



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

21280

Distr.
RESTRICTED

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ISED/R.50
27 November 1995

ORIGINAL: ENGLISH

REGIONAL NETWORK ON PESTICIDES FOR ASIA AND THE PACIFIC

US/PAK/90/294

PAKISTAN

Technical report: Findings and recommendations*

Prepared for the Government of Pakistan
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

*Based on the work of Erik Kirknel,
consultant on ecotoxicology*

Project Manager: B. Sugavanam, Chemical Industries Branch

* This document has not been edited.

V.95 59845

ABBREVIATIONS

ADI	Acceptable Daily Intake
MRL	Maximum Residue Limit
PARC	Pakistan Agricultural Research Council
NARC	National Agricultural Research Centre
OECD	Organization for Economic Cooperation and Development
GC	Gas Chromatograph
GLP	Good Laboratory Practice, a Quality Assurance System based primarily on Standard Operating Procedures (SOP's).
HPLC	High Performance Liquid Chromatography
RENAP	Regional Network on Pesticides for Asia and the Pacific.
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organization
IOBC	International Organization for Biological Control.
NIAB	Nuclear Institute for Agriculture and Biology.

ABSTRACT

Title: Consultant for setting up Eco-toxicology Laboratory.

Objective:

This fourth mission on the project consisted of a follow-up of the third mission, technical input in establishing the ecotoxicology laboratories and provide assistance in better understanding of the impact on ecosystem of especially pesticides, in order to implement working plans for the laboratory for the benefit of Pakistan and RENPAP member countries. Collect informations on further equipment necessary to be purchased and evaluation of needed training for staff members.

Conclusions:

The chemical section is at operational stage. Training of two staff members were successful. Instruments would be fully operational with further minor technical adjustment and additional supply of accessories. The Terrestrial lab is under process of establishing parasite culture. The microbial section needs more effort to perform scientific tasks.

Recommendations

1. Supply of expendables and small sized equipment and repair service is urgently required.
2. Establishment of a steering committee to plan and evaluate training, to review project documents and to plan a long-term project and evaluation of the progress is strongly recommended.
3. Role definition of section heads and working plans for staff are needed.
4. Effort on parasite culture for the Terrestrial lab should be accelerated.
5. More laboratory space should be secured.
6. Aquatic biology and wildlife aspects should be given more emphasis than microbial impact under financial constraints

CONTENTS

	<u>Page No.</u>
ABBREVIATIONS	1
ABSTRACT	2
CONTENTS	3
I. INTRODUCTION	4
II. ACTIVITIES AND FINDINGS	4
A. Accomplished since the last report	4
B. Not accomplished since the last report	5
C. Identification of equipment and expendibles to be purchased and repaired	5
III. CONCLUSIONS	6
IV. RECOMMENDATIONS	6
ANNEXES	
I. Job Description	7
II. Itinerary	9
III. References and reports consulted	10
IV. List and information of equipment to be purchased	11
V. List and information of equipment to be repaired	17
VI. UNIDO substantive comments on the report of Mr.Erik Kirknel ..	18

I. INTRODUCTION

This report is made by Erik Kirknel, Ministry of Agriculture, Danish Institute of Plant and Soil Science, Department of Weed Control and Pesticide Ecology, Flakkebjerg DK-4200 Slagelse. The job description is reproduced in Annex I.

The first part of the mission took place on the 13-20th of February the second on 9th October to 6th November 1993, the third part from 14th March to 9th of April 1994 and the fourth part from 19th of December 1994 to 3rd January 1995.

This fourth mission on the project consisted of a follow-up of the third mission, technical input in establishing the ecotoxicology laboratories and provide assistance in better understanding of the impact on ecosystem of especially pesticides, in order to implement working plans for the laboratory for the benefit of Pakistan and RENPAP member countries. Collect informations on further equipment necessary to be purchased and evaluation of needed training for staff members.

The reports mentioned in ANNEX III, describes the available reports done previously in the project.

II. ACTIVITIES AND FINDINGS

A. Accomplished since the last report

A chemist on Ph.D. level in analytical organic chemistry has been hired.

