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**RISK REDUCTION IN AGROCHEMICALS DEVELOPMENT
IN THE AFRO-ARAB REGION**

XP/INT/96/012

VOLUME 1

Proceedings of the Expert Group Meeting on Risk Reduction in
Agrochemicals Development in the Afro-Arab Region
Port Louis, Mauritius, 4-6 December 1996*

Prepared for the Governments of the participating countries of the Afro-Arab Region
by the United Nations Industrial Development Organization

Based on the work of K. Ziller

*Project Manager: B. Sugavanam
Chemical Industries Branch*

* This document has not been edited.

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1. Introduction:

Afro-Arab region is an important consumer of agrochemicals with many problems related to its use, and with the population increasing at an average annual rate of 2-3 % the food security is becoming a major concern for the whole region. While there are many fresh water resources available in the area, the availability and access to irrigation water is becoming a critical factor in agricultural inputs along with soil management, improved crop varieties and above all the quality and safety of agrochemicals including fertilizers.

Many countries in the Arab region have already embarked on increasing their pesticide formulation capacity and at the same time some countries, both in the Afro and the Arab regions are seriously moving towards Integrated Pest Management (IPM) as a means for reducing dependence on man-made chemicals.

Despite the problems associated with the production and use of agrochemicals, just as in other parts of the world, in the Afro-Arab region also the consumption of pesticides is on the increase. While in the developed world, the trend is towards 'low volume/high value' pesticides and their formulations, the majority of the Afro-Arab countries still rely on old generation pesticides and their traditional formulations such as WP, EC which tend to be 'high volume/low value' pesticides and many of them highly toxic and persistent pesticides. In addition, the use of fertilizers are also on the increase and the leaching of nitrates and phosphates are causing problems of eutrophication blocking the waterways and harming aquatic life. Another major problem facing these countries are accumulation of obsolete and date expired pesticides and their formulations stored in highly hazardous conditions causing damage to human and animal life and the environment.

While some of the problems related to handling of agrochemicals are being dealt with either on a national or some at sub-regional levels there are no concerted efforts on a regional basis so as to catalyze capacity building in the region towards promoting risk reduction in agrochemicals development. A network such as the proposed Afro-Arab network would bring many countries of the region together to discuss and exchange the problems and experience in this very important complex and multidisciplinary field. In 1991 many African and Arab countries during an Expert Group Meeting at Brussels on development of integrated safety guidelines on pesticide formulation in developing countries requested UNIDO to set up a mechanism for setting up of a network on risk reduction in agrochemicals development similar to the Regional Network on Pesticides for Asia and the Pacific called RENPAP.

In order to obtain first hand information on the status of agrochemicals development in selected countries in the Afro-Arab Region, UNIDO in 1995 sent a delegation to selected countries in the Afro-Arab Region. The UNIDO Mission met representatives of various Ministries dealing with pesticides, research institutions, NGO and Women organizations. Based on the findings, two reports, one for the Arab region and one for the African region, were submitted. In addition, a draft project proposal was prepared giving a strategy for setting up of the network with objectives, outputs, activities and inputs. In order to discuss the reports and the project proposal an Expert Group Meeting hosted by the Ministry of Health, Government of Mauritius, was held at Mauritius from 4-6 December, 1996.

2. Agenda for the Meeting.

The final adopted Agenda is attached as Annex 1.

3. Opening of the Expert Group Meeting (EGM)

The EGM was opened by the Honourable Minister for Health, The Government of Mauritius Mr. K. Pillay. During the Opening ceremony the UNDP Resident Representative for Mauritius, Mr. Paul L. Andre de la Porte expressed his happiness for choosing Mauritius for organizing the EGM of this important topic. He said that the UN System is making every effort to fight poverty alleviation especially in the area of food security and at the same time protecting the environment and in preserving the bio-diversity. Whilst recognizing the vital role of agrochemicals in crop production and crop protection, he specially emphasized the importance of user and environment friendly products. He added that while the available technology makes chemical inputs into agriculture as a major factor to increase crop production, every effort should be made to reduce chemical inputs. He said that Agenda 21 has many areas dealing with sound management of chemicals including agrochemicals and that networking would be an ideal platform for North-South and South-South interaction to exchange information and experience. He added that he would be eagerly looking forward to the outcome of the EGM on a very important topic.

The UNIDO Representative welcomed the participants on behalf of the Director general of UNIDO. By having more than 50 participants coming from around 20 countries he saw a clear indication of the importance of the meeting and mentioned that the idea of setting up of an Afro-Arab Network started in 1991 at Brussels during an UNIDO meeting to develop Guidelines for Integrated Safety in Pesticide formulation in Developing countries. He explained the purpose of the EGM was to set up an Afro-Arab Network on Risk Reduction in Agrochemicals Development. Such a network would cover the whole spectrum of development from legislation, production, formulation, storage, transport, distribution, usage to fate in the environment. Such a network could act as a catalyst for capacity building to promote risk reduction in agrochemicals development. He said that while there was moral support from UNIDO's initiative, it was necessary to work together to convert this moral support into financial support. He thanked the Mauritius Government especially the Ministry of Health for providing all the facilities and hosting the meeting.

The Honourable Minister of Health Mr. Pillay in his opening speech welcomed the participants on behalf of the Government of Mauritius. He said that the EGM came at a propitious moment and that the African and the Arab regions have a common distinctive feature and in many countries agriculture and tourism sectors are important components of economy. With the high use of fertilizers and leading to undermining of natural fertility of the soil and posing hazards to public health and to the environment. At the same time he mentioned that awareness of the hazards which agrochemicals represent to health and to the environment, is on the increase. He appreciated the initiative of UNIDO to set up a Regional Network where the countries of the Afro-Arab region could formulate a plan for risk reduction/elimination.

He expected that the network will look into the broad spectrum of agro-chemicals development will facilitate regional awareness, promote inter-regional exchange and develop know-how and capability in the national program of the states of the region.

4. Election of office Bearers.

The EGM proposed Prof. Indur Fagoone, Dean, Faculty of Science, University of Mauritius as the Chair Person and Mr. Naidoo Ramanjaloo, Divisional Scientific Officer, Ministry of Environment, Government of Mauritius as the cochairman. Dr. Mosha, director of the Tropical Pesticide Research Institute, Arusha, Tanzania and Mr. A. Sulaiman Nujaidi of the Ministry of Industry & Electricity of Saudi Arabia were elected as Rapporteurs for the meeting.

5. Presentation of Country Papers

More than 50 participants from more than 20 countries registered for the conference. From the Afro-Arab region the following countries were represented:

- Algeria
- Ethiopia
- Ghana
- Kenya
- Kuwait
- Lebanon
- Madagascar
- Malawi
- Mauritius
- Palestinian Territories
- Saudi Arabia
- South Africa
- Sudan
- Syria
- Tanzania
- Tunisia
- Uganda
- Zambia
- Zimbabwe

Whilst Morocco did not nominate a representative, the delegates of Nigeria, Egypt and Jordan were not able to participate.

A total of 19 country papers plus the statement of a representative of the Common Market for Eastern and Southern Africa (COMESA) were presented during the first day of the meeting. Abstracts of the papers are given in annex ⁱⁱ. The full papers are found in Vol.2.

6. Technical Lectures**LIST OF TECHNICAL LECTURES PRESENTED**

- Plenary lecture on Occupational Health and Safety relevant to Pesticide Production and Use (Dr N. Cortes-Maramba from Philippines)
- Pesticides poisonings in Mauritius -
(Mr A. Jackaria - Chief Forensic Science Officer, Mauritius)
- Biopesticides - their relevance to the Afro-Arab regions
(Dr J. Menn, USA).
- Botanical pesticides in Mauritius
(Mrs S. Facknath - University of Mauritius)
- Importance of Ecotoxicology and Environmental monitoring
(Dr B. Sugavanam - UNIDO)
- Monitoring of Natural Water for Agrochemical Contamination in Mauritius
(Mr G. Umrit, MSIRI, Mauritius)
- Activities of the Regional Network on Pesticides in the Asia and the Pacific -
RENAP (Dr S.P. Dhua - India)
- Use of Modern Information and Communication Technology for Networking
(Mr K. Ziller, Germany)
- Lead Paper Presentation on the surveys carried out in the Afro-Arab Region
 - Introduction: Dr B. Sugavanam
 - Arab Region: Mr K. Ziller
 - African Region: Dr F. Kovats
- Presentation of Project proposal (Mr K. Ziller)
- Raising worker protection standards for pesticides through improved protective clothing in tropical countries
(Dr Anugrah Shaw - USA)

Abstracts (as far as available) are given in the Annex. ⁱⁱⁱ

7. Assignment of Groups

For the last day of the EGM the plenum was divided into African and Arab Region subgroups where details of possibilities on how to setup the proposed network were discussed. The procedures and the results of the group discussions are given below.

8. Group discussions

The group discussions were led by Mr. B. Vermeulen from South Africa as the Chairman for the African group and Mr. Y. Al Tarkma from Kuwait as Chairman for the Arab group. Rapporteurs were Dr. Masha from Tanzania (African group) and Dr. Abul Halim from Syria for the Arab group.

