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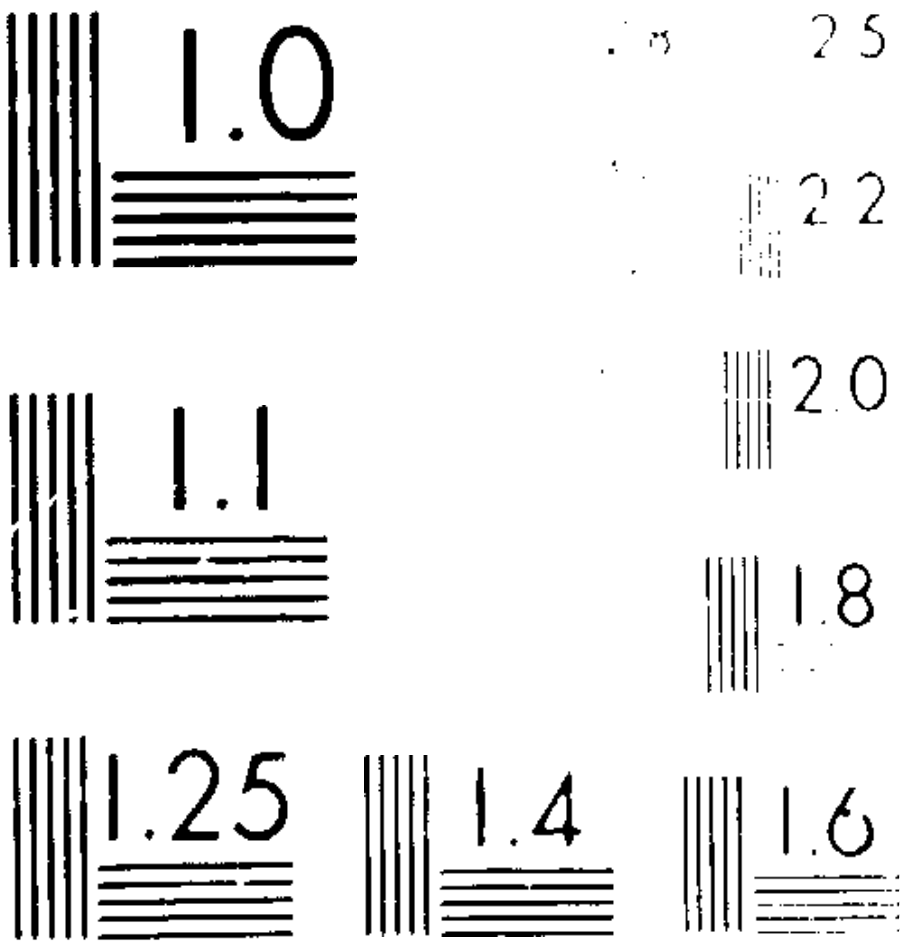
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UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Regional Network for the Production,
Marketing and Control of Pesticides
in Asia and the Far East

Experts Group Meeting on the Pesticide
Data Collection System*

Chiangmai, Thailand, 8 - 11 March 1983

REPORT** (Meeting on pesticides data collection, ESCAP).

DP/RAS/82/006

Prepared for the Participating Governments of
Afghanistan, Bangladesh, India, Indonesia, Korea, Pakistan,
Philippines, Sri Lanka and Thailand

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*Organized by the United Nations Industrial Development Organization in cooperation with ARSAP/Agro-Pesticide of ESCAP.

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I. INTRODUCTION

1. The Experts Group Meeting on the Pesticide Data Collection System organized by the United Nations Industrial Development Organization (UNIDO) in co-operation with ARSAP/Agro-pesticides of ESCAP convened in Chiangmai, Thailand, from 8-11 March 1983 at the Chiangmai Hills Hotel.

2. The Meeting was the implementation of one of the recommendations made by the Technical Advisory Committee (TAC) in its first meeting held in Manila on November 8-12, 1982. The Experts Group Meeting was convened to identify specific types of data required for the development of the pesticides industry and establish the mechanism to obtain, collect and report these data for distribution in the region.

3. The Meeting was attended by 9 delegates representing their respective governments, 6 representatives from 3 United Nations Organizations and 30 observers from trade, industry, research organizations and Thai Government departments. The list of participants is attached as Appendix 1.

4. The proceedings of the Meeting are summarized below.

II. OPENING OF THE MEETING

5. The Meeting was opened by Mr. Adam Aiemarun, Deputy Governor of Chiangmai who welcome the participants on behalf of the Governor of Chiangmai. He cited the importance of pesticides for agricultural and public health use and expressed the need for a systematic data collection in this region and wished them a successful meeting.

6. Mr. K. Szabo, Senior Industrial Development Officer, UNIDO, in his opening statement emphasized the importance of data collection which is the base of all judicious development. He recalled that the global pesticide demand and supply were out of balance at times. Because of the pesticide shortages experienced in 1973-74, the World Food Conference and subsequently the Government Consultations, held on the subject at FAO, gave a mandate to FAO and UNIDO to establish a continuous global survey system on pesticide demand and supply. The programme could not materialize lacking the co-operation of the pesticide industry. The Regional Pesticide Network in Asia and the Far East, a project supported by UNDP and executed by UNIDO, included in its programme such an activity on a regional basis. This meeting is held to define the mechanism and scope of the data collection and distribution system for the region. He expressed the Executive Director's appreciation of the Host Government and ARSAP's assistance in the organization and wished for a successful conclusion of the meeting.

7. Mr. S. Z. Khan, Chief of the ESCAP Agriculture Division, welcomed the participants and presented an account of ARSAP's experience in the field of Pesticides Data Collection. He mentioned that, following

the objectives of stimulating agricultural production and preventing crop losses by increased supply and efficient use of agro-chemicals, ARSAP initially directed its attention to chemical fertilizers which resulted in the establishment of a special framework for regional co-operation. In 1979 ARSAP entered into the complex field of agro-pesticides concentrating on two major aspects: first, a comprehensive programme for training of retail-level dealers and distributors of agro-pesticides, and second, an economic survey and information service on the supply, distribution and use of agro-pesticides in the region. Mr. Khan expressed the hope that the results so far achieved by ARSAP's work will be used to build up the UNIDO Regional Pesticides Network and to device a viable mechanism to meet the developing countries' need for agro-pesticides.

8. As regional co-ordinator, Mrs. Cecilia P. Gaston of the Philippines briefed the group on what the Regional Data Collection Center hoped to achieve, how the network operates and welcomed the delegates for a fruitful meeting.

III. ELECTION OF OFFICERS

9. Dr. Riksh Syamanonda (Thailand) was elected Chairman, Mr. Sandhu Gurinder Singh (India), Vice Chairman and Mr. Laurencio G. Teodoro (Philippines) Rapporteur.

IV. ADOPTION OF AGENDA

10. The Meeting adopted the agenda as presented in Appendix 2.

V. PRESENTATION OF PROBLEMS IN IN-DEPTH MARKET SURVEYS

The following three speakers were invited to share their experiences with regard to pesticides data collection at global, regional and national levels, respectively:

11. Mr. Trevor Matthews of the BATTELLE Geneva Research Centre presented a paper providing a general introduction to the methods available for data collection and analysis which can be used as a basis for decision making on the development of the pesticides industry. He gave a brief description of BATTELLS's Pesticide Data Collection Project focusing on the types of data it generates and collection methods. Mr. Matthews ended his presentation by stressing the need for defining as clearly as possible the objectives in establishing a data collection system in order to define in exact terms the types of data to be generated. He also cautioned the group to bear in mind their countries' capabilities in providing or collecting raw data at the present time, pointing out the practicability of a gradual process in building up a data bank. A copy of Mr. Matthews' paper is attached as Appendix 3.

12. Mr. W. D. E. Staring of ARSAP/Agro-pesticides presented the methods of collection and types of data that ARSAP generates, the constraints and problems it experiences and offered suggestions to remove the constraints and to implement a simple data collection system. A copy of his paper with Annexures is attached as Appendix 4.

13. Mr. Tanong Pongpanich of the Shell Company of Thailand presented the data collection system of his organization highlighting the methods used and the types of data generated.

VI. PRESENTATION OF COUNTRY PAPERS

14. Delegates from 9 participating countries presented papers on the status of pesticide data collection in their respective countries and types of data needed for developing the pesticides industry. The papers included the types of data currently available, sources, methodology, constraints in collection and scope for improvement. A summary of each country paper is attached as Appendix 5.

VII. MECHANISM FOR DATA COLLECTION AT NATIONAL AND REGIONAL LEVELS

15. The Meeting deliberated on the scope of pesticide data collection in the participating countries. It was felt that in first instance, the objective of the data collection had to be clearly defined, taking into consideration what data the member countries could provide at the present time. The Meeting agreed to state the objective as follows:

> "To collect basic quantitative data on supply (trade and production) of pesticides in order to assist in policy decisions which are aimed at securing adequate supply."

16. The Meeting agreed that the following types of data be collected and submitted by each of the participating countries covering calendar years 1980, 1981, 1982:

A. Quantity of imported formulated products of pesticides in terms of formulation weight or volume.

B. CIF value of imported formulated products of pesticides.

C. Quantity of imported technical grade material indicating the concentration or purity of the material

D. CIF value of imported technical grade material.

E. Quantity and FOB Value of exported pesticides.

F. Quantity and ex-factory value of locally manufactured technical grade material, including manufacturing capacities.

G. Capacity for local formulations and actual output for each type of pesticide (insecticide, herbicide, fungicide, other) according to the type of formulation (granular, liquid, dry, etc.).

H. Quantity of pesticide formulations used in public health and other non-agricultural sectors.

I. Retail prices of selected pesticides products as of 1 January 1983 (information should include concentration, packing nearest to kg or 1 li and subsidized prices if applicable). Eighteen pesticide products most commonly used in the member countries are identified in Appendix 6.

17. Except for items 16 G and 16 I data should be provided on a product by product basis by its common name, duly classified under the appropriate headings (insecticide, herbicide, fungicide, others).

18. A format for collection of the above data was designed to be used by all member countries for uniformity and consistency.

19. The Regional Coordinator of the project provided a brief description of the structure of the regional network as well as the scheme for data collection in the region and requested the designation of National Data Collectors, who will complete the above-mentioned format for submission to the Regional Coordination Unit.

20. Four delegates (Bangladesh, Sri Lanka, Thailand, Philippines) identified their designated National Data Collectors.

21. The delegates were requested to submit to the Regional Coordination Unit by March 31, 1983, the name, designation, organization and address of the respective National Data Collectors.

22. The Meeting agreed to the following:

A. Communication on data collection from the Regional Coordination Unit shall be directly addressed to the designated National Data Collector with a copy to the National Coordinator.

B. One copy of the completed format will be sent by air mail by the National Data Collectors directly to the Regional Coordination Unit.

C. The Regional Coordination Unit will provide four copies of the report on the compiled data to the participating countries through the respective National Coordinators.

23 The Meeting agreed that data will be submitted to the Regional Coordination Unit in June of every year. The Regional Coordination Unit disseminate the data in report form once a year, providing information on each country separately with a summary for the region.

24. The Meeting agreed to the following schedule for the first report:

April 15, 1983 - Regional Center to provide National Data Collectors the finalized format for data to be collected.

August 31, 1983 - Submission by National Data Collectors of the complete format to Regional Coordination Unit.

October 31, 1983 - Dissemination of the First Report by the Regional Coordinating Unit to participating countries.

25. The Meeting requested UNIDO to communicate with the government of the participating countries urging them to provide full support and cooperation in order to facilitate the data collection.

26. The Meeting recommended that pending receipt of the finalized format participating countries shall initiate immediate action to collect the required data for timely submission.

27. The Meeting recognized that the data on demand, distribution and consumption of pesticides in the region are essential for securing adequate supply and recommended that the Technical Advisory Committee take appropriate steps for collection of such data on priority basis.

28. The Meeting considered the collection of data on locally formulated pesticides on product by product basis in terms of their common names, weight or volume and value, but in view of the present difficulties in obtaining such data, the Meeting recommended the collection of such data at national level.

