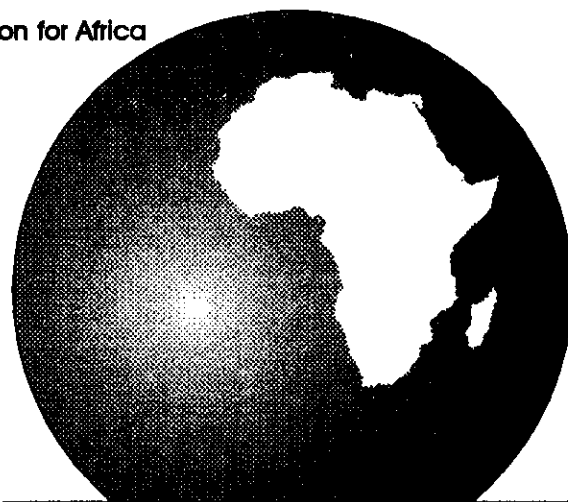


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United Nations
Economic Commission for Africa



Multidisciplinary
Regional Advisory Group

MISSION REPORT ON ADVISORY SERVICES
TO THE KENYA METEOROLOGICAL DEPARTMENT FOR
ASSISTANCE TO THE INSTITUTE OF METEOROLOGICAL
TRAINING AND RESEARCH IN THE PREPARATION OF
THE WATER QUALITY WORKSHOP
NAIROBI, KENYA, FEBRUARY 1996

By
MR. M. TAWFIK
REGIONAL ADVISER
WATER RESOURCES

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ADDIS ABABA
MARCH 1996

UNITED NATIONS
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I. INTRODUCTION

1. Water is life - it has contributed greatly to the birth and development of some of the world's great civilizations. Water is so vital a resource that the value of its existence is at times underestimated and ignored. The economic strength of a country is at most times determined in terms of its fresh water resources.

2. As a result of the population increase in Africa, the demand for water has increased greatly. This has all resulted in increased pressure on the African fresh water bodies, leading to a slight deterioration in the quantity and quality of Africa's inland waters.

3. River and lake water is used for irrigation schemes, production of electrical power as well as domestic and commercial uses. Therefore, water plays a major role in the socio-economic development of the African countries.

4. The quality of water is of great importance as is its quantity because the availability of contaminated water is useless and has direct impact on human health - thus resulting in depreciation of manpower.

5. In the last few years, considerable attention has been focused on the importance of water quality for sustainable development of the water resources. This is evidenced by statements from the Mar-del Plata UN Water Conference of 1977, the Dublin statement of 1992, the UNCED Recommendations of 1992 and the UN Secretary General's Initiative for Africa of 1996.

6. Despite this continuous international attention, the water quality issue in the African water sector is considerably lagging

behind when compared to the rest of the world. Regarding this issue, it is noticed that training should be undertaken within Africa as well as encouraging exchange of training programmes from outside the continent.

II. BACKGROUND

7. Water is a very precious and vital commodity which is now becoming scarce and we should now think seriously of water's economic value and how best to improve its quality for the betterment of socio-economic development.

8. Phenomenas like population increase, desertification, soil erosion, climatic changes, natural disasters, deforestation and ethnic conflicts dramatically affected the quality of fresh water bodies in Africa with negative results on the socio-economic development of the continent.

9. The above facts including other factors cause deterioration in the quality of water, which calls for an urgent solution through capacity building and strengthening and focusing more attention on the development of skilled manpower in the African water quality sector. This can be achieved by promoting public awareness through training programmes and specialised courses designed for the improvement of water quality in the African countries.

10. The Institute of Meteorological Training and Research (IMTR) in collaboration with the University of Nairobi conducts a post-graduate nine-month diploma training course in Operational Hydrology. This training programme was initiated through the efforts of IMTR, World Meteorological Organisation (WMO), the University of Nairobi and other international institutions. It

covers a wide range of subjects which are designed to equip the students with adequate know-how so as to best manage the fragile water resources in Africa.

11. Since the beginning of the training programme, it is a well known fact that besides the course curriculum which gives generalized solutions to the many problems encountered in the management of water resources, there is an urgent need to train the graduates of the hydrology course further and more intensively on more detailed approaches to water resources management, quality assessment and protection.

12. Realising the importance of water quality in the water resources development field and its link with the training programme in hydrology, the IMTR felt that a two week training workshop specifically on hydrological monitoring for water quality assessment and protection with lecturers from inside and outside the African continent can adequately contribute towards achieving the goal of capacity strengthening in the water sector of Africa.

13. IMTR requested the UNECA's assistance in aiding their staff in the preparation of this project so as to launch a successful workshop.

