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TECHNICAL EVALUATION OF PROJECT FOR STRENGTHENING OF PESTICIDES DEVELOPMENT CENTRE, GURGAON, INDIA

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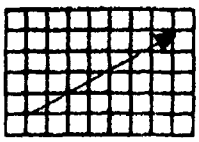

ECONOMIC INFORMATION TECHNOLOGY

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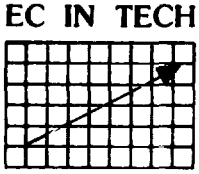

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EXECUTIVE SUMMARY

Pesticides have played a very vital role in the agricultural and industrial growth and thereby the economic development of the country. Use of pesticide started in India in 1948 to control Malaria to locuster and in 1949 in agriculture. India is the largest producer of basic pesticide chemicals among South Asian and African Countries excluding Japan. The total installed capacity is 1,16,000 tonnes. In 1994-95, the consumption of pesticides in agriculture was around 86,ooo tonnes. The total demand for pesticides by the year 2000 is estimated at 1,18,000 tonnes (97000 tonnes for agriculture and 21 000 tonnes for health). The current total investment in the Industry is around Rs. 1000 crores with a turnover of Rs 1800 crores.

The Government of India during the 80's wanted to provide assistance to pesticide industries through a R&D centre which could provide the necessary services to the industry in the latest developments in pesticide formulation technology. Thus was born the Institute for Pesticide Formulation Technology at Grugaon, India with the support of UNDP and assisted by UNIDO. The goal was to have a Centre of Excellence in pesticide formulation.

It was decided, after discussions with GOI, to carry out a technical evaluation of the Project, assess its impact to industry and find ways and means for further improving the centre. The job was entrusted to Economic Information Technology, Calcutta.

A team of Economic Information Technology held detailed discussions with the staff, acquainted themselves with their educational background, level of training, visited laboratories and examined equipment and other facilities. This was followed by discussions with Pesticides Association of India and Pesticides Formulators Association of India.

A list of basic manufacturers and formulators was prepared. Mailed questionnaires were sent to 781 such units in the country. However, response was very poor. A team of executives then visited different parts of the country and personally interviewed a cross section of the industry. 62 responses were received. Officials who have had training in IPFT were also interviewed personally. In all 53 trainees were interviewed. Time constraints prevented us from getting annwers from more companies.

The Institute is well-equipped with the state-of-the-art Laboratory, instrumental and other facilities including fully equipped pilot plant to make it a Centre of Excellence. Some of the equipment are not commonly available in the country . The Institute has also qualified foreign-trained and highly motivated scientists.

Economic Information Technology, however, feels that the Institute lacks in several key infrastructural areas like the buildings, utility supplies, transport for employees and landscaping and presentation of the Institute. The premises need modernization.

A very high priority has been attached to human resources development by the Institute. The Institute has successfully conducted several national and international training programmes for the benefit of the pesticide industry. However, it is strongly felt that the Institute lacks in two basic facilities— a good library equipped with documentation facilities, information techonology and communication facilities and residential accommodation for key scientific personnel at the site.

The field study results indicate that majority of the trainees have ranked the training programmmes as very good or excellent. They have benefitted by attending these programmes. The trainees have also opined that the cost of training, imparted by the institute, could be increased by at least 20%. Industry had mixed response on the performance of the Institute. 52% of those interviewed were aware about the Institute and only 32% of them have availed some services/facilities of the Institute. 85% of those who have availed the facilities relate to training and 60% of them have availed analytical services. 100% of those who availed the services mentioned that the Institute was technically and otherwise equipped. 75% of them thought that the services were of international standard. In terms of pricing of services, 60% felt that the industry will continue to avail services/facilities of the Institute even if they were to raise the charges by 20%.

There are eight (8) spelt-out clear objectives set before the Institute. Technical evaluation carried out leads us to the following conclusions regarding the performance of the Institute under each objective :

1. Technology development— highly satisfactory.
2. Need based formulation development for botanical pesticides etc. — work is in the exploratory stage. Pre-mature to evaluate the performance. Activities are in right direction.
3. Adaptation of new application technique — Performance not upto the desired level mainly due to resource constraints.
4. Continuous education through specialized training programmes — Highly satisfactory.
5. Consultancy services to pesticides industry —Performance satisfactory. Very good beginning has been made.
6. Analytical services and standard development — Performance highly satisfactory.
7. Publication of a safety manual — The safety manual is ready and expected to be published shortly.

8. System development to render effective assistance to RENPAP member countries — Performance highly satisfactory.

Both quantitatively and qualitatively the Institute has made good impact in terms of benefits to pesticide industry and to the country.

At the present stage of the development of the Institute, 'Marketing of the Institute' is of immediate necessity. A 'Workshop on the Institute' is suggested as a first step. The Institute should immediately have a Business Development Manager to undertake this activity.

The Institute is presently generating a part of their budgetary requirement through different activities. For self-sustainability, profit-oriented and industry-demanded activities have to be augmented. Time has also come to revise the changes upwards to generate more funds.

Specific recommendations regarding structure of activities and directions are included in the report and a compilation of recommendations is annexed (Annexure No.4). Implementation of some of the recommendations will require increased funding from UNIDO/UNDP and GOI for some time. The Institute need to take self-finance generating activities to take care of themselves mainly in the long run.

RECOMMENDATION 1 : OBJECTIVE OF THE INSTITUTE

UNIDO / UNDP and GOI may have a fresh look at the objectives to make it more industry-oriented.

RECOMMENDATION 2 : FACILITIES

The following facilities need to be strengthened / augmented :

1. Suitable laboratory space needs to be added to house existing and additional Laboratories.

2. A good library equipped with documentation and communication facilities and information technology .

3. Residential accommodation for key scientific personnel at site.

4. Micro-biological Laboratory, application technology facilities and a laboratory for residue/ pollution work.

5. In order to modernize the Institute and improve the presentation of the Institute, an International Specialist in the field may be engaged for landscaping, layout, utitlity services and designing of the laboratory.

6. Transport facilities may be provided to scientists and employees to improve their effectiveness.

RECOMMENDATION 3 : HUMAN RESOURCES

The Institute is short of key manpowers Scientist. a Business Development Manager, a Training Manager and a Financial Analyst should be added immediately. Staff should be captive to the Institute. Highly qualified, trained and motivated scientists at the Institute is a STRENGTH and also is a THREAT. In order to stop possible flight of scientists from the Institute, suitable remuneration package may be developed.

RECOMMENDATION 4 : ACTIVITIES

The present activities need to be continued and strengthened. Following activities need to be augmented . :

1. Environment - friendly non-chemical pesticide formulation research and technology development.
2. Preparation and characterization of certified reference materials used for analysis of pesticides formulation and residue.
3. Organize specialized custom-made training programme for different niche markets.
4. Organize a 'Workshop on the Institute'.
5. Undertake rigorous R&D to come out with cost-effective packaging alternatives.

RECOMMENDATION NO 5 : PRICING OF SERVICES

There is a strong case for increasing fees/charges levied by the Institute for the services/ facilities offered.

CONTENTS

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1.0 INTRODUCTION

BACKGROUND

1.01 Pesticides is an essential input in increasing the agricultural production by preventing crop losses before and after harvesting. It is estimated that about 30% of the food production and storage is annually lost in India due to insect pests, plant pathogens, weeds, rodents, birds etc. In view of this, use of pesticides has become almost essential.

1.02 Pesticides were first used in India for Malaria control (using DDT) and locust control (using BHC) in 1948. Pesticides use for crop protection in India started in 1949.

1.03 The consumption of pesticides in agriculture was 83,000 tones in terms of technical grade for the year 1993-94 and is estimated to be 86300 tonnes in 1994-95.

1.04 The Working Group on Eighth Plan for pesticides has forecast the demand for pesticides at 1,18,000 tonnes of technical grade by the year 2000. This comprises of a demand level of 97, ooo tonnes for agriculture and 21,000 tonnes for public health.

PESTICIDES INDUSTRY IN INDIA

1.05 Pesticides Industry in India has played an important role in economic growth. The industry comprises of basic manufacturers, formulators and the distribution network. There are multi-national companies and large, medium, small and tiny sector Indian companies.

1.06 The total installed capacity of the industry is 1,16,000 tonnes with a total current investment of about Rs. 1000 crores.

1.07 India is the largest manufacturer of basic pesticide chemicals among the south Asian and African countries next only to Japan. With a modest production of around 2800 tonnes in 1955-56, it has reached a level of 85,000 tonnes of production of basic pesticides.

1.08 The pesticides industry in India is regulated by Insecticides Act, 1968 and Insecticides Rules. 1971.

WHY THE PRESENT STUDY

1.09 The Govt. of India during the 1980's wanted to provide assistance to pesticide industry through a R&D centre which could provide the necessary services to the industry in the latest developments in pesticides formulation technology. An Institute for Pesticides Formulation Technology was established at Gurgaon near Delhi, supported by UNDP and assisted by UNIDO.

1.10 The goal is to have a Centre of Excellence in pesticides formulation which could be used to serve the national industry and to some extent the regional requirements to promote safety in pesticides development.

1.11 Based on discussions with Government of India, UNIDO / UNDP decided to carry out a technical evaluation of the project with an objective to assess its impact to industry and find ways and means of further improving the Centre.

1.12 The job of technical evaluation was assigned by UNIDO / UNDP (UNIDO Project DP/ IND/89/128) to Economic Information Technology, Calcutta, Vide UNIDO contract no. 95/ 224JP.

METHODOLOGY FOLLOWED

1.13 At the outset, discussions were held with the National Projects coordinator of the Centre on the terms of reference of the study. The meeting laid down the ground rules and modus-operandi of conducting the study.

1.14 Detailed discussions with the Institute were held for two days (15th and 16th November '95). The meeting was attended by the Heads of the Departments and Senior Officials of the Institute. Economic Information Technology was represented by a pesticides expert, an economist and a market research executive. In addition to collection of information, , the meeting helped an in-depth inter course between the two teams.

1.15. Discussions have been held with Pesticides Association of India, Pesticides Formulators Association of India, Bureau of Indian Standards and Directorate of Plant Protection, Quarantine and Storage for getting their opinions and suggestions.

1.16 A Format was developed to elicit information from individuals from pesticides industry already trained by the Institute. Format was mailed to all the trainees and was followed by interviewing a cross-section of the total group. In all, 53 responses from trainees are available. The list of trainees interviewed is attached to the report as Appendix 1 (C).

1.17. A list was prepared for all the pesticides manufacturers and formulators of the country.

1.18 A Questionnaire was prepared., pre-tested and finalized for eliciting the required information from these manufacturers / formulators. The questionnaire was mailed to 781 manufacturers / formulators all over the country. The response to mailed questionnaire was extremely poor.

1.19. Personal Interview of manufacturers / formulators was done at two stages. At the first stage, the Pesticides Experts held discussions with key members of the pesticides industry in Bombay, Delhi and Ahmedabad.

1.20 Project Director and other members of the project team visited different regions of the country and interviewed a number of manufacturers / formulators. The list of officials met/ interviewed is presented in Appendix 1 (A) and 1 (B).

1.21 In all, 62 responses from manufacturers / formulators are available. The region-wise break up is indicated below :

Eastern Region —	11
Western Region —	21
Northern Region —	10
Southern Region —	20
Total	= 62

1.22 In terms of impact of the data on the findings of a study, it would have been extremely useful to intrerview more than 10 % of the companies (as has been done in the present study). However, because of the time constraints,it was not possible to contact more companies to get their answers.

1.23 Data received from these units will be discussed in a subsequent chapter.

1.24 The names of the project team members are given in Annexure - II. The curriculum vitae of the core team members consisting of the following officials are presented in Annexure - II :

1.	DR. K. N. SHRIVASTAVA —	PESTICIDES EXPERT.
2.	DR. A. K. ROY —	Economist and Project Director.
3.	B. M. Bhattacharya —	Market Specialist.
4.	Mr. B. Mazumder —	Market Research Executive.

1.25 Before launching the field work, the field staff were given a training on objective, methodology.

2.0 FACILITIES (TECHNICAL)

TECHNICAL FACILITIES AVAILABLE WITH IPFT/PDC

2.01 ANALYTICAL FACILITIES — Analytical laboratory of the Institute is well equipped with the state-of-the-art analytical instruments including GAS Chromatograph, Gas Chromatograph coupled with Mass Spectrometric Detector (GC - MSD), High Performance Liquid Chromatographs (HPLC), Super Critical Fluid Chromatgraph (SFC), High Performance Thin - Layer Chromatograph (HP - TLC) etc. The services available at the Institute are :

1. Analysis of pesticide material,
2. Supply of standard reference materials of pesticides,
3. Method development.

2.02 PESTICIDE FORMULATION TECHNOLOGY DEVELOPMENT FACILITIES — Instrumental and other facilities for the development of new generation, user and environment friendly formulations, namely water dispersible granules, suspension concentrates, controlled release formulations, micro encapsulated products etc, are available.

