Intergovernmental Oceanographic Commission
Training Course Reports
3

ROPME-IOC-UNEP Training Workshop on Oceanographic Sampling, Analysis, Data Handling and Care of Equipment

Held at the University of Qatar
Doha, Qatar
3-15 December 1983

Unesco

IOC Training Course Reports

No.	Title	Language versions
1.	IOC Indian Ocean Region Training Course in Petroleum Monitoring. Held at the Australian Department of Science and the Environment, Perth, 18 February-1 March 1980	English
2.	IOC Regional Training Course for Marine Science, Technicians, Held at the Institute of Marine Science, Cape Ferguson, Queensland, 1-28 June 1980	English
3.	ROPME-IOC-UNEP Training Workshop on Oceanographic Sampling, Analysis, Data Handling and Care of Equipment, Doha, Qatar, 3-15 December 1983	English

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PREFACE

Within the framework of co-operation between the Intergovernmental Oceanographic Commission (IOC) of Unesco, the Regional Organization for the Protection of the Marine Environment of the Gulf (ROPME) and the United Nations Environment Programme (UNEP), a project providing IOC's assistance to ROPME in the implementation of the Kuwait Action Plan (KAP) was agreed upon and signed in September 1982. The activities of this project included a Regional Training Workshop on "Oceanographic Sampling, Analysis, Data Handling and Care of Equipment". The Workshop took place at the University of Qatar from 3 to 15 December, 1983.

This report, prepared by Dr. Makram A. Gerges, IOC Consultant, describes the arrangements of the Workshop and gives details of the training course outline. It also provides an evaluation of the course in the light of the assessments made by the instructors and the trainees at the end of the workshop.

The report concludes by a set of recommendations for the future training courses to be carried out in the KAP Region, in order that such training courses be an effective means of transferring marine scientific knowledge and technology amongst marine scientists in the various countries of the region.

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BACKGROUND AND OBJECTIVES

The Training Workshop on "Oceanographic Sampling, Analysis, Data Handling and Care of Equipment" was held at the University of Qatar from 3 to 15 December 1983. It was organized by the University of Qatar in co-ordination with and under the sponsorship of the IOC, ROPME and UNEP within the framework of co-operation for the implementation of the Kuwait Action Plan (KAP).

The purpose of the workshop was to provide for training of experts and technicians from the KAP Member States, who will be involved in the implementation of the future monitoring programmes in the KAP Region, in methods of oceanographic sampling, analysis and data handling as well as in maintenance and care of oceanographic equipment.

The Training Workshop was designed to meet the following specific objectives:

- to train participants from the Kuwait Action Plan (KAP) Region on sampling procedures and methods of data analysis, interpretation and presentation of certain oceanographic parameters, with a view to upgrading their analytical capabilities to enable them to execute the monitoring programme in the KAP Region and other research programmes in their countries.

- to demonstrate to the participants and train them on the handling techniques, care and maintenance of oceanographic equipment.

- to establish working contracts between the participants and marine science institutions in the Region, and to encourage and initiate full participation of the KAP Region countries in oceanographic research and in regional cooperative monitoring programmes.

OPENING

The formal opening of the Workshop took place at the Auditorium of Qatar University, Doha, Qatar, on 3 December 1983. The Workshop was inaugurated by Dr. Mohammed Ibrahim Kazem, President of Qatar University, who welcomed the participants to the Workshop.

Dr. Kazem, while emphasizing the importance of the Workshop, stated that the Gulf topographically is uniquely situated, bordered by a number of States which for a number of years have been actively involved in socio-economic activities. Thus, the Gulf is not only an important source of both living and non-living resources but also serves as an important waterway for the growth and development of activities of great economic importance to the well-being of the countries of the region. Therefore, it falls to the lot of the States of the Gulf to share the responsibilites for preservation and protection of its marine environment so as to ensure rational utilization of its resources for the common good of all concerned.

Elaborating the concept of "Protection", he said, the term had a definite connotation, especialy when it comes to dealing with the marine environment of an area such as the Gulf. In fact "Protection" calls for preservation of a given marine environment in a manner that its natural viability to reproduce the resources should at all cost be preserved. Unfortunately, this does not happen, and the human activities often are intensified beyond the limit where the expression "abuse" becomes a usual practice. This is due, among other factors, to lack of scientific knowledge about the environment and the resources themselves.

Over the years, he said, the scene of the Gulf was dominated by many activities including trade, commerce, exploration and exploitation of biological resources of all kinds, which have been adversely affecting the environment with implication on those resources. It is imperative, therefore, that serious considerations be given to the question of protection and preservation of the Gulf on a scientific basis, which calls for strengthening of the capbailities of the States and their institutions to become actively involved. It is also important to recognize that this aspect cannot be handled by an individual institution alone and therefore, there is a need to examine the whole question in terms of effective cooperation among the States.