The main topics discussed included the key areas of concern to the various countries according to the list given in the project proposal, the classification of the countries according to UNIDO's four categories, the importance of fertilizer problems along with pesticide problems, the suitability of the RENPAP model or adaptations needed, the appropriate ministries or institutions to plan the focal role as national coordinators or technical coordinator units in the various countries, the level of commitments expected from the participating countries and the ways and modalities by which the network could be launched.

The results of the group discussions were presented to the plenum and conclusions and recommendations were drawn as given in the following chapter.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

9.1.1. The Expert Group Meeting (EGM) having considered the vital importance and urgency of risk reduction in the agro-chemical development (production, storage, distribution, usage, disposal, and regulation) strongly felt the need for the regions to come together through a networking system to deal with the problem in a comprehensive manner and utilising the resources already existing within the region.

9.1.2. The EGM having studied and discussed the Regional Network for the Production, Marketing and Control of Pesticides in Asia and the Pacific (RENAP) network model agreed to adopt it with suitable adjustments to meet the exacting needs of the participating countries.

9.1.3. The meeting also agreed on the following ten key elements and identified the countries to host the activities as suitable areas for coverage by the network.

- | | |
|---|------------------------------------|
| • Data collection, retrieval, and dissemination | South Africa |
| • Industrial hygiene and occupational health and safety | Tanzania |
| • Ecotoxicology and environmental monitoring | Zambia/Mauritius/
Saudi Arabia |
| • Development of bio- and botanical pesticides | Kenya/Sudan |
| • Production and industrial safety | South Africa |
| • Waste management and disposal | Zimbabwe/Tunisia |
| • Quality control and quality assurance | Tanzania/Kuwait |
| • Application technology | Ghana/Algeria |
| • Legislation and enforcement | Mauritius |
| • IPM | Syria/Saudi Arabia
Ghana/Uganda |

9.1.4. In order to have the networking of the ground at the earliest, the meeting agreed to seek the support of the RENPAP for initiating training and workshops in selected technical coordinator units in those areas prioritized both by the African and the Arab regions viz:

- 9.1.4.1. Development of user and environment-friendly formulations and quality control.
- 9.1.4.2. Monitoring of pollutants in the air, soil, and water.
- 9.1.4.3. Development of bio- and botanical pesticides
- 9.1.4.4. Augmenting occupational safety and industrial hygiene
- 9.1.4.5. Waste management and effluent treatment including disposal of obsolete and expired pesticides.

- 9.1.5. The EGM commended the initiatives taken by the Government of Mauritius in hosting the EGM and for providing all the support facilities.
- 9.1.6. The Group agreed that for initiating such a network UNIDO may seek assistance from UNDP and other suitable donor agencies.
- 9.1.7. The meeting agreed to a proposal from Palestine that a Pilot Project in the field of information collection and dissemination through electronic network be started with existing facilities. South Africa and Tanzania agreed to coordinate in this matter.
- 9.1.8. Having taken into account absence of some participating countries , UNIDO was requested that these countries be contacted regarding joining the network and provide technical inputs.
- 9.1.9. The meeting also requested to keep the network as an "open network" so that the door is always open to new members. It was also agreed to keep the question of options such as one network, two networks or one network with two sub-networks open.

9.2 Recommendations:

- 9.2.1. The Expert Group Meeting (EGM) strongly recommended setting up of a network to deal with the problems of risk reduction in the agro-chemical development in an adequate and comprehensive manner and decide in due course of time the question of having one network or two networks for the Afro- Arab region.
- 9.2.2. The EGM having studied and discussed the RENPAP model recommended that this be adopted with suitable adjustments in due course of time.
- 9.2.3. The meeting recommended acceptance of the offer of the Government of Mauritius to set up the Secretariat of the proposed network and requested the regional coordinator for RENPAP to be the advisor.
- 9.2.4. The meeting strongly recommended that with the assistance of RENPAP workshops be organized in the key areas of concern in their technical coordinator units followed by similar workshops in the participating countries with the assistance of the trained core group.
- 9.2.5. The meeting strongly recommended that UNIDO formally take up the project with the participating countries preferably before the end of March 1997 and seek the assistance of UNDP and suitable donor agencies.

10. Action to be taken

- UNIDO to contact countries that somehow were not able to participate in the EGM in order to find out whether they still would be interested to join the proposed network
- UNIDO to formally take up the project with the participating countries
- UNIDO to seek assistance of UNDP and other donor agencies to finance the project

11. Evaluation

An evaluation questionnaire was distributed and returned by 33 participants. A short evaluation is given below.

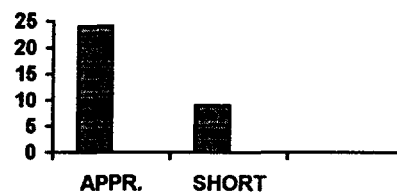
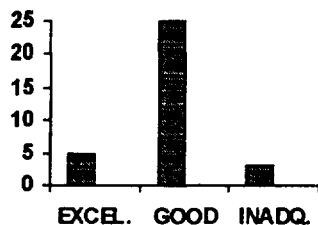
EXPERT MEETING EVALUATION (33 returned questionnaires)

1. (Name)

2. (Organization)

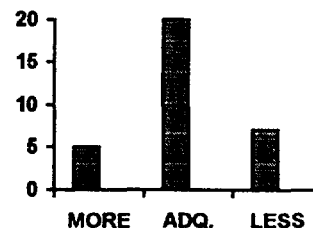
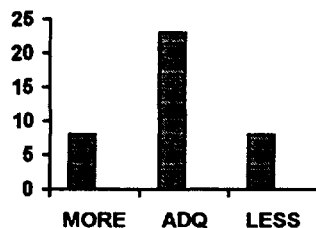
3. QUALITY OF ARRANGEMENTS

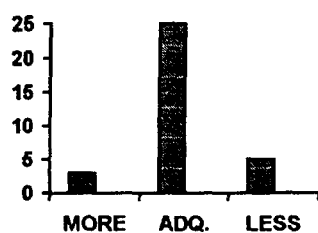
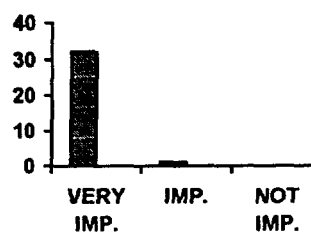
4. DURATION OF THE MEETING



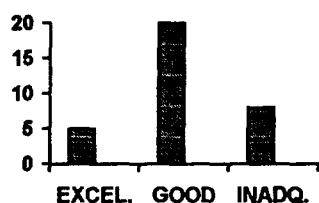
5. TOPICS COVERED

6. COUNTRY PARTICIPATION IN THE MEETING



7. TOPICS FOR GROUP DISCUSSION-
TOPIC OF THE KEY ELEMENTS8. IMPORTANCE OF THE
THE MEETING

9. EFFECTIVENESS OF THE GROUP DISCUSSIONS



12. Closing Ceremony

The EGM was closed by the Honourable Junior Minister for Health, the Government of Mauritius, Mr. V. Bundhun. Referring to the growing concern about the problem of Agrochemical use and pointed out that a concerted effort is required to adopt measures for low-risk pesticide control management. Aware of the trend in Industrialized countries towards use of low volume/high value products to minimize risks he mentioned that developing countries are confronted with problems of toxic agrochemicals and effective waste disposal measures. He was pleased to see that there was a clear consensus on the necessity to provide for a regional network to facilitate contacts and cooperation to minimize risk reduction.

13. Participants List

A short list of all participants with their addresses is given in annex. ^{iv}

**RISK REDUCTION IN THE DEVELOPMENT OF
AGROCHEMICALS
IN THE AFRO-ARAB REGION**

**Interregional Expert Group Meeting
The Republic of Mauritius, 4-6 December 1996**

Organized by

**The United Nations Industrial Development Organization (UNIDO)
in collaboration with
The Ministry of Health, The Republic of Mauritius**

Tentative Programme

Wednesday, 4 December 1996 - Opening Ceremony and Country Papers

08.30-09.00	Registration
09.15-10.30	Opening Ceremony
	* introduction
	* address of the UN Resident Representative
	* statement of WHO Resident Representative
	* statement of UNIDO Representative
	* opening address by the Honorable Minister of Health
10.30-11.00	Coffee break
11.00-11.15	Election of office bearers
11.15-11.30	Discussion and adoption of the agenda
11.30-12.15	Plenary lecture on Occupational Health & Safety relevant to Pesticide Production and Use by Dr. N. Cortes-Maramba from Philippines
12.15-12.30	Pesticide Poisonings in Mauritius Mr. A. Jackaria, Chief Forensic Science Officer, Mauritius
12.30-12.35	General announcements
12.35-14.00	Lunch
14.00-16.30	Presentation of Country Papers (session includes one coffee break)

Thursday, 5 December 1996 - Ecotoxicology, Biopesticides, Networking

- 09.00-10.30 Biopesticides - their relevance to the Afro-Arab Region
(Dr. J. Menu, USA)
- Botanical Pesticides in Mauritius by
(Mrs. S. Facknath, University of Mauritius)
- Importance of Ecotoxicology and Environmental
Monitoring
(Dr. B. Sugavanam, UNIDO)
- Monitoring of Natural Water for Agrochemical
Contamination in Mauritius
(Mr. G. Umrit, MSIRI, Mauritius)
- 10.30-11.00 Coffee break
- 11.00-12.30 Activities of the Regional Network on Pesticides in the
Asia and the Pacific - RENPAP (Dr. S.P. Dhua, India)
- Use of Modern Information and Communication
Technology for Networking
(Mr. K. Ziller, Germany)
- 12.30-14.00 Lunch break
- 14.00-15.30 Lead Paper Presentation
- Introduction: Dr. B. Sugavanam
 Arab Region: Mr. K. Ziller
 African Region: Dr. F. Kovats
- 15.30-16.00 Coffee break
- 16.00-17.30 Presentation of Project Proposal
- discussions on project proposal and
assignment of working groups

Friday, 6 December, 1996 - Group Discussions and Recommendations

09.00-09.30	Raising Worker Protection Standards for Pesticide Users through Improved Protective Clothing in Tropical Countries (Anugrah Shaw, University of Maryland, USA)
09.30-11.00	Group discussions
11.00-12.00	Coffee break
12.00-13.00	Presentation of results from group discussions
13.00-15.30	Lunch break
15.30-16.30	Conclusions and Recommendations
16.30	Closing Ceremony

From Mr. BADA MOHAMED HADI
TECHNICAL DIRECTOR
ASMIDAL - ALGERIA.