14. In response to this request, the UNECA extended its advisory services to the IMTR by providing the Institute of Meteorological Training and Research with the Regional Advisor in Water Resources to discuss and draft the Project Proposal with the senior staff from the IMTR.

III. MISSION OBJECTIVES AND TERMS OF REFERENCE

15. The main objective of the mission was to assist the senior staff of the Institute of Meteorological Training and Research in designing and drafting the project proposal for water quality assessment and protection and at the same time assist and advise them on how to acquire the necessary funding and support.

The terms of reference were as follows:

- a) To discuss all issues regarding the organisation of the workshop and advise accordingly;
- b) To draft the project documents;
- c) To advise and assist on the acquisition of necessary funds and support;
- d) To review requirements for organisation of the workshop;
- e) To discuss with the IMTR staff all logistical arrangements for the workshop.

IV. SUMMARY OF DISCUSSIONS WITH OFFICIALS

16. My first meeting was with the Director of the Kenya Meteorological Department (KMD) who welcomed and briefed me about the on-going course on Operational Hydrology and how successful it is. Due to this fact, the Institute of Meteorological Training and Research is proposing to conduct a yearly course on water quality issues. The Director informed me that the Government of Netherlands is interested in giving some support towards such ventures.

17. After that I briefed the Director about myself and about the UNECA's mandate of assisting the member States in their strive for socio-economic development and promoting technical cooperation

amongst the African countries, in particular in the area of capacity building. I went ahead to brief him about the UNECA/WMO Conference last March (1995) which resulted in drafting a strategy and an action plan for water resources assessment and monitoring in Africa.

18. The discussion went on to cover ways of mobilizing financial resources for supporting the proposed training programme on water quality where I mentioned the possibility of approaching the Egyptian Fund for Technical Assistance to African sister countries. The Director welcomed this idea and referred to our previous approach with the Egyptian Ambassador regarding this issue. He went on to request me to arrange a similar meeting with the Egyptian Ambassador in Nairobi to discuss the issue. At the end of the meeting, the KMD Director expressed his appreciation of the UNECA's efforts to help the Kenya Meteorological Department.

19. Later, I held a meeting with the principal of the Institute of Meteorological Training and Research who welcomed me to their Institute. He explained that since the diploma course in Operational Hydrology was doing very well, the Institute had decided to launch another short course specifically for water quality monitoring assessment and protection. He further added that the course will help the African countries in strengthening capacity in this important and vital area. At the end of the meeting, he referred me to the Assistant Director for Training who is responsible for all training activities.

20. After these two meetings, I held a meeting with H.E. the Egyptian Ambassador to Kenya where I briefed him about the IMTR activities in the field of training and the UNECA's role in assisting the member States in their training programmes and in

enhancing and promoting technical cooperation amongst the African countries.

21. H.E. the Egyptian Ambassador in turn welcomed me to his office and expressed his pleasure at the UNECA's request to the Egyptian Government for technical assistance towards training activities in Africa.

22. The Ambassador went on to brief me about the Egyptian Fund for Technical Assistance to African countries and its achievements in assisting African countries in all aspects of socio-economic development. He further mentioned details about the funds support towards capacity strengthening in Africa through seminars and workshops.

23. The Ambassador agreed in principle with the idea and asked me to request the KMD to put their request by way of an official letter for submission to the Egyptian Fund.

24. At the end, we agreed on a meeting later on with officials from the KMD to submit their written request officially and to provide further details on the proposed workshop.

25. Later I held a meeting with the Assistant Director for Training at the IMTR and he gave me a detailed summary about the on-going diploma course in Operational Hydrology. He explained that due to the course's success and the realisation of the importance of water quality, the Institute had proposed a two-week workshop with specific topics like monitoring for water quality, assessment and protection.

26. In reply, I thanked him for seeking the UNECA's guidance in this programme and I briefed him about my previous meetings with

the Egyptian Ambassador and about his request for an official letter of request from the KMD to the Egyptian Fund.

27. The Assistant Director for Training of the IMTR agreed with me on the main points to be included in such a letter and requested me to draft the letter for discussion at a later meeting to discuss some other issues connected with the course. At that later meeting, the Assistant Director said he would invite the Chairman of the Meteorological Department from the Nairobi University who is also the coordinator for the International Hydrology course at the IMTR.

28. A further meeting was held with the Assistant Director for Training at the IMTR in the presence of the Chairman of the Meteorological Department of the Nairobi University. During this meeting, we discussed and finalised the draft letter to the Egyptian Ambassador in Nairobi. It was agreed that the letter would be signed by the Director of the KMD and would be delivered to the Egyptian Ambassador during our forthcoming meeting at the Embassy.