Dr. Kazem also recalled that recognizing the importance of marine scientific research, the Qatar University recently acquired an oceanographic research vessel "Mukhtabar Al-Bihar" through Unesco. It is the responsibility of the University and its Department of Marine Sciences to properly make use of this important tool in educating and preparing the manpower needed and then carrying out research as well.

Finally, Dr. Kazem said the Workshop provides a forum for analyzing these problems as well as for developing and understanding the practical significance of oceanographic research and its operational modes. Hence the need for greater regional co-operation in tackling vital issues like

pollution is obvious. He referred to the important role played by the regional and the international organizations such as ROPME, IOC, Unesco and UNEP in this regard. He expressed his best wishes to the participants for their studies during the Workshop.

Dr. Manaf Behbehani, representative of the Regional Organization for the Protection of the Marine Environment, addressed the opening ceremony on behalf of the organization. Stating that the present workshop which is the third in a series of symposia and workshops organized by ROPME in co-operation with the specialized U.N. Agencies, Dr. Behbehani stressed the importance of this training course, which deals with the questions of oceanographic sampling, analysis, data handling and care of equipment. He expressed the hopes that this Workshop will succeed in training the participants to the extent they are able to effectively participate in the 18-months monitoring programme planned to be carried out in the Gulf. Dr. Behbehani further expressed his appreciation to the University of Qatar for hosting the Workshop and offering its facilities and research vessel, and to the IOC and UNEP for their fruitful cooperation in co-sponsoring the activity.

Dr. Makram A. Gerges, as the IOC representative speaking on behalf of the Chariman and the Secretary of the Intergovernmental Oceanographic Commission, expressed the Commission's appreciation for the fruitful co-operation with ROPME, UNEP and Qatar University which made it possible to convene this important workshop. Dr. Gerges emphasized the fact that the IOC gives special attention and support to the training aspects to provide the basis for fostering marine scientific research at the national, regional and international levels. He pointed out that the study of the marine environment of the Gulf and its protection is a subject of an utmost importance, and hence the training in the relevant fields. He hoped that the present Workshop will be a success and will eventually lead to upgrading of knowledge required to enable them to participate in the 18-months monitoring programme of ROPME, which is an essential effort to assessing the impact of oil and non-oil pollutants on the marine environment of the Gulf.

Dr. Gerges further expressed the IOC's readiness to continue its cooperation in the framework of KAP for strengthening the regional activities in this region and its willingness to consider any suggestions and proposals in this regard. He thanked the Qatar Authorities and the University President and Staff and wished the participants an interesting and productive Workshop.

ARRANGEMENTS

PARTICIPANTS

Twenty-two trainees from seven Gulf States participated in the Workshop. Each country's representation was as follows: Bahrain 3; Iran 3; Iraq 3; Kuwait 3; Oman 1; Qatar 6; and the United Arab Emirates 3. A list of names and details of the participants is included in Annex I.

WORKSHOP ACTIVITIES

The Workshop objectives were met by conducting the following activities:

- series of lectures, giving brief reviews on physical and chemical oceanography and on marine biology, with special reference to the KAP region.
- field trips in Qatari waters on board the R/V "Mukhtabar El-Bihar" for practical training on handling of oceanographic equipment, taking oceanographic samples and on meteorological observations.
- practical sessions in physical and chemical oceanography to demonstrate and provide training in the various methods of laboratory analysis of water samples, data processing and presentation.
- examination and estimation of plankton biomass and determination of productivity.
- evaluation of participants and graduation.

Dr. El-Sayed M. Hassan, Chairman of the Department of Marine Sciences of Qatar University introducted the instructors of the Workshop. The trainees were then requested to introduce themselves. This was followed by a brief intoduction on the Workshop, its contents and working schedule. Dr. Abdu A. El-Sayes acted as Workshop Coordinator, and was responsible for local arrangements.

COURSE OUTLINE

The course covered four main components, namely: theoretical (lectures), practical(laboratory sessions) and field work (on board the Qatari Research Vessel "Mukhtabar Al-Bihar"), and data reporting, analysis and representation, in the fields of 1)physical oceanography, ii) chemical oceanography and iii) biological oceanography.

The following is the Training Course outline, with a brief description of the contents of each component of the course. The detailed timetable of the Workshop by subject is given in Annex II.

1. PHYSICAL OCEANOGRAPHY

1.1 THEORETICAL

1.1.1 Introduction to physical oceanography

1.1.2 Physical properties of seawater with reference to and emphasis on the KAP sea region

1.1.3 Water masses, currents and large-scale circulation processes; tides

1.1.4 Waves, tides and tidal currents

1.1.5 Methodology and equipment for and observations of meteorological parameters

1.2 LABORATORY

1.2.1 Demonstration of water sampling bottles, hydrographic winch, meter wheel, inclinometer. Collection and storage of water samples.