SITUATION OF PESTICIDES INDUSTRY IN ALGERIA

ABSTRACT

Pesticides Industry exists in Algeria since more than fifty years. The activity of production of pesticides is managed by the company ASMIDAL issued from SONATRACH in 1985.

ASMIDAL disposes of four sites where pesticides and domestic products are produced. Two of these sites (BARAKI and BENI MERED) produce liquid and powdered pesticides. The other sites (MASCARA and GOSBAT) produce insecticides for domestic use.

ASMIDAL produces more than twenty pesticides with imported raw material and using local charges.

Each pesticide in the market disposes a label on which lay specifications of the product, the toxicity, types of cultures to use, directions for use

Regarding the importance of risk from these products, Algeria published regulations executive decrees to protect the environment. Before we use pesticides, it is necessary to obtain approval from a commission composed of members from the Ministry of Health, the Industry, the Environment-protection, the trade, the institute of vegetables protection and the representing of toxicology and biological committees.

This commission has all power concerning the manufacture, the trade and use of new pesticides in the country.

Before giving any approval, the institute of vegetables protection makes all tests. These tests need more than two years. When all the tests are agreed, the commission gives approval for ten years (A.P.V).

Protection of environment is taken in charge by the Government. There is one department in the Ministry of interior which takes in charge all the problems concerning the protection of environment. Algeria publishes since 1976 regulations and decrees to protect environment. For the reduction of risk of using pesticides there is a regulation published in 1987 and an executive decree in December 1995.

Country Paper

ETHIOPIA**Risk Reduction in the Development
of Agrochemicals in Ethiopia**Berhanu Gebremedhin¹**Abstract**

In Ethiopia agriculture contributes over 46 percent of the GDP, accounts for 90 percent of the country's export earnings and employs 65 percent of the labour force.

At present the total cultivated land in the country is approximately 7.55 million has of which 7.2 million is cultivated by means of rain and the remaining 350,000 is irrigated.

The country has issued a special pesticide Decree (No. 20/1990) in September 1990, which assigned overall pesticide registration and control responsibility to the Ministry of Agriculture (MOA), Pesticide Registration and Control (PRC) office. But the registration became effective since July 7, 1996 and it has registered 45 pesticides since then. According to UNIDO's plan if the Afro-Arab region risk reduction in agro-chemicals net work is set up, Ethiopia can actively participate as an information centre.

¹ Ministry of Agriculture, P.O. Box 62347, Addis Ababa, Ethiopia

Country Paper

GHANA**ABSTRACTS**

In Ghana chemical pesticides have become the quickest and most reliable means of reducing the magnitude of crop losses for farmers. Pesticide usage in Ghana continues to increase on an annual basis and the average yearly consumption is around 800 metric tons. No pesticide is manufactured in Ghana, however there are now two formulation plants.

In the past few decades, it has become more apparent that pesticides use is associated with numerous human and environmental problems of which the small scale farmer (who typically is non literate) has no knowledge. In several instances, most poisonings occur to humans because of illiteracy, misuse of the chemicals, faulty application equipment, lack of proper storage facilities, repackaging of products, none availability of protective gears and improper disposal of empty containers.

PESTICIDE LAW

Recently (1996) Ghana has enacted its pesticide law, and this will strengthen the regulation on pesticides importation, distribution, sale and use in the country.

LABORATORY FACILITIES

With assistance from FAO, Ghana has set up two pesticide laboratories: one for quality control and the other for pesticide residue analysis. The pesticide quality control laboratory is now not functioning because of faulty equipment.

PUBLIC AWARENESS AND EDUCATION

The Public in Ghana is well aware of the hazards of misuse of pesticides through the Media. However, the Plant Protection Services Department of the Ministry of Food and Agriculture and Non Government Organisations (NGOs) in the country have been educating and training extension staff and farmers on the safe and efficient use of pesticides.

INTEGRATED PEST MANAGEMENT - FARMERS FIELD SCHOOL TRAINING METHODOLOGY

The Ministry of Food and Agriculture in 1992 adopted the Integrated Pest Management as its strategy for pest and disease control. Ghana has since then successfully implemented the Farmers Field School training methodology in Rice and Cowpea production. This has drastically helped to reduce the use of pesticides in the cultivation of the two crops. We will be obliged to share our experience with other countries.

PROSPECTS AND NEEDS

The enactment of the pesticide law and the adoption of the IPM concept are encouraging steps to manage and minimise the use of pesticides. Furthermore there is the need to solicit for local and foreign funding to promote and improve on existing pesticide management schemes in the country. To conclude, I think there is a need to foster regional and sub-regional collaboration and cooperation in the Management of pesticides.

Country Report**KENYA****ABSTRACT**

Kenya is one of the three East African countries with a population of 29.3 m people.

Agriculture is the mainstay of the economy with 78 - 80% of the active population being involved in farming activities. The contribution of agriculture to GDP is 29.1%. Agriculture output is more dependent upon wheather fluctuations although there is a marked increase on irrigated land in Mwea Tabere and along Tana and Athi rivers. Major field crops are maize, beans, tea, coffee and Horticultural crops.

Fertilizer consumption is 285,000 tons per year valued at 57M US dollars whereas pesticide consumption is estimated at 45M US dollars.

Pyrethrum is produced in the country at an average yield of 11,000 tons per year most of which is exported.

The Pest Control Product Board of the MOALD&M regulates pesticides trade in the country. Kenya Agricultural Research Institute co-ordinates research on pest identification and control, pesticide residue analysis and integrated pest management.

Similar programmes are being carried out by the I.C.P.E. Kenya Safe Use Project in collaboration with the Plant Protection Services Branch of the Ministry of Agriculture has trained 2,500 extension staff and 300,000 small scale farmers on safe and effective use of agrochemicals. The country has adequate facilities and trained personel to enable full participation in the Afro-Arab Network.

Country Report

KUWAIT**Abstract**

Kuwait imports 25.30 MT of Pesticides annually for use in agriculture of which 60% are insecticides, 25 % fungicides and the rest others.

There is a pesticide regulation procedure in the country which has to be observed by all dealing in pesticides.

Kuwait has banned 62 pesticides a list of which is enclosed.

Quality control procedures are followed and chemical, physico-chemical and biological tests are carried out before permitting the import of pesticides.

In order to reduce the load of chemicals on the environment bio-pesticides are being increasingly applied and pesticide application sequence adjusted to minimise building of resistance of resurgence of pests.

The IPM programme is being implemented and the use of bio-pesticides botanical pesticides and predators and parasites are being promoted.

Country Paper

LEBANON**ABSTRACT**

The cultivated land in Lebanon is around 332.3 thousands hectare, representing about 32% of the total area of Lebanon accounting for 10400Km²

Permanent crops account for 90 thousands hectare, seasonal crops counting on rain 148.9 thousands hectare and 93.4 thousands hectare on permanent irrigation. The surface area covered by forests is about 80 thousands hectare (50000) and land pasture 10 thousands hectare. Total agricultural output is about 9% of the total national output.

The labor force in Lebanon is about 1.1 million and 75 thousand work in various fields of agriculture. The total number of rural population is about 9% of the total population of Lebanon.

There are about 1647 thousand towns in Lebanon. 406 in the north, 608 in the mountain Lebanon, 412 in the south and 221 in the Bekaa valley.

The annual rainfall season in Lebanon begins from November till February, with small amount during the remaining months.

The proportion of people working in the agricultural sector was in 1965 29% from the whole labor force. This proportion dropped during the years 1990-1992 to 14%. The proportion for the industrial sector was in 1965 24%, it increased to 27% for the same period 1990-1992.

