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UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA

MAJI

Information Bulletin on Water Resources Activities in Africa

In This Issue :

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Water

... You are not necessary to life: You are life...
You are the greatest wealth in the World,
and you are also the most delicate,
you so pure in the bowels of the earth.
You accept no mixing,
you can bear no impairment,
you are a suspicious divinity...
But you shower an infinitely simple happiness on us.

By
Antoine de Saint-Exupéry

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*The views expressed in the individually authored articles in this publication are those of the respective authors themselves and do not reflect the official position of the United Nations on these matters.

EDITORIAL

Once again it's a pleasure to announce the appearance of the 8th issue of the technical information bulletin - MAJI - ECA's annual publication on water resources. Maji conveys to our readers diverse information on water development activities. Judging from numerous communications received from our readers within and outside Africa, Maji has, over the years, gained increased popularity and usefulness. This is attributed to the new ideas which it began to feature in recent years. The first priority was to emphasize on reflections from sources external to UNECA rather than dwelling on development activities carried out by the secretariat itself so that the reader would be afforded a wider perception embracing developments taking place at the regional and global levels in the water and related fields. In this regard, we would like to express our heartfelt gratitude to those who have taken time to contribute articles and to publishers who granted us permission to reprint their interesting articles. We would also like to encourage our readers, particularly experts and researchers in Africa, to come forward in contributing and playing visible roles in supporting Maji as a matter of their shared responsibility and challenge as well as their role of ownership -- Maji being their creation when in 1986 participants from African member States to the Regional Meeting on Socio-Economic and Policy Aspects of Water Resources Management requested UNECA to investigate the possibility of publishing such a technical information bulletin on water activities. The bulletin has the objective of serving as a medium for exchange of information and experiences, enhancing knowledge, promoting coordination and harmonization of programmes by various organizations and keeping engineers, scientists technicians and administrators abreast of new innovations and developments in the water sector.

Another feature introduced recently was the new column on "Letters to the Editor" that started to appear beginning with the 6th. issue in December 1993.

The current issue of has even broken newer ground which to an extent is an effort to satisfy the needs of our diverse readers. This new drive is to introduce integrated presentation of articles in the three main languages in Africa i.e. **English, French and Arabic.** This will broaden our readership by affording them the privilege of multi-lingual reflection which will add a new dimension to the forthcoming issues. It is important to note that the articles in the three languages often treat different subjects. It means that each article stands by itself and that people who are conversant in more than one language will have the full advantage from Maji of this diversity in subject matters.

The editor would like to extend the call for articles in any of the three languages with a view to be able to ultimately maintain language balance for the future issues of the bulletin.

In order to look back, examine and assess what impact has been made through Maji, an evaluation form is included in the last pages of this issue. These same questionnaires were sent along with previous issues and are now being sent again since the feed back was not adequate to draw any conclusive analysis. We therefore urge our readers to let us know their opinion by completing and forwarding the questionnaires to the editor of the Maji.

Kindly address your communications to:

The Editor
Water Resources Bulletin
Natural Resources Division
P.O.Box 3001 Addis Ababa, Ethiopia
Fax : (251-1) 51 44 16

LETTERS TO THE EDITOR

Dear Sir,

Since I am currently writing a Ph.D. thesis on the waters of the Nile, I would be very glad if you include me in the mailing list of "Maji - Information Bulletin on Water Resources Development in Africa". Thank you very much in advance. Kindest regards.

Clemens Oswald
University of Hamburg, Germany
PH.D. candidate

Dear Sir,

I have recently come across your information bulletin Maji and wonder if we could be put on your mailing list, if the bulletin is still produced.

We run M.Sc. courses in irrigation, water resources and rural development and would benefit from being kept up-to-date on water resources activities in Africa. Thanking you in anticipation.

Dr. M.A. Burtan
Deputy Director
University of Southampton
U.K.

Dear Sir,

The Centre National D'appui à la Recherche (CNAR) is a Chadian institute which has the objective of supporting Chadian and foreign researchers working in Chad, particularly in the area of rural development. The various activities of CNAR are the following:

- Documentation (library, research bibliography, and document supply...
- Publishing (Revue Scientifique du Tchad, Monographies..)
- Remote Sensing
- Enhancing of research through seminars, conferences and training courses
- Facilitating interaction among researchers

In order to provide a better service to the users (researchers, scientists, professors, students, development workers in the field..) we would appreciate receiving regularly your Maji publication. We are therefore kindly requesting to be included in your mailing list.

Jean Luc Rame
Librarian

Dear Sir,

Since June 1994 the Division of Natural Resources and Energy of ECLAC is actively involved in the preparation of the international rivers and lakes newsletter of the United Nations. For that reason I shall be grateful if you could put us in your mailing list so that we receive copies of every document prepared by the Division of Natural Resources related to international waters, international law, measures for water planning and management, protection of shared environmental resources and generally any document dealing with water and environment/water economics.

Miguel R. Solanes
Regional Advisor in Water Resources Legislation
Division of Natural
Resources and Energy
ECLAC, Santiago, Chile

Dear sir,

I wish to acknowledge with thanks receipt of your letter of 30th May 1994 together with the enclosed copies your Bulletin-Maji

As requested we have retained one copy for ourselves and distributed the other five (5) copies.

We look forward to receiving future copies of this interesting and informative document.

John O. Kakonge
UNDP Resident Representative
Leshotho, Maseru

Dear Sir,

Thank you for the material listed below which we have received and are forwarding to the Exchange and Gift Division of the Library of Congress, Washington D.C. Your continued assistance in furthering the exchange of publications is very much appreciated.

Maji information bulletin, No.6, Dec. 1993.

Ruth A. Thomas
Field Director
Library of Congress
Embassy of theUSA
Nairobi, Kenya

Dear Sir,

I wish to thank you for the bulletin Maji you sent for us. We found it useful.

Would you please send us all your publications we are requesting by this letter, including the 1st, 2nd and the 3rd issues of Maji.

Joyce Musake
Library Assistant
Kampala, Uganda

Dear Sir,

I submit herewith the attached information on an International Seminar on Monitoring of African River and Lake Basins held from 8 to 20 February 1993 in Accra, as our contribution for publication in Maji.

Nii Boi Ayibotele
Director Water Resources Research Institute
Accra, Ghana

Dear sir,

Please find enclosed the paper we discussed for inclusion in the Maji Information Bulletin on Water Resources Activities in Africa.

I hope it meets your requirements and remain with best regards.

K. Frochlich
Acting Head Isotope Hydrology Section,
IAEA

ISOTOPE TECHNIQUES FOR WATER RESOURCES DEVELOPMENT IN AFRICA

Technical Cooperation Projects supported by the International Atomic Energy Agency (IAEA), VIENNA

By: K. Froehlich, Acting Head, Isotope Hydrology Section, and A. Boussaha, Head, Africa Section, IAEA

The Potential of Isotope Techniques in Water Resources Development in Arid and Semi-arid Regions

Given the nature of hydrological problems existing in arid and semi-arid regions, isotope techniques are increasingly recognized as indispensable tools for water resources assessment and development in these regions, when adequately utilized with other hydrological methods in an integrated manner. Most of these isotope techniques are based on the measurement of isotopes naturally occurring in the water cycle, such as stable isotopes of the elements of the water molecule, environmental tritium, and radiocarbon. Although not able to detect and delineate groundwater resources, isotope techniques can provide unique information relevant to assessing dynamics and balance of aquifers including recharge conditions and vulnerability to pollution and over-exploitation.

For example, conventional hydrological methods often fail in identifying and evaluating modern groundwater replenishment, if the replenishment rates are smaller than some tens of mm of water per year. Under arid and semi-arid climatic conditions, however, modern recharge is often much smaller. The analysis of the natural isotopic composition of rainfall, surface and groundwater is then the only tool which allows evaluation of present and/or past groundwater replenishment - a basis for estimating the renewable source of water available for sustainable exploitation.

