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MINISTRY OF INDUSTRY (MOI)
INSTITUTE OF INDUSTRIAL CHEMISTRY (IIC)
CENTER OF ENVIRONMENTAL PROTECTION
AND CHEMICALS SAFETY (CECS)

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REPORT OF THE INTERNATIONAL TRAINING COURSE ON "GEOGRAPHIC INFORMATION SYSTEMS AND WATER MANAGEMENTFOR INDUSTRIAL ACTIVITIES"

organized in Hanoi, 9 - 18 June 1997 by ICS and CECS

Contract Reference No.:	UNIDO Contract No. 97/105 97/11P TF/GLO/PL/105
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Signed on:	16 May 1997
By:	Mr. V. Koloskov, Contracts officer of UNIDO, Vienna and Prof. Dr. Mai Tuyen, Director of IIC (contractor)
For the provision of services related to the Training Course on:	"Geographic Information Systems and Water Management for Industrial Activities"
Dates:	9 - 18 June 1997
Venue:	Hanoi, Vietnam
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CONTENT OF THE REPORT:

1. PREPARATION OF THE TRAINING COURSE

The Training Course was organized in close cooperation with the Staff of the International Centre for Science and High Technology (ICS), Trieste, Italy.

CECS (Mr. Do Thanh Bai as Executive Local Organizer) acted as the local organizer for the training course on behalf of IIC (Prof. Mai Tuyen).

The following were done for the setting and preparation of the course by ICS and CECS:

1.1. Identification of the objectives and expected outputs of the training course, that are described in the AIDE-MEMOIRE (enclosed in this report).

In recent years, the relationship between industrial and water has become a critical issue for ecological sustainable development (ESID). As a matter of fact, industry is the fastest growing sector with respect to water use. The total water pollutant load from the industrial sector is increasing and we are facing a shift from biological to chemical contamination. A direct consequence has been an increasing impact on aquatic environment and human health. UNIDO is trying to coordinate its activities related to water, focusing the attention on pollution prevention and water conservation, by source controls and demand management. The UNIDO initiative is aimed at providing support to decision markers in governments, regulatory agencies and the private sector. Moreover it aims at developing assessment and planning tools to support the formulation of national and regional action programmes through capacity building and training. In this context, one of the priorities are assessment and modeling tools, such as Geographic Information Systems (GIS) and Decision Support Systems (DSS).

GIS, Multi-objective Decision Support Systems and related information technologies have become powerful in their ability to manipulate a wide variety of social, economic, environmental and physical data. Especially the integration of GIS and MCA systems has become a central focus for the development of general- purpose land/ water use/ environmental planning tools and methods that can help decision makers.

The implementation of GIS and DSS can stimulate and guide the water management for industrial activities: it can minimize the degradation of the natural system, provide a framework for the management of multi-sectoral activities (industry, agriculture, municipal waste etc.) and maintain options for future uses of resources, ultimately contributing to the improvement of environmental quality and human health and to the protection and sustainable use of region water resources.

The main objective of the training course is to introduce the participants to the advanced use of Geographic Information Systems (GIS) and Decision Support Systems (DSS) in Environmental Impact Assessment (EIA) studies and to provide the participants the good conditions for getting familiar and practicing on soft wares and hard wares used in GIS and DSS. The training course is also a chance to put the question how such tools can effectively be implemented in the social- economic- political context of developing

countries to assist the local authorities in proposing consistent policies and strategies aiming at an effective sustainable developing approach in the management of water resources for industrial activities.

The training course was occasion to establish a common forum of discussions and exchange of experiences for the participants, focusing on the analysis of the industrial activities with special attention to water management related issues.

The training course was designed for middle level technical personnel with some experiences in the field of utilization of GIS and DSS and aims to the people working directly or indirectly in industrial planning.

The course was consisted of different types of activities :

- Introductory lectures (theoretical);
- Demonstrations and field trip;
- Participants' presentations;
- Case studies and tutorials;
- Technology management.

Special practical training was given to the participants by using adapted case studies and computer demonstrations.

1.2. Definition of the general criteria for the identification of the target participants of the training course.

1.3. Identification and suitable adjustment of the main topics for the course, that consist of:

1.3.1. Industrial development in general and in the South East Asia Region in particular and its relationships with water management issues; the ongoing Industrial Pollution Prevention International Projects in Vietnam and the possible solution of GIS application to regional water resources management involved in these projects.

1.3.2. Basic knowledge on GIS, DSS and application possibilities for water management and industrial planning.

1.3.3. Data bases needed for GIS and water modeling.

1.3.4. Multi Criteria Analysis (MCA) and implications in water management and industrial development and planning.

1.3.4. Software of IDRISI (for windows), DUFLOW, and COSMO.

1.3.5. Situation of the GIS and DSS utilization in developing countries: needs, opportunities and challenges, especially in the technology management of

GIS, DSS and in the implementation problems of these technologies in developing countries.

1.4. Identification of the programme of practical computer exercises to improve the understanding of the theoretical lectures and allocation of reasonable time for this activity.

1.5. Identification of contents, goals and necessary length of the case - studies to be presented in the course.

1.6. Clarification of goals, concrete activities, length and sites for the field trip, so that it could be a good and useful contribution to the overall goal of the course.

1.7. Preliminary requirements in terms of presented topics and plans for the participants' presentations.

2. SELECTION AND INVITATIONS OF THE PARTICIPANTS AND SPECIALISTS AND ARRANGEMENTS FOR THEIR ENTERING VIETNAM

2.1. Selection of participants

2.1.1. Principle:

- As mentioned in the Announcement and AIDE-MEMOIRE, most of the selected participants had at least a few-years experience in GIS and in computer work. They were middle-level scientists working in the field of pollution control management and industrial planning. Most of them came from governmental bodies, institutions linked to the industrial sector and are supposed to support the decision-making processes in their home countries.

2.1.2. Procedure of sending the application forms and selecting participants:

- The announcements and Application Forms were sent by CECS and ICS to the following countries: Vietnam, Bangladesh, Brunei, Cambodia, China, India, Indonesia, Laos, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand, Maldives and New Guinea. In some cases, these documents were sent through the UNIDO country offices.

Most applicants sent directly application forms and CVs to CECS. The selection for Vietnamese was done by a committee from CECS and the representatives of Ministry of Industry, Ministry of Science, Technology and Environment; National Center of Natural Science and Technology and UNIDO Hanoi. The committee selected 10 official participants and 10 observers from different agencies and various parts of Vietnam. The applicants outside Vietnam were selected by discussion and agreement between CECS and the ICS Staff. No participants were selected by one side only.

Time available for communications between applicants and organizers was short, so that the number of applicants outside Vietnam did not exceed 15. Nevertheless, all the applicants (Vietnamese and foreign) had a good and suitable background for the training course, and as result, the selected participants contributed remarkably to the success of the course.

Totally 15 participants outside Vietnam were selected, coming from the following countries:

- Bangladesh	01
- China	02
- Cambodia	01
- India	04
- Indonesia	01
- Laos	03
- Malaysia	01
- Sri Lanka	01
- Thailand	01

Due to last minute impediment, two Indians and a Bangladesh were not able to come. Therefore, the total of foreign participants was 12. One foreign observer, who is a Norwegian Ph.D. student from Oslo University of Norway, who is involved in a project dealing with transporting industrial pollution from developed to developing countries through technology transfer projects in Vietnam, was also accepted to attend the course at her expenses.

The list of the participants who attended the training course is enclosed in annex 5 of this report.

2.2. Invitation of Specialists:

To achieve the defined goals of the training course, the organizers discussed with international and Vietnamese specialists who had a good knowledge of the topics mentioned in part 1.3. and had good skills for presentation and training experience as well. The foreign specialists come from Belgium, Canada, Italy, The Netherlands, Sweden, United States (some of them are working in Vietnam as the international consultants for the ongoing projects in Vietnam such as UNIDO Projects, EU Projects and the Vietnam-Canada Project) and they were chosen by ICS in consultation with UNIDO Vienna. A list of the international specialists is enclosed in annex ... of this report. The Vietnamese specialists were chosen by the Local Organizer in consultation with ICS and UNIDO, Hanoi. A list of the Vietnamese specialists who attended the training course is enclosed in annex 5.

2.3. Arrangement for visa, travel and arrivals of the participants and lecturers outside Vietnam

2.3.1 The Local Organizer kept in close contact with all the invited lecturers/participants to check the status of their visa. When necessary, CECS discussed with The Immigration Office of the Ministry of Interior of Vietnam to arrange visa for the invited persons of the training course. As regards the round-trip air-tickets of the invited persons, CECS discussed by phone or fax with each person to check the status of his/her air ticket. The procedure for buying air tickets depended on the possibility to buy tickets in Hanoi and current situation at that time.

- The Local Organizer bought 6 air-tickets for 6 participants coming from China (2), Laos (2), Thailand (1) and Cambodia (1).

- Due to the shortage of time or to the difficulty in buying air tickets in Hanoi (in most cases is cheaper to buy tickets at departure places) the invited persons who bought their air tickets by themselves in their home countries were reimbursed by the Local Organizer upon their arrival in Hanoi. Totally, 14 air tickets and 01 train ticket were reimbursed in cash, they are:

For Lecturers:	1 from Canada
	1 from The Netherlands
	1 from Italy
	2 from Ho Chi Minh City (HCMC)
For Participants:	1 from Malaysia
	1 from Sri Lanka
	2 from Laos
	2 from India
	1 from Indonesia
	2 from HCMC
	1 from Da Nang
	1 from Hai Phong (train ticket)

2.3.2. All communications between the Local Organizer and the invited people of the course were maintained to ensure everyone would be taken care of when arriving the airport of Hanoi.

All foreign participants were received by the Local Organizer at the Noi Bai Airport and provided all the necessary information related to the training course programme and accommodation in Hanoi as well as a lump-sum in local currency upon their arrival, all guests were provided with a map of Hanoi. Upon their departure, cars and/or taxis were also provided to reach the airport from the hotel.

All meals were reserved in the hotel's restaurant by the arriving day for the guests.

3. CONDUCTING THE TRAINING COURSE.

3.1. General Activities.

3.1.1. The Official Programme of the course was finally defined on 6 June during a meeting of the Local Organizer and the ICS Staff in Hanoi, according to last minute apologies. The programme included the following:

- Activities in the Opening Ceremony and delegates attending the Opening Ceremony

- The main blocks of the course:

- Registration
- Block I - Introduction to the course
- Block II - Description of Issues and Problems Areas
- Block III - Methodologies and Tools
- Block IV - Case studies
- Block V - Demonstration and Practical Exercises, including field trip
- Block VI - Implementation and Decision making
- Block VII - Follow-up and Course Evaluation

3.2. The actual activities in the course according to the schedule

The programme of the course is enclosed in annex 2

3.2.1. Opening and introduction:

In the opening ceremony chaired by the Local organizer, The Vice Minister of Ministry of Vietnam (Mr. Le Quoc Khanh) gave a speech to welcome all Lecturers and participants participating the training course, and a speech of the overall target of the course. The Director of IIC (Prof. Dr. Mai Tuyen) introduced briefly about IIC and CECS. The Director of UNIDO (Mr. Michel Brenning) Hanoi gave a short presentation of the activities of UNIDO in Vietnam, including the course and thanked ICS, IIC a CECS for their efforts to organize the training course in Hanoi. Prof. Feoli, ICS Area Coordinator, gave a introduction of ICS-UNIDO and the international training and

research support activities of ICS. Due to many Vietnamese delegates present in the opening ceremony, interpretation of English and Vietnamese was used.

Since the first day of the course, the course was conducted block by block as planned in the programme (see annex□). All the presentations and discussion in the other parts of the training course were conducted in English.

3.2.2. Lectures: the main topics presented in the course consist of:

* Industry development in general and in South East Asia in particular and the its relationships dealing with water management; The ongoing Industrial Pollution Prevention International Projects in Vietnam and the possible solution of GIS application to regional water resources management involved in these projects.

* Basic knowledge on GIS, DSS and possibility to be applied to water management and industry planning;

* Data base needed for GIS and water modeling

* Multi - Criteria - Analysis (MCA) and implication in water management and industry development and planning

* Soft ware of IDRISI (for windows), DUFLOW, EQUAL 2 and COSMO

* Situation of GIS and DSS development in developing countries, needs, opportunities and challenges, especially the technology management of GIS, DSS development and application in the developing countries

After each block, an summary was made briefly by the organizers so that the participants could be easier to get the main contents of the previous presentation and to enter into the next part.