Country Report

MADAGASCAR**PROBLEMS AND PRIORITIES**
IN THE MANAGEMENT OF CHEMICAL PRODUCTS**ABSTRACT**

- **National environmental policy:** sustainable and harmonious balance between the human development needs and ecological concerns.
- **International conventions signed:** Vienna and Montreal in process : Bamako
- **Status of environmental pollution:** non significant and very located
- **Status of actions:**
 - field of pesticide: management of commercialisation, distribution and uses of agro-chemical products, by:
 - a structure of control
 - a national committee of homologation
 - educational and information program
 - penalisation of infractions
 - field of industrial and consumption chemical product:
 - starting establishment of legal and reglementary chart
 - permanent environmental management structure at the Ministry of Industry
 - a sectorial program for the ecologically sustainable industrial development
 - actions of NGO for the prevention and the risk reduction in chemical development
 - national profile for the evaluation of national capability to manage chemical products.
- **Problems:**
 - * lack of legal and reglementary charts related to the chemical products
 - * deficiency in the control and follow up structure
 - * inadequacy of the waste management infrastructure
- **Needs:**
 - * elaboration of national policy and establishment of required legal chart
 - * sectorial and central data management
 - * large information about the potential risk of chemical products
 - * technical assistance for:
 - data management
 - free and facilitated access to information sources
 - qualified technicians
 - reinforcement of national human and institutional capability.

Country Report***MALAWI*****Risk Reduction in the Development of Agrochemicals in the
Afro-Arab Region the Malawi contribution****(M.P.K.J. Theu)****Abstract**

Malawi's economy is agrobased and all pesticides and herbicides are imported. There is only one packaging facility with Agricultural Development and Marketing Corporation of Malawi. Previously, pesticides and herbicides came under the form feeds and remedies act Chapter 67 Laws of Malawi. With the liberalisation of fertiliser selling, the act was amended and the amendment only affected fertiliser selling.

Due to the sale of a lot of chemicals which are falsely claimed to work wonders, government has decided to start several programmes. There is the Pharmacy Poisons and Medicines Board which will classify pharmaceuticals and chemicals according to World Health Organization Standards. The board will also produce an antidote list which can be used by the Ministry of Health for reference. Pesticide legislation and pesticides analysis, has been initiated and with the financial support Food and Agriculture Organisation this will probably not fail. The government will also appoint a pesticide registrar to coordinate all the necessary activities which will include the registration, inspection and analysis of chemicals.

Malawi will benefit from the network, but will also contribute in the field of personnel, building space and research areas.

COUNTRY PAPER

MAURITIUSABSTRACT

Mauritius is a small island in the Indian Ocean, having an area of 1,865 sq.km and a population of 1.2 million.

Agriculture plays an important part in the economy of the island, coming after textiles and tourism. In 1995, agriculture provided employment to 12.5 % of the population and contributed to 10% of the GDP. The main agricultural product is sugar (600,000 tons annually).

Agrochemicals are extensively used in agriculture. Fertilisers are produced locally and are exported to neighbouring countries. About 1 500 tons of pesticides are imported yearly. The use of pesticides per hectare is quite high in Mauritius.

Environmental and health monitoring is being carried out regularly. The main health problem being intentional poisoning, which needs a multisectoral approach.

IPM programs have been going on for several years and are being reinforced to control pests and diseases. Research on botanical pesticides specially on neem is being carried out by the university.

There is an awareness of the adverse health and environmental effects of Agrochemicals. The situation is being monitored closely and steps need to be taken to eliminate highly toxic pesticides and to reduce their use in Mauritius.

The Pesticides Control Act is being replaced by "The Dangerous Chemicals Act" to reinforce management of toxic chemicals including pesticides.

Country Paper

Palestinian National Authority

Pesticide Usage In Palestine

Abstract

Pesticides, when used properly have been of tremendous benefits to human being and environment, but when misused or used carelessly, they have caused considerable harm. Many pesticides are potentially toxic to higher animals and can be dangerous to all exposed to them. Pesticide residues all too frequently find their way into food, water and soil. Rural and urban populations are at times subjected to un-necessarily high levels of pesticides due to overspraying, improper storage, and burning or burial of pesticide-laden agricultural wastes.

In Palestine, pesticides are excessively used quantitatively and qualitatively. There are about 125 types of pesticides that are being used in Palestine with application rates ranging between 2.1 kg/donum and 8.5 kg/donum. Of these pesticides, about 49 % are insecticides, 34 % fungicides, 13 % herbicides and the remainder are fumigants, repellants, and others.

Pesticides are excessively used in the districts of Tulkarm, Jenin, Jericho and Gaza, where the under plastic agriculture is mainly practiced.

Safety measures in pesticide application are rarely applied. Proper dilution and application methods are still in need of more awareness.

Regulations controlling the pesticide marketing and use are available from the Jordanian and Egyptian mandates. The decades of Israeli occupation have affected the enforcement power of these laws. However, after the transfer of the authority to the PNA, there is an urgent need for a unified national regulations to control the pesticide use and marketing.

Integrated Pest Management (IPM) project has been launched on a regional level between Palestine, Jordan and Israel. This project needs to be supported and applied.

Clearly, improving farmers' understanding of the ecological system with which they are working is vital. This includes improved understanding of the importance of soil organisms and of pest-predator relationships and understanding of the concept of economic threshold. Education is the key to coming to terms with the problems of pesticide usage in Palestine.

Country Report

KINGDOM OF SAUDI ARABIA**ABSTRACT**

1. The Ministry of Industry and Electricity in the Kingdom of Saudi Arabia is the agency concerned with granting industrial licences. In general, the MOIE is supervising all factories in the Kingdom including those of Agricultural Chemicals and does not permit the entry of any material that may have a negative effect on the animate and inanimate environment.
2. The Ministry of Agriculture and Water supervises the farms, all of the Agricultural producing sectors and Control all the importers and users of the Agro-chemicals and it is the Agency authorized to provide clearance for pesticides and agricultural fertilizers.
3. There are seven factories producing chemical fertilizers in the Kingdom with total annual capacity of 636.000 ton.
4. Volume of imports from chemical fertilizers reached 29.674 ton in 1994.
5. Pesticides training is controlled by a Regulations Rule and the practice of this profession necessitates a license that will be issued as per numerous conditions and considerations.
6. No pesticides is permitted to enter the Kingdom before having been registered in the Kingdom.
7. There is a list of pesticides (360 compounds) which have duly been registered in the Kingdom.
8. A list of prohibited pesticides (72 compounds) has also been elaborated.
9. There are three pesticides producing factories with total annual capacity of 6.113 ton.
10. Volume of imports from chemical fertilizers marked 851 ton for liquid pesticides and 674 ton for powder pesticides in 1416H.
11. The Saudi Government is always keen on eliminating the effect resulting from any chemical substances or others and punishes strictly those who violate the relevant rules.
12. The Saudi Government supports the safe means developed in using the chemicals in general and the agricultural in particular.
13. The Kingdom's participation in this programme indicates its care towards eliminating the risk of agricultural chemicals.

Abdullah S.Al Nugaidi

RISK REDUCTION IN AGROCHEMICAL DEVELOPMENT IN SOUTH AFRICA

J.B. VERMEULEN

DIRECTORATE : AGRICULTURAL PRODUCTION INPUTS,
NATIONAL DEPARTMENT OF AGRICULTURE, PRIVATE BAG X343, PRETORIA
0001

Republic of South Africa

Abstracts

South Africa is a major user and producer of agrochemicals. Twenty-three different active ingredients are currently being manufactured locally. Although the domestic market is fairly static, exports of pesticides manufactured in South Africa have increased quite dramatically over the last decade. The current pesticide market in South Africa is in the region of \$210 million while the fertilizer market is 2 200,000 metric tons annually.

The most successful activity to reduce risk is the control exercised over pesticides by Act No. 36 of 1947. Because of the wide range of controls that can be exercised in terms of this act, it has enabled the Registrar to withdraw, prohibit and to restrict many high-risk pesticides. Coupled with strict labelling requirements and an effective inspectorate, it has been possible to obtain adequate regulation of pesticides in South Africa.

The development and promotion of biological control and IPM strategies has been highly successful in some instances. This has been made possible by the expertise available in the ARC and its activities in this field over many years. ARC representation on INDAC and on the Agricultural Liaison Committee of AVCASA and the Department of Agriculture has resulted in a holistic approach to risk-reduction. The ARC has also played a major role in the development of better control strategies for pests. A number of training and education programmes have been initiated over the last decade.

The Department of Environmental Affairs and Tourism is currently investigating the establishment of a Designated National Authority (DNA) to enable South Africa to participate in PIC and IPCS. It is envisaged that once established, the DNA will play an important part to facilitate communication with other DNAs, WHO, FAG, UNEP and UNIDO.

Country Report***SUDAN*****Abstract**

Sudan being the largest country in the Afro-Arab region with a total area of 2.5 million km² has vast, extended cultivable areas representing one third of the total land. However only 10 - 15 % of this area are cultivated and merely 2% are irrigated. Sudanese economy is primarily based on agriculture which contributes with more than 1/3 to GDP and to 90% of export revenues.

Sudan heavily depends on importation of pesticides and fertilizers from the Industrial West. The expenditure of 100 million for fertilizers and pesticides has put a strain on the economy. Efforts were made in the 1970s to produce fertilizers locally and a plant was constructed. However the enterprise was abandoned due to lack of raw materials and poor location of the plant.

In recent years a program was instituted to introduce IPM practices in agriculture and provide training to farmers in safe use of pesticides; the Ministries of Industry, Health and Agriculture are involved in these projects.

Sudan being classified among the least developed countries is really in confrontation with difficulties and hence should be shared in its challenge.

Country Report***SYRIA*****Abstract**

Syrian agriculture made progress in recent years in increasing crop yields due to improved crop protection measures, and greater use of fertilizers. The latter are also manufactured in the country.