2.03 BIO-SCIENCES FACILITES — The Institute has a well equipped bio-Science department undertaking biological evaluation of pesticides formulations which include micro jector/ applicator, quantimat image analyser. AIMS Droplet Measurement and Analysis Device, Kearhs and March Knock Down Chamber. The Institute also has extensive facilities for field trials on the agricultural crops. The services offered by the Institute include data generation of pesticides formulations for meeting the registration requirements through bio-assay, phytotoxicity evaluation, evaluation of compatability of pesticides and insecticide resistance to insects.

2.04 PILOT PLANT FACILITIES— The Institute has a fully equipped pilot plant for scaling-up of new formulations developed in the formulation laboratory upto semi-commercial level. The facilities include Dyno-mill, Fluid - Energy mill, Lodige mixer, Ribbon blender, Hammer mill, besides various size reduction mills.

EVALUATION OF TECHNICAL FACILITIES

2.05 The Institute has duly qualified foreign trained scientists and very good equipment/ laboratory facilities. Some of the equipment such as Dyno-mill, Fluid bed Spray granulator, Silver mixer, are noteworthy. They are not commonly available. Special mention may be

made of a costly Laser based particle size analyser which is hardly available at a couple of places. On account of this, both particle and non-particle companies are coming to IPFT for particle size testing.

2.06 UNIDO/UNDP and GOI deserve appreciation for having provided GC Mass, SFC and FTIR etc which are unique, most modern and sophisticated and are hardly available in the country, particularly GC.

2.07 Sponsored projects have been undertaken for the development of tailor-made formulations. The Institute has already developed for the industry few flowable fungicides, herbicides, insecticides and a number of water based formulations. The state-of-the-art facilities for the production of spray granulated water dispersible granules has enabled the Institute to produce any formulation for meeting the domestic and export requirements.

2.08 Quality improvement and cost reduction studies of the conventional formulations like WP and EC are undertaken for meeting the stringent quality control requirements particularly keeping in Export Strict Requirement in mind.

2.09 It is felt that utilization of equipment for new/exploratory research and development need to be augmented for a better cost-effective result. There is a stronger case for augmenting utilization of sophisticated equipment like GC, FTIR, SFC where the current utilization factor is not very high.

2.10 The Analytical Services Department is very well-equipped in terms of hardware. However, we have felt that there is a need for an extra laboratory for residues for residue/ pollution related work.

2.11 Higher utilization of existing facilities and augmentation of facilities (para 2.10) will call for increasing the scientists' man-power. This will be discussed in the next chapter.

RECOMMENDATIONS

2.12 Lack of laboratory space is hindering effectiveness of the Institute. Suitable laboratory space needs to be added to house existing laboratory and more laboratories (viz Extra laboratory for residue etc.), GOI may be approached if necessary.

2.13 One of the activities which needs to be augmented is the work related to preparation and characterization of certified reference materials used for analysis of pesticide formulation and residue.

2.14 Facilities in the field of Application Technology need to be augmented together with more of R&D work in the field.

2.15 The Institute should be associated with Central Insecticide Board to assess technological competence and feasibility of the industry before granting license.

2.16 It is recommended that GOI may be approached to make "Technology Audit" of the Pesticides Industry compulsory to ensure conformity with safety and other aspects (not toxicity etc). The Institute may be entrusted with this responsibility with a fee suitably fixed between the Institute and GOI.

2.17 All out efforts need to be made by the Institute to cut the time to give analysis report.

3.0 HUMAN RESOURCES DEVELOPMENT

OBJECTIVE

3.01 One of the IPFT Project Objectives (No. 4) reads as follows :

"Continuous education through specialised training programmes for pesticide industry personnel and materials published on technology and new developments in pesticides formulations, including compendium on state-of-the-art equipments, for use by pesticide industry."

3.02 The above objective sets the high priority attached to human resources development (HRD) by the Institute. In this chapter we shall examine different aspects of HRD of the Institute.

HUMAN RESOURCE DEVELOPMENT BY IPFT

3.03 Economic Information Technology, consisting of Pesticides Expert, Economist, Market specialist, Market Research Executive and the Jr. Economist, held detailed discussions with the staff, acquainted themselves with their educational background, level of training, visited laboratories and examined equipment and other facilities.

A. MANPOWER

3.04 The Institute presently has three categories of staff :

(a) staff exclusively recruited for the Institute (16 in number)

(b) Staff on HIL (Hindustan Insecticides Ltd.) working 100% for the Institute (11 in number).

(c) Staff working commonly (50 : 50 basis) for HIL (R&D) and the Institute (33 in number)

3.05 About 40% of the total staff strength of the Institute are technical/scientific personnel. Ten (10) of these scientists hold Doctorate degrees . There are two (2) chemical engineers, one of whom has a Master's degree in Business Administration. Scientific manpower, therefore, is properly qualified. They all have been trained abroad to handle higher levels of skill.

3.06 During the visit to the Institute and discussions with the scientific staff, members of Economic Information Technology were highly impressed by their motivation level. They seemed to have the missionary approach to work.

3.07 The high level of motivation, qualification and training of the scientific manpower of the Institute is perceived as a THREAT by Economic Information Technology. Their research work are acclaimed both nationally and internationally. They are in demand at national/ international market. Unless their work is backed up by commensurate levels of remuneration (cash and kind) there will always be a danger of flight of scientist from the Institute. If that happens, it will cause a threat to the Institute.

3.08 The present method of sharing staff between the Institute and HIL may not be the right thing. It is suggested that the Institute has captive staff, at least the scientific manpower.

3.09 With the augmentation of facilities as suggested, the Institute will have to increase their scientific staff strength.

B. INFRASTRUCTURAL FACILITIES

3.10 The Institute lacks in several key infrastructural areas like the buildings, utility services, landscaping and designing of the Institute. The presentation of the Institute must be improved and modernized.

3.11 At present the Institute does not offer hostel facilities. However, a now hostel building has already been constructed and will be ready for use in approximately 3-4 months time. This is a must for increasing the effectiveness of training programmes.

3.12 There is no residential accommodation for officials at the site. Because of the stress and strain of journey to and from the Institute, efficiency is getting affected. It is suggested that residential accommodation for at least key scientific personnel be provided at the site. If necessary, the Institute may approach UNIDO/UNDP and GOI for funding.

3.13 In order to improve the efficiency and effectiveness of both scientists and employees, transport facilities need to be provided to them.

C. LIBRARY

3.14 An Organization is known by the Library it has. If that be the yardstick, the Institute will find it difficult to score high. The present library does not match the technical level of excellence of the Institute. A good library is a must for the Institute.

3.15 The Library should also be equipped with state-of-the-art documentation facilities, information technology and communication facilities.

D. TRAINING

3.16 The Institute offers training in the following areas :

(a) Development of safe, effective and economical pesticidal formulations like water dispersible granules, suspension concentrates, slow release formulations, micro-emulsion, bio and botanical formulation etc.

(b) Pesticide analysis and quality control, process of analytical reference standard marking, handling and maintenance of sophisticated analytical instruments.

(c) Bio-efficacy evaluation under Laboratory and field conditions, pesticide registration and regulations.

(d) Pilot plant-process development of pesticidal formulations.

(e) Safety and hygiene in Laboratory and in the plant.

3.17 The Institute has successfully conducted several National and International training programmes for the benefit of the pesticide industry.

3.18 It is suggested that the Institute organize specialised Custom-made Training Programmes at appropriate locations (e.g. Ankleshwar, Bangalore, Hyderabad etc.) at fees much higher than the normal training fees.

3.19 It has been observed that the Institute does not have a person "Trained in Training". Because of its importance, the Institute should have a person trained and qualified in training.

EVALUATION OF TRAINING (OBJECTIVE NO. 4)

3.20 Based on discussions with the industry and information collected at the field level, it is observed that the performance of the Institute under this objective is HIGHLY SATISFACTORY.

PUBLICATIONS

3.21 It hardly needs emphasis that data and information on new, better formulations and new technology development in pesticides must be published in appropriated journals, at national and international levels.

3.22 A Compendium on the state-of-the-art equipments for pesticides industry, if published by the Institute, would be of practical benefit to the industry. This could be suitably priced. Perhaps advertisement from equipment/machinery suppliers could be incorporated to generate some fund for the Institute.

RECOMMENDATIONS

3.23 IPFT Technical Committee should meet twice a year. More technically sound persons should be included in the Committee.

3.24 A National Project Coordinator should maintain the appropriate rapport with the sectional heads and scientists dealing with the key activity areas of the project. The Institute could have attracted many more sponsored projects from industry had this leadership been of an appropriate level. Government of India may, therefore, consider posting of a highly qualified Pesticides Formulation Specialist of National Standing as the National Project Coordinator of the Institute.

3.25 Landscaping and designing of the laboratories would need to be done by one of the International Specialists in the field keeping in mind the need for this Institute to attain a truely International character.

3.26 A good library is a must for the Institute. The library should be fully equipped with state-of-the-art documentation facilities, information technology and communication facilities.

3.27 Residential accommodation should be provided to key scientific personnel at the site.

3.28 The Institute should approach GOI to make training of chemists of the pesticides industry mandatory. The Institute is the most appropriate place for this.

3.29 The Institute is short of key man power. Staff strengths should be captive to the Institute and the following should be recruited immediately :

(a) Scientists (number to be determined by the Institute)

(b) A Business Development Manager.

(c) A Training Personnel trained and qualified in training.

(d) A financial Analyst (who will also look after administration)

3.30 In order to stop flight of scientists from the Institute, suitable remuneration package may be developed.

3.31 The Institute should organize specialised Custom-made Training programme.

3.32 The Institute should prepare a compendium on state-of-the-art equipment for pesticides industry.

3.33 The Institute should provide transport facilities to scientists and employees.

4.0 FIELD STUDY RESULTS

4.01 The present chapter deals with the results obtained from interviewing individuals and companies through the format/questionnaire. Tables are presented at the end of the report. First five tables deal with the data obtained from individual trainees and the rest 11 tables relate to industrial units.

DATA FROM TRAINEES

4.02 About 50% of the trainees have attended the course on Pesticides Formulation Technology followed by Pesticides Registration and Regulation (Table 1)

4.03 Majority of the trainees have ranked the training programmes organized by the Institute on each subject as very good or excellent. Higher ranking percentage for Instrumental Method of Analysis of Pesticide and their Formulation and subject of pesticide analysis (Table 2).

4.04 Most of the trainees have mentioned that they have benefited by attending the programmes. Half of the trainees who attended the two courses mentioned in para 4.03 has mentioned that they have been highly benefitted (Table 3).

4.05 Trainees were asked to give their views on the cost of training i.e. whether they felt that the training was expensive etc. 80% of the trainees felt that the cost of training was reasonable. Only 20% felt the training was expensive (Table 4).

4.06 It has also been observed during the interviews that 80% of the trainees thought that the Pesticides Development Centre was a Centre of Excellence.

4.07 It is interesting to note that 85% of the trainees felt that the cost of training imparted by the Institute could be increased by at least 20%, 17% of them thought that the increase could be 30% (Table 5)

DATA FROM INDUSTRY

4.08 The number of industrial units interviewed (basic manufacturer/formulators) have been grouped under different sizes in terms of annual turnover. Out of 62 responses, there is fairly an even distribution of units under different size groups (Table 6).

4.09 Out of 62 responses, 58 are formulators. Only 2 are basic manufacturers and 2 are both basic manufacturers as well as formulators (Table 7)

4.10 52% of those interviewed were aware about IPFT/PDC. Except for 4 units in the category of RS. 10-20 crores who were all aware about the Institute, no other category showed cent per cent awareness. There also does not seem to be any relationship between the size of the company and awareness (Table 8). Lack of awareness about the activities of the Institute for all types of industrial units is quite evident form the table.

4.11 Table No. 9 shows that there is a big gap between awareness about the Institute and availing the services of the Institute in some form. While 32 units out of 62 were aware, only 20 units have availed the services of the Institute. Out of the services availed by them, highest percentage (85%) is observed for training followed by analytical services (60%).

4.12 An attempt was made to find out the industry opinion about the services rendered by the Institute. Results are presented in Table 10. Only training seems to have a high (60%) positive opinion. Some of the negative opinions expressed by companies are as follows:

(i) Analysis is good but takes time to send the results.

(ii) Application technology is not very good.

(iii) Trying to avail the services of formulation development but these were not found satisfactory to our requirement.

There appears to be a communication gap between the users and the Institute.

4.13 Cent per cent of those who availed the services of the Institute have mentioned that IPFT was technically and otherwise equipped (Table 11)

4.14 All those who availed the services of the Institute felt that Technically, the Institute was equipped at International standards, 75% of them opined that even on services rendered, the Institute was of international standard (Table 12).