29. Regarding the organisation of the workshop, the IMTR officials were of the opinion of commencing the programme by June/July 1996. This was due to the fact that the Diploma course on Operational Hydrology ends by that time and therefore would be the ideal time since students who finished the Diploma course would have the chance of attending the proposed workshop. In this way, travel costs to and from their countries of origin would be tremendously lowered.

30. After lengthy and thorough discussions of all options, it was found to be impossible to commence the workshop this year. More time was required to prepare the project document for presentation to potential donors. In the end, all agreed that the

implementation of the workshop should be postponed until next year to allow proper preparations including the drafting of a comprehensive project proposal for presentation to potential donors as soon as possible. I was requested to prepare such a document.

31. The meeting went on to discuss the format of the project proposal and it was agreed to design the project on a yearly basis commencing in October every year and ending in the following September. During this time, letters of invitation should be sent out to all the countries for the nomination of suitable participants. At the same time, specialized institutions should also be approached for the availability of suitable lecturers in the subjects covered by the course. All the necessary administrative work should be dealt with and the workshop should be held by the end of June or early July. After the workshop two months should be spent (i.e. August and September) in preparing and publishing an evaluation report on the workshop.

32. At the end of the meeting, I was requested to finalize the project document as soon as possible and to submit it to the IMTR for their comments. I informed the officials that the UNECA will do everything possible to finalize the project document and it would be sent to them hopefully by the end of March 1996 (Refer to Annex 2).

33. I arranged for a meeting between the KMD officials and the Egyptian Ambassador to Kenya. The meeting took place in the Ambassadors's office in the presence of the Ambassador, the Director of KMD and the Assistant Director for Training and myself. I introduced the Kenyan officials to the Ambassador and briefed him on the purpose of the visit.

34. The Egyptian Ambassador welcomed the officials and expressed his satisfaction with the cooperation between Kenya and Egypt. He particularly expressed satisfaction in the field of training. In return, the Director of the KMD expressed his appreciation of the advanced technology in Egypt in the field of water resources and its management. The Director went on to add how it was necessary for all African countries to benefit from such advances by exchange of information and promotion of training programmes. Thus leading to benefits for all the people of the African continent.

35. The Assistant Director for Training presented an official request for technical support towards the organisation of the workshop to the Egyptian Ambassador. This was followed by a detailed discussion regarding the background and objectives of the workshop. Possible areas for cooperation and support between Kenya and Egypt were also clarified.

36. In turn, the Egyptian Ambassador asked about the role played by the UNECA in supporting such activities. In my reply, I explained the UNECA's mandate for providing technical assistance to its member States in the way of advisory services and training for capacity building such as this water quality workshop. I explained further how the UNECA was assisting the IMTR in drafting a comprehensive project document and in further assisting the IMTR in mobilizing funds towards the successful implementation of their programme. I went on to explain that the UNECA could provide some logistical support during the implementation phase of the workshop. This would be in the way of personnel in the organisation of the workshop. The UNECA would also provide the services of some lecturers to cover specific topics in the field of water quality. Such services could be provided upon written request from the IMTR.

37. The Egyptian Ambassador, after reading the letter of request from the KMD and discussing its context with the officials, agreed in principle with the idea of providing support towards the workshop. He requested the KMD Director to finalise the project document so as to substantiate their request. In reply, the KMD Director informed the Ambassador that the draft project document would be forwarded to the Egyptian Embassy in a month's time.

38. At the end of the meeting, the Ambassador informed us that he would forward their request to the Egyptian Fund for Technical Cooperation to African States with his personal recommendation for supporting this training programme. In the meantime, he would await the project document to be forwarded to Cairo in order to decide on the areas of cooperation and support.

39. The KMD Director thanked the Ambassador for his positive approach towards supporting their workshop and hoped for further cooperation between the Egyptian Fund and the Kenya Meteorological Department. He went on to thank the UNECA for their active role in supporting their training programme. The Egyptian Ambassador also expressed his appreciation of the UNECA's role in promoting technical cooperation amongst the member States.

40. In line with the TOR of assisting in the acquisition of necessary funds and support, I held a meeting with Mrs. Isabelle Vanderbeck, Programme Officer in charge of GEMS Programme in the Fresh Water Unit of the UNEP. During this meeting, I briefed the Programme Officer about the KMD's planned water quality workshop to be implemented next year. I approached the GEMS Programme with the idea of sponsoring some African participants to the workshop as well as supplying some equipment as they did with the Nile Basin Countries Training Courses in 1993 and 1994.

41. The Programme Officer appreciated the UNECA's role in promoting joint ventures by involving UNEP in such activities. She went on to inform me that currently UNEP had submitted some project proposals for funding and were awaiting replies to their requests. She advised me to send the request with the project document to the Chief of the Water Unit at UNEP who was out of the country at the time. I replied that IMTR would forward a request of funding the workshop with a copy of the project document to UNEP as soon as they were available.

