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**REGIONAL NETWORK ON PESTICIDES
FOR ASIA AND PACIFIC**

DP/RAS/88/031

DRAFT TERMINAL REPORT

**Prepared for the Governments of the
member States of the Regional Network: Afghanistan,
Bangladesh, People's Republic of China, India, Indonesia, Malaysia,
Myanmar, Pakistan, Philippines, Republic of Korea, Islamic Republic of
Iran, Sri Lanka, Thailand and Vietnam by the United Nations Industrial
Development Organisation acting as executing agency for the United Nations
Development Programme in cooperation with the Food and Agricultural
Organisation of the United Nations, The World Bank, the World Health
Organisation and the Economic and Social Commission for
Asia and the Pacific.**

Based on the work of Dr. S.P. Dhua, Regional Coordinator

**United Nations Industrial Development Organisation
Vienna**

***This document has not been formally edited.**

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REPORT SUMMARY SHEET

1. Country : Asia/Pacific Region.
2. Project title : Regional Network on Pesticide for Asia and the Pacific
3. Project No. : DP/RAS/88/031
4. Executing Agency : United Nations Industrial Development Organisation

1. Brief Statement.

1.1 Objectives and achievements

Regional Network on Pesticides for Asia and the Pacific (RENAP) is an inter-country project comprising of a network of national institutions of the participating countries of the region. It is a multi-sectoral project executed by UNIDO in association with FAO, WHO, ESCAP/ARSAP and CIRAD.

The project aims at providing assistance for the safe production of pesticides, preserving the environment and ensuring protection of workers health in the RENAP member countries through a harmonised approach of identifying clean technology, revamping of old/operational plants, development and popularisation of protective clothing and implementing safety guidelines for workers health safety, training technicians/medicos on occupational health/industrial hygiene, effluent treatment, pollution control, establish effluent standard limits based on best technology available and assisting the industries to meet the standards and development of environment friendly pesticides and their formulations including bio/botanical pesticides besides collection and dissemination of information.

The project during this phase beginning on 1.3.1990 has strengthened regional cooperation in promoting safe manufacture, handling and usage of pesticides through organisation of workshops, training programmes and rendering expert services to the member countries of the Network. The TCDC concept has been extensively utilised in providing training to the nominees of the member Governments and in the recruitment of consultants. The countries participating in the programme are Afghanistan, Bangladesh, People's Republic of China, India, Indonesia, Iran, Malaysia, Myanmar, Republic of Philippines, Pakistan, South Korea, Sri Lanka, Thailand and Vietnam. Countries such as Nepal and Papua New Guinea have shown interest in the activities for joining the Network. The Data Collection and Technical aspects related to the activities of RENAP have been disseminated to member countries through RENAP Gazette. In addition, papers were presented in international meetings giving the activities of RENAP.

To put the project on a more sound footing, the Project Management Committee decided to set up Technical Coordinator Units in countries who offered to host

these by virtue of availability of infrastructural facilities and expertise. Eight Technical Coordinator Units hosted by the member Governments have been set up to comprehensively meet the needs of the member countries in the key areas of pesticide production, handling and usage. These are :

Pesticide Formulation Technology/Quality Control, India.

Effluent Management/Waste Disposal/Pollution Control, Indonesia.

Occupational Health Safety, Philippines.

Pesticide Specification and Impurities in Active Ingredients at the Manufacturing level, Republic of Korea.

Bio-Botanical Pesticides Development, Thailand.

Pesticide Application Technology, Malaysia.

Eco-Toxicology, Pakistan.

Pesticide Data Bank - Development and Use of Computer Software for Pesticides Data, storage, Retrieval and Dissemination, India/Bangkok.

With the setting up of these 8 Technical Coordinating Units, the project has been providing training and consultancy services in the much needed areas to meet the urgent requirements of the region, adopting the TCDC concept.

These Technical Coordinating Units are designed to meet the following requirements of the region:

- * Fielding consultants in specialised fields
- * Organisation of Workshop in the identified areas
- * Organisation of indepth training programmes
- * Trouble shooting.

The immediate objectives defined for achieving the developmental goals of the project are :

- * Market survey and data collection.
- * Survey of raw materials available within the region.
- * Pesticide Formulation Technology Development
- * Effective enforcement of Quality control.

- * Harmonised approach for improvement of industrial safety, hazard management, effluent control and promotion of bio/botanical pesticide usage and application technology.
- * Coordination with Japanese funded FAO Code of Conduct project on pesticide distribution and use.
- * Self-sustainability of the project.

