see Section 4.7.) have applied for an industrial licence to formulate insecticide ECs, but without any known success. Another newly formed company named Fitosan have applied for a licence to formulate Propanil and Paraquat, but without any known success.

No suitable materials for pesticide formulation are known to be available locally in Ecuador.

5.8. MEXICO

Table 8.5. lists the pesticide formulators in Mexico, and their formulation capacities, by type of product and formulation.

Almost all pesticides which are imported are as the technical materials, for formulation locally.

The total reported formulation capacity of over 200000 tons is near three times the capacity required.

Table 8.5.1. lists the additives for pesticide formulation which are produced locally in Mexico.

Heavy naptha is produced in Mexico, but is not used in pesticide formulations.

It is unclear if Cyclohexanone is made in Mexico.

Hoechst, Retzloff and ICI make emulsifiers locally.

Dupont have a small local production of wetting agents, but they are all used captively in Dupont's local plants.

Locally available kaolin and talc are used for formulating wettable powders and dusts, and the silica sand for producing granules.

9.9. PARAGUAY

All pesticides are imported ready formulated.

An import duty of 10.5% is levied on formulated pesticides, and the same duty would be imposed on any technical materials imported.

Both Shell and Estrella possess small insecticide liquid formulating facilities, as shown in Table 9.5., which are not utilised.

No suitable materials for pesticide formulation are known to be available locally in Paraguay.

5.10. PERU

Table 10.5. lists the pesticide formulators in Peru, and their formulation capacities, by type of product and formulation, on a one shift basis operating 300 days annually.

Some 15000 ton capacity exists, mainly for insecticides, which is under utilised because most products are imported ready formulated, since duty on imported pesticide:

- technical materials in 50%
- formulations is nil.

No fungicides are formulated locally except the locally produced Copper and Sulphur products, where the milling and mixing is undertaken by the producers (see Section 4.10.).

Emulsifiers and wetting agents are imported.

Local fillers are available, of which several have been found to be suitable. It is not known if suitable local solvents are available, at a cost competitive with the solvent content of imported formulations.

5.11. URUGUAY

No import duties are levied on either formulated pesticides now, nor on technical materials, nor does any preference exist for pesticides imported from LAFTA countries. Now, almost all pesticides are imported ready formulated, with the exception of the phenoxy herbicides, which are imported as the dry acid, and mixed locally with imported dimethylamine.

Table 11.5. lists the pesticide formulators in Uruguay, and their formulation capacities, by type of product and formulation. These facilities are now much under utilised. Some doubt was expressed as to the reliability of the wettable powder facility.

Emulsifiers and wetting agents are imported.

Local fillers are available, some of which are reported to have been found suitable. It is not known if suitable solvents are available locally.

5.12. VENEZUELA

Table 12.5. lists the pesticide formulators in Venezuela, and their formulation capacities, by type of product and formulation.

Virtually all patent lapsed insecticides and herbicides are imported as technical materials, since only 1% import duty is levied on technical materials but 50% duty is paid on formulated products.

No fungicides are formulated locally except the locally produced Sulphur products, for which the milling and mixing is undertaken by the producers (see Section 12.4.).

The capacity reported to exist of 88000 tons is vastly in excess of that required.

Both Kaolin and Talc, milled to 325 mesh, are produced in Venezuela, and sell locally at US $46.50 ton.

Bayer report these locally produced fillers as being suitable for formulation purposes, but Shell prefer to import their fillers.

Shell maintain the only locally produced solvent is their odourless kerosene (named Maruven) which is suitable only for formulation of domestic insecticides, and that all solvents for agricultural pesticides must be imported.

It is reported that Alkylated benzene and fatty alcohol sulphonate emulsifiers are produced in Venezuela by both Hoechst and Diamond Shamrock, and sold at internationally competitive prices. Non-ionic polyoxyethylated emulsifiers, and wetting agents are imported.

6. POTENTIAL INTER-COUNTRY COOPERATIVE SCHEMES

Probably the most publicised attempt at cooperation on a pesticide production plant is within the Andean Pact countries, on the Bolivian insecticide project. The main insecticide market within this group of countries is Colombia, who is opposed to granting any more than 10% preference to production from this plant, yet a minimum 35% protection is obligatory to ensure project viability.

This project is at an apparent standstill, and the varied interests involved, highlight the problem of cooperative, and even complimentary production schemes, anywhere in this region.

There exists now, sufficient installed and planned capacity within the region to more than satisfy forecast demand for the whole region for most of the major volume pesticides, including:

- virtually all the organochlorines, the Parathions, Malathion, Monocrotophos, DDVP and Trichlorfon, and 70% of the Dimethoate.
- the phenoxies, the triazines, Diuron, Trifluralin, Propanil and Paraquat.
- all the inorganic fungicides and dithiocarbamates, PCP and Quintozene

yet substantial volumes of these materials are imported into the region.

The cost of intermediates and of production is higher within the region, than in the industrialised countries, with the result that the products made within the region are not normally competitive on the open market, nor in other countries within the region in spite of some preference granted to products from countries within the region.

It may be seen from the use and production tables in this report that there are candidate pesticides for production within the area. These include:

- the carbamate insecticides, of which some are reported to be in patent, and difficulty could be encountered in securing the intermediates.

- Benthiocarb, Bentazone, Metribuzin, Alachlor, Metolochlor, Glyphosate and Dalapon, of which most are in patent.

- Chlorothalonil, Captafol and perhaps Benomyl, of which all three are reported as being in patent, with Dupont having recently stopped competitive Benomyl imports to Brazil.

From this list, the only product without any known commercial strings is Dalapon, with the main market being Brazil. This possibility could be examined, as well as the patent position (and compulsory licencing) and availability of the required intermediates.

No obvious answer is apparent to the problem of utilising as much of the existing production capacity within the region. Most of the producing countries have their own definite policies with local manufacturers insulated with protective tariffs and the import licencing policy. While those without local production seek to purchase at the best price, which normally is to be found outside the region.

Unless a serious attempt has been made recently to resolve this very difficult problem, it is suggested that agreement be sought, within the region, at first in principle, for a system of transfer prices of pesticides made within the region between member countries, on a contra account basis.

Such a proposal would lead to discussion as to which other products (possibly chemical and/or agricultural) and credits/debits could be the subject of such contra accounting. In the present circumstances, and except within centrally planned economies, no other complimentary scheme for production is likely to be practicable. The exceptions are the sales which are already taking place, which are:

- transfers between a production plant owned by a multinational to another subsidiary owned by the same multinational in another country within the region. Examples are Cyanamid with Malathion, Rohm and Haas with dithiocarbamates and Propanil, and Dupont with Diuron.

- sales by the producer, on the free market, at competitive international prices where their costs permit them to do so. Examples are Hercules, Nicaragua in the past with Toxaphene, and now Sintesis with Propanil and Toxaphene, and sometimes Peru with copper products.

This type of action can easily be encouraged by export rebates, which are already used by Brazil, Venezuela and others, but are under review because of the wish to permit free market conditions to prevail, and to persuade local industry to be self supporting.

Formulated pesticides already flow in volume from:

- Argentina to Uruguay
- Brazil to Paraguay
- Colombia to Ecuador

However, with the exception of the small countries in the region, all countries have already near three times the formulation capacity required.

Local formulation can readily be encouraged or discouraged by maintaining a differential between the import duties on technical and formulated pesticides. However, there are hazards in invoking this policy. The most practicable method of encouraging the flow of formulated product from one country to another is for the manufacturing countries to ensure that the quality of their formulations are above reproach, especially of the wettable powders, which facilities require substantially more capital expenditure than the easier to produce liquid formulations.

No cooperative or complimentary marketing schemes can be suggested that are likely to be mutually attractive to all countries within the region, and economically practicable.

At a recent meeting of the Andean Pact countries, with selected members of industry, no agreement was reached on pesticide production. However, agreement was reached on areas where cooperation was feasible, and these were:

- identifying the problems associated with formulation, especially good formulation.

- labelling and transportation of pesticides.

- application of pesticides, particularly in the exchange of experience regarding the performance of individual pesticides and ecological considerations.

7. TABLES

The Tables which follow are referred to in the text in Sections:

- 3., which deals with the 1978 use of pesticides, and 1988 forecast.
- 4., which deals with the production of pesticides, and of chemical intermediates and their local selling prices.
- 5., which deals with pesticide formulation, and the local production of formulation additives and their local selling prices.

SUMMARY - TABLE 1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988 - TONS ACTIVE

INSECTICIDE	ARGENTINA		BOLIVIA		BRAZIL		CENTRAL AMERICA		CHILE		COLOMBIA		ECUADOR		MEXICO		PARAGUAY		PERU		URUGUAY		VENEZUELA		TOTAL	
	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988
ORGANOCHLORINES																										
DDT	45	40			4500	3500	5000	3000	50	60	353	250			4930	4000			210	255	100	100	800	400	15988	11605
BHC 16%	130	100			2650	2500									2060	2000	10	13	70	85					4920	4698
ALDRIN	20	10			780	700	50	40			163	50	20	32					40	48	60	40	10	5	1143	925
TOXAPHENE					4800	3600	9000	5000			1048	300			2290	2000							200	100	17338	11000
ENDOSULFAN	325	400	60	98	485	500	100	200	8	10	84	140	20	32	136	200	8	12	20	24	10	16	30	50	1286	1682
ENDRIN	93	60	15	24	960	900	200	100	4	5	36	10	16	26	127	80	15	20	10	12	40	40	200	100	1716	1377
HEPTACHLOR	220	150			210	230	50	20							255	150			20	24					755	574
ORGANOPHOSPHATES																										
M-PARATHION			140	230	2420	2600	6000	8000	60	80	1926	2500	58	94	2970	3200	30	40	20	24	50	80	600	1000	14274	17848
E-PARATHION	1030	1200			190	300	4000	5000	40	48	287	200			1515	1800	40	60	46	56	40	65	200	300	7388	9029
MALATHION	730	800	5	8	1450	1500	70	100	70	70	290	300	13	21	170	150			3	3	15	25	40	40	2856	3017
DIMETHOATE	200	250	10	16	1075	1200	60	100	10	12	120	150	20	32	340	370	10	13	2	3	20	40	40	60	1907	2246
DISULFOTON					243	250					7	5			21	20							5	8	276	283
FENITROTHION	15	20			640	700	100	80					10	16			2	2	5	6					772	824
MONOCROTOPHOS	244	300	30	48	1620	2200	600	800	30	36	142	200	45	73	425	600	8	12	40	48	10	30	90	120	3284	4467
PHOSFAMIDON					152	150	40	30	15	18	48	30	20	32	4	5							10	20	289	285
CHLORPYRIFOS			10	16	640	600	100	100			19	20	5	8	30	25			10	12					814	781
TRICHLORFON	20	60	15	24	260	300	100	100	20	24	235	300	40	64	106	150			105	128			300	400	1201	1550
DDVP	200	250									28	40	5	8	80	100	5	6							318	404
AZINPHOS	67	75	30	48			50	30	60	70	21	20	5	8	255	200	2	3	3	6	10	20	100	130	615	610
METHAMIDOPHOS			10	16	161	180	850	1100	18	23	74	90	50	80	225	300			70	85					1488	1874
PROFENFOS							500	600																	500	600
DIAZINON	18	20			133	120					28	20			76	60									255	220
CARBAMATES																										
CARBARYL	140	200	30	48	1410	1600	150	200	10	12	143	180	30	48	1275	1300	20	25	105	128	30	60	120	200	3463	4001
METHOMYL	10	10	2	5	130	180	300	350			49	30	5	8	297	300			20	24			50	80	863	1007
CARBOFURAN	47	60			265	300	100	100			103	70	55	100	68	70	5	7	10	12	2	5	30	40	680	764
ALDICARB					147	150																			147	150
ARSENATES - Ca + Pb.											154	50							80	90					234	140
PYRETHROIDS	1	4	0.5	2	NIL	10	10	50	NIL	0.5	5	20	0.5	3	20	50	0.2	1	1.5	3	NIL	0.5	0.5	6	39.2	150
OTHER INSECTICIDES	170	150			2611	2270	240	290	72	86	218	170	100	144	805	600			27	33	10	13	80	100	4333	3856