4.15. An attempt was made in the study to find out the views of the Industry on pricing of services rendered by the Institute. Only 10% of those interviewed felt that the prices of services charged by the Institute were high whereas 90% felt that pricing was moderate (Table13).

4.16 We wanted to know from the industry whether they felt that the services charged by the Institute was comparable to similar ones offered by the Private sector of Pesticides Industry or with other industries or with international standards. Results are presented in Table 14. 50% of the responses were that the charges were comparable to the private sector of the pesticides industry. Only 20% thought that the charges were comparable to international standards. 100% of those who thought that charge were not comparable with international standards felt that the charges were lower. Similarly 87% and 73% of them felt that the charges were lower than private sector of the pesticides industry and other industries respectively.

4.17 In order to get an idea whether the industry was prepared to accept an increase in the charges levied by the Institute for different services, opinions were solicited from them. 60% of them felt that, even if the fees are increased by 20% or more, the industry will continue to avail the services/ facilities offered by the Institute. In fact, for R&D, the percentage is even higher at 70%. There is a sizeable percentage (ranging between 25-35%) who felt that the industry will continue to use the services/facilities even if the fees were to increase by 30% or even more (Table 15).

41.8 100% of the industrial units interviewed who have availed the services of the Institute have benefitted or highly benefitted (Table 16). The benefits ranged from confidence building, information/knowledge gathering to commercial benefits in terms of getting license etc.

RECOMMENDATIONS

4.19 A well-designed and well-orchestered publicity campaign is called for in order to increase awareness about the Institute and to bridge the communication gap that seems to exist between the industry and the Institute. The campaign should cover Image Building, Project the facilities and services rendered and the fact that the Institute is a Centre of Excellence of International Standard. A publicity organization of repute may be entrusted with this job.

4.20 Develop niche market for different training programmes depending on the strength of the Institute.

4.21 There is a strong case for increasing the fees/charges levied by the Institute for the services/facilities offered. At the present stage of the development of the Institute, it is recommended to follow DIFFERENTIAL PRICING STRUCTURE. We suggest the following increases over the present rate :

A. Tiny / small scale industries — No change

B. Medium / Large Scale Industry / — Multinational Companies 20% .

C. Foreign Participants — 30%.

5.0 TECHNICAL EVALUATION

IPFT PROJECT OBJECTIVES

5.01 There are 8 (eight) spelt out clear objectives of the Institute. They are :

1. Technology development for the relevant new generation formulations with suitable candidate pesticide system with special emphasis to the use of indigenously developed additives.

2. Need based formulations development for botanical pesticides and biocidal materials and development of suitable quality control methods.

3. Adaptation of new application techniques by interfacing with new pesticide formulations.

4. Continuous education through specialized training programmes for pesticide industry personnel and materials published on technology and new developments in pesticides formulations, including compendium on state-of-the-art equipments for use by pesticide industry.

5. Consultancy services to pesticide industry in India in the areas of custom formulations development, manufacture and project management to provide optimal performance turnkey formulations plants.

6. Analytical services and standards development for new pesticide formulation and their raw materials.

7. Publication of a safety manual for pesticide industry including pollution prevention aspects.

8. A system to be developed to render effective assistance to RENPAP member countries in training, setting up of R&D facilities and developmental studies in different aspects of pesticide formulation and collaborative arrangements developed within the region on the organisation of training programmes and on technology development projects.

5.02 We have already examined objective No. 4 in the earlier chapter. We will examine the rest in this chapter.

TECHNICAL EVALUATION

5.03 OBJECTIVE NO. 1 — Formulation Technology Development Department has successfully developed 3 (three) new and better formulations using indigenous additives of widely used pesticides for commercialization and export by three major companies who sponsored the work. Significant improvements have been made in Endosulfan 50 EC which is in extensive use in India and is also exported. Commendable work has been done in formulation process of Malathion 50 WP, meeting stringent WHO— International standards enabling thereby M/S United Phosphorus Ltd. to export a sizeable quantity of 800 MT. Besides formulation technology development of 10 (ten) better formulations is underway, some of which are already in commercial use in India and a few have export potential.

5.04 Considering the above achievement in this area, the performance against this objective can be rated as HIGHLY SATISFACTORY.

5.05 OBJECTIVE NO. 2 — In case of botanical pesticides, development work is still in exploratory stage and QC method for active ingredients of planned species have yet to be fully developed.

5.06 In Bio-side, a self spreading oil flowable formulation based on Bacillus thuringienris and Bacillus sphericus for surface feeding mosquito larvae has been developed which could be very effectively used for National Malaria Eradication Programme after it is approved.

5.07 Product performance studies with new formulations viz. FP, WP, SC and GR have been initiated.

5.08 Method for analysis of azadarachtin in neem based formulation has been developed by analytical laboratory which has been adopted by the Bureau of Indian Standards (BIS). This is a good work as use of neem based formulations, though recently started, may proved to be very effective and highly demanding. It is however, still in the preliminary stage.

5.09 In view of the fact that the work under this objective is mainly in the exploratory stage, it is rather premature to evaluate the performance. Activities are in the right direction. The Institute, however, must speed up the work in order to establish credibility under this objective.

5.10 OBJECTIVE NO. 3 — Due to resource constraints not much of work has been done in this field. The performance, therefore, is not upto the desired level.

5.11 The Institute has initiated studies of new method of application like Control Droplets Application (CDA) and Ultra Low Volume (ULV) spraying in comparison with conventional methods of application.

5.12 A modern pesticide application technology Laboratory is under creation for both Research & Development and Training. This is a welcome move for its possible utility by the pesticide industry. This will also bring the Institute to a level of Excellence.

5.13 Till such time the modern pesticide application technology Laboratory becomes functional, Institute should pay attention to generation of bio-effecacy data of new better formulation developed/being developed in comparison to commonly used standard materials in which the users (i.e. the industry) would be primarily interested. Also, by commissioning own experimental farm and by laying out field trial in nearby fields, in the mean while, bio-efficacy data for pesticide industry (e.g. Excel Industries Ltd.) against suitable and agreed payment could be taken up for better utilization of facilities, manpower and for generation of funds.

5.14 No sooner residue analysis facilities are ready from bio-efficacy trials of experimental farm as well as of nearby fields, samples for residue determination can also be given to analytical laboratory which in turn, would generate more funds.

5.15 Along with bio-efficacy, studies on hazards / safety in application for highly toxic pesticides could also be taken up involving pesticide industry.

5.16 Considering low level of education of growers in India, usage of conventional manual sprayers/dusters, hand application of highly toxic pesticide granules such as phorate, carbofuran etc. in crops like rice, there is a great need to develop efficient (minimising wastage, drift) and safer application technique and cheap hand operated granule applicators.

5.17 Work on development of affordable appliances by new methods of application like CDA, ULV depending on cost effectiveness, should continue in collaboration with equipment manufacturers.

5.18 OBJECTIVE NO. 5 — The Indian pesticide industry has started actively participating with the Institute. Four (4) large companies (M/s United Phosphorus, M/s Excel Industries, Aimco Pesticides and EID Parry) have sponsored/are sponsoring custom formulation development and are availing of consultancy on their own initiative. A number of other companies have availed of processing facilities and are getting particle size tested. A number of non-pesticide companies have got particle size tested.

5.19 There does not seem to be any involvement of industries from small and medium sector. This is probably because they are not aware of Institute's facilities and services. This is also borne out by field study results.

5.20 Published material and specialized consultancy in upgradation/modernisation, management got optimal performance in case of existing plants and guidance in setting up new modern formulation plants on turn-key basis would be most welcome and will be paid for by the pesticide industry. This merits attention of project management of the Institute.

5.21 Facilities available in pilot plant (some equipments not commonly available with the industry) and formulation technology department are adequate for consultancy. Apart from providing on site consultancy to pesticide industry in scaling up production, solving processing problems in effluent treatment, waste disposal, pollution control and safety in manufacturing hazardous pesticides, pilot plant should also undertake production of new formulation for market seeding/trial for which industry members and even multinational companies are willing to pay stipulated charges. This has a good scope for generating fair amount of funds for the Institute . Besides, samples of effluents form the plants of industry can be taken and suitable treatment suggested which would be useful to them.

5.22 A very good beginning has been made under this objective and the performance is satisfactory. The activity is going to play the most crucial role in future in terms of the Institute's contribution to the pesticide industry.

5.23 OBJECTIVE NO. 6 — Required services are being provided to industry for analysis of formulations, technical grades, determining purity/impurity chemical composition of active materials. By and large, services are satisfactory and recipient industry is satisfied with quality and technical competence etc.

5.24 In absence of awareness of facilities and services, mainly large companies are utilizing them. BIS is also utilizing the services of the Institute in analysis of formulation, new method development and for training of their laboratory people. There is scope to expand these activities.

5.25 Another area which need emphasis is supply of reference technical standards. Except import, the industry has any other reliable source for the same. Hence, this needs to be projected. There is a good case for hike in charges by almost double.

5.26 The institute should augment analysis of air, water and dust samples for BOD, COD and others for pollution control.

5.27 New methods of analysis for three pesticide active ingredients have been developed.

5.28 Good progress has been made in development of several reference technical grade standards as well as collaborative studies with CIPAC, FAO, IAEA, GTZ, RENPAC on international level and with Central Insecticide Laboratory at Faridabad.

5.29 Performance of the Institute under this objective is HIGHLY SATISFACTORY.

5.30 OBJECTIVE NO.7— A Safety Manual for pesticide industry incorporating safety in manufacturing/handling of hazardous materials (very much desired by medium level formulators), in effluent treatment, waste disposal and in preventing air, water, dust pollution is very much welcome by the industry, users and for the nation. The manual is expected to be published shortly. Once published, this objective will be fully met. It will also make a significant contribution to the growth of a safe pesticides industry in the country.

5.31 OBJECTIVE NO. 8 — In view of the Institute's role as technical coordination unit of RENPAP on pesticide formulation development and quality control, it is providing required training for foreign participants from the region in pesticide formulation technology as well as in carrying out collaborative studies with International bodies such as CIPAC, AOSE, FAO, IAEA, GTZ and RENPAC. Performance of the Institute vis-a-vis this objective is HIGHLY SATISFACTORY.

5.32 With augmentation of facilities as suggested the demand for the Institute's facilities and services will grow at a fast rate in countries of South-east Asia, Middle East and Africa.

IMPACT ASSESSMENT IN TERMS OF BENEFITS TO PESTICIDES INDUSTRY AND TO INDIA.

5.33 QUANTITATIVE — Quantitatively the achievements of the Institute are as under :

A. Formulation Technology Development— 16 product/formulation types developed/under development— benefiting 9 pesticides industries — encompassing Agriculture, Health and Rubber Plantation.

B. Botanical pesticides and Bio-Cidal Material —

(1) Standards of bio-assay with reference material made against sensitive insects.

(2) A self spreading oil flowable formulation developed for surface feeding mosquito larvae.

(3) Developed method for analysis of azardarachtin in formulation based on neem.

C. Adaptation of New Application Techniques—

Initiated studies of new methods of application like CDA, ULV, spraying in comparison with conventional method —

D. Training / Continuous Education — The following are the achievement :

(1) Programmes organized —17 —446 perticipants

(2) 4 persons from China each for one month and 2 persons from Iran for 16 days and one from Sri Lanka for one month trained in pesticide formulation technology.

(3) Co-organized International symposium on Industrial Application of Micro Emulsians Technology.

(4) Visit of UNIDO consultant —38 visits organised.

(5) 24 scientists trained abroad under UNIDO fellowship training.

(6) Study tour organized abroad for 9 Indian scientists and Engineers.

(7) 11 foreign nationals from China, Afganisthan, Indonesia, Iran, Sri Lanka trained under UNDP/UNIDO project

E. Consultancy services to Pesticide Industry —23 pesticide industries, including multinationals utilized the consultancy services of the Institute.

F. Analytical Service — (1) Continuously providing analytical services the pesticides industry and BIS. Institute is recognized reference Laboratory by BIS and collaborative Laboratory with CIPAC.

(2) Providing analytical facilities to pesticides industry, CIL, BIS, CIPAC RENPAC, FAO, IAEA and GTZ

G. Safety Manual — Ready for publication.

H. Effective Assistance to RENPAP member countries —

(1) Institute has been assigned the role of technical coordination unit of RENPAP on pesticide formulation development and quality control.

(2) Organized a workshop for RENPAP members — 18 nominees participated.

5.34 QUALITATIVE : (1) India being one of the largest producer in the world of pesticides needed an Institute of Excellence for support, guidance to pesticide industry. The Institute has played a very significant and successful role in this area.. It has put India firmly in Global Pesticide Formulation and R&D map.

(2) It has helped upgrade knowledge of the industry on developments world wide.

(3) Assisted the industry in upgradation and modernisation plants.

(4) It has assisted the industry in promoting exports.

(5) Newer pesticides/formulations available to industry.