So far 4 interim reports detailing the progress of implementation of the project activities as per the work plan contained in the project documents and subsequently updated by the Project Management Committee meeting, have been submitted to UNIDO. The status of the progress of implementation of the project activities is contained in the updated workplan enclosed at Annexure 1. The output sought and output produced, based on the immediate objectives as contained in the project document, through the execution/implementation of the project activities are as follows :

1.2 Output sought and produced

Output Sought	Output Produced
1. Data base on Regional pesticide market with a standard format extended to all member countries and at least two updated RENPAP Gazette with periodic updating beyond the 3rd phase published.	i) Govt. of France extended financial support for development and use of computer software for pesticide data processing and retrieval of RENPAP under project US/RAS/90/148. ii) Regional Data Base centres have been established in Delhi and Bangkok. Regional data base centre in Delhi is also functioning as the Central Coordinating Unit. iii) Indonesia, Philippines, China, South Korea and Pakistan are functioning as Data Entry Centres and the rest of the countries as Data Collector Centres. iv) Experts from CIRAD France visited the Central Coordinating Unit in Delhi (India) and Regional Data Base Centre Bangkok (Thailand), finalised pesticide economic data base formats and installed software in Delhi and Bangkok. The Pesticide Economic Data Collection formats have been updated and data collected by Thailand, Indonesia - Philippines - India, South Korea, Sri Lanka has been received and compiled & consolidated for publication in RENPAP Gazette. v) One Senior/Junior Data Collection Expert each is in position in India, Thailand, South Korea, Pakistan, China, Malaysia and Indonesia and appointments in other countries are in the pipeline. vi) Index data base is being integrated with the RENPAP economic data base.

2. A Technical Coordinator Unit for formulation unit set up in India and one Regional Workshop on Recent Developments in Pesticide Formulation organised and in-depth training provided to three fellows in formulation technology.

3. Adaptation of new Analytical technology by interfacing with formulation technology

Technical Coordinating Unit set up at PDC India (now IPFT) earlier has been upgraded to attain international standards for meeting the designated requirements of RENPAP - TCU. It is well equipped with all modern instruments and equipment including pilot plant facilities and staffed with competent and trained personnel to meet the training and consultancy needs of the member countries of the Network.

ii) The member countries and their industries are being provided with new technologies to enhance production of safer and environment friendly pesticide formulation. Based on the strength of the TCU, a project has been sanctioned in People's Republic of China by UNDP for the production of newer, safer and environment friendly pesticide formulation adopting TCDC concept.

iii) The Technical Coordinator Unit has so far conducted the following programmes for the RENPAP:

a) Workshop on Newer formulation technology from 9-21 April 1990: 16 chemists from all the 10 member countries participated in the workshop. Out of 16 chemists, 5 were women chemists representing the member countries of PR China, Indonesia and Philippines.

b) Individual training offered to 3 chemists, one from China and 2 from Indonesia.

iv) A chemist from South Korea underwent training in controlled release formulation in the laboratory of Dr. Vollner in Germany.

v) Dr. Vollner from Germany was recruited as consultant to provide consultancy services in South Korea in the field of Controlled Release formulation.

i) Technical Coordinator Units have been set up focussing on

a) Quality Control of Pesticide Formulation at PDC India (now IPFT)

b) Analysis of impurities in technical grade material at Agricultural Chemicals Research Institute in South Korea.

These units are fully operational.

ii) Following training programmes (both group and individual) have been organised by the Technical Coordinator Units.

A. INDIA

1) Workshop on Newer Formulation Technology and Quality Control from 9-21 April 1990 at PDC

2) A chemist from Afghanistan underwent training on Quality Control of pesticide formulation for one month.

3) An analytical chemist from China underwent training on Quality Control.

B. REPUBLIC OF KOREA

1) A Regional Workshop on Analysis of impurities in Technical Grade Pesticide Material was organised in October 1992 at ACRI and was participated by specialist nominees of the member countries.

2) Mr. Garrino was recruited as Consultant to strengthen the TCU in Republic of Korea and also to act as a resource person in the workshop held in Oct. 1992.

4. Data collected on the availability of raw material in selected member countries and experiments carried out in PDC India (now IPFT) regarding their suitability for pesticide formulation and recipe provided.

5. At least five laboratories from RENPAP region would have participated in the international collaborative analysis organised by CIPAC.

iii) Mr. Nose consultant from UNIDO completed his consultancy assignment in the development of pesticide specifications in Republic of Korea. The consultant also assisted in the setting up and strengthening of the TCU on analysis of impurities in technical grade pesticide material at ACRI, Republic of Korea.

i) 76 clay samples and 60 emulsifiers samples from Bangladesh and India have been analysed and data has been supplied to member countries. Economic and effective recipes for candidate pesticides developed as per the request of the concerned member countries have also been provided.

ii) Laboratory and pilot plant facilities are being consistently upgraded at the PDC in India (IPFT) and Institute of Packaging Govt. of India to meet the training and consultancy needs of the member countries.

iii) Candidates coming from abroad for training on pesticides formulation technology are bringing samples of locally available carriers, adjuvants etc. for developing optimum recipes for candidate pesticides. They used various analytical techniques and methods for testing raw materials.

iv) PMC meeting in New Delhi held in April 6-8, 1992, accepted hosting of TCU in the area of raw materials and intermediate prospecting and analysis by Govt. of Iran for providing training and consultancy services to the member countries of the Network. The National Coordinator has been requested to take followup action for the benefit of the member countries of the region. Formal acceptance of Govt. of Iran is awaited.

i) Laboratories of the participating countries namely China, India, South Korea, Philippines, Indonesia and Thailand have joined the collaborative testing programme of CIPAC.