SUMMARY - TABLE 2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988 - TONS ACTIVE

HERBICIDE	ARGENTINA		BOLIVIA		BRAZIL		CENTRAL AMERICA		CHILE		COLOMBIA		ECUADOR		MEXICO		PARAGUAY		PERU		URUGUAY		VENEZUELA		TOTAL	
	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988
LICS–DNBP/DNOC	2	2			30	10			25	30	11	10			30	30					12	5	30	20	140	107
NITROFEN															42	40			1	1			60	50	103	91
KINS – 2,4-D	1400	1700	30	42	1100	2000	700	750	90	120	1546	2000	60	80	1200	1450	30	60	60	73	40	120	1100	1460	7356	9855
MCPA	200	250			74	40			130	170			5	7			5	15			5	13	80	110	499	605
MATES – ASULAM					70	50									3	5			70	85					143	140
EPTC	65	50									4	2			25	20									94	72
MOLINATE	30	40			490	400	10	10	10	12	4	8			4	2			3	3	5	13			556	488
BENTHIOCARB					230	290	10	10			274	250			2	4			5	6					521	560
D.-UREAS – DIURON	15	25	10	14	900	1600	1600	170	10	12	167	170	25	33	255	310	5	15	20	24	15	39	60	70	1642	2482
FLUOMETURON			10	14			20	20			40	50	15	20	17	20			5	6	5	13	50	75	162	218
LINURON	5	5	2	2	18	10	5	5	5	6	10	10			34	40			8	8			40	55	127	141
NES – BROMACIL	8	8			220	100	5	5			2	2			4	5					2	5			241	125
BENTAZONE	60	80			330	550					24	40			25	35					5	13			444	718
INES – ATRAZINE	30	35	10	14	180	200	100	110	15	18	342	350	12	16	340	410	5	15	30	36	5	13	250	400	1319	1607
AMETRYNE	12	15	15	21	1240	1600	170	190			145	150	40	54	319	390	5	15	40	48	10	26	60	100	2056	2609
SIMAZINE					420	400	30	30	5	6					3	3			2	2			50	80	510	521
METRIBUZIN	6	6	5	7	610	1200	10	20			6	10			8	20									645	1263
– PROPANIL	15	20	18	24	1070	1700	500	580	20	24	1230	1400	110	140	250	325			32	40	10	26	700	1100	3955	5379
ALACHLOR	31	35			2240	3600	80	80			14	10			6	5							10	10	2381	3740
METOLACHLOR					815	1320																			815	1320
BUTHACHLOR			10	14	170	150	10	10	5	6	56	60	9	12					20	24	10	26	35	40	315	342
ANN. – PARAQUAT	33	35	12	16	225	1000	230	250	15	18	58	70	36	48	85	105			12	15			90	140	796	1697
DINES – TRIFLURANN	812	1400	35	49	3740	6100	200	240	10	12	91	130			340	400	20	80			15	39	30	50	5293	8500
PHENOXALINE					65	100					26	30													91	130
S – DALAPON	120	150	10	14	440	700	40	40	30	36	45	45	30	40	51	60			10	10	10	26	95	100	881	1221
DICAMBA	18	20					20	20	15	18	6	5			21	25									80	88
GLYPHOSATE	37	50	4	5	475	770	25	40	6	8	23	40							2	4					572	917
MSMA	105	100			490	500					36	30	20	27	65	90	2	3	6	7			60	50	804	807
PICLORAM	48	60			190	300	50	60			26	55			11	15									325	490
OXYDIAZON					34	50																			34	50
TCA	185	250			70	50											2	4							257	304
HERBICIDES	153	105			610	610	35	50			976	400	16	22	150	390	2	3	18	25			40	80	2200	1685

SUMMARY - TABLE 3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988 - TONS ACTIVE

FUNGICIDES	ARGENTINA		BOLIVIA		BRAZIL		CENTRAL AMERICA		CHILE		COLOMBIA		ECUADOR		MEXICO		PARAGUAY		PERU		URUGUAY		VENEZUELA		T O T A L	
	1978	1988	1978	1988	1978	1988	1978	1'38	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988	1978	1988
INORGANICS-COPPER SULFATE	915	900			1200	1000									935	1000							80	90	3130	2990
OTHER COPPERS	1500	1700	20	27	2990	3400	330	100	160	200	119	100	50	74	640	700	10	20	50	50	260	200	30	35	6159	6606
SULPHUR DUST	2500	2000	40	54	1900	1000			5900	6000			60	89	1020	1100			1200	1100	130	160	500	500	13250	12003
SULPHUR WP	1500	2200			2210	2500	40	50	55	60	15	15					10	40	140	150	120	150	20	40	4110	5205
CHLORINATED PHENOLS - PCP	15	15			40	40	30	30	3	4			3	4	110	120	3	3	3	3	5	8	5	5	217	232
DINOCAP	3	3							1	1					3	3	3	3	4	3					14	13
CHLOROTHALONIL	3	5			72	90	75	500			15	15			21	23							10	15	196	648
QUINTOZENE	32	25			182	160	25	25			18	10			425	450			43	40	6	9			731	719
DITHIOCARBAMATES - MANEB	165	180	20	27	2930	3200	210	200	20	25	1988	2000	180	266	765	860	15	30	65	70	55	90	320	380	6733	7328
MANCOZEB	435	480	35	47	2740	2700	1440	1300	50	65	1793	1800	130	192	85	100	40	65	140	130	25	40	100	160	7013	7079
METIRAM	53	50			6	5	40	20	15	20			25	37					90	100	30	50	100	120	359	402
PROPINEB	28	40	25	34	600	660	140	140	30	40	112	135	80	118	4	5	10	20	70	70	30	55	170	200	1299	1517
THIRAM	25	20			140	140	5	5	3	4	12	10	2	2	85	100			4	2	17	25			293	308
ZINEB	515	400	5	7	85	70	25	15	10	13			15	22	340	350			20	10	50	80	10	10	1075	977
ZIRAM	10	30			180	150															40	65			230	245
PHTALAMIDES - CAPTAN	60	40			90	60	25	25	35	47	30	35	5	6	110	130					20	32	14	15	389	390
CAPTAFOL	8	20			342	340	50	20			9	15	8	12	8	10					7	11			432	428
FOLPET	5	5							2	3					13	10					8	8			28	26
MERCURIALS	2	2			1	1			1	0.5			0.5				0.5	0.5							5	4
AMINE DERIVED - BENOMYL	6	15	1	2	120	140	35	20	5	10	16	20	5	10	25	30	2	16	10	16	3	6	12	20	240	305
THIABENDAZOLE	5	5					11	8			1	1			9	10			6	5					32	29
CARBOXIN/OXYCARBOXIN	3	3			12	15					7	5			7	5			12	10					41	38
THIOPHANATE-METHYL	19	30			157	180									4	10	2	16	6	8	4	6			192	250
OTHERS - EDIFENPHOS			2	2	12	15	20	25			94	120	4	7	4	8			24	25					160	202
ETHIRIMOL					62	75																	2	4	64	79
DODINE									25	33					3	1									28	34
FENTIN COMPOUNDS	4	2			35	20					17	10			3	1					4	6			63	39
[illegible]			5	7	98	110	5	5											4	5					112	127
TRIADIMEFON					35	55					12	20			10	25									66	100
TRIDEMORPH					65	75											1	10	8	6					74	91
HCB	60	50																			2	3			62	53
OTHER FUNGICIDES	1051	1051			64	44	40	35	27	33	66	75	25	37	14	15	0.5	1	8	10			30	45	1325.5	1346

ARGENTINA - TABLE 1.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - DDT	45	40
BHC	130	100
ALDRIN	20	10
ENDOSULFAN	325	400
ENDRIN	93	60
HEPTACHLOR	220	150
ORGANOPHOSPHATES		
-E-PARATHION	1030	1200
MALATHION	730	800
DIMETHOATE	200	250
FENITROTHION	15	20
MONOCROTOPHOS	244	300
TRICHLORFON	20	60
DDVP	200	250
AZINPHOS	67	75
DIAZINON	18	20
ETHION	100	100
CARBAMATES - CARBARYL	140	200
METHOMYL	10	10
CARBOFURAN	47	60
OTHER INSECTICIDES	70	50
PYRETHROIDS	1	4

ARGENTINA - TABLE 1.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS - DNBP	2	2
PHENOXIES - 2,4-D	1400	1700
MCPA	200	250
CARBAMATES - EPTC	65	50
MOLINATE	30	40
SUB. UREAS - DIURON	15	25
LINURON	5	5
MONURON	10	10
DIAZINES - BROMACIL	8	8
BENTAZONE	60	80
MALEIC HYDRAZIDE	5	5
TRIAZINES - ATRAZINE	30	35
AMETRYNE	12	15
METRIBUZIN	6	6
AMIDES - DINITRAMINE	43	10
PROPANIL	15	20
ALACHLOR	31	35
QUAT. AMM. - PARAQUAT	33	35
TOLUIDINES - TRIFLURALIN	812	1400
OTHERS - ATA	45	20
DALAPON	120	150
DICAMBA	18	20
GLYPHOSATE	37	50
MSMA	105	100
PICLORAM	48	60
TCA	185	250
OTHER HERBICIDES	50	60

ARGENTINA - TABLE 1.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER SULPHATE	915	900
OTHER COPPERS	1500	1700
SULPHUR DUST	2500	2000
SULPHUR WP	1500	2200
CALCIUM POLYPHOSPHATE	1000	1000
CHLORINATED PHENOLS-PCP	15	15
DINOCAP	3	3
CHLOROTHALONIL	3	5
QUINTOZENE	32	25
DITHIOCARBAMATES - MANEB	165	180
MANCOZEB	435	480
METIRAM	53	50
PROPINEB	28	40
THIRAM	25	20
ZINEB	515	400
ZIRAM	10	30
PHTALAMIDES - CAPTAN	60	40
CAPTAFOL	8	20
FOLPET	5	5
MERCURIALS	2	2
AMINE DERIVED-BENOMYL	6	15
CARBENDAZIM	5	15
THIABENDAZOLE	5	5
CARBOXIN/OXYCARBOXIN	3	3
THIOPHANATE - METHYL	19	30
OTHERS - FENTIN CMPDS.	4	2
TCMTB	3	3
HCB	60	50
CHLORONEB	3	3
OTHER FUNGICIDES	40	30

BOLIVIA - TABLE 2.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - ENDRIN	15	24
ENDOSULFAN	60	98
ORGANOPHOSPHATES		
M-PARATHION	140	230
MALATHION	5	8
DIMETHOATE	10	16
MONOCROTOPHOS	30	48
CHLORPYRIFOS	10	16
TRICHLORFON	15	24
AZINPHOS	30	48
METHAMIDOPHOS	10	16
CARBAMATES		
CARBARYL	30	48
METHOMYL	2	5
PYRETHROIDS	0.5	2

BOLIVIA - TABLE 2.2.

