



VITAL FACTOR CONSULTING
Creating Winning Business Solutions

Local Manufacturers

- Imaspro Corporation Berhad;
- Agricultural Chemicals (M) Sdn Bhd;
- Ancom Crop Care Sdn Bhd;
- Kenso Corporation (M) Sdn Bhd;
- Halex (M) Sdn Bhd;
- Serba Kimia Sdn Bhd;
- Zagro Chemicals Sdn Bhd;
- Hextar Chemicals Sdn Bhd.

- Not all the above players have their own manufacturing plants. All of the Multinational Agrochemical companies operating in Malaysia outsource their manufacturing with the exception of Monsanto.
- The above players are involved in Pesticides for use in the Agriculture and non-Agriculture Sectors.

14. **BARRIERS TO ENTRY**

Level of Difficulty

- Generally, barriers to entry into the Pesticide Industry are **high** as this industry is highly regulated and controlled by the Government in Malaysia and overseas. This is further substantiated by the fact that there are approximately 20 manufacturers of Pesticides in Malaysia (*Source: Primary Market Research undertaken by Vital Factor Consulting Sdn Bhd*)

Government Regulations

- Government regulations provide a barrier to entry into the Pesticide Industry from two perspectives:
 - product is strictly prohibited from import, manufacture and sale unless it is registered with the Pesticides Board;
 - only companies that have a local presence in Malaysia are allowed to register Pesticide products.
- The process of registering a Pesticide product with the Pesticides Board involves stringent disclosure of information and requires approval.
- Under the Pesticide (Labelling) Regulations 1984, Pesticide products are prohibited from sales unless they obtain approval on the labelling by the Pesticides Board.
- In addition, the packaging must also comply with the Malaysian Code of Practice for Packaging and Storage of Pesticides.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

- Approval of a registered Pesticide product varies significantly depending on the product. If all the requirements are fulfilled, the Pesticides Board has indicated that it could approve a product within eight months.
- However, practical experience has indicated that in many cases it takes longer than eight months and could take up to four years for a Pesticide product to be approved by the Pesticides Board.
- Based on the latest amended Pesticides Act and Regulations 1974, all Pesticides that are registered and approved by the Pesticide Board on 1 April 2005 onwards shall be given a registration period of five years. Pesticides that were registered and approved by the Pesticide Board before 1 April 2005 will continue to have a registration period of three years.
- As at 12 December 2005, Imaspro Group has 125 approved product registrations and 47 applications pending approval by the Pesticides Board of Malaysia. In addition, the Group has 65 products registered in nine overseas countries and pending approval of 16 products in overseas.

Patented Products

- Developments of new Pesticide compounds are usually patented. This serve as a barrier to entry for other manufacturers to formulate similar types of products for a defined period of time. As this involves a significant amount of investment in time, resources and cost, only the global companies are able to undertake this type of research.
- However once the patent expires, other manufacturers are then free to modify or duplicate the formulation and develop generic brands of the same product.

Capital and Set-up Costs

- The capital set-up cost for the manufacturing of Pesticides is relatively high.
- The capital cost of setting-up a small sized plant to produce a Glyphosate based Pesticide would be approximately RM3 million (excluding land and building). This would include a reactor, cooling system and ancillary equipment. The revenue generated from this plant is estimated at RM20 million a year.
- However, for operators who are only focusing on blending and mixing activities they face lower barriers to entry in terms of capital set-up cost. Most of these operators run small and medium scale production operations.

Technical Expertise and Experience

- There is a certain level of technical expertise and experience required in the Pesticide Industry, particularly in the following areas:
 - chemistry and chemical engineering;
 - process technologies;
 - occupational health and safety;

13. INDEPENDENT MARKET RESEARCH CONSULTANTS' REPORT (Cont'd)



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

- setting-up of the manufacturing plant for optimum efficiency, effectiveness and safety.
- This is in relation to the following areas:
 - Ensuring that the formulation of Pesticide products meet the specifications and purpose of its use for example type of crop to be used, colour, chemical composition to achieve desired effects for different applications such as selective, non-selective and others;
 - Research and development to improve the efficacy of the Pesticide for the respective applications including formulation and testing to ensure the performance of the Pesticide is optimum under different climatic conditions for export markets. Tests that are performed must also adhere to the specifications of the Food and Agriculture Organisation of the United Nations Council (FAO) or World Health Organisation (WHO), which will be required as part of the supporting documents for product registration.
 - Chemical knowledge is also required to understand the usage, applications and characteristics of the chemicals for example reactivity and toxicity. As Pesticides are considered hazardous and toxic, technical knowledge and handling these types of chemicals are critical.
- As such, technical expertise and experience represents a major barrier to entry for new entrants.