V. OTHER MISSION ACTIVITIES

42. I used the opportunity of being in Kenya for collecting some data for the UNECA's programmed technical study on large scale irrigation schemes in Africa. I visited the National Irrigation Board in Nairobi where I held two meetings with the Chairman of the Board, the General Manager of the Board and his Deputy.

43. During my first meeting which was with the Board's Chairman, I introduced myself and went on to brief him about the study being undertaken by the UNECA. I explained that the results of the study were to be published as a non-current publication by the UNECA for distribution to other member States so as to encourage exchange of information and techniques. The Chairman summarized the work of his organisation and their achievements and referred me to his Deputy for further detailed information.

44. The next meeting was with the Deputy Director of the Irrigation Board of Kenya. The Deputy Director explained in detail all the activities undertaken by the Board and their experience in large scale irrigation schemes in Kenya. He provided me with very

useful information covering a wide range of subjects included in the UNECA's study. They are as listed below:

- a) The present status of large scale irrigation schemes in Kenya
- b) Their past experiences
- c) Their future plans
- d) Availability of water
- e) Farmer's participation and the role of women.

45. Additionally, I was also given some useful papers covering the above subjects. The Deputy Director advised me to visit the Ministry of Agriculture, the Ministry of Water Development and the FAO Office for more information regarding the irrigation schemes. Unfortunately, due to shortage of time, I could not make any follow-up visits. It is recommended that another mission be arranged particularly for data collection from Kenya. (For information provided refer to Annex 4).

46. During my stay in Nairobi, I also contacted Professor Frank Njenga who had previously done a study for the UNECA/NRD on Marine Pollution in some selected countries of Africa. I handed over to him his draft report with the NRD's comments and recommendations. We had a lengthy discussion on the report. I put forward the UNECA's comments and amendments and the final format as preferred by the ECA. We ended the meeting on agreeing on all changes to be made and he promised to finalise it and send it to the UNECA as soon as possible. He requested for the payment of his fees to assist him in finalizing his report. On my part, I promised to pass on his message to the WEM's Chief at the NRD.

VI. MISSION OUTCOME AND ITS IMPACT

47. The mission was a successful accomplishment and fulfilled its purpose. Listed below are all the activities achieved:

- a) Drafting a letter requesting funds and technical support from Egypt. The letter was submitted to the Egyptian Ambassador in Kenya;
- b) A comprehensive project document was prepared for distribution to potential donor agencies for funds;
- c) A link was established between the Kenya Meteorological Department and the Egyptian Fund for Technical Cooperation to African countries, enabling the provision of technical assistance to Kenya;
- d) The proposed workshop was introduced to UNEP for possible support and funding;
- e) IMTR's senior officials were advised on issues covering the arrangements and logistical support required for the proposed workshop.

48. The mission had immense direct impact on the Kenya Meteorological Department. The Director of the KMD expressed his gratitude towards the UNECA and appreciated the UNECA's efforts in promoting technical cooperation amongst member States. He underscored the importance of the technical assistance towards his Institute from the Egyptian Fund and also appreciated the UNECA's help in preparing the project document which was clearly indicated by a letter of appreciation to the MRAG Coordinator.

ANNEX I
LIST OF PEOPLE MET

1. Mr. Evans A. Mukolwe,
Director
Kenya Meteorological Department
Kenyan Permanent Representative with WMO
2. Mr. Stephen J.M. Njoroge,
Principal
Institute for Meteorological Training and Research (IMTR)
3. Mr. P.D. Munah
Assistant Director
IMTR
4. Dr. Francis M. Mutwa
Chairman
Department of Meteorology, University of Nairobi
Coordinator, International Hydrology Course at IMTR
5. H.E. Ahmed Sabry, Ambassador
Embassy of Arab Republic of Egypt,
Nairobi
Kenya
6. Mr. B.T.C. Bargoria,
General Manager
National Irrigation Board, (NIB)
Nairobi
Kenya
7. Mr. Ali Abdul Razak
Deputy General Manager
NIB
Nairobi
Kenya
8. Mrs. Isabelle Vanderbeck
Programme Officer
Fresh Water Unit,
UNEP
Nairobi
Kenya