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOXIES - 2,4-D	30	42
SUB. UREAS. - DIURON	10	14
FLUOMETURON	10	14
LINURON	2	2
TRIAZINES - ATRAZINE	10	14
AMETRYNE	15	21
METRIBUZIN	5	7
AMIDES - PROPANIL	18	24
BUTACHLOR	10	14
QUAT. AMM. - PARAQUAT	12	16
TOLUIDINES - TRIFLURALIN	35	49
OTHERS - DALAPON	10	14
GLYPHOSATE	4	5

BOLIVIA - TABLE 2.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS - COPPER PRODUCTS	20	27
SULPHUR DUST	40	54
DITHIOCARBAMATES		
MANOZEB	35	47
MANEB	20	27
PROPINEB	25	34
ZINEB	5	7
AMINE DERIVED		
BENOMYL	1	2
OTHER ORGANICS		
EDIFENPHOS	2	2
KITAZIN	5	7

BRAZIL - TABLE 3.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - DDT	4500	3500
BHC (16%)	2650	2500
ALDRIN	780	700
TOXAPHENE	4800	3600
ENDOSULFAN	485	500
ENDRIN	960	900
HEPTACHLOR	210	230
OTHERS	34	60
ORGANOPHOSPHATES-M-PARATHION	2420	2600
E-PARATHION	190	300
MALATHION	1450	1500
DIMETHOATE	1075	1200
DISULFOTON	243	250
FENITROTHION	640	700
MONOCROTOPHOS	1620	2200
PHOSPAMIDON	152	150
CHLORPYRIFOS	640	600
TRICHLORFON	260	300
METHAMIDOPHOS	161	180
DIAZONON	133	120
DICROTOPHOS	463	550
OTHERS	1092	960
CARBAMATES - CARBARYL	1410	1600
METHOMYL	130	180
ALDICARB	147	150
CARBOFURAN	265	300
ACARICIDES	1022	700
PYRETHROIDS	Nil	10

BRAZIL - TABLE 3.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS - DNBP	30	10
PHENOXIES - 2,4-D	1100	2000
MCPA	74	40
CARBAMATES - ASULAM	70	50
MOLINATE	490	400
BENTHIOCARB	230	290
SUB.UREAS - DIURON	900	1600
LINURON	18	10
DIAZINES - BROMACIL	220	100
BENTAZONE	330	550
TRIAZINES - ATRAZINE	180	200
AMETRYNE	1240	1600
SIMAZINE	420	400
METRIBUZIN	610	1200
AMIDES - PROPANIL	1070	1700
ALACHLOR	2240	3600
METOLACHLOR	815	1320
BUTACHLOR	170	150
QUAT.AMM. - PARAQUAT	225	1000
DIQUAT	78	110
TOLUIDINES-TRIFLURALIN	3740	6100
PHENOXALINE	65	100
OTHERS - DALAPON	440	700
GLYPHOSATE	475	770
MSMA	490	500
PICLORAM	190	300
OXYDIAZON	34	50
TCA	70	50
OTHER HERBICIDES	532	500

BRAZIL - TABLE 3.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER SULPHATE	1200	1000
COPPER OXYCHLORIDE	1340	1500
CUPRONS OXIDE	1650	1900
SULPHUR DUST	1900	1000
SULPHUR WP	2210	2500
CHLORINATED PHENOLS-PCP	40	40
CHLOROTHALONIL	72	90
QUINTOZENE	182	160
DITHIOCARBAMATES-MANEB	2930	3200
MANCOZEB	2740	2700
METIRAM	6	5
FERBAM	32	10
PROPINEB	600	660
THIRAM	140	140
ZINEB	85	70
ZIRAM	180	150
MERCURIALS	1	1
PHTALAMIDES-CAPTAN	90	60
CAPTAFOL	342	340
AMINE DERIVED-BENOMYL	120	140
CARBON/OXYCARBOXIN	12	15
THIOPHANATE-METHYL	157	180
OTHERS - EDIFENPHOS	12	15
ETHIRIMOL	62	75
FENTIN ACETATE/ HYDROX.	35	20
KITAZIN	98	110
TRIADIMEFON	35	55
TRIDEMORPH	65	75
OTHER FUNGICIDES	32	34

CENTRAL AMERICA - TABLE 4.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-DDT	5000	3000
ALDRIN	50	40
TOXAPHENE	9000	5000
ENDOSULFAN	100	200
HEPTACHLOR	50	20
ENDRIN	200	100
ORGANOPHOSPHATES		
-M-PARATHION	6000	8000
E-PARATHION	4000	5000
MALATHION	70	100
DIMETHOATE	60	100
FENITROTHION	100	80
MONOCROTOPHOS	600	800
PHOSFAMIDON	40	30
CHLORPYRIFOS	100	100
TRICHLORFON	100	200
AZIMPHOS	50	30
METHAMIDOPHOS	850	1100
PROFENOFOS	500	600
ACEPHATE	50	40
CARBAMATES-CARBARYL	150	200
METHOMYL	300	350
CARBOFURAN	100	100
PYRETHROIDS	10	50
OTHER INSECTICIDES	190	250

CENTRAL AMERICA - TABLE 4.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOXIES - 2,4-D	700	750
CARBAMATES-MOLINATE	10	10
BENTHIOCARB	10	10
SUB.UREAS - DIURON	160	170
FLUOMETURON	20	20
LINURON	5	5
DIAZINES - BROMACIL	5	5
TRIAZINES- ATRAZINE	100	110
AMETRYNE	170	190
SIMAZINE	30	30
METRIBUZIN	10	20
AMIDES - PROPANIL	500	580
ALACHLOR	80	80
BUTACHLOR	10	10
QUAT. AMM.-PARAQUAT	230	250
TOLUIDINES - TRIFLURALIN	200	240
OTHERS - DALAPON	40	40
DICAMBA	20	20
GLYPHOSATE	25	40
PICLORAM	50	60
OTHER HERBICIDES	35	50

CENTRAL AMERICA - TABLE 4.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	330	100
SULPHUR WP	40	50
CHLORINATED PHENOLS-PCP	30	30
CHLOROTHALONIL	75	500
QUINTOZENE	25	25
DITHIOCARBAMATES-MANEB	210	200
MANCOZEB	1440	1300
METIRAM	40	20
PROPINEB	140	140
THIRAM	5	5
ZINEB	25	15
PHTALAMIDES-CAPTAN	25	25
CAPTAFOL	50	20
AMINE DERIVED-BENOMYL	35	20
CARBENDAZIM	10	5
THIABENDAZOLE	11	8
OTHERS-EDIFENPHOS	20	25
KITAZIN	5	5
OTHER FUNGICIDES	30	30

CHILE - TABLE 5.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - DDT	50	60
LINDANE	10	12
ENDOSULFAN	8	10
ENDRIN	4	5
ORGANOPHOSPHATES		
-M-PARATHION	60	80
E-PARATHION	40	48
MALATHION	70	70
DIMETHOATE	10	12
MONOCROTOPHOS	30	36
PHOSPAMIDON	15	18
TRICHLORFON	20	24
AZINPHOS	60	70
METHAMIDOPHOS	18	23
DEMETON-S-METHYL	12	14
METHIDATHION	20	24
CARBAMATES		
-CARBARYL	10	12
PIRIMICARB	10	12
OTHERS		
TETRADIFON	10	12
DICOFOL	10	12
PYRETHROIDS	0	0.5

CHILE - TABLE 5.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS - DNOC	25	30
PHENOXIES - 2,4-D	90	120
MCPA	130	170
CARBAMATES-MOLINATE	10	12
SUB. UREAS-DIURON	10	12
LINURON	5	6
TRIAZINES-ATRAZINE	15	18
SIMAZINE	5	6
AMIDES-PROPANIL	20	24
BUTACHLOR	5	6
QUAT. AMM.-PARAQUAT	15	18
TOLUIDINES-TRIFLURALIN	10	12
OTHERS - DALAPON	30	36
DICAMBA	15	18
GLYPHOSATE	6	8

CHILE - TABLE 5.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	160	200
SULPHUR DUST	5900	6000
SULPHUR WP	55	60
CHLORINATED PHENOLS		
-PCP	3	4
DINOCAP	1	1
DITHIOCARBAMATES		
-FERBAM	4	5
MANCOZEB	50	65
MANEB	20	25
METIRAM	15	20
PROPINEB	30	40
THIRAM	3	4
ZINEB	10	13
PHTALAMIDES		
-CAPTAN	35	47
FOLPET	2	3
MERCURIALS	1	0.5
AMINE DERIVED		
-BENOMYL	5	10
OTHER ORGANICS		
-DODINE	25	33
FENAMINOSULF	23	28

COLOMBIA - TABLE 6.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-DDT	353	250
LINDANE	25	30
ALDRIN	163	50
TOXAPHENE	1048	300
ENDOSULFAN	84	140
ENDRIN	36	10
ORGANOPHOSPHATES		
-M-PARATHION	1926	2500
E-PARATHION	287	200
MALATHION	290	300
DIMETHOATE	120	150
DISULFOTON	7	5
MONOCHROTOPHOS	142	200
PHOSPAMIDON	48	30
CHLORPYRIFOS	19	20
TRICHLORFON	235	300
DDVP	28	40
AZINPHOS	21	20
METHAMIDOPHOS	74	90
DIAZINON	28	20
DICROTOPHOS	17	10
CARBAMATES-CARBARYL	143	180
METHOMYL	49	30
CARBOFORAN	103	70
LEAD ARSENATE	154	50
PYRETHROIDS	5	20
OTHER INSECTI IDES	176	130

COLOMBIA - TABLE 6.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS-DNBP	11	10
PHENOXIES-2,4-D	1546	2000
2,4,5-T	772	200
CARBAMATES-EPTC	4	2
MOLINATE	4	8
BENTHIOCARB	274	250
SUB.UREAS - DIURON	167	170
FLUOMETURON	40	50
LINURON	10	10
DIAZINES - BROMACIL	2	2
BENTAZONE	24	40
TRIAZINES-ATRAZINE	342	350
AMETRYNE	145	150
METRIBUZIN	6	10
AMIDES-PROPANIL	1230	1400
ALACHLOR	14	10
BUTACHLOR	56	60
QUAT.AMM.-PARAQUAT	58	70
TOLUIDINES-TRIFLURALIN	91	130
PHENOXALINE	26	30
OTHERS-DALAPON	45	45
DICAMBA	6	5
GLYPHOSATE	23	40
MSMA	36	30
PICLORAM	26	55
OTHER HERBICIDES	204	200

COLOMBIA - TABLE 6.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	119	100
SULPHUR WP	15	15
CHLORINATED PHENOLS		
-CHLOROTHALONIL	15	15
QUINTOZENE	18	10
DITHIOCARBAMATES-MANEB	1988	2000
MANCOZEB	1793	1800
PROPINEB	112	135
THIRAM	12	10
PHTALAMIDES-CAPTAN	30	35
CAPTAFOL	9	15
AMINE DERIVED-BENOMYL	16	20
THIABENDAZOLE	1	1
CARBOXIN/OXYCARBOXIN	7	5
OTHERS-EDIFENPHOS	94	120
FENTIN CMPDS.	17	10
TRIADIMEFON	12	20
OTHER FUNGICIDES	66	75

ECUADOR - TABLE 7.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-ALDRIN	20	32
ENDOSULFAN	20	32
ENDRIN	16	26
ORGANOPHOSPHATES		
M-PARATHION	58	94
MALATHION	13	21
DIMETHOATE	20	32
FENITROTHION	10	16
MONOCROTOPHOS	45	73
PHOSFAMIDON	20	32
CHLORPYRIFOS	5	8
TRICHLORFON	40	64
DDVP	5	8
AZINPHOS	5	8
METHAMIDOPHOS	50	80
PRIMIPHOS	85	120
CARBAMATES		
CARBARYL	30	48
METHOMYL	5	8
CARBOFURAN	55	100
PYRETHROIDS	0.5	3
OTHERS	15	24

ECUADOR - TABLE 7.2.