The use of chemical pesticides has been curtailed due to new regulations and mass education and training of farmers and the public.

Training and education in agricultural research institutions has been stepped up resulting in greater emphasis on basing crop protection on the IPM approach and safeguarding beneficial organisms (parasitoids).

Application of fertilizers has been made more precise based on soil fertility testing prior to fertilizer application.

Biological control is now practiced in forestry and citrus culture. Efforts are underway in several key areas that will lead to sustainable agriculture. These measures include: improved seed dressing technology, making disruption with pheromones, monitoring pesticides for environmental impact, increased emphasis on toxicological standards for pesticides, and quality control of chemical pesticides.

Syria is fully supporting organizing a network of Regional Countries in order to accomplish the desired goals concerning risk reduction from agrochemicals. Syria would provide network leadership in the areas of IPM, developing biopesticides and botanical pesticides and technology for seed dressing.

Country Paper

TANZANIA

by

A. Magashi
Tanzania Industrial Research and Development Organisation
(TIRDO) Dar es Salaam, Tanzania

AND

F. W. Mosha
Tropical Pesticides Research Institute (TPRI)
Arusha, Tanzania

ABSTRACT

Tanzania, with a population of 27 million people and 95 million ha. of land imports about 4000 tonnes and 593,000 lts. of pesticides per year. About 85% of these are imported and mainly used in the agricultural sector.

Efforts made so far towards risk reduction include , established registration scheme, reduced importation of pesticides and reduced problems of unwanted pesticides. Existing major problems include prior enforcement of the pesticide law, limited use of protective gear, improper disposal of empty containers and obsolete stocks of pesticides as well as misuse of pesticides.

Existing national institutions like Tropical Pesticides Research Institute (TPRI) and Tanzania Industrial Research and Development Organization (TIRDO) have adequate infrastructure equipment and manpower to participate in the Network.

Country Report***TUNISIA*****Abstract**

Protection of crops against diseases, pests and weeds is a serious problem in Tunisia and on account of fruit fly infestation alone the loss of crops is estimated at about US\$ 1.4 million.

The pesticide legislation has been established in line with that of the FAO code and the Ministry of Agriculture is the implementing authority which is supported by a well equipped analytical laboratory.

All pesticides are imported and about 80 insecticides, 50 fungicides, 60 herbicides and 20 others are used in the country. There is no local production of pesticides.

The Ministry of Agriculture is authorised to import the needed pesticides and it provides the necessary information to the farmers.

The expectation of the country of the expert group meeting are:

- (1) assistance in the establishment of appropriate and adequate legislation specific to the country.
- (2) assistance in providing training to the technicians.
- (3) assistance in the exchange and collaboration between participating countries in quality control and analytical procedures of pesticides.
- (4) assistance in the exchange of information relating to pesticides.

Country Report**UGANDA****Abstract**

There is no manufacture or formulation of agrochemicals in Uganda. In 1989/90 about US\$ 25 million were spent on importing pesticides. The importation, handling and application of agrochemicals constitute a major issue in the country because they are used extensively in agricultural production, livestock and human health protection. A wide variety of agrochemicals are used to improve the quality and quantity of crops and livestock. Most of this is used and carried out by small land owners who apply simple traditional methods and are ill equipped for proper application of the chemicals. Correspondingly a wide variety of hazards are posed to public health and the general environment. The importation and use of agrochemicals is on the increase. Many of the pesticides that have been used intensely over long periods in Uganda are organochlorines which are well known for their persistence and accumulation in the environment, apart from their inherent toxicological behaviours. They are now being replaced.

Agrochemicals usage has taken place without corresponding measures in place to ensure the safe use of such toxic chemicals. Various hazards do exist in the country. These are accumulation of old stocks, ingestion of treated seeds, fishermen using pesticides to catch fish, use of empty containers resulting in death. Annually 272,000 cases of poisoning are reported and around 1 % of these cases are fatal.

The Agricultural Chemicals Statute of 1989 enabled the creation of the Pesticides Control Board which is charged with ensuring safe use of chemicals. The Law is implemented by the Ministry of Agriculture, Animal Industry and Fisheries and is also responsible for the registration of Pesticides.

There is a well developed distribution system through agricultural extension and cooperative societies.

The National Environment Statute 1995 provided for the establishment of the National Environment Management Authority which is the principal agency responsible for the management of all aspects of the environment; this agency is also proposed to become the National Coordinator for the Network.

Country Report***ZAMBIA*****ABSTRACT**

Zambia is a landlocked country in Southern Africa. It has eight (8) neighbouring countries namely Angola, Botswana, Malawi, Mozambique, Tanzania, Zambia, Zaire and Zimbabwe.

In 1990, Zambia enacted the Environmental Protection and Pollution Control Act (EPPCA) No 12 of 1990, which led to the establishment of the Environmental Council of Zambia (ECZ). Part V11 of the EPPCA , No 12 of 1990 deals with Pesticides and Toxic Substances. Within the ECZ, there is a Pesticides and Toxic Substances Unit which is charged with amongst other things, control and monitoring of the importation, exportation, manufacture , warehousing, transportation, distribution, packaging, labeling, sale, use and disposal of Pesticides and Toxic Substances.

Notwithstanding the positive benefits, agrochemicals have had some adverse impacts on the environment in some parts of Zambia. For example, the eutrophication of the Kafue river and growth of water hyacinth leading to reduced water flow. Meanwhile cases of human poisoning, misuse and non-target kills are common.

The Zambian Government is aware of risks of misuse of agrochemicals. Therefore, in addition to the EPPCA , the Pesticides and Toxic Substances Regulations were issued in 1994, to specifically deal with issues of Pesticides and Toxic Substances use in the country. In addition to this a Chemical Profile document which documents the usage of chemicals in the country, has just been completed. However , the above efforts need to be supplemented by public awareness campaigns and additional resources for sound agrochemicals management.

Country Report***ZIMBABWE*****ABSTRACT**

The conditions for registration of pesticides in Zimbabwe are outlined. This includes field tests complied with laboratory experiments.

Requirements for importation, exportation, sale storage, packaging and handling of particulars and their containers are also outlined. Industry faces problems in the importation and formulation of pesticides. These problems are also highlighted together with new developments in organic fertilizer manufacture.

Methods for the formulation of agrochemicals are listed together with QC/QA in the agrochemical Industry.

Pests Control methods are discussed including the natural Controls and IPM.

COMMON MARKET FOR EASTERN AND SOUTHERN AFRICA

(COMESA)

COMESA stands for Common Market for Eastern and Southern Africa, an Organisation transformed from the PTA "Preferential Trade area for Eastern and Southern African States which was in existence since 1981.

The member states of COMESA are Angola, Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zaire, Zambia and Zimbabwe.

The main objective of COMESA is promotion of regional economic integration in all fields of economic activity, namely: Agriculture, Industry, Trade, Transport and Communications, Monetary Affairs, Environment, Tourism, Women in Development etc...

The Headquarters of COMESA is in Lusaka, the Capital of the Republic of Zambia. The theme of the meeting on Risk Reduction in Agrochemicals Development for Afro-Arab Regions is of direct relevance to COMESA agricultural programmes. The main thrust of COMESA agricultural programmes is Food Security. In 1994, COMESA in collaboration with FAO was able to draw a comprehensive Food Security strategy for Eastern and Southern Africa. In that strategy some of the activities are going to be handled by COMESA, others will be shouldered by the Southern African Development Community "SADC", the Indian Ocean Commission "IOC" and the Intergovernmental Authority on drought and Development "IGADD". Also the theme of the meeting is relevant to the COMESA Environmental Action plan.

COMESA pledges its full support to the project; and the fact that most of the participating countries from the African region are COMESA members, gives COMESA a leading role in the implementation phase of the project.

My personal experience in the detrimental effect of the use of harmful agro-chemicals relates to TEMEC which is a product produced by the then Union Carbide Company. Due to its negative effects on soil fertility TEMEC was banned in the USA, nevertheless; it found its way to the Gezira Scheme in Sudan.

After a strong campaign against it, TEMEC was banned in Sudan after the damage has already been done.

Last but not least, I would like to thank UNIDO for extending the invitation to COMESA to attend this important meeting. I would also like to thank the Government and people of Mauritius for the warm welcome and hospitality accorded to us.

Abstract

Occupational Health and Safety Relevant to Pesticide Production and Field Use

NELIA P. CORTES-MARAMBA, M. D.

Great strides being enjoyed by developed countries in the area of pesticide technology which have resulted in the eradication of some vector - borne diseases and in higher crop yield have not yet benefited the developing countries. The continuing unsafe use of toxic pesticides has resulted in increasing number of pesticide poisoning and even tragic deaths in developing countries mainly due to lack of appropriate information and unsafe working conditions. At present there are more than 1400 active pesticide ingredients in over 60,000 formulations in use around the world.

There is an urgent need to be concerned with the health and safety of pesticide handlers since pesticides by their very nature are harmful to living organisms, including man. In the absence of advance technology, developing countries should cope with the problems of acute and chronic pesticide poisoning through an integrated, multidisciplinary approach. Comprehensive legislation implemented by a national authority must control and manage the registration, manufacture, formulation, importation/exportation, distribution, use and disposal of pesticides.

