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**Final Report**

Workshop on  
Combinatorial Technologies – Awareness and Familiarisation for  
Decision Makers  
**October 23-24, 1998**

and

Training Workshop on Methods Applications & Economics of  
Combinatorial Chemistry and Combinatorial Technology

**October 26-31, 1998**

UNIDO Project No. TF/GLO/96/105

Contract No. 98/229

Council of Scientific and Industrial Research, New Delhi, India

## INTRODUCTION

New developments in drug discovery technology have dramatically increased the productivity of the drug discovery process. Recent advances in molecular biology and genetic engineering have enhanced the basic understanding of human physiology and the biological action of drugs on cell receptors and proteins. As a result, scientists can now design an 'ideal' compound that is expected to counteract the undesired state and chemists can then synthesize molecules with characteristics as close as possible to the 'ideal' compound. New tools such as combinatorial chemistry, structure based molecular design and high throughput screening have revolutionized the drug discovery. This increasing 'scientification' of drug research encourages a division of labour amongst agents specialised in different segments of the innovation chain i.e. basic biomedical research, chemical synthesis, process development, clinical testing etc. Thus networking and coordination amongst different components of the innovation chain is not only necessary but imperative in order to bring down the time and costs of new drug discovery and its introduction.

It is accepted that both molecular modelling and combinatorial chemistry/ technology are powerful tools for the implementation of a country's capabilities in new drug development, necessary to equip developing countries for market competition. The above considerations are reinforced by the fact that many developing countries have large potentials in terms of natural resources, currently well below full exploitation. India as well as its neighboring countries in the region are entering into the area of new drug development. Thus it is an ideal time for involvement of combinatorial technologies and SBMD in the effort. Further CC/CT and SBMD represents a modern approach with low investment and is therefore applicable in R&D institutions and industries (even small and medium) in developing countries. CSIR with its wide contacts in industry and government is ideally placed to bring together the various players in the 'innovation chain' of new drug development including training of researchers in the new tools and techniques.

Accordingly, CSIR (India) in cooperation and association with ICS-UNIDO organised two Workshops on CC/CT in India in late October 1998 viz.:

- i. A two day Workshop on "Combinatorial Technologies – Awareness and Familiarization for Decision Makers": October 23-24, 1998.

- ii. A six day training Workshop on “Methods, Applications and Economics of Combinatorial Chemistry and Combinatorial Technology”: October 26-31, 1998.

## **OBJECTIVE**

The objective of these Workshops therefore were:

- To build awareness on industrial applications of CC/CT
- To advance the scientific and technological level of participants in the field of combinatorial chemistry/Technology
- To provide the course participants with basic training and information in this field which represents a modern approach with low investment and is therefore applicable in R&D institutions and industries (even small and medium) in developing countries
- To identify regional R&D institutions in developing countries through contacts established with the participants in the training course to create regional network on CC/CT
- To evaluate possible follow up project proposals and feasibility studies under ICS coordination

## **ORGANISATION**

The Workshops were jointly organised by the International Centre for Science and High Technology (ICS) and Council of Scientific and Industrial Research (CSIR), New Delhi.

The local organizers were:

Dr. H.R. Bhojwani

Dr. K.V. Raghavan

Dr. J.S. Yadav

Dr. D. Yogeswara Rao

For advising on the Scientific contents of the programme, a scientific committee was constituted which comprised of local and international scientists. The composition of the Committee was as follows:

Dr. H.R. Bhojwani (CSIR, New Delhi)

Prof. Stanislav Miertus (ICS, Trieste, Italy)

Dr. G. Fassina (Technogen, Italy)

Dr. J.S. Yadav (IICT, Hyderabad)

Dr. M.K. Gurjar (NCL, Pune)

Dr. D. Yogeswara Rao (CSIR, New Delhi)

## **VENUE, DATES AND FACILITIES**

The two Workshops were held consecutively at Indian Institute of Chemical Technology (IICT), Hyderabad a constituent laboratory of CSIR from 23<sup>rd</sup> to 31<sup>st</sup> October 1998. The excellent conference facilities of the IICT were made available for the lectures. Besides the institute's laboratory as well as combinatorial chemistry facilities were used for experimental and demonstration purposes. The molecular modelling facilities were also made available to participants. Dr. K.V. Raghavan, Director of the institute had acted as the host for the entire programme and spared no effort in successfully conducting the programmes.