ii) An analytical council under the name Regional Network on Pesticide Analytical Council (RENPAC) as a sister organisation of CIPAC has been set up. All these laboratories of the Network countries would participate in International Collaborative Testing organised by CIPAC.

iii) The aims constitution and organisation of the RENPAC was approved by PMC and formation of the RENPAC ratified. The concept of formation of RENPAC is helping in harmonising trade and tariff of pesticide in the region.

iv) A number of pesticides have been identified for standardisation testing of analytical procedures, through collaborative participation of the member countries viz. China, India, South Korea, Thailand, Pakistan, Indonesia and the work is in progress.

v) Member countries deputed Govt. nominees as members of the analytical council and participate in the RENPAC programme.

vi) Delegates from member countries continue participating in the CIPAC meeting being held every year. Three members of the RENPAC from China, Sri Lanka and India participated in the CIPAC meeting held in France in June 1993. As per decision taken in the CIPAC meeting, India would be playing the coordinator role for CIPAC collaborative testing programme and TCU India would be the nodal agency for all matters and would advise CIPAC to directly despatch sample to the RENPAC laboratories of the region.

6. Eight fellows given indepth training in residue analysis in Thailand which has all the facilities
- TCU on residue analysis has been made available at the Division of Agricultural Toxic Substance Laboratory, Bangkok for providing training on pesticide analysis to individual/groups.
7. Technical Coordinator Unit on i) Effluent Control / waste disposal established and training organised for member countries.
- TCU on Effluent Treatment and Waste Disposal in Indonesia has been established backed by the Public sector pesticide industry facilities and is being upgraded as a country project with UNDP assistance. The proposal is at an advanced stage of approval.
- ii) A Regional Workshop on Effluent Control, and Waste Disposal was held from 10-14 Dec. 1990 in Indonesia. The proceedings of the workshop have been circulated to member governments for followup action.
- iii) A consultant on Effluent Control & Waste Disposal was recruited to help in setting up the TCU as well as to improve the waste disposal facilities of the pesticide production units in Indonesia.
- iv) TCUs facilities as planned have been fully developed and made available for training and trouble shooting needs of the member countries. For meeting the needs of the member countries, the TCU is designated to serve as one of the focal points for upgrading effluent treatment and waste disposal facilities of the pesticide production formulation in the member countries of the network.
- v) Expertise developed in the field of Effluent Control and Waste Disposal System and the services of the experts are available in Indonesia to meet the requirements of the region in the specialised fields of work. Limits of chemicals present in the effluent after treatment have been determined and norms developed for adoption by the member countries.
- vi) A candidate from Indonesia underwent training in Effluent Treatment and Disposal for one month in USA.
8. Technical Coordinator unit on i) Industrial Hygiene and Occupational Health Safety and their environmental concerns established and training ii) provided for member countries.
- TCU on Industrial Hygiene and Occupational Health Safety has been set up in Philippines under the Technical Coordinatorship of Dr. Nelia Maramba.
- A Regional Workshop on Industrial Hygiene and Occupational Health Safety and their Environmental Concerns was organised by the TCU in April 1991 and the proceedings have been circulated to all member countries. The workshop organised was very fruitful in identifying health safety / needs of various countries of the region .
- iii) TCU facilities as planned have been set up and fully developed and extended for training of trouble shooting needs of member countries. The experts are available to meet the requirements of the region in the specialised field of work.
9. Role of RENPAP in developing i) integrated guidelines for industrial safety in the pesticide formulation plants of the developing countries.
- For the Asia and the Pacific region the RENPAP Secretariat Coordinated canvassing of the questionnaire, recruitment of international consultants and provided leadership in conducting the meeting for finalising the draft guidelines in Brussels during Feb. 1992.
- ii) Regional Coordinator along with delegates from the member countries of RENPAP participated in the Expert Group Meeting on Development of International Safety Guidelines for Formulation Plants in Developing Countries in Brussels in the last week of Feb. 1992 and assisted in developing the safety guidelines.
- iii) The experience of TCU on effluent control and waste disposal in Indonesia has been extensively used in the workshop organised to develop safety guidelines for pesticide formulation in developing countries.

- iv) The Regional Coordinator, Dr. Maramba and Dr. Srivastava participated in the experts group meeting and chaired relevant sessions and assisted in the preparation of the safety guidelines. These guidelines have been accepted by the UNIDO.
 - v) Dr. Maramba, Head of the Technical Coordinating Unit Philippines participated as a regional expert on industrial safety and occupational health safety for Asia and the Pacific and played a key role in drafting the guidelines. The safety guidelines were finally developed and adopted by the expert Group.
 - vi) UNIDO has brought out a publication on International Integrated Safety Guidelines on Pesticide Formulation in Developing Countries and copies of this publication have been circulated to network countries for implementation.
 - i) TCU on Bio-botanical pesticide development has been established in Thailand.
 - ii) Two candidates from Thailand underwent training.

One candidate was trained in Botanical pesticide development at Prof. Fred Klengsuf's Lab, in Germany and the other candidate was trained in Bio-pesticide development at Dr Vaughn's Laboratory in USA, as a part of the effort to strengthen the Technical Coordinator Unit.