1.2.2 Design principles of reversing thermometers. Reading and correction of thermometers. Depth estimation.

1.2.3 Fundamental principles of inductive salinometer. Standardization using standard seawater. Calculation of salinity from conductivity ratio using International Hydrographic Tables. Sources of errors.

1.2.4 Current meter description and demonstration.

1.2.5 Fundamental principles employed in STD and CTD instruments and conductivity/salinity measurements.

1.3 FIELD WORK ON R/V "MUKHTABAR AL-BIHAR"

1.3.1 Meteorological observations: air temperature, barometric pressure, wind speed and direction, evaporation and relative humidity.

1.3.2 Water colour and transparency.

1.3.3 Water temperature determination, sample collection for salinity and other chemical parameters.

1.3.4 Use of CSTD.

1.3.5 Use of current meters.

1.4 DATA REPORTING, ANALYSIS AND REPRESENTATION

2. CHEMICAL OCEANOGRAPHY

2.1 THEORETICAL

2.1.1 Introduction to chemical oceanography

2.1.2 Chemical composition of seawater and its properties with emphasis on O_2, nutrient salts, and alkalinity with special attention being given to the KAP Sea Region.

2.1.3 Chemical methods of analysis and procedures for water sampling, including sample preservation and storage for on-board and shore based analysis, limitation and storage of samples.

2.1.4 Limitations of chemical and instrumental methods for determinations of O_2, nutrients and alkalinity.

2.2 LABORATORY

2.2.1 Analysis of oxygen (Winkler titration and dissolved O_2 probes).

2.2.2 Analysis of phosphate, silicate, nitrate and nitrite.

2.2.3 Measurements of pH/alkalinity.

2.3 FIELD WORK ON R/V "MUKHTABAR EL-BIHAR"

2.3.1 Collection of samples for on-board analysis.

2.3.2 Collection and preservation of samples for shore based analysis.

2.4 DATA REPORTING, ANALYSIS AND REPRESENTATION

3. BIOLOGICAL OCEANOGRAPHY

3.1 THEORY

3.1.1 Introduction to biological oceanography

3.1.2 Phytoplankton - general

3.1.3 Zooplankton - general

3.1.4 Ichthyoplankton - general

3.1.5 Bacteria - general

3.1.6 Basic concept of nutrient flux

3.2 LABORATORY

3.2.1 Studying and measuring plankton population.

3.2.2 Measuring primary production including demonstration and chlorophyll measurements.

3.3 FIELD WORK ON R/V "MUKHTABAR EL-BIHAR"

3.3.1 Equipment and sampling apparatus used for plankton collection and studies.

3.3.2 Collection, preservation and storage of plankton samples.

3.4 DATA REPORTING, ANALYSIS AND REPRESENTATION

COURSE INSTRUCTORS

The Faculty of the Training Workshop was formed by the following instructors, each in his field of competence, as indicated:

1.	Dr. Amin H. MESHAL	Physical Oceanography
2.	Dr. Hassan Mustafa HASSAN	" "
3.	Dr. Turgut I. BALKAS	Chemical Oceanography
4.	Dr. Hosny I. EMARA	" "
5.	Dr. Jamal K. ABAYCHI	" "
6.	Dr. Manaf BEHBEHANI	Biological Oceanography
7.	Dr. Samy SHAABAN	" "
8.	Mr. Sam D. BAIRD	Mooring Engineer
9.	Mr. W. B. TAYLOR	" "
10.	Mr. Sh. E. A. AL-SADDIK	Senior Technician
11.	Mr. Y. I. EL-KHAYAT	" "

A list of instructors with their full addresses is given in Annex III.

GRADUATION

Upon the conclusion of the course, the graduation of the Workshop participants took place in an official ceremony, during which Dr. Mohammad Ibrahim Kazem, President of Qatar University, presented each participant with a commemorative medal of the University of Qatar.

It was decided that the Certificate (Annex IV) prepared by Qatar University, indicating the successful completion of the training course, duly signed and stamped by the hosting University of Qatar and the organizing agency, ROPME, will be sent by mail to all Workshop participants at a later date.

WORKSHOP EVALUATION

COURSE ASSESSMENT BY PARTICIPANTS

On the last day of the Workshop, before the conclusion of the course, the trainees replied anonymously to a written questionnaire, designed to obtain their opinions regarding the various aspects of the course (Annex V).

Their replies to this questionnaire were examined by the Workshop Coordinator. The results were then presented and discussed in a group discussion attended by the majority of the teaching staff, the Head of the Marine Science Department of Qatar University and the representatives of ROPME and the IOC.

All participants agreed that the arrangements made for their reception at the airport, as well as for accommodation, were adequate. With regard to teaching conditions and facilities, the majority of the trainees considered the classrooms were suitable, the ship and the field trips were quite satisfactory, but the laboratory space was inadequate.