## **FUNDING**

The expenditure in organising the programmes were shared between ICS-UNIDO and India. The Indian part of the expenditure was shared between CSIR and Department of Science and Technology. ICS-UNIDO support was to the extent of 50% of the total expenditure and basically to meet the expenditure of the international participants and resource persons. An initial contribution of US \$ 26,000 was received from UNIDO. IICT, Hyderabad had provided the logistic support for organising the workshop besides the facilities for lectures, demonstration etc. A summary of the final expenditure of the ICS – UNIDO component is given in Appendix I.

Actual total expenditure of ICS-UNIDO component was 18,705 USD. The saving was due to cheaper tickets and lodging & boarding expenses than originally estimated. The balance is going to be sent to UNIDO account.

## **LECTURES**

**1<sup>st</sup> Programme - "Combinatorial Technologies – Awareness and Familiarization for Decision Makers": October 23-24, 1998.**

The first programme was basically aimed at sensitizing the decision-makers in government, R&D institutions and pharma industry on the application and economics of combinatorial chemistry and its importance in new drug development. Accordingly the programme was interlaced with 6 lectures, 3 case studies and 2 round table discussions. Details of the programme is given in Appendix – 2. A total of 6 experts, 4 from international and 2 from national were the main resource persons and presented the lectures as well as relevant case studies. The round table discussions were chaired by Prof. R. Kumar, an eminent academician in Chemical Engineering. Resource persons came from both industrial and academic institutions. Indeed 3 of the 4 international speakers were from industry. While the lectures covered the intricacies and importance of combinatorial chemistry, the case studies presented the practical applications of these modern tools and was 'the icing on the cake'. A complete list of resource persons is given in the Appendix – 3. All the out-station lecturers were fully sponsored (airfare, living expenses and accommodation).

**2<sup>nd</sup> Programme - "Methods, Applications and Economics of Combinatorial Chemistry and Combinatorial Technology": October 26-31, 1998.**

The programme was a structured training programme intended to provide the necessary knowledge and skills in CC/CT for scientists in the industry, academia and industry oriented research institutions. Accordingly the programme was organised with lectures, case studies and demonstration exercises, besides providing sufficient time for the participants to interact with the faculty. A detailed programme schedule is enclosed at Appendix – 4. The resource persons for the training programme was largely drawn from abroad. The complete list of faculty was given in Appendix-5. A total of 28 lectures including case studies as well as demonstrations were presented. The experts were largely drawn from industry from abroad. In addition Prof. S. Miertus gave a talk on the activities of ICS-UNIDO at the beginning of the training programme for the benefit of the participants. The lectures covered a wide spectrum of topics concerning combinatorial chemistry viz.

- combinatorial approaches: field of application;
- information technology, chemical databases, software tools;
- solid phase synthesis of libraries;
- screening and deconvolution;

- biological methods for library preparation;
- biopanning
- medium/high throughput screening;
- data handling of M/HTS etc.

All the 5 outstation faculty members were fully supported (airfare, living expenses and accommodation)

## **PARTICIPANTS**

The organizers solicited applications via special letters/flyers posted to industrial enterprises and institutions within India and outside the country (Bangladesh, Nepal, Sri Lanka, Malaysia, Philippines, Indonesia, South Africa and Saudi Arabia). Whilst the first programme was earmarked for senior level decision making officials, the training programme was open for active research workers irrespective of their level. The local organising committee in constitution with ICS-UNIDO selected the participants. Geographical distribution and the institutional distribution of participants for both the programme are shown in table 1 and 2 respectively. Indeed most of the participants were from industry or industry oriented research institutions. The list of the participants for both the programmes are shown in Appendix – 6&7. The international participants as well as some of the Indian participants particularly from Academic institutions were fully sponsored (airfare, living expenses and accommodation). All the outstation Indian participants were fully supported for living expenses and accommodation. All the participants including local were sponsored on all social activities and meals related to the workshop.