 - iii) An expert group meeting to promote the development and use of Bio-Botanical pesticides was organised by TCU in Dec. 1991 at Bangkok Thailand. Dr. C. Hulpap from Germany served as a consultant on Botanical pesticides and also participated in the workshop. Dr. Jane L. Vaughn from USA served as a consultant for bio-pesticides and also participated in the workshop.
 - iv) A candidate from South Korea underwent training in development of Microbial pesticides in Japan.
 - v) Potential donor countries are showing interest in supporting TCU through national projects in order to serve the needs of RENPAP.
10. Technical Coordinator Unit for the development of Bio-botanical pesticides established in Thailand and expert group meeting to promote the development of pesticides organised.
- i) A Technical Coordinator Unit on Eco-toxicology set up and expert group meeting held to promote development of the concept of toxicology in the region for effective protection of environment vis-a-vis use of pesticides.
 - ii) TCU on Ecotoxicology in Pakistan has been strengthened with the financial assistance of DANIDA through establishment of a country project entitled 'Strengthening of Ecotoxicology Facility' for a period of 3 years. An expert group meeting on Eco-toxicology management has been scheduled in March/April 1994.
 - iii) A Consultant was recruited to provide the technical backup for the TCU and would also participate in the workshop on Ecotoxicological management planned for March/April 1994.
 - iv) The output would help to minimise the environmental hazard for both human and animal through adoption of proper environmental management methods.
 - v) Limits of toxic chemical permissible in the eco-system would be standardised and would be effectively used by the environmental protection agencies and the health regulatory agencies of the network countries.
11. A Technical Coordinator Unit on Pesticide Application Technology established and training facilities for member countries
- i) TCU set up in Malaysia is hosting a Regional Workshop on Pesticide Application Technology during Sept. 20-25, 1993. The workshop would be jointly organised with the Malaysia Plant Protection Society - the University, the Research Institute and the pesticide industry of Malaysia.
 - ii) A consultant on Pesticide Application Technology has been recruited to assist strengthening of the TCU and also to participate as a resource person in the proposed workshop scheduled for Sept. 1993.

13. Mutual participation and exchange of information between RENPAP and FAO/Japanese funded project
- Dr. Koniya-Obuchi of FAO participated in the deliberations of the PMC meeting held in April 92 in New Delhi. He suggested that the RENPAP has to work closely with the FAO in view of the possible termination of the code of conduct project of FAO in the Asia and the Pacific Region so that the activities could be carried forward in the region without any disruption.
- ii) FAO has been involved in the finalisation of the RENPAP workplan in order to ensure good coordination and mutual participation in the planned activities of the RENPAP and FAO in the region.
 - iii) The proceedings of the various workshops and other publications of the RENPAP have been made available to the FAO.
 - iv) Invitations have been made from time to time, to the concerned FAO officials for participating in the workshops and meetings organised by the RENPAP.
14. Phased approach for self-sustainability of network beyond UNDP/UNIDO assistance established
- i) Eight Technical Coordinator Units have been established in support of long sustainability of the project and TCDC concept has been strengthened through the project by providing regional experts training and organising workshops, making use of the facilities available within the region.
 - ii) RENPAP GAZETTE will be published on regular basis to generate funds.
 - iii) Strong linkages have been established between the RENPAP and various country projects and the assistance provided by Govt. of India for the establishment of Permanent Secretariat has been appreciated by the member countries.
 - iv) PMC at its meeting in April, 1992 having discussed in detail, the benefits derived from the project and noting the contribution made by the different TCU's to the success of the project with more technical and financial support from Govts. have recommended its further continuation.
 - v) The RENPAP activities have catalysed the transfer of technology from one country to another and setting up of projects for safe development of pesticides
 - vi) Donor countries are expressing keen interest to sponsor country project in the field of botanical pesticides and bio-pesticides in Bangkok.

1.3 Utilisation of results

Satisfaction has been expressed by the Government officials of the participating countries on the post training performance of their nominees who had undergone training (individual and group training); and the delegates feel more confident in performing their task of analysis, quality control, effluent control, etc. Further during the last PMC meeting held in April, 1992, the following observations were made through the country papers presented by the country delegates.

- i) The member countries expressed their strong commitment to further the objective of the project in view of the significant benefits they are deriving from the various outputs.
- ii) The workshops organised are rated high in terms of technical exchanges, the consultants engaged having contributed significantly towards meeting the specific

needs of the member countries. Also all the workshops organised were considered appropriate to meet the needs of the member countries, these are:

- a) R&D in Formulation Technology of Newer Formulation and Quality Control.
 - b) Industrial Safety related to Environment Protection and Effluent Control in Pesticides Industry.
 - c) Industrial Hygiene, Occupational Health Safety and their Environmental concerns.
 - d) Bio-Botanical pesticide development.
 - e) Analysis of impurities in Technical Grade pesticides.
- iii) The member countries appreciated in the meeting the effective implementation of the project activities as per the approved workplan. Having thoroughly reviewed the progress of activities, the PMC meeting expressed satisfaction on the achievements of the current phase of the project.