The assessment of participants' replies also indicated that the purpose and object of the Workshop was clearly pursued throughout them, and that the material taught to them helped in the realization of these objectives. All participants agreed that they had gained knowledge and had benefitted from all aspects of the course. Most were of the opinion that the course was too short. It was suggested that either the course be extended to about three weeks, the last week being devoted to more specialized topics and the trainees split into groups according to their interest and field of specialization -- or that a more specialized course followed the present one after a short period of time. Only three of the participants had had the opportunity to participate in previous regional workshops organized by ROPME.

COURSE ASSESSMENT BY THE TEACHING STAFF

A second questionnaire (Annex VI) was distributed to the local and the invited course instructors for reply. The anwers indicated that the reception and accommodation arrangements were most satisfactory. They all agreed that the teaching conditions and the training facilities were adequate, and particularly that the R/V "Mukhtabar Al-Bihar" proved to be very efficient for field work in the Gulf under moderate sea state. However, a few instructors indicated the need for additional laboratory equipment (for biological oceanography) and some glassware (for chemical oceanography). All the staff mentioned that a few participants faced difficulty in communicating in English. The majority of instructors were satisfied with the level of the trainees who could effectively absorb what they were being taught. However, a general remark was made by most of the instructors on the heterogeneity of the trainees, and they stressed the importance, in future workshops, of having a group of trainees of more homogeneous background, level of knowledge and experience. A suggestion, similar to that given by the trainees, was also proposed by the instructors. Future workshops should either deal with a more specific topic, or be extended for an additional week during which time more specific training may be given to smaller groups defined by the trainees' field of interest and speciality. It was further suggested that field work on-board the research vessel should be given more time and/or be more specialized.

ASSESSMENT BY QATAR UNIVERSITY AND CO-SPONSORING AGENCIES

During the group discussion referred to above, an assessment was made of the Workshop activity as a whole. All participants agreed during this discussion that the Workshop was a success. The results of the above mentioned questionnaire were presented by the Workshop Coordinator, Dr. Abdu El-Sayes. An analysis was made of these results and further remarks were made by the representatives of the co-sponsoring agencies: Dr. Manaf Behhehani from ROPME and Dr. Makram Gerges from IOC. The outcome of this discussion is reflected in the final conclusions given below.

CONCLUSIONS AND GENERAL REMARKS

In conclusion, the Workshop is considered to have been a successful undertaking which has achieved its objectives to a great extent. The course curriculum was well put together, and gave a good overview and understanding of the various oceanographic disciplines. The training essentials in these disciplines were adequately presented. An obvious advantage of such a set up was that the trainees were exposed to a wide spectrum of knowledge and have thus gained understanding of the interrelationship of physical, chemical and biological oceanography.

It was quite evident that the participants had all enjoyed the course, and particularly the field trip on-board the R/V "Mukhtabar El-Bihar". The ship facilities were excellent, staffed with a well-trained and experienced captain and crew and equipped with very adequate laboratories and surveying facilities. Furthermore, the participants very much appreciated the opportunity to meet and work with colleagues from other institutions in the Gulf region.

The participants were pleased to receive the ROPME Manual, together with written notes on most of the lectures given and on some of the practical work, for their easy reference and use in the future, after the workshop and on their return to their home institutions.

The instructors and the Qatar University staff in particular established a good relationship between themselves and a definite spirit of camaraderie was present amongst the participants by the end of the course. In this context, the Workshop participants were continually encouraged to communicate with each other and with the Workshop instructors on course-related subjects, whenever needed in the future.

Nevertheless, from the scientific and organizational points of view, the following essential observations may be made:

1. As can be seen from the list of trainees (Annex I) who participated in the Workshop, the types of institution from which they came vary quite considerably, e.g. university, industry, civil service, environmental protection council, etc., and it may be noted that some of these trainees will obviously not have any chance, in the future, to contribute to the KAP activities, and in particular to its 18-month monitoring programme.

2. Furthermore, with regard to selection of the trainees, by looking at the scientific background of the participants, it can be seen that there is a wide difference in the disciplines, e.g. chemistry, physics, ecology, biology, geology, hydrography survey engineers. There did not appear, therefore, to be any sort of selection criteria set by the sponsoring organization, and this led to candidates of extremely mixed disciplines. Perhaps, if criteria had been set up for candidate selection, it may have been easier for the countries represented and their national focal points to select trainees closer to such criteria.

3. Some participants were disadvantaged by their poor command of English, but showed improvement during the course through the assistance of their colleagues. Whenever English proved to be difficult or inadequate, support was given by the Arabic-speaking instructors.

4. It was generally felt that the participants needed to do more practical work, particularly in laboratory work involving chemical analysis and handling of specific equipment. On the other hand, some participants needed additional time to learn more about data analysis and interpretation, particularly in physical oceanography.