(6) By shortly publishing the Safety Manual the Institute will do a great national service.

(7) The Institute is/will be providing knowhow experience to countries of the region, Africa and Arabian countries thereby giving India a leading position.

RECOMMENDATIONS

5.35 The Institute should stress more on environment friendly non-chemical pesticide formulation research and technology development.

5.36 Establish the micro-biological laboratory. If necessary GOI and UNIDO/UNDP may be approached.

5.37 Augment application technology facilities.

5.38 Establish a laboratory for residue/pollution work.

5.39 Finalize print the safety Manual immediately. Price it suitably and give it a very wide coverage.

5.40 To effectively play the role of an institution building project of UNIDO & GOI with international ramifications, all infrastructural facilities may be provided to the Institute by UNIDO/UNDP, GOI, RENPAP and Pesticides Industry.

5.41 UNIDO/UNDP and GOI may have a fresh look at the spelt out Objectives to make it more Industry oriented. This has become necessary in view of deletion of objective no. 7 (shortly) and more industry linked role to be played by Institute. Leading pesticides industry members may be associated in this exercise.

6.0 MARKETING PDC

6.01 We have observed during field study and personal interviews with the industry members, that the level of awareness about the facilities and services offered by the Institute is not very high. This has affected fuller utilisation of the Institute's facilities/services by the small and medium scale industries. In short, the Institute has not reached out to the industry. Marketing of Pesticides Development Centre as a concept/philosophy has not been the strength of the Institute.

6.02 Marketing of a concept and marketing of a commodity are two distinct ball games. Concept marketing needs much more involvement at all levels, mainly the policy level. Concept marketing has been very successfully used in India in the field of Health and Education. Similar endeavour is necessary for marketing the Institute.

6.03 As a first step, it is suggested to have a Brain-storming workshop on the Institute involving the Institute, GOI, UNIDO/UNDP, Pesticides Association of India. CIL, BIS, RENPAP and suitable representatives from pesticides industry (covering each of multi-national, large medium and small companies).

6.04 The Institute should have a Business Development Manager, exclusively meant to undertake this activity. the Business Development Manager should be senior technocrat, well versed in pesticides with a background of industry and marketing. He should have contacts both in industry and related agencies like GOI, International Organization. This should receive a high priority.

6.05 Packaging plays a very crucial role in any marketing operation. Pesticide Packaging is distinct from Consumer Good Packaging. It has all the elements of market-driven packaging requirements including cost effectiveness. It has added dimensions of safety and strength. The Institute should devote time to Research & Development in packaging so that the pesticide industry gets cost effective packaging alternatives.

RECOMMENDATIONS

6.06 A Brain-storming Workshop on the Institute may be organized, sooner the better.

6.07 A Business Development Manager may be appointed immediately.

6.08 The Institute should undertake vigorous R&D to come out with cost-effective packaging alternatives.

7.0 CREDIBILITY AND SELF-SUSTAINABILITY

CREDIBILITY

7.01 We have already observed that the Institute has already established a very fair amount of credibility for the facilities and services offered by it. It has reached to "take-off stage. All that is now necessary is to augment the facilities and services and reach out to the Pesticides Industry with a message of being a Centre of Excellence and being industry-friendly.

SELF-SUSTAINABILITY

7.02 The mandate given to the Institute demands that they carry out both profit and non-profit oriented work. Some fundamental research and development work, as a non-profit activity will continue to be done at the Institute.

7.03 Any organization to sustain or even survive should have a self-financing self-sutstaining mechanism built into it. It is however, recognisd that, at this stage of development and for meeting expansion requirements, fixed investments and also to bring it fully as an International Centre of Excellence, financial back-up by UNIDO/UNDP and GOI should continue for some time and even be stepped up.

7.04 For self-sustainability, the following actions/decisions are necessary.

(1) The Institute is already generating funds by way of making Life Members, Members etc. Efforts should be made to make as many members, Life Members as possible. Membership scheme of the Institute should be reviewed and made more attractive. It is also expected that, with growing awareness about Institute's facilities and services, there will be more of demand among pesticide industry to become member/lifemember of the Institute.

(2) The income generating efforts of the Institute in terms of providing facilities and services to the industry should be stepped up. The Institute should also increase the fees charged at the rates suggested in para 4.21.

(3) The Institute should revise their analytical charges and training fees charged to BIS upwards by around 20% as it is felt that present rates are artificially pegged down.

(4) The Institute should organize Specialised Training Programme in analytical services involving training with sophisticated equipment. The fees charged for the training programme should be 75-100% more than the normal training programme.

(5) Similarly in case charges for finding out impurities of technicals, especially those involving exports, there is a case for a good hike (20-30%) in charges as there is hardly any other laboratory having unique equipment as the Institute.

(6) The consultancy work, both nationally and internationally be stepped up to attract more funds.

7.05 A word of caution is necessary here. The self-sutainability action suggested in para 7.04 should be preceded by the posting of a Business Development Manager and the Publicity Campaign as suggested.

BRINGING THE INSTITUTE TO INTERNATIONAL LEVEL OF EXCELLENCE

7.06 The Institute already has the necessary infrastructure, laboratory facilities, equipment and highly trained and motivated manpower. Scientific competence and certain hardware are close to international standards. By augmenting some of the facilities, as suggested, the Institute can come up to the International level of Excellence sooner than expected.

RECOMMENDATIONS

7.07 The present budgetary support to the Institute by UNIDO/UNDP and GOI should continue and be stepped up to take care of augmentation of facilities and to support non-profit oriented work.

7.08 The Institute should review the present charges/fees and suitably increase them for all kinds of facilities and services rendered by them.

ANNEXURE 1

Terms of Reference

Introduction :

The Government of India during the 1980s wanted to provide assistance to pesticide industries through a R&D centre which could provide the necessary services to the pesticide industry in the latest developments in pesticide formulation technology.Supported by UNDP and assisted by UNIDO an Institute for Pesticide Formulation Technology was established at Gurgaon near Delhi. Being an institution building project it took more than 5 years to establish the Centre train the staff and provide the necessary service to the pesticide industry. The goal is to have a Centre of excellence in pesticide formulation which could be used to serve the national industry and to some extent the regional requirements to promote safety in pestcide development. Based on recent discussions with the Government of India it has been decided to carry out a technical evaluation of the project, assess it impact to industry and find ways and means of further improving the Centre.

Terms of Reference :

The subcontractor initially is expected to assesss the objectives of the project and measure the achievement so far by discussion with the staff, their level of training, and the facilities available. Following the discussion they should also contact the recipients viz the industries as to their response to the Centre. They should analyze both qualitatively and quantitatively the benefits to the country in having such an institution for the benefit of national pesticide industries.

They are expected to develop a questionnaire and send it to relevant people and from the answers received and personal contacts made, should assess the Institue. In this the evaluation should take into account the concept of self sustainability of the Institute and to what extent this is feasible if the Institute was to carry out both profit and nonprofit oriented work.

The evaluation should address the technical capacity of the institute and its credibility to become a Centre of Excellence in the region, and whether or not it has all the elements for such as international standards, marketing, presentation skills, technical excellence etc.

Expertise Required :

The subcontractor should have a team of economist, market specialist, and pesticide expert who are familiar with project management and evaluation. The pesticide specialist should be familiar with pesticide formulation, registration requirements, safety and environmental impact.

Reports:

They are expected to submit an interim report (3 copies) and a draft final report (3 copies). Once cleared by UNIDO they should submit 20 copies of the final report.

Time of evaluation :

The evaluation should start in October 1995 and would last around three months

First Month :

Preparatory work, go through report, preparation of questionnaire, contacting industries and get the answers

Second Month :

Carry out detailed analysis of the facilities, personal interviews with the Institute staff, industry personnel and assess the impact of the institute on national and regional basis

Third Month :

Interpretation of the answers received, conclusions and presentation of the draft report in a meeting and submit the report to UNIDO. After getting the clearance from UNIDO submit the final report.

PROJECT TEAM

PROJECT DIRECTOR : DR. A. K. ROY

CORE TEAM

1. DR. K. N. SHRIVASTAVA — PESTICIDES EXPERT
2. DR. A. K. ROY — ECONOMIST
3. MR. B. M. BHATTACHARYA — MARKET SPECIALIST
4. MR B. MAZUMDAR — MARKET RESEARCH EXECUTIVE

FIELD TEAM :

1. MISS. KEKA DAS — JR. ECONOMIST
2. MR. KUMAR RANA — FIELD SUPERVISOR
3. MR. SOUMYA BANERJEE — FIELD COORDINATOR
4. MISS. ARUPA DAS — FIELD INVESTIGATOR

SYSTEM ANALYST : MR. T. K. GHOSH

ADMINISTRATOR : CAPT. D. K. MOITRA (RETD.)

ANNEXURE 3

CURRICULUM — VITAE

1.	Name	:	DR. ARUN KUMAR ROY
2.	Address (office)	:	CHIEF EXECUTIVE ECONOMIC INFORMATION TECHNOLOGY Flat–6/2, Type 4RB, PURBACHAL HOUSING ESTATE, PHASE–II Sector III, SALT LAKE CALCUTTA 700 091. Phone : (91)-(33)2443861. Fax : (91)-(33)-2443861.
	Address (Permanent)	:	Flat–6/2, Type 4RB, PURBACHAL HOUSING ESTATE, PHASE–II Sector III, SALT LAKE CALCUTTA 700 091. Phone : (91)-(33)3219132.
3.	Date of Birth	:	July 18, 1940
4.	Academic Qualification	:	B.Sc. (Honours) Hons. In Statistics; Physics and Mathematics as subsidiary. Ist Class (71% Marks) form University of Patna in 1959. M.Sc. (Statistics) High IInd Class (59% Marks) from University of Patna in 1961. M.A. (Economics) High IInd Class (57% Marks) from Delhi University in 1967. Ph.D. (Sociology) — Kalyani University (W.B) Thesis "Sociology Implications of Agriculture Modernization in India"
5.	Professional Traning	:	A) PROJECT MANGEMENT Institute of Cost and Works Accontants of India, Calcutta One Week Course covered subjects PERT, CPM, Evaluation, Feasibility Reports, etc. B) MARKETING RESEARCH Fertiliser Association of India. Two Week Course covered theoretical and practical aspects of Marketing Research.

: C) MARKETING MANAGEMENT
Administrative Staff College, Hyderabad.

Four Week Course covered sales and distrubution management,demand forecasting, consumer behaviour MIS, Advertising Management, etc.

D) The International Worksho- on Socio Economic Factors and Soil Erosion conducted by the International Federation of Institute for the Advanced Studies at Wagenigen. The Netherlands September, 1982. Presented a Paper Jointly with Dr. S. Sidhu of I.F.D.C. on Fertilizer Usage and Production of Crops under different Soil Erosion Status.

E) Attended a Project Management Development Course in July, 1987 organised by Agricultural Extension & Rural Develop0ment Centre, University of Reading, U.K., British Council Division and HFC.

6. Faculty member : Have acted as Member of Faculty in the training Programmes conducted by the Fertiliser Association of India, Hindustan Fertilizer Corporation.

7. Experience :

From Sepember 1992 in India : Acting as CHIEF EXECUTIVE of ECONOMIC INFORMATION TECHNOLOGY.

May 1991—August 1992 in India : Acted as Head of Marketing of Bihar State (HFC). Annual turnover is around 3,00,000 tonnes (Rupees Ninety Crores).

1990—April '91 in India : Acted as Head of Marketing of N.E. States (HFC). (Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, Arunachal Pradesh). Annual turn-over is 1,50,000 tonnes (Rupess forty five crores).

1981-89 in India	:	Acted as SPECIALIST (ECONOMICS) in Indo-British Fertilizer Education Project, Monitoring & Evaluation of the Projecet was my responsibility. Also acted as Chief of Marketing Research and Coordination of Hindustan Fertilizer Corporation Limited.
1986 in United Kingdom	:	Invited by the British Government under Colombo plan to visit institutions in U.K. University of Cambridge, University of Newcastle Upon-Tyne, University of Reading.
1984-85 in India	:	Did the Monitoring & Evaluation of Indo-EEC (European Economic Community) Fertilizer Education Project being implemented by National Fertilizer Limited in the State of Uttar Pradesh, Madhya Pradesh and Rajasthan.
1980-83 in India	:	Course Director for the Marketing Training Cum-Visit Programme for trainees from Bangladesh Agricultural Developement Corporation, Government of Bangladesh.
1982 in U.S.A	:	Worked at IFDC (International Fertilizer Development Centre), Muscle Shoals, Alabama, U.S.A. on Fertilizer Demand Adoption Study in India.
1982 in Netherlands	:	Attended the International Workshop on Socio Economic Factors and Soil Erosion conducted by IFIAS (International Federation of Institute for Advanced Studies) at Wageningen.
1982 in Philippines	:	Attended a workshop at Philippine Council for Agriculture and Resource Research, Manila for the International Workshop at Waginengen.
1980-81 in India	:	Prepared a Report on Movement of Fertilizer From Namrup and Haldia through Inland Waterways Transport Corporation for Submission to World Bank. Preappraisal Committee of World Bank, visited India And approved the report.