Track Record

- Track record also forms one of the barriers to entry for new entrants. It is unlikely that a new entrant without any track record will be able to compete effectively in this market. The Pesticide Industry is dominated by established international players including Bayer, Syngenta, BASF, Monsanto, Du Pont and Dow Agrosiences.
- As such, track record would pose a major barrier to entry for new entrants, which would find it difficult to gain immediate access into the market.

15. **BARRIERS TO EXIT**

- Barriers to exit are **moderate** for the production of Pesticides as there are approximately 20 manufacturers in the industry where operators are able to sell their machinery and equipment. These manufacturers include both agrochemical and non-agrochemical Pesticides (Source: Primary Market Research undertaken by Vital Factor Consulting Sdn Bhd).



VITAL FACTOR CONSULTING
Creating Winning Business Solutions

16. INDUSTRY OUTLOOK

- The outlook of the Pesticide Industry is **favourable**.
- The following factors and observations in local production and export, and end-user industry performances provide support for the favourable outlook:

Local Production - Sales Value of Pesticides (Herbicides, Insecticides, Fungicides)

- Between 2000 and 2004, sales value of local production of Pesticides declined at an average annual rate of 7.1%. However in 2004, sales value of local production of Pesticides grew by 13.6%, which amounted to approximately RM353.4 million.
- For the first seven months of 2005, sales value of local production of Pesticides increased by 9.6% compared to the same period in 2004.

Exports - Value of Pesticides (Herbicides, Insecticides, Fungicides)

- Between 2000 and 2004, exports of Pesticides grew at an average annual growth rate of 2.9%. In 2004, export value of Pesticides under this category declined by 7.0%, which amounted to approximately RM232.9 million.
- For the first seven months of 2005, export value of Pesticides grew by 10.4% compared to the same period in 2004.

(Source: Department of Statistics)

Global Market Size

The large global market size for Pesticides also provides growth opportunities especially for export oriented Pesticide manufacturers. In 2004, the global market size for Pesticides amounted to US\$33 billion segmented as follows:

- Herbicides accounted for US\$15 billion;
- Insecticides accounted for US\$9 billion;
- Fungicides accounted for US\$7 billion;
- The remaining accounted for US\$2 billion

(Source: Secondary Market Research undertaken by Vital Factor Consulting Sdn Bhd)

Performance of End-User Industries in Malaysia

The outlook of the Pesticide Industry would also be dependent to a certain extent, on the outlook of the main end-user industry in Malaysia, which is the Agriculture Industry.

General Agriculture Industry

- For the second quarter of 2005, Agriculture recorded a 3.2% growth primarily contributed by the crude palm oil and crude palm kernel oil production growth of 14.5% and 25.1% respectively.

13. INDEPENDENT MARKET RESEARCH CONSULTANTS' REPORT (Cont'd)

**VITAL FACTOR CONSULTING**

Creating Winning Business Solutions

- Between 2000 and 2004, GDP for Agriculture, Forestry and Fishing grew at an average annual rate of 3.2%.
- The targeted production growth for selected Agricultural Commodities for 2005 are depicted in the following table:

	Average Annual Growth Rate 2004 - 2005 (%)	Targeted Production in 2005 ('000 Tonnes)
Industrial Commodities		
Rubber	3.8	670.0
Crude Palm Oil	4.3	13,320.0
Palm Kernel Oil	8.4	1,868.0
Cocoa	1.0	51.0
Food Commodities		
Paddy	0.4	2,164.0
Pepper	5.0	32.0
Tobacco	11.3	14.0
Flowers	1.4	141.6
Fruits	4.2	1,612.6
Vegetables	7.3	936.5

Figure 5 Targeted Production of Selected Agricultural Commodities

- The Malaysian Government's targeted average annual growth rate of Selected Agricultural Commodities for 2005 augurs well for operators in the Pesticide Industry.