1.4 Findings and Recommendations

- 1.4.1 The Regional Network on Pesticides for Asia and the Pacific (RENAP) programme has been given an industrial orientation and during the current phase of the programme, the main thrust has been in the areas of , production of environment and user friendly pesticide formulations, ensuring industrial workers health safety, prevention of pollution and promotion of environment friendly bio-botanical pesticides.
- 1.4.2 The manufacturers and users of pesticides in the developing countries are facing a serious challenge for the preservation of the environment by preventing long term damage to eco-system. The problem has a different dimension in the developing countries because of the following :
- a) out-dated technology with inadequate safety and effluent treatment and control systems.
 - b) hazardous product mix and proces routes.
 - c) absence of safer and environment pesticides formulations.
 - d) a large number of small scale manufacturers with limited knowledge and resources to ensure safety.
 - e) inadequate industrial hygiene and occupational safety measures.
- 1.4.3 To achieve the objective of protection of the eco-system, workers health and reduction of the load of chemicals on the environment, a series of activities have been launched by the RENAP through setting up of Technical Coordinator Units

to comprehensively deal with all aspects of industrial and workers safety environment protection, etc. A series of programmes have been undertaken through organising workshops, training programme, consultancy services etc. as per the workplan of project activities. From the status of progress of implementation of the project activities, it is revealed that almost all the activities have been successfully completed.

1.4.1 Workshop on Industrial Safety Environment Protection and Effluent Control in Indonesia from 10-14 December, 1990.

The Workshop made an indepth evaluation of the problems of waste disposal and the associated hazards and identified:

- i) inadequate waste inventory monitoring
- ii) improper treatment and disposal system
- iii) lack of facility to identify and quantify waste material as the main problems needing urgent attention.

The Workshop recommended measures on regional/national basis to promote awareness as well as to assign responsibility to the industries, Government and public for preventing environment pollution encountered during the production of pesticides.

1.4.2 Workshop on Industrial Hygiene, Occupational Health Safety and their Environmental Concerns in Philippines 15-19 April, 1991.

The Workshop noted that -

- i) quite a few countries of the region do not have a regulatory health safety and industrial hygiene programme for the pesticides industry and recommended that guidelines for inspection and procedure for health and safety and industrial hygiene programme be adopted in a format recommended in the workshop.
- ii) biologic monitoring of workers exposed to pesticides is of considerable importance and many of the member countries do not have access to accurate and standardised monitoring facilities. The workshop recommended comprehensive survey of the current capability of the biological monitoring facilities in the region and to undertake standardisation of laboratories within the region.
- iii) the Workshop also advocated Toxicovigilance to further the occupational health safety measures among the member countries and recommended that these countries which have regulatory programmes should strengthen these adequately.

1.4.3 Workshop on Bio-Botanical Pesticide Development in Bangkok from 11-19 December, 1991.

The Workshop aimed towards development and promotion of safer pesticides in the region. The workshop noted that:

- i) indexing, identification and creation of data bank of potential pesticidal plants in the region was required and recommended a time bound programme for commercial application in the agriculture and public health pest control be launched with "neem product" and also recommended to undertake a time bound gap filling data generation on plants having good potential for pesticidal activities like turmeric (*curcume longa*), sweet flag(*Acorus calamus*), Vitext Negundo, pongamia glaborbe undertaken
- ii) regarding Botanical pesticide development, since these are readily degradable in the environment, the workshop recommended that these pesticides be used on post harvest agricultural products, fruit and vegetable crops.

Inorder to remove inconsistency the results of various chemicals and bio activity evaluation studies, the workshop recommended development of uniform chemical/bio assay methods for more logical appraisal.

- iii) With regard to the development of bio-pesticides, the workshop felt
 - a) the importance of standardised techniques for the screening of microbial pesticides and recommended standardisation of protocol for the screening of microbial pesticides.
 - b) uniqueness of microbial pesticides vis-a-vis registration.
 - c) resistance development due to the excessive use of microbial pesticides.

The Workshop recommended to formulate and adopt sound and practical management strategies which could serve as vehicle for use of microbials in conjunction with other controlling agents.

1.4.4 Workshop on Analysis of Impurities in Technical Grade Pesticide Material in Republic of Korea - 11-18 October, 1992.

The main theme of this workshop was to make the final product more user and environment friendly through limiting level of impurities in the technical grade material.

1.4.4 One of the largest Network project in the Asia and the Pacific

Participation of the 14 countries in this network project makes it one of the largest network in Asia and the Pacific region. The member Govts. while reposing confidence in the project activities continued providing more support in cash and kind for effective hosting of workshops training programmes, etc.

1.4.5 The Technical Coordinating Units which have been set up with significant Govt.'s contribution have now grown to eight in number covering all major technological areas of pesticide production handling and usage. Setting up of these technical coordinator units is considered as a major step towards attaining self-sustainability.