Training of two staff members in analytical chemistry has taken place as scheduled at NIAB, Faisalabad with Dr. Altaf Hussain. It was agreed with NIAB that the training should be on analysis of "cold" pesticides, but instead, radioactive material was the main issue in the training. This was unsatisfactory and of limited use for the two students.

Terrestrial lab. has tried to raise a culture of *Trichogramma*.

A staff member, Dr. Matin has been on a three weeks training in Europe on "IOBC-test methods for beneficial organisms" with contact to Dr. Hassan, Darmstadt.

Millipore reverse osmosis filter (except part of the order), two Warring blenders, gel-filtration system, solvents, P-filter for the FPD has arrived.

Establishment of the remaining two of three fume hoods is progressing. Despite reasonably clear drawings, the quality of the fume hoods is far from ideal, a compromise with the engineer was tried.

Establishment of safety devices as prescribed in the earlier report is progressing.

B. Not accomplished since the last report.

It is still strongly recommended to establish a steering group as recommended fall 1993. The duty of the group should be to plan future training and secure implementation of such, to review the project document, the budget, make plans for the future work and check success of the work. It has been mentioned in earlier reports but with no effect. I will not avoid stating my honest opinion on this matter despite it might be unwanted. The most urgent need for the different sections to function is establishing an infrastructure in management. If this infrastructure is not established very soon, it will be fatal to future activities.

Development of written working plans for all scientist's in the three sections.

Terrestrial lab. has not been successful in raising a culture of parasites for investigating the effect of pesticides.

Tools and voltmeter has not been ordered and delivered (UNIDO responsibility).

Spare parts for GC from Perkin-Elmer, list of spare parts for HPLC still not received by the consultant, check address in the report of October 1993 (UNIDO responsibility). A new list is made.

The need for an electrical generator is urgently needed. The frequency of power drop-out inhibits pesticide residue analysis. A 25 kW generator will be sufficient.

Dust is still a problem in the building.

Not enough offices are available for the staff members in order to perform scientific work.

C. Identification of equipments and expendables to be purchased and repaired

Much effort was given to identify equipment and expendables needed for the normal operation of the Ecotoxicology Center. Discussions with the Director of the Center, Dr. Baloch and inquiries to suppliers of the equipment were made. Lists and acquired information on equipment to be purchased and repaired are attached in ANNEX IV and V respectively.

III CONCLUSIONS

The ERC chemical section is pretty close to being able to perform pesticide residue analysis. Two staff members have for two months in Denmark in consultants pesticide residue laboratory, received introductory training in the disciplines necessary and only practice and regular contact with experienced analysts in the future is needed for being on the track.

The instruments are almost implemented although small technical adjustments always will be needed in a laboratory like this. A list of further necessary equipment is given below.

The terrestrial lab. is trying to establish cultures of parasites for testing but need minor financial support in the range of 500\$ for local supplies to continue. The microbiological section has not yet been able to establish a scientific starting point.

IV RECOMMENDATIONS

It is still strongly recommended to establish a steering group as recommended fall 1993, delegating responsibilities to the individual scientists. The duty of the group should be to plan future training and secure implementation of such, to review the project document, the budget, make plans for the future work and check success of the work.

The steering committee should as a minimum consist of the scientists of the ecotoxcenter, the director Dr. U.K. Baloch, representatives from UNDP environmental activities and a **trained** analytical chemist.

A clear definition of responsible persons for the three sections is urgently needed. Especially is needed an internal procedure for designation of functions in the labs, working hour, availability etc. Development of written working plans for all scientist's in the three sections. **Standard operating procedures for planning experiments was developed a year ago.**

Terrestrial lab. should try putting all efforts in raising a culture of parasites for testing. The scheduled training course in: "Pesticide registration and evaluation of pesticide effects on natural enemies- an international training course and workshop", late february to mid march 1995, at the Training Centre of the Malaysian Agricultural Res. and Dev. Centre (MARDI) should be attended by a staff member of ERC.

Still not enough offices are available for the staff members in order to perform scientific work. The influence of pesticides on microbes is a field of interest. It is on the other hand an extremely difficult discipline to handle. Especially on the background of limited financial resources, this area should for the time being have a low priority for the ERC.

