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REGIONAL NETWORK ON PESTICIDES FOR ASIA AND THE PACIFIC

DP/RAS/88/031

Technical report: Workshop on Industrial Hygiene and Occupational  
Health Safety and Their Environmental Concerns  
Metro Manila, Philippines, 15-19 April 1991\*

Prepared for the Governments of the Member States of the Regional Network  
(Afghanistan, Bangladesh, China, India, Indonesia, Iran, Myanmar, Malaysia,  
Pakistan, Philippines, Republic of Korea, Sri Lanka and Thailand)  
by the United Nations Industrial Development Organization  
acting as executing agency in association with the Ministry of Agriculture  
and the Fertilizer and Pesticide Industry of the Rep. of the Philippines  
for the United Nations Development Programme

Based on the work of Ms. Nelia C. Maramba  
and Mr. W.R. de Alwis and adopted by the participants  
of the workshop on 19 April 1991

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Vienna

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\* This document has not been edited.

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## TABLE OF CONTENTS

	Page No.
I. Introduction	1
II. Opening Ceremony	1
III. Election of Chairperson	3
IV. Adoption of Agenda	3
V. Country Papers	3
VI. Agencies Report	25
VII. Lectures	26
VIII. Plant Visit	33
IX. Workshop	33
X. Conclusion	33
XI. Recommendation	34
XII. Closing Ceremony	37

## ANNEXES

Annex 1	List of Participants	39
Annex 2	Schedule of the Workshop	49
Annex 3	Recommendations made in the Indonesia Workshop held in Surabaya, 10-14 Dec. 1990	55
Annex 4	UNIDO comments	57

## I. INTRODUCTION

1. The seminar/workshop on Industrial Hygiene, Occupational Health Safety and their Environmental Concerns in Pesticide Production Plants, one of the RENPAF programmes, was held in Manila, Philippines, from 15-19 April 1991.
2. This seminar/workshop was attended by representatives of the member countries from Afghanistan, Bangladesh, Peoples Republic of China, Indonesia, India, Republic of Korea, Malaysia, Myanmar, Pakistan, Thailand, Philippines and Sri Lanka and from United Nations Agency i.e. UNIDO.
3. This seminar/workshop was organized by the Fertilizer and Pesticide Authority of the Department of Agriculture, Republic of the Philippines for RENPAF. The list of participants is attached as Annex of the report.

## II. OPENING CEREMONY

4. An invocation was delivered by Mr. Ruben de Leon.
5. The welcome address was delivered by Hon. Senen C. Bacani, Secretary of the Department of Agriculture. He emphasized that this workshop should serve as a regional forum to assess each country's capabilities, and to enable these countries to help each other in improving the industrial capabilities of the region. He wished that this forum would bear fruitful results.
6. Respective sponsoring agencies then gave their messages: Mr. Christian Newman, UNIDO Country Director conveyed the greetings of Mr. Domingo Siazon, Jr., UNIDO Director General and the regrets of Mr. Kevin Macgrath, UNDP Resident Representative for not being able to attend. He pointed out that the Philippines has greatly contributed to UNIDO, the objective of which is to raise the standards of occupational safety.
7. Representative of UNIDO, Vienna conveyed greetings of the Director General of UNIDO. He commended the Philippines for having a strong pesticide program. RENPAF has 13 member-states in the Asia-Pacific region which represent 1/2 of the world's population. This Philippine workshop is the completion of an initial workshop held in Indonesia last year involving industrial safety, waste management, and effluent control. This present workshop aims to demonstrate the real problems of pesticide development and use. He hoped realistic views would be developed for proper guidelines for the protection of workers and the end users.

8. Dr. S. F. Dhua, RENPAF Regional Coordinator extended his congratulations to Mr. Luis T. Villa-Real, Jr., overall Chairman and his staff for preparing the workshop seminar that addresses the occupational problems relating to agricultural pesticides.

A workshop held in China, 1990 concluded that the industry is responsible for developing and choosing safer chemicals that are environmental friendly. For example, pesticides started with organo-chlorines followed by the development of organo-phosphates and carbamates and recently the synthesized pyrethroids.

Both the scientific and industrial sectors have to address side-by-side the following issues: 1) revamping of old plants; 2) protecting the workers and; 3) preserving the environment.

The first series of RENPAF Workshop is now in the Philippines particularly addressing the issues of health of workers in pesticide production plants.

9. Prof. Elma B. Torres was tasked with the introduction of the speaker, Dr. Alfredo Benzon, Secretary of Department of Health.
10. The inspirational message of Dr. Benzon was a signal and affirmation of the desire and capabilities of the Philippines to deal with three (3) areas:
- 1) Training in the safe use of pesticides brought down more effectively to the level of workers and farmers;
  - 2) Research and implementation to suit the local situation;
  - 3) Reexamination of government programmes concerning the following:
    - issues on lower costs and greater safety and,
    - fewer chemicals or the development of other substitutes.
11. Mr. Luis T. Villa-Real, Jr., FFA Executive Director thanked the different guests and sponsors of the Workshop (i.e. Agricultural Pesticide Institute of the Philippines) and declared the conference officially opened.

### III. ELECTION OF CHAIRPERSON AND APPOINTMENT OF RAPPORTEUR:

12. Mr. Luis T. Villa-Real, Jr., was elected over-all Chairman while Dr. Ranjit de Alwis (Sri Lanka) was appointed General Rapporteur.

13. It was proposed and unanimously approved by the Assembly to have daily chairpersons and rapporteur. They were as follows:

	Chairperson	Rapporteur
Day 1	Luis T. Villa-Real, Jr.	Ranjit de Alwis Dr. S. F. Dhua
2	Nelia C. Manamba	Joselito Capas
3	Elma B. Torres	Aida V. Ordas
4	Carmen F. Castaneda	Norman Slagen/ Marivic Garcia
5	Luis T. Villa-Real, Jr.	Ranjit de Alwis

14. Responsibilities of the chairpersons and rapporteurs were as follows:

The Chairperson of the day should be familiar with the proceedings of the day in order to direct timing of events, to highlight important issues, and to keep sessions in order. The rapporteur would be responsible for the minutes of the proceedings of that day.

### IV. ADOPTION OF AGENDA

15. The Agenda was presented and adopted unanimously. UNIDO Representative suggested that the recommendations of the Indonesian meeting held last year be taken up here and together with the outputs and recommendations of the Philippine meeting come up with a package for the region.

### V. COUNTRY PAPERS

16. The delegates of member countries submitted their country papers. The following are their abstracts:

#### 16.1 Afghanistan

A. Authorities and Agencies Responsible for Industrial Hygiene

and Occupational Health and Safety.

Ministry of Health - responsible for public health, policies and guidelines.

Ministry of Agriculture - responsible for control of diseases and pests.

Fertilizer and Pesticide Authority Departments - responsible for regulation of fertilizer and pesticide users.

Afghan Fertilizer and Agricultural Services Company - responsible for importation and distribution of pesticide.

B. Pesticide Usage/Production/Hazard Category/Formulating Plant

1. Pesticides Used:

- Insecticides
- Nematicides
- Fungicides
- Rodenticides

2. Pesticides Produced: none

3. Hazard Category: not mentioned

4. There are no formulating plants

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

The government believes in the promotion of the health, safety and welfare of the workers and has promulgated laws to set standards for such.

D. Problems involved in Industrial Hygiene and Occupational Health and Safety.

1. Inadequate data collection and analysis.
2. Lack of technical expertise.
3. Poor safety and hygienic standards in the workplace.

16.2 Bangladesh

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

1. Environmental Pollution Department

2. Ministry of Agriculture

- a. Pesticide Technical Advisory Committee
- b. Pesticide Technical Advisory Sub-Committee

3. Ministry of Industry

B. Pesticide Usage/Production/Hazard Category/Formulating Plants

1. Pesticide Used:

Acaricide - Bromopropylate, Dicofol, Ethion, Sulfur, Properdite.