3.2.3. Participant presentation:

Preliminary requirement in terms of presented topic and plans for the participants' presentations were identified by the ICS coordinator and local organizer basing the registration forms of the participants. 10 participants (5 Vietnamese and 5 foreigner) were selected to present. All the presentations focused on their work, GIS application in their home countries and their expectation from the course. These presentations were also a good opportunity for all participants and lecturers to understand each other in the first days of the course.

3.2.4. Practical work and case studies:

Identification of programme of practices on computers exercises to enhance understanding the theoretical lectures and reasonable time allocation in the training

course for this activity were done in cooperation between ICS Coordinator, lecturers and Local Organizer in the preparation step of the course.

Exercises of specific computer programs on computers aiming to demonstrating the theoretical matters presented by the lecturers were done in small groups (2 - 3 participants), and it was free for the participants working after finishing official lecture time in the lecture room.

The following soft wares were introduced and practiced on the computers:

- IDRSI for windows (GIS)
- Duflow (Water modelling)
- Equal 2 (Water modelling)
- COSMO (MCA)

Contents, goals and necessary duration of time of the case - studies to be presented in the course were identified in advance. These case studies cover the following topics:

- Ohio River Project GIS application
- Bagmati River Project
- Oil spilling (in the Southern Sea of Vietnam) project
- EU project on Environmental Management in Quang ninh area
- GIS application in India
- Possibility to apply GIS and DSS in the Dong nai (Vietnam) industrial zone

These case studies were presented by International and Vietnamese Speakers and have contributed greatly to the results of the course.

In the last case study, the participants were divided into 6 groups to discuss all aspects dealing with GIS application project in the concrete industrial zone (Dong nai area in Vietnam) basing on the information of this area in terms of topography, river network, industrial development plan and industrial pollution provided by the Vietnamese specialist. The presentations of each group were done in the open discussion of all participants and lecturers.

3.2.5. Field trip:

The goals, concrete activities, duration of time and sites for the field trip were prepared by Local Organizer in a consultation of ICS, so that it could be a good and useful contribution to the overall goal of the course.

The field trip was organized by Local Organizer in cooperation with the Division of Computer Application for Chemical Research (ACCRA) of Institute of Chemistry of National Center for Natural Science and Technology (NCST). This boat field trip was divided into two parts:

- the morning part was on Red River in combination with visiting an old and well known village (Bat trang) producing ceramic goods on the other side of the Red River down stream, where there have been water and air pollution problems)

- the afternoon part was on the West Lake of Hanoi, where the water has been polluted by many kinds of man made activities.

On the boat, the participants got chance to see how the water quality in situ measurement can be done, and what capacity of the measuring equipment can be interfaced and treated in computer. Some important parts of this equipment is made by the Vietnamese Scientists.

The boat field trips were a very good chance for discussion between the participants and the Lecturers as well as other Specialists.

3.3. Infrastructure for the course:

3.3.1. Course Material

Almost the course materials sent to CECS from ICS or Vietnamese Speakers and Foreign Lecturers working in Vietnam were made copies and distributed in the first day of the course to all participants. These materials also include the programme of the course, list of participants (including lecturers), registration form and the evaluation form. During the courses, the additional materials newly given by the lecturers were also copied at once and distributed to all participants and lecturers.
In general, the extensive material of the course were given out on all lectures and the participants were exposed to a variety of software and models
The materials in details are listed in the appendix 3

3.3.2. Lecture room:

The Lecture room was a big conference hall inside the Hotel (Cau Giay Hotel), where all the rooms for all participants and foreign lecturers have been reserved. The lecture room was equipped with all necessary facilities for learning and teaching, that included:

- Sufficient lighting and air-conditions
- Microphones
- 10 computers
- LCD Projector
- Overheads and white screens
- White board
- Color pens and transparent papers for all speakers
- Laser Printer
- Communication (email, fax, telephone)
- Separate space for break time

The evaluation of participants on quality lecture room shows that 3% of opinions is fair, the reason is that for a few hours the power got technical problem (whole city power net), and all participants had to suffer from the hot weather, but a generator was used for light and computers as well as ventilators.

10 computers were equipped in the lecture room, but in fact one of these was not working well. But this not affected much the results of working group exercises. It is suggested that the number of computers could be increased for the next course so that maximum only 02 people work with one computer.

3.3.3. Managing logistic and hospitality matters for the participants and invited persons in the course.

- All foreigners and Vietnamese (outside Hanoi) who attended the training course were provided the full lodging and boarding in a good hotel within the frame of the allowable budget allocation such as:
    - modern and comfortable rooms
    - meals and soft drinks, including coffee breaks
    - helps for air tickets and visa if necessary
    - shopping and entertainment in the weekend
    - guidance when necessary
    - private matters if possible

All participants and invited persons of the training course recognized the hospitality and friendship of the Local Organizers, the course servants and the hotel staff. Security of participants and invited persons during the course was guarantied.

To ensure good logistic and administrative activities for the course, almost the whole CECS staff were recruited for the entire duration of the course. This staff and their functions is enclosed in the annex 6.

3.4. Social activities:

During ten days of the training course in Hanoi, besides the tuition activities taking place in the lecture room, various social activities were organized by the organizers to enhance the understanding each other and to create friendship.

These activities include the followings:

- introducing about some situation of Vietnam during field trips
- organizing sight seeing outside Hanoi (Haiphong port, Doson Beach, Cucphuong National park and Huong pagoda) on Sunday (15 of June)
- some other cultural activities on the evening time (shopping, theater, dancing..)

These social activities were conducted very flexible and freely, but it contributed a lots to creating a friendly atmosphere among the participants, lecturers and organizers,

especially it created a community of people interested in similar issues. This community feeling would be very useful in communication and cooperation for future.

Almost main activities during the course were recorded by photography or video tape. One copy of these was sent to ICS. Some part of the course' activities were shown on the mass media of Vietnam.

4. GENERAL EVALUATION OF THE TRAINING COURSE

4.1.The course achieved the following goals:

- To transfer basic and necessary knowledge for the target participants, in order to enhance their ability to support industrial development planning and management in the developing countries.

- To contribute to the capacity building of the national or provincial managers in the field of GIS and DSS application in industrial development planning and water management

- To contribute to the dissemination of information on GIS and DSS technologies and their applications in industrial planning and management.

- The training course is a good forum for disseminating information about the UNIDO projects and other international project on going in Vietnam or in the region, where GIS could be implemented

4.2. In general, the activities of organizing the course in various steps were conducted in a very close cooperation of ICS and CECS. Preparation, printing and dissemination of announcement and application forms to the target countries were done in a little hurry, especially for applicants outside Vietnam. As result the final number of applicants sending application forms was quite limited. But fortunately, the participants being accepted have good background for the course, so in fact they had well contributed to the final successful result of the course.

4.3. The structure of the programme is suitable for the selected participants and the fixed duration of time.

4.4. The programme of the course was fruitfully conducted with a little and reasonable adjustments so that the effectiveness of the course could be raised.

In the course, the participants were provided with the following main important scientific subjects:

- Implication of ecologically sustainable development in the industrial development of the developing countries and the related issues of spatial planning and water management

- Environmental impact assessment and water management

- GIS and DSS: basic knowledge and application in the water management and industrial siting. Technique of using IDRISI for windows

- Techniques of water modeling by Duflow and Equal2

- Multi-Criteria-Analysis (MCA): technique of using some programmes in IDRISI for windows to do MCA (weighting), demonstration of COSMO soft ware for supporting decision making process

- Problems of implementing GIS and DSS in developing countries

- Some specific case studies of GIS application for water management

- Situation of industrial development in Vietnam and the South East Asian countries and related industrial pollution

4.5. The scientific and tutorial activities in the field of GIS and DSS and related presentations were highly appreciated not only by the participants but also by the lecturers. In the reality, some topics presented by some lecturers without preparation of printed materials, but it accounted for only a small percent in the total of materials distributed to the participants.

4.6. The presentation of the participants focused on the followings:

- The issues and problem of GIS and DSS application in their current work or in their home countries, their expectation from the course.

- Challenges and solutions to overcome of implementation of GIS and DSS project in the certain industrial zone (Dong Nai Province - Case study)

The discussion was good opportunity for sharing and exchanging experience, knowledge and views not only among the participants, but also lecturers, that contributed a lots to the success of the course

4.7. The field trip within only one day (14 of June) was a good chance for not only demonstrating and discussing a technique of in-situ measurement of water quality (computerized water checker, GPS and polarograph), but also for sight seeing and relaxing after several days of hard working of all participants and lecturers and the course

servants. It also was a good chance for enhancing understanding one another and friendship.

4.8. Working groups consisted of small number of participants with computers exercises (2-3 participants) or for doing case studies (5-6 participants) facilitated the effective way of practical learning and, especially on computers. Each working group consists of one Vietnamese and one foreigner so that they can help each other in enhancing computer skills. Anyhow, for future training course, the maximum number of people working with one computer should be 2, so that effectiveness of practical exercises on computers could be increased, and to do so, it is recommended that institutes and/or organizations from which observers come from could provide some funds for additional computers renting.

4.9. Management of logistic and administrative matters related the course was good.

4.10. In the last section of the course, an open discussion among all participants, lecturers and organizers was carried out in order to evaluate the result of this training course and to follow up the ICS sub-programme on Decision Support System such as other training courses, fellowship, study tours... Mr. Ambassador of Italian and Director of IIC were present in the last hour of the training course and awarded the certificates to the participants.

The course evaluations from the participants were statistically done through the participants' evaluation forms and expressed in the charts enclosed in the appendix.

The figures in the charts show that:

For the information process:(chart 1)
Fair: 0%, Good: 10%, Very good: 60%, Excellent: 30%
It means that almost participants were received good and adequate information of the course before applying and attending, only 10% of the participants received not enough documentation or information of the course due to the time is so short.

For the announcement and pre-course material (chart 2)
Fair: 3%, Good: 30%, Very good: 37%, Excellent: 30%
Very few participants (3%) not received announcements and pre-course material. The reason could be as that above mentioned or not so good telefax communication lines.

For the quality of scientific programme:(chart 3)
Fair: %, Good: 0%, Very good: 80%, Excellent: 20%
It means that the scientific quality of the course has been highly appreciated by all participants, and the scientific contents of the course are very good.

For the applied lecture/workshop (chart 4)
Fair: 0%, Good: 10%, Very good: 60%, Excellent: 30%

It means that the lectures have practical meanings for almost participants and have fit to their expectation from the course.

For the use of small working groups: (chart 5)
Fair: 0%, Good: 30%, Very good: 57%, Excellent: 13%
It means that not any participant complained about the way of the organizers to organize small working groups for computer exercises or case studies, but anyhow 30% of the participants have evaluated only good.

For Case studies (Chart 6)
Fair: 0%, Good: 13%, Very good: 74%, Excellent: 13%
It means that almost participants (87%) have highly appreciated case studies, especially the last case studies of implementing GIS in developing countries, in which the participants and lecturers contributed a very good discussion.

For the time spent by lecturers in class and after class on specific questions/examples (Chart 7)
Fair: 0%, Good: 7%, very good: 73%, Excellent: 20%
It means that near all lecturers and specialists (93%) chosen by the organizers have good knowledge and experience on the fields which the participants interested in.

For the students scientific knowledge (Chart 8)
Unbalanced: 10%, Balanced: 90%
It means that for almost participants (90%), the scientific knowledge provided by the course have a good balance for their levels.

For the duration of programme (number of days) (Chart 9)
Too short: 30%, Too long: 7%, Just right: 63%
In general, more than 50% of the participants thought the duration (10 days) of the course is enough, 30% of them wanted to prolong the course more, very few (7%) thought it is too long. The reasons might be from their different background or their working positions in the home countries.

For the length of working days (Chart 10)
Too short: 0%, Too long: 27%, Just right: 73%
It means that 27% of the participants thought that the lecture days is hard for them. But 73% considered that is OK.

For the lecture rooms (Chart 11)
Fair: 3%, Good: 10%, Very good: 64%, Excellent: 23%
Only 3% of the participants thought that the quality of the lecture room is only fair, it might be from losing electricity for few hours in the quite hot days. But almost participants (87%) thought that the quality of the lecture room is very good.

For the refreshments/breaks (Chart 12)
Fair: 0%, Good: 38%, Very good: 48%, Excellent: 14%

100% of the participants said that quality of the refreshment/breaks during the course is OK.