Aquatic biology and wildlife would be of more interest as the impact of pesticides has shown to be of far more importance

ANNEX I

JOB DESCRIPTION

US/PAK/90/294/11-01

Post Title: Chief Technical Adviser

Duration: 1 m/m

Date required: December 1994 to February 1995,
(2 weeks in Islamabad, 2 weeks homebased)

Duty station: Islamabad, Pakistan.

Purpose of project:

To establish an eco-toxicology laboratory at the National Agricultural Research Centre (NARC) Islamabad, belonging to The Ministry of Agriculture and study the fate and effects of pesticides in the environment and also make Pakistan effectively interact as Technical coordinator giving inputs to eco-toxicology to the Regional Network on Pesticides for Asia and The Pacific (RENPAF).

Duties:

The expert, during his return mission, is expected to assess the work carried out in the Centre with regard to the functioning of the various laboratories. He should also assess the progress made since the last expert group meeting (EGM), the type of project undertaken by the research groups and also the type of linkages that should be maintained between the ecotoxicology centre and other laboratories.

He should also assist in preparing a workplan for the next 12 months and also suggest a project concept for consideration beyond 1995. In his home based assignment he should contact equipment suppliers to provide their quotations to UNIDO for purchase during 1995. At the end of the assignment he should submit a report giving his findings and recommendations.

Qualifications:

A chemist, biologist or environmentalist with extensive experience in analytical work related to pesticides and their residues in the ecosystem. Must have held senior position in Government laboratories or industries and supervision for group of analytical chemists. Must be familiar with GLP and MRL, ADI for pesticides and OECD guidelines with regarding to quality control and quality assurance. Experience in the developing countries would be an advantage.

During his/her homebased work he/she will identify the suppliers of equipment and also arrange any training to the counterparts on ecotoxicology and provide necessary advice for UNIDO to take action.

Language: English

Background information:

The United Nations Industrial Development Organization (UNIDO) has been assisting 15 Asian countries through a network called Regional Network on Pesticides for Asia and the Pacific (RENPAF) mainly to promote safe development of pesticides. Under this project specific areas have been assigned to the different member countries to provide technical inputs as shown below:

Formulation technology:	India
Quality control:	Rep. of Korea
Bio-botanical pesticides and Residue analysis:	Thailand
Occupational safety:	Philippines
Operational safety, Waste management and Environment safety:	Thailand
Application technology:	Malaysia
Data collection/Dissemination:	India
Ecotoxicology:	Pakistan

Pakistan has taken up ecotoxicology based on the facilities available. These facilities need to be strengthened and from the contribution of Denmark to UNIDO Industrial Development Fund (IDF) a project has been approved to strengthen the ecotoxicology laboratory of the National Agricultural Research Centre of the Ministry of Agriculture. The main aim is to link pesticide industries with the ecotoxicology laboratory and make use of the facilities for carrying out experiments on the fate of pesticides they produce for Pakistan market. Self sustainability (partly or fully) of the project is also considered to be an important factor by providing services to industries, government institutions dealing directly or indirectly with pesticides.

ANNEX II

ITINERARY

ACTIVITIES IN ERC FROM 19 December, 1994 to 3 January, 1995.

Mainly stayed at NARC getting the analytical instruments operational for analysis.

Contacted the different suppliers in Europe for technical advise in order to correct malfunctions of instrumentation.

Frequent meetings with the country director, Dr. Abd El-Rahim Marei.

ANNEX III

REFERENCES AND REPORTS CONSULTED

1. **CALDERBANK, A.**
UNIDO report on environmental toxicology related to pesticides in Pakistan.
DP/RAS/85/023. 1988.
2. **CALDERBANK, A.**
UNIDO report on an Ecotoxicology Research Center in Pakistan.
DP/RAS/85/023, 1990.
3. **FLETCHER, K.**
UNIDO report on Establishment of an Ecotoxicology Center. US/PAK/90/294,
1992.
4. **KIRKNEL, ERIK**
UNIDO report on findings and recommendations on establishing an
Ecotoxicology Center in Pakistan.
DP/RAS/88/031. 1993a.
5. **KIRKNEL, ERIK**
UNIDO report on findings and recommendations on establishing an
Ecotoxicology Center in Pakistan.
DP/RAS/88/031. 1993b.
6. **KIRKNEL, ERIK**
UNIDO report on findings and recommendations on establishing an
Ecotoxicology Center in Pakistan.
US/PAK/90/294/11-01/B/J13426

ANNEX IV

LIST AND INFORMATION OF EQUIPMENT TO BE PURCHASED.