5. The laboratories were not really adequate for such a large number of trainees (twenty-two), but the willingness and assistance of the Qatar University staff helped to overcome this problem.

6. Due to the heavy teaching load, it was also noticed that both staff and trainees were exhausted at the end of each day. The trainees therefore had neither the energy nor enough time for private study and discussions amongst themselves and with the staff. In short intensive training courses such as this Workshop, it is very advantageous if staff and trainees are given the opportunity to spend as much time as possible together.

RECOMMENDATIONS FOR FUTURE TRAINING ACTIVITIES

A scheme to train marine scientists of the Gulf region is obviously needed. However, the training should be designed to give the maximum benefit to the trainees. The following are some guidelines and recommendations to be considered in future training activities:

1. Scope and duration of workshop

The trainee can certainly benefit if he gains skill and confidence in particular methods of sa pling and/or analysis, and at the same time, learns the reason for using a certain methodology and its limitations. However, the participants of a workshop are unlikely to acquire such skills unless the course is more specialized or of considerably longer duration. It is therefore recommended that future training courses be designed for a smaller group of trainees and be more specialized in scope. The trainees could then concentrate on a specific field for a sufficient period ot time to gain the

necessary experience. The duration of such a specialized training course will largely depend on the complexity of the field of training, its subject and the range of methods taught.

2. Selection of trainees

The trainees should be accepted for future taining courses after careful examination of their professional career by the ROPME Secretariat in consultation with the executing agency. This is to assess the suitability of the trainees' background and experience in the field of training for which the course is designed,and thus ensure the selection of the right trainees for the right course. For this purpose, it is therefore recommended that ROPME Member States submitting nominations of candidates for training to ROPME Secretariat, be requested to provide their Curriculum Vitaes to facilitate judgement on the suitability of each candidate and hence, to make the selection. The selection criteria should be defined by ROPME in cooperation with the executing agency responsible for the preparation of the course outline.

3. Preparation of workshop programme

It is recommended that allowance be made for exchange of opinion through correspondence between all parties - the Organizing Committee (or Worshop Coordinator), the executing agency and the course instructors - a long time prior to the workshop, in drawing up the course programme. Also, allowance should be made for all instructors to confer on course outline matters the day previous to the beginning of the workshop.

4. Workshop manual

The manual prepared by ROPME proved to be very useful during the course of the Workshop. However, it was indicated by course instructors that some parts of the manual need review and updating. It is therefore recommended that further review of this manual be made.

5. Field and laboratory equipment inspection

It is also recommended that workshop instructors dealing with critical equipment should be allowed enough time prior to the workshop to enable full inspection and familiarization with this equipment, before its demonstration to the trainees.

6. Field work

It is further recommended that more time be devoted to field cruises, so that, on each trip, more operations may be conducted with enough repetition to ensure that both skill and confidence are acquired by the trainees.

7. Possible subjects of future workshops

Various topics were recommended for future training workshops. However, the following are topics most needed at present for the KAP region:

(a) Training Workshop on "Current measurements and analysis: Theories, techniques and equipment"

(b) Training Course on: "Biological productivity of the Gulf waters: Field measurements and laboratory techniques"

(c) Training workshop on: "Determination of petroleum hydrocarbons in seawater, sediments and fish tissues"

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ANNEX I

LIST OF PARTICIPANTS

NAME (1)	UNIV./ORGANISATION (2)	EDUCATION (3)	PRESENT POSITION (4)	ADDRESS (5)
ALI AMER ABDULLA	COUNCIL FOR CONSERVATION OF ENVIRONMENT, OMAN	B.SC.	SPECIALIST	P.O. BOX 5310, ROUWI SULTANAT OF OMAN
MOHAMED ALI HASSAN	ENVIRONMENTAL PROTECTION COMMITTEE, BAHRAIN	B.SC.	CHEMIST	P.O. Box 26909 AL-ADLIYYA, BAHRAIN
MOHAMMED JUMA ALRUMAIDH	FISHERIES/BAHRAIN	B.SC.	RESEARCHER (BIOLOGIST)	P.O. BOX 5479 AL-MANAMAH, BAHRAIN
SHAKER ABDULHUSSAIN KHANDEN	ENVIRONMENTAL PROTECTION COMM., BAHRAIN	B.SC.	ECOLOGIST	P.O. BOX 26909 AL-ADLIYYA, BAHRAIN
MAHBOOB HASSAN MAHBOOB	HIGHER ENVIRONMENTAL COMMITTEE, U.A.E.	B.SC.		MINISTRY OF HEALTH P. O. BOX 1853, DUBAI
IBRAHIM NASRALLAH HADIAN	HIGHER ENVIRONMENTAL COMMITTEE, U.A.E.	B.SC. (PHYSICS)	SPECIALIST	P. O. BOX 1853 DUBAI. U.A.E.
SAAD AL-NUMAIRY	MINISTRY OF HEALTH, U.A.E.	B.SC.	CHIEF IN CHARGE	ENVIRONMENTAL HEALTH DEPT P.O. BOX 1853, DUBAI
SALEH AHMED BU-HASHI	SHUAIBA AREA AUTHORITY, KUWAIT	B.SC.	CHEMIST	P.O. BOX 39148 AL-NUZHA, KUWAIT
JAMAL ALABDUL JALEEL	KUWAIT	B.SC.	METALLURGICAL EN. IN WATER AND CORROSION	P.O. BOX 42177 AL-SHUWAIKH, KUWAIT
MISS. SHAHA AL-KANDARI	SHUAIBA AREA AUTHORITY, KUWAIT	B.SC.	SENIOR OF BIOLOGICAL LAB.	P.O. BOX 10049 AL-SHUAIBA, KUWAIT