VIII. ADOPTION OF THE REPORT

29. The participants discussed and amended the draft report and adopted the report in its present form.

Appendix 1

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APPENDIX 2

EXPERTS GROUP MEETING ON THE PESTICIDE DATA COLLECTION SYSTEM

For the

REGIONAL NETWORK FOR THE PRODUCTION, MARKETING AND CONTROL OF PESTICIDES IN ASIA AND THE FAR EAST

Organized by

UNIDO/ESCAP/ARSAP

MARCH 8-12, 1983
THAILAND

AGENDA

1. Opening
2. Election of Chairman
3. Adoption of Agenda
4. Presentation of problems in in-depth market surveys
5. Presentation of country paper
6. Mechanism for data collection in national and regional levels
   - 6.a. Types of data required
   - 6.b. Sources that exist or have to be explored
   - 6.c. Constraints in data collection, and possible solution
   - 6.d. Structure for regional data collection system
   - 6.e. Transfer of information
7. Data processing and dissemination of information by the Regional Coordinating Unit
8. Uniform scheme for data collection system
9. Workplan for 1983-1984
10. Implementation scheme
11. Other business
12. Adoption of Report
13. Closing

Appendix 3

U N I D O

United Nations Industrial Development Organization

Methods of Pesticide Data Collection

by T. Matthews

Battelle - Geneva

given at

Experts Group Meeting on Pesticide Data Collection Systems

Regional Network for the Production, Marketing and Control of Pesticides in Asia and the Far East

Chiang Mai - Thailand

March 8-12, 1983

INTRODUCTION

The main objective of the present meeting is to establish a well-defined work plan for a pesticide data collection system, which will be useful for the planning and development of the pesticide industry at national and regional level. The principal aim is to identify specific types of data required for pesticide industry development and to design the mechanism to obtain, analyse and report on this data.

The main purpose of this paper is to provide a general introduction to the methods available for data collection and analysis which can be used to develop useful data on pesticides on which decisions about the future development of pesticide industry can be based. The term "pesticide industry" is itself an all encompassing phrase which includes a number of different levels of production, formulation, packaging and downstream distribution activities, which independently and conjointly can loosely be called "The Pesticide Industry". Before looking at means of data collection, it is first necessary to define as precisely as possible, what will constitute the pesticide industry. Only when this has been done, will it be possible realistically to assess the data needs for decision making at the various component levels and then the methods open to develop the necessary data.

This paper is, therefore, divided into four separate sections as follows:

- The structure of the pesticide industry
- The data needs for decision making
- Evaluation of potential data sources
- Examples of depth of information which can be achieved.

STRUCTURE OF THE PESTICIDE INDUSTRY

What is a pest ? Well it is really quite a complicated matter to give a precise and succinct definition of a pest.

A pest can be insect or other living creature or a plant, or a fungus, which is unwanted by man where it would like to form its habitat. It need not necessarily be dangerous or even cause any damage to its host. Head lice are not particularly dangerous to their human host - they are simply undesirable. However a severe infestation of cotton leafworm on a cotton crop is highly destructive and if left uncontrolled can completely wipe out the crop. Similarly wild plants growing in uncultivated fields are of no consequence, but these same plants infesting a field crop can have a disastrous effect on its yield if left unchecked.

Fungus equally will attack wood, reducing it to a powdery shell, and in a damp atmosphere will attack wall paint or will grow on unprotected food rendering it inedible.

Surrounded as we are by such a multitude of pests, how do we survive? The answer, we all know, is by judicious use of pesticides.

What is a pesticide ? The simple answer is a product, which controls or kills a pest.

In today's modern and chemically sophisticated world, pesticides tend to be complex organic molecules of increasing selectivity. That is to say they kill one pest and leave others untouched. But not all pesticides are sophisticated. Lots of sodium chlorate is still used for total weed control, and a very simple and effective killer it is. And not all pesticides necessarily kill the pest on which they are targeted. The naturally occurring sex-hormones, the pheromones, can, under certain conditions so effectively disrupt the mating of one generation of insects, that these die naturally of senility, without producing any offspring, thus providing effective control.

What is the pesticide industry ?

From the above, it follows that the pesticide industry is that which dedicates itself to the production and distribution of pesticides for the control of pests. This is, of course, a very wide reaching definition, for it encompasses all possible types of products for all possible applications.

To reduce the definition to more conventional and tangible form, the pesticide industry is usually taken to mean the industry producing and distributing pesticides principally for the agricultural market. Very often companies active in this crop orientated segment, which is most countries is the largest value market segment, often have a subsidiary activity in public health and industrial pesticide applications. The reason why most pesticide companies concentrate on agricultural applications is the sheer size of the market (Agricultural insecticides sales, for example, were valued at US.$ 5 billion at user prices in 1980).

It is here that the huge research and development costs can be justified. Once a product has been identified as of potential for agriculture, it is then checked for other applications. Most, but not all, products emerge from an agricultural screening programme initially.

For the purpose of this discussion, we shall limit ourselves to the agricultural pesticide business and the infrastructure required to support it, for it is usually to this market that pesticide companies first look when expanding into a new territory.

Structure of the Agropesticides Industry

Of all chemical products, agropesticides are probably the most complex both to develop and to distribute. In themselves, they are highly sophisticated, costly chemicals, involving multimillion dollar research and development investments. At the other end of the scale, they are sold in smallish packs - 1 kg. containers are not uncommon - to the farming community, which in many ways is almost a consumer product universe and has little to do with industrial products. It is the transfer of the bulk product to the small scale user that greatly complicates market research and data collection in this industry.

Figure 1 shows the principal component parts of the pesticide industry. Not all of them are relevant in every country, but wherever a free market exists, and products are not centrally controlled, a complicated distribution system normally evolves over a period of time. Figure 1 is not meant to be definitive but rather illustrative of the sort of structure which evolves. Typically what happens is as follows:

1. Initially all pesticides are imported ready formulated. The only local operation may be a repacking job.

2. Once a market has developed local formulation based on imported active ingredients begins. Formulated products may still simultaneously be imported, unless the government decides to insist on local manufacture.

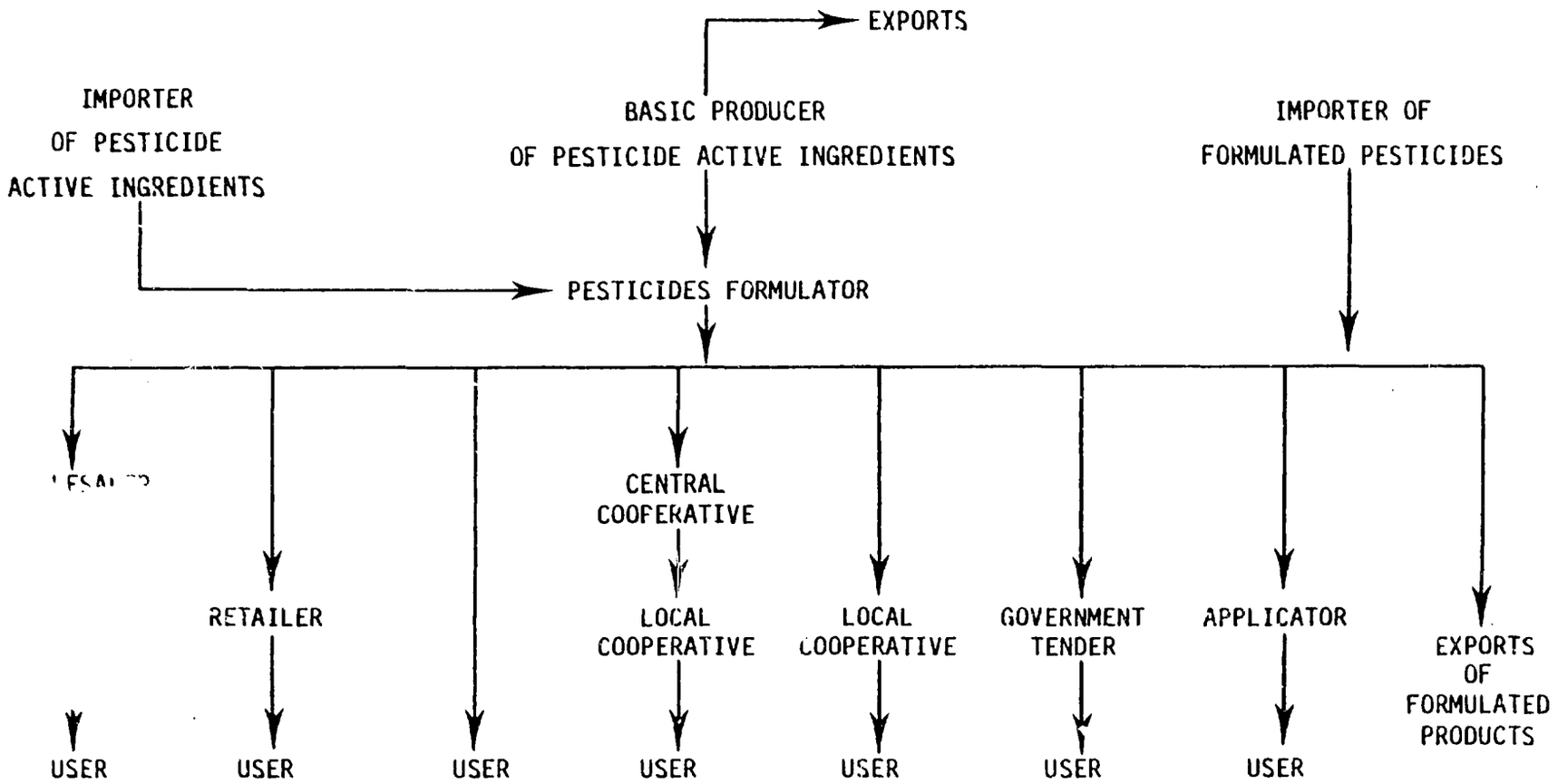
3. Once a market develops for sizeable quantities of certain active ingredients, local production of these is commenced. Some countries, seeing a useful export market for certain bulk products, manufacture items for which their own national market is very limited or even non-existent.

4. Research and Development in pesticides, because of the huge costs involved, appears to date, to be limited in the free world to companies located in the U.S.A., Western Europe and Japan.

5. Below the formulator level, the distribution pattern can become very complicated indeed, and a combination of any or all of the patterns illustrated can evolve, with possible other variants dependent upon local conditions.

It is this complex structure of the pesticide industry which makes data collection and analysis in the pesticides business a complicated but fascinating business.

FIGURE 1 TENTATIVE OUTLINE OF PESTICIDE INDUSTRY



THE DATA NEEDS FOR DECISION MAKING

Before going any further it is worthwhile looking again at the specific objective of this meeting.

"To establish a well defined work-plan for a pesticide data collection system which will be useful in the planning of the pesticide industry at national and regional level"

Let us examine the data needs for coherent decision making at the different levels of the pesticide industry. Figure 1 can be simplified into roughly four basic categories of activity as follows :

- active ingredient manufacture
- formulating to make finished pesticides
- distribution of finished pesticides
- application of products by user.

Active ingredient manufacture

The manufacture of active ingredients has really little to do with the pesticide industry itself, though many observers see it as a key operation. The fact of the matter is, that pesticide active ingredient production is simply a branch of the fine chemicals industry. Their production is often totally unrelated to agricultural conditions in the countries where they are produced. For example, Bayer in West Germany produces a long list of patented and commodity insecticides, not 5% of which are used in the German market.

This fact is the key to the information needed to decide how to develop such an industry. Few countries can justify a chemical plant to make a specific pesticide active ingredient solely for national consumption. Any decision must, therefore, be based on an assessment of the international market for proposed products. Major international pesticide companies tend to regard the world market for virtually all their products, particularly new patented substances, where large development costs have to be recovered. It is possible that countries in Asia and the Far East could identify a key group of products which would justify manufacture to serve a group of regional markets.

It should be noted that many but by no means all active ingredient manufacturers, also formulate and sell finished pesticides.

Pesticide Formulators

Pesticide formulation is often a precursor to active ingredient manufacture: Developing markets are usually supplied initially by importation of formulated products, either in bulk or in consumer packs. Once a sizeable defined market has developed, the next step is formulation locally, usually from imported active ingredients.

In order to decide what to formulate, a detailed knowledge of the precise characteristics of the local market is necessary. The prospective formulator basically requires much more detailed knowledge of the problems associated with the local agricultural scene, to ensure that he produces the right mix of products to control the pests encountered. The data he needs for rational decision making is much more detailed than that required by the active ingredient manufacturer, for he must produce a wider range of products to control a whole spectrum of problems if he is to qualify as a full-line formulator.