1978-79 in Rumania	:	Importation of fertilizer from M/s. DANUBIANA;Bucharest under a Global Tender for a project in india with West German collaboration.
1979 in Bangladesh	:	Joint meeting between HFC, IFDC of USA and BARC (Bangladesh Agricultural Research Council on Fertilizer Demand Adoption Study, visited Dacca, Coomilla, Pabna and Chittagon).
1978-79 in West Germany	:	Attended meeting at GTZ at Frankfurt on importation of Fertilizer for the West Germany Project.
1974-79 in India	:	Acted as Marketing Research Specialist in charge of Monitoring & Evaluation of Indo German Fertilizer Educational Project.
1970-74 in India	:	Worked in Fertilizer Corporation of India in the Marketing Research Department.
1968-70 in India	:	On deputation as Economist to Fertilizer association of India, New Delhi on a Project of Fertilizer Demand and Marketing sponsored by USAID.
1965-70 in India	:	Worked as Economist in National Council of Applied Economic Research, New Delhi in the following Projects : a) Structure and Behaviour of Farm Prices in India. b) Effectiveness of Rural Employment in India.
1963-65 in India	:	Worked as Officer in State Bank of Bikaner & Jaipur in different sections like advances,call Loan Market etc. posted in Bomby, Calcutta, Delhi & Jaipur.
8. Publication	:	I have worked in the following two Projects of National Council of Applied Economic Research, New Delhi which have been published. a) Structure and Behaviour of Farm Prices in India.

b) Effectiveness of Rural Employment in India.

Some of the publications in different journals are listed below :

1. "Transport system to sustain increased Consumption"—Fertiliser News, Vol 28, No, 7, July 1983.

2. "Inland Waterways as a means of Fertilizer Transport" Fertilizer News, Vol.31, No.12 December 1986.

3. "Paschimbanga Saar Babahar Sarbaharao Chitra" Saar Samachar (Bengali) July - September 1987 (Silver Jubilee Year).

4. "Looking Ahead fertilizer Scene in Eastern India" Indian Fertilizer Industry Annual Vol. 5, No.5, December 1987.

5. "Fertilizer Use Under Uncertainly" Indian Fertilizer Scene Annual, Vol.1, No.1 December, 1988.

6. "Growth of Fertilizer Industry in India. A look into regional imbalances" — Indian Fertilizer Scene Annual, Vol. 2, December, 1989.

7. "Self Reliance in Indian Fertilizer Industry" THOUGHT, Vol. III, Issue 4, July - September '90.

8. "Anatomy of Fertilizer Marketing in Eighties" Indian Fertilizer Scene Annual, Vol.3, No.3, December 1990.

9. "Emerging Fertilizer Scenario of Nineties" Indian Fertilizer Scene Annual, Vol.4, No.4, December 1991.

10. "Challenges of Fertilizer Marketing in Bihar" Indian Fertilizer Scene Annual, December 1992.

Most of the other works are in Company reports.

ANNEXURE 3

B I O D A T A

Name	:	DR. KAILASH NARAIN SHRIVASTAVA; (K.N.) S/o Late Sri. L.N. SHRIVASTAVA.
Qualifications	:	B.Sc Agri (Entomolgy, P. Pathology, Horticulture, Agronomy/Farm Management , Animal husbandry, Dairy Science, Agril-biology, Chemistry, Economics etc. in 1955
	:	M.Sc. Agri (Horticulture)—Pomology, Olericulture & Floriculture etc. in 1957
	:	Doctorate in Agril. Science — STUTTGART — HOHENHEIM, W. GERMANY in 1962
	:	Thesis on Tomato breading, Horticulture (Major), Plant Protection & Seed Science.
	:	Diploma in Export/Import management (by Correspondence)
	:	L. L. B. (Pre)
	:	Secured I Division High school — 1951, inter (Sc. Bio-Agril) in 1953, B.Sc Agri. 1955, M.Sc. Agri — 1957, Doctorate — 1962.
	:	Merit Scholarship holder throughout from 1952-62.
	:	Got Sole Fellowship of DAAD for advanced studies / Research in W. Germany 1959 (through all India selection)
Languages	:	Can read, Write, Speak — HINDI, ENGLISH, GERMAN (Passed 2 Exams in W. Germany)
	:	Can understand — Bengali, Marathi, Gujrati, little Tamil / Spanish.
Technical	:	PESTICIDE formulation technology/Dev, Q.C., Toxicology, Registration
Training	:	PESTICIDE MARKETING/PD/MD, Safety/Pollution Control etc, W.Germany with Bayer and with Union Carbide U.S.A
	:	Fumigation — Storage pests — M/S De Geseh — W. Germany
	:	Green / Glass houses — Erection, maintenance W. Germay & U.S.A.
	:	PESTICIDE Application Technology (Manual/Tractor mounted Plant Protection equipments, Granude applicators and in aerial application - UCC - U. S. A.
	:	Screening of New Compounds for Pesticidal activity in green /

		glass house, Lab/Field, including Pest/Weed/Test Plant rearing in green houses / labs with Union Carbide USA & in Japan.
Management	:	In house management Courses for PESTICIDEL – MARKETING, BUSINESS – DEV. STRATEGIC / LONG-TERM PLANNING, R&D / REGISTRATION MANUFACTURING (Tech / Formulation, Pilot plant operation, / Effluent treatment / Pollution Control etc in Union Carbide & Shaw Wallace.
Experience	:	Approx 30 years (28 years in Industry & 2 years Teaching / Research.
	:	Unique experience of having managed total PESTICIDE BUSINESS (with Profit/Loss responsibility), all India MARKETING, Imports/Exports, Supervision of MANUFACTURING, R&D Managing PD/MD/REGISTRATION/Businss Development & Govt. Liaison of Pesticides.
	:	Set up R&D Centre at Bhopal, organised PD/MD/Registration in Union Carbide. Streamlined Pesticide. MARKETING of Shaw Wallace & MIL (ensuring turn around - Loss to profit) prepared annual/long range MARKETING / DIVERSIFICATION Plans, R&D Programs, annual PD/MD/Tranining programs in Union Carbide.
	:	Served with Bayer Germany/India 5 years, Union Carbide India 16 Yrs, Shaw Wallace 5 Yrs, MIL 1½ Yrs (Contract) & Coromondel 1 Yr.
Positions held	:	I/c Sales/PD/MD - Northern region - Bayer India Ltd,
	:	I/c Sales/PD/MD - Western, Southern & Central regions - Union Carbide.
	:	Manager PD/Tech Service, Markt Dev. (All India) - Union Carbide.
	:	Manager Biological Research & I/c R&D Centre – Union Carbide.
	:	Manager Business Development (incl. New projects) – Union Carbide.

	:	All India MARKETING Manger (Agril. products) – Union Carbide.
	:	DIVISIONAL Manager – Agrochemicals, Fertilisers, P. P. Equipments – Shaw Wallace.
	:	GENERAL MANAGER OPERATIONS – MIL (Ranbaxy Group)
	:	Resident Director – Coromondel
Exposure to other Agro inputs	:	Fertilizers (chemical, Organic, Biological), P. P. Equipments, Drip Irrigations (Sprinklers), Mushrooms, Seeds & Plastics in Agriculture.
Visits Abroad	:	Have visited Multinationals/ Pesticide Companies of repute in W .Germany, U. K., France Switzerland, Singapore, Hongkong, Phillipines, Indonesia, Thailand, Japan & Egypt. Have visited R&D facilities of certain multinationals in U. S. A., W. Germany & Japan : of Agril Universities in W. Germany, U. K., France, Austria & Holland.
International Seminars/ Workshops	:	Attend on Weed Control in West Germany, Pesticide Registration in Bangkok, Union Carbide Corporation's workshops on Registration in Geneva & USA and their seminars on Pesticide Marketing/Product Development in U. S. A., Indonesia and Hongkong, Seminar at International Rice Research Institute Manila.
Contacts	:	Ministry of Fertilizer/Chemicals, Ministry of Agriculture/Food, BIS (ISI), ICAR, Directorate of Plant Protection, Central Boards of Insecticides and Pollution Control, Registration Committee, IARI/State Agril. Universities, UPASI/TOCKLAI, Deptt. of Science & Technology, NRDC, Central Research Institutes of Sugarcane, Jute, Fruits, Tobacco etc., NCL, RRL, NMEP/NICD, National Dev. Boards of Horticulture, Oildeeds, Toxicology, Labs in India / U. S. A., CFTRI, IRCIRISAT and with most companies handling Pesticides, Drugs, Fertilisers (including Govt. Undertakings), FAI and some companies handling seeds Drip, Irrigation and P. P Equipments.
Extra Curricular Activities Activities	:	I was elected CHAIRMAN OF PESTICIDES ASSOCIATION OF INDIA for 2 terms, VICE CHAIRMAN for 4 terms and DIRECTOR IN Governing Body for several years.

	:	I was member for 2 terms of National Development Council of Chemicals Industry of G. O. I. which reviews, advises, Govt on all important aspects of Pesticides/Certain Chemicals (except Petrochemicals)
	:	Received "Man of the year" (National Agro Scientist) award for 1986 from IBC Delhi.
	:	Have been Director in Board of Directors of Couple of Subsidiary companies of Shaw Wallace & MIL.
	:	Have been Member in several ISI (BIS) Committees dealing with Pesticides, Indian Entomological, Horticultural and Weed Control Societies.
	:	Was Editor of College Magazines during Graduate/Post Graduate Studies.
	:	Have won prizes/Certificates of Proficiency in Hockey, Football, Table Tennis. My hobbies include Chess, Numerology, Club Membership and I am a voracious reader.
	:	I have two cars and drive myself and prefer visit to hill stations.
Marital Status	:	Married with one son aged 21 years. My wife is Reader in a constituent College of Delhi University and is M.A. in Psychology & Philosophy.
Date of Birth	:	26. 01. 1938, physically fit for touring/hardword. I am non smoker, casual social drinks and prefer vegetarian food.
	:	Positive outlook, aptitude for achieving results and for team work.
Address	:	162, Nilgiri Apartment, Alaknanda, New Delhi – 110 019 (G. K. II)
	:	Own accommodation – Tel. No. 6462053
	:	Also have an office set up with typing, Fax tobe installed soon) at above mentioned address alongwith ISD/STD phone.

(Dr. K. N. SHRIVASTAVA)

New Delhi Dated : 20.11.1995

ANNEXURE 3

CURRICULUM – VITAE

Name	:	BRAJA MADHAB BHATTACHARYA
Date of Birth	:	15TH Novembr, 1945.
ADDRESS	:	4 – RB –6/5, Purbachal Housing Estate, Phase –II, Salt Lake, Calcutta – 700 091. Tel No. : 3219170
QUALIFICATION	:	1. M. Sc. (Statistics) from Banaras Hindu University, Varanasi. 2. Post Graduate Diploma in Statistical Quality control & Operations Research from Indian Statistical Institute, Calcutta.
PROFESSIONAL	:	Participated in the "Specialised & Distribution Programme on Logistics of Fertilizer" conducted by The Fertilizer Association of India, New Delhi.
EXPERIENCE	:	Twenty Six (26) years working experience with Marketing Division of Hindustan Fertilizer Corporation Ltd., of which 20 years were devoted in the Market Research Wing. Closely associated with the following studies : a) Evaluation of Fertilizer Promotion Programme of Hindustan Fertilizer Corporation of India. b) Estimation of Effective – Demand of Fertilizers in the Eastern & North Eastern States of India. c) Markt Feasibility of Fertilizers to be produced by Haldia Plant of Hindustan Fertilizer Corporation Ltd. Besides Market Research, was responsible for Marketing activities in the states of West Bengal and Assam. Devoted maximum period of service in Planning, Monitoring, distribution of imported fertilizers handled by Hindustan Fertilizer Corporation Ltd. on behalf of Govt.. of India.

ANNEXURE 3

CURRICULUM – VITAE

Name	:	BHASKAR KISORE MAZUMDER
Date of Birth	:	1st March 1951
Address	:	3/2, Harsha Nath Mukherje Road, Dum Dum Cantonment Calcutta – 700 028
Qualification	:	Passed B.Sc. Math (Hons.) in the year 1970 from University of Dibrugarh, Assam.
Professional Training	:	1. Training in CIM&E and Agril Extension and Applied Statistics from University of Reading U. K. in the year 1987.
		2. Diploma in Marketing Sales and Advertising Management from IIM, Calcutta.
Experience	:	22 years of working experience with Marketing Research Division of Hindustan Fertilizer Corporation Ltd. in the following Interalia Research Studies/Rural Development Projects :
		a) Evaluation of Fertilizer Promotion Progamme of a National Level Fertilizer Company.
		b) Planning and Implementation of an Agricultural Development in the State of West Bengal under German Aid.
		c) Planning and Implementation of an Agricultural Development Programme in the States of West Bengal, Bihar, Assam, Madhya Pradesh, Uttar pradesh, Orissa under British Aid.
		d) Planning and Implementation of an Agricultural Development Program in the States of Rajasthan, Madhya Pradesh, Uttar Pradesh, under European Economic Community.
Publications	:	In Company reports.