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOXIES - 2,4-D	60	80
MCPA	5	7
SUB. UREA - DIURON	25	33
FLUOMETURON	15	20
TRIAZINES-ATRAZINE	12	16
AMETRYNE	40	54
AMIDES-PROPANIL	110	140
BUTACHLOR	9	12
QUAT.AMM.-PARAQUAT	36	48
OTHERS-DALAPON	30	40
MSMA	20	27
OTHER HERBICIDES	16	22

ECUADOR - TABLE 7.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	50	74
SULPHUR DUST	60	89
CHLORINATED PHENOLS		
PCP	3	4
DITHIOCARBAMATES		
MANCOZEB	130	192
MANEB	180	266
METIRAM	25	37
PROPINEB	80	118
THIRAM	2	2
ZINEB	15	22
PHTALAMIDES		
CAPTAN	5	6
CAPTAFOL	8	12
MERCURIALS	0.5	NIL
AMINE DERIVED		
BENOMYL	5	10
OTHER ORGANICS		
EDIFENPHOS	4	7
OTHER FUNGICIDES	25	37

MEXICO - TABLE 8.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-DDT	4930	4000
BHC	2060	2000
TOXAPHENE	2290	2000
ENDOSULFAN	136	200
ENDRIN	127	80
HEPTACHLOR	255	150
ORGANOPHOSPHATES		
M-PARATHION	2970	3200
E-PARATHION	1515	1800
MALATHION	170	150
DIMETHOATE	340	370
DISULFOTON	21	20
MONOCROTOPHOS	425	600
PHOSFAMIDON	4	5
CHLORPYRIFOS	30	25
TRICHLORFON	106	150
DDVP	80	100
AZINPHOS	255	200
METHAMIDOPHOS	255	300
DIAZINON	76	60
CARBAMATES-CARBARYL	1275	1300
METHOMYL	297	300
CARBOFURAN	68	70
PYRETHROIDS	20	50
OTHER INSECTICIDES	805	600

MEXICO - TABLE 8.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS-DNBP	30	30
NITROFEN	42	40
PHENOXIES - 2,4-D	1200	1450
CARBAMATES-ASULAM	3	5
EPTC	25	20
MOLINATE	4	2
BENTHIOCARB	2	4
SUB.UREAS-DIURON	255	310
FLUOMETURON	17	20
LINURON	34	40
DIAZINES-BROMACIL	4	5
BENTAZONE	25	35
TRIAZINES-ATRAZINE	340	410
AMETRYNE	319	390
SIMAZINE	3	3
METRIBUZIN	8	20
AMIDES-PROPANIL	250	325
ALACHLOR	6	5
QUAT.AMM.-PARAQUAT	85	105
TOLUIDINES-TRIFLURALIN	340	400
OTHERS - DALAPON	51	60
DICAMBA	21	25
MSMA	85	90
PICLORAM	11	15
OTHER HERBICIDES	350	390

MEXICO - TABLE 8.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER SULPHATE	935	1000
OTHER COPPER CMPDS.	640	700
SULPHUR DUST	1020	1100
CHLORINATED PHENOLS-PCP	110	120
CHLOROTHALONIL	21	23
DINOCAP	3	3
QUINTOZENE	425	450
DITHIOCARBAMATES-MANEB	765	860
MANCOZEB	85	100
PROPINEB	4	5
THIRAM	85	100
ZINEB	340	350
PHTALAMIDES-CAPTAN	110	130
CAPTAFOL	8	10
FOLPET	13	10
AMINE DERIVED-BENOMYL	25	30
THIABENDAZOLE	9	10
CARBOXIN/OXYCARBOXIN	7	5
THIOPHANATE-METHYL	4	10
TRIFORINE	4	5
OTHERS - EDIFENPHOS	4	8
DODINE	3	1
FENTIN CMPDS.	3	1
TRIADIMEFON	19	25
OTHER FUNGICIDES	10	10

PARAGUAY - TABLE 9.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - BHC	10	13
ENDOSULFAN	8	12
ENDRIN	15	20
ORGANOPHOSPHATES		
M-PARATHION	30	40
E-PARATHION	40	60
DIMETHOATE	10	13
FENITROTHION	2	2
MONOCROTOPHOS	8	12
DDVP	5	6
AZINPHOS	2	3
CARBAMATES		
-CARBARYL	20	25
CARBOFURAN	5	7
PYRETHROIDS	0.2	1

PARAGUAY - TABLE 9.2

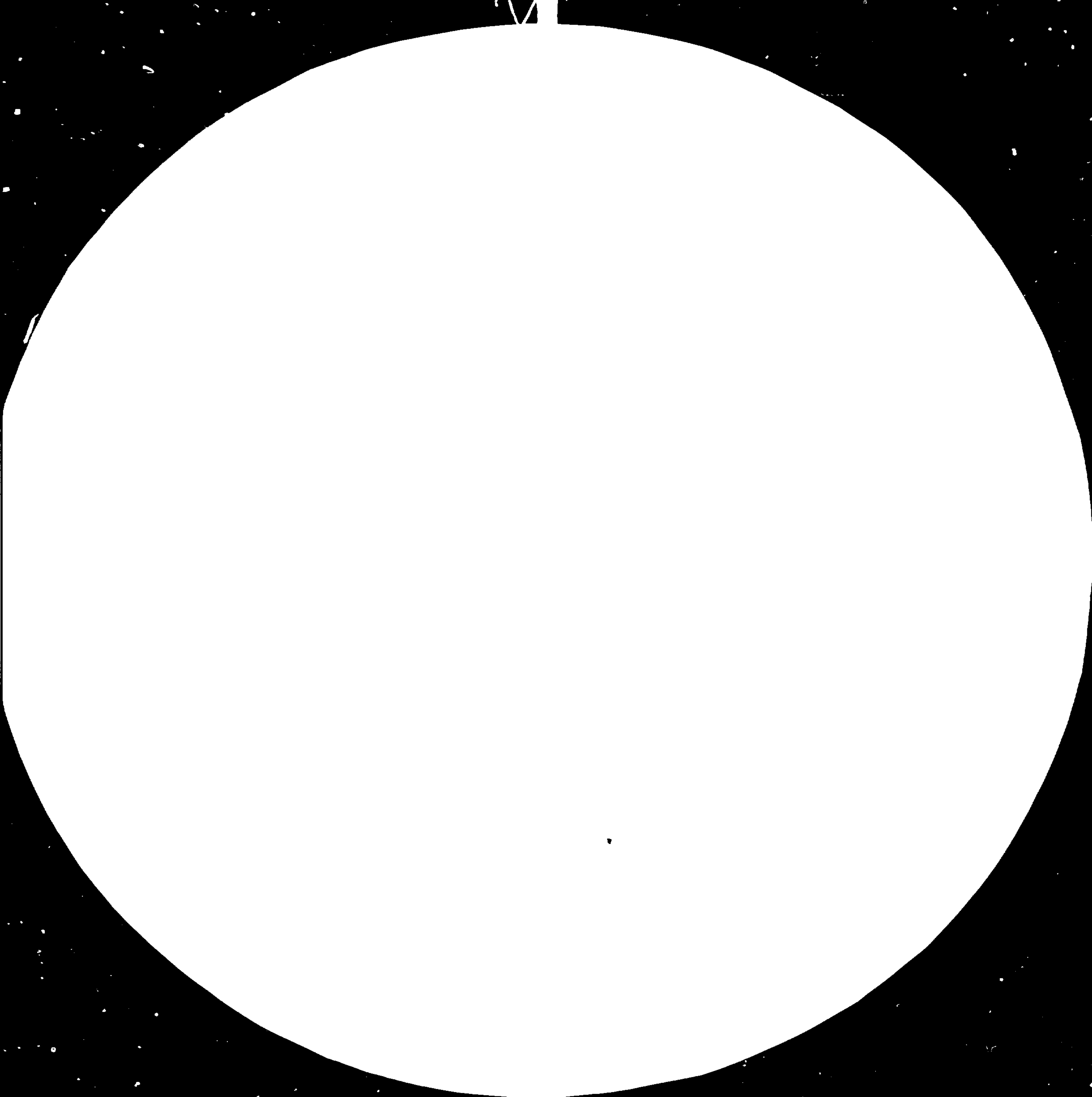
ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

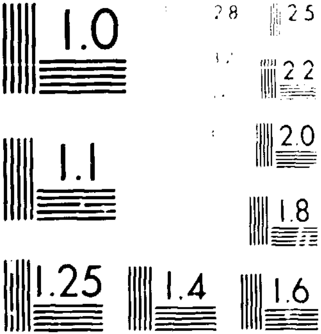
Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOXIES - 2,4-D	30	60
MCPA	5	15
SUB. UREAS-DIURON	5	15
TRIAZINES-ATRAZINE	5	15
AMETRYNE	5	15
PROMETRYNE	2	3
TOLUIDINES-TRIFLURALIN	20	80
OTHERS - MSMA	2	3
TCA	2	4

PARAGUAY - TABLE 9.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	10	20
SULPHUR WP	10	40
CHLORINATED PHENOLS		
-DINOCAP	3	3
PCP	3	3
DITHIOCARBAMATES		
-MANCOZEB	40	65
MANEB	15	30
PROPINEB	10	20
AMINE DERIVED		
-BENOMYL	2	16
THIOPHANATE-METHYL	2	16
MERCURIALS	0.5	0.5
OTHER ORGANICS		
-PYRAZOPHOS	0.5	1
TRIADIMEFON	1	10