Under the present climatic conditions, some of the main aquifers used as a source of water may not be replenished at all, and their exploitation would simply represent a mining operation of the existing stored volume of water in the system. In such cases, mapping of palaeowaters and estimation of available reserves are essential for proper planning of development strategies. It should be underlined that environmental isotopes constitute the only tool capable of identifying palaeowater through groundwater dating, e.g. by radiocarbon (radioactive carbon isotope, carbon-14), and/or use of climatic imprints on the water reflected by its isotopic composition (deuterium, oxygen-18).

Problems in assessing, developing and proper management of water resources where the use of isotope techniques is indispensable, include identification of origin and dynamics of groundwater (palaeowater resources); evaluation of recharge and discharge of aquifers; evaluation of mixing between surface (river, lake) and groundwater; definition of aquifer vulnerability to pollution and over-exploitation; determination of water balance of reservoirs; evaluation of possible enhancement of local groundwater resources.

Recognizing the great potential of isotope techniques in arid zone hydrology, the Department of Research and Isotopes of the International Atomic Energy Agency (IAEA), Vienna, embarked, within its 1993-94 programme on Water Resources Development, on a subprogramme entitled Water Resources Evaluation in Arid and Semi-arid Regions. The aim of this subprogramme is to promote applied research related to the use of isotope techniques in arid zone hydrology, to establish and strengthen capabilities for the practical use of these techniques in member States, and to provide technical assistance to field projects in hydrology and associated environmental studies.

Establishment of a regional technical cooperation project for water resources development and management in African countries.

Given the high relevance of water resources development for Africa, a joint effort of the Department of Technical Cooperation and the Department of Research and Isotopes was started in April of last year (1993) to streamline the IAEA activities in African countries pertaining to the use of isotope techniques in the water and environment sector. As a first step, a Regional Planning Seminar on Water Resources Assessment in Arid and Semi-arid Regions of Africa

was held from 6 to 9 September 1993 in Rabat, Morocco. The seminar hosted by the Ministry of Public Works and Vocational Training, Morocco was attended by 13 participants from Algeria, Egypt, Ethiopia, Libya, Mali, Morocco, Niger, Senegal and Sudan and by two invited experts from France and Italy, and two senior staff members of the IAEA. The major aim of the seminar was to define a regional technical co-operation project on the practical use of isotope techniques in the development of water resources in arid and semi-arid countries of Africa.

During the seminar, the outline of a regional project proposal entitled "Practical use of Isotope Techniques in Water Resources Development" was prepared, and the focal points of the national contributions were defined. Every effort was made to plan practical end user-oriented activities pertaining to the water sector within the African region. The objective of this regional project is to apply isotope techniques in combination with other hydrological investigations to practical problems in drinking water supply of the participating countries. In particular, the project aims at solving problems where the use of isotope technique is indispensable. These problems include:

- identification and evaluation of groundwater recharge and discharge - two quantities which are crucial for rational water resources development and management in these countries;
- evaluation of surface water infiltration to groundwater - a practical task in connection with the development of surface water resources for drinking water supply;
- identification of palaeowater, often the only potable water resources in arid and semi-arid regions;
- definition of aquifer vulnerability to pollution and over-exploitation.

The project will constitute a suitable framework for strengthening regional capabilities and enhancing regional co-operation in the use of isotope hydrological techniques. As of 1993 it was expected that the following countries would co-operate in the regional project: Algeria, Egypt, Ethiopia, Libya, Mali, Morocco, Niger, Senegal, and Sudan. The preliminary budget is estimated to be about US$ 3 million for a project duration of 4 years. The sub-project activities to be carried out under the regional project in the respective countries were expected to be concerned with: underground water resources in the Hoggar and Tassilis Trough (Algeria); induced recharge to Western Desert Fringes and agricultural pollution to groundwater (Egypt); replenishment of groundwater in the Moyale area (Ethiopia); groundwater recharge of Kufra aquifers in south-east Libya (Libya); recharge and evaporation rates of unconfined aquifers within the Gondo Plain (Mali); water resources in south Atlantic aquifers (Morocco); underground water in the alluvial valley of Dallol Maowi (Niger); water supply for Dakar and its surroundings (Senegal); adjacent Nile aquifers in the northern state (Sudan).

The project was expected to yield important hydrological data which is essential, both from the economic and social standpoint, for the competent national authorities and water resources administrations in planning medium- and long-term exploitation activities and in devising rational management and development programmes of water resources in the areas of interest. The project will contribute to establishing local expertise in the integration of isotope hydrology projects within water resources assessment and development programmes in individual countries. Moreover, it was expected that the regional capabilities and local infrastructures for isotope analyses and field work will be strengthened. It was envisaged to include the project in the 1995-96 technical co-operation programme of the IAEA. Currently (1995) the project as revised is being conducted in 4 selected countries: Ethiopia, Morocco, Egypt and Senegal. This part of the project activity is being implemented over a two-year duration (1995-1996). Based on the outcome of the project in course, it is envisaged to further extend the activity to other countries.

AN OVERVIEW OF DEVELOPMENTS IN THE NILE RIVER BASIN 1/

BY: Azm Fazlul Hoque 2 /

Introduction

Rivers are the lifelines of the planet earth. They are as important to the ecosystem as the blood veins in human bodies. Just as the veins carry blood from different parts of the body to the heart which pumps it back through the arteries, so the rivers carry the life-giving and life-sustaining waters to the oceans from where it goes back to the ecosystem through the hydrological cycle.

The planet earth is endowed with a large number of river systems some of which run beyond the political boundaries of many countries. Some examples are the Amazon, the Mississippi, the Yangtze, the Mekong, the Ganges, the Bhramaputras, the Indus, the Rhine, the Danube, the Congo-Zaire, the Zambezi and of course the Nile.

Rivers can make or break human civilizations. Thus, we read of the river flood in Noah's time which almost destroyed the known world at that time. We also read about many devastating floods in recent years in America, Western Europe and of course almost every year in that flood-prone country of Bangladesh.

Few rivers however are linked with as much human history, culture and civilization as the River Nile system. Thus, we know the ancient Egyptian civilization was solely a product of the Nile. One can not think of Egypt or Egyptian civilization without thinking of the contributions to it by the Nile River. No other country in the world is as wholly dependent on one single river as Egypt is on the Nile. Egypt is one of the driest, if not the driest country in the world. The mean annual rainfall in Egypt is less than 200 mm which many tropical countries may get in perhaps one day. If one takes the Nile Valley out of the map of Egypt, one sees nothing but deserts. The greenbelt on both sides of the Nile where 99% of Egyptian agriculture is confined represent only 2 percent of the total land area of Egypt. That means the rest 98% of the country are largely unsuitable for agriculture.

Source of the Nile River

For thousands of years, the source of the Nile had been a mystery to the Egyptians and to the world. The ancient Egyptians considered the Nile floods as the reward and punishment respectively for their good and bad deeds from their gods. If the flood was good enough for their crops it was a reward; if it was too much which destroyed their homes and properties, it was a god-sent punishment. Indeed, the ancient Egyptians used to consider the Nile as one of their gods and used to worship the Nile even by sacrificing the most beautiful girl in the community by drowning her in the Nile in the belief that she was being married to their Nile god. It is understood that the ritual is still practised in Egypt with the exception that instead of a real girl they use a dummy. The pharaohs sent out expeditions to seek out the source of the Nile. Roman Emperor Nero ordered his centurions up the river. All were turned back by the Sudd, that great forbidding swamp of the Nile in Southern Sudan. It was only in the early 17th century (1613) that the Portuguese Jesuit Priest Pedro Paez discovered the source of the Blue Nile from Lake Tana in the Ethiopian highlands. But the source of the White Nile was to remain a mystery for mankind for another 200 to 300 years. In the words of the Victorian Africanist, Sir Henry Johnston, the quest for this source had become the greatest single geographical secret after the discovery of America. It was only in the second half of the Nineteenth century (1858 - 1877) that explorers of Africa discovered that the White Nile originates from thehighlands of the central African countries of Burundi and Rwanda in the Mountains of the Moon.