**Table I**  
**Programme I**

<b>Geographical distribution of participants</b>	
<b>Country</b>	<b>Number of participants</b>
Bangladesh	1
Malaysia	1
South Africa	1
ICS-UNIDO	1 (faculty)
Italy	3 (faculty)
UK	1 (faculty)
India	27 (including faculty)

Institutional Distribution of Participants	
Institutional Type	Number of participants
Academic	8 (including 2 faculty)
Industrial	10 (including 3 faculty)
Industrially oriented Research Inst.	14 (including one faculty)
Government officials	2
ICS-UNIDO official	1

## Programme 2

Geographical Distribution of Participants	
Country	Number of Participants
Bangladesh	1
Malaysia	2
Philippines	1
Sri Lanka	1
ICS-UNIDO	1 (faculty)
Italy	4 (faculty)
UK	1 (faculty)
India	30 (including faculty)

Institutional Distribution of Participants	
Institutional Type	Number of participants
Academic	7 (including one faculty)
Industrial	20 (including 4 faculty)
Industrially oriented Research Inst.	13
ICS-UNIDO official	1

## MATERIAL DISTRIBUTED

Participants and faculty for both the programme were provided with a workshop bag containing relevant material. A copy of overhead transparencies presented by each lecturer was supplied to each participant. A copy of lecture notes were also provided to each participant.

## PROGRAMME

### Inaugural Session

The inaugural session was presided over by Prof. R. Kumar. The other who were present were Dr. R.A. Mashelkar, DG, CSIR and Secretary, DSIR, Govt. of India; Prof. S. Miertus, ICS-UNIDO; Dr. K.V. Raghavan, Director, IICT; and Dr. H.R. Bhojwani, Adviser, CSIR. Dr. Raghavan in his welcome address emphasized the importance of the Combinatorial Chemistry. Prof. Miertus had presented the overview of ICS-UNIDO and its activities. Prof. Kumar in his presidential address brought forth the importance



of modern tools in new drug discovery. Dr. R.A. Mashelkar inaugurated the programme with an inaugural address on "innovation Management" and its relevance to the new drug development. Dr. H.R. Bhojwani presented the vote of thanks.

### Programmes

Thereafter the programmes were conducted as per the schedule shown in Appendix I & II. Two interesting panel discussions were conducted in the first programme, one was on 23<sup>rd</sup> and the other was on 24<sup>th</sup>. The result of this panel discussions were that combinatorial chemistry approaches are emerging frontier areas with applications in pharmaceuticals, catalysis and materials. These modern tools would not only reduce the cost of identifying a new chemical lead molecule but also reduce the time frame drastically. The knowledge and capabilities in the developing countries were limited and the expertise needed to be acquired / built-up in these areas for these countries to be competitive in the post WTO era. Participants felt that it would be essential to set up a regional centre for CC/CT and SBMD in this region basically to develop the trained manpower on a continuous and longer term basis. Participants also felt that India, with its good and large scientific base, was eminently suited to set-up such centre and should take initiative in association with ICS-UNIDO. Participants also felt that the centre could initiate some regional programmes in new drug development, particularly in tropical diseases as well as in materials (catalysis).

The second programme was basically a structured training programme to familiarise the researchers in the combinatorial chemistry and its intricacies. The lectures were organised with a view to build the subject. The case studies presented by the faculty helped the participants in understanding the difficulties and how to overcome those difficulties. Participants were also familiarized through demonstration on how to build combinatorial libraries. The discussion session further helped to sharpen the understanding. Most of the participants complimented CSIR and ICS-UNIDO for taking up such excellent initiative.

### Social events

Several social events were organised to allow the participants, resource persons and organizers to meet and interact informally. These were:

- A welcome dinner on the evening of 23<sup>rd</sup> October 1998
- A welcome dinner on the evening of 26<sup>th</sup> October 1998
- An excursion trip to Golconda Fort an historical place
- A sighting seeing trip in Hyderabad
- A tour around the laboratories of IICT and CCMB

#### Programme evaluation

The organisation and the contents of the programme was assessed by the participants through a questionnaire. A copy of the same is placed at Appendix 8. The responses of the participants were analysed and are presented in the Appendix 9. Most of the participants were extremely happy with the overall content of the programme and general arrangements and appreciated the initiatives of the CSIR and ICS-UNIDO.