Fungicide - Bordeaux mixture and cupraneb, Carboxin + thiram, Copper Oxichloride, Edifenphos, Mancozeb, Tridimorph, Aluminium phosphide, Methyl bromide, Triademifon, Triademinol, Pirimiphos methyl, Iprodione, etc.

Herbicide - 2,4-D Glyphosate, Dalapon, Dalapon Sodium, Paraquat, Propanil, etc.

Rodenticide - Zinc Phosphide, Cumatetralyl, Bromadiolone

Wood Preservative - Oxide of CCA type-C

Insecticide - BPMC, Carbaryl, Carbofuran, Carbosulfan, Cartap, Chlordane, Cypermethrin, Chlorpyrifos, Diazinon, Deltamethrin, Dichlorvos, Dicrotophos, Dieldrin, Dimethoate, Endosulfan, Fenitrothion, Fenthion, Fenvalerate, Formothion, Heptachlor, Isoprocarb, Isaziphos, Malathion, Monocrotophos, Methocritos, Oxydemeton methyl, Phenthoate, Phosalone, Phosphamidon, Pirimicarb, Quinalphos, Trichlorphon, etc.

Public Health

Product - Chlorpyrifos, Chlorpyrifos methyl, d-allethrin, Pirimiphos-methyl, Esbiothrin, Fermithrin, Tetramethrin, Temephos.

2. Pesticide Produced: none mentioned



3. Hazard Category - (WHO) IB, 2,3 are used
4. Presence of formulating plants

C. Government Policies Towards Industrial Hygiene and Occupational Health and Safety.

Licensing from the Plant Protection Wing based on the recommendation of the Environmental Pollution Department of the Ministry of Environment and Forest is required for all formulating plants based on set of standards. Pesticides classified under Category IA are banned from use.

D. Problem involved in Industrial Hygiene and Occupational Health and Safety.

- 1) Inadequate data collection - medical personnel are not obligated to report poisoning cases: no nationwide census.
- 2) No technical manufacturing plant.

### 16.3 China

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

1. Bureau of Health Inspection (BHI) under the Ministry of Public Health (MPH).
  - policy making, legislative body promoting occupational health and safety.

Functions:

- a) National standards for chemicals and dusts
  - b) Preventive measures for keeping of standards
  - c) Medical examination
  - d) Technical expertise
  - e) Rules and legislation
  - f) Monitoring of chemical concentrations in the work place
  - g) Biological monitoring of chemicals and their metabolites
2. Institute of Occupational Medicine, Chinese Academy of Preventive Medicine - most important link in the system of BHI.
  3. Chinese Environmental Protection Agency
  4. Medical universities

5. Anti-epidemic sanitation stations
  6. Local institute of occupational medicine
- B. Pesticide Usage/Production/Hazard Category/Formulating Plants
1. Pesticide Used/Produced:
    - a) Organophosphates
    - b) Organochlorines
    - c) Methyl carbamates
    - d) Pyrethroids
    - e) Fumigants
    - f) Insect growth regulators
    - g) Biological insecticides
    - h) Fungicides
    - i) Herbicides
    - j) Rodenticides
    - k) Nematicides
    - l) Plant growth regulator
  2. Hazard Category: (WHO) 1A, 1B, 2, 3, 4 are used.
  3. Presence of Formulating Plants.

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

Policies are oriented towards the establishment of hygienic services and preventive measures in the workplace and environment. MPH has passed laws and regulations, set safety standards and disseminated information regarding diagnostic parameters for occupational diseases.

- D. Problems involved in Industrial Hygiene and Occupational Health and Safety.
1. Lack of knowledge regarding acute and chronic effects of pesticides.
  2. For small scale industries, there is a lack of technical expertise, lack of medical services and poor health and safety standard in the workplace.

18.4 India

A. Authority and Agencies responsible for Industrial Hygiene and Occupational Health and Safety.

National Institute of Occupational Health.

B. Pesticide Usage/Production/Hazard Category/Formulating Plants.

1) Pesticide Used:

- a) Fungicide
- b) Insecticide
- c) Weedicide
- d) Rodenticide
- e) Fumigants

2) Pesticide Produced:

- |                    |                 |
|--------------------|-----------------|
| a) Insecticides    | d) Rodenticides |
| EDT                | Zinc Phosphide  |
| BHC                | Aluminium       |
| Phosphide          | Others          |
| Endosulfan         |                 |
| Malathion          |                 |
| Others             | e) Fumigants    |
| b) Fungicides      | Methyl Bromide  |
| Carbendazin        |                 |
| Dithiocarbomates   |                 |
| Copper Oxychloride |                 |
| Others             |                 |
| c) Herbicide       |                 |
| Butachlor          |                 |
| Isoproturon        |                 |
| Others             |                 |

- 3) Hazard Category: (WHO)
- 4) Presence of Formulating Plants

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

- 1. Factories Act, 1948
- 2. Workmen's Compensation Act
- 3. ESI Act 1948
- 4. Air (Prevention and Control of Pollution) Act, 1981.
- 5. Atomic Energy Act 1962
- 6. Coal Mines Amendment Act, 1970
- 7. Drugs and Cosmetics Act, 1940
- 8. Insecticide Act, 1968
- Insecticides Act, amended 1982

9. Water (Prevention and Control of Pollution) Act
10. Prevention of Food Adulteration Act, 1954
11. Factories Act, Amended 1987 - fixes the primary responsibility for prevention of occupational accidents and diseases on the manufacturer of the factory.
12. Indian Chemical Manufacturers Association 1987

E. Problems involved in Industrial Hygiene and Occupational Health and Safety.

1. Majority of the small scale industrial unit are not equipped with the adequate safety and pollution control equipments.  
since financial position of the small scale units do not permit installation of such equipments.
2. Government does not provide incentives to industries adhering to safety and health standards.

16.5 Indonesia

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

1. National Safety Council (NSC), 1982 - government advisory body on policy and implementation for improvement of occupational health and safety.
2. Ministry of Manpower - responsible for industrial hygiene, occupational health and safety.

Functions:

- a) Conducts campaign on promotion of health and safety.
  - b) Offers incentives to industries - "Safer Awards."
3. Ministry of Health - regulates and classifies hazardous materials controls production, circulation, packing and labeling of pesticides.
  4. Ministry of Defense and Security - regulates use of explosive materials in government and industry.
  5. Ministry of Industry - regulates use of poisonous materials in industry.
  6. BIIH (Industrial environment Forum) - association composed of representative from the industry, community and government.

Functions:

- a) Disseminate information.
  - b) Sets up preventive measures.
  - c) Addresses environmental problems such as pollution and destruction of natural resources.
7. Pesticide Committee, Ministry of Agriculture - prepares legislation for the control of pesticide use.
  8. Ministry of Trade - controls importation and distribution of pesticides.
  9. Pesticides - Under-Production, Hazard - Category, Formulating Plant.
    1. Pesticides Used:
      - a) Endosulfan
      - b) Carbofuran
      - c) BFMC
      - d) Dalapon
      - e) Fenthioate
      - f) Others
    2. Pesticide Produced:
      - a) Diazinon
      - b) Carbofuran
      - c) BFMC
      - d) MIPC
      - e) Glyphosate
      - f) Normal phosphonemethyl glycine
    3. Hazard Category - (WHO)
    4. Presence of Formulating Plant
  10. Government Policies towards Industrial Hygiene and Occupational Health and Safety.  
Adoption of a 5 year National Programme (Ministry of Manpower).

Objectives:

- a) Occupational safety and health campaign.
- b) Training and education on occupational safety and health.