1/ *Notes of a lecture delivered to the teachers and senior students of the International Community School of Addis Ababa, Ethiopia in February 1995*

2/ *Chief of Water, Environment, and Marine Affairs Section at UNECA*

Ptolemy, the Romano-Egyptian astronomer and geographer described Lake Victoria and Lake Albert as the source of the White Nile (see figure on next page). However, present day hydrologists believe that the Kagera river originating from Burundi upstream of lake Victoria is also a contributory to the Nile and that the river has a distinct well-defined channel even through Lake Victoria. The White Nile starts its journey from Uganda passing through Southern Sudan until it meets with the Blue Nile near Khartoum. The Nile on the way is also enriched by flows from Atbara river before it reaches Egypt and finally to the Mediterranean sea north of Cairo near Alexandria and Port Said. In the process, the Nile travels some 6,800 kms - the second longest in the World. The catchment area of the Nile system spreads over ten independent countries and covers an area of about 3 million square kilometers.

Nile flows

Of all the large river systems in the World, the Nile probably has the earliest historical records of its flows. Maximum annual flood records were engraved on a large stone dating as far back as 3000 B.C. It is estimated that the amount of water that would flow from the Nile river system to the sea without interference of man would be in the range of 80-84 billion cubic meters per year measured at Aswan in Egypt. During 1977 to 1987 it was reduced to 70-72 cubic kilometers with as low as 50-52 cubic kilometers during 1984-87. The lowest recorded flow this century was 42 cubic kilometers in 1916 at Aswan.

The Blue Nile originating from Lake Tana in the Ethiopian highland contributes some 86 percent of the total Nile flow. However, in recent years flow contribution from the Blue Nile has been decreasing and that from the White Nile increasing steadily.

Nile Water Use

The Nile has provided the basis of agricultural development in Egypt and the Sudan since the start of agriculture in the area some 7000 years ago. Systematic man-made irrigation in Egypt started about 5000 years ago. Storage of Nile water to make up for seasonal or year-to-year variation in flows started only this century with the construction of the first Aswan Dam in 1903. It was augmented by construction of dams at other locations and by raising the height of the first Aswan Dam. This culminated in the construction of Aswan High Dam in 1963.

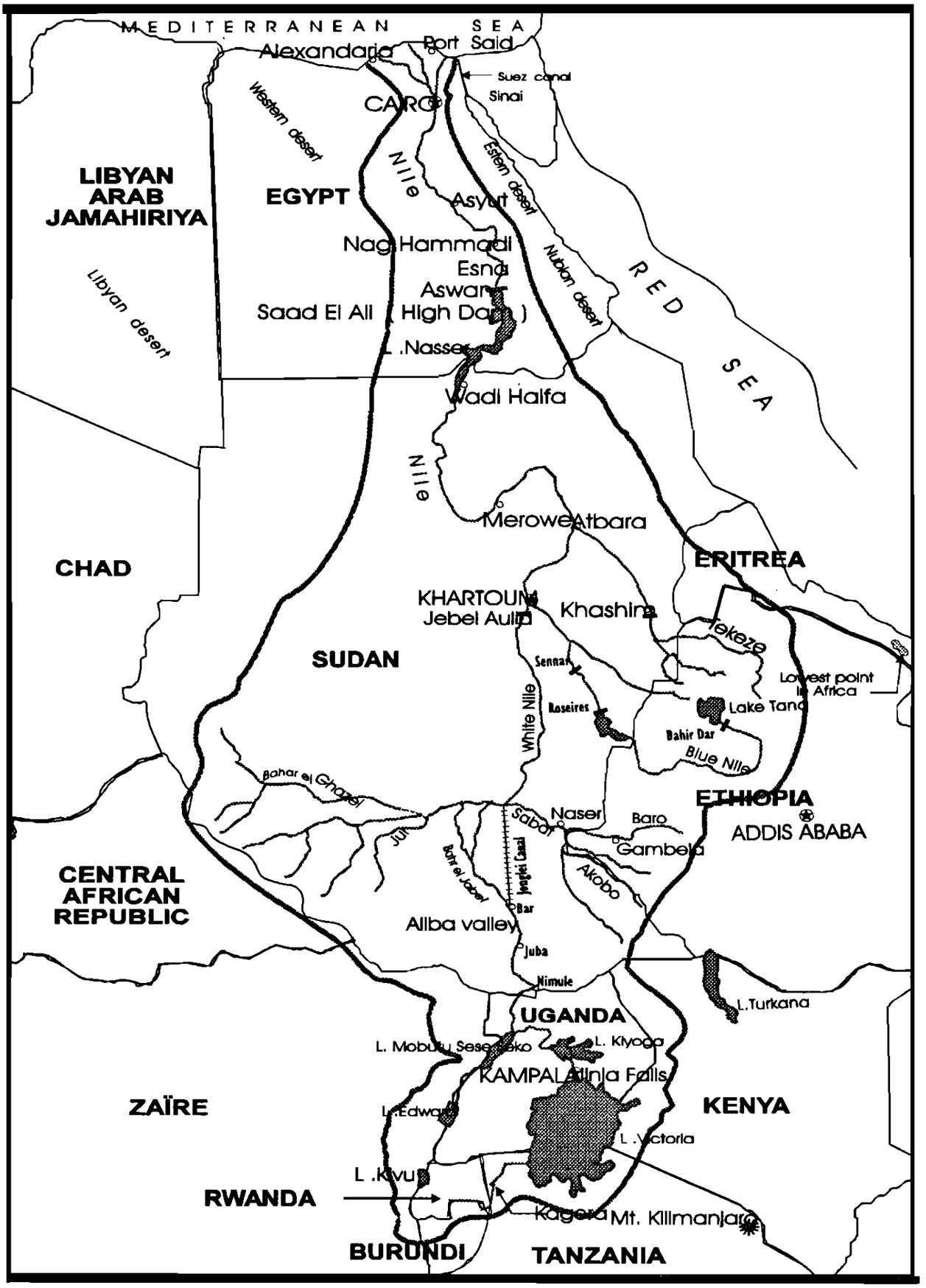
Of the total available average annual Nile flow of say 80 billion cubic meters, Egypt presently uses about 55.5 billion cubic meters. It has long-term plans for utilizing upto 65.5 billion cubic meters annually.

Second to Egypt, Sudan uses about 18.3 billion cubic meters each year and it has long term plans of using upto 31 billion cubic meters. Ethiopia presently utilizes only about 0.6 billion cubic meters and the other riparian countries like Tanzania, Rwanda, Burundi, Kenya, Uganda and Zaire together are utilizing a mere 0.05 billion cubic meters of the Nile waters.

Possible Source of Conflict

Use of Nile waters at present by individual riparian countries depend largely on their level of overall socio-economic development and specially on their capability to harness the water resources of the Nile within their boundaries. As the upper riparian countries including Ethiopia prepare long term plans for utilizing a greater share of the Nile water and as both Egypt and the Sudan also plan to increase their irrigated agriculture and consequently utilization of a greater share of the Nile waters, there is a possible source of conflict over the share of the Nile waters . One way of resolving this conflict is to increase the available Nile flow by reducing the loss of almost 50% of the White Nile flow through evapotranspiration in the great swamps of the Southern Sudan. This was contemplated under the ambitious large-scale water transfer project by way of constructing the Jonglei Canal. This large man-made canal was to divert White Nile water without going through the great swamp land of Southern Sudan called the Sudd where up to 50% of flow is lost because of evaporation. However, the fate of the project is in jeopardy because of continued civil war in Sudan and because of present cool political relations between Egypt and Sudan.