ANNEX 2

DRAFT

**PROJECT PROPOSAL FOR WORKSHOP
ON
STRENGTHEN THE AFRICAN CAPACITY IN THE
FIELD OF WATER QUALITY**

PROJECT PROFILE

Title:	Workshop for strengthening the African Capacity in the field of water quality
Sector:	Management and development of water resources.
Sub-sector:	Hydrological Monitoring for water quality assessment and protection.
Primary Objective:	Human Resources development for sustainable development in African countries.
Secondary objective:	Enhancing and strengthening skilled personnel in the field of water quality.
Location:	Nairobi, Kenya
Executing Agency:	Institute of Meteorological Training and Research (IMTR).
Associated Agencies:	UN Agencies and potential donors.
Participating countries:	All African countries.
Project Duration:	One year to be repeated yearly for five years.
IMTR's Contribution;	US\$20,000 (20%)
Donor's contribution:	US\$80,000 (80%)
Total estimated budget:	US\$100,000
Estimated date of commencement:	October 1996
Estimated date of ending:	September 1997

INTRODUCTION

1. The world community at large and the African continent in particular face many environmental and developmental problems of which the pollution of the fresh water resources is just one. "Water is Life" so it says but the context of this lies in the quality of water. Therefore we can change this parable slightly so as to say "safe water is life but polluted water is death!"

2. Fresh water in Africa is a very finite and fragile resource which is essential for agricultural needs, industrial needs and for the very existence of mankind. Therefore it is a fact that without adequate quantity and quality of water resources, sustainable development cannot take place. Pollution and the wasteful use of water are threatening socio-economic reforms and development in Africa.

3. The provision of safe and clean water to the people is an essential element in the building of a healthy nation as it reduces incidents of water borne diseases which claim the lives of many Africans. This therefore proves the point of the importance of good quality of drinking water in any country's water supply programme.

4. One of the major components of the water resources development is the monitoring and assessment of water quality. However it needs to be strengthened further by the availability of well trained personnel and the provision of essential analytical equipment. This is the area which needs urgent assistance.

5. All African countries are faced with constraints in the execution of their water quality programmes. One way of assisting them to overcome this, is by holding regular workshops throughout Africa. Such workshops would strengthen water quality monitoring and assessment capabilities and offer the venue for discussions on

common operational problems and constraints. The benefits of sharing experiences and ideas would then have direct impact on how to achieve the desired goals.

BACKGROUND

6. The Institute of Meteorological Training and Research (IMTR) of the Kenya Meteorological Department in collaboration with the university of Nairobi conducts a nine month postgraduate training course in operational hydrology.

7. This training programme was initiated through the efforts of the IMTR, the World Meteorological Organization (WMO), the University of Nairobi and many other institutions to enhance and strengthen the water resources development capabilities in the field of operational hydrology.

8. The training programme covers a range of subjects which in the end equip the students with adequate knowledge on how to manage the fragile water resources of the African continent.

9. But since the inception of the diploma course it has been evident that the course curriculum by way of necessity offers the students only generalised solutions to the water problems. There is need for additional and intensive training in the management, quality assessment and protection of the water resources fields. When included these subjects would then add the finishing touches to the final training programme.

10. The IMTR is aware of this through its experience from conducting hydrology courses and has come to the conclusion that a short comprehensive two-week course covering water resources management, quality assessment and protection would be the solution

to the problem and would add the "icing to the cake!" The Institute decided to hold this course on a yearly basis just following the hydrology course.

11. This project has been worked out by the IMTR in line with Agenda 21 and the UN Secretary general's initiative for Africa, for assisting member States in implementing their water plans and effectively cover any gaps in the water quality expertise throughout Africa.

PROJECT JUSTIFICATION

12. Rivers and lakes in Africa like anywhere else in the world play a major role in the development of the African countries. The fisheries industry is of course an important source of food and for economic values.

13. There is just one set-back, namely "pollution." The water resources are endangered by pollution and consequently water from rivers and lakes due to its pollution poses a danger for all users of water; be it for irrigation schemes, human and livestock consumption and all industrial needs. All these sectors are totally dependent on satisfactory water quality and quantity.

14. However in these modern times a lot of industrial wastes are precipitated in the water from rivers and lakes due to the ever-increasing number of industrial plants so necessary for economic expansion of any country. The primary cause is polluted discharges from factories and industries, waste water from urban areas and of course the return flows from agricultural areas. All these discharges impose a serious threat to the quality of water from lakes and rivers.

15. As a result of the above named facts, the quality of water in Africa has dramatically deteriorated in the past few decades. This threat needs urgent attention. The solution to these problems lies in the adoption of a monitoring system for quality control and assessment which requires well trained staff for it to be a success.

16. In the coming years, the pressure on the scarce water resources of Africa will be increased enormously due to population and industrial increases. Already the agricultural sector has expanded enormously due to increased irrigation schemes and livestock production. The industrial and urban water demands will also go up and widen the gap between the demands and the water quality monitoring and assessment capabilities.

17. Training is crucial in strengthening the capacity of African technicians dealing with water quality and exchange of information techniques and experience in this vital field is absolutely necessary for an effective contribution towards substantial socio-economic reforms throughout the continent.