(Source: Bank Negara Malaysia and Mid-Term Review of Eighth Malaysia Plan 2001 – 2005, Economic Planning Unit, Prime Minister's Department)

Oil Palm Industry

- The Oil Palm Industry in Malaysia is the largest end-user of Pesticides. As such, the general growth of the Oil Palm Industry would have a significant bearing on the Local Pesticide Industry.
- Between 2000 and 2004, the planted areas of Oil Palm grew at an average annual rate of 3.6%. In 2004, the planted areas of Oil Palm grew by 2.1% to reach approximately 3.9 million hectares (Source: Ministry of Plantation Industries and Commodities). Although growth rates may be relatively low, the large acreage of the Oil Palm Industry in Malaysia would mean that growth in physical size is very large.
- Between 2000 and 2004, the export of Palm Oil grew at an average annual rate of 19.2%. In 2004, export of Palm Oil declined by 0.4% to reach RM20.1 billion (Source: Bank Negara Malaysia).



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

17. DRIVERS OF GROWTH

- Some of the drivers of growth for the Pesticide Industry are as follows:
 - Growth in the **Agricultural Industry** would provide the largest impetus for growth in the Pesticide Industry. This is because most Pesticides are for use in the Agriculture sector.
 - Increased use of **Generics** would help drive the Pesticide Industry as Generics are usually cheaper than patented products. Generics will make Pesticides more affordable to increase usage.
 - **Exports**, particularly to Agricultural-based countries would provide significant growth opportunities for local manufacturers. Although the Agriculture sector in Malaysia is large, the relatively small population base would limit growth opportunities unless manufacturers export their products.
 - **Product improvement** would help drive growth in the Pesticide Industry through the following manner:
 - counter Pesticide resistant organisms;
 - increase product efficacy;
 - increase product friendliness to the environment;
 - increase safety for humans.
 - **Product Innovation** resulting in new applications would also help drive growth. Potential areas include, among others, the following:
 - use of biocides in everyday items like toilet seats, mattresses and chairs;
 - use of appropriate Pesticides for veterinary applications including animal shampoo.
 - Growth in **Aquaculture** would also benefit the Pesticide Industry as more Pesticides will be used to control water-borne pests.
 - Increased efforts in **public health and sanitation** would also drive growth. Some of these would include vector control, for example controlling dengue virus through controlling spread of mosquitoes.

18. THREATS AND RISK ANALYSIS

Dependency on the Supply of Raw Materials

- Manufacturers of Pesticides are dependent on the supply of raw materials. Disruption in the supply of one or more key raw materials may lead to a disruption in their manufacturing operations.
- Although Malaysia has a relatively large chemical industry, the availability of some of these raw materials may be limited. As a result, it may be necessary to rely on imported chemicals for certain raw material to satisfy domestic demand.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

Mitigating Factors

- Raw materials used in the manufacture of Pesticide are generally widely traded commodities. As a result, it is relatively easy to source the required raw materials in the open market.
- In addition, these raw materials can be sourced from numerous countries, mitigating the possibility of disruption in supply from any one country.

Changes in Regulations

- The Pesticide Industry is one of the most heavily regulated industries in Malaysia.
- There is a risk that regulations governing the manufacture, sale and use of a particular Pesticide may negatively be affected by a number of factors, including:
 - scientific findings uncovering new or increased negative effects on humans or the environment;
 - changes in public opinion.
- Action by regulatory bodies to restrict or ban the use of a particular Pesticide will have a negative effect on the current business and future viability of manufacturers. The recent decision by the Pesticides Board in Malaysia to phase out the manufacture and sale of Paraquat-based herbicides in Malaysia is an example.

Mitigating Factor

- The impact of a ban or phasing out of an individual Pesticide is likely to be less severe for manufacturers with a wide range of registered Pesticide products. Diversified manufacturers with a wide range of registered Pesticide products have alternative products from which they can derive revenue, and already possess the manufacturing capabilities to manufacture alternative products.