#### **CONCLUSION**

The programmes had achieved the goals set to be accomplished. Most significantly all these were achieved at much lower cost than what was estimated originally. The programmes from all accounts was a great success. Several decision makers in industry, academic, industry oriented research institutions as well as government were familiarized with the Combinatorial Chemistry/Technologies and its importance in various fields, particularly in new drug development. About 41 researchers from wide spectrum of Organisations were trained in combinatorial methodologies & approaches and provided with the basic understanding required in the field. The participants had evaluated the programme as the best. The programmes identified setting up a regional centre for advancing the knowledge on a sustained basis in CC/CT as well as SBMD as a follow up programme and suggested India to take the initiative in association and cooperation with ICS-UNIDO.

## ICS Component

				US\$
		Estimate	Actual Expenditure	Savings
<b>Programme I: 23<sup>rd</sup> to 24<sup>th</sup> October 1998</b>				
(a)	Travel of 4 invited international speakers	7000	4919	2081
(b)	Living expenses of 4 invited international speakers for 3 days	1080	1080	-
(c)	Living expenses of 3 international participants for 3 days	1620	810	810
(d)	Travel of 2 international participants	1800	1925	125
	<b>Sub Total</b>		<b>8734</b>	
<b>Programme II: 26<sup>th</sup> to 31<sup>st</sup> October 1998</b>				
(a)	Travel of 1 invited international speakers	7000	1226	5774
(b)	Travel of 5 international participants	7200	3585	3615
(c)	Living expenses of 5 invited international speakers	5000	3150	1850
(d)	Chemicals, resins and glassware for demonstration / experimentation	2000	2010	-10
	<b>Sub Total</b>		<b>9971</b>	
	<b>GRAND TOTAL ((I+II)</b>		<b>18705</b>	

# ICS – UNIDO – CSIR

Programme on  
**Combinatorial Technologies – Awareness and  
 Familiarization for Decision Makers**  
October 23 – 24, 1998

## Programme Schedule

<b>Day One</b>	
0930 – 1100 hrs	Inaugural Session Welcome Address: Dr. K.V. Raghavan, Director, IICT Program & Activities of ICS: Prof. S. Miertus, ICS Presidential Remarks: Prof. R. Kumar, Chairman, RC, IICT Inaugural Address: "Innovation Management" Dr. R.A. Mashelkar, DG,CSIR Vote of Thanks: Dr. H.R. Bhojwani, Head, RPBD, CSIR
1100-1130 hrs	Tea
1130 - 1215 hrs	New Ways of making Drugs: Principles and Industrial Applications of Combinatorial Chemistry P. Seneci, Glaxo-Wellcome
1215 - 1300 hrs	Economics of Combinatorial Chemistry and Combinatorial Technologies – G. Fassina, Technogen
1300 - 1400 hrs	Lunch
1400 - 1445 hrs	Automation, HTS and MTS and Data Management – G. Fassina, Technogen
1445 - 1530 hrs	Biological Approaches in Combinatorial Technologies – M. Dani, Technogen
1530 - 1600 hrs	Tea
1600 - 1700 hrs	Tour of CC/CT and SBMD Laboratory Facilities at IICT
1700 - 1800 hrs	Round Table Discussion – Secretaries, Industry Participants, Directors of R&D Institutions, Academia and Resource Persons
1930 -	Dinner
<b>Day Two</b>	
0900 - 0945 hrs	Rationale Drug Design – Prof. S. Ranganathan
0945 - 1030 hrs	Computational Aspects of Combinatorial Chemistry – V. Gillet, Univ. of Sheffield
1030 - 1100 hrs	Tea
1100 - 1140 hrs	Case Study – I - G. Fassina
1140 - 1220 hrs	Case Study – II – P. Seneci
1220 – 1300 hrs	Case Study - III – Dr. J.S. Yadav
1300 - 1400 hrs	Lunch
1400 - 1500 hrs	Tour of CCMB laboratory Facilities
1500 - 1530 hrs	Tea
1530 - 1700 hrs	The next steps - Panel Discussion Chairman – Prof. R. Kumar
1930 hrs	Dinner