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PERU - TABLE 10.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-DDT	210	255
BHC	70	85
ALDRIN	40	48
ENDOSULFAN	20	24
ENDRIN	10	12
HEPTACHLOR	20	24
ORGANOPHOSPHATES-		
M-PARATHION	20	24
E-PARATHION	46	56
MALATHION	3	3
DIMETHOATE	2	3
FENITROTHION	5	6
MONOCROTOPHOS	40	48
CHLORPYRIFOS	10	12
TRICHLORFON	105	128
AZINPHOS	5	6
METHAMIDOPHOS	70	85
DEMETON-S-METHYL	15	18
CARBAMATES		
CARBARYL	105	128
METHOMYL	20	24
CARBOFURAN	10	12
ARSENATES-CALCIUM + LEAD	80	90
PYRETHROIDS	1.5	3
OTHER INSECTICIDES	12	15

PERU - TABLE 10.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS -NITROFEN	1	1
PHENOXIES -2,4-D	60	73
CARBAMATES-ASULAM	70	85
MOLINATE	3	3
BENTHIOCARB	5	6
SUB. UREAS-DIURON	20	24
FLUOMETURON	5	6
LINURON	8	8
TRIAZINES-ATRAZINE	30	36
AMETRYNE	40	48
SIMAZINE	2	2
AMIDES-PROPNIL	32	40
BUTACHLOR	20	24
QUAT.AMM-PARAQUAT	12	15
OTHERS - DALAPON	10	10
GLYPHOSATE	2	4
MSMA	6	7
OTHER HERBICIDES	18	25

PERU - TABLE 10.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	50	50
-SULPHUR DUST	1200	1100
-SULPHUR WP	140	150
CHLORINATED PHENOLS		
DINOCAP	4	3
QUINTOZENE	43	40
DITHIOCARBAMATES		
MANCOZEB	140	130
MANEB	65	70
METIRAM	90	100
PROPINEB	70	70
THIRAM	4	2
ZINEB	20	10
PHTALAMIDES		
AMINE DERIVED		
BENOMYL	10	16
THIABENDAZOLE	6	5
CARBOXIN/OXYCARBOXIN	12	10
THIOPHANATE-METHYL	6	8
OTHER ORGANICS		
EDIFENPHOS	24	25
KITAZIN	4	5
TRIDEMORPH	8	6
CHLORONEB	3	2
PYRAZOPHOS	3	4
OTHER FUNGICIDES	2	4

URUGUAY - TABLE 11.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES - DDT	100	100
LINDANE	5	8
ALDRIN	60	40
ENDOSULFAN	10	16
ENDRIN	40	40
ORGANOPHOSPHATES		
M-PARATHION	50	80
E-PARATHION	40	65
MALATHION	15	25
DIMETHOATE	20	40
MONOCROTOPHOS	10	30
AZINPHOS	10	20
DEMETON-S-METHYL	5	5
CARBAMATES		
CARBARYL	30	60
CARBOFURAN	2	5
PYRETHROIDS	-	0.5

URUGUAY - TABLE 11.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS - DNOC	12	5
PHENOXIES - 2,4-D	40	120
MCPA	5	13
CARBAMATES-MOLINATE	5	13
SUB. UREAS-DIURON	15	39
FLUOMETURON	5	13
DIAZINES-BROMACIL	2	5
BENTAZONE	5	13
TRIAZINES-ATRAZINE	5	13
AMETRYNE	10	26
AMIDES-PROPANIL	10	26
BUTACHLOR	10	26
TOLUIDINES-TRIFLURALIN	15	39
OTHERS - DALAPON	10	26

URUGUAY - TABLE 11.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER PRODUCTS	260	200
SULPHUR DUST	130	160
SULPHUR WP	120	150
CHLORINATED PHENOLS		
-PCP	5	8
QUINTOZENE	6	9
DITHIOCARBAMATES		
-MANEB	55	90
MANCOZEB	25	40
METIRAM	30	50
PROPINEB	30	55
THIRAM	17	25
ZINEB	50	80
ZIRAM	40	65
PHTALAMIDES		
-CAPTAN	20	32
CAPTAFOL	7	11
FOLPET	8	8
AMINE DERIVED		
-BENOMYL	3	6
THIOPHANATE-METHYL	4	6
OTHER ORGANICS		
-FENTIN ACETATE	4	6
HCB	2	3

VENEZUELA - TABLE 12.1

ESTIMATED 1978 INSECTICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
ORGANOCHLORINES-DDT	800	400
ALDRIN	10	5
DIELDRIN	20	10
TOXAPHENE	200	100
ENDOSULFAN	30	50
ENDRIN	200	100
ORGANOPHOSPHATES		
M-PARATHION	600	1000
E-PARATHION	200	300
MALATHION	40	40
DIMETHOATE	40	60
DISULFOTON	5	8
MONOCROTOPHOS	90	120
PHOSFAMIDON	10	20
TRICHLORFON	300	400
FENTHOATE	25	30
AZINPHOS	100	130
CARBAMATES		
CARBARYL	120	200
METHOMYL	50	80
CARBOFURAN	30	40
PYRETHROIDS	0.5	6
OTHER INSECTICIDES	35	60

VENEZUELA - TABLE 12.2

ESTIMATED 1978 HERBICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
PHENOLICS-DNBP	30	20
NITROFEN	60	50
PHENOXIES-2,4-D	1100	1460
MCP	80	110
SUB. UREAS-DIURON	60	70
FLUOMETURON	50	75
LINURON	40	55
TRIAZINES-ATRAZINE	250	400
AMETRYNE	60	100
SIMAZINE	50	80
AMIDES-PROPANIL	700	1100
ALACHLOR	10	10
BUTACHLOR	35	40
QUAT.AMM.-PARAQUAT	90	140
TOLUIDINES-TRIFLURALIN	30	50
OTHERS-DALAPON	95	100
MSMA	60	50
OTHER HERBICIDES	40	80

VENEZUELA - TABLE 12.3

ESTIMATED 1978 FUNGICIDE USE AND FORECAST 1988

Product	Tons Active	
	Estimated Actual 1978	Forecast 1988
INORGANICS-COPPER SULPHATE	80	90
OTHER COPPERS	30	35
SULPHUR DUST	500	500
SULPHUR WP	20	40
CHLORINATED PHENOLS		
CHLOROTHALONIL	10	15
PCP	5	5
DITHIOCARBAMATES		
-MANCOZEB	100	160
MANEB	320	380
METIRAM	100	120
PROPINEB	170	200
ZINEB	10	10
PHTALAMIDES-CAPTAN	14	15
AMINE DERIVED-BENOMYL	12	20
OTHERS-ETHIRIMOL	2	4
OTHER FUNGICIDES	30	45

ARGENTINA - TABLE 1.4

PESTICIDE PRODUCTION IN 1978

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
2,4-D ACID	ATANOR	2500	2500
MCPA ACID	ATANOR	1200	200
2,4-DB ACID	CIA. QUIMICA	600	350
2,4-D ESTER	CIA. QUIMICA	1000	700
2,4-D ESTER	SINTESIS QUIMICA	700	500
TRIFLURALIN	ESTRELLA	1000	40
TRIFLURALIN	QUIMEL	2000	START UP AUGUST 1979
SULPHUR DUST + WP	BASSO Y TONNELIER	5000	2000
SULPHUR DUST + WP	CIA. QUIMICA	1000	700
CALCIUM POLYSULPHATE	CIA. QUIMICA	2000	1000
COPPER SULPHATE	CIA. QUIMICA	600	200
TRIBASIC COPPERSULPHATE	CIA. QUIMICA	500	200
PCP	SINTESIS QUIMICA	50	CLOSED DUE POLLUTION
HCB (15%)	CIA. QUIMICA	100	80
COPPER SULPHATE	TORT VALLS	1200	900
COPPER OXYCHLORIDE	TORT VALLS	1000	300
TCA	ATANOR	1000	400
BHC (16%)	DUPERIAL	1000	500
DDVP	CIBA GEIGY	200	200
METHYL BROMIDE	RHODIA	300	CLOSED IN 1978
NIMIDANE	CYANAMID	200	50
MEPHOSFOLAN/PHOSFOLAN	CYANAMID	500	200
TRICHLORFON/DDVP PHOSFAMIDON CHLORDIMEFORM	ESTRELLA	1000	130
COPPER OXYCHLORIDE	ALBITE	1000	400
COPPER SULPHATE	ALBITE	1000	500
THIRAM	PROTOQUIM	500	300

ARGENTINA - TABLE 1.4.1

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN ARGENTINA, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $/TON

REFERENCE TO SECTION 8. WILL INDICATE IN WHICH LOCAL PESTICIDE PRODUCTION PLANT EACH OF THESE LOCALLY PRODUCED INTERMEDIATES ARE USED.

CHEMICAL INTERMEDIATES	SELLING PRICE IN ARGENTINA US $ PER TON
2. PHENOL	1550
3. CHLORINE	360
4. ACETIC ACID	1500
17. ACETONE	NOT KNOWN
25. FORMALDEHYDE	400
26. N-BUTANOL	1700
33. SODIUM HYDROXIDE	400
35. AMMONIA	576
36. SULPHUR	LOCAL MINE NOW CLOSED
37. COPPER SCRAP	2500
44. HYDROGEN PEROXIDE	1400
PTHALIC ANHYDRIDE	1200
49. CHLORAL	PRODUCTION STOPPED 1976
50. BENZENE	625
51. SULPHURIC ACID	130
53. VINYL CHLORIDE	1200
62. METHANOL	280
65. ETHANOL	580
77. NITRIC ACID	730
78. ANILINE	VARIOUS GRADES - $10,000 - 30,000 TON
80. TOLUENE	NOT KNOWN
81. O-DICHLOROBENZENE	1700
83. HYDROGEN FLUORIDE	NOT KNOWN
85. TRICHLOROETHYLENE	1030

BRAZIL - TABLE 3.4.

PESTICIDE PRODUCTION IN 1978

PRODUCT	PRODUCER	TONS ACTIVE 1 9 7 8	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
BHC (16%)	MATARAZZO	6000	2738
TOXAPHENE	MATARAZZO (HERCULES)	7200	5125
DDT	HOECHST	8000	4898
MALATHION	CYANAMID	6800	1775
MONOCROTOPHOS	SHELL	1700	1048
DICROTOPHOS	SHELL	300	266
M-PARATHION	BAYER	2500	2520
E-PARATHION	BAYER	500	195
MANEB/MANCOZEB	DUPONT/ROHM AND HAAS	11000	6283
COPPER OXYCHLORIDE	GUILINI/SANDOZ	3000	1356
CUPROUS OXIDE	SANDOZ	3000	1700
THIRAM/ZIRAM	C.N.D.A. (RHODIA)	1800	339
PARAQUAT	CIA. IMPERIAL (ICI)	1000	155
PROPANIL	C.N.D.A.	1200	1151
TRIFLURALIN	ELANCO	6000	2000
TRIFLURALIN	MORTOX	6000	1880

BRAZIL - TABLE 3.4.1.