As an adjunct to his local activities, the enterprising formulator may also aspire to sell some of his formulated pesticides internationally, in other countries where similar problems are encountered. To obtain international information can be a great problem for such companies.

Pesticide distributors

This stage has been separated from the term pesticide formulator, to stress the importance of getting the product to the user. It is common to speak of "distributors" when really the word "formulator" would be more precise. Of course, the formulator initiates distribution of his products by selling them into the first stage of the actual distribution chain, which, as shown in Figure 1, can be complicated and made up of many different components.

Many people will probably regard the distribution chain as an adjunct to, rather than an integral part of, the pesticide industry. In a country where there is no adequate commercial distribution system, statistics on farm concentration and crops are needed in order to enable a coherent distribution system stocking the right products in appropriate quantities to be built up. Although much of the information needed is the same as that required by the formulators, a geographic dimension must be added to ensure correct locating of depots and sales points.

Application of products by the user

Although the user himself is not part of the pesticide industry itself, it is to him that the products are directed. As expressed earlier, the users, the farmers are almost equivalent to a consumer product type universe, but the pesticides, although sold in smallish quantities, often with consumer type advertising, are not consumer goods of the toothpaste category. The user cannot be left completely to his own devices. He requires guidance and technical assistance in the choice and application of what is a highly sophisticated - and often potentially dangerous - group of technical products.

This advice must come from technically competent field personnel, either in the employ of the formulator or distributor, or supplied by the government in the form of extension workers, who ensure that a realistic choice of products is made and that these are correctly applied.

Whoever is supplying this technical advice also requires information on the market, and at this level, the most detailed and subdivided information on crops, pests and competitive products is needed, if realistic advice is to be tendered.

In summary, therefore, if we broadly accept that the "pesticide industry" can be divided into the above four main types of activity, it is evident that a mass of data and information of different types is required to enable sensible decisions to be taken at all stages.

EVALUATION OF POTENTIAL DATA SOURCES

And now we come to the crux of the matter. Where can useful data be obtained and how can it be collected and analysed to serve a useful purpose ?

Figure 2 shows a list of potential sources of information. This list is not claimed to be exhaustive, but it contains a fair representation of the types of source where some data might be available. Before examining the types of data which each source could supply, it is worth making a few observations about research methodology.

Methodology

Because it is likely that the individual countries and organisations participating at this workshop will have relatively limited human and financial resources available to conduct data gathering and analysing exercises, the methods outlined here are those suitable for small teams or even individual researchers.

Provided with a clear brief, it is quite amazing what can be achieved by interrogating various potential sources of information and piecing together an overall picture. No reference will be made to sophisticated and costly panel or similar techniques, which are very costly and which are unsuited to developing countries.

It is quite amazing, even in relatively underdeveloped countries, how many potential contacts there appear to be. The list can be quite formidable. However, most data collection and analyses exercises have both financial and time constraints and the aim must always be to decide how to obtain the best results within those constraints. And let us be quite clear. There must be both constraints, however generous they might be, because without them, no project would ever be finished ! Collecting and analysing data without any specific aim in view is to be avoided like the plague !

And so, the first key to a successful project is accurately and precisely to define the problem. The researcher on receipt of the brief or in discussion with his "client" - and all researchers have clients, even if it is only their immediate office superior - should always and without fail write down concisely, wherever possible, in one single sentence, what is the principal objective of the investigation. What exactly is he trying to achieve ? This can be followed by a series of sub-objectives and a listing of precisely what information is required. If the researcher cannot do this, based on the brief, then he cannot do the job and the brief requires further definition.

The importance of this definition step cannot be over-emphasized. The lack of it, or the frequent vagueness of it, is one of the single biggest problems in all types of market investigation and the biggest cause of argument between client and researcher. Rich and famous companies and research organizations in the Western World are often guilty of it. In Asia and the Far East where both cash and highly trained human resources are limited in many areas, it is vital that the objective be clearly defined to avoid waste of both time and money.

Once the problem is clearly defined, the researcher can attempt to assess which of the potential contacts could ultimately provide the type of data and information he requires. There is little point in talking to extension services whose expertise is essentially technical, if hard data on pesticide consumption is being sought. On the other hand, such extension workers would be a prime source of say, weed or insect problems and their distribution by crop and region.

Since all sources can rarely be contacted - there is usually neither time nor money to permit it nor is it desirable, the researcher must use his knowledge and common sense in putting together the most sensible call list. Even a relatively inexperienced researcher can make sensible decisions. He simply puts himself in the place of the proposed contact and asks himself the question "What could this man tell me, What, given his position and business, could he reasonably be expected to know which would help me ?" This simple device allows useless contacts to be avoided.

Too many researchers (so called "experienced researchers") sell, and too many buyers of market research (so called "experienced buyers") buy, projects based upon contact lists which are nonsense. Proposals are padded out with such phrases as "Information will be collected from sources including distributors, cooperatives, wholesalers, end users and government statistical departments".

If the object of the exercise is to determine the size of the market for a number of products, in the study country, it immediately becomes obvious, by the self questioning exercise above, that none of the proposed contacts could reasonably be expected to provide the type of information required. Yet countless proposals containing such absurdities are written and accepted each year by naïve and unthinking researchers and buyers, with disastrous results, which strain the credibility of the research industry to deliver the goods '

Therefore, before venturing forth on a data gathering exercise, always apply the self questioning test. It will help choose the best potential contacts. It will, alas, not guarantee that these contacts will necessarily import their knowledge to you ! A measure of personal charm and experience, plus an ability to talk around the subject and tell the respondent something which he wants to know, may well be needed to ensure an adequate flow of information.

Individual contacts and their usefulness

In a general paper on methodology such as this one, it is not practical to describe a specific research project. However, it will probably be helpful to potential researchers if we examine the sorts of information which might reasonably be available at the different types of data source shown in Figure 2. It is then the job of the individual researcher to decide which of these to include in his contact list.

1. Import - Export Statistics

The usefulness of these varies enormously from country to country, depending on whether importers request supression of data or consolidation into a blanket category. As a minimum, it should be possible to obtain an idea of the total tonnages imported. At best, many individual products may be broken down in detail both by quantity and price.

This source can be a very useful first step in sizing the total pesticide demand in a country with little or no indigenous pesticide industry. It is the type of data needed in building up a case on whether or not co commence pesticide active ingredient manufacture. The more developed the country, the more obscure become the statistics and the less use they are. However, it does not cost much to check them so it is a common first step in many projects aimed at determining pesticide consumption.

One trick, given that pesticide active ingredients are simply fine chemicals, is to have the product classified as such under its full - usually complicated - chemical name. A good knowledge of precisely the products sought helps to ensure all potentially relevant nomenclatures are checked.

2. Tender information

Results of tenders for pesticides are usually fairly readily available from the tendering authority or from the industry within the country itself. Because tenders are very precise as to products and price, they provide excellent detailed size information on the crop market segment they cover, and give the researcher a clear idea of how much of specific products is used. The knowledgeable researcher will be able to relate these products to specific pests being controlled, and from their quantities and appropriate dose information obtainable from manufacturers' literature, can make estimates of areas treated for control of specific problems.

Figure 2 : POTENTIAL DATA SOURCES

- Import - export statistics
- Tender information
- Industry statistics
- National programmes on specific pest problems or crops
- Manufacturers
- Formulators
- National distributors
- Regional distributors
- Cooperatives
- Wholesalers
- Retailers
- Farmers
- University / Government extension workers
- Crop research stations .
- Existing data banks
- Public health authorities
- World Health Organization

In some countries where there is only one crop of commercial importance, carefully controlled by government agencies (e.g. cotton in the Sudan) the tender data provides an accurate picture of the pesticide market. Where an agency tenders for a specific purpose, that market is defined. Tenders are often useful sources of public health insecticide information, as most public health products are in the hands of some official agency.

3. Industry statistics

Industry statistics are of very variable quality. In developing countries, they are often much better than in the more advanced markets in that more and better data is published. Where a pesticide industry exists, production data is often quite transparent on a product by product basis. Usage data is much less clearly visible, basically because usage is not controlled by the producers. However, such statistics are a good source of input for a study aimed at determining the overall size of the pesticide industry.

4. National programmes on pests and crops

In addition to tender data, many countries have agencies involved with specific pest problems or in the control of a key crop. Whether or not pesticides are supplied by tender or by normal commercial means, such agencies often have exact knowledge of what products are used and in what quantities. This is especially true for public health insecticides, for say malaria mosquito control, but also for key crops such as cotton or rice.

4. Manufacturers

Pesticide active ingredient manufacturers, if such exist in a given country, are a prime source of hard data on internal consumption of specific products. They also may have a good idea of some export markets for their key products. As most such basic producers also formulate pesticides, they have also a good appreciation of the usage of formulated products on a crop by crop basis. They are a prime source of information at national level, providing data input to enable the total size and constitution of pesticide sales to be determined. However, it must be remembered that the only really solid data they have is their own sales data, and usually their overall market estimates are based partly on guess-work as to what the competition is doing. Therefore, a check-out of the market with all manufacturers is desirable.

6. Formulators

Much the same quality of information as from the basic manufacturers, but for formulated products. Here again, each company is only sure of what it sold, but by getting information from most formulators active in a given country, the researcher can build up a fairly accurate picture of the present pesticide consumption pattern.

7. National distributors

This is a rather vague term, for the manufacturer - formulator and formulator also can be called national distributor. The distinction has been made into this separate category, because in some countries, there may well be no manufacturing pesticide activity at all, and all products used will be imported and pass, in the free-non tender market, through national distributors. In such countries, macro-pesticide usage data can be obtained from such sources.

8. Regional distributors

In countries where a well defined crop region is served by a regional distribution useful numerical information on a product by product basis can be obtained from this source. However, when regions are ill defined, product sales data become completely unrepresentative and, unless some statistical sampling technique is used the researcher can do little with the information he obtains on market size.

Qualitative information about regional problems, crops and so forth might be usefully obtained, but there are better sources.

Before proceeding with the rest of the list, it is useful to point out that the 8 categories of respondent discussed above are the prime sources of information on market size and overall product consumption. The individual researcher or small research team must rely upon such sources to obtain data for market size estimates. Such data must be collected at a macro-level, for the researcher cannot piece together the market from scraps of information collected any lower down the chain than the regional distributor. The problem is, that below this level, the number of sources involved suddenly proliferates, and any individual source questioned, however knowledgeable, has no means of estimating the total market. The researcher, equally, has no means of taking even the most detailed information provided and scaling it up to get the total market size.

Hence, in projects involved in determining market size and potential, the researcher should concentrate his efforts with the above 8 categories.

But, market size is not everything, and some of the other types of respondent have useful information to import, as is now shown.

9. Cooperatives, wholesalers and retailers

These have been grouped together because they are all, to a greater or lesser degree, selling points, - shops. They are usually a remarkably dull source of any information. They have only their sales figures and,

because very often they work on small profit margins, they cannot afford to offer any technical service to farmers. Their technical competence often ends with parroting of the manufacturers label instructions. In spite of this, cooperatives and wholesalers often figure high on contact lists, because the researcher has asked himself what they could usefully supply.

10. Farmers

The growers themselves are an excellent source of qualitative information on the problem encountered in the crops they cultivate, but careful sampling is needed to obtain representative results. In the final analysis, the growers are the only accurate source of pesticide consumption data, for it is they who apply the products. In a few western countries, (U.S.A., France and the United Kingdom) pesticide manufacturers pay huge sums of money for product usage information by crop, obtained by statistically sampling the grower universe. These procedures, usually called "Panels" produce some excellent results, but are financially beyond the scope of most countries.

In brief, for the solitary researcher, the farmers are not much help.

11. University / Government extension workers

By an extension service worker is meant a technically qualified person who is usually attached to some agronomic research institute, but who deals with farmers problems and the pest problems in a defined region or on a specific crop. The U.S.A., for example, has such workers down to the individual country level. Many developing countries employ such people to supervise cultivation activities in key crops.

Not only can the extension worker provide product consumption data for his crop - which may in some cases be the entire pesticide market - but he can also provide important qualitative data on the pest problems and their evolution over successive seasons, thereby enabling forward pesticide planning to be undertaken.