Hydrogen generator (extra). The new model HG200 will serve as a necessary back-up for the present generator. The last 4 months has demonstrated the need for this item.

Price: £3271

Deliverer:

Peak Scientific

Turner Road, Abbotsinch trading estate

Paisley, PA3 4EN, Scotland, United Kingdom.

Tel.: +44 141-887 0321, Fax: 0044 141-887 2235

(contact Jim Brown)

Glassware, for general purpose in the chem. lab.:

Package of 10 of all items Dkr: (Item in english)

Tragt 60 mm	nr. 1-T-0920	138.00	Funnel
Tragt 100 mm	nr. 1-T-0945	278.20	
Tragt 150 mm	nr. 1-T-0980	674.60	
Bægerglas 50 ml	nr. 1-P-5251	135.00	Beaker
Bægerglas 100 ml	nr. 1-P-5256	138.00	
Bægerglas 250 ml	nr. 1-P-5266	152.70	
Bægerglas 600 ml	nr. 1-P-5281	240.00	
Rundbundet 50 ml	nr. 1-R-1010	369.60	Roundbott. flask
Rundbundet 100 ml	nr. 1-R-1020	401.10	
Rundbundet 250 ml	nr. 1-R-1025	619.50	
Erlenmeyer 250 ml	nr. 1-P-5700	206.00	
Måleglas 25 ml	nr. 1-M-0421	179.50	Meas. cyl.
Måleglas 50 ml	nr. 1-M-0422	219.40	
Måleglas 100 ml	nr. 1-M-0423	317.10	
Måleglas 500 ml	nr. 1-M-0425	976.50	
Måleglas 1000 ml	nr. 1-M-0427	1638.00	
Målekolbe 1 ml	nr. 1-M-0931	413.70	Meas. glass
Målekolbe 2 ml	nr. 1-M-0936	413.70	
Målekolbe 5 ml	nr. 1-M-0941	334.40	
Målekolbe 10 ml	nr. 1-M-0946	279.30	
Målekolbe 25 ml	nr. 1-M-0956	303.40	
Målekolbe 50 ml	nr. 1-M-0961	367.50	
Målekolbe 100 ml	nr. 1-M-0966	407.90	

Fuldpipette 1 ml	nr. 1-P-0870-1	85.50	Vol. pipette
Fuldpipette 2 ml	nr. 1-P-0870-2	89.00	
Fuldpipette 5 ml	nr. 1-P-0870-5	99.50	
Fuldpipette 10 ml	nr. 1-P-0870-10	103.00	
Fuldpipette 20 ml	nr. 1-P-0870-20	125.50	
Fuldpipette 25 ml	nr. 1-P-0870-25	141.50	
Pasteurpip. 155 mm	nr. 1-P-0051C	410.00	Pasteur pipette
Pasteurpip. 230 mm	nr. 1-P-0053C	450.90	
Hver pak indeholder 250 stk.			
Spatel 150 * 10 mm	nr. 1-S-0860	133.80	Spatula
Spatel 185 * 5 mm	nr. 1-S-0950	99.70	
Hofmann klem 30mm	nr. 1-K-0350	154.30	
Parafilm 10cm*38 m	nr. 1-P-2151	1127.20	
Vejebåde 3 ml	nr. 1-V-0250	458.30	Weigh boats
Vejebåde 6 ml	nr. 1-V-0260	560.00	
Guko manch.(5pcs)	nr. 1-G-4490	250.00	

Total Dkr:		13,490.00	

Deliverer:

Bie and Berntsen a/s

Sandbækvej 7

2610 Rødovre

Phone: +45 44 94 88 22

Fax: +45 44 94 27 09

Capillary column for GLC

4 columns, 25 m long, 0.32 mm inside diam. 0.2 µm filmthickness.

Equivalent to Chrompack:

CP-Sil 5CB

CP-Sil 8CB

CP-Sil 19CB

CP-Wax 52 CB

Inclusive ferrules

A capillary column knife, **cheap!**

Any Perkin Elmer deliverer.