(1)	(2)	(3)	(4)	(5)
ALI HAMAD ALBADR	UNIV. OF QATAR	B.SC.	DOMEN STRATOR MARINE SCIENCES DEPARTMENT	P.O. BOX 7190 DOHA, QATAR
JASSIM ABDULLA AL KHAYAT	UNIV.OF QATAR	B.SC.	BIOLOGIST MARINE SCIENCES DEPARTMENT	P.O. BOX 8843 DOHA, QATAR
ALII AHMED AL-MULLA	FISHERIES DEPT. QATAR	B.SC.	BIOLOGIST	P.O. BOX 8706 DOHA, QATAR
HUSSAIN ABDULRAHMEN ALBAKER	ENVIRONMENTAL PROTECTION COMMITTEE, QATAR	B.SC.	ASSISSTANT SCIENTIFIC OFFICER	P.O. BOX 140693 DOHA, QATAR
HUSSAIN N.AL REKABI	BASRAH UNIVERSITY	M.SC.	RESEARCH ASSISTANT	MARINE SCIENCE CENTRE BASRAH UNIVERSITY BASRAH, IRAQ
KASSID ABDULSATTAR	BASRAH UNIVERSITY	B.SC.	"	"
MALIK HASSAN ALI	BASRAH UNIVERSITY	M.SC.	"	"
MOHAMED ATIF MOHAMED JAHLOUM	UNIV. OF QATAR	B.SC. DIPLOMA OF PETROLEUM GEOLOGY	GEOLOGIST	GEOLOGY DEPT. FACULTY OF SCIENCE P.O. BOX 2713, DOHA
AHMED ABDELSALAM ALI	UNIV. OF QATAR	M.SC. GEOMORPHOLOGY	SPECIALIST	GEOGRAPHY DEPT. P.O. BOX 2713, DOHA
MASOAD KOUCHE MESHKIAN	ENVIRONMENT PROTECTION, IRAN		OFFICER ENVIRONMENT	KALILI STREET SHIRAZ, IRAN
HUSSAIN REZANIA	N.I.O.C.OIL COMPANY, IRAN	B.SC. MATH. AND B.SC.IN SURVEY ENGINERING	HYDROGRAPHIC SURVEYOR	GENERAL SURVEY DEPT. ROOM 306, P.O. BOX 1065 TEHRAN, IRAN
MORTEZA SHISHINEH	NATIONAL IRANIAN OIL COMPANY (N.I.O.C.)	M.SC. SURVEY ENG. B.SC. MATH.	HYDROGRAPHIC SURVEYOR	GENERAL SURVEY DEPT. P.O. BOX 1065 TEHRAN, IRAN

ANNEX II

WORKSHOP PROGRAMME AND TIMETABLE

S U B J E C T	TIME	LECTURER
Saturday, December 3, 1983		
Registration	8.00 - 9.00	
Opening Session	9.00 - 10.00	
- Introduction to basic physical oceanography	10.30 - 11.30	Dr. HASSAN
- Physical properties of sea water with reference and emphasis on the KAP region	11.30 - 12.30	Dr. HASSAN
LUNCH	12.30 - 14.00	
- Demonstration of water sampling bottles, hydrographic winch, meter wheel, Inclinometer*	14.00 - 15.00	Dr. HASSAN
- Collection and storage of water samples	15.00 - 16.00	Dr. EMARA
BREAK	16.00 - 16.15	
- Introduction to chemical oceanography	16.15 - 17.15	Dr. BALKAS