12. Crop research stations

Such stations tend to know a great deal about the problems associated with their crop, qualitatively about the products used to control the problems, but are less well informed about actual product usage.

13. Existing data banks

We are not aware of any nationally available data banks on pesticides, which treat the Far Eastern and Asian countries in detail. Some large international pesticide manufacturers do have data available on individual countries in which they are active. The more successful at new product innovation the company, the more foreign subsidiaries can be set up based on patent protected products, the more data can be

collected (from the sources outlined above) and stored. Such companies are few in number and the data is not published.

Panel data on pesticide usage exists in the U.S.A., France and the United Kingdom, but this, again, is available only to subscribers. Numerous multiclient studies on pesticide markets in developing countries exist and are currently available from various research agencies. These tend to provide good introductory information about a market, but do not contain the hard data on which investment decisions can be based.

The Battelle World Pesticide Programme treats certain Far Eastern and Asian countries in detail, but is also only available on subscription.

14. Publich Health Authorities / World Health Organization

These bodies, principally concerned with eradication programmes at regional and national level are prime sources of pesticide consumption data.

EXAMPLES OF DEPTH OF INFORMATION WHICH CAN BE OBTAINED

Precisely what the output of any piece of data collection and analysis should be, depends upon the basic objective of the research. Battelle-Geneva is currently engaged in a World Wide Pesticide Programme, the principal objective of which is

"To provide manufacturers with a detailed estimate of the consumption of principal pesticide active ingredients by country, crop and pest controlled, to enable market potential for new pesticides to be assessed"

Starting from this clear objective, Battelle has now completed a 22 country study in which at least 80% of the agricultural pesticide consumption in each country was assessed and quantified against the four dimensions :

COUNTRY - CROP - PRODUCT - PEST.

Battelle's only information sources are those listed earlier in this study. In other words, the market has been pieced together by a single researcher in each country, by judicious choice of respondents, rather than by any statistically sound method, which on a world scale would have been prohibitively expensive.

Figure 3 shows an example of the detailed information which can be obtained. It refers to the stone fruit market in Italy. For reasons of confidentiality, the actual names of the products involved, have been supressed.

Using the methods outlined, Battelle covered :

22 countries

33 crops

79 pests

250 products.

Needless to say, there is an associated computer programme designed to handle the data, for although it was generated annually, there is so much of it that adequate analysis can only be handled by computer.

CONCLUSION

The main aim of this paper has been to examine the principal means of data collection in the pesticide field, and to evaluate the types of data available from a number of defined sources. An attempt has been made, in a general manner to indicate the types of data needed for rational decision making at different levels in the pesticide industry.

Although the industry is complex, we believe that the methods outlined will enable a small research team with low budget to produce quite detailed results, which are useful to the pesticide industry.

CEA.191-2402/TM/hm
March 1983.

BASIC TABLE: CROP - PRODUCT - PEST

CROP: STONE FRUIT
YEAR: 1980
CURRENCY: LOCAL CURRENCY

Date: 3-MAY-82 Time:14:38:16

			1 INFES AR	2 TREAT AR	3 DEVEL AR	4 APPLI RA	5 PRICE	6 COST	7 VOLUME	8 VALUE
1	ITALY									
1	01	APHIDS	105.1	---	177.0	---	***	***	***	5061.2
2	105	P	---	28.4	56.7	625.0	5950.0	37187.5	35.4	2100.5
3	001	A	---	13.8	27.5	700.0	3400.0	23800.0	19.3	655.5
4	005	M	---	7.3	14.6	870.0	4862.0	42299.4	12.7	616.7
5	003	M	---	5.7	11.3	800.0	4530.5	36244.0	9.1	411.0
6	007	M	---	5.7	11.3	750.0	2125.0	15937.5	8.5	100.7
7	091	O	---	4.9	9.7	750.0	2125.0	15937.5	7.3	154.9
8	046	D	---	9.0	9.0	500.0	1402.5	7012.5	4.6	63.1
9	005	A	---	4.1	8.1	850.0	1700.0	14450.0	6.9	117.0
10	004	M	---	1.6	3.2	850.0	4420.5	37642.3	2.8	122.0
11	094	P	---	1.6	3.2	700.0	1275.0	8925.0	2.3	20.9
12	060	F	---	3.0	3.0	1750.0	1224.0	21420.0	5.3	64.3
13	199	O	---	11.1	19.2	1100.0	2550.0	28050.0	21.1	530.6
14	10	SCALES	81.0	---	60.8	---	***	***	***	1400.7
15	156	M	---	40.5	40.5	525.0	1275.0	6693.8	21.3	271.1
16	157	M	---	40.5	40.5	14000.0	164.7	23019.4	602.6	932.3
17	004	M	---	4.9	4.9	570.0	4420.5	25242.4	2.0	122.7
18	199	O	---	3.2	3.2	1000.0	2550.0	25500.0	3.2	82.6
19	02	MITES	61.0	---	40.0	---	***	***	***	1211.7
20	031	C	---	22.0	22.0	500.0	6100.0	30940.0	11.0	600.7
21	109	PI	---	6.0	6.0	1100.0	2021.3	22234.3	6.6	133.4
22	134	FI	---	2.0	2.0	1100.0	4165.0	45815.0	2.2	91.6
23	199	O	---	10.0	10.0	1200.0	2550.0	30600.0	12.0	306.0
24	99	OTHERS (INSECTS)	81.0	---	106.0	---	***	***	***	2596.2
25	005	A	---	24.3	48.6	850.0	1700.0	14450.0	41.3	702.3
26	013	C	---	20.3	40.5	1750.0	765.0	13387.5	70.9	542.2
27	050	E	---	12.0	24.0	1050.0	1593.8	16734.4	25.2	401.6
28	094	P	---	16.2	32.4	850.0	1275.0	10837.6	27.5	361.1
29	007	M	---	8.1	16.2	750.0	2125.0	15937.5	12.2	250.2
30	199	O	---	12.1	24.3	550.0	2550.0	14025.0	13.4	340.0

INFES AR Estimated infested area for each pest (1000 ha)
TREAT AR Treated area (1000 ha)
DEVEL AR Developed area (1000 ha)
APPLI RA Application rate (g /ha)
PRICE Price per g of active ingredient (user level - loc. cur. cents /g)
COST Cost of application (user level - local currency /ha)
VOLUME Market in volume (tonnes)
VALUE Market in value (millions local currency)

Source: BATTELLE (*** = Undefined, --- = None or not applicable)

Figure 3

Appendix 4

ARSAP'S PESTICIDE DATA COLLECTION SYSTEM IN THE ESCAP REGION

A paper presented at the UNIDO/ARSAP Expert Group Meeting on the Pesticide Data Collection System, 8-12 March 1983, Chiengmai.

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SOME ASPECTS OF ARSAP's PESTICIDE DATA COLLECTION SYSTEM IN THE ESCAP REGION

WHAT IS ARSAP?

1. ARSAP, the acronym for the Agricultural Requisites Scheme for Asia and the Pacific, is a long-term programme adopted by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and carried out with financial assistance from the Government of the Netherlands.

ARSAP's broad objective is to facilitate, increase and widen the domestic use of more productive agricultural inputs by small scale producers of food and cash crops in the developing countries of the ESCAP region.

Agro-chemical inputs - chemical fertilizer and agro-pesticides - are crucial to the achievement of higher productivity and the improvement of living standards for farmers. Consequently in 1975 ARSAP began the first phase of the project on chemical fertilizer, which was followed later by similar work on agro-pesticides in 1978.

2. This second phase was officially known as ARSAP/2/AGRO-PESTICIDES. The main components of the agro-pesticides programme are:

. A training programme on pesticide management for retail-level dealers or distributors of agro-pesticides in the ESCAP region. The long-term objective of this programme is to create a cadre of professional retailers trained in the various aspects of safe handling and effective use of agro-pesticides.

. The establishment of a regional economic survey and information service dealing with all facets - economic as well as institutional - of the use of agro-pesticides by farmers. It is also concerned with the domestic supply and marketing of agro-pesticides through public as well as private channels.

ARSAP's REGIONAL ECONOMIC SURVEY AND INFORMATION SERVICE

3. In most developing countries of the region, there is a growing need for more effective crop protection both in the cultivation and in the storage of foodgrains in order to provide their ever-increasing population with sufficient food and adequate basic income.

/The introduction

The introduction of new cultural practices, such as multiple cropping, the use of high-yielding varieties of seeds and increased fertilizer application have generally aggravated the incidence of pest and disease attack. In the package of available plant protection measures, the integrated use of agro-pesticides would be an indispensable tool for many years.

Consequently, the Governments of the developing countries are giving high priority to the formulation of policies which are aimed at increased efficiency in the supply and application of pesticides in agriculture. However, there is a great need to collect data and analyse experiences involving agro-pesticides distribution and use in order to reformulate policies and strengthen domestic pesticide legislation.

4. ARSAP has initiated a regional economic survey and information service on agro-pesticides with the aim of assisting Governments in identifying the discrepancies between the intended promotion of efficient pesticides use and actual practices at the Government and farm level.

In pursuing this service the ARSAP staff soon discovered that ready-to-use aggregated data on agro-pesticides supply, distribution and use in the countries of the region, if available, was extremely fragmented and in most instances non-existent. These data are considered essential for policy formualtion. It was with the intention to fill this void that ARSAP set out to collect data on agro-pesticides supply, distribution and use.

SOURCES OF INFORMATION

5. ARSAP has used 4 different methods of data collection.

(1) Missions: on the spot collection of data, directly from plant protection departments, customs, statistics, private industries etc. This method has proven to be very effective in combination with prior surveys (2)

(2) Surveys: specially commissioned studies on pesticides use undertaken by nationals of the respective countries under the direction of ARSAP. The quality of these studies differed considerably, but in combination with the missions a good overview could generally be obtained. (For guidelines please see Annex 2).

(3) Desk research: using existing publications.

(4) Questionnaires: an extensive questionnaire was sent to all ARSAP contacts. The response has not been very encouraging (please see Annex 3).

TYPE OF DATA COLLECTED

6. ARSAP has collected information in 13 ESCAP countries mainly on the following items:

(1) Local actual production and importation of agro-pesticides as well as production capacity.

(2) Organization and practices of marketing and distribution.

(3) Retail prices of agro-pesticides and price structure.

(4) Economic incentives to farmers such as subsidy and loan schemes.

(5) Regulations affecting pesticide management such as registration of pesticides, licencing and quality control.

7. Occasionally, data could be obtained on:

(1) actual consumption of agro-pesticides by crop (group).

(2) policies and training programmes (private and government) related to the handling and application of agro-pesticides and with regard to pest and disease control.

(3) economics of pesticides use at the farm level.

(4) problems and pest control practices involving small-scale farmers.

(5) crop-wise information on pest damage and common control measures.

(6) poisoning incidents.

(7) local production and importation of application equipment.