Price range 12.000 Dkr

Computers

486 DX, 8 ram, 300 mb, 66Mhz.

Dr. Umar Khan Baloch will try to buy locally.

Printer cartridges to Okidata OL 400ex

8 pieces.

Any printer dealer.

Millipore chlorine tablets for water purification unit.

Mentioned earlier in fax, missing item from deliverer of the Millipore unit.

Software DOS-6

Will be delivered free from consultant.

Overhead projector

An overhead projector of good quality is desired.

Slide projector

A slide projector of good quality is desired.

Gelfiltration apparatus. spare parts

Two extra teflon pistons with O-ring for the delivered gelfiltration apparatus.

Deliverer:

Mikrolab Århus a/s

Aksel Kjærs vej 34

DK-8270 Højbjerg

Phone: +45 86 29 61 11

Fax: +45 86 29 61 22

Tools and voltmeter

Contact consultant, will eventually be brought at next consultancy

Perkin-Elmer Autosystem GC

It has in general been very difficult to get the commercial suppliers to deliver quotations, if they feel the chances are small for being chosen.

This is the case with the Danish Perkin Elmer dealer. I have tried when installing the two GC's, to make a list of spare parts together with the local representative in Islamabad. This list has been given in my report from fall 1993, and nothing has been delivered since. I repeat it and **have incorporated earlier requested autoinjector**. These autoinjectors should be installed by the local PE-representative.

Cat. no	Text	Quantity	*
?	Auto injector	2	

I hope these informations are sufficient to select the right **autoinjector**.
ERC have two GC's "Autosystem".

No:	1	2
Detectors:	ECD+NPD	ECD+FPD
Back side paper stick:	74454A	66942A
Under cover on top right:		
Serial:	610N3051802	610N3051803
Part no:	N611	N611
	9001-0002-1032-2037-3000	9001-0002-1032- 2038-3000
Control:	9	15

GC no 2 (with ECD and FPD) is the preferred GC, in case only one is installed

N930-1178	Gas line moisture filter	4	
N930-1179	Oxygen trap	4	
N610-1041	Flow controller	1	*
N930-1191	Oxygen indicator trap	4	
N600-1554	Needle valve, comb. control	4	*
G009-1357	Septa Teflon faced	4	
N610-0097	Injector heater, 240V	1	*
N610-0006	Inj/det sensor	2	*
N612-0084	Trap split/splitless inj;	2	
N610-0124	Split solenoid	1	
N610-0059	Oven sensor	1	*
N610-005?	Oven heater	1	*
N610-1102	Oven heater ceramic tube	1	*
N610-1374	Glass liner silicon O-ring	2	
N610-1378	Glass liner graphite O-ring	2	
0992-0105	1/6"*0.5mm id.cap graph/vesp.	4	
0990-3981	1/8" graph. ferr. cap	2	
0990-3129	1/8" brass ferr. front	20	
0990-3130	1/8" brass ferr. rear	20	
N610-1292	Sensor as plunger	2	*
N610-1293	Sensor as vial	2	*
0992-0107	1/6"*0.8mm id.w.bore inj.ferr.	2	
N612-0093	NPD replacement bead	4	
N612-0020	1/8 to 1/6" det. adaptor	1	
N612-0205	ECD heater	1	*

***Autoinjector add-on kit**

Necessary equipment for the auto sampler, vials etc. must be discussed with consultant. There is no catalogue available local. Kit no N610-0200 includes most of the spare parts marked with *. *-items should therefore be omitted if kit is purchased

GC-pressure regulators

8 pcs pressure regulators, output 4 bar, inclusive fittings and copper tubing

Price Dkr.: 6.000

Deliverer:

Mikrolab Århus a/s

Aksel Kjærs vej 34

DK-8270 Højbjerg

Lambda-3B uv/vis spectrophotometer.

Cat no. B011-4620 1 pcs Tungsten lamp

B011-4615 Deuterium lamp

HPLC

Lamps for 295 detector

Flow cell assembly, 18 µl, stainless steel.

HPLC spare parts

Cat no. 0258-0180 2 pcs Cartridge column holder kit, includes 3.5 cm holder, 2 fillings, 2 gaskets, two 1/16" ferrule, two 1/16" nuts and restrictions. A hexagonal holder 1/2".