Phasing Out the Manufacture and Sale of Paraquat-based Pesticides

- The Pesticides Board issued an announcement on the 27th of August 2002 phasing out the manufacture and sale of Paraquat-based herbicides in Malaysia. No new licences are to be issued after August 2002 and remaining stocks are to be depleted by manufacturers and users.
- This phasing out will have a negative impact on the current business and future viability of Pesticide manufacturers that currently rely heavily on the manufacture of Paraquat-based herbicides.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

Mitigating Factors

- Herbicides are still required to successfully carry out commercial agriculture. Phasing out Paraquat-based herbicides is likely to increase the demand for substitutes, including Glyphosate-based herbicides. Current manufacturers of Glyphosate-based herbicides, such as Imaspro Group, are expected to benefit from the phasing out of Paraquat-based herbicides.
- Based on a meeting in June 2005, the Pesticides Board has decided to provide an extension up to 1 July 2007 for the use of Paraquat only on Oil Palm that are less than two years old. As at 17 November 2005, three companies have been approved to manufacture and supply Paraquat. The Pesticides Board expects to approve an additional two other companies to manufacture and supply Paraquat.
- In 2002, global market size for Glyphosate-based Pesticides amounted to approximately US\$4.7 billion (Source: Secondary Market Research undertaken by Vital Factor Consulting Sdn Bhd)

Change in Agricultural Practices

- 'Organic' farming techniques, whereby the use of manufactured agrochemicals such as chemical pesticides and chemical fertilisers is reduced or eliminated, is increasing in popularity as consumer affluence and their awareness of food safety increases. This trend originated in the developed world, and is increasing in popularity in the rest of the world.
- The demand for agrochemicals, including Pesticides, is expected to decline if organic farming techniques become more prevalent.

Mitigating Factors

- Demand for organically farmed food is currently limited as organically farmed food is generally more expensive. The use of organic farming techniques is currently limited by the generally low demand for organically farmed food.
- Organic farming techniques are not suitable for every type of agriculture. For example, organic farming techniques are not suitable for the cultivation of plantation crops. As the large majority of agricultural land in Malaysia is planted with plantation crops such as rubber and oil palm, any decline in the demand for agrochemicals including Pesticides is not likely to be significant.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

19. AREAS OF GROWTH AND OPPORTUNITIES

New Export Markets

- Pesticides primarily service the needs and requirements of customers in the international market. This is reflected by the fact that Malaysia's export value of Pesticides grew at an average annual rate of 2.9% between 2000 and 2004. In 2004, the export value of Pesticides amounted to RM232.9 million in 2004. The value of exports of Pesticides in Malaysia reached RM168.9 million for the first seven months of 2005, a growth of 10.4% compared to the same period in 2004. *(Source: Department of Statistics)* As such, there are opportunities for Malaysian operators to explore the potential of export markets for Pesticides
- The large global market size for Pesticides also provides growth opportunities especially for export oriented Pesticide manufacturers. In 2004, the global market size for Pesticides amounted to US\$33 billion segmented as follows:
 - Herbicides accounted for US\$15 billion;
 - Insecticides accounted for US\$9 billion;
 - Fungicides accounted for US\$7 billion;
 - The remaining accounted for US\$2 billion

(Source: Secondary Market Research undertaken by Vital Factor Consulting Sdn Bhd)

Vertical Integration

- In the Pesticide Industry, there are opportunities for vertical integration of upstream and downstream activities.
- Within upstream, operators can expand their manufacturing activities to include active ingredients. Currently there are no local manufacturers of active ingredients. As such, there are significant business opportunities for the local manufacture of active ingredients to replace imports.
- Within downstream, operators can expand their activities to include distribution or direct sales to end-users. Alternatively, operators can also under application, for example pest extermination through use of Pesticides
- Vertical integration will enable operators to provide a diverse range of products and services to meet customer requirements in addition to optimising cost efficiency through economies of scale and cost savings.

Diversification

- Manufacturers of Pesticides for commercial use may be able to adapt existing products so that they are suitable for use by consumers.
- Successful adaptation will enable existing manufacturers to address a market comprising households, commercial places and public areas in urban towns and cities.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

- In this respect, Imaspro Group plans to conduct Research and Development activities to develop urban pest control products and technologies. Targeted pests include termites, cockroaches, mosquitoes, flies and ants.
- Areas for diversification also include use of Pesticides in various industries, including the following:
 - building and construction
 - wood-based
 - animal husbandry
 - veterinary
 - aquaculture
 - paints and coatings.