NILE BASIN AND THE JONGLEI CANAL



The boundries and names shown on this map do not imply official endorsement or acceptance by the United Nations

International and bilateral agreements

In order to avoid any possible conflict between and among the riparian countries over the Nile waters, there has been a number of bilateral and international agreements between the concerned countries. The first such agreement was signed in Rome as early as 1891 between Italy and Great Britain which were acting on behalf of Eritrea and Egypt respectively. The agreement stipulated that Italy would undertake not to construct on the Atbara river any irrigation or other works which might modify its flow into the Nile.

Agreements of 1902, 1906, 1925, 1929, 1949 and 1959

The 1902 agreement between Ethiopia and Great Britain stipulated that Ethiopia would not construct any work on the Blue Nile so as to interrupt its flow to the Nile and finally to Egypt.

The 1906 agreement signed in London was between Belgium and the United Kingdom on behalf of the Congo and the Sudan respectively at that time. The agreement stipulated that the State of Congo would not construct or allow to be constructed any work on or near the Semliki or Isango rivers which would diminish the volume of water entering Lake Albert except in agreement with the Government of the Sudan.

The 1925 agreement signed in Rome was between Italy and the United Kingdom whereby Italy recognized the prior hydraulic rights of Egypt and the Sudan in the waters of Blue and White Niles and guaranteed not to construct on the headwaters of these rivers and their tributaries any work which might modify their flows into the main Nile River.

The 1929 Nile waters agreement was concluded between Egypt and Great Britain. Great Britain at the time was representing the East African countries of Uganda, Kenya, Tanzania and the Sudan. The agreement contained statements stipulating that the British Government on behalf of these countries pledged that no works would be undertaken on the Nile, its tributaries and lakes in the basin which would reduce the volume of the Nile waters reaching Egypt. This treaty also gave Egypt the right to inspect and investigate along the whole length of the Nile and to the remote sources of the Nile tributaries.

The 1949 agreement on the Nile was between Egypt and the British Government on behalf of Uganda. This agreement allowed for construction of the Owen Falls Dam at the outlet of Lake Victoria. The reservoir of the Dam was to assure a controlled water release to Egypt and to produce electric power for Uganda.

The 1959 agreement, the latest in the series, was for full utilization of the Nile waters. This treaty was between Sudan and Egypt and was an updated version of the 1929 agreement. This agreement made provision for construction of the Aswan High Dam as the major element for the control of Nile waters for use by Egypt and the Sudan. This agreement made provisions allowing Egypt to utilize upto 55.5 billion cubic meters and Sudan upto 18.5 billion cubic meters of Nile water.

Since 1959, there has not been a major publicly-known agreement between the riparian countries of the Nile. However, recently there have been talks between the Ethiopian Government and Egypt with a view to looking at the whole question of Nile waters.

Views of upper riparian countries

Most of the upper riparian countries from Tanzania to Ethiopia currently look at all these previous agreements on the Nile with a degree of distrust and indignation. Their position is that most of these agreements were concluded when their countries were under colonial rule and they therefore do not consider these treaties binding on them.

On the other hand, the level of water resources development, water expertise and available water data in these countries are not anywhere near those in Egypt or even in Sudan. They, therefore, do not feel ready yet to negotiate, on equal basis, any treaty with Egypt and Sudan on the question of use of Nile waters.

Recent International efforts for Nile basin development

In recent years, there have been a number of initiatives by the United Nations and other international agencies to promote cooperation among the Nile basin countries for its integrated development with equitable benefits for all concerned countries. Some of these are briefly as follows:

(i) ECA-UNDUGU Group initiative

This initiative started as early as 1983. The Nile basin countries were brought together under the forum called UNDUGU to establish a dialogue for cooperative efforts for integrated development of the Nile basin countries. The word UNDUGU is a kiswahilli word meaning brotherhood. Its main advocate and patron was the former state minister for Foreign Affairs and Deputy Prime Minister of Egypt--Dr. Boutros Boutros Ghali. ECA was requested by Mr. Boutros Ghali to act as its secretariat. For almost ten years the Group met formally once or twice a year and exchanged words of brotherhood, fellowship, cooperation etc. The objective of the Group was more political, cultural and to provide a forum where mutual concerns and issues could be discussed in an amicable way. Hence the participation of member/observer states was rather non-committal. However, in 1989-90, under the Undugu initiative a technical framework for a master plan for integrated, multidisciplinary development of the Nile basin was prepared by a French Ambassador to the United Nations, namely, Mr. Paul Mark Henry. Following this, ECA attempted to bring together the Nile basin countries under the auspices of the UNDUGU Group to sign a formal Memorandum of Understanding (MOU) with a view to formalizing the organizational structure of the UNDUGU and to undertake implementation of technical projects including preparation of a detailed master plan. In 1992, the group was very close to success in this venture. At a Cairo meeting of experts from the Nile basin countries, a draft MOU was agreed upon and it was presented to a ministerial meeting of the UNDUGU group of countries at ECA in February 1993 for their final approval. There, the ministers decided to postpone action on it for political reasons. Since then, the Undugu group is relatively inactive despite ECA's repeated attempts to revitalize it; mostly because of lack of political will and commitments by the UNDUGU group of countries.

(ii) UNDP-ECA Study

In 1986, UNDP organized a meeting of ministers from the Nile basin countries at Bangkok to benefit from the experience of the Mekong River Commission there. Following this meeting, ECA-UNDP jointly prepared a study proposing cooperative development programme in the Nile basin area. However, Ethiopia objected to the terms of reference of this study and no follow-up action was possible again for lack of coordination and cooperation among the Nile basin countries.

(iii) Hydromet/TECCONILE Project

Some 30 years back, with UNDP assistance, a technical committee of the Nile basin countries was formed. This was called Hydromet and its objective was to collect hydro-meteorological data in the Nile basin. Hydromet collected a lot of technical data. But when UNDP stopped funding, the Committee became inactive. However, recently it was replaced by a technical committee of the Nile riparian countries. This commttee is ealled TECCONILE. However, due to differences of opinion among the riparian countries the TECCONILE is still not very active.

(iv) Nile 2002 initiative:

This is the most current and active international initiative on the Nile. Under this initiative, with assistance from Canada, a series of technical conferences are being organized. The first one was in Egypt in 1993, the second was in Sudan in 1994 and the third was in February 1995 in Tanzania.

(v) 1993 ECA study

Meanwhile, ECA prepared a study on problems and prospects for intercountry cooperation for integrated development of water resources in the Nile river basin. This study is now being published by ECA and will be distributed to all concerned countries and ECA will await their reactions.

In this study ECA analysed the problems and constraints for intercountry cooperation in the development of Nile basin. These are mainly as follows:

(a) The Nile riparian countries realize the need for the establishment of an intercountry organization to coordinate the integrated development of the basin. However, they cannot agree on any central organization proposed so far, such as: the Undugu, the TECCONILE and others. Needless to say, lack of mutual trust and difference of opinion in the modus operandi of such a central organization is a prime deterrent in this regard.

(b) Most of the upstream riparian countries feel they are not at the same stage of technical and economic development to negotiate at par with lower riparian countries i.e Sudan and Egypt.

(c) Reluctance of some international donor agencies to assist these countries to prepare their national water master plans unless and until they come to an overall basin-wide agreement on Nile water use is also a hinderance in this regard.

(d) All the old agreements intended to protect the rights of Egypt and Sudan for Nile water use are regarded by some upper riparian countries as obstacles for integrated development of the Nile basin.

Recommendations

The ECA study makes the following recommendations in this regard:

(a) All international assistance for integrated development of the Nile basin should be better coordinated.

(b) International community can provide assistance to the upper riparian countries in the preparation of their national water master plans and in consolidating these plans into an overall Nile basin master plan for development.

(c) Assistance should be provided to lower riparian countries for water conservation and improving their water-use efficiency.

(d) Assistance should be provided to the Nile basin countries to agree on and establish a central intercountry organization for overall and equitable development of the Nile waters.

(e) Development of the Nile basin should be focused on water conservation measures in the equatorial lakes basins and measures for reducing water loss in the Sudd region by reactivating the Jonglei Canal Project.