For the hotel accommodation (Chart 13)
Fair: 0%, Good: 21%, Very good: 71%, Excellent: 8%
100% of the participants who were provided rooms in the hotel stated that the quality of the rooms in the hotel is OK.

For the meals at the hotel (Chart 14)
Fair: 0%, Good: 21%, Very good: 71%, Excellent: 8%
In general, in the budget frame of the course, all the participants were provided good meals in the hotel, that is why nobody got sick because of meals during the course.

For the organizer's response to participants needs (Chart 15)
Fair: 0%, Good: 7%, Very good: 43%, Excellent: 50%
93% of the participants satisfied with what they have been helped by the organizers whenever they need during the course. It means that a very good friendship among the participants and organizers was created.

For the overall programme organization (Chart 16)
Fair: 0%, Good: 13%, Very good: 54%, Excellent: 33%
It means that the way of the course's organization was very much highly appreciated by all the participants

For the course material from lecturers (Chart 17)
Fair: 0%, Good: 10%, Very good: 77%, Excellent: 13%
88% of the participants stated that the material provided by the lecturers during the course are very useful and good quality.

For the resident lecturer presentation (Chart 18)
Fair: 0%, Good: 13%, Very good: 64%, Excellent: 23%

For the international lecturer presentation (Chart 19)
Fair: 0%, Good: 3%, Very good: 54 %, Excellent: 43%

It means that all participants have satisfied with all the lecturers, but in general, quality of the international lecturers is higher than the local. The reason for this evaluation might be from the local lecturers' English that is not so good.

For the ability of lecturers to answer specific questions (Chart 20)
Fair: 0%, Good: 13%, Very good: 47%, Excellent: 40%.
87% of the participants have satisfied with the answers for their special questions from the lecturers. It means that the specialists invited by the organizers have very good knowledge and experience in the topics the training course dealt with.

5. RECOMMENDATION FOR FOLLOW UP

In the last section of the course, an open discussion among all participants, lecturers and organizers was taken place in order to evaluate the result of this training course and follow up the ICS sub-programme on Decision Support System such as other training courses, fellowship, study tours... Mr. Ambassador of Italian Embassy in Hanoi and Director of IIC were present in the last hour of the training course and awarded the certificates to the participants.

Concerning the topics discussed in this section of following up, from the results of the course's organization and some introduction on the ICS activity sub-programmes made by ICS coordinator, the participants suggested the followings:

5.1- Embedding GIS technology within on-going projects (possibly creating horizontal linkages within Government departments already involved in development projects, e.g. UNIDO, VCEP, EU, or Bilateral...projects). These on-going projects could be potential human resources for being trained and potentially financial supports with coordination of ICS area 2.

5.2- A real need to create focal points in the developing countries: criteria to be focal points and tasks of the focal points. The selected focal points should be good bodies for developing and sustaining relationships between participants, collecting, storing and disseminating information through participants and specialists. The focal points have also a task of evaluation of best organizations that will organize future activities of the defined programmes of ICS etc.

5.3- Through this training course, it is found that there are many chances for future collaboration from different international universities such as University of Alberta, London School of Economics, University of Oslo, ITC of Netherlands etc. and there is a need to follow up on that.

5.4- To assign at least 1-2 ICS fellowships for the young participants (to demonstrate technology applications, build training material, to follow case studies presented in the course etc.). The organizers have distributed the ICS application forms for fellowships to all participants, and they will send directly them to the ICS if they would like to apply.

5.5- A suggestion from many participants of the course to have further training programmes in some other countries such as in Indonesia, Cambodia etc. which could be different in terms of course's scale or target participants.

5.6- It is necessary to enhance the role of private sectors in GIS and DSS projects in the developing countries as some experience from the regional countries (India)

5.7- Some suggestions on how the material from different course of the programme could be collected and packaged by ICS and distributed further to all participants of this training course. With this way, it is able to increase the results of the training courses.

5.8- It is necessary to find ways to make possible influences to the legal authorities of the countries at different levels in terms of GIS and DSS projects' application, e.g. how to show the managers GIS possibilities and limits and create the possible technical and financial support sources.

5.9- It is very important to understand the roles of information and its dissemination processes, especially through NGOs. Newsletters of this programme should be made and linked with focal points.

6. THE FINANCIAL REPORT

The expenditures (in USD) for all the course's activities are listed in the following table . The receipts are enclosed in the annex.

Travel: 1. For 12 foreign participants - 3 foreign lecturers outside Vietnam - 2 foreign lecturers from HCMC - 2 Vietnamese from HCMC - 1 Vietnamese from Danang - 1 Vietnamese from Hai Phong	**11,835.00**
Perdiem - for foreigners (20 USD x 163 days) - for Vietnamese (10 USD x 90 days)	**4,160.00**
Hotel - 27 nights x 76 USD/night - 189 nights x 50 USD	**11,583.00**

Meals in the hotel	**2,160.00**
Parties (opening and closing) - renting restaurant: 2 x100 USD - meals:	**670.00** 200 470
Training facilities - lecture room (11 days): 12 days x 200 - computers: 8 computers x 13 USD/p. day x11 day - overheads and screens: 20 x 12 days - LCD projector: 12 x 20USD - decoration	**4,074.00** 2400 1144 240 240 50
Field trip - big boats renting (2)(380 + 400) - service fees - measurement equipment renting - party (diner) - drinks on boats	**1,500.00** 780 50 300 300 70
Lecturers' fee - Prof. Mannearts - Prof. Van Ninh - Dr. Danh Son - Dr. Hung - Mr. Bai - Dr. Quang	**1,700.00** 600 250 250 200 300 100
Local transportation - airport taxi expenses (arrivals and departures) - renting buses for field trips - car in charge of service for working days of the TC	**1,180.00** 480 400 300
Communication: - fax + phone - email - mail	**1,600.00** 1198.15 297.47 104.38

Material and documentation printing - announcement and application form printing - course material photocopy - certificates	**2,010.00** 250 1700 60
Assistants and miscellaneous - assistant staff for the TC organization - video and photo - airport and visa extra costs	**2,040.00** 1800 120 120
TOTAL	**44,512.00 USD**

Hanoi 31 July 1997

INSTITUTE OF INDUSTRIAL CHEMISTRY
DIRECTOR

MAI TUYEN

ANNEX

1- Announcement and Aid-memoir
2- programme of the course
3- list of course material
4- charts of the course evaluation statistics
5- list of participants and lecturers
6- list of assistant staff
7- list of people who were bought tickets by CECS
8- list of people who were reimbursed by CECS for tickets
9- break down of all expenses and relevant bills or receipts

Coordination of the Training Course

ICS Coordinators :

Enrico Feoli, *Earth, Environmental and Marine Science and Technologies Area Coordinator, ICS, Trieste, Italy.*

Driss Ben Sari, *Earth, Environmental and Marine Science and Technologies Associate Area Coordinator, ICS, Trieste, Italy.*

Local Coordinator:

Do Thanh Bai, *Institute of Industrial Chemistry, IIC, Centre of Environmental Protection and Chemical Safety, IIC, Hanoi, Vietnam.*

Deadlines

Submission of application form: 15 April 1997
Selection of participants: 30 April 1997.

Application and information :

Institute of Industrial Chemistry, IIC
Centre of Environmental Protection and Chemical Safety
2 Pham Ngu Lao
tel +84 48 249231 ; fax +84 48 249508
e - mail: baittmt@netnam.org.vn

ICS - UNIDO

Earth, Environmental and Marine Sciences and Technologies
Via Grignano, 934014 Trieste, Italy
tel + 39 40 224572 : fax + 39 49 224575
e - mail: roa@ics. trieste.it

IIC

UNIDO

ICS

FIRST ANNOUNCEMENT

Training course on geographic information system and water management for industrial activities

Organized by:

- The International Centre for Science and High Technology (ICS), Trieste, Italy
- The Institute of Industrial Chemistry, IIC (Centre of Environmental Protection and Chemical Safety), Hanoi, Vietnam.

International Centre for Science and High Technology
ICS - UNIDO

Training Course on Geographic Information System and Water Management for Industrial Activities

9 - 17 June 1997, Hanoi, Vietnam

Institute of Industrial Chemistry-IIC
Centre of Environmental Protection and Chemical Safety

Presentation

The International Centre for Science and High Technology (ICS), Trieste, Italy, is organizing a training course on Geographic Information Systems and Water Management for Industrial Development in Hanoi, Vietnam, in collaboration with the Institute of Industrial Chemistry (Centre of Environmental Protection and Chemical Safety), from 9 to 17 June, 1997.

The course is addressed to junior and middle level experts in environmental problems and data analysis who have contacts with the decision making parties of their countries in supporting planning an management with a special focus on environmental quality protection.

The aim of the course is to introduce the participants to the advance use of Geographic Information Systems (GIS) and Decision Support Systems (DSS) in Environmental Impact Assessment (EIA) studies and to question how such tools can effectively be implemented in the social, economic, political context of developing countries.

Contents

The course will focus on the practical application of GIS, DSS and EIA methods. Discussed topics will be : industrial risk assessment, industrial activity planning and siting, population distribution and tracking analysis, water management, environmental quality assessment, technology management, plan making and policy analysis. Case studies and practical will be provided.

Program

Theoretical lectures and practical will cover the following (modification may occur according to academic staff availability, etc.):

- Industrial activity overview
- Risk and influence of industrial activities
- Disturbance of ecological Systems
- Technology management
- GIS - DSS: spatial analysis for EIA
- Population flow and distribution
- Industrial siting and suitability analysis
- Measurements of water parameters
- Field trip
- Water quality assessment
- Implementation systems (GIS-DSS)

Academic Staff

Do Thanh Bai, *IIC, Hanoi, Vietnam*
Driss Ben Sari, *ICS, Trieste, Italy*
Leif Braute, *UNIDO, Vietnam, Austria*
Kurt Fedra, *ESS, Vienna, Austria*
Enrico Feoli, *ICS, Trieste, Italy*
Christian Mannaerts, *ITC, Enschede, The Netherlands*
Pham Van Ninh, *CMESRC, Hanoi, Vietnam*
Andrea Patrono, *ICS, Trieste, Italy*
Sundeep Sahay, *ICS, Trieste, Italy*
Nguyen Danh Son, *NISTPASS, Hanoi, Vietnam*
Piergiorgio Stipa, *ICS, Triese, Italy*

Methodology

The course will be organized in five main parts:

- Introductory lectures (theoretical)
- Demonstrations and field trip
- Participant's presentations
- Case studies and tutorials
- Technology management

Financial support

Selected participants (max. 20) will be granted according to standard UNIDO policy. Travel and full board accommodation expenses will be covered by the organization (excluding participants from Hanoi). Inscription will be free of charge.

AIDE-MEMOIRE

BACKGROUND AND JUSTIFICATION

Uncontrolled development of industrial activities in South East Asia has led to a massive increase of exploitation and uneven of the coastal, marine and fresh water resources and facilities. The living and non-living resources are extensively overexploited and poorly managed due to lack of technologies and adequate funds. The absence of environmental data, information and specific technologies mandatory to introduce a sustainable and feasible approach for the utilazation of the resources have been among the limiting factors of the adequate management for industrial activities.

In recent years, the relationship between industrial and water has become a critical issue for ecological sustainable development (ESID). As a matter of fact, industry is the fastest growing sector with respect to water use. The total water pollutant load from the industrial sector is increasing and we are facing a shift from biological to chemical contamination (e.g. POPs). A direct consequence has been an increasing impact on aquatic environment and human health. The International Community is focusing its attention to these issues through several programmes and documents, recently approved. The most important guidelines of intervention can be found in Agenda 21, in global and regional conventions and protocols, in the Global Programme of Action (Washington D.C., 1995),in the UNDP/World Bank Water programme, in the UNDP strategy for water and sustainable development, and in the UNIDO Industry and Water Initiative. In this framework UNIDO is trying to coordinate its activities related to water, focusing the attention on pollution prevention and water conservation, by source controls and demand management. The UNIDO initiative is aimed at providing support to decision markers in governments, regulatory agencies and the private sector. Moreover it aims at developing assessment and planning tools to support the formulation of national and regional action programmes through acity building and training. In this context, one of the priorities are assessment and modeling tools, such as Geographic Information Systems (GIS) and Decision Support Systems (DSS).