1.4.6 Setting up of the Regional Pesticide Analytical Council (RENPAAC)

RENPAAC has established the Regional Pesticides Analytical Council (RENPAAC) and India, People's Republic of China, Thailand, Philippines, Pakistan, Indonesia and Republic of Korea are the current members. This Regional Network is playing a complementary role to that of the CIPAC with the added advantage that all the laboratories in the network are in the governmental sector, well-equipped and are capable of providing independent test results of the new analytical techniques for agro chemicals.

As per the decision of the Project Management Committee, three members of the RENPAAC from China, Sri Lanka and India participated in the CIPAC meeting held in France in June 1993. It was decided in the CIPAC meeting that, henceforth, India would play the Coordinator's role for CIPAC Collaborative Testing Programme in the Asia/Pacific region and that all communications in this regard would be made through this unit. Having identified the collaborating RENPAAC laboratories of the region, this unit would advise CIPAC to directly despatch samples to the RENPAAC laboratories, who would be participating in the collaborative testing, for avoiding delay and damage to the samples.

1.4.7 Spin-off Effects

Three country projects have emerged as spin off effects of the network activities of the project through attracting funding from the donor agencies and the member Governments. In Pakistan, with the assistance of DANIDA, the Technical Coordinator Unit on Eco-Toxicology has got converted into a country project entitled 'Strengthening of Eco-Toxicology facility'. In China, a Pesticide Development Programme with UNDP input of US \$ 1.27 million and Govt. of China input of RMBY 19.9 million has been approved in 1992 and is under implementation with the active involvement of the Regional Coordinator in its formulation and thereafter in its evaluation and monitoring. The country project in India entitled

"Pesticide Development Centre" has had an extension to its second phase. Setting up of yet another Pesticide Development Centre in Indonesia is under active consideration.

- 1.4.8 During the last PMC meeting held in April, 1992 in Delhi, the representatives of the participating member countries expressed their strong support to continue with this comprehensive programme to assist the pesticide industry of the region in the areas of selection of clean technology for the manufacture of active ingredients and their formulations, environment protection through proper effluent treatment and pollution control, measures for observing industrial hygiene and occupational health safety for protecting health of the industrial workers and the farmers, safe disposal of pesticides and commercial scale development and usage of bio-botanical pesticides. It was also agreed in the meeting that the FAO Code of Conduct project being terminated by the end of the current year, would be suitably followed up through inclusion of appropriate activities in the RENPAP. It was further decided in the PMC meeting that a suitable proposal focussing on clean technologies, user and environment friendly products and process technologies be submitted to the UNDP for consideration as a follow up of the observations made by the UNIDO on the PPER and the representatives of the Network member countries.

As a follow up of the recommendations made by the PMC at its meeting held in New Delhi in April, 1992, pertaining to the extension of the project, UNDP has approved the proposal of continuing the RENPAP activities as a sub-programme entitled "Pesticide Production and Information" of the programme "Farmers Centered Agricultural Resource Management(FARM)". UNIDO has tentatively drawn up an activity plan for the pesticide sub-programme (copy enclosed at Annexure II) for the consideration of the PMC at the forthcoming meeting proposed to be held from 6-8 October, 1993 in New Delhi, India.

1.5 Appraisal of the project by the UNIDO Headquarters.

The following appraisal is quoted from the PPER for the years 1991-93.

"While achievements of the project are commendable the project should further assist national focal points to strengthen their capacity to improve safety in production and use of pesticides and promote safer pesticides, their formulations including bio pesticides and support integrated pest management. This would need strong support for the RENPAP Secretariat and the Technical Coordinator Units from the Governments, the industries and the international organisations.

The linkages between the national projects and the regional project proved to be a very strong point in support of the network and the Project Management Committee members strongly came in favour of continuation of the network which still needed support from international organisations to build up this regional capability to assist the national institutions."

UNIDO has also made the following observation on the Project Performance Evaluation report submitted in January, 1993:

"The project is progressing along with the expected course and has changed from a project to a programme according to the needs of the member countries and also in addressing the changes taken place in the field".

1.6 CONCLUSIONS

1.6.1 The Regional Network Programme on Pesticides has been making steady progress in the areas of selection of clean technology, adoption of effective effluent recycling techniques, adoption of environment friendly pesticide formulations, strengthening of industrial hygiene and occupational health safety programmes and helping the member countries in the development and usage of bio botanical pesticides. All these activities are directed towards ensuring safety in the production and usage of pesticides on the one hand and reducing the pollution load on the environment thereby preserving it for the mankind on the other.

1.6.2 The Regional Network on Pesticide for Asia and Pacific project considered by the Project Management Committee in its meeting held in New Delhi in April, 1992 is one of the major successes of the UN systems operational activities for development of this region. Further, it is a rare example of an initiative which simultaneously addresses some of the following thematic priorities as singled out by UNDP governing Council in response to the General Assembly Resolution 44/211 of 22 December, 1989.

- * Poverty eradication and grassroots participation in development.
- * Environmental problems and natural resources management.
- * Management development.
- * Technical cooperation among developing countries.
- * Technology for development.
- * Women in development.

1.6.3 The network project has been an excellent show case for development of appropriate technology to address urgent development concepts and is directly promoting technical cooperation among developing countries and it emphasises safety and environmental protection.