(f) A Nile development fund should be established for financing and strengthening of a central intercountry Nile basin organization and other activities leading to the integrated development of the basin.

UNECA/WMO CONFERENCE ON WATER RESOURCES: Policy and Assessment

(20-25 March 1995, Addis Ababa, Ethiopia)

A conference on Water Resources: Policy and Assessment was jointly organized by UNECA and WMO for the African region and was held at Addis Ababa from 20 - 25 March 1995. It was attended by senior representatives of water resources agencies from 41 African countries, international river/lake basin authorities, regional bodies and non-governmental organizations, external support agencies and the United Nations system of organizations.

The conference had plenary and working group sessions. In its plenary session, the conference considered the following five themes which were presented by keynote speakers: (i) Role of water scarcity and water stress in addressing the economic challenges facing African countries at the dawn of the 21st century (ii) Institutional arrangements for integrated water resources assessment and management in Africa (iii) Basic water resources monitoring systems and the economic value of water and water data in the development of Africa (iv) Capacity building, manpower development, technological trends and material for water resources assessment, and (v) Policy and strategy and action plan for water resources assessment in Africa.

Objective of the Conference

The objective of the conference was to prepare a strategy to rehabilitate, build and/or adapt the institutional, financial, manpower and technological capacity of the relevant services of the countries and regional bodies concerned to enable them assess water resources within the context of its integrated and comprehensive development and management for socio-economic development on a sustainable basis.

A strategy was prepared following the findings and recommendations of the UNDP/World Bank, Sub-Saharan Africa Hydrological Assessment Project and the UNESCO/WMO Evaluation of Water Resources Assessment.

The strategy has took into account the principles of Chapter 18 of Agenda 21 of the Rio Conference and the World Bank Water Resources Policy and the Water Resources Management Strategy for Sub-Saharan Africa which is under preparation.

The strategy is based on a strong determination to overcome the issues, problems, constraints and conditions that bedeviled water resources assessment on a sustainable basis in the past. To this end it is proposed that the water resources agencies should improve their productivity and efficiency; there should be optimal use of human and financial resources; external support agencies and UN organizations should strengthen the co-ordination of their activities to support water resources assessment at different levels; demand for water resources data and information should be based on the level of socio-economic development, and there should be a strong political will to co-operate at river, lake and groundwater basin levels.

The strategic actions recommended by this conference are in the areas of management capacity building, promotion and creation of awareness of the capacity of the hydrological services and the value of hydrological data, attainment of sustainable financial capacity, integrated water management, regional and sub-regional initiatives and responses, and a new role for External Support Agencies.

The strategy is recommended to:

Governments, sub-regional and regional organizations to incorporate it in their water resources assessment programmes towards sustainable development.

UN organizations involved in water resources to adopt it for use in their water resources assessment assistance programme to the countries, sub-regional and regional organizations.

PARTICIPANTS AT THE CONFERENCE

ESAs to incorporate it in the water resources assessment component of their programme of assistance for integrated development and management of water resources at the country, sub-regional and regional levels.

The preparation of the strategy by the conference was part of a process for water resources assessment for the African region. The subsequent process will be to promote it widely to appropriate authorities at the national, sub-regional and regional levels and also to the External Support Agencies. This strategy has been presented to and endorsed by the ECA Conference of Ministers and the WMO Congress.

To implement the strategy, an action plan consisting of seven main points was elaborated.

The Main Components of the Action Plan are:

i) Management Capacity Building
ii) Awareness Promotion
iii) Sustainable Financial Base
iv) Integrated Approach to water resources assessment (WRA)
v) Refined Subregional initiatives and responses
vi) Role of External Support Agencies (ESA)
vii) Conference Follow-up

The full report and summary of the proceedings is available at ECA and can be provided upon request free of charge.

CELEBRATION OF THE WORLD DAY FOR WATER

Articles on this subject started to appear in the Maji beginning from 1993. It appears again in this issue with a wider coverage and details on the event that took place in Ethiopia and Mauritius.

General Background

The decision to observe the World Day for Water was taken by the United Nations General Assembly in its Resolution 47/193 which was adopted at the 47th session in 1992. The resolution declared the 22nd of March of each year starting in 1993 to be observed as the World Day for Water, in conformity with the recommendations of the United Nations Conference on Environment and Development (UNCED). The event of March 22, 1995 was the third in the series. Each succeeding year has seen the celebration to have a wider scope and greater involvement that invoked awareness on water use, conservation and management by increasingly larger segments of population. The objective is to ultimately elevate the full awareness of the world community to wisely manage the finite and fragile water resources of the planet.

Objective

The objective of the celebration of this particular Day is to draw attention and enhance awareness among population worldwide of the value and importance of the precious, life-giving, and life-sustaining finite water resource. The goal is to enhance the level of understanding of the general populace for rational use and conservation of this rare commodity at the individual, community, local, national, regional and global levels.

UNECA's initiatives

It is noted that the General Assembly Resolution requested the Secretary-General of the United Nations to make the necessary arrangements in order to ensure the success of the observance of the Day worldwide. Accordingly the UNECA as the United Nations secretariat, responsible for the co-ordination and harmonization of water activities within the African region has as in previous years addressed reminder messages to all its member States to urge them to make advance preparations for

the commemoration of the World Day for Water. In the letters to the countries, UNECA outlined possible areas for inclusion in their programme and suggested that country offices of UNDP, UNICEF, WHO and other UN agencies might be invited to participate at and assist in the preparation for the celebration of the Day at the national level.

Because of its vicinity, the UNECA was able to closely assist and advise Ethiopia in the preparation of its programmes and activities and provide logisties and facilities for the celebration of the Day. This year (1995) the UNECA subsequent to sending a formal message to the Ministry of Foreign Affairs of the Transitional Government of Ethiopia (TGE), also sent a letter to the Ministry of Natural Resources Development and Environmental Protection (MNRDEP) of TGE which is the ministry responsible for the organization of the event. UNECA also liaised with UNDP, UNICEF, FAO and WHO offices to mobilize their assistance. It is notable that UNICEF came out with substantial financial assistance to the Government of Ethiopia in celebrating the Day.

The 1995 celebration of the Day was given much prominence and publicity in Ethiopia since it coincided with the ECA/WMO Joint Conference on Water Resources that took place from 20 to 25 March, at Addis Ababa. Thus, there was all the more reason for the two organizations to assist the MNRDEP in the planning and preparation process for the Day.

UNECA maintained a very close contact with the officials of the MNRDEP and provided logistic support and advice for the organization and celebration of the World Day for Water. It invited the ministry and made its premises and facilities such as the Rotunda and the Plenary Hall at the disposal of MNRDEP for the organization and arrangement of the events for the Day. The role played and financial contribution of UNICEF has been very significant and was highly appreciated by the organizers.

Needless to say the full engagement of the MNRDEP of TGE in the preparation of the programme for the World Day for water was fascinating and very heartening.

In order to reflect the celebration of the Day in African countries on Maji publication the UNECA had requested its member States to provide it with a report on their activities. The reports of the event in Ethiopia and another one that were received from Mauritius are included in this issue of the Maji.