**Resource Persons for Programme I**

1. Dr. G. Fassina  
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Parco Scientifico  
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Via Fleming, 4  
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3. Dr. M. Dani  
Technogen S.C.p.A  
Parco Scientifico  
81015 Piana di Monte Verna (CE)  
Italy
4. Dr. V. Gillet  
Professor  
Department of Information Studies  
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United Kingdom.
5. Prof. S. Ranganathan  
INSA Sr. Scientist  
Regional Research Laboratory  
Industrial Estate P.O.  
Thiruvananthapuram – 695 019
6. Dr. J.S. Yadav  
Head, Organic Chemistry Division  
Indian Institute of Chemical Technology  
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Hyderabad – 500 007

**ICS-UNIDO TRAINING PROGRAMME**  
**on**  
**Methodologies, Applications and Economics**  
**of**  
**Combinatorial Chemistry and Combinatorial Technologies**  
**Indian Institute of Chemical Technology, Hyderabad**  
**OCTOBER 26-31, 1998**

**October 26**

9.00-9.30	Training Course and Participants Presentation Prof. S. Miertus ICS-UNIDO, Dr. K.V. Raghavan, IICT & G. Fassina, Technogen & Dr. D. Yogeswara Rao, CSIR
9.30-10.00	Programmes & Activities of ICS-UNIDO, Prof. S. Miertus ICS-UNIDO
10.00-11.00	Combinatorial Chemistry: Principles and Industrial Applications G. Fassina , Technogen
11.00-11.30	coffee break
11.30-12.30	New trend in Combinatorial Chemistry –P. Seneci, Glaxo-Wellcome
12.30-13.00	Discussion session
13.00-14.30	lunch
14.30-15.30	Computational Methods in Library Design – V. Gillet, Univ. of Sheffield
15.30-16.30	Solid Phase Synthesis of Organic Libraries- P. Seneci, Glaxo-Wellcome
16.30-17.00	coffee break
17.00-18.00	Resins, Linkers and Reactions for Solid Phase Synthesis of Organic Libraries P. Seneci, Glaxo-Wellcome
18.00-18.30	Discussion Session

**October 27**

9.00-10.00	Liquid phase synthesis of organic libraries – P. Seneci
10.00-11.00	Deconvolution techniques for organic libraries – P. Seneci
11.00-11.30	coffee break
11.30-12.30	A Case Study of application of CC/CT – P. Seneci
12.30-13.00	Discussion session
13.00-14.30	lunch
14.30-15.30	Softwares for Combinatorial Chemistry - V. Gillet
15.30-16.30	Chemistry of solid phase synthesis of peptide libraries – M. Ruvo, Technogen
16.30-17.00	coffee break
17.00-18.00	A case study of screening of peptide libraries – M. Ruvo
18.00-18.30	Discussion Session

**October 28**

9.00-10.00	Biological Libraries – M. Dani, Technogen
10.00-11.00	Analytical methods for quality control of synthetic peptide libraries – M. Ruvo
11.00-11.30	Coffee Break
11.30-12.30	Experimental of solid phase synthesis of peptide libraries – M. Ruvo
12.30-13.00	Discussion session
13.00-14.30	lunch break
14.30-15.30	Biological peptide libraries: design & construction – M. Dani
15.30-16.00	coffee break
16.00-17.30	visit to CCMB facilities

**October 29**

09.00-10.00	High & Medium- Throughput Screening – G. Fassina
10.00-11.00	Biopanning – G. Fassina, Technogen
11.00-11.30	coffee break
11.30-12.30	Methods in Biological Libraries I – M. Dani
12.30-13.00	Discussion session
13.00-14.30	lunch break
14.30-15.30	Methods in Biological Libraries II – G. Palombo
15.30-16.30	A Case Study of Application of CC/CT – G. Fassina
16.30-17.00	coffee break
17.00-18.00	A Case Study of Application of Biological Libraries – G. Fassina
18.00-18.30	Discussion session