OBJECTIVES

18. Long term objectives.

- (a) To assist the African countries in developing their manpower capacity for sustainable socio-economic development.
- (b) To assist the African countries in the implementation of their plans for Agenda 21 chapter 18, "The Strategy and Action Plan for water resources assessment and

development" and also for the implementation of the UN Secretary General's initiative for Africa.

19. Short term objectives.

- (a) The workshop will provide the African technicians with an opportunity in promoting their skills and expertise in the field of water quality.
- (b) The workshop will enhance the national capabilities for the African countries in water quality monitoring and assessment using appropriate field techniques and data processing facilities and also by the introduction of methodology devised for specific African needs.

INPUT

20. Every year between 15 to 20 participants from African countries involved in the field of water resources will be nominated to attend the workshop. Each one of them will be armed with the specific problems and needs of his or her country and the workshop will offer them all a platform for brainstorming solutions for each and every issue being discussed.

21. The Institute of Meteorological Training and Research (IMTR) has already expressed its interest in hosting the workshop on a yearly basis. The IMTR will be responsible for the provision of the following:-

- (a) Provision of lecture theatres
- (b) Provision of local transport and arranging all travel within Kenya.
- (c) Provision of all secretarial services.

- (d) Provision of all training facilities including laboratory facilities.
- (e) Provision of all logistical support.
- (f) Provision of the final workshop report.

22. The UN agencies and interested donors will be requested to sponsor the participants travel and DSA and will also provide resource persons, lecturers and computers.

OUTPUT

23. It is the project's target to have 15 to 20 well trained personnel to deal with all problems pertaining to water quality assessment and monitoring.

24. A thorough workshop report incorporating individual experiences of the participants as well as country applications of valuation methodologies applicable to fresh water resources will be available for reference to all member States.

25. The workshop will offer the right venue for exchange of information through case studies done by member States as well as lecturers covering different subjects throughout the course. All this will in the end offer solutions for various field problems. Personal computer and software which can be useful as a tool for further training. Also the trained personnel would serve as resource persons in future national training programme.

WORKSHOP PROGRAMME

26. The workshop programme consists of lectures, case studies, group discussions and field visits. Duration of the workshop is two weeks. The topics to be covered area as follows:

(1) Introduction

- (a) International initiatives on water quality
- (b) International and national approaches to water quality
- (c) Linkages between water quality and the socio economic development focusing in health aspects
- (d) Hydrology, water quality and environment.

(2) Water Quality Monitoring

- (a) Parameters considered in Water Quality Monitoring.
- (b) Selection of Stations.
- (c) Hydrometric data requirements.
- (d) River Monitoring.
- (e) Lake Monitoring.

(3) Biological and Microbiological Monitoring

- (a) Indicators and Methods
- (b) On site testing/sampling and preservation
- (c) Field trip and field measurement.

(4) Quality Assurance and Quality Control

- (a) Principles of Quality Assurance and Quality Control
- (b) Water Quality Assessment.
- (c) Water Quality Data Interpretation..

(d) Data Reporting and Validation.

(5) Computer Applications

(a) Statistics and Output Options.

(b) Raison/GEMs Software.

ACTIVITIES AND WORK PLAN

27. The project's proposed implementation is from October 1996 and its supposed to end by September 1997. The activities and the work plan which will be carried out are indicated below:

<u>27% Activity</u>	<u>Schedule Time</u>
A. <u>Programme Development</u>	
(1) Finalization of the Training Programme	October 1996
(2) Financial resource mobilization	Oct./Nov. 1996
(3) Allocation of responsibilities	November 1996
(4) Identifying lecturers and resource persons	December 1996
B. <u>Selection of Participants</u>	
(1) Invitation sent out	January 1997
(2) Response expected	February 1997
(3) Selection of Participants	March 1997
(4) Travel arrangements	April/May 1997
C. <u>Training Programme and Workshop</u>	
(1) Preparatory arrangements	May/June 1997
(2) Finalization of Local Logistics	June 1997

- | | |
|-------------------------------------|-------------|
| (3) Conduct two weeks workshop | July 1997 |
| (4) Evaluation of training services | August 1997 |

D. **Workshop Report**

- | | |
|-------------------------------------|-----------------|
| (1) Finalization of workshop report | Aug./Sept. 1997 |
| (2) Distribution of report | september 1997 |

PROFILE OF PARTICIPANTS

28. Participants should be drawn from technicians working in the field of water quality either in the field or in laboratories. It is recommended that the participants should have passed the diploma course in operational hydrology as a basis for joining the workshop. They should also hold a diploma in the field of water resources as a minimum qualification for the course and should be directly involved in the field of water quality monitoring and assessment.