Celebration of the World Day for Water in Ethiopia

The MNRDEP of the TGE with assistance from the UN organizations mentioned in the previous paragraphs was the central body that made the arrangement for the celebration of the World Day for Water in Ethiopia. The Ministry acting through its Department of Water Resources Development and Conservation was able to gather its full force with dynamism. It mobilized human and financial resources from within and without and guided the organization of the events in a coordinated, concerted and harmonized manner. It pooled the resources from its own ministry and called for the support and collaboration of other ministries in the country who had a stake in the water sector. It also called upon and encouraged the collaboration of the private sector to participate and assist in the organization and celebration of the Day. This it did by inviting firms and offering them the opportunity to demonstrate their equipment and machinery, and to introduce their technical capability and involvement in water development schemes and projects. Thus, many firms were able to participate and exhibit their items in a corner allocated for them. Schools were drawn in to participate in various activities. The mass media had also a very important role. It was possible to keep the subject of water in various news papers, T.V. programmes and radio broadcasts for over a week such that the focus of attention on water issues and the relation of women and water was properly addressed. Colourful posters with slogans: "Conserve and Use Water Rationally" were posted and displayed in various parts of the capital with a view to drive the message of awareness creation home. The theme chosen for the (1995) celebration of the World Day for Water was "Women and Water" as a recognition of their special role in water management. It was in the perspective of the important role that women have and their special relation with water -- as tradition has placed on them the responsibility -- that, the TGE decided to make the celebration of the World Day for Water to be observed with colour, glamour and jubilation countrywide. The well prepared plan and advance arrangements have gone a long way to meet desired objectives. The commemoration event and the campaign that was launched towards promoting awareness has attained a level that was satisfactory to all those who contributed and those who had the opportunity to share the experience in the event.

The TGE had a special committee formed which comprised of local experts, professionals in the MNRDEP including members from other concerned

ministries for the preparation of the celebration in 1995.

The event itself had various planned activities divided into two parts. The first part consisted of a formal presentation of a keynote speech, songs of water, citation of poems and awards in colouring competition at the Plenary Hall of ECA. The second part was an exhibition of water-related activities, dance demonstrations and video shows at the Rotunda of ECA.

The celebration started with a comprehensive speech by H.E. Dr. Mesfin Abebe, Minister of MNRDEP of the TGE. The minister highlighted the importance of water to life and the need for taking due care and appropriate measures for its conservation and development as it is a fragile element that is vital for all living creations. Following the speech by the minister, a large number of school children from Addis Ababa participated in songs that expressed the importance and value of water. This was followed by a speech from Dr. M. D. Sarr, Acting Executive Secretary of the Economic Commission for Africa. In his speech Dr. Sarr underscored the importance of water for life and the role UNECA plays in assisting African countries in conservation and development of water resources.

The representative of the Secretary-General of the World Meteorological Organization gave a brief statement highlighting some salient features of water resources. This was followed by recitation of poems on water and sanitation by two children.

To add a distinctive feature for the auspicious celebration and to mark the role and relation of women to water use and management, the guest of honour, Her Excellency, Mrs. Genet Zewde, the Minister of Education of the TGE graced the audience by delivering a keynote address on the theme "Women and Water". She underlined that in developing countries women are the main carriers of water and that women are also custodians of family hygiene. In her statement, the minister noted that women have close association with water as tradition has vested on them the responsibility of fetching water for drinking and domestic use. The need for close involvement of women in the planning and implementation of water and environmental projects was mentioned to be not only desirable but also decisive since women are defacto managers of local water resources. After concluding her address, Mrs. Genet awarded prizes and certificates to school children who participated in colouring competition. The drawings of the competition were posted on bill boards at the Rotunda exhibition for display.

The involvement of schools in the programme for the World Day for Water had the motive of cultivating the culture and encouraging the youth sector of the community to grow with awareness on the care to be accorded to water resources. Needless to say that the gospel would meantime be well diffused through them as best conveyors.

The first part of the celebration in the plenary was attended by cabinet ministers of the Government of Ethiopia, dignitaries, ambassadors, representatives of international organizations and other invited guests.

The guest of honour then proceeded to formally open the water exhibition at the Rotunda of ECA. At this juncture, she expressed appreciation on the extraordinary and admirable organization of the exhibition in terms of quality, diversity and completeness of displayed items which all combined to enhance public awareness. The exhibition was the climax of the jubilant event of the day. This arrangement had picture expositions, water equipment and machinery, pump demonstrations, posters on water development, project charts, an assortment of exhibit materials and video and cultural shows. It was visited by ministers, prominent personalities, invited guests, school children and the general public.

The World Day for Water in Ethiopia was thus magnificently organized to orchestrate the objective of raising awareness and is a good example to follow. The recognition of the day was felt countrywide because of the extensive coverage by mass media including, radio, newspapers and T.V programmes that gave comprehensive coverage for over a week to adequately promote the campaign.

The great success of this year's (1995) achievement of the celebration in Ethiopia was a result of full cooperation and concerted efforts of all parties concerned including the international organizations and most particularly the committed and dedicated efforts and hard work of the officials of the MNRDEP.

Celebration of the World Day for Water in Mauritius

The World Day for Water in 1995, was celebrated in Mauritius on 22 March as called for by

the United Nations General Assembly Resolution 47/193.

The objective was to arouse awareness in the minds of the Mauritian public on the need to conserve water. The Central Water Authority of Mauritius telecast a programme at prime time on 22.3.95 and explained the steps that are being taken to reduce transmission losses within the water supply network to acceptable levels. In this context, mention was made of an extensive lead control project being undertaken to bring down the level of unaccounted water. It was underscored that by saving water which is otherwise lost, more can be made available to the consumer.

The efforts that are being made to provide an uninterrupted supply of clean, wholesome water to the entire population within the next few years were also mentioned in the television interview of the General Manager of the Central Water Authority.

The television clip showed, in some detail, the water treatment process for potable water, from the inflow of raw water into the treatment plant to the process of disinfection before distribution.

Quality control of both raw water and treated water as is carried out in the Authority's modern water quality laboratory was shown to the public.

In the context of regional co-operation the biochemist of the Water and Sewerage Division of the Seychelles Public Utilities Corporation who is being trained in the Central Water Authority's Water Quality Laboratory, was interviewed by the local television. This interview was included in the TV programme on the world Day for Water.

Lake Victoria: Africa's Largest Lake

(Reprinted from "OVERSEAS" Issue No.7,1994 by the Institute of Hydrology, UK)

Lake Victoria is the largest lake in Africa and one of the largest lakes in the world. The lake catchment includes Western Kenya, Northern Tanzania, Southern Uganda and most of Rwanda and Burundi. The outflow from the lake is the main source of water for the White Nile and also provides a small but important contribution to the flow in the main Nile down to Cairo. Since 1954, with the construction of the Owen Falls dam, the lake out-flow has been harnessed for hydropower production and now supplies most of Uganda's electricity requirements.

Historical Water Balance

Lake levels and hence outflows are determined by the balance between direct rainfall on the lake surface, evaporation, inflow from the surrounding catchment area and outflows into the Nile. For such a huge lake, it is difficult to predict the distribution of rainfall and evaporation over the lake surface: indeed satellite images and measurements show that the lake itself generates substantial additional cloud cover and rainfall when

compared to the surrounding land surface. As a result, perhaps the only reliable way to estimate the net rainfall on the lake surface is as the difference between all remaining terms in the water balance for periods in which these terms are known.

The most complete data coverage for the region was during the main data collection phase of the Hydrometeorlogical Survey Project, which operated during the 1960s and 1970s and was sponsored by the World Meteorological Organisation.

In this period, some 80% of the inflow to the lake was gauged (including some 20-25 major rivers) and many additional raingauges and meteorological stations were set up around the lake catchment. Using measurements from this period and for subsequent years, it has been possible to relate the individual components in the water balance to rainfall records at the main long term meteorological stations around the lake shore.

The water balance of the lake has thus been simulated from the time rainfall records first started in the 1890s. A satisfactory balance was obtained throughout, including the period 1961 to 1964 when the lake level rose suddenly and unexpectedly by some 2.5m. The simulations confirmed the results of previous studies which have shown that this rise can be attributed almost entirely to an increase in rainfall on and around the lake in this period; in particular, an unusually wet period in Kenya during late 1961 and early 1962. The simulations also show that levels have remained relatively high since then due to a small but persistent increase in the annual rainfall in the region. There seems to have been only a small influence from operations at Owen Falls dam.