QUALITY OF DATA COLLECTED

8. The data gaps encountered were enormous and quite often information for various sources proved to be conflicting. The problems in data collection centered around the following main issues:

(1) classification: sometimes the confusion arises from the rather complicated classification of agro-pesticides under the Brussels Tariff Nomenclature (BTN), and

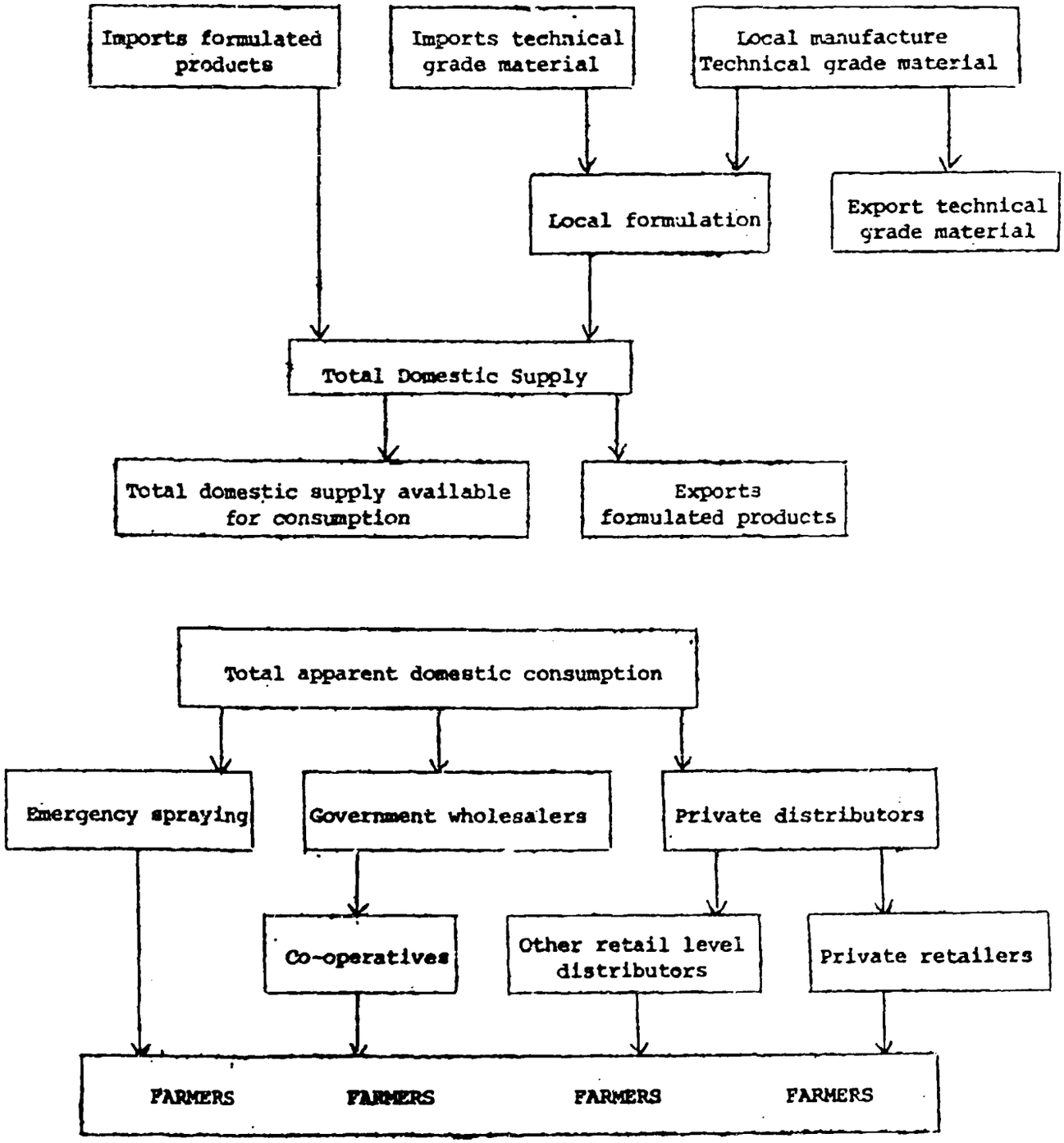
the Standard International Tariff Classification (SITC) revision 1 and 2 (please see Annex 4). According to BTN and SITC, formulated agro-pesticides are to be classified under one section (BTN 38.11 and SITC (2) 591) and technical grade materials under other sections (mainly BTN chapter 29, organic chemicals).

(2) standardization: in some statistics agro-pesticides supply is presented in formulation weight (the weight of the formulated product), in other cases it is expressed as technical grade material (the quantity of technical grade material needed to produce the formulation) or it is expressed as active ingredients (the weight of the active pesticidal ingredients in the formulation). Different concepts to express the value of agro-pesticides are also being used, e.g. CIF, landed cost, ex-factory, wholesale, retail, farm-gate prices etc.

(3) measuring units: the problem is further aggravated because the quantity of liquid pesticides is expressed either in litres, US gallons, imperial gallons (all volumes) or, just as the non-liquids, in weight as kg, tons, cwt, pounds etc.

(4) calculation concept: sometimes the imported quantities of technical grade material and finished products are totalled and presented as the total imports of pesticides in formulation weight or even as the total domestic supply. However, as shown in figure 1 technical grade material requires local formulation before it can be distributed as a final product. Adding to the confusion is the problem that it is sometimes

Figure I. Schematic flow chart of pesticid supply and distribution



not clear whether figures refer to pesticides in general or to pesticides for agricultural use (agro-pesticides) in particular.

(5) accuracy: inconsistencies in data may stem from failure to indicate such important items as kind of weight (formulation weight versus active ingredient), kind of value (e.g. CIF versus retail), year, currency, exchange rate, unit (kg, tons etc.) and source.

ANALYSIS OF DATA

9. Agro-pesticides are marketed in various types of formulations, in different concentrations and under a wide variety of brand names. Prices, quality prescriptions for application and other data concerning agro-pesticides are not easily comparable. Therefore, reliable data are hard to collect and need to be thoroughly analyzed.

10. It is absolutely essential that an analysis is made of the collected or presented data because of:

(1) Complexity of the very subject matter, pesticides.

(2) Necessity of further calculation and processing.

(3) Possible inconsistency between data within one source or report and between various sources or report.

(4) Possible inaccuracy of presented data.

11. Procedure for basic analysis of data e.g. report on the supply, distribution and use of pesticides:

(1) check type of data presented.

(2) cross check on consistency

- internal: check on consistency within the same report
- external: check on consistency with outside sources.

(3) check accuracy of calculations and measuring data (year, unit etc.).

(4) rationalize any inconsistency

- in many instances a reason for the apparent inconsistency between data con be found or assumed such as other year/period, other mix

of constituting elements (e.g. with or without DDT, petroleum oils, household pesticides), other prices or exchange rate, calculation mistakes, other scientific or technical concept, other sources, other classification or grouping, other land area etc.

(5) clarify inconsistency with the reporter or source.

(6) if the inconsistency cannot be clarified then make the best possible or logical estimate or do not mention the inconsistency, leaving the interpretation open to others.

This is the least scientific and most subjective step in the process of basic analysis. It does not however indicate the criteria on which to base the estimation. Some criteria used in daily practice to verify the reliability of data (depending on the type of data and inconsistency) are:

. alleged reliability of reference source.
. number of apparent inconsistencies (internal and external).
. presentation (outlook) of data.
. trend consistency.
. interpretation by people from private sector or with field experience.

(7) standardization: compare the accepted data to or reduce them to the same denominator as data from other countries. In other words standardize them according to a uniform reporting format.

(8) depending on the kind of analysis required assess relations between the data on pesticides themselves (time series, cross section) as well as between pesticide data on one hand and other type of data (e.g. agricultural, economical, sociological) on the other.

ESTIMATION OF REQUIRED DATA

12. Data are not always readily available, but it is sometiems possible to recalculate and combine data so as to arrive at the required information. This exercise forms an integral part of the analysis. A few examples are given below:

(1) Local formulation

13. Sometimes no exact data are available on the total quantity of agro-pesticides which are locally formulated each year; moreover, the market is not very transparent. However, an attempt could be made to estimate the total local formulation based upon the data available on imports of technical grade material.

14. Group totals of imported technical grade material can be multiplied by calculators in order to arrive at the totals for local formulation. For this purpose, calculators could be estimated as weighted averages by combining imports of major technical grade pesticides with their respective formulation formulas.

15. In the case of Thailand the following conservative calculators have been arrived at:

Insecticides: Technical grade x 2.4 = Formulation weight

Fungicides: Technical grade x 1.8 = Formulation weight

Others: Technical grade x 2.0 = Formulation weight

The formulation weight of carbofuran (3% Gr.) which is a popular product in Thailand and is being prepared from imported carbofuran (75%) technical grade material has been estimated separately by multiplying the quantity of imported carbofuran (75%) by a factor of 25.

(2) Market value

16. The total market value (farm level) of these locally formulated agro-pesticides has been estimated per group by applying certain calculated marketing/formulation margins to the average import price of Technical Grade multiplied by the volume of locally formulated agro-pesticides. Again, the market value of carbofuran (3% Gr.) has been calculated separately.

17. In the same manner the total market value of imported finished products of agro-pesticides has been estimated by multiplying the import value of the different groups of agro-pesticides by their respective average marketing margins.

18. In more simple cases, where only a few products are on the market, the retail market value of the total supply may be calcuated by multiplying the quantities of the marketed products with their respective retail prices.

(3) Total supply

19. Another example of information which is not readily available but which could be calculated or estimated with some effort is shown from citing case of Bangladesh. In Bangladesh the procurement of pesticides was up to 1980 centralized by the Bangladesh Agricultural Development Corporation (please see figure 2). Detailed statements comprising all procurements were readily available.

20. Procurements included (a) imports of formulated products,
(b) imports of technical grade material,
(c) locally formulated products.

21. BADC supplied local formulators with technical grade materials (e.g. Malathion technical). These materials, however, were also directly imported by the local formulators, without being channelled through BADC (e.g. Diazinon for subsequent formulation to Basudin 10G).

22. Information on the quantities of pesticides which are being locally formulated each year (d) is also readily available.

23. Sometimes, these figures on procurement by BADC are taken to represent total imports of pesticides or even the total supply available for consumption. In view of the above explanation it becomes evident that this is a misconception since there is no economic significance in adding quantities of formulated products in terms of formulation weight to quantities of unformulated products i.e. technical grade material which are more or less equivalent to active ingredients. (The case of values is a different matter of course). The misunderstanding is further aggravated by also qualifying local procurements by BADC as imports.

24. Total supply in a particular year could be easily calculated by adding the imports of formulated products (a) as procured by BADC to the supply of locally formulated products (d) in the same year (see table 1).

Table 1: Supply/procurement of pesticides in Bangladesh 1978-1979

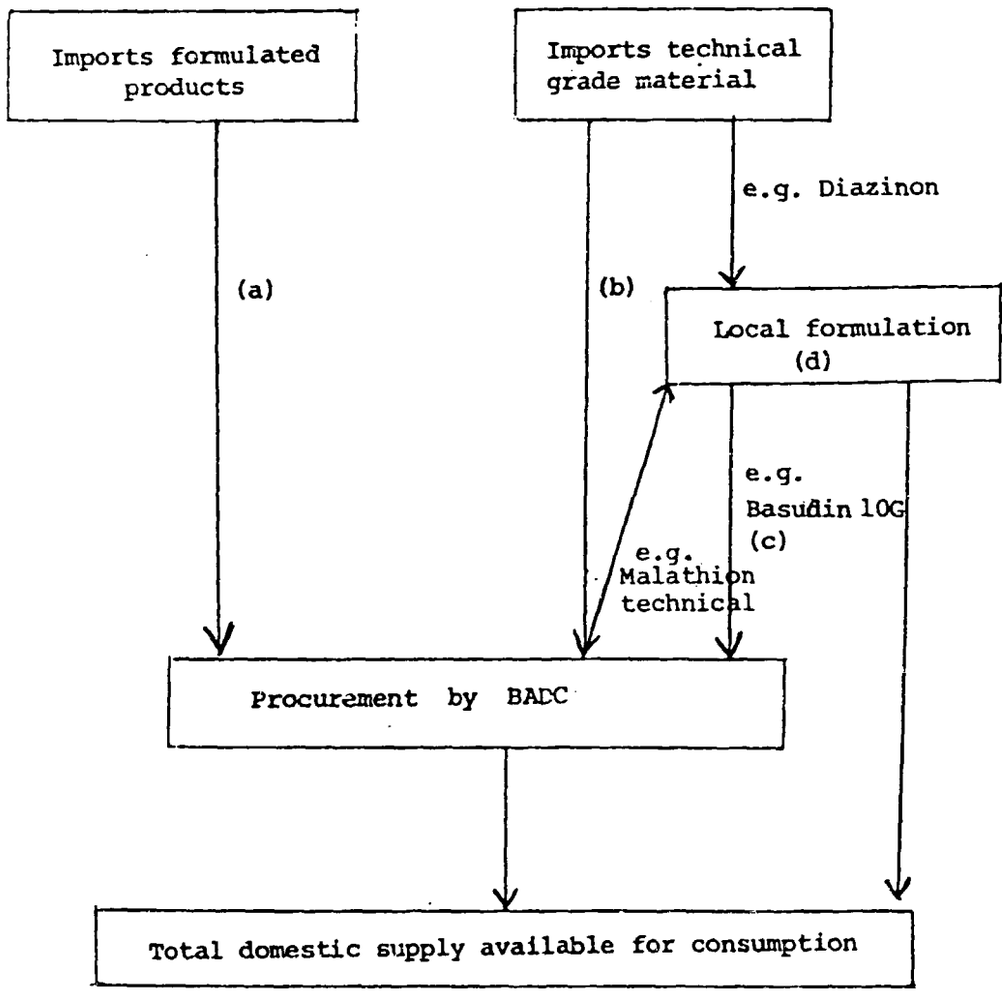
(in metric tons)

BADC import formulated products (a)	BADC import technical grade material (b)	BADC local procurement formulated products (c)	Locally formulated products (d)
1158	294	250	447

Total supply = a + d = 1605

Total BADC procurement = a + b + c = 1702.