PLANNED PRODUCTION PLANTS

PRODUCT	PRODUCER	RATED PLANT CAPACITY TONS	YEAR PLANNED FOR PLANT START UP
TRICHLORFON	BAYER	500	1979 PRODUCTION
DIMETHOATE	NORTOX	1000 - 1500	1980 PLANNED
BAYER	FENITROTHION	180	
BAYER	FENTHION	80	1980 PLANNED
BAYER	COUMAPHOS	140	
PROPANIL	BAYER	1000	1979 PRODUCTION
PROPANIL	ROHM AND HAAS	1000	1979 PRODUCTION
DIURON	DUPON	2000	1979 PRODUCTION
DIURON	C.N.D.A. (RHODIA)	1000	1980 PLANNED
2,4-D	DOW	9000	1979 PRODUCTION
TRIAZINES	CIBA-GEIGY	4500	1980 PLANNED
TRIAZINES	C.N.D.A. (RHODIA)	3500	1980 PLANNED

BRAZIL - TABLE 3.4.2.

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN BRAZIL, AND THEIR SELLING PRICES IN BRAZIL ARE NOTED BELOW IN US $ TON

CHEMICAL INTERMEDIATE	SELLING PRICE IN BRAZIL US $ PER TON
2. PHENOL	856
3. CHLORINE	154
4. ACETIC ACID	811
17. ACETONE	695
25. FORMALDEHYDE	307
26. N.BUTANOL	347
33. SODIUM HYDROXIDE	262
35. AMMONIA	234
36. SULPHUR	41 - 70
38. NITROBENZENE	1096
40. CARBON DISULPHIDE	NOT KNOWN
42. MANGANESE SULPHATE	NOT KNOWN
44. HYDROGEN PEROXIDE	1510
45. MALEIC ANHYDRIDE	1254
46. BUTADIENE	432
49. CHLORAL	126
50. BENZENE	382
51. SULPHURIC ACID	52
53. VINYL CHLORIDE	458
62. METHANOL	304
65. ETHANOL	246 (K LITRES)
77. NITRIC ACID	191
80. TOLUENE	358
85. TRICHLOROETHYLENE	332

CENTRAL AMERICA - TABLE 4.4.

PESTICIDE PRODUCTION IN 1978

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
PROPANIL	SINTESIS QUIMICA. G.	400	350
TOXAPHENE	SINTESIS QUIMICA G.	8000	START UP 1979
TRIFLURALIN	SINTESIS QUIMICA G.	500	START UP 1979
TOXAPHENE	HERCULES N.		4000
CHLORDIMEFORM	DEQUINSA G.		START UP 1979

N.B. G. DENOTES GUATAMALA

N. DENOTES NICARAGUA

CENTRAL AMERICA - TABLE 4.4.1

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN CENTRAL AMERICA AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON

CHEMICAL INTERMEDIATE	SELLING PRICE IN CENTRAL AMERICA US $ TON
3. CHLORINE	370 FOB MANAGUA
33. SODIUM HYDROXIDE 50% SOLN.	210 (100% BASIS)
51. SULPHURIC ACID	PLANT CLOSED
52. CAMPHENE	ALL CONTRACTED TO HERCULES
65. ETHANOL	1000 (K LITRE)

CHILE - TABLE 5.4

PESTICIDE PRODUCTION

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
COPPER OXYCHLORIDE	QUIMETAL	1000	250
COPPER SULPHATE	QUIMETAL	5000	350
THIRAM	QUIMETAL	20	8
SULPHUR DUST	SOC.AZUFRERA BORLANDO Y cia	10000	6500
SULPHUR DUST	CARRASCO	2000	1100

N.B. COPPER AND SULPHUR ARE AVAILABLE LOCALLY

COLOMBIA - TABLE 6.4.

PESTICIDE PRODUCTION IN 1978

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
PROPANIL	ROHM AND HAAS	1300	1100
PROPANIL	BAYER	1000	START UP IN 1979
MANEB	ROHM AND HAAS/DUPONT	3000	2500
MANCOZEB	ROHM AND HAAS	3000	1950
MANCOZEB	DUPONT	3500	START UP IN 1979
DIURON	DUPONT	500	400
SULPHUR DUST	DERIVADOS DE AZUFRE	1000	20
COPPER OXYCHLORIDE 43%	M.I. QUIMICOS	500	220

COLOMBIA - TABLE 6.4.1

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN COLOMBIA, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON

CHEMICAL INTERMEDIATE	SELLING PRICE IN COLOMBIA US $ PER TON
3. CHLORINE	650
4. ACETIC ACID	NOT KNOWN
17. ACETONE	NOT KNOWN
25. FORMALDEHYDE	2625 (PUREGRADE) 900 (ADDITIVE TO GLUE)
33. SODIUM HYDROXIDE	62
35. AMMONIA	118
36. SULPHUR (EXTRACTED)	100
40. CARBON DISULPHIDE	NOT KNOWN
44. HYDROGEN PEROXIDE	NOT KNOWN
50. BENZENE	427
51. SULPHURIC ACID	125
62. METHANOL	NOT KNOWN
65. ETHANOL	1.12 PER US GALLON
77. NITRIC ACID	200
80. TOLUENE	375

MEXICO - TABLE 8.4.

PESTICIDE PRODUCTION IN 1978

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
CAPTAN	QUIMICA ORGANICA	275	140
QUINTOZENE	QUIMICA ORGANICA	1020	410
THIRAM	QUIMICA ORGANICA	100	90
PROPANIL	QUIMICA ORGANICA	500	CLOSED 1978/1979
DBCP	QUIMICA ORGANICA	1044	450
SULPHUR DUST	PEMEX	10000	1000
MANEB/COPPER	ROHM AND HAAS	180	NIL
PROPANIL	ROHM AND HAAS	600	200
MANEB/ZINEB	DUPONT	1500	NIL
DIURON	DUPONT	500	280
MANEB/ZINEB	ZINC NAL	300	NIL
MANEB	QUIMICA POTOSI	1000	900
ZINEB	QUIMICA POTOSI	500	380
CUPROUS OXIDE	QUIMICA POTOSI	130	130
CUPRIC HYDROXIDE	QUIMICA POTOSI	130	130
COPPER OXYCHLORIDE	QUIMICA POTOSI	150	120
COPPER SULPHATE	QUIMICA POTOSI	1600	840
TRI BASIC COPPER SULPHATE	QUIMICA POTOSI	300	140
ENDRIN	QUIMICA POTOSI	2300	150
COPPER SULPHATE	QUIMICA AGRICOLA INDUSTRIAL	3600	NIL
TRIBASIC COPPER SULPHATE	QUIMICA AGRICOLA INDUSTRIAL	400	120
COPPER OXYCHLORIDE	CUPROQUIM	800	NIL
2,4-D	POLAQUIMIA	2000	1200
PCP	POLAQUIMIA	1000	270
MSMA	POLAQUIMIA	650	85
ATRAZINE/AMETRYNE	CIBA-GEIGY	600	600
SIMAZINE/PROMETRYNE	CIBA-GEIGY		
MONOCROTOPHOS	CIBA-GEIGY (ATOQUIM)	1000	START UP 1979
TRIFLURALIN	HOECHST	400	360
DDVP	POLAQUIMIA/PRODUCTOS BASICOS/QUIMICA LUCAVA	420	80
DDT	DIAMOND/FERTIMEX	8000	6000
BHC	DIAMOND/FERTIMEX	2300	1900
TOXAPHENE	FERTIMEX	2000	2300
E-PARATHION	FERTIMEX	1500	815
M-PARATHION	FERTIMEX	6000	3000
MALATHION	QUIMICA LUCAVA	900	200
NALED	QUIMICA LUCAVA	50	20
TRICHLORFON	QUIMICA LUCAVA	600	100
MEVINPHOS	PRODUCTOS BASICOS/VIMSA	200	NIL
NALED	PRODUCTOS BASICOS	25	NIL
TRICHLORFON	PRODUCTOS BASICOS	100	20
CARBARYL	PRODUCTOS BASICOS	400	START UP 1980
DBCP	QUIMICA AGROSANO	1000	NIL
FOLIMAT	BAYER	200	START UP 1979
AZINPHOS	BAYER	350	
FENTHION	BAYER	150	
ASUNTOL	BAYER	150	

MEXICO - TABLE 8.4.1

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN MEXICO, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON

CHEMICAL INTERMEDIATE	SELLING PRICE IN MEXICO US $ PER TON
1. BUTYLENE	918 (K LITRE)
2. PHENOL	1476
3. CHLORINE	262
4. ACETIC ACID	700
5. O-CRESOL	437
11. DIETHYLAMINE	1968
15. BROMINE	525
17. ACETONE	1662
19. ETHYLAMINE	1749
20. ISOPROPYLAMINE	1530
21. METHYL MERCAPTAN	3061
22. PROPIONIC ACID	2842
23. CHLOROACETYL CHLORIDE	2624
25. FORMALDEHYDE	350
26. N-BUTANOL	656
28. SODIUM	306
29. METHYL ChLORIDE	743
31. DIPROPYLAMINE	1968
32. ARSENIC TRIOXIDE	1749
33. SODIUM HYDROXIDE	284
35. AMMONIA	131
36. SULPHUR-EXTRACTED	130
37. COPPER	612
38. NITROBENZENE	787
39. ETHYLENE DIAMINE	1750
40. CARBON DISULPHIDE	2186
41. SOLUBLE ZINC SALT	1312

.../Cont'd.

CONTINUATION: MEXICO - TABLE 8.4.1

CHEMICAL INTERMEDIATE	SELLING PRICE IN MEXICO US $/TON
42. MANGANESE SULPHATE	875
44. HYDROGEN PEROXIDE 50%	875 (K LITRE)
45. MALEIC ANHYDRIDE	1000
46. BUTADIENE	525
49. CHLORAL	CAPTIVE USE
50. BENZENE	328
51. SULPHURIC ACID	57
52. CYCLOPENTADIENE	2626
53. VINYL CHLORIDE	424
59. PENTANES	437
61. PARA-NITROPHENOL	2186
62. METHANOL	262
63 PHOSPHORUS PENTASULPHIDE	2624
64. BUTETHANOL	787
65. ETHANOL	197
67. METHYLAMINE	1530
69. ETHYLACETOACETATE	732 (K LITRE)
70. PHOSPHORUS TRICHLORIDE	1750
76. CALCIUM SALT	306
76. LEAD SALT	394
77. NITRIC ACID	262
78. ANILINE	1750
80. TOLUENE	284
82. CROTONIC ACID	1093
83. HYDROGEN FLUORIDE	525
85. TRICHLOROETHYLENE	1749
88. META-CRESOL	656

PERU - TABLE 10.4

PESTICIDE PRODUCTION

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
PROCESSED SULPHUR	RAYON Y CELANESE	5000	1320
SULPHUR POWDER	PERUANA S.A.		88
PURE SULPHUR	PERUANA S.A.		504
SULPHUR 80 WP	PERUANA S.A.		615
COPPER OXYCHLORIDE	INDUSTIAS QUIMICAS OMICRON	100	90
COPPER OXYCHLORIDE	INDUSTRIA PERUANA de METALES y DERIVADOS S.A.	200	160
LEAD ARSENATE	S.U.L. Co. S.A.	1000	500
CALCIUM ARSENATE	S.U.L. Co. S.A.		200
COPPER OXYCHLORIDE	S.U.L. Cia. S.A.	300	260
COPPER SULPHATE	EIGHT SEPARATE PLANTS	10000	6000

URUGUAY - TABLE 11.4

PESTICIDE PRODUCTION

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
COPPER SULPHATE	FANABROQUI	500	350
COPPER OXYCHLORIDE 50	RESYPLAST	500	60
SULPHUR DUST	QUIMUR	500	210
SULPHUR WP	QUIMUR	500	240

N.B. COPPER AND SULPHUR ARE AVAILABLE LOCALLY.