Future Levels

The water balance models have also been used to explore the effects of hypothetical future variations in the individual components in the lake water balance. For example, preliminary work suggests that the impact of even quite major land use changes on lake levels is likely to be small. This is because the inflow to the lake makes a relatively small contribution to the overall water balance when compared with rainfall and evaporation. Other consequences, of course, such as increased sediment content and larger flood flows, may well be severe. The model has also been used to investigate the response time of the lake when subjected to variations in net inflow. These studies show that, owing to its enormous size, the lake can take 10-20 years to reach a new equilibrium level following any major disturbance to the water balance. This result has important implications when assessing the likely future behaviour of the lake in response to land use and climate change.

INTERNATIONAL SEMINAR ON MONITORING AFRICAN RIVER AND LAKE BASINS 8-20 FEBRUARY 1994 ACCRA - GHANA

By Michael Tsiagbey
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Introduction

The monitoring of river and lake basins on a continuous basis to provide data and information for environmentally sound management is a pre-requisite for achieving water related socio-economic development on a sustainable basis. The satisfaction of the basic needs of the fast growing population in terms of food, health, shelter and energy in the African region is putting severe pressure on the land and water resources. The impending climate change is expected to affect the distribution of rainfall in the region with consequential impact on water resources, the productivity of land resources and socio-economic activities.

The consequences of population pressure in the African region are impoverishing soil fertility, washing off soil nutrients into lakes and reservoirs thus affecting lake/reservoir water quality and biological life and inducing significant sedimentation resulting in reduced storage capacities of lakes and reservoirs. Pollution of rivers lakes/reservoirs and groundwater are on the increase because of increased discharge of domestic, industrial and agricultural wastes.

To ensure that the rivers, lakes/reservoirs and groundwater are available for use on a sustainable basis it is important that their condition and the basins that contribute to them should be continuously monitored and known so that appropriate policies can be formulated and implemented for their rational management. Unfortunately monitoring is not one of the strong points of organisations established to manage these water resource systems.

While lack of financial resources is clearly a major constraint, a more serious drawback is the lack of adequate awareness of the need to carry out continuous monitoring of the climate, vegetation, land use activities, hydrological, hydrogeological, pedological, topographical phenomena in the river basins of the region and to integrate the data and information to assess the impact of changes on water resources.

To combat and arrest this state of affairs it is important that those charged with the responsibilities of developing and managing the river and lake basins be given the necessary training to make them aware and capable in the monitoring and use of data and information in an integrated manner to achieve the objectives of water related socio-economic development on sustainable basis.

It was against this background that the international training seminar on monitoring African river and lake basins was held in Accra, Ghana from 8 to 20 February 1993.

Sponsorship & Organisation

The seminar was sponsored by a number of international and national organisations namely: (i) International Lake Environment Committee which is based in Japan (ii) The United Nations Environment Programme (iii) The IHP/OHP National Committee of Germany (iv) UNESCO and the International Institute for Aerospace Survey and Earth Science (ITC) of the Netherlands and (vi) The Ghana National Committee for International Hydrology and Water Resources Programmes.

The organisation of the seminar was jointly handled by the Ghana National Committee for International Hydrology and Water Resources Programmes (GNC/IHWRP) and Water Resources Research Institutes of the Council for Scientific and Industrial Research.

Participants and Resource Persons

In all fourteen (14) participants were at the seminar. They are all middle level engineers and scientists in the field of planning, development management, education and research from national

institutions and river and lake basin organisations in Africa. Out of the fourteen participants, six are Ghanaians and one from each of the following countries: Chad, Ethiopia, Mali, Sudan, Tanzania, Uganda, Zambia and Zimbabwe.

The resource persons for the International seminar were provided firstly by Water Resources Research Institute (WRRI) of the Council for Scientific and Industrial Research (CSIR) of Ghana and the International Institute of Aerospace Survey and Earth Sciences and secondly by Volta River Authority, the Meteorological Services Department and the Department of Geography and Resource Development of the University of Ghana.

Objectives of the Seminar

The long-term (development) objective of the seminar was to improve the management of river and lake basins, to increase food and agricultural production, improve health and meet basic energy needs for present and future socio-economic development of Africa.

The immediate (short-term) objective was to train specialists of national and sub-regional river and lake basin organisations to improve their knowledge and capability to organise the monitoring of the elements that have an impact on the state of the river and lake basin resources and use the knowledge for rational management.

Training Seminar Content & Outputs

The international training seminars addressed critical issues on monitoring African river and lake basins by way of lectures by resource persons, presentation of country reports by the participants, laboratory and field visits and general discussions.

The major topics covered during the seminar were: (i) Water Resources, Socio-Economic Development and the African River and Lake Basin Environment (ii) Problems of African Hydrology and Surface Water Resources (iii) Evaluation of Water Resources Assessment Activities (iv) Water Sampling and Water Quality Analysis (v) Data Management, Geographic Information Systems and Remote Sensing (vi) Assessment of Water Resources, Time and Space Changes: Water Quantity and Water Quality Aspects (vii) Institutional Aspects of Monitoring African River and Lake Basins and (viii) Country Reports on Monitoring of River and Lake Basins from Chad, Ethiopia, Ghana, Mali, Sudan, Tanzania, Uganda, Zambia, and Zimbabwe.

Furthermore, the participants carried out laboratory and field visits to relevant institutions namely, Water quality and sediment laboratories of Water Resources Research Institute, Hydrometeorlogical and Hydrological Services Department, Remote Sensing Centre of University of Ghana, and Volta River Authority.

The major documented outputs from the seminar were:- (i) A published report on the Training Seminar containing the main points emphasized through the discussions and the lectures, (ii) A compilation of notes and other publications which were distributed during the seminar.

Conclusion

The benefits of the training seminar was widely acknowledged by all the participants.

There was the realisation of the enormous task ahead of the African continent in developing her monitoring activities in the field of hydrology and water resources. This probably will result in the development of monitoring standards for the various countries.

There is a need for frequent exchange of ideas and experiences of African Water Scientists and Engineers for improvement in the planning, development and management of the African water resources systems. It was also concluded that there is a need for strengthening of the intergovernmental cooperation of African countries in dealing with problems of water resources systems.

The weak position of water resources consultants as compared to structural and architectural engineering consultants in Africa was recognized and the need to educate more water resources and hydrology professionals was stressed.

Due attention should be paid to analysis of hydrological data collected since, adequate data collected but analyzed poorly negates developmental efforts of the continent.

THIRD ANNUAL MEETING OF INTER - AGENCY GROUP FOR WATER IN AFRICA (IGWA) (15-16 NOVEMBER 1994 NAIROBI, KENYA)

The Third Annual Meeting of IGWA was organized by UNECA and hosted by UNEP. It was held at UNEP headquarters in Nairobi from 15-16 November 1994. The meeting was attended by high level representatives from the following agencies: WHO, UNEP, UNCHS, UNIDO, IAEA, UNECA, UNESCO, WMO and Niger Basin Authority (NBA).

Among the list of agenda items discussed were the following main issues of focus. These are:

- Presentation by the member agencies on their list of water activities in Africa with a view to identifying possible areas for interagency coordination and harmonization.

- Presentation by UNEP on mechanisms/modalities/approaches and other concrete ways for interagency coordination and harmonization of water activities in Africa.

- Proposal (by UNICEF) to change the name of IGWA to reflect sanitation aspect in the activities of the Group.

The meeting was attended by senior technical staff of the participating organizations which made the discussions very effective and intense. Representatives of organizations gave an overview of their water activities in Africa with a view to identifying priority areas for interagency co-ordination.

The UNECA presented a comprehensive paper which served as a basis for discussions. UNECA, UNESCO, IAEA, NBA, WHO, UNCHs, UNIDO, WMO and UNEP gave outlines on their activities in the water sector in Africa. The discussions centred on exchange of information on joint interagency collaboration on water activities in Africa and on identifying further areas of possible collaboration.

UNEP's Regional office for Africa gave a presentation on the mechanisms/modalities/approaches and other concrete ways for interagency coordination and harmonization of water activities in Africa.