- c) Research through a safety and health laboratory.
- d) Development of personal protective equipments.
- e) Development and strengthening of occupational safety and health communities.
- f) Implementation and strengthening of occupational safety and health policies.

D. Problems involved in Industrial Hygiene and Occupational Health and Safety.

- 1. More than 95% of industries are small and medium scale which have minimum knowledge, and awareness of cost-benefit returns of safety and health.
- 2. 87% of workers have only reached basic school education.
- 3. Low wages have significantly affected the workers health and productivity.
- 4. Industries are spread out in more than 10 provinces creating difficulties in inspection and transfer of information.
- 5. Limited number of government inspectors.

16.6 Korea

A. Authorities and Agencies responsible for Industrial Hygiene and Occupational Health and Safety.

Ministry of Labor - major administrative authority

Others:

- 1. Ministry of Agriculture, Forestry and Fisheries
- 2. Ministry of Health and Social Affairs
- 3. Ministry of Environment

B. Pesticide Usage/Production/Hazard Category/Formulating Plants

1. Pesticides Used/Produced:

- a) Fungicide
- b) Insecticide
- c) Herbicide
- d) Other

2. Hazard Category

**Classification of Hazard according to Acute Toxicity of Formulated Products.**

Class	Acute LD50 (mg/kg body weight)		Acute LC50 (mg/l air, 4hr exposure)		
	-----		-----		
	Oral	Dermal	Inhalation		
	Solids	Liquids	Solids	Liquids	
Extremely Hazardous	< 5	< 20	10	40	0.5
Highly hazardous	5-50	10-200	10-100	40-400	0.5 - 1
Moderately hazardous	> 50	> 200	100 - 400		1

**Note:**

- (1) The classification is based on the acute toxicity data which are obtained by the toxicity tests for pesticides item notification.
- (2) The classification by acute inhalation toxicity is limited to the products which are volatile.
- (3) The terms "solids", "liquids" and "gases" refer to the physical state of the formulation when to be used.

**Classification of Fish Toxicity**

Rank	TLm (48 hrs. ppm) for Carp
I	< 0.5
II	0.5 - 2
III	> 2

**Note:**

- (1) The rank of each formulation is determined by the toxicity to carp of its active ingredient which is obtained by fish toxicity test for pesticides item notification.

**B. Presence of Formulating Plants**

- C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

1. Industrial Safety and Health Laws - major law associated with industrial hygiene and occupational health safety.

Functions:

- a) Formulate, execute and regulate industrial safety and health policies.
- b) Insures safety and improvement of facilities in the workplace.
- c) Disseminates instructions to the public regarding health and safety.
- d) Coordinates, investigates and manages anti-disaster movement.
- e) Supports, guides and controls health-related organizations.

2. Other related policies

- a) Toxic Substances Control Laws - authorizes the Ministry of Environment to evaluate regarding new toxic chemicals prior to their manufacture, and to regulate production, use and disposal of toxic chemicals.
- b) Water Conservation Laws - authorizes the Ministry of Environment to establish list of toxic water pollutants and set standards.
- c) Air Conservation Laws - authorizes the Ministry of Environment to set emission standards of hazardous air pollutants.
- d) Agro-Chemical Management Laws - authorizes the Ministry of Agriculture, Forestry and Fisheries to regulate registration, production sale and use of agricultural chemicals; and to promote environmental conservation.
- e) Labor Standard Laws - authorizes the Ministry of Labor to set and control labor standards.

- D. Problems involved in Industrial Hygiene and Occupational Health and Safety.

1. Poor working conditions in the plant
  - inadequate ventilation



- inadequate personal protective equipments

1a.7 Malaysia

H. Authority and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

Ministry of Health  
Ministry of Human Resources  
Ministry of Agriculture

B. Pesticides Usage/Production Hazard Category/Presence of Formulating Plants.

1. Pesticide Used:

- a) Insecticide
- b) Fungicide/Bactericide
- c) Herbicide
- d) Rodenticide
- e) Others

2. Pesticide Produced

List is not available.

3. Hazard Category - (WHO: IA, IB, C, D, 4, and 5)

4. Presence of Formulating Plants

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

Factories and Machinery Act 1967 - for notification  
Employee Social Security Act 1969 - for compensation

D. Problems involved in Industrial Hygiene and Occupational Health and Safety.

- 1. Lack of national policy.
- 2. Inadequate data collection and analysis.
- 3. Lack of expertise.
- 4. Lack of coordination.

16.8 Myanmar

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

- 1. Department of Health
- 2. Factories and General Labor Law Inspection Department.  
Ministry of Labor
- 3. Others  
Myanmar Agriculture Service, Ministry of Agriculture and Forests

B. Pesticide Usage/Production/Hazard Category/Formulating Plants.

1. Pesticide Used:

- a) Insecticides
  - Aldrin 5% dust
  - Decis
  - Dimethoate
  - Monocrotophos 40 EC
  - Padan 4 G
  - Padan 50 S.F.
  - Sumicidin 5 E.C.
  - Sumicidin 20 E.C.

- b) Fungicides
  - Vitazin 17 G
  - Vitazin 48 E.C.
  - Daconil
  - Toosin

- c) Herbicides
  - Atrazine 80 W.F.
  - Satumi 60 E.C.
  - Herbit

2. Pesticides Produced	Type
a) Fenitrothion 50 E.C.	Organophosphate
b) Cypermethrin 10 E.C.	Synthetic pyrethroid
c) Diazinon 40 E.C.	Organophosphate
d) Phenthoate 40 E.C.	Organophosphate
e) Endosulfan 35 E.C.	Organochlorine

3. Hazard Category: (WHO) 1A, 1B, 2 are used.

4. Presence of Formulating Plants.

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

1. Factories Act, 1951
2. Workman's Compensation Act, 1923
3. Social Security Act, 1954
4. Mines Act, 1924
5. Boilers Act, 1924
6. Electricity Act, 1984
7. Pesticide Law, 1990 - regulates pesticide production and marketing.
8. Private Industrial Enterprise Law, 1970 - encourage private sector participation in production and marketing of pesticides.

D. Problems involved in Industrial Hygiene and Occupational

Health and Safety.

1. Inefficient labor inspection service.
2. Lack of training facilities for health inspectors.
3. Absence of specialized consulting services.
4. Need for establishment of laws and regulations regarding environmental concern together with their enforcement procedures.

16.9 Pakistan

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

There is a Federal Law and an Environment Protection Council already in place. However, the provincial government of Punjab and Sindh, enforces their own respective legislation. Presently, active steps are being taken by the Environment Protection Councils to put into practical effect the provisions of law.

B. Pesticide Usage/Production/Hazard Category/Formulating Plants.

1. Pesticide Used

Ascaricides  
Fungicides  
Herbicides  
Insecticides  
Nematicides  
Rodenticides  
Fumigants  
Synthetic Pyrethroids

2. Pesticides Produced

DDT -presently banned  
BHC -presently banned

3. Hazard Category : (WHO) 1B, 2, 3, 4 are used

A process has been started to register products falling in category 1B and proceedings are currently afoot against several toxic products.

4. Presence of Formulation Plants

C. Government Policies Towards Industrial Hygiene and Occupational Health and Safety.

- 1) Environmental Protection Ordinance (1983) - enforces

provisions set up by the Federal Government.

- 2) Agricultural Pesticide Legislation (1971) - requires compensation of persons involved in handling agricultural pesticides in cases of accidental injury or death.
  - 3) Factory Act, 1940 - Allows only registered brands of pesticides for use in the country.
  - 4) Environmental Impact Assessment standards (EIA):
- B. Problems involved in Industrial Hygiene and Occupational health and safety.
1. Inadequate data collection.
  2. Ineffective enforcement agency.