COMPILATION OF RECOMMENDATIONS

A. FACILITIES (TECHNICAL)

A. 4.1 Lack of laboratory space is hindering effectiveness of the Institute. Suitable laboratory space needs to be added to house existing laboratory and more laboratories (viz Extra laboratory for residue etc.), GOI may be approached if necessary. (Para 2.12)

A. 4.2 One of the activities which needs to be augmented is the work related to preparation and characterization of certified reference materials used for analysis of pesticide formulation and residue. (Para 2.13)

A. 4.3 Facilities in the field of Application Technology need to be augmented together with more of R&D work in the field. (Para 2.14)

A. 4.4 The Institute should be associated with Central Insecticides Board to assess technological competence and feasibility of the industry before granting license. (Para 2.15)

A. 4.5 It is recommended that GOI may be approached to make "Technology Audit" of the Pesticides Industry compulsory to ensure conformity with safety and other aspects (not toxicity etc). The Institute may be entrusted with this responsibility with a fee suitably fixed between the Institute and GOI. (Para 2.16)

A. 4.6 All out efforts need to be made by the Institute to cut the time to give analysis report. (Para 2.17)

B. HUMAN RESOURCES DEVELOPMENT

A. 4.7 IPFT Technical Committee should meet twice a year. More technically sound persons should be included in the Committee. (Para 3.21)

A. 4.8 A National Project Coordinator should maintain the appropriate rapport with the sectional heads and scientists dealing with the key activity areas of the project. The Institute could have attracted many more sponsored projects from industry had this leadership been of an appropriate level. Government of India may, therefore, consider posting of a highly qualified Pesticides Formulation Specialist of National Standing as the National Project Coordinator of the Institute (Para 3.24).

A. 4.9 Landscaping and designing of the laboratories would need to be done by one of the International Specialists in the field keeping in mind the need for this Institute to attain a truely international character (Para 3.25).

A. 4.10 A good library is a must for the Institute. The library should be fully equipped with state-of-the-art documentation facilities, information technology and communication facilities. (Para 3.22)

A 4.11 Residential accommodation should be provided to key scientific personnel at the site. (Para 3.23)

A. 4.12 The Institute should approach GOI to make training of chemists of the pesticides industry mandatory. The Institute is the most appropriate place for this. (Para 3.24)

A. 4.13 The Institute is short of key man power. Staff strengths should be captive to the Institute and the following should be recruited immediately :

(a) Scientists (number to be determined by the Institute)

(b) A Business Development Manager.

(c) A Training Personnel trained and qualified in training.

(d) A financial Analyst (who will also look after administration) (Para 3.25)

A. 4.14 In order to stop flight of scientists from the Institute, suitable remuneration package may be developed. (Para 3.26)

A. 4.15 The Institute should organize specialised Custom-made Training programme. (Para 3.27)

A. 4.16 The Institute should prepare a compendium on state-of-the-art equipment for pesticides industry. (Para 3.28)

A. 4.17 The Instiute should provide transport facilities to scientists and employees (Para 3.33).

C. FIELD STUDY RESULTS

A. 4.18 A well-designed and well-orchestered publicity campaign is called for in order to increase awareness about the Institute and to bridge the communication gap that seems to exist between the industry and the Institute. The campaign should cover Image Building, Project the facilities and services rendered and the fact that the Institute is a Centre of Excellence of International Standard. A publicity organization of repute may be entrusted with this job. (Para 4.19)

A. 4.19 Develop niche market for different training programmes depending on the strength of the Institute. (Para 4.20)

A. 4.20 There is a strong case for increasing the fees/charges levied by the Institute for the services/facilities offered. At the present stage of the development of the Institute, it is recommended to follow DIFFERENTIAL PRICING STRUCTURE. We suggest the following increases over the present rate :

A. Tiny / small scale industries — No change

B. Medium / Large Scale Industry / Multinational Companies — 20% .

C. Foreign Participants — 30%. (Para 4.21)

D. TECHNICAL EVALUATION

A. 4.21 The Institute should stress more on environment friendly non-chemical pesticide formulation research and technology development. (Para 5.35)

A. 4.22 Establish the micro-biological laboratory. If necessary GOI and UNIDO/ UNDP may be approached. (Para 5.36)

A. 4.23 Augment application technology facilities. (Para 5.37)

A. 4.24 Establish a laboratory for residue/pollution work. (Para 5.38)

A. 4.25 Finalize / print the safety Manual immediately. Price it suitably and give it a very wide coverage. (Para 5.39)

A. 4.26 To effectively play the role of an institution building project of UNIDO & GOI with international ramifications, all infrastructural facilities may be provided to the Institute by UNIDO/UNDP, GOI, RENPAP and Pesticides Industry. (Para 5.40)

A. 4.27 UNIDO/UNDP and GOI may have a fresh look at the spelt-out Objectives to make it more Industry oriented. This has become necessary in view of deletion of objective no. 7 (shortly) and more Industry linked role to be played by Institute. Leading pesticides industry members may be associated in this exercise. (Para 5.41)

E. MARKETING PDC

A. 4.28 A Brain-storming Workshop on the Institute may be organized, sooner the better. (Para 6.06)

A. 4.29 A Business Development Manager may be appointed immediately. (Para 6.07)

A. 4.30 The Institute should undertake vigorous R&D to come out with cost-effective packaging alternatives. (Para 6.08)

F. SUSTAINABILITY

A. 4.31 The present budgetary support to the Institute by UNDIO/UNDP and GOI should continue and be stepped up to take care of augmentation of facilities and to support non-profit oriented work. (Para 7.07)

A. 4.32 The Institute should review the present charges/fees and suitably increase them for all kinds of facilities and services rendered by them. (Para 7.08)

Economic Information Technology
CALCUTTA

TECHNICAL EVALUATION OF PROJECT FOR STRENGTHENING OF PESTICIDE DEVELOPMENT CENTRE IN INDIA (GURGAON)

QUESTIONNAIRE FOR THE INDUSTRY

1.0 **The Company**

1.1 Name of The Company :

1.2 Status :

Govt. undertaking	Co-operative	Public Ltd. Co.	Pvt. Ltd. Co.

Proprietorship

1.3 Address : _____

_____

1.4 Year of establishment :

1.5 Activity : _____

_____

_____

_____

1.6 Product/s of the company with annual capacity :

	Product	**Annual capacity**
1.		
2.		
3.		
4.		

1.7 Annual turnover of the Company : (Rs) _____

1.8. Do you have any collaboration
With a Foreign company ? YES NO

If yes, please name the company :

ABOUT THE INSTITUTE OF PESTICIDE FORMULATION TECHNOLOGY (IPFT), GURGAON.

1.9 Are you aware of the various
Services rendered by IPFT ? **YES / NO**

2.0 Are you availing of the services
rendered by IPFT ? **YES / NO**

2.1 IF Yes, would you please tell us the
services you are availing and rank them
according to their usefulness to you :

	Services	**Rank**
I.		
II.		
III.		
IV.		
V.		

2.2 What is your opinion about each of the services you are availing

	Services	**Opinion**
I.		
II.		
III.		
IV.		
V.		

2.3 Do you think that IPFT is adequately technically and otherwise equipped to cater to the needs of the INDUSTRY / your organisation ? **Yes / No**

2.4 If no to 2.3

(i) Could you please tell us in which areas IPFT needs strengthening ?

(ii) What are your suggestions for improvement in areas where IPFT needs strengthening ?

	AREA	**SUGGESTION**
1.		
2.		
3.		
4.		

2.5 If 'yes' to 2.3

(i) Do you feel that IPFT should give more attention to certain areas for further improvement to meet future requirement of Industry/your organisation ? Yes/No

(ii) If yes, which are the areas and what are your suggestions ?

	Area	**Suggestion**
I.		
II.		
III.		
IV.		
V.		

2.6 Do you think that IPFT is fully equipped to International Standards as a Centre of Excellence ?

(i) Technical Yes/No

(ii) Services rendered Yes/No

2.7. If 'no' to 2.6 would you please tell us what improvement is necessary and in which area to make IPFT a Centre of Excellence of International Standard ?

	Area	**Suggestion**
I.		
II.		
III.		
IV.		

2.8 **Pricing of Services rendered by IPFT**

2.9 For the services of IPFT utilized by you (ref : Q 2.1 & Q 2.2), what is your observation on the fees/charges levied by IPFT ?

Very Low	Low	Moderate	High	Very high

3.0 Are the fees/charges comparable to

a)	Other such facilities available in private sector of Pesticides Industry	Yes/No	If no, is it Lower/Higher
b)	Similar services rendered by other industries	Yes/No	Lower/Higher
c)	International Standards	Yes/No	Lower/Higher

3.1 If the fees/charges are increased, will you continue to avail the services/facilities of IPFT

A) **Research & Development** will continue to avail the services/facilities

a) If fees/charges are increased by 20% Yes/No

b) If fees/charges are increased by 30% Yes/No

c) If fees/charges are increased more than 30% Yes/No

B) **Analytical Services**

a) Yes/No

b) Yes/No

c) Yes/No

C) **Training**

a) Yes/No

b) Yes/No

c) Yes/No

3.2 Benefits received through association with IPFT :

3.3 For the services of IPFT utilised by you, have you been benefitted ? Yes/No

Benefitted	Highly benefitted	Not benefitted

3.4 Can you give the details of the benefits accorded to your company

_____

_____

_____

_____

Economic Information Technology
CALCUTTA

TECHNICAL EVALUATION OF PROJECT FOR
STRENGTHENING OF PESTICIDES DEVELOPMENT CENTRE
(INSTITUTE OF PESTICIDE FORMULATION TECHNOLOGY, GURGAON, INDIA).

Format for Officials already trained at IPFT

1.0 The Individual

1.1 Name :

1.2 Address :

1.3 Designation :

1.4 Name of Employer / Organisation :

1.5 Training Attended at IPFT :

i) a) Subject :

b) Period :

ii) a) Subject :

b) Period :

1.6 The Training

1.7 Do you consider the training received at IPFT.

Excellent

Very good

Good

Moderate

Not Very Good

1.8 Have you been benefitted by attending the training at IPFT ?

a) Highly benefitted

b) Benefitted

c) Not benefitted

1.9 If benefitted, can you tell us the benfits.

1.

2.

3.

2.0 Do you have any suggestions to imporve the training at IPFT ?

1.

2.

3.

2.1 Do you consider IPFT as a Centre of Exellence ? Yes/No

2.2 Cost of Training

2.3 Do you consider the cost of training of IPFT

a) Highly Expensive

b) Expensive

c) Reasonable

d) Highly Reasonable

2.4 Would you think that the Pesticides Industry will continue to sponsor trainees to IPFT if

a) Charges/Fees increased by 20% Yes/No

b) Charges/Fees increased by 30% Yes/No

a) Charges/Fees increased more than 30% Yes/No

Economic Information Technology
CALCUTTA

TECHNICAL EVALUATION OF PROJECT FOR
STRENGTHENING OF PESTICIDES DEVELOPMENT CENTRE
(INSTITUTE OF PESTICIDE FORMULATION TECHNOLOGY, GURGAON, INDIA).

Format for Institutions/Associations

1.0 Institution/Association

1.1 Name of the Institution / Association

1.3 Address :

1.4 Functional Relationship with Institution of Pesticide Formulation Technology (IPFT), Gurgaon :

1.5 About IPFT

1.6 Can you please rank the services rendered/ facilities offered by IPFT :

Services / Facilities	Rank
a)	
b)	
c)	
d)	

1.7. What in your opinion, are the areas in which IPFT needs strengthening ?

a)

b)

C)

d)

1.8 What is your assessment of the contribution of IPFT to the Pesticides Industry ?

a) Highly beneficial

b) Beneficial

c) Not beneficial

1.9. Do you consider the Institute of Pesticide Formulation Technology, Gurgaon as a Centre of Excellence ?

Yes / No.

2.0 SUGGESTIONS

2.1 Can you give your valuable suggestions for effectively improving the performance of IPFT ?

a)

b)

c)

d)

e)

LIST OF ACRONYMS

IPFT	INSTITUTE FOR PESTICIDES FORMULATION TECHNOLOGY
PDC	PESTICIDES DEVELOPMENT CENTRE
GOI	GOVERNMENT OF INDIA
UNIDO	UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANISATION
UNDP	UNITED NATIONS DEVELOPMENT PROGRAMME
CRORE	10^7
Rs. ONE CRORE	≅ $ 2,85,715.