VENEZUELA - TABLE 12.4.

PESTICIDE PRODUCTION

PRODUCT	PRODUCER	TONS ACTIVE 1978	
		ESTIMATED CAPACITY	ESTIMATED PRODUCTION
PROPANIL	INICA	1000	600
PROPANIL	PENCO	350	80
PROPANIL	INQUIPORT	1000	300
ATRAZINE	PENCO	500	250
2,4-D ESTER	RESIMON	2000	1200
SULPHUR DUST	PETROLECS DE VENEZUELA	500	500
SULPHUR WP	PENCO	300	30

N.B. ALL INTERMEDIATES WERE IMPORTED EXCEPT LOCALLY AVAILABLE SULPHUR AT US $ 100 TON. THE 2,4-D ACID IS IMPORTED FOR LOCAL ESTERIFICATION.

VENEZUELA - TABLE 12.4.1

CHEMICAL INTERMEDIATE PRODUCTION

THE FOLLOWING CHEMICAL INTERMEDIATES ARE PRODUCED IN VENEZUELA, THE SELLING PRICES OF THESE INTERMEDIATES IN VENEZUELA ARE NOTED BELOW IN US $ TON

CHEMICAL INTERMEDIATE	SELLING PRICE IN VENEZUELA US $ PER TON
3. CHLORINE	600
4. ACETIC ACID	800
33. SODIUM HYDROXIDE	60
35. AMMONIA	110
36. SULPHUR	100
51. SULPHURIC ACID	120
53. VINYL CHLORIDE	460
59. PENTANES (ONLY AL L.P.G.)	NOT KNOWN
65. ETHANOL (ONLY AS RUM)	NOT KNOWN
77. NITRIC ACID	200

ARGENTINA - TABLE 1.5. - PESTICIDE FORMULATION CAPACITIES

TONS/K LITRES

FORMULATOR	INSECTICIDES				HERBICIDES				FUNGICIDES		
	Liquid	WP	Dust	G	Liquid	WP	Dust	G	Liquid	WP	Dust
ATANOR	1000	1000	1000		5000	1000				1000	1000
CIA. QUIMICA	2000		1000	1000	3000			1000	1000	1000	1000
CIBA-GEIGY	1000	1000			1000	1000					500
REPOSA	2000	1000	1000	1000	2000	1000		1000	1000	1000	1000
IMPERIAL (ICI)	1000	1000	1000		1000						1000
BAYER	1000		1000	1000	1000			500			500
PUNCH	1000	1000	1000	1000							
ICONA	1000	1000	1000	1000							
SINTYAL	1000				1000						
KREGLINGER	1000		1000		1000						500
RANCO	1000				1000						500
VINELLI	1000				1000						500
VELSICOL	1000				1000						
GYLER	1000				1000						
SINTESIS QUIMICA	1000				2000						
BASSO Y TONNELIER		2000		1000						1000	5000
QUIMICA ESTRELLA	1000	1000			1000						

ARGENTINA - TABLE 1.5.1.

LOCAL PRODUCTION OF PESTICIDE FORMULATION ADDITIVES

THE FOLLOWING ADDITIVES FOR PESTICIDE FORMULATION ARE PRODUCED IN ARGENTINA AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON/K LITRE.

FORMULATION ADDITIVE	SELLING PRICE IN ARGENTINA US $ PER TON/K LITRE
HEAVY NAPTHA-HIGH FLASH - S.G. 0.873	600 (K LITRE)
XYLENE - S.G. 0.865	634 (K LITRE)
KEROSENE - S.G. 0.9	220 (K LITRE)
ALCOHOL - ISOBUTANOL	1400
BENZENE SULPHONATE WETTING AGENTS 75%	2900
TALC	100
KAOLIN	194
DOLOMITE	112
DIATOMACEOUS EARTH	240
BENTONITE	180

BRAZIL - TABLE 3.5.

PESTICIDE FORMULATION CAPATICIES

TONS/K LITRES

FORMULATOR	INSECTICIDES - TONS/K LITRE				HERBICIDES		FUNGICIDES		
	Liquid	WP	DUST	G	Liquid	WP	Liquid	WP	Dust
BAYER	10000	5000	20000	1000	10000	1000	1000	1000	2000
CIBA-GEIGY	10000	5000	15000	1000	4000	5000		1000	
SHELL	10000	5000	15000		4000	5000		1000	
DUPONT		1000	2000		1000	5000		5000	
HOECHST	5000	1000					1000	1000	
CNDA (RHODIA)	5000	5000			2000	3000			
BASF	5000		5000		1000	2000			
ELANCO					6000	2000			
CIA. IMPERIAL (ICI)	5000	1000	5000		1000			1000	
DOW	5000				20000				
ROHM AND HAAS					5000		1000	5000	
CYANAMID	5000	2000	5000		5000	1000		1000	
SANDOZ	5000		5000	2000				5000	
MONSANTO					20000				
VELSICOL	5000		5000	2000	5000				
STAUFFER	2000				2000				
IHARABRAS	5000	2000	5000	2000	5000	2000	1000	1000	
GUILINI							2000	3000	
BENZENEX	5000		10000		2000				
COCITO	2000		2000		1000				
BUSHLE + LEPPE	2000		5000		1000				
AGROCERES	5000	2000	5000	2000					
UNION CARBIDE		5000		5000					
DIAMOND	2000	1000	5000		1000	1000	1000	1000	
NORTOX	5000	2000	6000		5000				

BRAZIL - TABLE 3.5.1.

LOCAL PRODUCTION OF PESTICIDE FORMULATION ADDITIVES

THE FOLLOWING ADDITIVES FOR PESTICIDE FORMULATION ARE PRODUCED IN BRAZIL, AND THEIR SELLING PRICES IN BRAZIL ARE NOTED BELOW IN US $ TON/K LITRE

FORMULATION ADDITIVE	SELLING PRICE IN BRAZIL US $ PER TON/K LITRE
XYLENE	568
HEXYLENE GLYCOL	795
CYCLOHESANONE	591
NON IONIC POLYOXYETHYLATED EMULSIFIERS	1818
KAOLIN (325 MESH)	34.10
TALC (325 MESH)	22.73

CENTRAL AMERICA - TABLE 4.5.

PESTICIDE FORMULATION CAPACITIES

TONS/K LITRES

FORMULATOR	INSECTICIDES				HERBICIDES			FUNGICIDES	
	Liquid	WP	Dust	G	Liquid	WP	G	Liquid	WP
BAYER N.G.S.	5000	1000	2000	1000	2000	1000			
MONSANTO N.G.S.	10000				2000				
SHELL N.G.S.	5000		2000		2000				
ICI N.	2000				5000				
FERTICA N.S.	10000	1000	2000		2000	1000			
ORTHO CR.	10000	2000	3000	2000	2000	1000	1000		
GURDIAN CR.	2000				1000				
GURDIAN N.	5000				1000				
ROHM AND HAAS CR.	2000	4000		3000	5000	1000		2000	3000
TECUN G.	2000				2000				
AGROQUIMICAS DE G.	5000				2000				
AVELAR G.	2000				1000				
MELO P.	2000				1000				
RAPPACCIOLI N.	2000				1000				
AGROQUIMICAS DE H.	2000				2000				
HERCULES N.	10000				1000				
VALENZUELA G.	1000								

N. DENOTES NICARAGUA
G. " GUATIMALA
S. " SALVADOR
CR. " COSTA RICA
P. " PANAMA
H. " HONDURAS

CENTRAL AMERICA - TABLE 4.5.1

LOCAL PRODUCTION OF PESTICIDE FORMULATION ADDITIVES

THE FOLLOWING ADDITIVES FOR PESTICIDE FORMULATION ARE PRODUCED IN CENTRAL AMERICA, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON/K LITRE

FORMULATION ADDITIVE	SELLING PRICE IN CENTRAL AMERICA US $ PER TON/K LITRE
H. H. A. (AROMATIC TYPE)	502 (K LITRE)
ALKYLATED BENZENE SULPHONATE EMULSIFIERS	1500 (60% ACTIVE)
CALCIUM CARBONATE 10-20 MESH U.S.	26-46
PUMICE 10-20 MESH U.S.	79-38
DIATOMACEOUS EARTH 100 MESH	77-18

CHILE - TABLE 5.5

PESTICIDE FORMULATION CAPACITIES

ONE SHIFT - 300 DAYS/YEAR OPERATION

FORMULATOR	INSECTICIDES TONS/K LITRES			HERBICIDES - K LITRES
	Liquids	Dusts	Granules	Liquids
BAYER	1000	500	500	500
CIBA-GEIGY	1000			
SHELL	500			
ANASAC	500			
QUIMETAL		1000	300	

COLOMBIA - TABLE 6.5

PESTICIDE FORMULATION CAPACITIES

TONS/K LITRES

FORMULATOR	INSECTICIDES				HERBICIDES			FUNGICIDES		
	Liquid	WP	Dust	G	Liquid	WP	G	Liquids	WP	Dust
BAYER	5000		1000	1000	3000					
HOECHST	5000	2000	2000		1000	1000				
CELAMERK	1000	2000	2000	1000	2000	1000				
CIBA-GEIGY	2000	1000			2000	1000				
PROFICOL	5000		2000		3000					
SCHERING	5000	2000		1000	2000	1000				
DOW	1000				2000					
BASF	2000		2000		2000					
ROHM AND HAAS					3000			1000	3000	1000
DUPONT	1000				1000	1000	1000		5000	
ELANCO					3000					
SHELL	5000				2000					
MONSANTO	2000				1000					
UNION CARBIDE	2000	2000		1000						
QUIMOR	2000	2000	2000		2000					

COLOMBIA - TABLE 6.5.1

LOCAL PRODUCTION OF PESTICIDE FORMULATION ADDITIVES

THE FOLLOWING ADDITIVES FOR PESTICIDE FORMULATION ARE PRODUCED IN COLOMBIA, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON/K LITRE

FORMULATION ADDITIVE	SELLING PRICE IN COLOMBIA US $ PER TON/K LITRE
XYLENE	362
KEROSENE	2350
CYCLOHEXANONE	2275
FATTY ALCOHOL SULPHONATE EMULSIFIERS	2825 (AVERAGE PRICE)
KAOLIN	43.75 (200 MESH) 46.25 (325 MESH)
DOLOMITE	NOT KNOWN
CALCIUM CARBONATE	60 (200 MESH)

MEXICO - TABLE 8.5

PESTICIDE FORMULATION CAPACITIES

TONS/K LITRES

FORMULATOR	INSECTICIDES				HERBICIDES			FUNGICIDES		
	Liquid	WP	DUST	G	Liquid	WP	G	Liquid	WP	Dust
DUPONT	5000	2000	2000	1000	2000	2000	1000		2000	1000
ROHM AND HAAS					2000					
QUIMICA ORGANICA	2000							1000	2000	2000
CIBA-GEIGY	5000	2000	5000	1000	2000	3000	1000			1000
BAYER	5000	3000	2000	2000	2000	1000	1000		2000	1000
UNION CARBIDE	3000	3000		2000						
SHELL	2000				2000					
ICI	2000				3000					1000
CYANAMID	2000	1000	2000	2000	1000				1000	
FERTIMEX	10000	5000	5000							
VIMSA	2000		5000		2000					
DOW	2000				5000					
DIAMOND	2000			2000	3000			2000	2000	
HOECHST	3000				3000			1000	1000	
LUCAVA	5000	3000			2000					
CALVILLO	3000	3000			3000					1000
PALSA	5000				5000					
QUIMICA POTOSI	2000							1000	1000	1000
POLAQUIMIA	2000				5000			2000	1000	1000
PRODUCTOS BASICOS	5000	2000	2000							

MEXICO - TABLE 8.5.1.