#### 16.10 Philippines

- A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.
1. Fertilizer and Pesticide Authority (FPA), Department of Agriculture.
    - regulatory agency for all aspects related to pesticide production, use and importation.
  2. Bureau of Working Condition, Department of Labor and Employment (DOLE) - coordinates with the FPA; takes care of workers and oversees the working condition in the industry.
  3. Department of Health - cooperates in the formulation of policies and guidelines.
  4. Agricultural Pesticide Institute - association of companies handling pesticides tasked to assist in the implementation of the different programmes.
- B. Pesticide Usage/Production/Hazard Category/Formulating Plants.
1. Pesticides Used:
    - Organophosphate
    - Carbamates
    - Organochlorine
    - Pyrethroids

OP + Carbamates  
OC + Carbamates  
OC + Pyrethroids  
Herbicides  
Fungicides  
Growth Regulator  
Others

2. Pesticides Produced - not specified

3. Hazard Category (WHO):

Category	Insecticide	Fungicide	Herbicide
I	10	0	0
II	18	0	6
III	4	0	3
IV	11	11	8

4. Presence of Formulating Plants.

C. Government Policies Towards Industrial Hygiene and Occupational Health and Safety.

1. Government establishes standards for pesticide formulation and use in relation to workers health, environmental concern and plant hygiene.
2. Checking of Standards by FPA Audit Team is done during planned and spot investigations.
3. Compliance by industries is a mandatory prerequisite prior to granting of license to operate.
4. Violation of standards are met with cessation of work operations and revoking of granted license.

D. Problems involved in Industrial Hygiene and Occupational Health and Safety:

1. Organizational Aspects

- Ineffective organizational set-up in terms of delegation of duties and responsibilities to subordinates.
- Lack of functional safety committees.
- Deficiency of routine auditing.
- Lack of training programmes for proper handling of pesticide chemicals.

2. Occupational Health Programs (OHP):

- Establishment and implementation of an effective OHP.
- Training of medical and paramedical personnel.
- Compliance to periodic medical examination.
- Lack or absence of local medical centers.
- Under reporting of pesticide poisoning cases.

3. Industrial Hygiene

- Lack of adequate ventilation and exhaust system.
- Improper method of washing of contaminated clothing and equipment.
- Poor housekeeping practices.

4. Safety and Security

- Inadequate or improperly placed emergency showers and eyewash facilities.
- Inadequate training and facilities for fire fighting.

5. Environmental Protection

- Improper manner of containment disposal and clean-up of pesticide spillage.

1a.11 Sri Lanka

H. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

Department of Labor

- 1) Factories division
- 2) Division of Occupational Hygiene

Others:

- 1) Department of Health
- 2) Faculty of Medicine, Colombo
- 3) Central Environmental Authority

- 4) Department of Agriculture  
Registration of Pesticides - licensing authority
- 5) Pesticide association
- 6) Industrial Health and Safety Association

B. Pesticide      Usage/Production Hazard      Category Formulating Plant.

1. Pesticides Used

- Organophosphate
- Organochlorine
- Carbamate
- DJ Carbamate
- Pyrethroid
- Growth Regulator
- Chlorophenol
- Propionic Acid
- Pyridinium
- Acetanilide
- Acetamide
- Coumarin
- Others

2. Pesticides Produced: none

3. Hazard Category - (WHO). 1A, 1B, 2, 3, 4 are used.

4. Presence of Formulating Plant



C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

1. Factories Ordinance No. 45, 1942 - covers workers safety, health and welfare.
2. Control of Pesticide Act No. 22, 1980- compulsion registration of all pesticide materials; regulates the importation, formulation, packing, labelling, storage, transport, sale and use of pesticide.

D. Problems involved in Industrial Hygiene and Occupational Health and Safety.

1. Sites of pesticide factories are not well planned.
2. Activities involving pesticides are performed manually.
3. Medical examination of workers are not regularly done.
4. Lack of Personal Protective Equipments and strict supervision in their usage.
5. Poor waste disposal:
  - reusing of containers
  - no pre-treatment of effluent water
6. Government priority for health and safety in industries is low.
7. No uniform health and safety standards for pesticide factories.
8. Lack of expertise.
9. Lack of laboratory facilities for monitoring.
10. Pesticide poisoning is the 6th leading cause of death.

16.12 Thailand

A. Authorities and Agencies Responsible for Industrial Hygiene and Occupational Health and Safety.

1. National Institute for the Improvement of Working Conditions and Environment (NICE), Department of Labor - promotes the improvement of working conditions of workers and their protection from occupational injuries and diseases; governs over PHUS and 3 Regional Units.
2. National Occupational Safety and Health Information Center of Thailand (NACIS) - collects and disseminates information on occupational safety and health.

3. Industrial Safety and Hygiene Division, Department of Industrial Works (DIW) - responsible for keeping the factories safe.

Functions:

- a) Approves the license applications of factories.
- b) Sets industrial safety and hygiene standards.
- c) Evaluates safety and health hazards.
- d) Provides training services and dissemination of health information.
- e) Conducts safety inspection.

4. Occupational Health Division, Department of Health

- WHO Collaborating Center

Functions:

- a) Evaluates worker's health problem.
- b) Conducts feasibility studies on primary health care.
- c) Undertakes training programs (WHO) in occupational medicine and toxicology.
- d) Exchanges information with WHO on occupational health matters.

5. Educational Institutions

- a) Occupational Health and Safety, Department Faculty of Public Health, Mahidol University (OHSD).
- b) Occupational Health Division, Health Sciences Department Sukhota Thamnatharatch Open University (OHST).
- c) Industrial Engineering Department, School of Engineering Chulalongkorn University (IEDC).

- B. Pesticide Usage/Production/Hazard Category/Formulating Plant.

1. Pesticide Used

- a) Insecticides
- b) Herbicides
- c) Fungicides
- d) Rodenticides
- e) Fumigants

3. Pesticide Produced

a) Organic

- a.1 Organophosphate - Parathion, Folidol, Malathion, Dimethoate, Heptachlor
- a.2 Carbamates - Carbaryl
- a.3 Organochlorine - DDT, Aldrin
- a.4 Pyrethrum - Pyrethrins

b) Inorganic Chemicals

- a) Arsenic
- b) Thallium

c) Biological Insecticide

- a) Dibel

3. Hazard Category : (WHO)

4. Presence of Formulating Plants

C. Government Policies towards Industrial Hygiene and Occupational Health and Safety.

- Government supported.
- Follows policies provided by National Economic and Social Development Plan (1992-1998).

Objectives:

- a) To establish regional institute to monitor safety conditions, and to supervise and train personnel in the provincial areas regarding work safety and occupational health.
- b) To inform agricultural sectors regarding usage of chemical substances.
- c) To develop safety inspection and occupational health system emphasizing on a tripartite system.
- d) To develop a major Hazards Control System to ensure safety in the workplace.

- e) To conduct technical training and continuing education health and safety personnel.
  - f) To encourage the public and private agencies regarding safety promotion.
- D. Problems involved in Industrial Hygiene and Occupational Health and Safety.
- 1) Worker's lack of previous industrial experience.
  - 2) Poor working conditions
    - a) hygiene and safety practices
    - b) ventilation
    - c) worker's reluctance to use PPE's
  - 3) Inadequate number of inspectors.

## VI. AGENCIES REPORT

### 17.1 FAO's Activities on Distribution and Use of Pesticides:

Since more than 90% of pesticide produced in the world are used in agriculture, FAO has maintained an extensive programme covering all aspects of pesticide registration, use and control. The main thrust of the FAO programme in recent years has been the development of the International Code of Conduct on the Distribution and Use of Pesticides and in assisting countries in their implementation and in the application of its comprehensive subsidiary set of technical guidelines.