In recent years a number of studies have focused on the role of the spatial information systems in facilitating more understandable and environmental-friendly industrial and lands e planning. Special attention has been given to the potential use of geographic information systems (GIS) when combined with multi-criteria analysis (MCA) techniques in environmental management.

GIS, Multi-objective Decision Support Systems and related information technologies have become powerful in their ability to manipulate

a wide variety of social, economic, environmental and physical data. Especially the integration of GIS and MCA systems has become a central focus for the development of general- purpose land/ water use/ environmental planning tools and methods that can help decision makers.

Lands e planning and more recently industrial planning are probably the most obvious and widely cited fields to benefit from GIS. Spatial information and GIS are key tools in ecological analysis and environmental impact assessment (EIA), where the primary aim is to provide a synoptic view of large lands e spatial data sets, especially for making comparative studies over space and time. Spatial information systems cannot be considered tools as such, but rather tools for improving the quality of planning and decision-making. This also means that it is an aid in solving one of the key problems faced by decision makers concerning the identification of the most ecological- acceptable compromise by means of comparison, on a multiple criteria, within a given set of feasible alternatives. In this last phase, MCA support is critical because rules of combination and/ or comparison do not necessarily require the separate evaluation of each potential or actual combination of environmental criteria, nor the determination of mathematical relationships among mapped criteria. Many spatial decision- making problems, such as site selection or land/ water use allocation, require the decision maker to consider the impacts of choice-alternatives along multiple dimension in order to choose the best alternative.

The implementation of GIS and DSS can stimulate and guide the water management for industrial activities: it can minimize the degradation of the natural system, provide a framework for the management of multi-sectoral activities (industry, agriculture, municipal waste etc.) and maintain options for future uses of resources, ultimately contributing to the improvement of environmental quality and human health and to the protection and sustainable use of region water resources.

AIMS AND EXPECTED OUTPUTS OF THE TRAINING COURSE.

The main objective of the training course is to introduce the participants to the advanced use of Geographic Information Systems (GIS) and Decision Support Systems (DSS) in Environmental Impact Assessment (EIA) studies and to question how such tools can effectively be implemented in the social- economic- political context of developing countries to assist the local authorities in proposing consistent policies and strategies aiming at an effective sustainable developing approach in the management of water resources for industrial activities.

The training course will also be the occasion to establish a common forum of discussions and exchange of experiences for the participants, since each participant is expected to present his/her current activities in the

regional context focusing on the analysis of the industrial activities with special attention to water management related issues.

STRUCTURE OF THE TRAINING COURSE

The training course is designed for middle level technical personnel with some experiences in the field of utilization of GIS and DSS.

The course will consist of different types of activities :

- Introductory lectures (theoretical);
- Demonstrations and field trip;
- Participants' presentations;
- Case studies and tutorials;
- Technology management.

Several lectures will be given by specialists in GIS, DSS and EIA.

Theoretical lectures will be presented on topics such as:

- Industrial activity overview;
- Risk and influence of industrial activities;
- Disturbance of ecological Systems;
- GIS-DSS: spatial analysis for EIA;
- Pollutant flow and distribution;
- Industrial sitting and suitability analysis;
- Measurements of water parameters;
- Water quality assessment;
- Implementation systems (GIS-DSS);
- Technology management.

Special practical training will be given to the participants by using adapted case studies and computer demons.

Deadline

The deadline for the submission of application forms will be the 30 April 1997.

PARTICIPATION

Participation is by invitation, after selection of candidates. A maximum of 25 participants (of which 10 from Vietnam) will be admitted to the training course coming from South East Asian countries (e.g. Bangladesh, Birmania, Brunei, Cambodia, China, India, Indonesia, Laos, Malaysia, Philippines, Sri Lanka, Taiwan, Thailand, Maldives, New Guinea). About twelve lecturers will be invited to speak on specific topics.

Profile of Participants

The candidates should have a medium level expertise in environmental problems and data analysis. They should have a Bachelor's or Master's degree in natural/biological sciences, engineering, environmental sciences or economics (environmental oriented) and few years of practical experience in the fields of GIS and DSS, industrial planning and Research and Development. It is highly recommended that candidates have close contacts with the decision making parties of their country in supporting planning and management. Those with Ph.D. degree and those involved only in administration will not be considered. Participants should provide a guarantee that he/she would continue to work in the trained field after the training.

ICS- UNIDO will, in cooperation with the local coordinator, select the participants from the applications received, giving due regard to professional qualifications, experience, and other relevant considerations. Preference will give to those candidates working in the industry or with the industry.

TENTATIVE PROGRAMME

Monday 9 June

08:30-09:30	Registration
09:30-10:30	Opening ceremony
10:30-11:00	Coffee break
11:00-12:30	Overview of industrial development in Vietnam (and South East Asia) in the last decade (Bai, Quang)
12:30-14:00	Lunch
14:00-15:30	Industry and water management issues (Braute, Quang)
15:30-16:00	Coffee break
16:00-17:30	Environmental management systems (O'Laoire, Danh Son)

Tuesday 10 June

08:30-09:30	Introduction to GIS (Fedra, Feoli)
09:30-10:30	Introduction to DSS (Fedra, Feoli)
10:30-11:00	Coffee break
11:00-12:30	Use of GIS and DSS for pollution flow modeling/ distribution (Fedra, Feoli)
12:30-14:00	Lunch
14:00-13:30	Industrial sitting/suitability practical (Fedora, Patron, Step, Sashay, Feoli)
15:30-16:30	Coffee break
16:00-17:00	Continuation of Industrial sitting/ suitability-practical (Fedra, Patrono, Stipa, Sahay, Feoli)

Wednesday 11 June

08:30-10:30	Industry and ecosystems (Feoli)
10:30-11:00	Coffee break
11:00-12:30	Overview on sample analysis and data processing (Feoli)
12:30-14:00	Lunch
14:00-15:30	Local case studies and participants' presentation of their research activities (Chaired session) open discussion
15:30-16:00	Coffee break
16:00-17:00	Continuation of Local case studies and participants' presentation of their research activities (Chaired session) open discussion

Thursday 12 June

08:30-10:30	Water resources management (Braute, Quang)
10:30-11:00	Coffee break
11:00-12:30	Overview on ground treatment technology (Ben Sari, Hung)
12:30-14:00	Lunch
14:00-15:30	Local case studies and participants' presentation of their research activities (Chaired session) open discussion
15:30-16:00	Coffee break
16:00-17:00	Continuation Local case studies and participants' presentation of their research activities (Chaired session) open discussion.

Friday 13 June

08:30-09:30	Introduction to EIA (Ben Sari, Hung)
09:30-10:30	Monitoring networks (Ben Sari, Hung)
10:30-11:00	Coffee break
11:00-12:30	Project implementation: Red River case study (UNIDO project) (Danh Son)
12:30-14:00	Lunch
14:00-15:30	Demonstrations, special systems/ ad-hoc applications (local regional projects) (MEKONG project) (Fedra, Patrono, Stipa)
15:30-16:00	Coffee break
16:00-17:00	Continuation of demonstrations, special systems/ad-hoc applications (local/ regional projects) (MEKONG project) (Fedra, Patrono, Stipa)

Saturday 14 June

08:00-17:00	Field trip measurements of water parameters for river water quality assessment (boat trip on Red River)

Sunday 15 June
(Free)

Monday 16 June

08:30-09:30	Problems of implementation of GIS and DSS systems in developing countries (Bai, Sahay)
09:30-10:30	Possibility to establish small GIS enterprises for environmental issues (Sahay)
10:30-11:00	Coffee break
11:00-12:30	Demonstrations, special systems/ad-hoc applications (local/ regional projects) (Patrono, Stipa)
12:30-14:00	Lunch
14:00-15:30	Continuation Demonstrations, special systems/ad-hoc applications (local/regional projects) (Patrono, Stipa)
15:30-16:00	Coffee break
16:00-17:00	Continuation Demonstrations, special systems/ad-hoc applications (local/regional projects) (Patrono, Stipa)

Tuesday 17 June

08:30-09:30	Technology management - case studies (Bai, Sahay)
09:30-10:30	Practical with GIS/ DSS/ ad hoc software, etc. (Patrono, Stipa)
10:30-11:00	Coffee break
11:00-12:30	Continuation of Practical with GIS/ DSS ad hoc software, etc. (Patrono, Stipa)
12:30-14:00	Lunch
14:00-15:30	Demonstration, special systems / ad- hoc application and or practical (local/regional projects) (Patrono, Stipa)
15:30-16:00	Coffee break
16:00-17:00	Continuation of Demonstration, special systems/ ad- hoc application and or practical (local/ regional projects) (Patrono, Stipa)

Thursday 18 June

08:30-10:30	Evaluation by the participants (discussion)
10:30-11:00	Coffee break
11:00-12: 30	Continuation of Evaluation by the participants (discussions)
12:30-14:30	Lunch
14:30-15:30	Closure of the course

DOCUMENTATION

The documents available for the training course will be:

1) Aide- mémoire of the training course.
2) Programme and list of participants
3) Lecture notes, bibliography and copies of manual of exercises (for internal use only).
4) A list of selected bibliography on DSS for industrial development.

LANGUAGE

The training course will be conducted in English and no translation facilities will be available. It is expected that the participants have a good command of English.

TIME AND VENUE

The Training course will be held in Hanoi, Vietnam from 9 to 18 June 1997. The course coordinator is Mr. Do Thanh Bai, Institute of Industrial Chemistry Center of Environmental Protection and Chemical Safety, 2 Pham Ngu Lao, Hanoi, Vietnam. Tel: +84 48 249231, Fax: + 84 48 248509

FINANCIAL ADMINISTRATIVE ARRANGEMENTS FOR UNIDO-ICS FINANCED PARTICIPANTS

ICS-UNIDO through the Coordinator of the hosting institute, will provide:

(a) Round-trip air transportation through the most direct and economic route between the airport of departure in the home country and Hanoi;

(b) Board and Accommodation for the official duration of stay in Hanoi;

(c) An ad-hoc lump sum allowance for out-of-pocket expenses;

(d) Internal travel for participants from the airport and related to training activities;

The participant's government or his employer will be required to bear the following costs:

(a) All expenses in the home country incidental to travel abroad, including, expenditure for passport, airport tax, visa, medical

examinations, vaccinations and other such miscellaneous as well as internal travel to and from the airport of departure in the participant's home country:

(b) Salary and other benefits from the participants during the period of the training programme.
Neither the host Institute nor the ICS-UNIDO will assume any responsibility for the following expenditures in connection with the participants' attendance to the training Course:

(a) costs incurred by participants with respect to any insurance, medical bills and hospitalization fees; It is strongly recommended to sign up for (take) a health and travel insurance prior to departure from home country to cover the period from the time of departure from home country until return to home country;

(b) compensation in the event of death, disability or illness of participants;

(c) loss or damage to personal property of participants and baggage;

(d) purchase of personal belongings and compensation in the event of damage caused to them by climatic or other conditions;

(e) cost of any excess luggage.

Participants are not permitted to have members of their family accompany them.

VISA ARRANGEMENTS

Before departure for Hanoi, participants should ensure that their passports are valid for travel to Hanoi for the whole period of the training course and should obtain valid visas and inform the host Institute for assistance if visa cannot be obtained in their countries. In case of difficulties, please advise the contact person mentioned below.

CONTACT PERSON

For additional information, please contact Mr. Do Thanh Bai. Further details about the training course and travel instruction will be provided upon request.

Mr. Do Thanh Bai

Institute of Industrial Chemistry
Center of Environmental Protection and Chemical Safety
2. Pham Ngu Lao, Hanoi, Vietnam
Tel:+84-48-249231 Fax: +84-48-248509
E- mail: baittmt@netnam.org.vn

JUSTIFICATION FOR CHOOSING THE INSTITUTION

The general justification of the Institute that will host the training course is due to the following reasons:

- the acity of the Centre of Environmental Protection and Chemical Safety, Institute of Industrial Chemistry, Ministry of Industry, Vietnam to organize activities in water management for industrial activities and the strong chance of Vietnam to be a reference focal point for strengthening the network of South East Asian centers interested in GIS and DSS for industrial development;

- the Centre of Environmental Protection and Chemical Safety, Institute of Industrial Chemistry, Ministry of Industry, Vietnam, was selected to hold the Training Course as it represents a prestigious institution in the South East Asia Region. In addition, the Centre is involved with on- going UNIDO projects on waste water pollution reduction, and this experience will be highly valuable for the conduction of the training activity.