PROPOSED PROJECT BUDGET

29. The total proposed budget for the Project is US\$100.00 and it will be distributed as follows:

(1) Three international lecturers	US\$15,000.00
(2) Travel Cost for International lecturers	7,000.00
(3) Four local lecturers	10,000.00
(4) DSA for 15 participants	22,000.00
(5) Travel cost for 8 participants	12,000.00
(6) Equipments	10,000.00
(7) Stationeries	3,000.00
(8) Logistical support and report finalization	8,000.00
(9) Secretarial services	7,000.00
(10) Miscellaneous	<u>5,000.00</u>
Total	US\$100,000.00

30. The IMTR will cover the expenses of convening the Workshop, carry out all organizational works, providing training facilities and preparing and publishing the final report. The cost of such services will be about US\$20,000 which represent 20 per cent of the total budget. The remaining \$80,000.00 requires to be obtained from interested donors.

ANNEX 3

DRAFT

LETTER FOR REQUESTING FUND AND TECHNICAL ASSISTANCE

H.E. The Ambassador,
Embassy of Arab Republic of Egypt
Nairobi, Kenya

Dear Sir,

SUBJECT: REQUEST FOR TECHNICAL ASSISTANCE

The Institute for Meteorological Training and Research, (IMTR) in collaboration with the University of Nairobi and other International Organizations conducts a nine month Post-graduate diploma training course in operational Hydrology every year. The training Programme covers a wide range of subjects which are selected to provide the student with adequate knowledge to be able to manage the complicated and usually fragile water resources in Africa.

To date after completion of five of these training programme, forty five students from fifteen African countries have been successfully trained. It was realized that there is a great and urgent need to train the graduates of the hydrology course further and more intensively on the more detailed approaches in Water Resources Management, quality assessment and protection. This can be achieved through a two weeks training workshop with lecturers drawn from various international institutions.

Based on the above facts and after the great success achieved by the Institute for Meteorological Training and Research, (IMTR) in conducting the postgraduate diploma training course in operational hydrology. IMTR is planning to start next year 1997 a training programme for five years to strengthen the capacity building in Africa in the field of water quality through conducting

a two weeks training workshop on the hydrological monitoring for water quality assessment and protection every year.

The proposed project will require, three international lecturers from the various international institutions preferably from Africa and three local lecturers from various institutions in Kenya, those lecturers will give lectures to about twenty participants from different African countries. Some equipments and tools like computers and software will be also required beside the other secretarial support.

A comprehensive project document under preparation with assistance from the United Nations Economic Commission for Africa (UNECA) will be ready very soon for submission to interested donors for funding and financial support.

The purpose of this letter is to request you kindly to use your good office in requesting the Egyptian fund for technical co-operation to the African countries to provide support towards the organization of this workshop which can be in form of one or two lecturers in the field of water quality or by sponsoring two or three participants from the African countries to attend the proposed workshop.

If you agree with our suggestion in principle we will send you very soon the full Project documents which explains the objectives and the budget required in details to allow the Egyptian fund to chose the item where they can provide assistance within their mandate.

Your interest in our workshop and your response to our request will be highly appreciated.

Best regards.

ANNEX 4

**USEFUL DATA COLLECTED FROM KENYA
FOR ECA STUDY
ON
LARGE SCALE IRRIGATION
SCHEMES IN AFRICA**

**SUMMARY OF INFORMATION COLLECTED FROM KENYA
FOR UNECA STUDY ON LARGE SCALE IRRIGATION
SCHEMES IN AFRICA**

Background

1. Kenya, situated on the East coast of Africa, has a total area of 580 370 km² with a current population of 27 million (1994 figures). The estimated population growth is about 3.4 percent annually. Kenya is mainly an agricultural country where 80% of the population live a rural lifestyle. The leading sector of the national economy is the agricultural sector which accounts for about 30% of the GDP (1988 figures).

2. The estimated irrigation potential is approximately 540,000 ha. However, only 52,800 ha is irrigated land representing approximately 10% of the total land surface in the country.

3. The National Irrigation Board (NIB) is the largest body in the country for large scale irrigation schemes. They deal mainly with small scale farmers with plots of about 1.6 to 4 acres. The mandate of the NIB is to bring small farmers together and assist them with the provision of services like water supplies, water management, land preparation and agro-chemical fertilizers. It also provides advisory services covering processing and marketing.