In order to ensure the effective implementation of the Code, FAO developed and currently executed several regional projects aimed at assisting member countries in promoting the safe and efficient use of pesticides. One of these is the FAO Regional Project on the Implementation of the International Code of Conduct on the Distribution and Use of Pesticides funded by the Government of Japan which covers 27 member countries in the Asia and Pacific region and by next year, will include another thirteen member countries in Latin America and the Caribbean. The project has been in operation since 1986. It concentrates on the promoting of safe and efficient use of pesticides through the provision of technical assistance in establishing and operating registration and control schemes among the participating countries and by conducting various training programmes on different provisions of the Code.

An important element of the Code refers to the responsibilities of government and industry in instituting measures to reduce health hazards and poisoning due to pesticide misuse, particularly in pesticide formulation and manufacturing plants. FAO is pleased to note that this workshop addresses this important issue and wishes the organizers and the participants success in their endeavor to promote industrial hygiene and occupational health safety standards for the region.

## VII. LECTURES

### 18. General Information on Pesticides

#### 18.1 Classification as to type, chemical groups, toxicity and hazards.

This area was discussed by Dr. Carmen F. Castaneda from the Department of Pharmacology, U.F. College of Medicine. Discussions involved the following topics: Pest and Pesticide Definition, Toxicity vs. Hazard Differentiation, LD50, and Pesticide Classification by type and chemical grouping.

Derivation of LD50 for formulated single or combination pesticide from the LD50 of the technical materials was explained. Types of pesticides (EC, Powder, Granules, etc.) were discussed including their applications. Classification of pesticides based on WHO guidelines was covered including modifications applicable to the country.

#### 18.2 Acute and Chronic Effects of Pesticide Health

Dr. Nelia F. Cortes-Maramba of the Department of Pharmacology, UF College of Medicine, shared her views on the above topics including: No observable effect levels (NOEL), contributory factors affecting pesticide susceptibility of exposed workers (exposure circumstances, genetics, and other human characteristics), and the epidemiological pyramid of pesticide intoxication composed of acute, high and low level long term exposures. Chronic effects of pesticide exposure were discussed including enzymatic changes, neurotoxicity, behavioral changes and other effects. Acute effects and diagnosis based on toxidromes were discussed.

### 18.3 Open Forum

Questions centered mainly on the recommendation for a universal classification of pesticide applicable to participating countries and the neurotoxic effects of chronic exposure to pyrethroids.

## 19. Principles and guidelines on Occupational Health Safety being Adopted Including Innovations.

### 19.1 Viewpoints of a developed country:

Historical and legal backgrounds were given concerning and the evolution of occupational health and safety in the United States. Responsibilities, objectives, and areas of operation of each agency and institutions such as NIOSH, OSHA and EPA were discussed.

The principle of air sampling and sampling techniques and procedures were covered at the later half of the presentation.

19.2 View points of a developing country was delivered by Dr. E. Sugavanam. A book entitled "Formulation of Pesticides in Developing Countries" by UNIDO was presented by the Speaker. Dr. Sugavanam discussed possible areas of exposure to pesticide in the developing country which include production, application, food residues, and environmental procedures.

### 19.3 Open Forum:

Questions in the open forum covered the areas of implementation of the Occupational Health and safety laws in the U.S. and the legal modification to existing U.S. labor laws. Some questions were on the field monitoring of pesticide and inert materials in the pesticide.

## 20.0 Implementation of Occupational Health and Safety

### 20.1 Viewpoints of a government agency in a developing country (Philippines) Fertilizer and Pesticide Authority.

Dr. Nella C. Manamba, in behalf of FFA, gave the presentation which covered three major areas: historical and legislative accounts leading to the creation of the Fertilizer and Pesticide Authority (FFA); FFA's objectives, functions, and areas of responsibility, and the approach FFA has taken on improving the Occupational Health and Safety.

situation of the industry. It was noted that EPA not only takes care of agricultural pesticide but also takes care of household pesticides.

#### 20.2 Viewpoints from Department of Labor and Employment

The Bureau of Working Conditions under the Department of Labor and Employment was presented by Mr. Wilson Estrada. Topics covered were: the historical and legislative actions that led to the creation of existing agencies within the Department of Labor involved in Occupational Health and Safety; the manner by which Occupational Health and Safety Programs are being administered; the Bureau of Working Conditions and its activities which include Enforcement of Health and Safety Standards, Training and Public Information, Research and Technical Services.

#### 20.3 Viewpoints from the Department of Health

Dr. Aida V. Alvarez of the Department of Health Malaria Services Control Program presented a working framework regarding the approach of the Department of Health on Occupational Health and Safety. Information was given on the Malaria Control Program, pesticide use and related problems as well as future plans.

#### 20.4 Open Forum

The questions asked covered the areas of: monitoring and evaluation of small pesticide formulators, strategies ensuring proper handling at the farmer's level, and application of pesticides through certified pesticide applicators. The education and training strategies were also discussed.

#### 20.5 Industry

The occupational health and safety program of Shell Chemical Company of the Philippines was discussed by Mr. Diosdado Cobin, Operations Manager. The company's safety policy was presented. The basic approach in hazard identification, risks assessment, and control measures undertaken by the company were presented. Action goals were enumerated covering areas such as those of Health, Safety, Environment and Quality Assurance.

#### 20.6 Open Forum

Questions asked of Mr. Cobin covered areas of product stewardship specifically companies subcontracted to

formulate Shell products and disaster planning for communities residing around the formulating plant.

## 21. Occupational Health Safety and Management of Poisoning.

21.1 Dr. Nella P. Cortes-Maramba from the Department of Pharmacology, UP College of Medicine talked on Toxicology in Occupational Health Safety. She stated here that multifactorial forces are at work that have bearing on work-related accidents and diseases. These causal factors include human, psychosocial and environmental aspects, thus in cases of accidents, the worker is not solely responsible. Toxicology on the other hand involves the active investigations and proper actions on different toxicological risks with the view of minimizing these risks. In line with pesticide industry, there are still many things to be done in improving the reporting and investigations as part of toxicology as well as the determinations of casual or direct effects of chemicals involved in work-accidents and injuries.

It was commented by a local participant that occupational injuries reached 1 million per year in the Asia-Pacific Region and that the reporting scheme in the Philippines is bad.

It was pointed out by another participant that community involvement in industrial chemical disaster preparedness is a crucial concern.

21.2 Emergency Management of Pesticide Poisoning was delivered by Dr. Kenneth Hartigan-Go from the Department of Pharmacology, UP College of Medicine. This was a lecture to guide the participants in establishing basic first aid standard operating procedures and principles, with the view that it be adapted in local situations. The importance of prevention and the rapid recognition and appropriate treatment were emphasized. Practical pointers in field management were discussed. Emphasis was given also to the provision of basic life support such as airway, breathing and circulation as a necessary component of poisoning management. All the first aid instructions may look simple and practical on the surface, however, to ensure its applicability, industry must create regular training drills for all concerned.



## 22. Industrial Hygiene and Environmental Concerns as these Relate to Worker's Health.

22.1 The first of this series was delivered by Mr. Dennis Gibbons, UNIDO Consultant. He highlighted the Principles and Guidelines in Industrial Hygiene in the Pesticide Industry. These are basically recognition, evaluation and control of hazards. Evaluation refers to analysis of the levels of exposures such as calculating average daily and peak exposure and comparing these with set standards. Control means engineering, administrative controls, and the utilization of personal protective equipment and clothing. Specifically, with application to pesticides, the following measures may be done: such as that of having written instructions on product labels, substituting a lesser hazardous pesticides, a closed system, with ventilation and personal protection only if and when indicated. He pointed that although there are many standards to follow, they are not observed. Many workplaces are not always monitored even in the United States.