The occupational health and safety programme must provide for the protection of pesticide handlers in industry and promotion of their physical and mental health. Education and training of workers on safe work practices should be done regularly. Management in industry should be required to implement pre - and periodic medical examinations, biological and ambient monitoring, provision of appropriate personal protective equipment and adequate medical facilities manned by qualified health personnel.

The protection of agricultural workers is much harder to achieve but still attainable. Although the exposure period of farmers is temporary, their exposure levels have large variations, skin penetration could be very high (inadequate PPE), air monitoring is difficult to control and biologic monitoring is not easily available, using the present field methods (Ellman method for cholinesterase) due mainly to financial constraints.

It is therefore vital that governments adopt a policy that only trained pesticide applicators would be allowed to handle the more hazardous pesticides (WHO category I and II) while the less hazardous formulations may be availed of by the ordinary farmers. However, it is still very important that farmers receive adequate information and training on the safe and judicious use of these chemicals and in the prevention of poisoning through good personal hygiene and proper disposal of containers and left - over pesticides. Sprayed fields should carry warnings on unsafe re-entry periods. Industry should also be required to advocate product stewardship of their products, be involved in the training of farmers and in the provision of protective equipment for field use.

The early recognition and management of pesticide poisoning especially at the primary care level can be achieved by training of health workers and by providing them with first aid kits for pesticide poisoning. The over-all survival of pesticide - poisoned patient would not only be increased but would also result in improving the quality of life of the survivor when health personnel are properly trained in the appropriate care and management of the pesticide - poisoned patient.

The Philippine experience with the UNIDO - assisted Regional Network for the Production Marketing and Control of Pesticides in Asia and the Pacific (RENAP) has been fruitful and effective in providing exchange of vital information, in the training of selected personnel in quality control and waste management, in harmonizing some safety guidelines and in fostering friendship among member countries. It is therefore heartening that UNIDO is spearheading this activity on risk reduction in the development of agrochemicals in the Afro-Arab Region.

PESTICIDE POISONING IN MAURITIUS

- A Forensic Toxicologist's point of view -

A.K. JACKARIA
Chief Forensic Science Officer
Police Forensic Science Laboratory
Mauritius

ABSTRACT

A Forensic Toxicologist's point of view would probably be relevant towards the possibility of risk reduction in the use of pesticide in the Afro-Arab Region, as pesticides account for about 90% of fatal poisoning cases in Mauritius.

Vital Statistics related to poisoning in Mauritius are presented: a typical pattern for any one year (1995) depicting main agents as well as a list of common pesticides encountered from 1990 - 1996.

Ready availability coupled with their known reputation as killers make pesticides the agents of choice for poisoning.

The Forensic science Laboratory is a good reference source to obtain the extent and trend of pesticide poisoning in the country.

Poisoning is generally classified as Suicidal, Accidental and Criminal. Most cases of poisoning in Mauritius are suicidal in nature.

In drawing attention to the extent of the problem and probably finding alternatives to highly toxic pesticides, the Forensic Toxicologist would probably fulfilling a useful social role.

Biopesticides - Their Relevance to the Afro-Arab Region

Julius J. Menn, UNIDO, Consultant

The Afro-Arab Region is currently in a unique position to reduce the reliance on chemical pesticides in crop protection by increasing emphasis on the practical development of native biopesticides and botanicals.

Although this region consumes only 2-3% of the world consumption of chemical pesticides, the growth of agriculture suggests that there will be an increase in the use of crop protection agents. New technological developments in the developed countries have demonstrated the practical utility of Bacillus thuringiensis (Bt) based insecticides, Baculoviruses, entomopathogenic fungi and entomopathogenic nematodes in crop protection. There are also new opportunities to apply neem oil as a broad spectrum insecticide and fungicide.

These biological organisms/agents are found in soils and plants throughout many regions of the world including the Afro-Arab region.

Research and development of several biopesticides and neem have been initiated in several countries in the region. Primary emphasis should be devoted to industrial development of Bt products and neem oil. The Lubilosa Project using a fungus Metarhizium Flavoviridae to control locust in the Sahel is a constructive model for the development of other entomopathogenic fungi for insect control.

Marshaling resources and networking in the region with support from UNIDO and other organizations and institutions would substantially help in implementing a concerted campaign to introduce biologically based crop protection to the region.

Biopesticides in concert with reduced use of chemical pesticides would safeguard the environment, provide significant risk reduction from chemicals to man and non-target organisms. In-country launched biopesticide industry would also conserve foreign exchange and provide local employment.

The success of the RENPAP project in Southeast Asia could serve as a constructive model for the establishment of a functional network in the region to implement this IPM based crop protection program.

STUDY OF BOTANICAL PESTICIDES IN MAURITIUS

by

Mrs S. Facknath
(Senior Lecturer (Entomology)
University of Mauritius

ABSTRACT

Botanicals are being increasingly reviewed and reconsidered in many parts of the world as safer, cheaper alternatives to Synthetic chemical pesticides. Their effectiveness, safety, availability and cost make them a logic choice in any pest management programme.

Considerable work has been done in Mauritius on botanicals. Over 20 easily available, local plant species have been screened for their pesticidal potential on a wide range of agricultural, horticultural and stored product pests. Several of the most promising ones have been further investigated in some detail, in order to study their pesticidal action, growth regulating activities, antifeedance, oviposition deterrence, as well as their synergistic action on synthetic and other botanical pesticides. Ongoing studies include isolation and characterisation of the bioactive groups in 2 plant species, namely piper betel and Ayapana triplinervis.

Neem is one of the best-studied and best-known success stories in the recent history of botanical pesticides. It is probably the botanical pesticide par excellence. Several commercial formulations of neem are available, from India as well as from the United States.

A significant amount of neem research has been conducted in Mauritius, and appropriate recommendations made. It is therefore heartening to note the increasing interest exhibited by some local agrochemical firms in importing neem formulations.

ECO TOXICOLOGY AND ENVIRONMENTAL MONITORING**B. Sugavanam, UNIDO, VIENNA**

In any country or community per capita production and consumption of chemicals in various outlets determine the standard of living. However, without proper management of these chemicals there will be no sustainability in the quality and safety of life and the environment. There are more than ten key elements in promoting risk reduction in the developing countries to assure food security. One of the ten elements is Ecotoxicology and environmental monitoring of chemicals of concern. In the case of pesticides, information on ecotoxicology is available but any developing country big, medium or small should have the capacity for environmental monitoring. While soil contamination is localized, contamination of surface water, oceans and air have no international barriers. This proposed regional or sub-regional networking would catalyse capacity building. UNIDO's experience in Asia is cited as an example of how ecotoxicology and environmental monitoring of agro industrial chemicals including agrochemicals could be developed. UNIDO is also promoting the simple phenomenon of Control of Substances Hazardous to Health and Environment also called (COSHHHE).

MONITORING AGROCHEMICAL CONTAMINATION OF NATURAL WATER IN MAURITIUS.

G. UMRIT
Mauritius Sugar Industry Research Institute
Reduit, Mauritius

Abstract

With increasing public awareness about possible contamination of drinking water sources by agrochemical residues, the M.S.I.R.I. has monitored the levels of nitrate in drinking water and of pesticide residues in ground and surface waters of Mauritius. At none of the 25 locations monitored between 1991 and 1994 the level of nitrate in drinking water exceeded the maximum limit of 50 mg N03/L permitted in the 1991 Environment Protection Act of Mauritius. Moreover, there was no tendency for nitrate levels to increase with time during the monitoring period despite annual inputs of about 11000 t of fertilizer N by the farming community. In a separate study, water samples from 20 boreholes and 8 rivers were analysed at fortnightly intervals for 10 pesticides commonly used in Mauritius. Only 3 herbicides, namely atrazine, diuron and hexazinone could be found dissolved in ground and surface waters. Even then their concentration in about 60 % of the water samples were below the detection limit (0.05 ppb). Concentrations in excess of the maximum permissible levels of 3 ppb atrazine, 14 ppb diuron and 210 ppb hexazinone were never detected.

REGIONAL NETWORK ON SAFE PESTICIDE PRODUCTION AND INFORMATION FOR ASIA AND PACIFIC

(RENPAP)

RENPAP

The Regional Network on Pesticides for the Asia and the Pacific known as RENPAP is a network of 15 Asia-Pacific countries namely Afghanistan, Bangladesh, Peoples Republic of China, India, Indonesia, Iran, Republic of Korea, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam and is one of the largest networks of UNDP/UNIDO in the Asia and the Pacific region. The major objective is to promote safety in pesticide development and information collection and dissemination.

RENPAP Mission

Protection of the environment and providing safety to the farmers and the workers at the production centres and increasing agricultural production through scientific choice and adoption of safer and environment friendly technologies and products needed for alleviation of poverty and hunger by addressing food security.

APPROACH

RENPAP uses a harmonized approach in promoting "clean" technologies, assessing and revamping old/operational plants, promoting the use of appropriate personal protective equipment, effluent treatment and pollution control, establishing effluent standard limitation based on best technology available, and following the Brussels Guidelines in giving assistance to the industries to enable them to meet the safety standards and develop safer pesticides and their formulations including bio-pesticides and botanical pesticides.

How does the RENPAP work

Within the programme framework RENPAP is providing services to the member countries in a highly decentralised way through 8 Technical Coordination Units (TCU) which are the focal points of specialized areas of the network.