**October 30**

9.00-11.00	Country & Institutional Reports – Training course participants
11.00-11.30	coffee break
11.30-12.30	The SELEX Technology for oligonucleotide Library Preparation and Screening – G. Fassina
12.30-13.00	Discussion session
13.00-14.30	lunch break
14.30-15.30	Visit to IICT facilities
15.30-16.00	Coffee Break
16.00-19.00	Field Visits

**October 31**

09.00-10.00	Economics of Combinatorial Chemistry - G. Fassina, TECNOGEN
10.00-11.00	Discussion on Possible Common Initiatives – G. Fassina, D.Yogeswara Rao and Dr. J.S. Yadav
11.30-12.00	coffee break
12.00-13.30	Workshop Evaluation – G. Fassina and D. Yogeswara Rao
13.30-14.30	Lunch

**Resource Persons for Programme II**

1. Dr. G. Fassina  
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# ICS – UNIDO – CSIR

Programme on  
**Combinatorial Technologies – Awareness and  
 Familiarization for Decision Makers**  
 October 23 – 24, 1998

## List of Participants

- |   |   |
|---|---|
| <p>1. Dr. R.A. Mashelkar<br/>           Director General, CSIR &amp;<br/>           Secretary, DSIR<br/>           Anusandhan Bhawan<br/>           Rafi Marg<br/>           New Delhi – 110 001</p>  | <p>7. Prof. S. Miertus<br/>           Area Coordinator<br/>           Pure and Applied Chemistry<br/>           International Centre for Science &amp;<br/>           High Technology<br/>           Area Science Park, Building L-2<br/>           Padriciano 99, 34012 Trieste, Italy</p> |
| <p>2. Prof. R. Kumar<br/>           Fellow<br/>           JN Centre for Advanced Scientific<br/>           Research<br/>           Indian Institute of Science<br/>           Bangalore – 560 012</p>   | <p>8. Dr. A.V.Rama Rao<br/>           Managing Director<br/>           Avra Laboratories Pvt.Ltd.<br/>           Avra House<br/>           7-102/54, Sai Enclave<br/>           Habsiguda, Hyderabad – 500 007</p>  |
| <p>3. Prof. S. Ranganathan<br/>           INSA Sr. Scientist<br/>           Regional Research Laboratory<br/>           Industrial Estate P.O.<br/>           Thiruvananthapuram – 695 019</p>  | <p>9. Shri Chowdhary V. Nannapaneni<br/>           Chairman &amp; Managing Director<br/>           Natco Group of Companies<br/>           Natco House, Road No. 2<br/>           Banjara Hills, Hyderabad</p>  |
| <p>4. Mr. Ranjit Raju<br/>           Strategic Market Developmetn<br/>           Group<br/>           CSIR South Africa<br/>           P.O. Box 395, Pretoria 001<br/>           South Africa</p>   | <p>10. Dr. Naresh Agarwal<br/>           Executive Vice President<br/>           Ranbaxy Laboratories Ltd.<br/>           20, Sector 18<br/>           Gurgaon – 122 001</p>  |
| <p>5. Dr. Rauzah Hashim<br/>           Associate Professor<br/>           Chemistry Department<br/>           University Malaya<br/>           50603 Kuala Lumpur<br/>           Malaysia</p>   | <p>11. Dr. A.Venkateswarulu<br/>           President<br/>           Dr. Reddy's Research Foundation<br/>           Ballaram Raod,<br/>           Miyapur<br/>           Hyderabad – 500 050</p>   |
| <p>6. Dr. Nurul Islam<br/>           Director<br/>           Bangladesh Council of Scientific &amp;<br/>           Industrial Research<br/>           Dr. Quadrat-e-Khuda Road<br/>           Dhanmondi, Dhaka – 1205<br/>           Bangladesh</p> | <p>12. Dr. M.R. Samuel<br/>           Senior Vice President<br/>           Cadila Health Care<br/>           203/204, Neelkanth Commercial<br/>           Centre, Sahar Road,<br/>           Andheri (East)<br/>           Mumbai – 400 099</p>   |

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**ICS-UNIDO TRAINING PROGRAMME**  
**on**  
**Methodologies, Applications and Economics**  
**of**  
**Combinatorial Chemistry and Combinatorial Technologies**  
**Indian Institute of Chemical Technology, Hyderabad**  
**OCTOBER 26-31, 1998**