- the Centre of Environmental Protection and Chemical Safety cooperates with the Ministry of Industry in Vietnam. This link will be practically used in the conduction of the training activity, whose main objective is to introduce the use of high technology tools (GIS and DSS) in the decision making process of industrial development at ministerial level.

- the Centre of Environmental Protection and Chemical Safety has collaborated in the past with the UNIDO country office of Hanoi, Vietnam. This past and present collaboration will enable a better management and use of the ICS budget allocated for this event (e.g. for computer facilities, communications and local assistance).

PROGRAMME

International Training Course on Geographical Information Systems and Water Management for Industrial Activities. (Hanoi, Viet Nam, 9-18 June 1997)

DAY/DATE	TIME	ACTIVITIES
MONDAY 9 June	08.30-09.30	Registration
	09.30-10.30	Opening Ceremony - Opening address by the Minister of Industry of Vietnam - Welcome speech of Prof. Tuyen (Director of IIC) - Presentation of UNIDO (Mr. Brenning, UNIDO Country Director) - Presentation of ICS-UNIDO (Prof. Feoli, ICS) - Addresses by invited national speakers: NEA and NCST - Presentation of IIC (Mr. Bai)
	10.30-11.15	*Coffee Break*
		Block I - Introduction to the Course
	11.15-12.15	Presentation of ICS Sub-programme on Decision Support Systems and scope of the ICS training course (Prof. Feoli)
	12.15-12.30	Overview of UNIDO's AEQM projects in Viet Nam (Mr. Day, Mr. Grayman,)
	12.30-14.00	*Lunch*
	14.00-15.30	Self-introduction of participants - background, work responsabilities, expectations, etc. (Chaired session)
	15.30-16.00	*Coffee Break*
		Block II - Description of Issues and Problem Areas
	16.00-16.30	The concept of Sustainable Industrial Development - the role of government and the private sector (focused on water issues) (Mr. Day)
	16.30-17.30	Overview of industrial development in Viet Nam and in the South East Asia region. (Mr. Bai, Mr. Son)
TUESDAY 10 June	08.30-09.30	Regional development scenarios and land-use planning as framework for sustainable industrial development. (Mr. Moss)
	09.30-10.30	Central issues for spatial planning and water management in industrializing areas - examples from ongoing UNIDO projects. (Mr. Day, Mr. Grayman)
	10.30-11.00	*Coffee Break*
	11.00-12.30	Introduction to Industrial Ecology and the implication for water management. (Prof. Feoli)
	12.30-14.00	*Lunch*
	14.00-15.30	Participants' presentation of issues and problems faced in their field of work. (Chaired session)
	15.30-16.00	*Coffee Break*
	16.00-17.30	[Continued]...Participants' presentations (participants are invited to prepare a short paper on problem issues to be discussed in the last day of the course)

WEDNESDAY 11 June		Block III - Methodologies and Tools
	08.30-09.00	Summary of Block II and overview of Block III. (Prof. Feoli)
	09.00-9.30	A brief history of Geographic Information Systems (GIS) in water resources (Mr. Grayman)
	09.30-10.30	Development of a spatial Decision Support System (DSS) for the Ohio river (Mr. Grayman)
	10.30-11.00	Water quality modeling - data collection and verification, interpretation of results. (Mr. Grayman)
	11.00-11.30	*Coffee Break*
	11.30-12.30	Use of GIS and DSS for pollution flow modeling (Mr. Mannaerts)
	12.30-14.00	*Lunch*
	14.00-15.30	Introduction to Geographical Information Systems (GIS) and its application in aera-wide industrial development planning. (Prof. Feoli, Mr. Patrono)
	15.30-16.00	*Coffee Break*
	16.00-17.00	Introduction to Decision Support Systems (DSS) and its application in area-wide industrial development planning. (Prof. Feoli, Mr. Patrono)
	17.00-17.30	Introduction to the *IDRISI* software. (Mr. Patrono, Mr. Stipa)
	17.30-	Getting to know *IDRISI* (free access to computers for tutorials) (Mr. Patrono, Mr. Stipa)
THURSDAY 12 June	08.30-09.30	Introduction to Multi Criteria Analysis and its application in area-wide industrial development planning. (Prof. Feoli, Mr. Patrono)
	09.30-10.30	Environmental assessment and water quality (Mr. Mannaerts)
	10.30-11.00	*Coffee Break*
	11.00-11.30	[Continued...] environmental assessment... (Mr. Mannaerts)
	11.30-12.30	Water management and EIA. (Mr. Mannaerts)
	12.30-14.00	*Lunch*
		Block IV - Case Studies
	14.00-14.30	Summary of Block III and overview of Block IV. (Prof. Feoli)
	14.30-15.30	Identification and assessment of waste emission impacts on water resources (using GIS/DSS) – Case study on the Bagmati river, Kathmandu valley, Nepal (Mr. Mannaerts)
	15.30-16.00	*Coffee Break*
	16.00-17.30	[Continued...] Use of GIS and DSS in specific water management and industrial siting projects (Mr. Mannaerts)
FRIDAY 13 June	08.30-09.30	Oil spilling case study (Mr. Ninh)
	09.30-10.30	Case studies from ongoing project in Viet Nam. Discussion (soil erosion project) (Mr. Eddy, Mr. Y,) [Continued...] case studies from ongoing project in Viet Nam. Discussion. (Mr. Thuren)
	10.30-11.00	*Coffee Break*
	11.00-12.30	Introduction to the COSMO software - MCA (Mr. Bai)
	12.30-14.00	*Lunch*

		Block V - Demonstrations and Practical Exercises
	14.00-14.30	Introduction and overview. (Mr. Patrono, Mr. Mannaerts)
	14.30-15.30	Demonstrations of software tools (Duflow modelling – advective/dispersive transports of conservative and non-conservative substances in rivers; oxygen balances....) (Mr. Mannaerts)
	15.30-16.00	*Coffee Break*
	16.00-17.30	Practical computer exercises with GIS/DSS software and related tools. (Mr. Patrono, Mr. Stipa)
SATURDAY 14 June	08.00-17.00	Field Trip (boat trip on the Red River): measurements of water parameters for river water quality assessment. (Mr. Hung) Field measurement technique (Mr. Hung) (presented on boat)
MONDAY 16 June	08.30-09.30	Demonstrations of software tools. (Mr. Patrono, Mr. Mannaerts)
	09.30-10.30	Practical computer exercises with GIS/DSS software and related tools. (Mr. Patrono, Mr. Stipa, Mr Mannaerts)
	10.30-11.00	*Coffe Break*
	11.00-12.30	[Continued...] Practical computer exercises with GIS/DSS software and related tools. (Mr. Patrono, Mr. Stipa, Mr Mannaerts)
	12.30-14.00	*Lunch*
	14.00-15.30	Demonstrations of software tools. (Mr. Patrono, Mr. Mannaerts)
	15.30-16.00	*Coffee Break*
	16.00-17.30	Practical computer exercises with GIS/DSS software and related tools. (Mr. Patrono, Mr. Stipa, Mr Mannaerts)
TUESDAY 17 June		**Block VI - Implementation and Decision-making**
	08.30-09-30	The role of economic incentive in the prevention and control of industrial water pollution (Mr. O'Rouke)
	09.30-10.30	Problems of implementing GIS and DSS in developing countries. (Mr. Sahay)
	10.30-11.00	*Coffee Break*
	11.00-12.30	[Continued...] Problems of implementing GIS and DSS in developing countries. (Mr. Sahay) + Discussion with the participants
	12.30-14.00	*Lunch*
	14.00-15.30	Case studies on implementation of GIS and DSS in the decision support process in developing countries. (Mr. Sahay)
	15.30-16.00	*Coffee Break*
	16.00-17.30	Open discussion on selected topics reflecting specific problems faced by the participants. (Chaired session)
WEDNESDAY 18 June		**Block VII - Follow-up and Course Evaluation**
	08.00-10.30	Open discussion on recommendations for possible follow-up reflecting the needs of the participants (based on short papers prepared by participants during the week) (Chaired session)
	10.30-11.00	*Coffee Break*
	11.00-12.00	Course evaluation by the participants. Open discussion. (Chaired session)
	12.00-12.30	Conclusions and closure of the course. (Mr. Bai, Mr. Stipa)

ANNEX 3: LIST OF COURSE MATERIAL USED IN THE TRAINING COURSE

1. ICS- UNIDO

2. **Complementary environmental measures to achieve sustainable industrial development.**
Ralph (Skip) Luken, Environment and Energy Branch
Industrial Sectors and Environment Division
UNIDO, Vienna, Austria

3. **Sustainable water:**
An update by population action international- population and environment program - USA

4. **GIS and ecosystem models**
E. Feoli

5. **Industrial development in Vietnam and the South- East Asia region**
Nguyen Danh Son, NISTPASS

6. **Geographic information systems and water resources**
American water resources association

7. **Environmental application of GIS**
Identification and assessment of waste emission impacts on water resources
Chris Mannaerts

8. **Idrisi for windows - User's guide**
Ronald Eastman

9. **water quality modeling of rivers**
Walter M. Grayman

10. **Some issues of the management and control of industrial pollution in Vietnam**
Do Thanh Bai, IIC

11. **An introduction to methods for environmental impact assessment**

Patrono, ITC

12. Instructions for use of the demonstration disks

13. Introduction to decision support systems
Andrea Patrono, ITC

14. GIS and decision making
UNITAR

15. GIS Applications in coastal zone research and management
Kevin St. Martin, USA

16. Environmental assessment & water quality
WHO

17. Vietnam- Canada environment project
environmental planning and management of industrial parks
Linda Ghanime - environmental consultant of VCEP Project

18. Use of GIS for surface water & pollution flow modeling
Chris Mannaets

19. Demo exercises: water quality
Chris Manaerts

20. COSMO: introduction

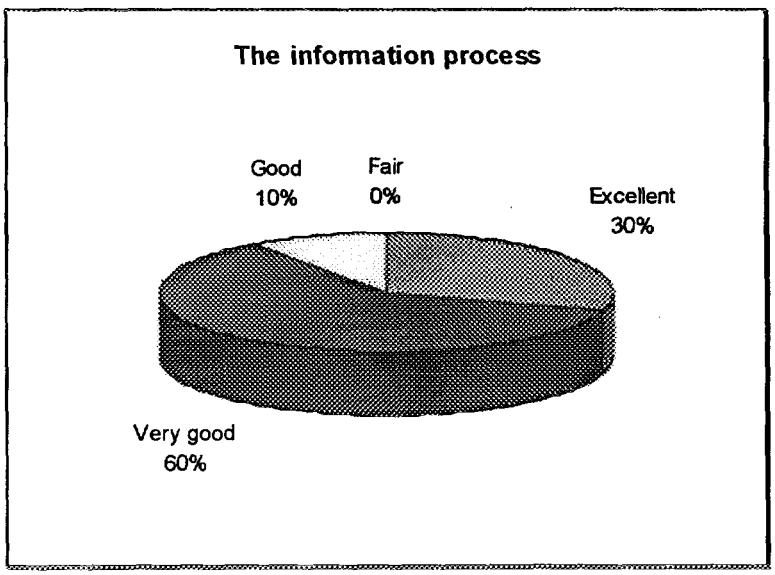
21. Application of GIS in oil spill sensitive mapping
Pham Van Ninh, CMESRC

22. GIS in developing countries: Problems and opportunities
Sundeep Sahay

23. Water resources development in Vietnam
Bui Cong Quang, Hanoi water resources university

24. Information of the industrial zone of Dong Nai Province for case study on implementation of GIS and DSS in the developing countries.
Do Thanh Bai, IIC

Chart number 1



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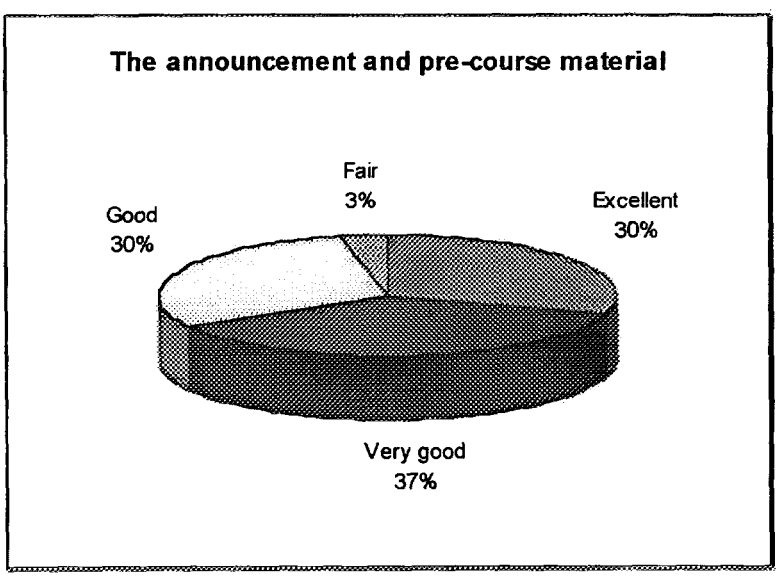