Figure 2: Schematic flow chart of pesticides in Bangladesh



(4) Active ingredients

25. In many cases supply figures in terms of active ingredient are not available. There is only one solution that is to calculate the amount of active ingredient contained on a product by product basis by multiplying the total formulation weights of imported finished products by their respective concentration formulas.

26. No account has to be given of locally formulated products, since the active ingredients involved are indicated from the imports or local manufacture of technical grade material usually containing about 90 per cent of pure active ingredient.

Reporting format

27. The collected data was analaysed by ARSAP country by country based on the following indicators according to:

(1) agro-pesticide use/supply (total and per hectare) in terms of:
- active ingredient
- formulation weight
- retail value

(2) product range available on the market

(3) sources of supply (imports, formulation and manufacture)

(4) distribution structure and retail prices

(5) regulatory infrastructure.

Reporting system

28. Data can be disseminated through:

(1) country reports: containing detailed information on pesticides for a particular country.

(2) comparative reports: containing standardized indicators which allow for a comparative analysis of the pesticides situation in a number of countries.

(3) regular news bulletins: containing very recent information and developments in the pesticides field.

29. These regular news bulletins are considered to be the most effective forum for information dissemination on recent developments in the pesticides field for a Network such as the UNIDO Regional Pesticide Network in which constraints are being felt on time, manpower and money.

Use of agro-pesticides in the developing countries of Asia

30. Agro-pesticides use per hectare of arable land and land under permanent crops differs widely. Five stages of development can be distinguished:

Stage I:	0 - 100	grams active ingredient used per hectare
Stage II:	100 - 500	grams active ingredient used per hectare
Stage III:	500 - 1,000	grams active ingredient used per hectare
Stage IV:	1,000 - 5,000	grams active ingredient used per hectare
Stage V:	5,000	grams active ingredient used per hectare

31. Afghanistan, Burma, Bangladesh and Nepal are at stage I of pesticides use development. A low level of pesticide use usually coincides with an inadequate regulatory infrastructure, absence of a local pesticides formulation or manufacturing industry (exception Nepal) and a very small range of products being marketed, generally cheap traditional products (e.g. organochlorines).

32. Pakistan, Indonesia, Papua New Guinea and India are at stage II of pesticide use development. Pakistan and Indonesia have a reasonably developed pesticide formulation industry, but still depend to a large extent on imports of technical grade materials. Papua New Guinea is a very small market and uses mainly herbicides in its plantation crops sector. India, being by far the largest agro-pesticides market in the region is almost self-supporting. Only some technical grade material is being imported. In 1981/82 these imports accounted for about 5 per cent of the total supply in terms of active ingredient. The total number of different kinds of pesticides available to an Indian farmer is only 122 as against about 900 in the United States of America. India having 16 per cent of the world population and almost 4 per cent of the world's cropped area has a share of only 3 per cent of the world's pesticide consumption. Consumption of pesticides for agriculture in India is expected to rise gradually to about 64,000 metric tons active ingredient in 1983/84 (Source: Report of the Working Group on Pesticides Industry for the Plan 1978/79 to 1983/84).

33. Agro-pesticide use per hectare in Sri Lanka, Thailand and the Philippines is at stage III. These markets are reasonalty well developed, in all aspects; the Philippines, in particular has recently made great progress in developing its regulatory infrastructure.

34. In Sri Lanka, after the import liberalization in 1977, the import level of agro-pesticides more than doubled in 1979, but in 1980 dropped to the level of 1976. Imports of agro-pesticides in 1980 totalled about 600 metric tons of active ingredients, with a strong increase of herbicides imports accounting for about 70 per cent of total imports. Thailand stabilized its import of agro-pesticides active ingredients at about 10,000 metric tons in 1981. The average import price of a kilogram or litre of agro-pesticide increased by about 275 per cent since 1973.

35. Peninsular Malaysia and the Republic of Korea are considered to be mature agro-pesticides markets (stage IV). In the Republic of Korea the recent farm price trends for agricultural inputs show a much smaller price increase for agro-pesticides than for fertilizers and farm equipment.

36. On the basis of the abovementioned situation it is possible to distinguish a development pattern. Countries start using traditional, cheap products in relatively small quantities. After some time the use increases and some legislation and regulations are introduced. The range of products which are marketed widens (relatively more herbicides and fungicides and recent insecticides). If the size of the market permits, a local pesticide formulation - or manufacturing industry develops. Also the distribution structure is developed; private retailers appear on the scene once the turnover per selling point becomes attractive.

37. Much progress is yet to be made in pesticide management at the government level. Most of the needed development will have to originate from within the respective countries, but there is also scope for future international development co-operation.

38. Some suggestions for a simple, standardized data collection system

I. Type of data to collect (indicators)

1. Total import Finished Product expressed in:

Active Ingredient

CIF value

Formulation weight

Table 2. Usage of Agricultural Pesticides in Selected Asian Countries & Australia
(mt of a.i.) (U.S. $)
1981

COUNTRY	Insecticides		Fungicides		Herbicides		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
India	23,954	$ -	2,571	$ -	723	$ -	27,248	-
Indonesia	4,845	43,801,200	906	2,871,200	833	11,221,385	6,584	57,893,785
Japan(1)	35,245	546,593,000	30,956	107,693,000	15,257	456,375,000	81,458	1,110,661,000
Korea (2)	6,358	80,705,000	5,502	77,292,000	3,374	39,176,400	15,234	197,173,400
Pakistan(3)	948	-	117	-	36	-	1,101	-
PRC	111,950	-	11,050	-	10,075	-	133,075	-
Philippines	1,615	14,990,300	832	5,807,200	1,062	5,295,400	3,509	26,092,900
Thailand	3,749	36,307,735	1,780	6,830,070	4,257	64,282,525	9,786	107,420,330
Australia	2,306	45,668,870	1,441	10,653,465	6,031	107,133,835	9,778	163,456,170

(1) Plus $425,925,000 value of combination insecticide/fungicides
(2) Korea 1980
(3) Total value of all materials $20,418,000

2. Total import Technical Grade expressed in:
   . Active Ingredient
   . CIF value
3. The above per sector of agriculture, public health and others.
4. The above per group of insecticides, herbicides, fungicides and others.
5. Local manufacture of Active Ingredient
6. Local formulation/manufacture capacity expressed in Formulation Weight.
7. Major products available on the market (formulation weight)
   . imported
   . locally formulated/manufactured
8. Retail prices of marketed products
9. Optional:
   . classification organochlorines etc.
   . usage per crop
   . percentage of area treated
   . crop areas (trends)

Of the indicators mentioned above the total supply of Active Ingredient to a country is considered to be very important as the data collected under this heading would provide a country with quite a valid comparison between separate years and between separate countries and could serve as a kind of indicator in the agro-ecological process.

As another indicator, one might consider a classification into major groups of pesticides imported viz. organo-chlorines, organo-phosphates, carbamates and others. These different groups have totally different impacts on the agro-ecological systems and these differences could be critical in influencing government decisions on policy-formulations and regulations and also provide important information for importers and manufacturers, as well as for scientific researchers.

II. Collection methods

1. questionnaire (1 or 2 pages only): to collect standard data; in each country one assigned officer should be responsible for data collection.
2. commissioned studies: to collect more specific data.
3. review missions (occasionally): to clarify and verify collected data and to collect additional data.

III. Reporting format

1. Monthly News bulletin only.

Appendix 5 SUMMARIES OF COUNTRY PAPERS

SUMMARY OF COUNTRY PAPER

B A N G L A D E S H

PESTICIDE DATA COLLECTION SYSTEM

The collection and storage of data of pesticides is very important in Bangladesh. It provides the Government with the records and also helps them to formulate policies on affairs relating to pesticides. Pesticide trade has recently been handed over to the private sector and the Agriculture Pesticide (Amendment) Act, 1980 has been enforced to regulate the import, manufacture, formulation, repacking, distribution, sale and end use of pesticides in the country. In this connection, it is essential to collect data on different aspects of pesticides regularly. The data are collected mainly from two sources - centrally from pesticide traders and from the fields. The Pesticide Inspectors perform the duties of collection of data from the fields, particularly, from pesticide dealers. Data of public health pesticides are collected from Municipal Corporations and Mosquito Control Offices. However, the technique of data collection and storage is not as systematic as desired. The pesticide dealers are not fully conversant with the know-how of maintenance of proper record of pesticide stock and sale proceeds. Government, however, took steps to re-organise the agricultural extension work including plant protection and as such data collection system is expected to improve. Even then, the assistances mentioned below are required :

(i) Training of the dealers is to be organised soon so that they can handle and maintain information and records of pesticides systematically.

(ii) Training of Government officials is needed to familiarise them with modern system of processing and storing of data.

(iii) Sophisticated computerized calculators are to be procured.

(iv) Facilities for setting up of a 'Data Bank' on pesticides in the country are to be made available.

If these proposals are fulfilled it will then be possible to feed-back the 'Regional Co-ordinating Unit' with authentic data regularly.

SUMMARY OF COUNTRY PAPER

B A N G L A D E S H

PESTICIDE DATA COLLECTION SYSTEM

In order to be able to decide the economic and commercial potential of sny Pesticides manufaturing/formulation/marketing venture, it is necessary to have accurate and appropriate data available easily and continuously. These country-wise data should be stored regionally in an uniform format and made available to all concerned annually in publication. The format for collection of data should be evolved by UNIDO and circulated to all concerned for adoption.

There should be a central Pesticides authority to monitor, control and store all data on Pesticides, irrespective of their end uses. This organisation of the Government should be the central focal point for all informations and policies on Pesticdes manufacture/formulation and uses of Pesticides in the country. UNIDO may help in formation of such a body in the Government of Bangladesh through the good offices of its Regional Pesticides Network and other local UN agencies such as FAO/WHO etc. Pesticide Association of Bangladesh, will be very glad to cooperate and coordinate with the UN agencies and the Government of Bangladesh in providing all assistance to achieve this objective.

SUMMARY OF COUNTRY PAPER

I N D I A

PESTICIDE DATA COLLECTION SYSTEM

India is one of the thickly populated countries of the world with about 15 per cent of world's population and 2.5 per cent geographical area. About 45 per cent of the area is available for cultivation. About 70 per cent of the population depends on agriculture and nearly 55 per cent of agricultural holdings are marginal.

Use of pesticides in India has increased significantly over the last two decades. The combined rate of pesticide consumption over the period 1955-56 to 1977-78 has been found to be 15.8 per cent/annum. On this basis, the pesticide demand for 1980-81 and 1984-85 should be of the order of 92,000 and 165,000 M.T./tech. grade respectively. But, this is hard to achieve. National Council of Applied Economic Research (NCAER) derived the likely demand of pesticides by a regression equation and calculated that in above mentioned financial years pesticides demand should be 78,000 and 104,000 M.T. respectively. NCAER derived the equation Y = a+bX(where Y denotes the M.T. quantity of pesticide consumed in the agriculture sector in a given year, X denotes the area under high yielding variety crops for the same year, and a and b are regression co-efficients) following simple linear regression relationship and estimated that pesticide demand for agriculture would be 53,000 and 70,000 M.T. in the year 1980-81 and 1984-85 respectively.

Estimates of the consumption of pesticides in agriculture differ quite markedly from year to year and the pesticide consumption in public healt will primarily depend on budgetary provisions og Government.

India is primarily an insecticide market. With the availability of 69 technical materials - 34 indigenous and 25 imported - India is formulating a conventional range of 122 formulations. Endrin, ethyl parathion, calcium arsenate, lead arsenate, carbophenthion (trithion), azinophos methyl (gusathion), EPN, mevinphos (phosdrin), 2,4,5-T, vamidothion, mophosfolan, azinphos ethyl, binapacryl, dicrotophos, thiodemeton, fentin acetate, fentin hydroxide, disulphoton, chinomethionate (morestan), ammonium sulphamate, leptophos (phoseul) can not be registered in this country for use under Insecticides Rules, 1971. BHC, DDT, malathion, methyl parathion, endosulfan, dimethoate, fenitrothion and quinalphos are much in demand.