### 22.2 Ergonomics in the Pesticide Industry

Ergonomics in the Pesticide Industry was given by Dr. Joselito Gapas. He stated that ergonomics is not a separate scientific identity but a combination of many professional groups like chemist, engineers, the medical field, etc. The Principles of Ergonomics involve analysis and modification of tools, tasks and the environment or work station. Personal Protective Equipment clothing was considered as a last resort for protecting workers against pesticide chemicals. Emphasis was placed on the use of practical local solutions instead of being dependent on advanced and sophisticated western technology.

## 23. Good Manufacturing Practice

23.1 The Role of UNIDO was given by UNIDO Secretariat. The objective of UNIDO has been to assist developing countries to industrialize with the Agrochemical Industries Unit to date supporting 2000 projects with the assistance of \$150 million sourced from UNDP, UNIDF, BIS, trust fund and cost sharing. The projects are focused on the least developed and the land-locked developing countries with the assistance varying, depending upon the status and type of economy. Activities, varies from conducting feasibility studies to assisting in procurement, construction, quality control and training. Quality and safety are promoted for products that provide consistent and effective biological control, are safe and easy to handle, conform to registration and

established specifications and are properly packaged and labelled. Environmental and occupational safety are high priorities including vertical and horizontal safety awareness and management of discharges. The strategy is to replace the subsidy on pesticides by subsidizing cleaner technology, safer products and formulations, plant modernization, monitoring systems and waste management.

- 23.1 The Role of Industry was delivered by Mr. Alencio L. Quizon. The major asset to any industry is the employee whose protection is essential. Since Category I technical are being formulated, it is imperative to follow GMP and detailed processes to protect both the employee and the environment. Good engineering control of a factor can prevent into locations but clean-up and decontamination of spills must be tended to immediately and good housekeeping, including waste disposal practices, to provide a better and safer working environment. Employee selection criteria have been established including educational attainment, family and social history and physical and medical examination. Before assignments are assumed, employees are trained in occupational health and safety providing time for acclimatization to protective equipment which is especially important in hot, humid countries. In these climates, timing of operation to the coolest periods and good ventilation are important in addition to reducing the occupational exposure period. Pre-formulation checks of operational safety and emergency equipment is essential. A supplemental power source is recommended if shortages are habitual. Monitoring of equipment and employee is required to maintain safety.

#### 24. Good Laboratory Practice

- 24.1 Dr. Modesto Chua from the Philippine Institute of Pure and Applied Chemistry Laboratory talked on good Laboratory Practice. GLP involves practices used by laboratories that will assure the production of accurate and reliable test data which serve as basis for critical decisions that have financial, health and safety, and environmental consequences. Good laboratory practice involves good laboratory management to establishing proper sampling procedures, test methods, reporting system, disposal/retention of samples after testing, record keeping, staff management and quality control systems. In sampling procedures, proper handling, transport, storage and identification of samples are of utmost consideration. Test methods involve inter-laboratory proficiency, other testing trials and calibration of equipment.

Reporting of results should include control ID, authorize signature, test carried out or any modifications and description of test materials.

Management of laboratory staff should include and ensure that staff are competent and qualified to carry out particular tests and setting up of training programs for all members of each staff.

Importance of establishing quality control systems ensure that test results are accurate and reliable.

24.2 Prof. Elma B. Torres of the UP College of Public Health spoke on the Laboratory Aspects of Health Monitoring. The monitoring of health involves two areas: the continuous monitoring of the work environment and biologic monitoring of workers. There are constraints, however, in health monitoring such as lack of trained technicians or analysts, limited laboratory equipment available for monitoring, high cost of chemical and equipment and the lack of quality assurance of laboratory data. Factors that must be considered in health monitoring are the required accuracy and sensitivity of equipment used in sampling and analyses, reliability of laboratory techniques and cost monitoring. The basic activities in conducting health monitoring are the review of workplace environmental conditions through walk through survey chemical inventory and process/equipment review, the actual exposure measurement and the health monitoring.

## 25. Information Networking

Dr. S. F. Dhua conducted this session. RENPAF is an Asian regional project bringing together 13 countries having similar problems with the aim to exchange knowledge and know how to benefit production, marketing and legislation for pesticides. The objective is to promote regional cooperation in agricultural output through the safe use of pesticides and exchange expertise, information and development with the focus on the industrial aspects of production, control and handling. Six technical coordinating units have been established including formulation technology, quality assurance, specifications and impurities, residues and bio botanicals, industrial safety, ecotoxicology and waste disposal.

The RENPAF Gazette, a journal for industry and government to exchange information was first issued in October 1990.

26. An informative documentary video was presented by Mr. E. Sudavaram concerning problems encountered in pesticide production plants.

#### VIII. PLANT VISIT

27. Dr. Carmen Castaneda briefed the participants on the procedures for plant visits and the use of the FHM inspection checklist. The participants were divided into two groups (see annex on plant visits) for the plant visits to Bayer Philippines in Carubang and Shell Chemicals Company in Pandacan. Facilitators for 1st group were Mr. Dennis Gibbons and Dr. Wilson Estrada and for the 2nd group, Dr. Joselito Gapas and Dr. Carmen F. Castaneda. Two buses were provided to transport the participants to the formulating plants. These plant visits were exercises in standardizing and harmonizing a method for evaluation of pesticide production plants.

#### IX. WORKSHOP

28. The participants were divided into three small groups which discussed common areas of concern and gave workable suggestions and solutions to perceived problems arising from this seminar workshop.

The recommendations of these small groups were presented in a plenary session.

#### X. CONCLUSIONS

29. After all the country reports and workshop discussions, it was found out that each country has their own problems ranging from regulatory programmes relating to Occupational Health Safety and Industrial Hygiene to the absence of standardize guidelines on the evaluation and assessment pesticide production plants. Some countries do not have a common way, based on WHO criteria hazard category to classify pesticides. There was also an awareness that a system of collecting data reporting occupational illness and accidents is wanting among pesticide production plants.
30. It also became evident that physicians and nurses involved in pesticide industry and government agencies have very little exposure and training as regards to occupational safety and health in pesticide production and use. There was difficulty in identifying the responsible people to assist in this training and standardization.

11. It was identified that laboratories in the region must be developed and strengthened among member-states. This is of particular interest in the biological monitoring of workers at risks of exposures to pesticide and the validation for analysis.
12. As a consequence of this present seminar-workshop, there was a greater calling to advocate to involvement and information networking.

## XI. RECOMMENDATIONS

### Establishment/Strengthening of a Regulatory Programme in Occupational Health Safety and Industrial Hygiene and their Environmental Concerns in Pesticide Production Plants.

#### The Workshop

Acknowledging the valuable technical and financial assistance of UNDP-UNIDO/REMPAP and the participation of network member countries in holding this workshop on Occupational Health Safety and Industrial Hygiene and their Environmental Concerns:

Recognizing the impact of a well-implemented occupational health safety and industrial hygiene programme in pesticide production plants on the health, economy and ecology of the nation:

Noting that a number of member countries in the region still do not have such a regulatory programme:

And noting further that some countries in the region with established regulatory programmes experience some difficulties in enforcing their regulations either due to lack of expertise, institutional support, limited resources or inherent problems in their legislation:

#### Recommends

That 1) countries that have not yet established regulatory occupational health safety program take action to initiate the needed measures:

2) that those countries with regulatory programme strengthen these programmes:

3) that technical expertise be shared among countries in the Region through technical cooperation among developing

countries (TDDO) as coordinated by UNDP/UNIDO/RENFAF.

### **Harmonization Among Member Countries in Classifying Pesticide and their Formulations According to WHO Hazard Category.**

Recognizing that pesticides have inherent toxic and hazards:

Noting that the World Assembly through WHO has classified pesticides according to hazards to promote safer use;

And further noting that not all member countries have adopted this classification of pesticides:

#### **Recommends**

That all member countries adopt the WHO classification of pesticides according to hazards thus harmonizing pesticide classification in the region.