LOCAL PRODUCTION OF PESTICIDE FORMULATION ADDITIVES

THE FOLLOWING ADDITIVES FOR PESTICIDE FORMULATION ARE PRODUCED IN MEXICO, AND THEIR LOCAL SELLING PRICES ARE NOTED BELOW IN US $ TON/K LITRE

FORMULATION ADDITIVE	SELLING PRICE IN MEXICO US $ PER TON/K LITRE
XYLENE	295 (K LITRE)
KEROSENE	175 (K LITRE)
ALCOHOLS	525 (K LITRE)
NON IONIC POLYOXYETHYLATED AND ALKYLATED BENZENE SULPHONATE EMULSIFIERS	2055 (AVERAGE)
KAOLIN (325 MESH)	86
TALC (325 MESH)	87.50
SILICASAND (20-40 MESH US)	65.60

PARAGUAY - TABLE 9.5.

PESTICIDE FORMULATION CAPACITIES,

ONE SHIFT - 300 DAYS/YEAR OPERATION

FORMULATOR	INSECTICIDE LIQUIDS K LITRES
SHELL	300
ESTRELLA	300

PERU - TABLE 10.5.

PESTICIDE FORMULATION CAPACITIES,

ONE SHIFT - 300 DAYS/YEAR OPERATION

FORMULATOR	INSECTICIDES - TONS/K LITRES				HERBICIDES - K LITRES
	Liquids	WP	Dust	Granule	Liquids
BASF	1000				
FARMAGRO	500				
BAYER	1000		3000	2000	500
SHELL	1000		2000		
FORMULAGRO	1000				
UNION CARBIDE (RODVAL)	1000	2000			

URUGUAY - TABLE 11.5.

PESTICIDE FORMULATION CAPACITIES,

ONE SHIFT - 300 DAYS/YEAR OPERATION

FORMULATOR	Liquids - K Litres		Fungicides-Tons
	Insecticides	Herbicides	WP
QUIMUR	300	500	500
BASF	300	300	
BAYER	300	300	
DUPERIAL	300	300	
SHELL	300	300	

VENEZUELA - TABLE 12.5.

PESTICIDE FORMULATION CAPACITIES

FORMULATOR	INSECTICIDES-TONS/K LITRES				HERBICIDES-TONS/K LITRES		
	Liquids	WP	Dust	G	Liquids	WP	G
SHELL	10000	2000			5000	1000	
BAYER	5000	1000	2000	1000			
PENCO	5000	2000	2000		2000	1000	
INICA	10000	3000	2000	3000	2000	1000	
INQUIPORT					2000		
CIBA-GEIGY	5000	3000	2000	3000		1000	2000

N.B. BASF AND HOECHST HAVE CEASED LOCAL FORMULATION OF PESTICIDES

8. INTERMEDIATES REQUIRED FOR PESTICIDE PRODUCTION

The more important insecticides, herbicides and fungicides which are used in volume in Latin America, are noted in List B below.

The important chemical intermediates which are normally required in the production of these pesticides are noted in List A, and each intermediate is numbered.

The numbers which follow each pesticide on List B refer to the chemical intermediates (as numbered on List A) required for the production of that pesticide.

In this way, it may be seen which chemical intermediates are required for the production of each pesticide noted on List B, some of which are produced in Latin America, and so noted in the Tables, prefixed 1.4. up to 12.4., which may be found in Section 7.

The countries where some chemical intermediates are produced are Argentina, Brazil, Central America, Colombia and Venezuela. The intermediates which are produced locally are noted in Tables 1.4.1. up to 12.4.1. in Section 7.

Thus, by referring to the appropriate country tables and to Lists A and B, it may be noted which of the intermediates required to make the pesticides produced locally are available locally, and which intermediates must be imported.

Pesticide producers were unwilling to divulge their intermediate requirements, their source or their production technology.

List A. Raw materials for basic production of pesticides

Raw materials for herbicide production (inter alia)

1. Butylene
2. Phenol
3. Chlorine
4. Acetic acid
5. o-cresol
6. 4-amino-benzene sulphonamide (78 + 79)
7. Methyl chloroformate (9 + 62)
8. Ethyl mercaptan
9. Phosgene
10. Hexamethyleneimine
11. Diethylamine
12. 4-chlorotoluene (40 + 44 + 80)
13. Dimethylamine
14. 3,4-dichloraniline (81 + 77)
15. Bromine
16. 3-sec-butylamine
17. Acetone
18. Cyanuric chloride
19. Ethylamine
20. Isopropylamine
21. Methyl mercaptan
22. Propionic acid
23. Chloroacetyl chloride
24. 2,6-diethylaniline
25. Formaldehyde
26. 1-butanol
27. Pyridine
28. Sodium
29. Methyl chloride

30. 1-chloro-4-trifluoromethyl benzene (80 + 3 + 83)
31. Dipropylamine
32. Arsenic trioxide
33. Sodium hydroxide
34. α - picoline
35. Ammonia

Raw materials for fungicide production

36. Sulphur deposits or extraction
37. Copper ore or scrap
38. Nitrobenzene (77 + 50)
39. Ethylene diamine
40. Carbon disulphide
41. Soluble Zinc salt (viz. sulphate)
42. Manganese sulphate (or chloride)
43. Propylene-bis-dithiocarbamate (84 + 40 + 33)
44. Hydrogen peroxide
45. Maleic anhydride
46. Butadiene
47. Tetrahydrophthalic anhydride (45 + 46)
48. 1,1,2,2,-tetrachloroethane-sulphenyl chloride (85 + 86)

Raw materials for insecticide production

49. Chloral
50. Benzene
51. Sulphuric acid
52. Cyclopentadiene
53. Vinyl chloride
54. Camphene (fraction of gum turpentine)

55. Hexachloropentadiene (59 + 3)
56. 1,4-diacetoxybut-2-ene (87 + 4)
57. Thionyl chloride

59. Pentanes
60. Fullers earth
61. Para-nitrophenol (3 + 50 + 77 + 33)
62. Methanol
63. Phosphorus pentasulphide
64. Butethanol
65. Ethanol

67. Methylamine
68. Nitrometacresol (77 + 88)
69. Ethylacetoacetate
70. Phosphorus trichloride
71. Sulphuryl chloride
72. Acetoacetic acid diethylamide (69 + 11)
73. Trimethyl phosphite (70 + 62)
74. 1-naphol
75. Arsene pentoxide
76. Calcium (or lead) salt
77. Nitric acid
78. Aniline
79. Chlorsulphonic acid
80. toluene
81. O-dichlorobenzene (3 + 50)
82. Crotonic acid
83. Hydrogene fluoride

84. Propylenediamine
85. Trichloroethylene
86. Sulphurdichloride
87. 2-butane-1,4-diol
88. meta-cresol

List B. Pesticide technical materials used in volume in Latin America

The pesticides listed below are used in volume in Latin America, and are therefore those chosen as being possible candidates for local production in Latin America.

The numbers noted against each pesticide refer to the raw materials (intermediates) required for the manufacture of that pesticide.

The actual raw materials required in the production of any pesticide are noted below only by their appropriate number. These raw materials may be identified by reference to the attached List A, which shows all the raw materials required for pesticide basic production, by both number and name.

Herbicides

1.	DNBP	1 + 2 + 36
2.	2,4-D	2 + 3 + 4
3.	MCPA	3 + 4 + 5
4.	Asulam	6 (78 + 79) + 7 (9 + 62)
5.	Molinate	8 + 9 + 10
6.	Benthiocarb	3 + 11 + 40 + 80 + 44
7.	Diuron	9 + 13 + 81 (3 + 50) + 77
8.	Bromacil	15 + 16 + 82 + 9 + 35
9.	Atrazine	18 + 19 + 20
10.	Ametryne	Atrazine + 21
11.	Simazine	18 + 19
12.	Propanil	22 + 14 (81 + 77)
13.	Alachlor	23 + 24 + 25
14.	Butachlor	23 + 24 + 25 + 26
15.	Paraquat	27 + 28 + 29
16.	Trifluralin	31 + 36 + 30 (80 + 3 + 83)
17.	Dalapon	3 + 22

18.	MSMA	29 + 32 + 33
19.	Picloram	3 + 34 + 35
20.	TCA	3 + 4

<u>Fungicides</u>

21.	Sulphur dust/WP	36
22.	Copper	37
23.	PCP	2 + 3
24.	Quintozene	3 + 38 (77 + 50)
25.	Mancozeb	33 + 39 + 40 + 41 + 42
26.	Maneb	33 + 39 + 40 + 42
27.	Metiram	39 + 40 + 41
28.	Propineb	41 + 43 (84 + 40 + 33)
29.	Thiram	13 + 40 + 44
30.	Zineb	39 + 40 + 41 + 33
31.	Ziram	13 + 40 + 41
32.	Captan	3 + 40 + 45 + 46 + 35
33.	Captafol	35 + 47 (45 + 46) + 48 (85 + 86)

<u>Insecticides</u>

34.	DDT	3 + 49 + 50 + 51
35.	BHC	3 + 50
36.	Aldrin	3 + 52 + 53 + 55 (59 + 3)
37.	Toxaphene	3 + 54
38.	Endosulfan	55 + 56 + 57
39.	Endrin	3 + 53 + 52 + 55 (59 + 3) + 44
40.	Heptachlor	3 + 59 + 60 + 55 (59 + 3)

41.	Methyl parathion	3 + 62 + 63 + 61 (3 + 50 + 77 + 33)
42.	e-parathion	65 + 63 + 61 (3 + 50 + 77 + 33)
43.	Malathion	45 + 62 + 63 + 65
44.	Dimethoate	3 + 4 + 63 + 62 + 67
45.	Fenitrothion	3 + 63 + 62 + 68
46.	Monocrotophos	3 + 62 + 69 + 70 + 67
47.	Phosfamidon	71 + 72 (69 + 11) + 73 (70 + 66)
48.	Trichlorfon	49 + 62 + 70
49.	Methamidophos	70 + 62 + 36 + 35
50.	Carbaryl	9 + 67 + 74
51.	Calcium (or lead arsenate	75 + 76