More that 40 per cent pesticides consumption is only in cotton crop followed by paddy where it is nearly 35 per cent. Cotton, paddy and vegetables take a share of 80 per cent of the consumption of the total pesticides. Four Southern States - Andhra Pradesh, Karnataka, Tamil Nadu and Kerala - consume 40 per cent of the total pesticides used in the country.

Production capacity, at present, stands at almost 103006 T.P.A. with a licenced capacity of 110187 T.P.A., a further 14300 T.P.A. is covered by letters of intent and 13900 T.P.A. in schemes registered but not started. India is able to produce about 85 per cent of its total requirement.

Pesticides data are available from Ministry of Agriculture, National Malaria Eradication Programme (NMEP), National Institute of Communicable Disease (NICD), Ministry of Health , Ministry of Chemicals and Fertilizers, Agricultural Universities, Indian Council of Agriculture Research (ICAR), National Council of Applied Economic Research (NCAER) and Hindustan Insecticides Limited (HIL). Some potential data sources are also available in the country. Proper methodology of data collection has not been adopted in this country except only one study by NCAER referred above. No data bank is in existance for the pesticides production, import, consumption, requirement, marketing and control. There are organisational structural sociological and technical constrains in data collection.

The real need for pesticides in health and agriculture in India, as well as in many developing countries of the region, is perhaps, far in excess of the estimates made by any methodology, but the actual demands and uses are, however, more governed by technical and economic limitations than the actual needs based on the practically achievable and techno-economicall feasible use level of pesticides in other parts of the world. So isthe case in India and the demand and use of pesticides is expected to grow towards fulfilment of the actual needs of health and agriculture with the overall technical and economic progress of the country in the years to come. Reliable forecasts would have to really take all these factors into consideration and build suitable demand models.

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SUMMARY OF COUNTRY PAPER

I N D O N E S I A

PESTICIDE DATA COLLECTION SYSTEM

There are several institutions in Indonesia involved in pesticides handling, so data sources of pesticides are scattered.

Before distribution, storage and application, any and all pesticides have to be registered with the Minister of Agriculture through Pesticide Committee. Then technical data of any registered pesticides can be obtained from Pesticide Committee.

To fulfil pesticide requirement, Department of Trade and Cooperative arrange pesticides supply from local formulators and import. Then data of imported pesticide (active ingredients and formulated) can be obtained from Department of Trade and Cooperative.

In general pesticides in Indonesia can be classified into subsidized and non-subsidized. Subsidized pesticide are pesticide which used for food crops in the frame work of BIMAS/INMAS programme. Since the last two years subsidized pesticides had been also intended for the farmers who participate in Industrial Crops intensification programme, i.e. cotton, fiber, sugar cane and tobacco intensification programme.

Pesticides used for BIMAS/INMAS programme represent about 75% of total pesticides consumption. This programme is coordinated by Bimas Directing Unit, under Department of Agriculture.

In preparing requirement of subsidized pesticides, Department of Trade & Cooperative consult to Bimas Directing Unit for forcast demand and to Department of Industry for quantity of pesticides which can be supplied by local formulators. While non-subsidized pesticides requirement data are given by private sector, and pesticides for public health purpose data are given by Department of Health.

Since March 1979, PT. PERTANI has been made solely responsible for the distribution of all pesticides for BIMAS/INMAS programme. So data of quantity and distribution system can be obtained from PT. PERTANI.

In order to get maximum advantage of those scattered data, coordination is needed. Coordination task will be taken by the Agency for Industrial Research and Development (AIRD) as National Coordinating Unit in the framework of RENPAF. Unit of AIRD which will conduct this activities is Institute for Research and Development of Chemicals Industry (IRDCI). Both are under Department of Industry.

Although AIRD was appointed National Coordinating Unit, many of institutinn related to pesticides activities did not know this appointment. The consider that AIRD as new comer involved in pesticides society. For that reason there are many obstacles faced by AIRD at the beginning.

For the short-term programme, AIRD will conduct a meeting by inviting al' institution involved in pesticide activities. Through this meeting it is expected that the role of AIRD will be known.

In order to get data which can be interchanged, it is necessary to prepare standard format agreed by all RENPAF member countries. This standard format will then be transferred into several questionaires, to make easier to answer by related institutions.

SUMMARY OF COUNTRY PAPER

K O R E A

PESTICIDE DATA COLLECTION SYSTEM

Pesticide is one of the essential materials in modern agriculture and plays an important role in increasing the agricultural production. But it is needed to be thoroughly controlled under governmental management and sufficient informations of it are to be secured because the misuse and ill-control of it may cause adverse effects on human, animals and their environments.

In this respect, pesticide is under strict management of Korean government from registration to marketing and most of all data/informations related to pesticide are gathered and filed by governmental authorities, such as Ministry of Agriculture and Fisheries, Agricultural Chemicals Research Institute. In the private sector, Agricultural Chemicals Industrial Association, which is the cooperative of pesticide formulators and technical producers, collects and publishes regularly the pesticide data related to industrial concerns. The data compiled by each authorities can be utilized by organizations concerned. Basic statistical data, including present status of registration, production, import/export, pest control, and regulations are issued periodically. And now, it is under consideration to establish a data bank in ACRI which will store all the data and informations related to pesticide in circulation of Korean market for the improvement of data collection and storage system

Local data are easily collected, but the gathering of foreign data/informations, which can be used as good references for pesticide management and the development of pesticide industry, are restricted by various factors. Therefore, it is now greatly expected to enlarge the international cooperation among Asia regional countries in pesticide data collection and transfer through the UNDP/UNIDO pesticide Regional Network Programme.

SUMMARY OF COUNTRY PAPER

P A K I S T A N

STATUS OF PLANT PROTECTION AND PESTICIDE INDUSTRY

The paper presents a history of development of plant protection activities in Pakistan through mid-50's and usage of pesticides in relation thereto pesticide usage reached a peak of 16½ thousand metric tons in 1976 when importation and sale was in government hands. After introduction of sale of pesticides in 1980, decrease occurred in the consumption of pesticides but they are picking up pace now. Currently, only BHC (HCH) and DDT are being manufactured but other proposals are also under consideration. A number of pesticide formulation units for producing EC, WP, D and Gr. pesticides are available in the country.

INFORMATION REGARDING COLLECTION OF DATA ON PESTICIDES IN PAKISTAN AS REQUIRED IN THE AID - MEMOIRE IS GIVEN BELOW:

A. TYPES OF DATA IDEALLY REQUIRED FOR:

Ideally data on all aspects of pesticides export, import, sale, consumption, local manufacture and local formulation is required. The proforma circulated by ESCAP in the form of a questionnaire in 1982 covers almost all aspects of pesticides data i.e. import/ export for technical material and formulated pesticides, local manufacture and formulation, total supply available, total number of pesticides sold, pesticides consumed, cropwise usage and retail pricing which can be useful for formulation and implementation of government policies.

B. TYPES OF DATA ACTUALLY COLLECTED AND READILY AVAILABLE ON A REGULAR BASIS

1. At present the Provinces of Punjab and Sind collect regularly pesticide data in the two proformas on quarterly basis. Proforma-I contains the following information:
Name of Firms, Name of Pesticides, Opening Balance in ltr./kg., Fresh Arrivals, Grand Total, Quantity Sold in ltr./kg. during the Quarter, Balance on the close of the Quarter and Remarks.

In Proforma-II:

Name of Firm, Date on which Indent Submitted to Provincial Government, Recommendation of Provincial Government, Date on which Firm applied for Licence, Grant of Import Licence

by CCI & E, Date of L/C opened and Shipment Schedule.

All the firms dealing with pesticides in Agriculture Sector have to give the above statements to the Provinces of Punjab and Sind on quarterly basis. Similarly system is likely to be followed by other two Provinces i.e. NWFP and Baluchistan where import and sale of pesticides has been transferred from Public to Private Sector w.e.f. 1.7.1982.

II. The Pakistan Pesticides Association also receives data on the above given proformas from its members whose sales are more than 70% in the above two Provinces.

III. The Investment, Promotion & Supplies Department, import pesticides on behalf of Central Plant Protection Department Government of NWFP and Baluchistan and Malaria Control Department and have information readily available with them regarding name of pesticides, quantity imported, country of origin, FOB & C&F prices, freight and insurance etc.

IV. Information is also readily available with Malaria Control Department about pesticides imported and consumed for control of malaria vector.

V. The Federal Department of Plant Protection compiles information regarding import and use of pesticides on quarterly basis for crop protection on all Pakistan basis.

VI. Federal Bureau of Statistics, Ministry of Finance, Statistics Division, Karachi keep record of import and export of all commodities including pesticides.

VII. Similar record is available with the Custom House, Karachi.

C. LOCAL SOURCES OF DATA:

KNOWN:

1. Department of Agriculture, Government of the Punjab, Lajore
2. Department of Ag iculture, Government of Sind, Karachi

3. Department of Agriculture, Government of NWFP, Peshawar
4. Department of Agriculture, Government of Baluchistan, Quetta.
5. Adviser and Director, Plant Protection Department, Government of Pakistan, Karachi.
6. Pakistan Pesticides Association, Karachi
7. Department of Investment, Promotion and Supplies, Government of Pakistan, Karachi
8. Malaria Control Department, Ministy of Health, Government of Pakistan, Islamabad.
9. Federal Bureau of Statistics, Ministry of Finance, Statistics Division, Karachi.
10. Custom House, Karachi, Ministry of Finance, Government of Pakistan, Karachi.

POTENTIAL:

1. Pesticides Formulating Units for Agriculture.
2. Formulators of House Hold Pesticides for Public Health.
3. Defence Puchases.
4. Forest Department
5. Food Departments of Federal and Provincial Governments
6. Pakistan Agricultural Storage and Supplies Corporation

D. SCOPE OF DATA COLLECTION:

Presently the Ministry of Agriculture, Government of Pakistan compiles the data on pesticides particularly regarding import and consumption in Agriculture Sector. They get the information from Provincial Agriculture Department , Investment, Promotion and Supplies Department, Government of Pakistan and Pakistan Pesticides Association.

As regards Public Health the Malaria Control Department complies the information regarding import and sale of pesticides in Public Health.

The Federal Bureau of Statistics, Ministry of Finance, Statistics Division, Karachi compiles the information regarding imports and export of pesticides.

E. DESCRIPTION OF TECHNIQUES FOUND USEFUL FROM PAST EXPERIENCE

The technique of collection of data in the Proforma-I and II mentioned above has been found useful. The system is that Provincial Agriculture

Departments provide the above proformas to all the registered firms in the Provinces who are bound by contract to supply the information on quarterly basis.

F. WAYS IN WHICH RESOURCES IN EXISTING DATA BANK CAN BE UTILIZED

Presently facilities do not exist for a Data Bank on pesticides

G. AVAILABLE FACILITIES FOR STORAGE AND RETRIEVAL OF DATA

Facilities for scientific storage and retrieval data on pesticides on all Pakistan basis are hardly available in the country.

H. CONSTRAINTS IN DATA COLLECTION

There are organizational and methodological constraints in data collection at present.

I. SCOPE FOR IMPROVEMENTS:

It is suggested that completely new set up should be organized for collection of data both in Agriculture and Public Health in Pakistan. Proformas should be prepared and information gathered on quarterly basis. A senior official should be made responsible to collect and compile data on pesticides. In this regard assistance can be provided in the form of typewriters, photocopying machines and may be a mini computor.

(MUSHTAQ AHMAD)

SUMMARY OF COUNTRY PAPER

P H I L I P P I N E S

PESTICIDE DATA COLLECTION SYSTEM

In 1972 food production programs were intensified by the government. With the increase in agricultural production emerged a subsequent increase in the utilization of pesticides and concern for its proper management. With it was the birth of Fertilizer and Pesticide Authority in 1977, the sole government agency responsible for the importation, exportation, manufacture, formulation, distribution, sale, transport, storage, use and disposal of pesticides. Regulations and legislation have been the primary thrust of the FPA and as such the main focus of its present data collection has mainly centered on the amount and volume of pesticides that form the supply of the country.