### **Standard Guideline for Inspection of Pesticide Production and Formulation Plants**

#### **The Workshop**

Recognizing a need for a standardized guideline for the evaluation of workplaces where pesticides are manufactured, formulated, or packaged:

#### **Recommends**

That UNIDO/RENFAF consider adoption of the guidelines for inspection developed for the conference and that this form be available to member countries for inspection purposes and pesticide production plants for suitable adoption.

### **Standard Form for Accident Investigation**

#### **The Workshop**

Recognizing present lack of uniform reporting of occupational accident and illness data in member countries, and with special interest in pesticide-related occupational illness and injury. And:

Recognizing a need to compile and document statistics about pesticide-related occupational injury and illness to develop a valuable regional data base.

### **Recommends**

That UNIDO/RENFAF initiate actions for the development and adoption of a standardized accident and injury form, establish an appropriate system of monitoring among member countries and designate the technical coordinator unit as the focal point for documentation and dissemination of information.

### **Establishment/Strengthening Regional Biologic Monitoring and Standardization Program**

Considering the importance of biologic monitoring of workers exposed to pesticides in the effective implementation of occupational health safety program and the importance of accurate and comparable data for each country in the network:

Further noting that women in reproductive age are employed in significant numbers in pesticide manufacturing and formulating plants in the region and their special biologic monitoring needs:

Recognizing that many countries in the region do not have access to accurate and standardized biologic monitoring facilities or are unable, due to limited resources, to establish their own facilities:

### **Recommends**

That UNIDO/RENFAF survey the current capability of pesticide monitoring facilities and standardization of laboratories within the region.

### **Establishing Regional Panel of Technical Experts**

Considering the central role of physicians and nurses in implementing occupational health safety in pesticide production plants:

Recognizing the need for additional and continued specialized training of physicians and nurses in the region with regard to occupational health safety in manufacturing and formulation plants:

### **Recommends**

That RENFAF, through technical cooperation among developing countries (TCDC) to maintain a roster (or panel) of technical experts to provide appropriate in-depth training to physicians

and nurses on occupational safety in pesticide production formulation plants.

### **Networking and Information Exchange**

#### **The Workshop**

Recognizing the value of information exchange and networking:

Realizing the importance of obtaining current information on occupational health safety and industrial hygiene from other countries;

And further noting that UNIDO/RENAPAP has a gazette for member countries:

#### **Recommends**

That government and private sector in member countries actively contribute and subscribe to the UNIDO/RENAPAP gazette.

### **Support of "Toxicovigilance"**

#### **The Workshop**

Recognizing a regional need for greater awareness of occupational hazards associated with pesticide production and formulation, and the necessity to ensure safety in pesticide handling through a proactive and sustained effort;

#### **Recommends**

That member countries advocate "Toxicovigilance" to further the occupational health safety measures among member countries.

## **XII. CLOSING CEREMONIES**

10. The closing remarks was first given by Mr. Luis I. Vujan-Beal, Jr., Chairman of the workshop. He began by reminding us of the perspective of this meeting as stated at the beginning of the seminar-workshop. He summarized the different activities that transpired among member nations and participant delegates during the course of the seminar-workshop. He underscored the Philippine experience which can serve as a good learning opportunity for other member-states of RENAPAP to emulate.



34. This was followed by responses from the different foreign delegates.

Mr. M. H. Baid of Pakistan commented that this workshop is an ideal opportunity to widen our knowledge on industrial hygiene, occupational health and safety and on environmental concerns. There is the need to implement the recommendations immediately. As a parting note, he thanked the sponsoring agencies and UNIDO/RENPAF.

Mr. Lee Hae Kwon of Korea thought of the usefulness of this seminar/workshop. He intends to work for the establishment of poison centers in Korea to address the pesticide poisoning problems in his country.

Mr. Frieda Chavul of Thailand thanked the organizers of this meeting and commended the Philippines for its active role in occupational health and safety in the pesticide industry. In this regard, he gave a brief situationer in Thailand. He plans to create awareness on the issues of pesticide industry among occupational health and safety practitioners in his country.

Mr. S. P. Dhus, RENPAF Regional Coordinator, summed up the seminar-workshop proceedings and thanked the organizers and the sponsors of the workshop.

Mr. B. Subramaniam, UNIDO Representative, gave his closing message that there is a need to harmonize the approach to promote occupational health, safety and industrial hygiene in pesticide production, involving international agencies and regional/local experts to promote technical cooperation. He commended the Philippines as a model to other member states.

Mr. S. P. Dhus officially closed the workshop.

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AGENDA

REGIONAL WORKSHOP ON INDUSTRIAL HYGIENE  
AND OCCUPATIONAL HEALTH SAFETY  
AND THEIR ENVIRONMENTAL CONCERNS

The Manila Peninsula Hotel  
Balagtas-Balmori Room  
April 15-20, 1991

Sunday, April 14, 1991

Arrival of participants in Manila.

EMCEE/Moderator: Mr. Cesar F. Duilisan

Day 1 - Monday, April 15, 1991

8:00 - 9:00 - Registration of Participants

9:00 - 10:30 - Opening Ceremony

Philippine National Anthem

Invocation Mr. Ruben De Leon  
Country Manager  
Monsanto Philippines

Welcome Address Hon. Senen C. Bacani  
Secretary, Department  
of Agriculture

Message Mr. Kevin McGrath  
UNDP Resident Repre-  
sentative

Message Mr. Christian A. Newman  
UNIDO Country Director

Message Dr. B. Sugavanam  
UNIDO, Vienna

Message Dr. S. F. Dhus  
Regional Coordinator  
RENPAF Project

Introduction of the Guest Speaker Prof. Elma B. Torres  
Dept. of Environmental  
& Occupational Health

Inspirational  
Message

Dr. Alfredo Bengzon, M.D.  
Secretary, Department of  
Health

Official Opening of  
the Workshop

Mr. Luis T. Villa-Real, Jr.  
FFA, Executive Director III

10:30 - 11:00 - B R E A K

11:00 - 11:30 - a. Election of Chairpersons and  
appointment of Rapporteurs

- 1) Over-all Chairperson
- 2) Daily Chairperson
- 3) General Rapporteur
- 4) Rapporteur per Topic

b. Adoption of Agenda

11:30 - 12:30 - COUNTRY REPORTS

- \* Afghanistan
- \* Bangladesh
- \* China

12:30 - 13:30 - LUNCH BREAK

13:30 - 15:10 - COUNTRY REPORTS

- \* India
- \* Indonesia
- \* Islamic Republic of Iran
- \* Republic of Korea
- \* Malaysia

15:10 - 15:30 - B R E A K

15:30 - 17:45 - \* Myanmar  
\* Pakistan  
\* Philippines  
\* Sri Lanka  
\* Thailand

Welcome Dinner

EMCEE/Moderator: Dr. Fonciano N. Halos

Day 2 - Tuesday, April 16, 1991

**Topic: General Information on Pesticide**

- 8:00 - 9:30 - a) Classification as to Type, Chemical Groups and Toxicity and Hazard  
b) Acute and Chronic Effects of Pesticide on Health