TABLE–1 : SUBJECT- WISE TRAINING ATTENDED

SL. NO.	SUBJECT	NO. OF TRAINEES (%)
1.	PESTICIDES FORMULATION TECHNOLOGY	49
2.	PESTICIDES ANALYSIS	18
3.	PESTICIDES REGISTRATION & REGULATION	21
4.	INSTRUMENTAL METHOD OF ANALYSIS OF PESTICIDES AND THEIR FORMULATION	8
5.	INDUSTRIAL SAFETY, EFFLUENT TREATMENT & PACKAGING IN PESTICIDES FORMULATION INDUSTRY	4

TABLE–2 : SUBJECT-WISE RANKING OF TRAINING

SL. NO.	SUBJECT	RANKING BY TRAINEES (%)				
		EXCELLENT	VERY GOOD	GOOD	MODERATE	NOT VERY GOOD
1.	PESTICIDES FORMULATION TECHNOLOGY	12	38	46	4	—
2.	PESTICIDES ANALYSIS	10	80	10	—	—
3.	PESTICIDES REGISTRATION & REGULATION	—	27	46	27	—
4.	INSTRUMENTAL METHOD OF ANALYSIS OF PESTICIDE AND THEIR FORMULATION	—	100	—	—	—
5.	INDUSTRIAL SAFETY, EFFLUENT TREATMENT & PACKAGING IN PESTICIDES FORMULATION INDUSTRY.	50	50	—	—	—

TABLE–3 : SUBJECT-WISE BENEFITS OF TRAINING

SL. NO.	SUBJECT	BENEFITS OF TRAINEES (%)		
		HIGHLY BENEFITED	BENEFITED	NOT BENEFITED
1.	PESTICIDES FORMULATION TECHNOLOGY	12	88	—
2.	PESTICIDES ANALYSIS	40	60	—
3.	PESTICIDES REGISTRATION & REGULATION	18	73	9
4.	INSTRUMENTAL METHOD OF ANALYSIS OF PESTICIDE AND THEIR FORMULATION	50	50	—
5.	INDUSTRIAL SAFETY, EFFLUENT TREATMENT & PACKAGING IN PESTICIDES FORMULATION INDUSTRY.	—	100	—

TABLE–4 : COST OF TRAINING — VIEWS ON

COST OF TRAINING	NO. OF TRAINEES (%)
HIGHLY EXPENSIVE	—
EXPENSIVE	20
REASONABLE	80
HIGHLY REASONABLE	—

TABLE–5 : VIEWS ON INCREASE – COST OF TRAINING

	NO. OF TRAINEES (%)
INCREASED BY 10%	1
INCREASED BY 20%	68
INCREASED BY 30%	17
INCREASED BY MORE THAN 30%	1

TABLE NO. 6 NUMBER OF INDUSTRIAL UNITS INTERVIEWED

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	COMPANY	
		NO.	%
1.	UPTO Rs. 2 CRORES	15	24
2.	Rs. 2 - 5 CRORES	12	19
3.	Rs. 5 - 10 CRORES	6	10
4.	Rs. 10 - 20 CRORES	10	16
5.	Rs. 20 - 30 CRORES	4	6
6.	Rs. 30 - 50 CRORES	6	10
7.	ABOVE Rs. 50 CRORES	9	15
	TOTAL	62	100

TABLE NO. 7 NUMBER OF INDUSTRIAL UNITS INTERVIEWED BASIC MANUFACTURER / FORMUALTION

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	NUMBER OF INDUSTRIAL UNITS			
		BASIC MANUFACTURERS	FORMUALTORS	BOTH	TOTAL
1.	UPTO Rs. 2 CRORES	—	15	—	15
2.	Rs. 2 - 5 CRORES	—	11	1	12
3.	Rs. 5 - 10 CRORES	—	6	—	6
4.	Rs. 10 - 20 CRORES	1	8	1	10
5.	Rs. 20 - 30 CRORES	—	4	—	4
6.	Rs. 30 - 50 CRORES	—	6	—	6
7.	ABOVE Rs. 50 CRORES	1	8	—	9
	TOTAL	2	58	2	62

TABLE NO. 8 AWARENESS ABOUT IPFT / PDC

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	AWARENESS ABOUT IPFT / PDC (%)	
1.	UPTO Rs. 2 CRORES	7	(1)
2.	Rs. 2 - 5 CRORES	67	(8)
3.	Rs. 5 - 10 CRORES	50	(3)
4.	Rs. 10 - 20 CRORES	70	(7)
5.	Rs. 20 - 30 CRORES	100	(4)
6.	Rs. 30 - 50 CRORES	50	(3)
7.	ABOVE Rs. 50 CRORES	67	(6)
	TOTAL	52	(32)

[Figure within bracket indicate number of companies]

TABLE NO. 9 AVAILING THE SERVICES FORM IPFT / PDC

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	SERVICES (%)					AVAILING THE SERVICES (%)
		R&D	ANALYTICAL	TRAINING	FORMUALTION	PACKAGING	
1.	UPTO Rs. 2 CRORES	—	—	—	—	—	—
2.	Rs. 2 - 5 CRORES	—	50 (2)	75 (3)	25 (1)	—	33 (4)
3.	Rs. 5 - 10 CRORES	50 (1)	50 (1)	100 (2)	50 (1)	100 (2)	33 (2)
4.	Rs. 10 - 20 CRORES	50 (2)	75 (3)	50 (2)	50 (2)	—	40 (4)
5.	Rs. 20 - 30 CRORES	33 (1)	33 (1)	100 (3)	100 (3)	33 (1)	75 (3)
6.	Rs. 30 - 50 CRORES	—	100 (2)	100 (2)	—	—	33 (2)
7.	ABOVE Rs. 50 CRORES	40 (2)	60 (3)	100 (5)	—	20 (1)	55 (5)
	TOTAL	30 (6)	60 (12)	85 (17)	35 (7)	20 (4)	32 (20)

[Figure within bracket indicate number of companies]

TABLE NO. 10 POSITIVE OPINION ABOUT SERVICES

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	POSITIVE OPINION ABOUT (%)					NO OPINION ABOUT SERVICES (%)
		R&D	ANALYTICAL	TRAINING	FORMUALTION	PACKAGING	
1.	UPTO Rs. 2 CRORES	—	—	—	—	—	—
2.	Rs. 2 - 5 CRORES	25 (1)	25 (1)	50 (2)	—	—	—
3.	Rs. 5 - 10 CRORES	—	—	50 (1)	—	50 (1)	50 (1)
4.	Rs. 10 - 20 CRORES	25 (1)	50 (2)	25 (1)	25 (1)	—	25 (1)
5.	Rs. 20 - 30 CRORES	—	33 (1)	100 (3)	67 (2)	33 (1)	—
6.	Rs. 30 - 50 CRORES	50 (1)	100 (2)	100 (2)	—	—	—
7.	ABOVE Rs. 50 CRORES		20 (1)	60 (3)	—	20 (1)	40(2)
	TOTAL	15 (3)	35 (7)	60(12)	15(3)	15(3)	20 (4)

[Figure within bracket indicate number of companies]

TABLE NO. 11 IPFT TECHNICALLY EQUIPPED — VIEWS ON

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	IPFT EQUIPPED TECHNICALLY & OTHERWISE (%)
1.	UPTO Rs. 2 CRORES	—
2.	Rs. 2 - 5 CRORES	100 (4)
3.	Rs. 5 - 10 CRORES	100 (2)
4.	Rs. 10 - 20 CRORES	100 (4)
5.	Rs. 20 - 30 CRORES	100 (3)
6.	Rs. 30 - 50 CRORES	100 (2)
7.	ABOVE Rs. 50 CRORES	100 (5)
	TOTAL	100 (20)

[Figure within bracket indicate number of companies]

TABLE NO. 12 IPFT EQUIPPED AT INTERNATIONAL STANDARD — VIEWS ON

SI NO.	SIZE OF COMPANY (IN TERMS OF ANNUAL TURNOVER)	IPFT EQUIPPED	
		TECHNICAL (%)	SERVICES RENDERED (%)
1.	UPTO Rs. 2 CRORES	—	—
2.	Rs. 2 - 5 CRORES	100 (4)	75 (3)
3.	Rs. 5 - 10 CRORES	100 (2)	100 (2)
4.	Rs. 10 - 20 CRORES	100 (4)	50 (2)
5.	Rs. 20 - 30 CRORES	100 (3)	100 (3)
6.	Rs. 30 - 50 CRORES	100 (2)	100 (2)
7.	ABOVE Rs. 50 CRORES	100 (5)	60 (3)
	TOTAL	100 (20)	75 (15)

[Figure within bracket indicate number of companies]

TABLE NO. 13 PRICING OF SERVICES RENDERED BY IPFT — VIEWS ON

SI NO.	FEES CHARGED	NO. OF COMPANY (%)
1.	VERY LOW	
2.	LOW	
3.	MODERATE	90 (18)
4.	HIGH	10 (2)
5.	VERY HIGH	

[Figure within bracket indicate number of companies availing the service]

TABLE NO. 14 COMPARABILITY OF CHARGES — VIEWS ON

SI NO.	FACTORS	YES (%)	NO OPINION (%)	NUMBER OF COMPANY	
				LOWER %	HIGHER %
1.	PRIVATE SECTOR OF PESTICIDE INDUSTRY	50 (10)	10 (2)	87 (7)	13 (1)
2.	WITH OTHER INDUSTIRES	35 (7)	10 (2)	73 (8)	27 (3)
3.	WITH INTERNATIONAL STANDARDS	20 (4)	25 (5)	100 (11)	—

[Figure within bracket indicate number of companies availing the services]

TABLE NO. 15 INCREASE IN FEES — VIEWS ON

SI NO.	INCREASING FEES	CONTINUATION OF AVAILING SRVICES / FACILITIES		
		R&D	ANALYTICAL	TRAINING
1.	INCREASED BY 20 %	35 (7)	25 (5)	35 (7)
2.	INCREASED BY 30 %	15 (3)	20 (4)	5 (1)
3.	INCREASED MORE THAN 30 %	20 (4)	15 (3)	20 (4)

[Figure within bracket indicate number of companies availing the services]

TABLE NO. 16 BENEFITS RECEIVED

Sl NO.	BENEFIT RECEIVED	NO. OF COMPANY (%)
1.	HIGHLY BENEFITTED	20 (4)
2.	BENEFITTED	80 (16)
3.	NOT BENEFITTED	—

[Figure within bracket indicate per centage based on units availing the services]

APPENDIX - I (A)

LIST OF OFFICIALS CONTACTED

BY PESTICIDES EXPERT OF ECONOMIC INFORMATION TECHNOLOGY

Sl.	Organisation	Name and Designation
1.	Untied phosphorus C . D . Marg Khar (W) Bombay	Shri Rajju Shroff Chairman and Managing Director
2.	Gharda Chemicals Ltd. Bombay	Dr. Gharda, Chairman & Managing Director
3.	Excel Industires Ltd., Bombay	Shri N.D. Gupta Vice-President (Marketing)
4.	Excel Industires Ltd., Bombay	Shri S. P. Iyer General Manager (Marketing)
5.	Excel Industires Ltd., Bombay	Dr. P. R. Sharma, Ex Director (Marketing) & Presently Adviser
6.	Sulphur Mills Ltd., Bombay	Shri Deepak P. Shah Chairman & Managing Director
7.	Kanoria Chemicals and Industires Ltd.	Dr. M. G. Srivastava Adviser (Pesticides)
8.	AIMCO, Bombay	Shri Pradeep Dave, Managing Director and President, Pesticides Formulators Association of India.
9.	EID parry (India) Ltd. Madras	Shri Ranjit Dutta, Adviser (Pesticides)
10.	Rallis India Ltd. Bombay	Shri M. L. Shah Vice-president (Pesticides Division)
11.	Rallis India Ltd. Bombay	Dr. Brija Shankar
12.	Rallis India Ltd. Bombay	Shri S. V. Datye
13.	I. O. C. Faridabad	Dr. A. K. Bhatnagar. Director (R & D Division)
14.	Montari Industries Ltd. Chandigarh	Shri S. Kumar Vice-president