* Laboratory work

S U B J E C T	TIME	LECTURER
Sunday, December 4, 1983		
- Chemical composition of sea water and its properties with emphasis on O_2, nutrient salts and alkalinity with special attention being given to KAP sea region	8.00 - 10.00	Dr. EMARA
BREAK	10.00 - 10.15	
- Current and large scale circulation processes in the oceans, water masses, tides and waves	10,15 - 12,15	Dr. HASSAN
LUNCH	12.15 - 14.00	
- Design principles of reversing thermometers, reading and correction of thermometers. Depth estimation	14.00 - 15.00	Dr. HASSAN
- Chemical methods of analysis and procedures of water sampling, including sample preservation and storage for on-board and shore-based analysis (limitation and storage of samples)	15.00 - 17.00	Dr. EMARA
Monday, December 5, 1983		
- Introduction to biological oceanography	8.00 - 9.00	Dr. SHAABAN
- Methods - equipment and observations of meteorological parameters	9.00 - 10.00	Dr. MESHAL
BREAK		
- Phytoplankton - general	10.15 - 11.15	Dr. SHAABAN
- Zooplankton - general	11.15 - 12.15	Dr. BEHBAHANI
LUNCH		

SUBJECT	TIME	LECTURER
Monday, December 5, 1983, continued		
- Description and demonstration of current meter	14.00 - 16.00	Dr. MESHAL
Tuesday, December 6, 1983		
- Methoorological observations	8.00 - 9.00	Dr. MESHAL
- Fundamental principles of inductive salinometer. Standardisation, using standard sea water. Calculation of salinity from conductivity ratio using international Hydrographic tables Sources of errors	9.00 - 10.30	Dr. MESHAL
- Demostration and description of current meter	10.30 - 12.00	Dr.MESHAL+TAYLOR+ BAIRD
LUNCH	12.00 - 14.00	
- Brief discussion on limitation of chemical and instrumental methods for determination of oxygen and nutrients	14.00 - 16.00	Dr. EMARA & Dr. AUBISHI
BREAK	16.00 - 16.15	
- Mooring	16.15 - 18.15	Dr. HASSAN
Wednesday, December 7, 1983		
Field work on board the RIV Mokhtabar El-Behar		
- Hydrographic winches and its use	8.00 - 9.00	Dr. HASSAN
- Use of current meters	9.00 - 10.00	Dr. HASSAN
- Water temperature determination - Sample collection for salinity and other chemical parameters	10.00 - 11.00	Dr. HASSAN & Dr. EMARA
- Mooring demostration	11.00 - 13.00	Dr. HASSAN
- Meteorology		Mr. BAIRD & Mr.TAYLOR

SUBJECT	TIME	LECTURER
Wednesday, December 7, 1983, continued		
LUNCH	13.00 - 14.00	
- Water colour and transparency - Collection, preservation and storage of plankton samples	14.00 - 15.00	Dr. SHAABAN
Thursday, December 8, 1983		
Laboratory work - Temperature correction and salinity determination - Analysis of oxygen content (Winkler titration and dissolved oxygen probes). Analysis of phosphate, silicate, nitrate and nitrite). - Date representation.	8.00 - 12.00	Dr. MESHAL & Dr. EMARA & Dr. BALKAS & Dr. AUBISHI
LUNCH	12.00 - 14.00	
- Analysis of Phyto Plankton samples	14.00 - 16.00	Dr. SHAABAN
Friday, December 9, 1983		
FREE DAY		
Saturday, December 10, 1983		
Field work on board RIV Mokhtabar El-Behar		
- Meteorological observations	8.00 - 9.00	Dr. MESHAL
- Samples for Chlorophyl determination, collection and preservation of plankton samples	9.00 - 11.00	Dr. BEHBAHANI
- Use of CSTD	11.00 - 12.00	Dr. HASSAN
- Recovery of moored current meter	12.00 - 14.00	Dr. MESHAL + Mr. TAYLOR + Mr. BAIRD

SUBJECT	TIME	LECTURER
Sunday, December 11, 1983		
Laboratory work		
- Continuation of chemical analysis	8.00 - 12.00	Dr. BALKAS + Dr. EMARA + Dr. AUBISHI
LUNCH	12.00 - 14.00	
- Chlorophyl determination	14.00 - 16.00	Dr. SHAABAN
Monday, December 12, 1983		
Laboratory work		
- Marine bacteria - general	8.00 - 10.00	Dr. SHAABAN
BREAK	10.00 - 10.15	
- Analysis of zooplankton samples	10.15 - 12.15	Dr. BEHBAHANI
LUNCH	12.15 - 14.00	
- Completion of chemical analysis	14.00 - 17.00	Dr. BALKAS + Dr. EMARA + Dr. AUBISHI
Tuesday, December 13, 1983		
- Physical oceanographic data reporting	9.00 - 12.00	Dr. HASSAN
LUNCH	12.00 - 14.00	
- Chemical oceanographic data reporting	14.00 - 17.00	Dr. BALKAS + Dr. EMARA + Dr. AUBISHI
- Discussion on reporting of phyto-plankton and zooplankton data		Dr. SHAABAN + Dr. BENBAHANI
Wednesday, December 14, 1983		
General discussions	8.00 - 12.00	All lecturers
LUNCH	12.00 - 14.00	
Graduation	14.00 - 17.00	All lecturers