- Dr. Carmen P. Castaneda  
UP College of Medicine, Manila

9:30 - 9:45 - B R E A K

**Topic: Principles and Guidelines on Occupational Health Safety Being Adopted, Including Innovations**

9:45 - 11:00 - Developed Country (OSHA/NIOSH/EPA)  
- OSHA (USA) Representative

11:00 - 11:45 - Developing Country  
- UNIDO Representative, Vienna

11:45 - 12:30 - OPEN FORUM

12:30 - 13:15 - LUNCH BREAK

**Topic: Implementation of Occupational Health Safety**

Government - Developing Country  
- Philippine Representatives

13:15 - 13:45 - Fertilizer and Pesticide Authority

13:45 - 14:15 - Dept. of Labor and Employment

14:15 - 14:45 - Department of Health

14:45 - 15:15 - OPEN FORUM

15:15 - 15:30 - BREAK

15:30 - 16:15 - Government - Developed Country  
- Representative, Japan

16:15 - 16:30 - Industry  
- Mr. Diosdado Cobin

16:30 - 17:00 - OPEN FORUM

EMCEE/Moderator: Mr. Leonardo L. Roa

Day 3 - Wednesday, April 17, 1991

**Topic: Occupational Health Safety and Management  
of Poisoning**

8:00 - 9:00 - Toxicovigilance in Occupational Health Safety

- Dr. Nelis E. Maramba  
UP College of Medicine, Manila

9:00 - 9:45 - Emergency Management of Pesticide Poisoning

- Dr. Kenneth V. Partigan-Co  
UP College of Medicine, Manila

9:45 - 10:15 - OPEN FORUM

10:15 - 10:30 - BREAK

**Topic: Industrial Hygiene and Environmental Concerns  
As These Relate To Worker's Health**

10:30 - 11:15 - Ergonomics in the Pesticide Industry

- Dr. Joselito Gapas  
UP College of Public Health

11:15 - 12:00 - Principles/Guidelines on Industrial Hygiene  
in the Pesticide Industry Including New  
Innovations

- Mr. Dennis Gibbons  
UNIDO Consultant

12:00 - 12:30 - OPEN FORUM

12:30 - 13:30 - LUNCH BREAK

13:30 - 13:45 - Briefing on Plant Visits

- Dr. Carmen P. Castaneda  
UP College of Medicine

13:45 - 17:00 - Plant Visit

Shell Chemical Plant  
Bayer Chemical Plant

Dinner AFIP

EMCEE/Moderator: Mr. Jose I. Caldeon

Day 4 - Thursday, April 18, 1991

Topic: Standards For Quality Assurance

8:00 - 9:00 - Good Manufacturing Practice (GMP)

8:00 - 8:30 - Role of UNIDO  
- Dr. B. Sudavanam

8:30 - 9:00 - Role of Industry  
- Dr. Vivencio L. Quinon

9:00 - 10:00 - Good Laboratory Practice (GLP)

9:00 - 9:30 - Phil. Institute of Pure &  
Applied Chemistry Laboratory  
- Dr. Modesto Chua

9:30 - 10:00 - Laboratory Aspects of Health  
Monitoring  
- Prof. Elma B. Torres  
College of Public Health

10:00 - 10:30 - OPEN FORUM

10:30 - 10:45 - BREAK

Topic: Information Networking

10:45 - 11:30 - Information Exchange

11:30 - 11:45 - OPEN FORUM

11:45 - 12:30 - Group Reports on Plant Visits

12:30 - 13:30 - LUNCH

13:30 - 14:30 - Statements of International  
Cooperating Agencies

14:30 - 15:00 - Workshop Assignments  
- Dr. Nella C. Maramba  
UP College of Medicine

15:00 - FREE



EMCEE/Moderator: Mr. Norberto S. Mendoza

Day 5 - Friday, April 19, 1991

8:00 - 9:00 - Group Workshop

9:00 - 9:15 - BREAK

9:15 - 10:30 - Presentation/Discussion of Workshop  
Recommendations

10:30 - 11:30 - BREAK FOR PARTICIPANTS

Meeting of Organizing and Documentation  
Committee

12:00 - 13:30 - LUNCH BREAK

13:30 - 14:30 - Adoption of Recommendations/Report

14:30 - 18:30 - Closing Ceremony

Closing Remarks:

- Chairperson of the Workshop
- Response from the Participants  
(Thailand, Pakistan, Korea)

Messages:

- RENPAP Regional Coordinator
- Representative, UNIDO, Vienna

Introduction of the Guest Speaker:

- Atty. Nicholas R. Deen

Closing Address:

- Hon. Ruben D. Torres  
Secretary, Dept. of Labor and  
Employment

Distribution of Certificates

Merienda Cenna

**RECOMMENDATIONS**

**made in the Workshop on Industrial Safety Related  
to Environment Protection and Effluent Control in  
Pesticide Industry, Surabaya, Indonesia, 10-14, December 1990**

The Workshop adopted the following recommendations.

- i) Having considered the existing infrastructural facilities available in the Region, both in well-developed and relatively less developed countries;
  - and having taken into account the need for process modification and plant design upgrading requirements in respect to production of active ingredients and their formulations which are not subject to patent coverage;
  - and also, having felt the need for new formulation, packaging and application technologies; locating safer and cleaner technologies;

**The Workshop recommends that:**

UNIDO/RENAP mechanism be used to provide the member countries with assistance for process modification, revamping of existing plants, and provide guidelines on plant designs meeting the basic minimum safety requirement, both for production of active ingredients and their formulation.

- ii) Being concerned over the lack of facilities for exchange of information among the member countries of the Region in the areas of production, formulation, packaging and application technologies.

**The Workshop recommends that:**

UNIDO/RENAP assist in strengthening the existing National facilities for data collection and dissemination of information in these areas.

- iii) The workshop having discussed the necessity for the member countries to have uniform minimum safety standards with respect to active ingredient production and their formulation;
  - and taking into account the need to identify appropriate protective clothing and equipment to be used in both active ingredient and formulation production plants; the need for assistance on safety audits/review of said plants.

- and also, the need for advice on relocation or rezoning of existing pesticide plants;

**The workshop recommends that:**

UNIDO/RENAP provide/develop information on minimum safety standards for pesticide production and formulation activities; provide guidance on identification of the appropriate protective clothing and equipment suitable for use in the Region; assist member countries in carrying out/implementing periodic safety audits/reviews in pesticide plants.

- iv) Taking note of the problems of waste disposal and the hazards associated with it; and the general non-availability of practical guidelines on waste minimization, containment, waste inventory monitoring, and treatment and disposal systems; and also the need for laboratory equipped with the right manpower and facilities to identify and quantify waste material;

**The workshop recommends that:**

- Each member country categorize waste from pesticide industry and consider to what extent these can be recycled/reused.
  - UNIDO/RENAP provide assistance in the establishment of methods by which non re-usable waste could be properly utilized/managed.
  - UNIDO/RENAP conduct a survey and drawout practical guidelines on waste minimization, containment, waste inventory monitoring, and treatment and disposal systems.
  - UNIDO/RENAP extend assistance in developing laboratory capability for waste identification and quantification by way of consultancy services and manpower training.
  - UNIDO/RENAP to consider the 1998 Jakarta meeting recommendations and speed up the setting of effluent standard limitations for pesticide industries in the region.
- v) Realizing the need for making management and workers of medium and small scale industries aware of the hazards involved in plant operation;

**The workshop recommends that:**

- UNIDO/RENAP assist in the development of suitable training modules directed towards creating awareness among management and workers of the potential hazards associated with plant operation.
- Member countries use RENAP media for creating awareness among all concerned.

UNIDO COMMENTS

(DP/RAS/88/031)

The report gives a detailed summary of the workshop proceedings on the important topic of Occupational Health and Safety in Industries dealing with pesticides. This workshop was preceded by another workshop in Indonesia in December 1990 covering Effluent Control and Waste Management in Pesticide Industries. Both the workshops together made a complete package for the promotion of safety in chemical industries especially those dealing with toxic chemicals and producing hazardous waste. For easy reference, recommendations of the Indonesian workshop is also included in this report as annex 3.

Both the workshops made use of local expertise to co-ordinate the workshops to provide high level technical inputs using local expertise and arrange field visits.

The recommendations made are very important and they should be followed up at the governmental level, industry level and the international agency level to promote safety in chemical production.

This UNIDO activity on safety in the pesticide industry along with FAO's Code of Conduct would go a long way in promoting overall safety in the management of pesticides both at the production and the user ends.