Types of data ideally required by the government should focus more on usage and consumption of pesticides which would support both regulatory and increased food production objectives. The following types of data are needed on a regular basis:

1. types of pesticides used by crop, by pests, by province.
2. Cost of pesticides used per hectare, per crop.
3. Yields per unit of pesticide used, per crop.
4. types of pesticides found most effective for specific pests, per province.

From the regulatory standpoint, updated information on the specific uses of a particular chemical, the amount to use per crop and control measures for specific diseases, weeds or pests should be gathered and monitored.

Data on pesticides are collected by Fertilizer and Pesticide Authority and the Agricultural Pesticide Institute of the Philippines.

Fertilizer and Pesticide Authority - As the regulatory agency on pesticides, it monitors all importations of chemicals in the country. It has data on the numbers of participants in the market and its coverage up to the provincial level. It complements the National Food and Agriculture Council's production program by recommending ceiling prices for retail pesticides products sold to farmers participating in government-sponsored projects.

Agricultural Pesticide Institute of the Philippines - A trade organization of 24 companies which accounts for 95% of industry sales. This organization turn out sales statistics, the only data available for estimating consumption of pesticides.

Present methods of data collection are limited to:

1. Foreign Inward and Outward Manifests published by the Central Bank listings of quantities of pesticides imported.

2. Fertilizer and Pesticide Authority requires all entities taking in chemicals to the country to secure a certificate authorizing such importation. From this, data on the quantity, price and country sources are generated.

3. Fertilizer and Pesticide Authority obtains reports on data on locally manufactured Technical Grade Materials from the lone local manufacturer, Agchem Manufacturing Corporation.

4. Fertilizer and Pesticide Authority obtains yearly reports from formulators on locally formulated products as part of the licensing requirements.

Consumption figures are gathered from more than 3,000 dealers spread all over the country. These statistics are classified by groupings, i.e., insecticides, herbicides, fungicides and others.

The Ministry of Agriculture has a computer center presently storing data on varied government agricultural projects. Its IBM 370 may be used for the storage and retrieval of pesticides data.

Data Collection in the Philippines is constrained by the following general factors:

1. Structural: The government bureaus which have access to farmers, Bureau of Agricultural Extension and Bureau of Agricultural Economics, are concentrating on direct farmer assistance toward increasing food production. Both are constrained by limited manpower and financial support from focusing on input utilization monitoring work.

2. Organizational: The existing manpower under the Fertilizer and Pesticide Authority also performs day to day work for the government's varied agricultural projects. Any effort to improve data collection needs a coordinated action on the part of provincial officials and as such would require at least one person per province on a full time basis.

3. Sociological: Filipino farmers have yet to appreciate the merits of record keeping that would facilitate data collection. Even under the supervised credit scheme where banks require reports on input utilization and adherence to technicians recommendations, farmers cannot be expected to report true facts on pesticide usage.

4. Technical: Differences in units of measurements, the variety of packaging plus the variety of brand names for the same products make the collection of uniform and comparable data difficult.

5. Competition in the Indsutry:

- Costs are confidential data for competitive reasons.
- Fertilizer and Pesticide Authority is bound by law to respect confidentiality of data relating to trade of specific products. This makes it difficult to monitor specific acquisition and distribution cost of certain pesticide products.

Scope of Improvement:

- Creation of a coordinating body that would harness and provide direction for the varied government agencies involved with agriculture.
- Proper directions as to the type of data required.
- With adequate logistical support, hiring of pesticide data col -tors would generate regular reports needed by both government and private sector.

SUMMARY OF COUNTRY PAPER

S R I L A N K A

PESTICIDE DATA COLLECTION SYSTEM

At present agrochemicals are imported to the country by number of private institutions and government agencies. A greater part of the agrochemicals market is supplied by the private organizations. These institutions are involved in formulating various products which are sold in different trade names. These products are made available to the farmer through the private dealers, co-operatives and government institutions like Agrarian Services Centres.

Collection of statistics regarding pesticide is done by number of organizations. Imports statistics are provided by the Department of Customs. Data on local manufature are available with institutions which involved in manufacture of insecticides. Data on consumption of agrochemicals are mainly collected by the Department of Agriculture. At present following information of pesticide use in relation to paddy cultivation is collected at the end of every cultivation season.

1. Percent average treated
2. Percent farmers used
3. Average amount per hectare
4. Average cost per hectare

The above information is collected in terms of different formulations. This exercise was initiated recently and the data on use of pesticides in the cultivation of other crops too will be initiated shortly.

There were number of difficulties in collecting data on agrochemicals. For instance, it is difficult to get data on imports of agrochemicals by formulations or products. However, the Department of Agriculture has already initiated actions to organize the pesticide data collection system in the island by having a better co-ordination with various institutions involved.

The pesticide data collection system in the island will be organized in such a way so that it will facilitate the collection and reporting of pesticide data as required in the format agreed by the participant countries.

SUMMARY OF COUNTRY PAPER

T H A I L A N D

PESTICIDE DATA COLLECTION SYSTEM

The rapid increasing demand of pesticides in Thailand is due to the government Plan to accelerate the rural development as specified in the Fifth National Economic and Social Development Programme. Secondary use of pesticide is in Public Health by both the government and private sector to develop the health care.

Thailand has promulgated the law to control the pesticide in 1967 so called "The Poisonous Article Act BE 2510" and amended in 1973 as is called "Poisonous Article Act BE 2516". These acts are responsible by different agencies of three ministries.

1. Department of Agriculture, Ministry of Agriculture and Cooperatives is responsible for the pesticide used in agriculture.
2. Food and Drug Administration, Ministry of Public Health is responsible for the pesticide used in public health and for chemicals used in household products.
3. Department of Industrial Factory, Ministry of Industry is responsible for chemicals used for industry.

According to the mentioned Act, the licensing is required for importation, exportation, bringing in transit, manufacturing for commercial (formulation and repacking), sale and pest control service. The licensee for importation and manufacturing have to register their commodity products.

Pesticide data collection has been done by:

1. The Department of Agriculture, Ministry of Agriculture and Cooperatives collects the data from the regulatory requirements which are the following
   (1) Kind and concentration of the active ingredient
   (2) Amount of pesticides in terms of weight of formulation or technical grade per year.
   (3) Trade name of origin and/or local name
   (4) Dosage form.

(5) C.I.F. value

(6) Origin country of active ingredient.

(7) Name of local importers or manufacturers.

2. The Office of Agricultural Economic, Ministry of Agriculture collects the following data:

(1) Market share of the pesticide in country.

(2) Consumption of classified pesticides on economic crops.

(3) Market channel survey.

(4) Local retail price.

3. Food and Drug Administration, Ministry of Public Health collects the data the same as in 1.

4. Private companies collect the data whatever they are interested in.

5. Epidemiology study is done by various hospitals, Ministry of Public Health.

Every types of data needs the appropriate model for collecting.

Appendix 6

EIGHTEEN PESTICIDE PRODUCTS MOST COMMONLY USED IN THE MEMBER COUNTRIES

1. CARBOFURAN 3% GR
2. MONOCROTOPHOS 40% S
3. CARBARYL 85% WDP
4. ENDOSULPHAN 35% EC
5. FENITROTHION 50% EC
6. PARAQUAT 2% S
7. MANCOZEB - 45
8. DIAZINON - 60% EC
9. PHENTHOATE 50% EC
10. DIMETHOATE 30% EC
11. 2,4-D ESTER
12. CAPTAN 50% WDP
13. MALATHION 57% EC
14. DIAZINON 01% GR
15. METHYL PARATHION 50 EC
16. ZINC PHOSPHIDE
17. CYPERMETHRIN
18. FENTHION

Product \ Country	Bangladesh	India	Indonesia	Korea	Malaysia	Pakistan	Philippines	Sri Lanka	Thailand
1. CARBOFURAN 3% GR	✓	✓	✓	✓	✓	✓	✓	✓	✓
2. MONOCROTOPHOS 40% S	✓	✓	✓	✓	X	✓	✓	✓	✓
3. CARBARYL 85% WDP	✓	✓	✓	✓	✓	✓	✓	X	✓
4. ENDOSULPHAN 35% EC	✓	✓	✓	✓	✓	✓	✓	X	✓
5. FENITROTHION 50% EC	✓	✓	✓	✓	X	✓	✓	✓	X
6. METHYL PARATHION 50% EC	X	✓	X	X	✓	✓	✓	✓	✓
7. BUTACHLOR 5% GR	X	✓	X	✓	✓	X	✓	X	✓
8. BUTACHLOR 50% EC	X	✓	X	X	✓	X	X	X	✓
9. PARAQUAT 20% S	✓	✓	X	✓	✓	✓	X	✓	✓
10. ZINEB 80% WDP	X	✓	X	✓	X	X	X	X	✓
11. ZINC PHOSPHIDE 80%	✓	✓	✓	X	✓	✓	X	X	✓
12. COC 50% WP	✓	✓	X	X	X	✓	X	✓	✓
13. MANCOZEB - 45	✓	✓	✓	✓	✓	✓	✓	✓	✓
14. DIAZINON - 60% EC	✓	X	✓	✓	✓	✓	✓	✓	✓
15. CYPERMETHRIN 2.5%	✓	✓	X	✓	X	✓	✓	X	✓
16. PHENTHOATE 50% EC	✓	✓	✓	✓	✓	✓	✓	✓	✓
17. DIMETHOATE 30% EC	✓	✓	X	✓	X	✓	✓	✓	✓
18. METHAMIDOPHOS	X	X	X	X	✓	X	X	X	✓
19. 2,4-D ESTER	✓	✓	✓	✓	✓	✓	✓	✓	✓
20. METHOMYL 80% EC	X	X	X	✓	X	X	✓	X	✓
21. CAPTAN 50% WDP	X	✓	X	✓	✓	✓	✓	✓	✓
22. GLYPHOSATE - 42%	X	✓	X	✓	✓	X	X	X	✓
23. BENOMYL 50% WP	X	X	X	X	X	✓	✓	X	✓
24. MALATHION 57% EC	✓	✓	✓	✓	✓	✓	✓	✓	✓
25. DIAZINON 10% GR	✓	X	✓	✓	✓	✓	✓	X	✓
26. FENTHION 50% EC	✓	X	✓	✓	X	✓	X	✓	✓

TABULATION FOR MOST COMMONLY USED

PESTICIDE PRODUCTS IN 9 COUNTRIES

Appendix 7

DATA COLLECTION FORMATS

TABLE 1

1. COUNTRY _____

2. YEAR _____

3. Import and export of formulated pesticides

Product	Import		Export	
	Quantity (formulation weight or volume)	Total CIF value	Quantity (formulation weight or volume)	Total FOB value
Insecticides				
1.				
2.				
3.				
Herbicides				
1.				
2.				
3.				
Fungicides				
1.				
2.				
3.				

Product: indicate common name, concentration and type of formulation e.g. MALATHION 57% EC

Value : in USD at date of purchase or sale as per invoice

Quantity: in metric ton or kilolitre.

TABLE 2

1. COUNTRY _____

2. YEAR _____

3. IMPORT, LOCAL MANUFACTURE EXPORT OF TECHNICAL GRADE MATERIAL

Compound	IMPORT		LOCAL MANUFACTURE			EXPORT	
	Quantity	Total CIF value	Capacity	Quantity	Value	Quantity	Total FOB value

Capacity: in metric ton or kilo litre

Compound: indicate common name and percentage concentration or purity

TABLE 3

1. COUNTRY _____

2. YEAR _____

3. Capacity and actual output of pesticides formulated locally

Formulation type	Capacity	Output			
		Insecticides	Herbicides	Fungicides	Others
1. Granules					
2. Dry					
Dust					
WP					
SP					
3. Liquid					
S					
EC					
ULV					
4. Others					

Output: in metric ton or kilo litre

Capacity: in metric ton or kilo litre

TABLE 4

1. COUNTRY

2. YEAR

3. Quantity of pesticide formulations used in public health and other non-agricultural sectors.

Product	Public Health	Other Non-agricultural use

Quantity: in metric tons or kilolitre

Product : indicate common name; concentration and type of formulation

TABLE 5

1. COUNTRY _____

2. YEAR _____

3. Retail price of selected pesticide products

Product	Packing Nearest to 1 kg or 1 l	Retail price per kg or l	Subsidised price

Price: in USD as of 1 January of the year under consideration

Appendix 8

LIST OF NATIONAL DATA COORDINATORS