ANNEX III

WORKSHOP INSTRUCTORS *

Name	Address	Tel/Telex Nos.
Invited Lecturers		
1. Dr. Jamal Kamil ABAYCHI	Marine Science Centre, Basrah University, Basrah, IRAQ.	Tel: (40) 212640 Tlx: 207025 IK
2. Mr. Samuel D. BAIRD	Oceanographic Division, Dept. of Fisheries & Oceans, P.O. Box 5050, Burlington, Ontario L7R 4A6, CANADA.	Tel: (416) 637-4709 Tlx: 0618 296 CCIW BUR
3. Dr. Turgut I. BALKAS	Chemical Engineering & Environmental Dept., Marmara Scientific & Industrial Institute, P.O. Box 141, Kadikoy, Istanbul, TURKEY.	Tel: 207376 Tlx: 34123 MAE TR
4. Dr. Manaf BEHBEHANI	Department of Zoology, University of Kuwait, Safat, KUWAIT.	Tel: (965) 830420 Tlx: KUNIVER 22616 KT
5. Dr. Amin Hamed MESHAL	Faculty of Marine Sciences, King Abdulaziz University, Jeddah, SAUDI ARABIA.	Tel: 689-55-91 Tlx: 402379 KAAUMC SJ
6. Mr. W. B. TAYLOR	Oceanographic Division, Dept. of Fisheries & Oceans, P.O. Box 5050, Burlington, Ontario L7R 4A6, CANADA.	Tel: (416) 637-4709 Tlx: 0618296 CCIW BUR
Local Staff		
1. Dr. Abdu A. EL-SAYES 2. Dr. Hosny I. EMARA 3. Dr. Hassan M. HASSAN 4. Dr. Samy SHAABAN 5. Mr. Shiekh Al Arab AL-SEDDIK 6. Mr. Youssef EL-KHAYAT	Marine Science Department, University of Qatar, P.O. Box 2713, Doha, QATAR.	Tel: 873910 Tlx: 4630 UNVSTY DH

* In alphabetical order

بسم الله الرحمن الرحيم

(UNEP) (IOC) (ROPME) University of Qatar

The Univeristy of Qatar and The Regional Organization for the Protection of the Marine Environment (ROPME)

This is to certify that

Mr.:

has attended the Workshop on Oceanographic Sampling, Analysis, Data Handling and Care of Equipment held at the University of Qatar during the period 3-15 December 1983.

In witness thereof this certificate is hereby awarded at Doha, Qatar.

Doha, December 15, 1983.

المدير التنفيذي بالوكاله
المنظمة الإقليمية لحماية البيئة البحرية
Acting Executive Secretary
ROPME

مدير جامعة قطر
President
University of Qatar

جامعة قطر والمنظمة الإقليمية لحماية البيئة البحرية

نشهد أن السيد :

قد حضر الدورة التدريبية حول طرق إستخدام الأجهزة في جمع وتحليل العينات والبيانات البحرية التي عقدت في جامعة قطر خلال الفترة من ٣ - ١٥ ديسمبر ١٩٨٣م .

وقد منح هذه الشهادة إشعاراً بذلك

الدوحة ، قطر

الدوحة ١٥ ديسمبر ١٩٨٣م

ANNEX IV

ANNEX V

QUESTIONNAIRE FOR THE TRAINEES

Please use additional paper whenever needed.

	YES	NO
1. Was your reception at the airport satisfactory?		
Is your accommodation adequate?		
Do you have suggestions for improvement?		
Are the teaching conditions suitable		
A) Class rooms		
B) Laboratory		
C) Ship		
Do you have suggestions for improvement?		
2. Is the purpose of the workshop clear to you?		
What is it?		
3. Did the material that you were taught help you realize that target?		
4. Did you learn anything that is new in the workshop?		

5. How much did you benefit from the workshop? 100% 80% 50%

6. Is the length of the workshop suitable?
too long? too short?

7. Any suggestions to improve future workshops?

8. Did you attend any previous workshops organized ROPME?
Name: in case you like to mention it.

ANNEX VI

QUESTIONNAIRE FOR THE TEACHING STAFF

Please use additional paper whenever needed.

1. ORGANIZATION:

	YES	NO
Was your reception at the airport satisfactory?		
Is your accommodation adequate?		
Do you have suggestions for improvement?		
Are the teaching conditions suitable		
A) Class rooms		
B) Laboratory		
C) Ship		
Do you have suggestions for improvement?		

2. TEACHING AID:

Are the available teaching aid, sufficient?

Was there a language barrier with the students?

Do you have suggestions for improvement?

3. STUDENTS:

To what extent could the students absorb what you were teaching? FULLY ADEQUATELY NOT AT ALL

Is the students' academic level what you expected is to be?

YES HIGHER LOWER

Do you have suggestions for improvement?

4. GENERAL:

How could the next workshop be made better than this one?