1.6.4 The Workshops organised are rated high in terms of technological exchanges, the consultants engaged have contributed significantly towards meeting the specific needs of the member countries and the RENPAP Gazette carried important articles to inculcate safety in the production and use of pesticides. The TCDC concept has

been comprehensively deployed and the country project in China has been formulated and is being implemented following this concept. The project is moving towards self-sustainability through mastering significant contribution in cash and kind from the member governments.

- 1.6.5 This project also has the unique feature of linkage with a country programme viz. Pesticides Development Centre which is serving as a strong Technical Coordinator Unit and catering to the training, consultancy and trouble shooting needs in the field of pesticides formulation for the participating countries of the network programme. Besides helping development of the pesticides industry of India, linkage with the network programme has helped in the development of a Pesticide Development Programme in China and helping the other countries also to derive equal benefits in the field of pesticides formulation and quality control.
- 1.6.6 The number of countries participating in the Network project are 14 which makes this project one of the largest network projects in the Asia and the Pacific region. The member governments are reposing more confidence in the project activities and providing more and more support in cash and kind for hosting workshops, group meetings, trainings, etc. With the cash and kind support of the member Governments, 8 Technical Coordinator Units in specialised areas have been set up and are meeting training, consultancy and trouble shooting needs of the member Governments.
- 1.6.7 Four country projects have emerged as "spin off" effect of the Network project, attracting funding from outside agencies and the member Governments.
- 1.6.8 A Country Project in China was planned and is being implemented with the active involvement of the Regional Coordinator following the TCDC concept.
- 1.6.9 The sharp focus of the project towards safety in production and providing means for effective environmental protection continues to attract strong support of the member countries in its activities.

REGIONAL NETWORK ON PESTICIDE FOR ASIA AND THE PACIFIC (RAS/88/031) UPDATED PROJECT WORKPLAN												
CONSULTANCY					TRAINING / STUDY TOUR							
INDIVIDUAL					INDIVIDUAL				GROUPS			
COUNTRY	Subject	Duration	Year	Country to provide Consultant	Subject	Duration	Year Date	Venue Proposed	All Countries Subject	Duration	Date & Venue	
1. AFGHANISTAN	Handing/ Packaging Consultant	1 m/m	1991	India (Completed)	Packaging handling & storage of pesticides	1 m/m	1991	India (Completed)				
	Instrumentation	To be reminded for early clearance				Instrumentation analysis	1 m/m	1991	India (Completed)			
2. BANGLADESH	Handing Packaging storage	1 m/m	1990	India (Completed)	Biological screening	1 m/m		Pakistan (Completed)				
	Environmental Toxicolog			Czechoslovakia (Completed)	Environmental toxicology	1 m/m	1991	(Completed)				
3. CHINA	Instrumentation	1 m/m	(Completed)		Instrumentation analysis	1 m/m	1991 (Completed)	India				
	Preparation of standard sample	1 m/m	1990	Withdrawn	Assessment of data for microbial pesticides	1 m/m	1992	USA (Completed)				
					Product Mee Too Registration	10 days	1992	EPA USA (Completed)				

4. INDIA	Effluent treatment	1 m/m	1991	(Completed)	Development of bio-botanical	10 days	1991	Thailand (Completed)	R&D in formulation (technology of newer formulation & Quality control)	10	April 90 (Completed)
					Effluent treatment & waste disposal industrial safety	8 days	1990	Indonesia (Completed)	PMC Meeting	3	April 1992 (Completed)
									PMC Meeting	3	October 6 8 1993
5. INDONESIA	Pesticides residue analysis with special reference to metabolite and degradation technology	1 m/m	1991	In process Job Description sent to UNIDO for Recruitment Action	Treatment & disposal of waste from pesticides industry	1 m/m	1990	UK/USA (Completed)	Industrial Safety & Protection of environment effluent control	6	Dec. 1990 (Completed)
	Effluent control and waste management	1 m/m	1990	(Completed)	Selection of carriers/ adjuvants in formulation	1 m/m	1992	India (Completed)			
6 SOUTH KOREA	Pesticide specification	1 m/m	1991	Japan (Completed)	R&D on Controlled Release Formulation	1 m/m	1991	Germany (Completed)	Impurity in Technical Material & disposal of deteriorated material		Oct. 1992 (Completed)
	R&D for controlled release pesticide	1 m/m	1990	Germany (Completed)	Development of Microbial Formulation	1 m/m	1991	Japan (Completed)			
	Pesticide Specification	2 weeks	1992	(Completed)							

7. PAKISTAN	Analytical Chemistry (Eco-Toxicology)	2 m/m	1992	(PART Completed)	Eco-toxicology Study Tour	1 m/m	1991	Japan (Completed)	Eco-toxicology Workshop	March 1994
					Analytical Chemistry (Eco-toxicology)	2 m/m	1992	Europe/ USA In process by UNIDO		
8 PHILIPPINES	Environmental protection	1 m/m	1991	US EPA (Completed)	Human Safety/ Environmental protection	1 m/m	1991	USA (Completed)	Industrial Hygiene & Occupational Health Safety & their Environmental Concerns	April 1991 ((Completed))
9 SRILANKA	Occupational Health Hazards	1 m/m	1992	Job description awaited	Post Registration Activity	2 weeks (27 Sept to Oct. 1993)		Malaysia		
	Insecticides efficacy	1 m/m	1990	India (Completed)	Pesticide formulation technology	1 m/m (Formal Nomination awaited)		India		
	Training of Private Pest Control (industrial) operators	2 weeks	1992	USA Job Description awaited	Pesticide Regulatory Procedures - Philippines (Air-Fares will be paid by the Govt.)					