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- |  |   |
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## ICS Workshop/Training Course: EVALUATION QUESTIONNAIRE

Course/Workshop: \_\_\_\_\_

**A. Organization:**

1. How did you obtain information about this workshop/course?

\_\_\_\_\_

	Excellent	Very Good	Good	Fair
2. The information process was	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. The announcement and pre-course material was	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Describe the content of the workshop/course:				

4. I found the scientific programme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.1. Applied Lecture/Workshop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2. Use of small working groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3. Case Studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4. The time spent by lecturers in class and after class on specific questions/examples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5. Students scientific knowledge was	Balanced <input type="checkbox"/>	Unbalanced <input type="checkbox"/>		

**B. Duration of programme:**

	Just right	Too long	Too short
1. Number of days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Length of working days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**C. Training facilities & Hotel:**

	Excellent	Very Good	Good	Fair
1. Lecture/Training Rooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Breaks/refreshments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Hotel accommodation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Meals at the hotel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If "Fair" please explain why: \_\_\_\_\_  
\_\_\_\_\_

D. Organizer's response to participants needs

E. Overall programme organization

F. Would you recommend to others from your institution/  
country to attend a similar activity in the future?

Yes  Maybe  No

1. Which part of the Activity did you find most useful?

\_\_\_\_\_  
\_\_\_\_\_

2. Which part of the activity do you think should be expanded?

\_\_\_\_\_  
\_\_\_\_\_

3. Which part of the activity do you think should be dropped?

\_\_\_\_\_  
\_\_\_\_\_

4. Any other suggestions for future improvements to the programme?

\_\_\_\_\_  
\_\_\_\_\_

5. Do you think that the topics/tools you studied during the course could be used by industries in you  
country? If so, how? If not, why not?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



5. contd.

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6. Can you suggest any programme and future activities which ICS could pursue in order to help with the technological and scientific advancement of your country?

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7. Do you think you have benefited from participation in this course/workshop? If so, how? and your Institution?

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8. How do you intend to disseminate the information you have acquired during the activity once back in your own country?

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**G. Evaluation of Lectures and Speakers**

	Excellent	Very Good	Good	Fair
1. Course material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Resident Lecture presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. International Lecture presentation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Ability of lecturers to answer specific questions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Any comments:

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*Thank you for your collaboration.*

## Analysis of Programme Evaluation

<b>A. Organisational Aspects</b>	<b>Excellent %</b>	<b>V. Good %</b>	<b>Good %</b>	<b>Fair %</b>
Information Process	52	35	13	0
Announcement and pre-course material	32	43	25	0
Scientific content of programme	50	40	10	0
Applied lecture/ workshop	16	52	26	6
Case studies	20	57	13	10
Time spent on discussions	52	39	9	0

<b>Participants scientific knowledge</b>	<b>Balanced %</b>	<b>Not Balanced %</b>
	100	0

<b>B. Duration of Programme</b>	<b>Just right %</b>	<b>Too long %</b>	<b>Too short %</b>
1. Period (No. of days)	58	39	3
2. Length of working day	74	23	3

<b>C. Training Facilities &amp; Accommodation</b>	<b>Excellent %</b>	<b>V. Good %</b>	<b>Good %</b>	<b>Fair %</b>
1. Lecture & training rooms	58	23	13	6
2. Breaks & refreshments	42	42	16	0
3. Accommodation	71	17	12	0
4. Meals	57	18	25	0

	<b>Excellent %</b>	<b>V. Good %</b>	<b>Good %</b>	<b>Fair %</b>
D. Organisers response to participants needs	53	37	10	0
E. Overall programme organisation	58	29	13	0

	<b>Yes %</b>	<b>May be %</b>	<b>No %</b>
F. Would you recommend to others from your institution/ country to attend a similar activity in the future	100	0	0

<b>G. Evaluation of Speakers</b>	<b>Excellent %</b>	<b>V. Good %</b>	<b>Good %</b>	<b>Fair %</b>
1. Course material	40	46	14	0
2. International lecture presentation	48	42	10	0
3. Ability of lecturers to answer specific question	48	33	19	0