- User and Environment Friendly Pesticide Formulation Technology, India
- Bio-botanical Pesticide Development , Thailand
- Pesticide Application Technology, Malaysia
- Eco-toxicology, Pakistan
- Industrial Hygiene and Occupational Health Safety - Philippines
- Quality Control of Technical Grade Materials, Republic Of Korea
- Industrial Safety, Environment Protection and Effluent Treatment and Disposal, Indonesia
- Development and Use of Computer Software for pesticide Market Data, Input, storage, Retrieval and Dissemination, India and Thailand.

These TCUs have been upgraded as Centres of Excellence through RENPAP assistance for meeting the requirements of training, consultancy and trouble shooting of the participating member countries of the Network.

RENPAP owned by the Country Coordinators

The participation in RENPAP is mainly at the level of technical experts and due to their intimate involvement, has provided continuity in discussions and also facilitated establishment of personal linkage between technical personnel in the participating countries. The country coordinators of the program are the key people with commitment to the objective of the Network & RENPAP is "owned by the Country Coordinators" all of whom have a strong sense of participation in the network.

Spin-off Effects

Implementation of this sub-program has resulted in significant spin-off effects and in this context specific mention needs to be made of the establishment of a country program named "Sustainable Pest Control and Soil Fertility" - CPR/91/120 in the People's Republic of China. This intimate linkage between regional network Sub-program and a country program has been commended by UNDP headquarters as a unique feature and recommended for emulation. Eco-toxicology Research Centre has been established as a country project with funding from DANIDA and the Government of Pakistan and is serving the training consultancy and analytical needs of the network. The India country program Strengthening of Pesticide Development Centre is yet another country project which is directly a contribution of the network of RENPAP, which is serving also the Technical Coordinator Unit of User And Environment friendly pesticide formulation and meeting the requirements of training consultancy etc of the member countries of the network.

TCDC in Action

The TCDC concept has been put to direct use in RENPAP programme and almost all the training program and workshops are being organized within the region besides recruiting Consultants from within the region.

RENPAP in the Field

RENPAP complements the watershed management, agro forestry, farming systems, bio-technology, bio-diversity, peoples Participation and Integrated Pest Management components of the Farmer Centered Agricultural Resource Management (FARM) programme works directly with farming communities in the project field sites. RENPAP promotes IPM compatible crop protection agents, and trains the farmers on safe handling and use of crop protection agents.

Pesticide Data Collection & Dissemination

With the financial assistance of Government of France and in collaboration with Centre for International Cooperation in Agronomic Research for Development (CIRAD), France, a computerised Database on Pesticides at regional level has been established for information collection and dissemination. Data on National Pollution Release and Transfer Register and Ecotoxicology are being included in the Database.

RENAP Attainments

1. RENAP is one of the largest network comprising of 15 member countries.
2. built strong linkage with various national programme in the member countries thereby multiplying the benefits of the various activities of the network.
3. persuaded the member governments to change their policies, especially in India and Philippines, to ensure significant reduction of persistent and toxic pesticide load especially on the environment.
4. increase in the number and quality of user friendly IPM complementing pesticides and their formulation including bio & botanicals.
5. adoption of maximum limits of toxic substances in the environmental protection.
6. building strong linkages and integration with the FARM programme.
7. cost-effective implementation of workshops, training programmes and consultancy through TCDC concept

USE OF MODERN INFORMATION AND COMMUNICATION TECHNOLOGY FOR NETWORKING

(KLAUS ZILLER, UNIDO CONSULTANT)

Information is important to make decisions. Nowadays, information management, which is the process of gathering, processing and interpreting data, generally use the information technology as provided by computers. The ways and the speed at which data and information can be passed or transferred from one place to another have changed drastically over the past decades. Today we are looking at a new emerging society: the information society.

Networking became a new and popular way of dealing with complex tasks, economizing on work, saving resources and boosting cooperation. The most important key to successful networking is communication which is needed to pass data and information. The technology for many networks, nowadays goes back to some military interests and developments in the late 60's in America and finally led to what is presently penetrating into our societies around the world: THE INTERNET. Originally with only 4 computers interconnected it offers at present access to an estimated 4 mio host computers. More than 40 mio users from governments, industries, business and private sector are making use of facilities and services of the INTERNET.

Communication services in the internet include:

- E-Mail
- mailing lists
- discussion groups
- live discussions
- teleconferencing

User friendly software operating along internationally agreed standards and norms facilitate finding and sharing of information around the globe. Data as well as complete software could easily be exchanged. Archives, "Gopher's" and search engines help locate information that may be available anywhere in the world within the network. This technology has also gained an important role in education, especially for the younger generation.

The relevance of modern information and communication technology to the planned Afro-Arab network is shown with a series of examples. Apart from facilitating increased access to information available locally, it helps to tap into the global knowledge base. Information that is available at international organizations such as the UN Organizations (e.g. WHO, FAO, UNIDO) or programmes such as UNEP or even national agencies such as the EPA of America could be directly accessed and used.

Especially in the very complex area of agrochemicals, which include pesticides and fertilizers, having effects not only on the target organisms, but also on humans and the environment, it is of utmost importance to have comprehensive information. From the development and production of agrochemicals to registration and marketing of the products, from their application to the target organisms to their fate in the environment, we do clearly see risks and hazards, and thousands of experts and scientists day after day are creating data that have to be converted into meaningful information. But in order to make this information also useful, it is of utmost importance, that it will be made available as well as fast and easily accessible.

It is therefore not only an option, but a necessity for the proposed network to embark on modern information and communication technologies.

Abstract

Title : PPE Model to Enhance Health and Safety of Pesticide Users in the Tropics

Presenter: Anugrah Shaw, Ph.D.

The international focus is on maximizing food production and reducing health and safety risks to individuals and the environment. The health and safety risks can be reduced through the use of safer pesticides, maintenance of equipment and use of appropriate Personal Protective Equipment (PPE). Research conducted in the last two decades indicate that dermal exposure can be as high as 85% of the total exposure. Thus, use of appropriate protective clothing can assist in reducing health risks.

The purpose of the proposed model is to:

- develop and evaluate PPE that meets the needs of pesticide applicators in diverse tropical countries.
- develop decision support system to identify and recommend PPE appropriate for specific end uses.

Development of PPE:

The "grass roots" approach will be used to obtain input from the users, governmental agencies, pesticide industry, researchers and related association for the development of PPE. Information regarding climatic conditions, cultural factors, cost, user perception and acceptability, availability of PPE, and maintenance and care of PPE will be collected. All efforts will be made to design garments that are similar to "work clothing" generally accepted by the workers, using easily available cotton/cotton blend materials with water- and oil-repellent finish.

Decision Support System:

Information obtained regarding textile materials, pesticide characteristics and application, cost, cultural factors, etc. will be included in a database. This will be used to develop clusters (based on similarities in PPE needs) to assist in the development of PPE that meets specific user needs. In addition, the decision support system will utilize a statistical model to make appropriate recommendations for the use of PPE based on pesticide characteristics.

Benefits:

The benefits of the model will be to:

- Additional PPE to improve the health and safety of workers in tropical countries
- A decision support system for the selection of appropriate PPE
- Strategies to promote use of appropriate PPE