10. THAILAND	Bio pesticides Development	1 n/m	1991	USA (Completed)	Botanical pesticides development and usage	1 n/m	1991	Germany (Completed)	Development of bio-botanical pesticides	10 days	Dec. 91 ((Completed))
	Botanical Pesticides development	2 n/m	1992	Germany (Completed)	Bio pesticide development	1 n/m	1991	USA (Completed)	CIPAC/ RENPAC	6 days Postponed	May 92
11. IRAN	Raw Material prospecting and analysis	2 n/m	1992	Job description awaited	Residue Analysis	2 n/m	1992	Thailand (No Formal Nomination)	China delegate sent to Basle in 1992		
12. MALAYSIA	Application Technology	1 n/m	1992	UK (Being recruited in Sept. 1993)	Application Technology	1 n/m	1993	U.K In Process	Application Technology	6 days	Sept. 1993
	Pest Control Certification of Operators	1 n/m	1992		Environmental fate monitoring of pesticides	1 n/m	1993	USA In Process			
13. VIETNAM					Microbial pesticide development (a) Virus	1 n/m					
					(b) Fungus (Bacteria)	1 n/m			Thailand (Completed)		
					(c) Residue Analysis	1 n/m	Nov. 1993		Thailand (Completed)		

TENTATIVE WORKPLAN FOR RAS/93/061 - RENPAP - PESTICIDE PRODUCTION AND INFORMATION																
INDIVIDUAL CONSULTANCY					GROUP MEETING				INDIVIDUAL TRAINING/ STUDY TOUR					GROUP TRAINING* (All Countries)		
Subject	Provi- sion	Year 1993 to 1997	Country requisition- ing	Country/ Agency for providing consultant	Subject	Provi- sion	Year 1993 to 1997	Venue	Subject	Provi- sion	Year 1993 to 1997	Country requisi- tioning	Venue proposed	Subject	Provi- sion	Venue
Application equipment and techniques	1 M/M			Malaysia	CIPAC/ IIPAC	1 M/M	1993 1994 1995 1996 1997	France USA**	Application Technology	3 M/M			Malaysia	Workshop on Application Technology	6 Days (Sep. 93)	Malaysia
Assessment of Formulation Technology, Plant Designs & Effluent Treatment Sys- tem	3 M/M			India Indonesia S. Korea	IPAC Meeting	3 Days " "	1993 1994 1995 1996 1997	India China Srilanka Vietnam India	User & environment friendly formulation technology/ natural product formulation & Quality Control	3 M/M			India	Workshop on user and environment friendly IPM compatible pesticide and their formulation and quality control	6 Days (94)	India
Toxic waste management	1 M/M			UNIDO					Ecotoxicology	3 M/M			Pakistan	Workshop on Ecotoxicology	6 Days (Mar. 94)	Pakistan
Botanical Pes- ticides	2 M/M			Thailand					Bio-botanical pesticide Development including safety of bio- pesticides	3 M/M			Thailand	Workshop on Development and production of bio-botanical pesticides	6 Days (94)	Thailand
Bio-pesticides	2 M/M			Thailand												

* Three Group Training Programmes during 5 years duration of the project.

** In conjunction with the National Programme in India - DIP/IND/89/128, China - CPR/91/121 & Pakistan - US/P/PAK/90/294

INDIVIDUAL CONSULTANCY					GROUP MEETING				INDIVIDUAL TRAINING/ STUDY TOUR					GROUP TRAINING*		
Subject	Provision	Year 1993 to 1997	Country requisitioning	Country/ Agency for providing consultant	Subject	Provision	Year 1993 to 1997	Venue	Subject	Provision	Year 1993 to 1997	Country requisitioning	Venue proposed	Subject	Provision	Venue
Effluent Control & Waste Disposal	2 M/M			Indonesia					Effluent Control, Waste Disposal & monitoring including data collection.	3 M/M			Indonesia	Workshop on upgrading of laboratory facilities for monitoring pollutant in air soil and water	6 days	Indonesia
Safe Packaging	2 M/M			India					Monitoring of Workers exposed to pesticide poisoning and remedial action	3 M/M			Philippines	Workshop on safety management	6 days	Philippines
Disposal of Discarded Pesticides	1 M/M			UNIDO					Use of personal protective equipment and safety equipment adopted to the region.	3 M/M			Indonesia	Workshop on safe disposal of pesticide waste and safe management of pesticide	6 days	South Korea
Production Technology, Plant Design & Effluent Treatment	3 M/M			UNIDO												

NB : In addition to the above mentioned activities, FAO code of conduct on the use of pesticides would be discussed during the PMC meeting.