0258-0213 4 pcs PE HCOODS C18 HS-5 cartridge column 3.5 cm x 4-6 mm

Do PE sell a HP-type of guard column, to be cleaned by ultrasonic treatment only? If yes, please 4 pcs.

0996-3250 2 pcs zero dead volume union

0990-4827 2 pcs sample loop 5 µl

0990-4938 2 pcs sample loop 10 µl

0254-0871 1 pcs Torque wrench kit

N260-0124 1 pcs High pressure piston.

0254-0275 4 pcs piston seal replacement kit includes high press. seals, high press. piston seals, back-up rings and O-rings

0089-0716 1 pcs PE HCOODS/PAH C18 analytical column, 25cm x 2.6 mm

N291-0346 1 pcs series 200 Maintenance kit

0271-2231 1 pcs LC 295 micro flow assy

0990-7126 1 pcs back pressure valve

0271-0287 1 pcs inlet filter frits

0271-2224 4 pcs LC 295 deuterium lamps

0254-0141 1 pcs Rheodyne 7125 inj kit

0089-0873 1 pcs operation kit

N930-1002 1 pcs fitting kit LC

If duplicates in items ordered, please correct

Electrical generator.

The need for an electrical generator is urgent. Power failure is a frequent event in Islamabad and it is impossible to make residue analysis if power drop-out is a daily event. The generator can be supplied locally, necessary effect in the range 25 kw. to run instruments. In the hot season a generator on 50 kw will be sufficient for supplying the aircondition with power.

Vacuum cleaner

A heavy duty vacuum-cleaner for cleaning the hall and laboratories is needed.

Deliverer: Local deliverer.

ANNEX V

LIST AND INFORMATION ON EQUIPMENT TO BE REPAIRED.

Gelfiltration unit.

Mikrolab Århus has been consulted regarding a malfunction of the control box. Mikrolab has offered to send two new timers inclusive instruction for repair with the next consultancy.

Danfoss compressor on lab. cooling unit.

Danfoss compressors GmbH inform on the compressor type TI 4B, the cooling fluid R-12 to be used as a refill.

Their contact in Pakistan is:

Khan Brothers

Engineers

684, Central Commercial Area

Allama Iqbal Road

P.E.C.H.S.

Karachi-75400

Telephone: 443351, 443352, 443314

Direct Aman Khan: 446178

Fax: 21 435995

Telex: 25562 kbros pk

Contact Mr. Aman Khan for advise, eventually advise to a local engineer

Hydrogenerator for GLC *

Peak Scientific has been consulted regarding faulty hydrogen generator. Following fault finding diagrams delivered by the company, the probable cause is faulty oxygen and hydrogen sensors, eventually the level board.

These items should be ordered from Peak Scientific immediately.

Peak Scientific

Turner Road, Abbotsinch trading estate

Paisley, PA3 4EN, Scotland, United Kingdom

Tel: +44 141-887 0321, Fax: 0044 141-887 2235

(contact Jim Brown)

Oxygen and hydrogen pressure transducers *

cat no: H480130

Level board, cat. no: H480140

* The cost for the above two pieces of equipment, if needed, should be discussed further

ANNEX VI

**UNIDO SUBSTANTIVE COMMENTS ON THE REPORT OF
Mr. ERIK KIRKNEI FOR PROJECT US/PAK/90/294/11-01**

The expert's report demonstrated his intense effort in the operation of the Ecotoxicology Center's laboratories. He carried out his mission successfully by way of assessing the work planned previously and technically pointing out several difficulties in setting up the basic ecotoxicology laboratories, for example, delays in procurement of small equipment and accessories for large equipment already purchased.

The expected activity of the expert in preparing the Work Plan for 1995 and a project concept beyond 1995 was not realized and instead he recommended an urgent formation of a Steering Committee for the purpose. There were no comments on the activities of the linkage between the Ecotoxicology Center and domestic cooperating laboratories.

The purchase of expendable equipment will be accelerated in 1995 as the expert has suggested and the Steering Committee will be one of the discussion topics at the tripartite meeting to be held in June 1995. It is time for the government of Pakistan to initiate a commitment to support the Ecotoxicology Center by planning the projects and providing substantial budgetary support for research at the Center in consideration of the termination of the UNDP project in 1996.