Although the above industries are currently using Pesticides, there are significantly more new areas to extend the use of Pesticides.

20. THREAT OF SUBSTITUTES

Alternative Farming Techniques

- A substitute for the use of chemical pesticides is the use of alternative farming methods, for example organic farming.
- Alternative farming methods generally seek to reduce the negative effects of pests through means other than the application of chemical pesticides.
- Common pest mitigation techniques include:
 - careful preparation of the crop growing area to remove pests before crop planting, and keeping the growing area closed off from the environment, for example through the use of a greenhouse or plastic sheeting;
 - introducing natural prey organisms to control insects and other animals. For example, owls and other birds of prey may be encouraged to nest in rice growing areas to keep the rodent population under control.
- While organic farming techniques may be effective, the cost of production associated with this farming method is generally higher than those associated with conventional farming. As a result, the prices commonly charged for organically produced crops are generally higher, which tends to reduce demand for these crops.
- In addition, alternative farming techniques are generally unsuitable for large-scale commercial agriculture, for example in plantations. As a result, chemical pesticides are still required to control pests in commercial plantations.
- As demand from the large-scale commercial agriculture sector constitutes the largest component of demand for chemical pesticides, alternative agricultural practices are not a comprehensive substitute for chemical pesticides.



VITAL FACTOR CONSULTING

Creating Winning Business Solutions

Genetically Modified Crops

- Genetically modified crops are crops whose genome has been altered by the insertion of one or more 'foreign' genes (i.e. genes that do not occur naturally in that particular species). Genetically modified crops may be engineered to express a range of characteristics, including resistance to a particular pest or disease.
- Genetically modified crops are a substitute to chemical pesticide in so far as resistance to a particular pest reduces or eliminates the need for the application of that particular chemical pesticide to control that pest.
- As such, genetically modified crops would still required pesticides to control pests not being addressed by the modified gene pool.
- While genetically modified crops are generally viable, there has been opposition to their introduction and use, particularly among consumers in Europe. The reluctance of European consumers to consume genetically modified crops, particularly as food, has slowed down their introduction in Europe and in countries that export these crops to Europe.
- The introduction of genetically modified crops does not affect demand from growers of existing non-genetically modified crops, particularly plantation crops with long economic lifespan such as rubber and oil palm.
- As such, genetically modified crops are not a perfect substitute for chemical pesticides and do not totally remove the use of Pesticides.

21. MARKET SIZE

- In 2004, the market size in Malaysia for **Pesticides** (includes only Herbicides, Insecticides and Fungicides) amounted to **RM350 million** based on sales value of production.
- In 2004, the market size in Malaysia for **Herbicides** was estimated at **RM320 million** based on sales value of production.
- In 2004, the market size in Malaysia for **Insecticides** was estimated at **RM25 million** based on sales value of production.

22. MARKET SHARE

- In 2004, Imaspro Group's market share of **Pesticides** (includes only Herbicides, Insecticides and Fungicides) was estimated at **12%** based on sales value of production
- In 2004, Imaspro Group's market share of **Herbicides** was estimated at **9%** based on sales value of production
- In 2004, Imaspro Group's market share of **Insecticides** was estimated at **22%** based on sales value of production

13. INDEPENDENT MARKET RESEARCH CONSULTANTS' REPORT (Cont'd)



VITAL FACTOR CONSULTING
Creating Winning Business Solutions

Vital Factor Consulting Sdn Bhd has prepared this report in an independent and objective manner and has taken all reasonable consideration and care to ensure the accuracy and completeness of the report. It is our opinion that the report represents a true and fair assessment of the industry within the limitations of, among others, secondary statistics and information, and primary market research. Our assessment is for the overall industry and may not necessarily reflect the individual performance of any company. We do not take any responsibilities for the decisions or actions of readers of this document. This report should not be taken as a recommendation to buy or not to buy the shares of any company.

Yours sincerely

A handwritten signature in black ink, appearing to be 'Wooi Tan', written in a cursive style.

Wooi Tan
Managing Director
Vital Factor Consulting Sdn Bhd