LIST OF PARTICIPANTS			EXPERT GROUP MEETING		MAURITIUS, 4-6 DEC 1998		UNIDO / Ministry of Health, Government of Mauritius		
No	SURNAME	FIRST NAME	COUNTRY	ORGANIZATION	POSITION	TEL	FAX	ADDRESS	
1	ABDUL HALIM	MR KHALIL	SYRIA	AGRO SCIENTIFIC RESEARCH DIRECTOR	HEAD OF PLANT RESEARCH DEPT	532 3037 / 5323038	532 3029	DOUMA PO BOX 113 DAMASCUS	
2	AISSA	MR BEN	TUNISIA	MINISTRY OF ENVIRONMENT	DIRECTOR	701 1258		AV 20 MARS BOUMHET - TUNIS	
3	AYESEH	MR AZZAM	PALESTINE	ENTOMOLOGY, HEAD	MOI	00 97 26 50 1027	00972 6501073	JENIN PO BOX 11 WEST BANK VIA ISRAEL	
4	BADA	MR M. HADI	ALGERIA	ASMIDAL	TECHNICAL DIRECTOR	213 8 84 54 55	213 8 84 47 39	BP 326 ANNABA	
5	BALGOBIN	MR S	MAURITIUS	CHIEF FACTORY INSPECTOR	MIN OF LABOUR	208 2890	211 0165	16 EUGENE LAURENT ST, PORT LOUIS	
6	BANGO	MR FLETCHER	ZIMBABWE	ASSISTANT SECRETARY	MINISTRY OF INDUSTRY AND COMMERCE				
7	BENI MADHU	MR S P	MAURITIUS	HEAD PROTECTION DIVISION	MOA	464 4874	464 8809	REDUIT	
8	BHUGWANDASS	MR HEMEN	MAURITIUS	SENIOR H INSPECTOR	MOH	211 2847	215 060	ATCHIA BLDG, PORT LOUIS	
9	BONNET	MR JEAN HERVE	MAURITIUS	PRODUCT DEV MANAGER	ROGER FAYDHERBE & CO LTD	208 1806	208 8545	4 QUEEN ST PORT LOUIS	
10	BUCHA	MR J	MAURITIUS	PRDO	MOA	464 4872	464 8749	BOUGAINVILLE ST CUREPIPE ROAD	
11	CHAUMBA	MR GEORGE	ZIMBABWE	MINISTRY OF HEALTH AND CHILD WELFARE	AIR POLLUTION CONTROL OFFICER	263 4 730011 / 708706	263 4 793634	BOX CY1122 CAUSEWAY	
12	CHEBIL	MR A	USA	MINISTRY OF AGRICULTURE	CHIEF ENGINEER	00216 788979 / 681639	216 1779 7047	30 RUE ALAIN SAVERY 1002 - TUNIS	
13	CORTES	DR N P	PHILIPPINES	UNIDO CONSULTANT OCC. HEALTH & SAFETY	PROF. OF PHARMACOLOGY & TOXICOLOGY	(632) 521 8251-521 1078	(632) 521 82 51	DEPT OF PHARMACOLOGY COLL. OF MEDICINE	
14	DABY	MR C	MAURITIUS	DEPUTY CHI	MOH	212 5399		ATCHIA BLDG PORT LOUIS	
15	DHUA	DR S P	INDIA	UNIDO	REGIONAL COORDINATOR RENPAP	462 9112	462 0912	55 LODI ESTATE UNDP NEW DELHI	
16	DIXON	DR G AGYEI	GHANA	MOF & A	DIRECTOR, PLANT AND PROTECTION DEPT.	00233 21 302638	665282 or 666183	PO BOX M37 ACCRA	
17	DOWLUT	DR P	MAURITIUS	RPHS	MOH	464 8358		23 GLADSTONE ST, ROSE HILL	
18	FACKNATH	MRS S	MAURITIUS	SENIOR LECTURER	UNIVERSITY OF MAURITIUS	454 1041		REDUIT	
19	FAGOONEE	MR INDUR	MAURITIUS	DEAN	UNIVERSITY OF MAURITIUS, FAC. OF SCIENCE	454 1041	465 6928	REDUIT	
20	FAREED	MR S V	MAURITIUS	OFFICER IN CHARGE	CENTRAL ENVIRONMENTAL LABORATORY	212 8992	212 6671	94 AMBROSE ST ROSE HILL	
21	GEBRU	MR B.G. MEDHIN	ETHIOPIA	MOA	PESTICIDE REGIS SECRETARY	18 36 71 (0) 188464	251 1 512984	A ABABA, W17 K20 HNO 1809	
22	GOPAUL	MR A K	MAURITIUS	SCIENTIFIC OFFICER	CWA	686 5071	686 6264	ST PAUL, PHOENIX	
23	GOVIDASAMY	MARDAYMOOTOO	MAURITIUS	ENTOMOLOGIST	MSIRI	454 1061	454 1971	REDUIT	
24	HUSSEN	MR M. ALI	SYRIA	GENERAL FERTILISERS CO	HEAD, PLANT PROTECTION RESEARCH DEPT.	031 475598 / 471515	031 471535	HOMS - PO BOX 165	
25	JHAMNA	MR D	MAURITIUS	CHIEF GOVERNMENT ANALYST	GOVT ANALYST DIV.	212 4921	212 4921	10 LABOURDONNAIS PORT LOUIS	
26	JOOMYE	MR A	MAURITIUS	PRDO	MOA	465 8652		REDUIT	
27	KACKARIA	A K	MAURITIUS	CHIEF FORENSIC SCIENCE OFFICER	POLICE FS LAB	466 4290	433 2224	MOKA	
28	KOVATS	MR FERENC	HUNGARY	UNIDO	CONSULTANT	(361) 200637	(361) 200637	VOLGY U 291 B 1021 BUDAPEST	
29	LAN PIN WING	MR MARCEL	MAURITIUS	SIDO	MOI	212 8632		PORT LOUIS	
30	LANIECE	MRS I	MAURITIUS	EPIDEMIOLOGIST	MIH	243 3772	243 3270	POWDER MILL, PAMPLEMOUSSES	
31	MAGASHI	MISS ANNE N.	TANZANIA	TANZANIA IND. RESEARCH & DIV. ORG.	SEN. RESEARCH OFF. / DEP. DIRECTOR CPCT	255 51 668105 / 668979	255 51 668147	BOX 23235 DAR ES SALAAM	
32	MALJANI	MR ALFRED	ZAMBIA	MINISTRY OF HEALTH	EXECUTIVE SECRETARY - FOOD & DRUGS B.	221 186	221 186	PO BOX 30205 LUSAKA	
33	MASRI	MR PAUL	LEBANON	MOI	FOOD TECHNOLOGY DEPT.	280889 426607	427 212	SAMI SOLH ST BEIRUT - LEBANON	
34	MBABAZI	DR REGINA	UGANDA	ENVIRONMENTAL INSPEC.	NATIONAL ENV. MGMT. AUTH.	236 817	256 41 25 7521	PO BOX 22255 KAMPALA UGANDA	
35	MENN	DR J	USA	EXC PULA INC.	CONSULTANT PEST. TOXICOLOGY & BIOPEST.	(301) 854 0145	(301) 854 0460	6681 LUSTER DR HIGHLAND MD 20777	
36	MOHAMMED	MR E.A.	COMESA	COMESA	SENIOR AGRICULTURAL EXPERT	00260 1 229725 32	00260 1 225107	PO BOX 30051 LUSAKA	
37	MOSHA	DR W F	TANZANIA	TROPICAL PEST. RESEARCH INSTITUTE	DIRECTOR	(057) 8217	(087) 8042	ARUSHA	
38	MUTEA	MRS JUDITH N	KENYA	MOA	AGRICULTURAL OFFICER	442 797	448 680	PO BOX 14733 NAIROBI	
39	NUJAJIDI	MR A SULAIMAN	SAUDI ARABIA	MINISTRY OF INDUSTRY & E.	CHEMICAL ENGINEER	477 6666	477 6939	PO BOX 42385 RIYADH 11540	
40	OMAR	DR M EL SIDDIQ	SUDAN	GENERAL MANAGER	SUDANESE CHAMBERS OF INDUSTRIES ASS.	471717 19	471 720	KHARTOUM PO BOX 2565	
41	PHIRI	MISS MISORI	ZAMBIA	ENVIRONMENTAL COUNCIL OF ZAMBIA	INSPECTOR OF POLLUTION	260 1 224009	260 1 223123	BOX 35131 LUSAKA	
42	RAMANOOLOO	MR NAIDOO	MAURITIUS	DIVISIONAL SCIENTIFIC OFFICER	MOA	465 7472		REDUIT	
43	RAMGOOLAM	MR P	MAURITIUS	AG DIV. ENVIRONMENT OFFICER	MOE	212 4385		KEN LEE TOWER BARRACKS STREET	
44	RATOVOARIVÉLO	MISS L. TIANA	MADAGASCAR	MOI HANDICRAFT AND TRADE	CHIEF SERVICE, TECH. & ENVIRONMENT.	261 2 255 15	261 2 27790	BP 527 101 ANTANANARIVO	
45	SHAW	DR ANUGRAH	USA	UNIV. OF MARYLAND	ASSOCIATE PROFESSOR	001-410 651 6064	001 410 651 6207	110 AUTUMN LANE, FRUITLAND, MD 21826	
46	SIBARTIE	DR RAVINANDAN	MAURITIUS	OCCUPATIONAL HEALTH CONSULTANT	MOH	211 2847	212 5060	ATCHIA BLDG, PORT LOUIS	
47	SIVRAPRAGASAM	DR MRS S	MAURITIUS	OCCUPATIONAL HEALTH PHYSICIAN	MOH	424 2840	424 2840	15 ALOUETTES AVENUE SODNAC QBORNES	
48	SULLIVAN	MR SYDNEY	MAURITIUS	PLANT PATHOLOGIST	MSIRI	454 1061	454 1971	REDUIT	
49	SUVAGANAM	MR B.	AUSTRIA	UNIDO	CHIEF A-CHEMICAL UNIT	0043 1 211313940	00431121131 6819	C/O UNIDO PO BOX 300 VIENNA	
50	TARAKMA	MR YOUSEF M AL	KUWAIT	AGRICULTURE AFFAIRS KUWAIT	DIRECTOR OF PLANT PROTEC. DIVISION	4723894 - 4765022	474 3619	AGRI AFFAIRS PLANT PROT. DIV.	
51	THEU	DR M P K J	MALAWI	DEPT OF AGRI & RESEARCH	TEAM LEADER	265 767 225	(265) 784 184	BOX 158 LILONGVN	
52	UMRIT	MR G	MAURITIUS	SCIENTIFIC OFFICER	MSIRI	454 1061	451 1971	REDUIT	
53	VERMEULEN	MR J BERNARD	SOUTH AFRICA	NATIONAL DEPT OF AGRICULTURE GEN	SENIOR AGRICULT. MANAGEMENT	27 12 319 3303	27 12 319 7179	PRIVATE BAG 343 PRETORIA	
54	ZILLER	MR KLAUS	GERMANY	UNIDO	CONSULTANT PESTICIDE MANAGEMENT	0049 6898 79177 or 41972	0049 6898 43153	AM DIETRICHBERG 5, D-66333 VOELKLINGEN	