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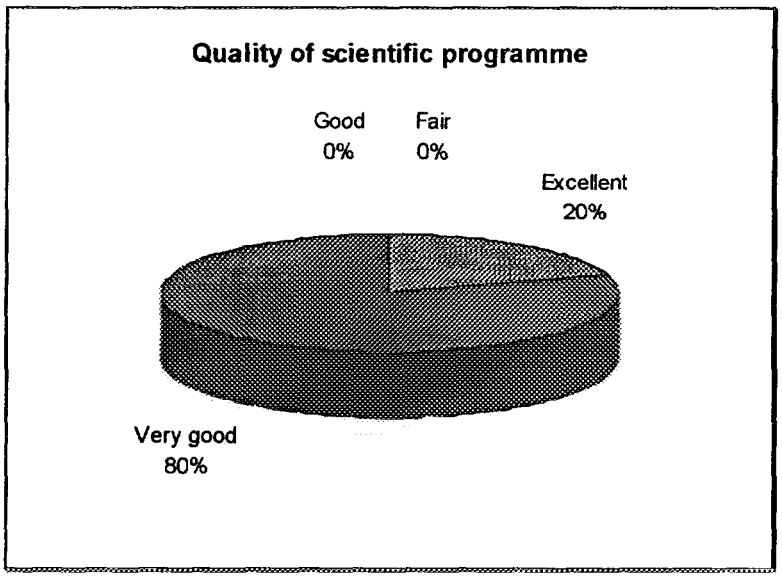

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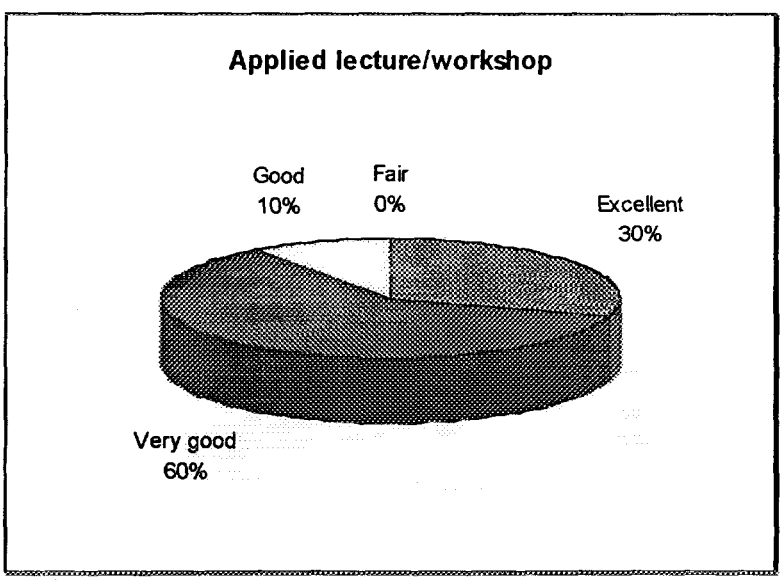

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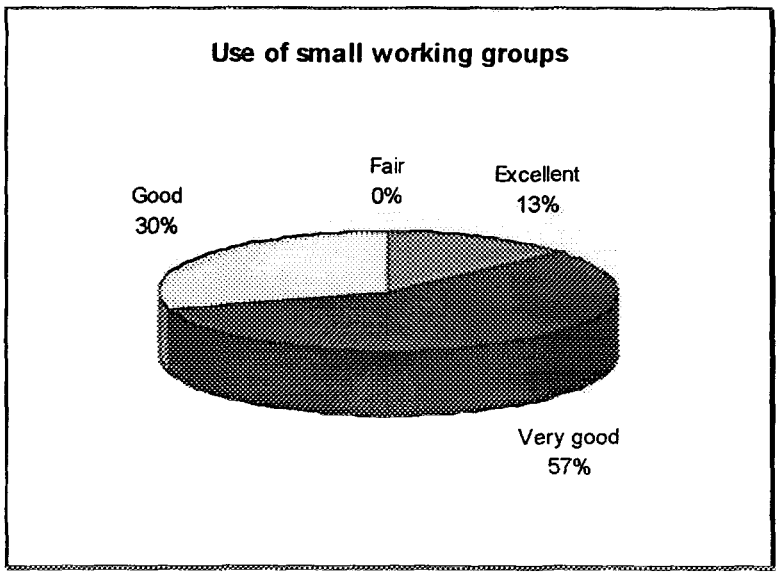

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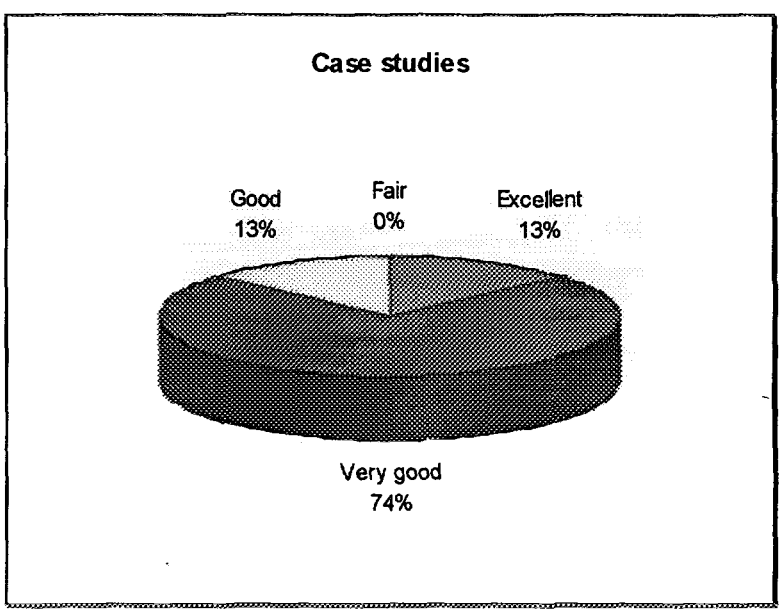

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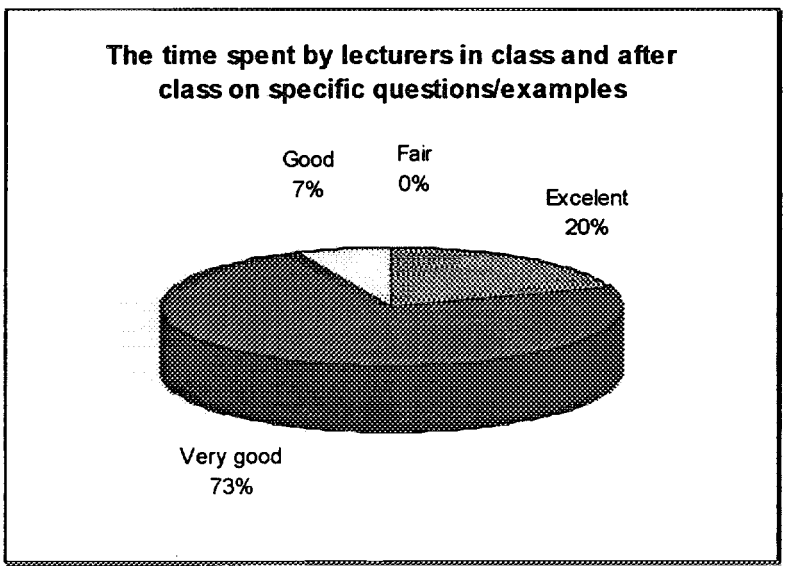

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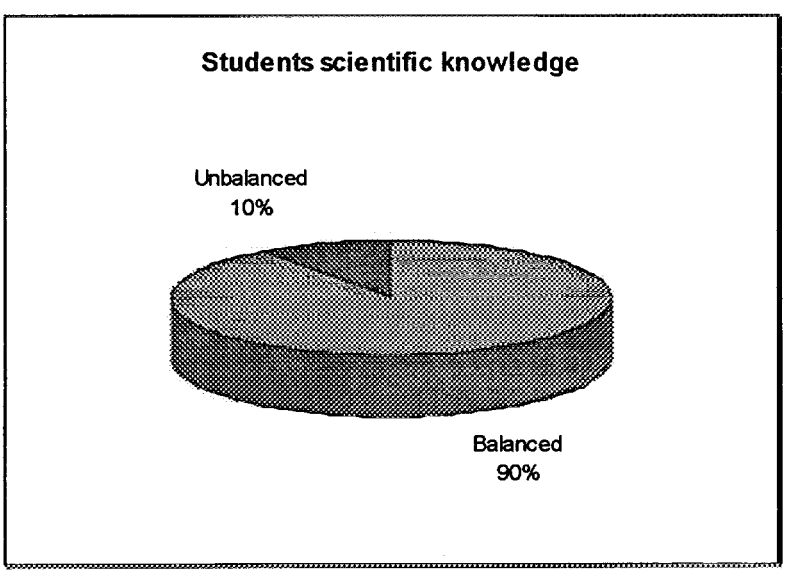

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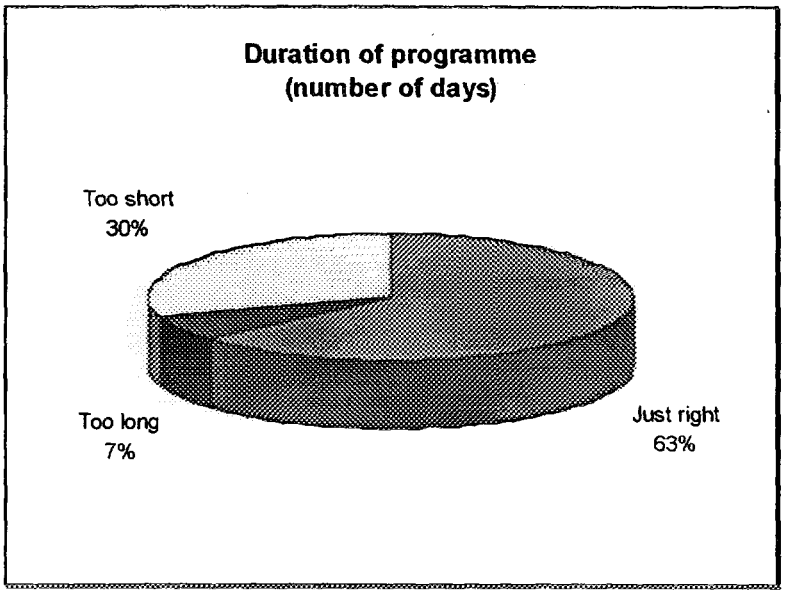

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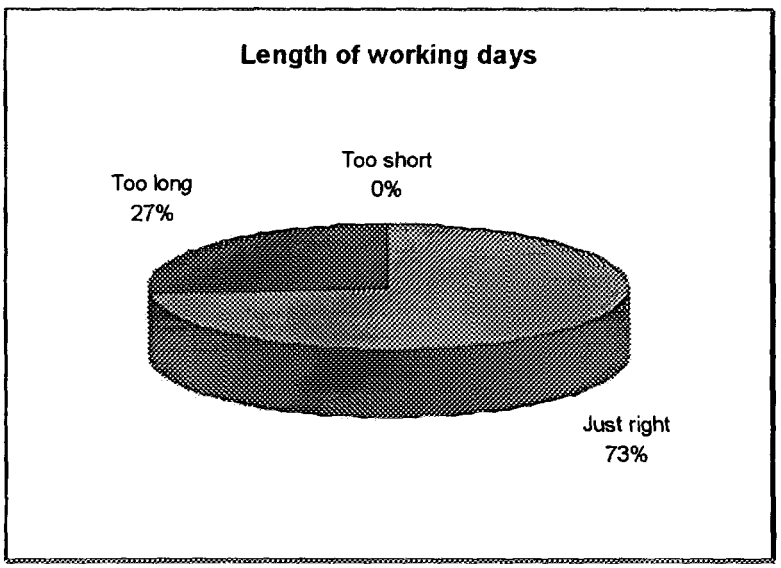