15.	Shaw Wallace & Co. Ltd.	Shri K. S. Apiah Vice-President (Pesticides)
16.	Hoechest Schering Agor Evo Ltd. Bombay	Dr. K. K. Unni-Managing Director
17.	Hoechest Schering Agor Evo Ltd. Bombay	Shri V. R. Menon-General Manager (Dev)
18.	Pesticides India, Udaipur	Shri Salil Singhal Managing Director & Chairman, Pesticides Association of India
19.	Pesticides Association India New Delhi	Shri S. C. Mathur Executive Director
20.	Pesticides Association India New Delhi	Shri H. S. Bahl Secretary
21.	Pesticides Formualtors Association of India, Delhi	Shri A. M. Singh Executive Director
22.	National Oilseeds & Vegetable Oil Dev. Board, Gurgaon	Dr. R. L. Rajak Executive Director (Ex-Plant Protection Advisor G. O. I. and Secratary Member of Registration Committee)
23.	Director of Plant protection, Qurantive & Storage, Faridabad	Dr. Ragunathan Plant protection Advisor, G. O. I.
24.	Central Insecticides Lab of Registration Committee, Faridabad	Shri V. C. Vhargava Senior Jt. Director
25.	Dt. of PPQ & S. Faridabad	Dr. Pawar Secretary, RC and CIB.
26.	I. A. R. I. New Delhi	DR. S. K. Handa Project Coordinator Division of Agrl. Chemicals.
27.	Bureau of Indian Standards, Delhi	Shri D. S. Ahluwalia Dy. Director General (Lab.)
28.	Bureau of Indian Standards, Delhi	Shri J. C. Gera Director (Training)
29.	Bureau of Indian Standards, Delhi	Shri Kaussal Kumar Dy. Director (I S Standards)

30.	Shri Ram Test House, Delhi	Dr. Dhingra
31.	Agchem Consultants and Techno Services, New Delhi	Shri Raj Kumar Singh Director
32.	Gupta Chemicals Ltd. Jaipur	Shri B. L. Gupta Managing Director
33.	Pesticides Industries, Ahmedabad	Shri Ganga Sahay Pathak Proprietor & Managing Director
34.	Vimal Pesticides Pvt. Ltd. Ahmedabad	Shri M. L. Rami Proprietor & Managing Director
35.	Agrimas Chemicals Ltd. Bombay	Shri S. R. Sreenivasa Managing Director
36.	Voltas Ltd. Secundrabad	Shri T. K. K. Krishan Executive Vice President
37.	Kanoria Chemicals & Industries Ltd.	Shri U. S. Baid President, Renukot Div.
38.	Dhanuka Pesticides, Delhi	Shri R. G. Agarwal Chairman
39.	Motilal Pesticides (I) Pvt. Ltd. New Delhi	Shri V. P. Goel Managing Director
40.	Unique form Aid Pvt; Ltd. New Delhi	Dr. P. D. Garg Director (Technical)
41.	Crop Health Products (P) Ltd. Ghaziabad	Shri Sabharwal Managing Director
42.	Lupin Agrochemicals (India) Ltd., Bombay	Shri S. K. Banerjee Sr. Technical Services Manager
43.	Rohm & Haas (India) Pvt. Ltd. New Delhi	Dr. V. L. Patil R & D Manager (Agro Chemical)
44.	MJ Export Ltd. New Delhi	Shri Maharaj K Zutshi Chief Executive —Agri Business
45.	Indo Gulf Fertilizer & Chemical Corporation Ltd. New Delhi	Dr. Romendra Singh Sr. Manager.
46.	I. F. F. Co. New Delhi	Shri Umesh Mathur Sr. Manager (Agrl. Products)
47.	Septu India Pvt. Ltd. Gurgaon	Shri Atri General Manager.

LIST OF INDUSTIRES INTERVIEWED

NAME OF THE INDUSTRY

South Zone

1. E. I. D. Parry Ltd.,
   Dare House, Madras.
2. Madhusudan Industries,
   Madras.
3. Omega Agro,
   Hyderabad.
4. Purnima Industries,
   Andhra Pradesh.
5. Food & Allied Products,
   Vijayawada.
6. Mysore Insecticides Co. Pvt. Ltd.,
   Madras.
7. D. M. S. Chemicals,
   Hyderabad.
8. Venkateswara Agro Chemicals & Minerals,
   Madras.
9. Tropical Agor Systems Ltd.,
   Madras.
10. Dr. Sarup's Pest Control (P) Ltd.,
    Hyderabad.
11. Siris India Ltd.,
    Hyderabad.
12. Plagro Technologies Ltd.,
    Madras.
13. Vayaz India Pesticides Ltd.,
    Madras.
14. Southern Pesticides Corporation Ltd.,
    Hyderabad.

15. Agro Chemical Industires,
Madras

16. M/s. Bhaskar Agro Chemical Ltd.,
Hyderabad.

17. Hyderabad Chemicals Supplies Pvt. Ltd.,
Hyderabad.

18. Tuticorin Alkali Chemicals & Fert. Ltd.
Madras.

19. Andhra Pradesh State Industrial Corpn. Ltd.
Hyderabad.

20. Tamil Nadu Agro Industries Corpn. Ltd.,
Madras.

West Zone

1. Sumex Chemicals Ltd.,
Bombay

2. Paushak Ltd.
Baroda.

3. Vitlaz Agri. Chem. Industries,
Baroda.

4. S. M. P. Pvt. Ltd.,
Bombay.

5. Ashoka pesticides
Baroda.

6. Amba Chemicals,
Baroda.

7. Kedia Chemicals
Bombay

8. Devidayal Sales Pvt. Ltd.,
Bombay.

9. Chemtar Organics Pvt. Ltd.
Baroda.

10. Camphor.
Bombay.

11. All India Medical Corporation
Bombay.

12. Exxon Chemicals Eastern Ltd.
Bombay.

13. Cynamide India Ltd.,
Valsad (Gujarat)

14. Indian Farmers Fertilizers,
Co-Operative Ltd.,
Gandhinagar.

15. M/s. Super Industries,
Ahmedabad.

16. Sulphur Nills Ltd.
Bombay.

17. Pest Control (India) Ltd.,
Bombay.

18. Searle (I) Ltd.,
Gujarat.

19. Untied Phosphorus,
Ankleshwar.

North Zone

1. Hindustahn Pulverising Mills
New Dehli

2. Bharat Rasayan Limited.
New Delhi

3. Pesto Chem
Delhi

4. Micro Agro Chemicals,
Roorkie Road,
Muzaffarnagar

5. Raja Sulphur Industries
953, Sector-15
Faridabad

6. Aarti Graphite (P) Ltd.
Delhi

7. M/s. Motilal Pesticides (India) Pvt. Ltd.
Mathura

8. Gayatri Industries Ltd.
New Delhi

9. Motilal Pesticides (India) Pvt. Ltd.
New Delhi

10. Shiv Shakti Pipe Industires,
Muzaffarnagar

11. Crop Health Products Ltd.
Ghaziabad. (UP)

12. Northern Mineral Ltd.
New Delhi

East Zone

1. B. D. Khaitan & Co.
Calcutta

2. Esser Synthetic Pvt. Ltd.
Calcutta

3. Sur Chemicals
Calcutta

4. Central Engineering Syndicate,
Calcutta

5. Ankar Industries Pvt. Ltd.
Calcutta

6. Dr. Sarup's Pest Control
Calcutta

7. Shaw Wallace & Co. Ltd.
   Midnapore, West Bengal.

8. Rashi Fertilzers
   Calcutta

9. Kanoria Chemicals
   Calcutta

10. Swarup Chemicals (P) Ltd.
    Lucknow.

11. India Pesticides Ltd.
    Lucknow.

APPENDIX - I (C)

LIST OF TRAINEES INTERVIEWED

BY ECONOMIC INFORMATION TECHNOLOGY

SL.	Name of the Orgrnisation	Name & Designation
1.	SPIC Ltd. Madras	Dr. C. Kandaswamy Chief Manager (Technical Dept.)
2.	Bureau of Indian Standards Mardras	Mr. P. D. Kumar Sr. Technical Assistant
3.	Bureau of Indian Standards Bombay	Mr. V. Gopinath Asstt. Director
4.	Hoechst Schering Agro Ankeleshwar	Mr. D. V. Eshwaran Manager (Formulation Development)
5.	Rhone Poulenc Bombay	Mr. Sandeep Gadre Product Manager
6.	Bureau of Indian Standards Andheri	Mr. S. G. kanoji Technical Asstt.
7.	Bureau of Indian Standards Bangalore	Mr. G. Harinath Reddy Technical Asstt.
8.	Bureau of Indian Standards Bangalore	Mr. T. V. Reddy Senior Technical Asstt.
9.	Rallis (India) Ltd. Bombay	Mr. S. V. Datye Sr. Manager, Formulation Development
10.	Godrej Soaps Ltd. New Delhi	Mr. A. G. Tewari Dy. Manager
11.	Bureau of Indian Standards Calcutta	Mr. Niloy Baran Chakraborty Technical Asstt.
12.	Bureau of Indian Standards Patna	Mr. M. D. Singh Sr. Technical Asstt.
13.	Bureau of Indian Standards New Delhi	Mr. K. S. Balagopal Tecnical Supervisor
14.	United Phosphorus Ankleswar	Mr. L. P. Gupta Dy. Manager
15.	Bureau of Indian Standards Bombay	Mr. Oguri Veeraiah Sr. Technical Assistant
16.	BAYER (INDIA) LTD New Delhi	Mr. R. D. Kapoor Registration & Biological Development Manager.

17.	MAIDC Ltd.	Mr. G. M. Bandawar Manager (Fert)
18.	Hoechst India Ltd.	Mr. Girish S. Verma Quality Assurance Officer
19.	M/s. TAC Fertilizers Ltd. Trichy	Mr. G. Rama Moorthy Senior Tecnician
20.	Bureau of Indian Standards Calcutta	Mr. K. C. Santra Dy. Director
21.	M/s. Kanoria Chemical & Ind. Ltd. U. P.	Mr. R. S. Baghel Dy. Manager (Laboratory)
22.	Maharasthra Insecticides Ltd. Akola	Mr. Chandrakant Vankatest Jawaharka Chief Executive
23.	Bureau of Indian Standards New Delhi - 2	Mr. P.K. Sarkar Addl. Director
24.	Bayer (India) Ltd.	Mr. R. D. Kapoor Registration & Biological Dev. Manager.
25.	Hindusthan Ciba Geigy Bombay	Dr. V. R. Ranade Executive
26.	Bureau of Indian Standards Mohali	Mr. Sanjeev A. Shome Tech. Asstt.
27.	Bureau of Indian Standards Calcutta	Mr. Suhas Chandra Jana Tech Supervisor
28.	Indo Gulf Fert. & Chemicals Muzaffar Nagar	Mr. Lalit Krishna Singh Asstt. Manager (Pesticides)
29.	Rallis India Ltd. Bangalore	Dr. G. Shankar Head, Dept. of Entomology
30.	Untied Phosphorus	Mr. Amul Desai Manager (R & D)
31.	Ulhas Oil & Chemical Industries Pvt. Ltd. Thane	Mr. N. R. Singh Factory Manager
32.	India Pesticides Ltd. Lucknow	Dr. A . Bhatnagar Chemist
33.	Ayyappa Agro Chemicals Pollachi	Mr. K. Senthil Kumar

34.	M/s. Untied Phosphorus Ltd. Bombay	Mr. Manohar M. Masurkar G. M. (Projects)
35.	Hochest Schering Agro Evo Ltd. Ankeleswar	Mr. Biren Patel Executive Agro Formulation & E. H. Prod.
36.	Searle India Ltd.	Mr. S. E. Bhoge Formualation manager
37.	Hochest India Ltd.	Mr. Girish Sonna Sr. Executive
38.	Hochest India Ltd. Gujarat	Mr. N. D. Ravat Asstt. Manager
39.	India Pesticides Ltd. Lucknow	Dr. A. Bhatnagar Chemist
40.	E. I. D. Parry (I) Ltd. Madras	Dr. R. Senrayan Dy. Manager
41.	Indo Gulf Fertilizers New Delhi	Dr. Ramendra Singh G M. (As)
42.	M/s. A. V. Thomas & Co. Ltd., Tamilnadu	Mr. T. Kutralingam Asstt. Manager (Production)
43.	United Phosphorus Ltd. New Delhi	Mr. Amitava Sanyal Reg. Executive
44.	Rallis India Ltd. Bangalore	Dr. Yogesh Kumar Scientific Officer
45.	Environment Protection Training & Research Institute, Hyderabad	Mr. G. Suryanaryana Faculty
46.	Hindusthan Pulverising Mills	Mr. Rajesh Agarwal Director (Operation)
47.	Montari Industries Ltd. Chandigarh	Mr. Vineet Bhushan Asstt. Manager, Analytical Development
48.	Dhanuka Agri Research Centre Gurgaon	Dr. T. P. S. Teotia Chief Entomologist
49.	Denocil Crop. Protection Ltd., Bombay	Mr. M. K. Rajendra Entomologist

50.	Rhome-Poelene Agro Chemicals Bombay	Mr. Purushottam Ramkrishan Tiwari Asstt. Manager (Quality Control)
51.	Krishan Bio-Tech Pvt; Ltd. Gujarat	Mr. Jayesh M. Ghetia Director
52.	United Phosphorus Ltd. Gujarat	Dr. R. N. Patel Chief Manager.
53.	N O C I L	Mr. Satish V. Joshi Process Engg. Officer.