Present Status

4. At present the NIB has six large irrigation schemes as listed below:

- a) Mwea Irrigation Scheme with 5840 ha belonging to 3238 farmers and under rice cultivation;
- b) Ahero Irrigation Scheme with 840 ha belonging to 519 farmers and also under rice cultivation;
- c) West Kano Irrigation Scheme with 700 ha belonging to 553 farmers also for rice cultivation;
- d) Bunyala Irrigation Scheme with 212 ha belonging to 132 farmers;
- e) Hola Irrigation Scheme with 870 ha belonging to 684 farmers, with cotton, maize and groundnut cultivation;
- f) Perkerra Irrigation Scheme with 350 ha belonging to 384 farmers for growing vegetables, cotton, maize and other cash crops.

5. The above irrigation projects supply 90% of the local demand for rice. All the above schemes use surface irrigation. Sprinklers and drip irrigation are used in private irrigation schemes for commercial flower growing in farms which export flowers abroad. Sprinklers and drip irrigation schemes are also used sometimes for coffee and cash crop cultivation.

Future plans

6. A feasibility study has been done and the design plans are all worked out for extending the Mwea Irrigation Scheme for a further 3000 ha. The project is ready for implementation and when implemented, Mwea will become the largest irrigation scheme in East Africa.

7. A further two extensions are planned for the Perkerra and Bunyala Irrigation Schemes. Each will be extended by about 2000 ha but the plans await the availability of funds.

8. A feasibility study will soon be done on the extension of the Ahero Irrigation Scheme by a further 1000 ha.

9. All the above named projects generally transfer water from the source to the schemes by way of gravity except in the case of the West Kano Plan where the use of gravity was found to be impossible. Pumps are used for pumping the water from the Lake for distribution to the scheme and then drained back to the lake also by using pumps.

10. The Bura Irrigation Project is planned to encompass 6700 ha in the near future. At present it has 2200 ha under cultivation and uses the pumping technique for the transfer of water to and from the scheme. This has been a costly operation with high maintenance costs which makes the scheme less profitable.

11. Recently, the irrigation scheme has managed to raise some funds which are to be used in the construction of a barrage to regulate the water for irrigation. With the presence of a barrage they hope to use the method of gravity for the distribution of water throughout the scheme and therefore cut operational costs and make the irrigation scheme economically viable. The project comes under the Ministry of Water Development and the Ministry has already short-listed a consultant to carry out a feasibility study on the project. This irrigation scheme is a project for growing cotton and off season maize. It is a settlement project where each farmer has 1.2 ha.

Tana Delta Irrigation Scheme

12. A feasibility study was done initially for cultivating 12 000 ha but so far only 2 000 ha have been used for the cultivation of rice. It uses the gravitational irrigation system with the construction of a barrage for the storage of water. The project is a commercial one and there is no settlement for farmers. It is a parastatal owned project.

Past Experience

13. The large scale irrigation schemes of Kenya are facing a lot of problems. Some of them are listed below:

a) Lack of clear-cut policy of irrigation

14. At the national level there is lack of planning and prioritization. There are no clearly defined objectives and legislative structure. No studies or figures regarding crop yields are available. The large scale irrigation schemes also lack manpower development and information regarding the different methods of irrigation schemes and their relationship to rainfed agriculture. Attention needs to be focused towards the benefits of irrigated export crops. A central country-wide organisation needs to be set up to oversee and standardize the practices. At the moment, all schemes are completely independent and need steady guidance.

b) Development approach

15. The development approach is lacking since there are no clear-cut policies. The NIB encourages the small-scale farmers approach whilst other commercial ventures encourage large scale commercial

practices. The small-scale farmers approach is targeted towards food security for the socio-economic benefit of the indigenous people. This makes it non-profitable. On the other hand, the commercial ventures are export-orientated and therefore earn the country foreign currency apart from creating jobs for the local people.

c) Lack of institutional arrangements

16. If large scale irrigation schemes are to be successful, Kenya needs to have clear-cut policies and institutional arrangements to encourage standardized procedures. Past and present records need to be kept so as to improve on quality and quantity yields. The irrigation schemes can play a major role in the agricultural sector if institutional arrangements are undertaken now to guarantee profitable large scale irrigation schemes in the future.

17. Funding from donor agencies and countries is required. Presently, the irrigation schemes are locally funded and therefore have very slim profit margins.

d) Maintenance costs

18. Maintenance of the pumping systems used for irrigation schemes is very costly leading to old fashioned and poorly maintained systems in use.

Water availability

19. The availability of fresh water for irrigation purposes is scarce especially in areas which have agricultural potentials. In areas with frequently available water, the land is not of high agricultural potential due to soil erosion.

Farming practices

20. Educating farmers on current and right farming practices is very necessary for the success of the large scale irrigation schemes. About 40% of the manpower in the agriculture sector is represented by women. Most of the farming work is done by women and they need to be guided by correct farming practices. Offering incentive packages by the irrigation schemes would enhance and guarantee the success of large scale irrigation schemes throughout Africa and would go a long way in ensuring food security for the family unit.