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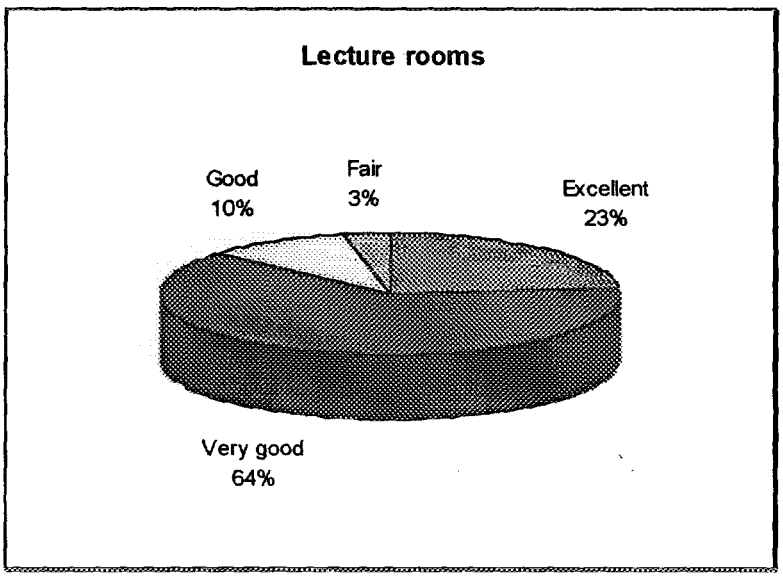

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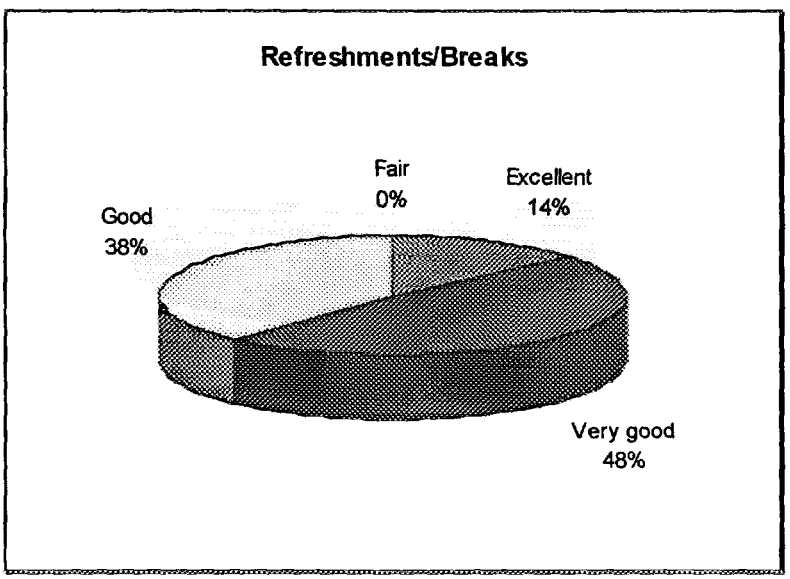

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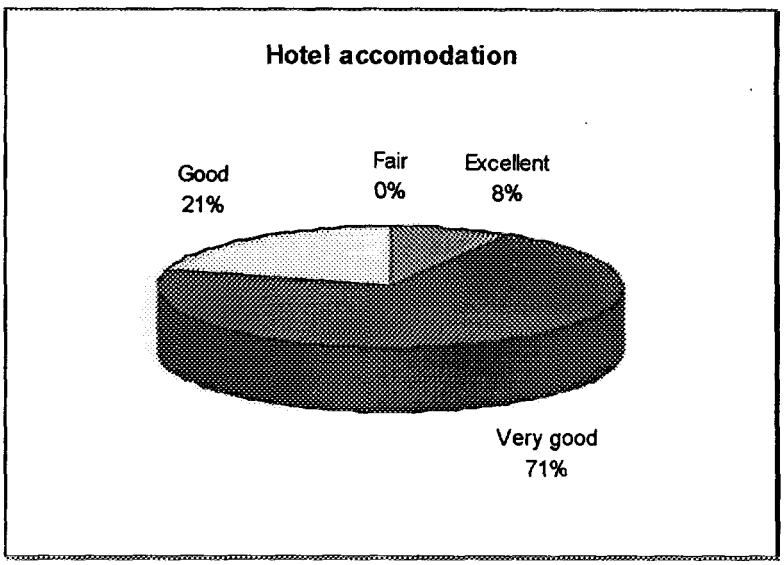

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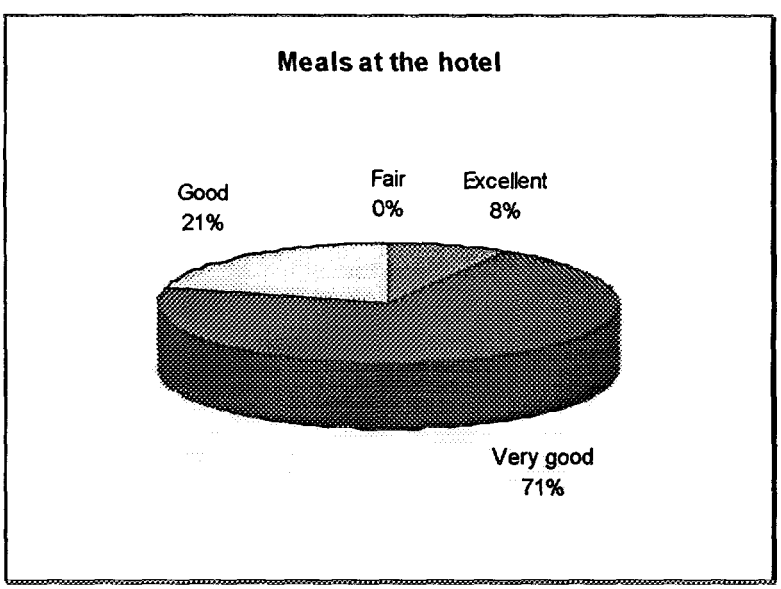

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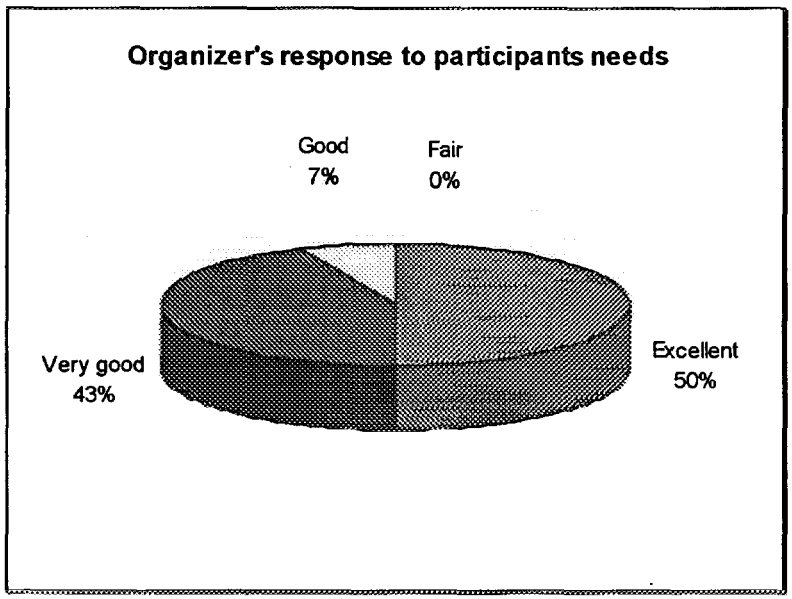

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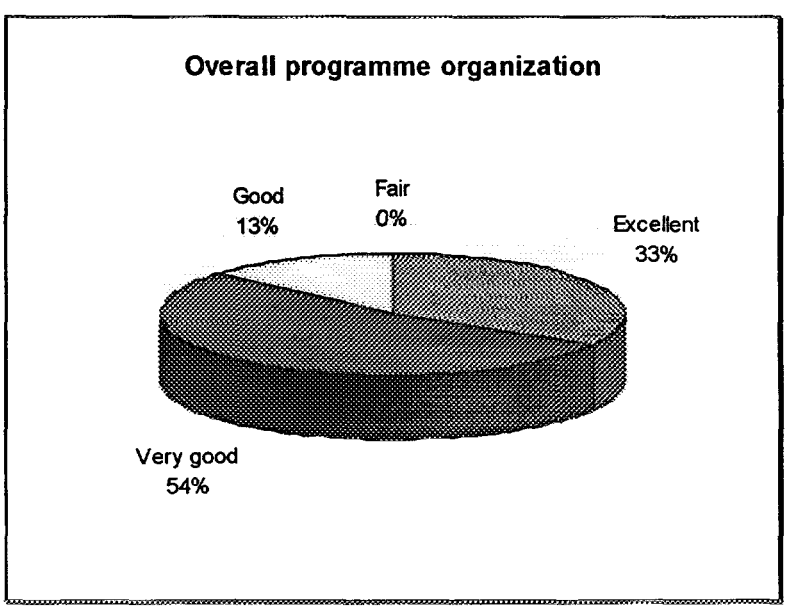

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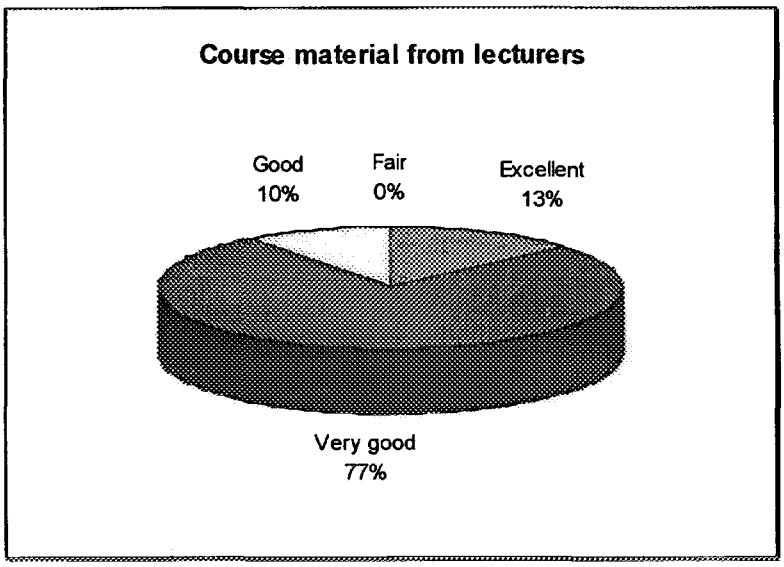

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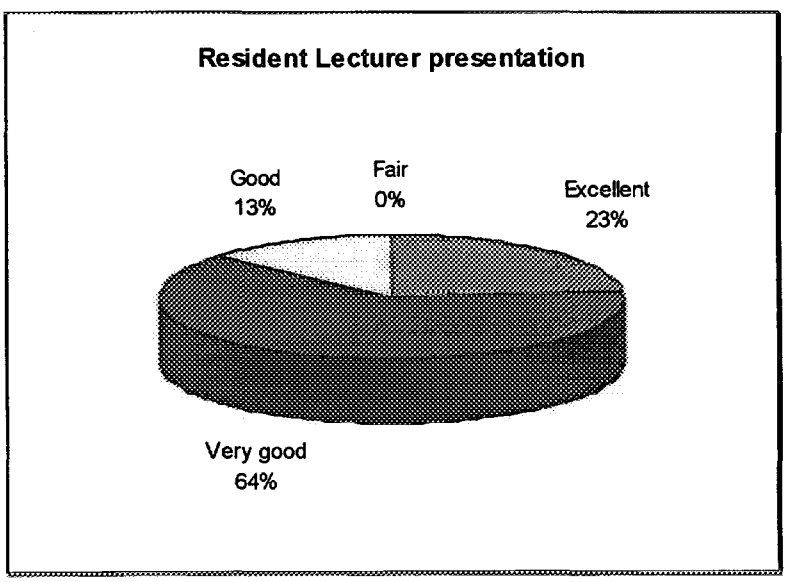

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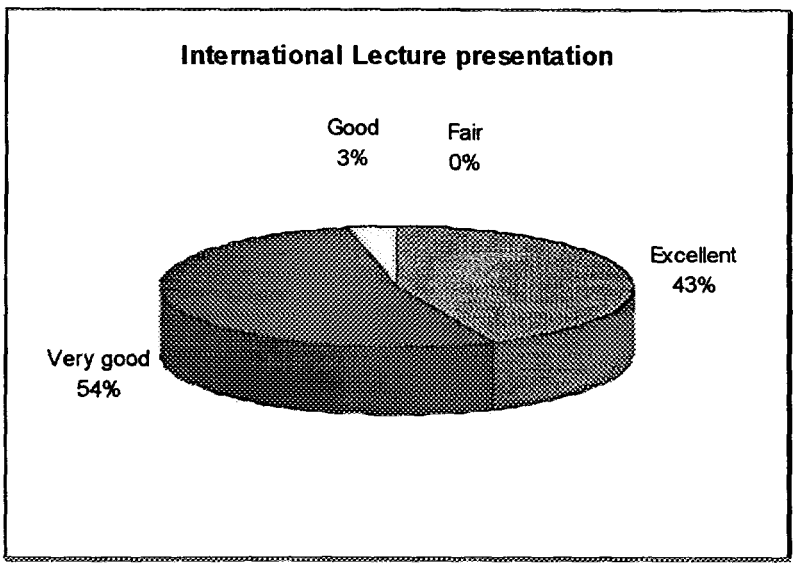

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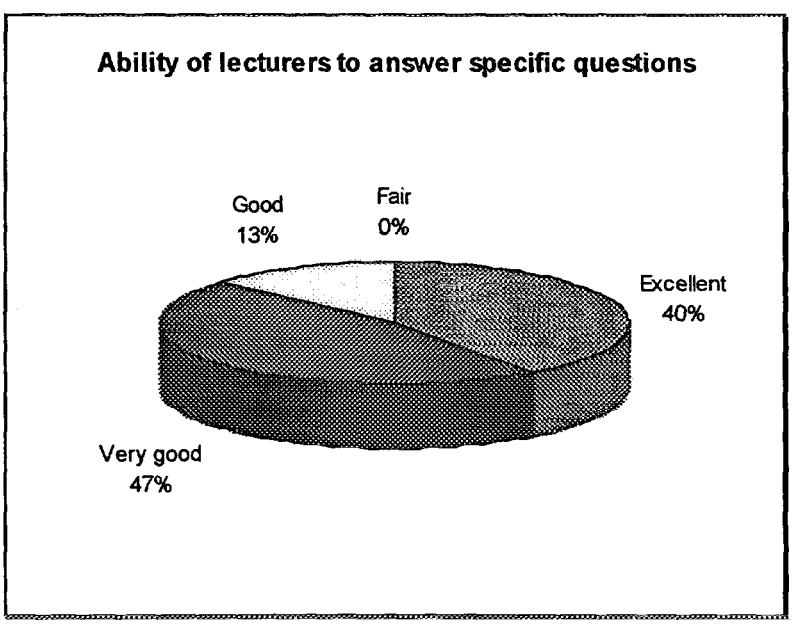

TRAINING COURSE ON GIS AND WATER MANAGEMENT FOR INDUSTRIAL ACTIVITIES, IN HANOI, 9-18 JUNE,1997

LIST OF PARTICIPANTS

No	Name	Date of birth	Nationality	Address	Fax	Tel
	Local Participants					
1	Mrs.Nguyen Thi Doan Hanh	10.8.1942	Vietnamese	Vietnam national minerals corporation	84 4 8770034	84 48 770016
2	Mr.Pham Quang Phuc	4.8.1962	Vietnamese	DOSTE of Haiphong	84 31 845183	84 31 846475
3	Mrs. Le Thi Bich Thuy	15.8.1960	Vietnamese	Ministry of Science, technology and environment national environment agency	84 48 251518	84 48 242510
4	Mrs. Pham Thi Chin	19.9.1968	Vietnamese	DOSTE of Danang	84 51 822864	84 51 891095
5	Mr. Nguyen Dong Lam	7.8.1940	Vietnamese	MOI- Department for technology and quality product		84 48 260657
6	Mr. Pham Gia Hai	28.2.1950	Vietnamese	DOSTE of Dong nai	84 61 821914	84 61 821805
7	Ms. Pham Thi Minh Hien	20.9.1967	Vietnamese	CEST	84 48 693551	84 48 691466
8	Mr. Nguyen Mai Dang	30.5.1970	Vietnamese	Hydrology and environment department, HN Water resources university	84 48 534198	84 48 522027
9	Mr. Do Quang Minh	27.8.1971	Vietnamese	Institute of chemistry-'VN National Center for Natural Science and Technology	84 48 361283	84 48 362008
10	Mr. Vuong Quang Viet	21.4.1960	Vietnamese	Environment Protection Centre- HCM	84 48 454263	84 48 454263
	Foreign Participants					
11	Mr. Wu Xiao Bo	29.9.1965	Chinese	Institute of Remote sensing application-Chinese Academy of Science, China	86-10-64919460	86-10-64915035
12	Mrs. Sun I	17.8.1955	Chinese	Jiamusi Paper MillJiamusi, China	86 454 837 9558	86 454 839 1437
13	Ms. Supatta Rotphanichkul	18.3.1973	Thai	Pollution Management Coordination Division. Pollution Control Department, MOSTE- Thailand	662 619 2305	662 619 2285
14	Mr. Nguon Narin	17.6.1955	Cambodian	Industrial Environment Office. Ministry of Industry, Mines and Energy.# 45 Norodom Biud, Norodom, Phnompenh, Cambodia	85523 427840	855 23 427840
15	Mr. Mohd Hizar Bakar		Malaysian	Department of Environment, Malaysia	603 293 1480 / 293 7655	
16	Mr. W M S Weerasinghe	20.12.1959	Sri lanca	Survey department. Colombo, Sri Lanca	94 1 585 111	94 1 584 532
17	Mr.PhouvienglithThanadabouth	5.6.1966	Laotian	Integrated Resources Mapping centre. Science Technology and environment organization. Prime minister's office, Loa DPR	85621213470	856 21 213472
18	Mr. Khamphou Sivongxay	1.7.1962	Laotian	Integrated Resources Mapping centre. Science Technology and environment organization.	85621213470	85621213472

				Prime minister's office, Lao DPR		
19	Mr S Sreekesh	17.4.1964	Indian	TERI, New Delhi, India	91 11 462 1770 / 463 2609	
20	Mr Syawaluddin Lubis	16.6.1955	Indonesian	Directorate of mines Jend Gatot Subroto Kav 49Jakarta- Indonesia	62 21 5207947	62 21 5251180
21	Mr Atul Kapoor		Indian	Infomap private limited, New Delhi, India	91 11 621 1942/ 686 8031	
22	Mr Bountneung Douangsavanh		Laotian	UNDP Vientiane, Lao PDR		
	Observers					
23	Mr Dang Huy Ram	16.1.1955	Vietnamese	Department of geology and minerals of VN		84 48 267501
24	Mr Le Xuan Dinh	6.9.1972	Vietnamese	VN INFOTERRA Centre/ MOSTE	84 48 263127	84 48 263108
25	Mr Vo Thanh Son	5.9.1962	Vietnamese	Center for natural resources national university	84 48 262932	84 48 262932
26	Ms Nguyen Thi Minh Hanh	16.3.1971	Vietnamese	CRURE	84 48 215796	84 48 215885
27	Mr Do Huy Cuong	3.2.1969	Vietnamese	National centre for natural science amd technology HN Institute of oceanography	84 48 352483	84 48 345402
28	Ms Nguyen Thi Minh Trang	4.1.1972	Vietnamese	Sub- institute ecology and biological resources		84 8 8 294243
29	Mr Vu Van Tuan	4.7.1948	Vietnamese	Water and atmospheric environment research center	84 48 260779	84 48 344469
30	Ms Truong Thi Van Anh	29/8/1975	Vietnamese	Reseach and development centre for petroleum safety and environment	84 88 996008	84 88 996976
31	Ms Tran Ha Vu	28.6.1974	Vietnamese	DOSTE Quang Ngai	84 55 824023	84 55 823918
32	Mr Le Xuan Thinn	29.10.1969	Vietnamese	Center for environment management	84 21 846680	84 21 846680
	Lecturers					
33	Prof Feoli		Italiian	ICS, Trietse, Italia	39 40 224 575	
34	Mr Piergior Stipa		Italiian	ICS, Trietse, Italia	39 40 224 575	
35	Dr Andrea Patrone		Italiian	ICS, Trietse, Italia	39 40 224 575	
36	Prof Sundeep Sahay		Indian	Faculty of Business Building- University of Alberta. Edmoton, Alberta, Canada	1-403 492 3325	
37	Dr Chris Mannaerst		Dutch	International Institute for Aerospcace. Survey and Earth Science-Netherlands	31 53 487 4336	
38	Mr Day		American	UNIDO expert in Vietnam	84 61 821 805	
39	Mr Moss		American	UNIDO expert in Vietnam	84 21 846 680	
40	Mr Grayman		American	UNIDO expert in Vietnam	84 21 846 680	
41	Mr O'Rouke		American	UNIDO expert in Vietnam	84 21 846 680	
42	Mr Ander Thuren		Swedish	UNIDO expert in Vietnam	84 48 327 697	
43	Mr Nerynck Eddy		Belgian	NCST		
44	Mr Peter Guy		Canadian	VCEP	84 48 255 312	
45	Dr Le Quoc Hung		Vietnamese	NCST		84 48 362 008
46	Dr Phan Van Ninh		Vietnamese	NCST	84 48 327 903	84 48 326 136
47	Dr Nguyen Danh Son		Vietnamese	MOSTE	84 48 252 873	84 48 642 407
48	Dr Tran Van Y		Vietnamese	NCST		
49	MSc Do Thanh Bai		Vietnamese	IIC	84 48 248 509	84 48 249 231

ANNEX 6: LIST OF ASSISTANT STAFF:

This assistant staff and their functions in the training course organization are follows:

1. Prof. Dr. Ho Quy Dao, Manager
2. MSc. Do Thanh Bai, Executive Organizer
3. Mr. Tran Khanh Quang, Secretary of the course
4. Mr. Vu Kien Nam, Financial assistant
5. Mrs. Tran Bich Thuy, Financial and accommodation assistant
6. Ms. Vu Huyen Phuong, in charge of course material
7. Mr. Bui Ngoc Khoa, in charge of course material
8. Mrs. Nguyen Van Anh, in charge of visa and air tickets
9. Mr. Pham Quyen Thinh, in charge of local transportation
10. Mrs. Vu Thi Quy, organization assistant
11. Mr. Pham Hong Phong computer assistant
12. Mrs. Nguyen Thu Ha, administration assistant

ANNEX 7: LIST OF THE INVITED PERSONS WHO WERE BOUGHT TICKETS BY CECS

1. Mrs. Sunli	from China	724 USD
2. Mr. Wu Xion Bo	from China	724 USD
3. Ms. Suppatta Rotphanichkul	from Thailand	364 USD
4. Mr. Nguon Narin	from Cambodia	390 USD
5. Mr. Knampnou Sivongxay	from Laos	190 USD
6. Mr. Phouvienglith Thanadabouth	from Laos	190 USD

ANNEX 8: LIST OF INVITED PERSONS WHO WERE REIMBURSED BY CECS

1. Mr. Mona Hiazi Bakar	from Malaysia	760 USD
2. Mr. W. M. Weerasinghe	from Sri Lanca	925 USD
3. Mr. S. Sreekesh	from India	874 USD
4. Mr. Atul Kapoor	from India	918 USD
5. Mr. Syawaluddin Lubis	from Indonesia	1088 USD
6. Mr. Bountheung Douangsavanh	from Laos	216 USD
7. Mr. Chris Mannaerst	from Neitherland	1004 USD
8. Mr. Sundeep Sahay	From Canada	1360 USD
9. Mr. Andrea Patrono	from Italy	1163 USD
10. Mr. Walter Grayman	from HCMC	162 USD
11. Mr. Jak Day	from HCMC	313 USD
12. Mr. Pham Gia Hai	from HCMC	157.27 USD
13. Mr. Vuong Quang Viet	from HCMC	157.27 USD
14. Ms. Pham Thi Chin	from Danang	85 USD
15. Mr. Pham Quang Phuc	from Haiphong	3.55 USD