Three major areas were identified for collaborative efforts by IGWA member agencies in the near future. These were: (i) integrated training programme (ii) integrated river/lake basins management and (iii) water resources data base for Africa.

It was agreed that IGWA members should focus their joint activities to the areas identified in order to attain the desired objectives.

In regard to integrated training programme, it was suggested that the steps should consist of: (a) assessment of training needs (b) developing an action plan for addressing training needs (c) developing an approach for seeking donor support.

There was considerable discussion on the idea of a regional conference on river/lake basins management. It was also strongly recommended to include in the Conference experiences on river basins outside of Africa and that IGWA members co-sponsor such a conference.

The delegates from various agencies expressed their high impression on ECA information bulletin on water resources in Africa (MAJI), and appreciated it as a tool for information exchange. The ECA representative urged IGWA members to provide any information on meetings and other relevant activities in the field of water resources to ECA secretariat to be published in the MAJI.

Conclusions and Follow-up Activities

Conclusions

- After extensive discussions, it was concluded that Inter-agency collaboration should be based on the shared goals of the UN system in water resources management.

- The UNECA, in cooperation with UNEP should be focal point for information exchange activities.

- There is a necessity for the UN system to assist the region in taking stock of policies,

programmes and action on river/lake basin management, particularly transboundary basins.

- IGWA should encourage consultations at early stages of agencies' planning and programming exercises relating to water activities.

- Project proposals for IGWA joint activities can be prepared for donor agencies' consideration.

Recommendation for follow-up action

The meeting agreed on the following recommendations and follow-up actions:

(a). A Regional conference to be organized on integrated management of transboundary fresh water resources in Africa.

- UNECA to develop a background document along with other IGWA documents to serve as a working document for this conference.

- The conference to take place in 1996.

- UNECA and UNEP to jointly prepare an aide memoire on the conference and distribute it to IGWA members and other agencies as appropriate for information and discussions at the fourth meeting.

- The possibilities of GEF and other funding sources for the conference to be explored.

- Interagency coordination to be promoted at the programming stage.

(b). A comprehensive training programme for human resources development should be developed for interagency collaboration.

- UNESCO was requested to prepare a comprehensive document on human resources development in the sector of education and training in water resources in Africa. The IGWA members were invited to provide input to UNESCO for the preparation of this document which should be circulated in time among interagency members for discussion at the fourth IGWA meeting.

(c) The development of a water resources data base for Africa was identified as one of the priority areas. WMO and UNEP were requested to prepare a background document on feasibility of water resources data base for Africa for consideration by IGWA at its fourth meeting.

INTEGRATED CATCHMENT MANAGMENT IN ZIMBABWE

(Reprinted from "OVERSEAS" Issue No. 7, 1994 by the Institute of Hydrology, UK)/

Catchments in semi-arid areas are degrading at an alarming rate. It is clear that action is needed immediately to halt the rate of degradation and, in the longer term, to bring about a degree of catchment rehabilitation.

The physical causes of degradation are well-known. Loss of trees, overgrazing, and poor surface management of marginal lands cleared for agriculture give rise to decreased infiltration, increased surface runoff and associated soil erosion. Faster loss of water via networks of rills and gullies also leads to a decline in groundwater recharge. Increasing population pressure and droughts exacerbate an already deteriorating situation. In short, the present system of land use and resource management in semi-arid areas is not sustainable. Although a considerable challenge, sustainable catchment management in semi-arid areas is possible. Management at present is poor, but improved practices and alternative systems of land use and land management are known and have been introduced in a few cases in isolation at a field scale.

During the last five years the Institute of Hydrology in United Kingdom has been collaborating with the Zimbabwean Ministry of Lands, Agriculture and Water Development and the British Geological Survey on a programme of work to improve the sustainability of agriculture in semi-arid areas. The initial phase of this project showed by research that it is feasible technically and economically to use limited groundwater resources for setting up small communal vegetable gardens. The innovations that resulted from this project were recommendations on the use of collector wells* in regions underlain by basement aquifers and on the use of simple low-cost irrigation techniques that can improve irrigation water-use efficiency on small vegetable gardens.

Work on collector well gardens continues and todate three gardens have been constructed in village sites in south-east Zimbabwe and other four are in various stages of completion. The results of this work are enormously encouraging and, as a result, a number of Non-Government Organisations have indicated that they would like to fund communal gardens as part of their long-term development plans. Considerable information is being gained from the current phase of this work which is studying the institutional and social aspects of village gardening as well as the technical aspects of siting wells and gardens and, once operational, ensuring good management.

Long-term viability

The catchment in which the first off-station collector well-garden was located has been instrumented as part of a very detailed study of land management and groundwater recharge. However, the sustainability of the yield from collector wells - and indeed all existing wells - is almost entirely dependent on the amount of recharge, and its year to year variability. This is unknown at present.

Typically, basement aquifers are not uniformly productive, but only yield adequate and sustainable supplies (a) where conditions allow adequate recharge, and (b) where weathering and/or fracturing has developed a significant permeability and storage over a sufficient area. Recharge has been estimated from baseflow analysis to be in the range of 0.5-4.0% but this will be locally very variable.

Recharge is influenced by many factors, including surface management (landuse and agricultural practice) quantity, intensity and distribution of rainfall, topography, soil type (infiltration rate), and vegetation type.

The researchers are now looking at the hydrological processes which affect the partitioning of rainfall at the land surface. The next stage is the installation of field equipment. Once the main sources

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*/ *these are wells but with drill holes inserted radially and horizontally into the wells below the water table to help increase sustainable yield*

and processes of recharge have been identified, the aim is to assess the influences that land use and agricultural practice have on the recharge process and to quantify the amount of recharge occurring. Armed with this information it will be possible to identify appropriate management practices that will ensure and perhaps even enhance present recharge rates.

Irrigating with saline water

An interesting aspect of the low-cost irrigation plot trials has been the demonstration of the feasibility of using shallow aquifers as a source of water for irrigated community gardens. If irrigated gardens are to be used more widely in semi-arid areas as an adjunct to rain-fed farming, irrigation methods and management practices are required that enable at least moderately saline groundwater to be used for vegetable production without the risk of long-term build-up of salt in the soil rooting zone.

An obvious first step is to select vegetable varieties which are salt tolerant. However, it also makes sense to see how the low-cost irrigation methods i.e. subsurface and pitcher irrigation already, developed to achieve maximum water use efficiency, perform when used with low quality groundwater.

Accordingly, a new collector well has been installed at Chindondodza where water quality is known to be poor. Meanwhile, a range of replicated trials growing a different crop has been conducted. Two dimensional distribution of salt accumulation has been monitored by taking soil cores. Previous experience with drip irrigation suggest that it should be possible to leach water from the crop rooting zones more effectively using subsurface irrigation than the traditional flood irrigation.

It is hoped that these trials will establish the level of salinity that can be tolerated using subsurface irrigation and correct management and with suitable crops.

UNITED NATIONS UNIVERSITY

INSTITUTE FOR NATURAL RESOURCES IN AFRICA (UNU/INRA) GIVING HIGH PRIORITY TO WATER RESOURCES RESEARCH TRAINING AND KNOWLEDGE DISSEMINATION

The United Nations University Institute for Natural Resources in Africa (UNU/INRA) was established in 1986 as one of the research/training centres of UNU. The Institute operated a Programme on Natural Resources in Africa from temporary sites in New York (1990 - 1991) and later from the UNESCO Regional Office for Science and Technology from February 1992 - December 1993.

The main objectives of the Programme and the UNU/INRA or Institute proper are: (i) to strengthen national institutions in Africa (ii) to help mobilize scientists and technologists throughout the continent and enhance their perception in applying knowledge and innovative technologies for productive work and for the formulation of planning and policy options and (iii) to assist the scientists and technologiests in better understanding of the socio-economic and other aspects of natural resources in the context of self-reliant development.

The programme priority areas of UNU/INRA are: (i) land use, soil conservation and management (ii) plant resources (iii) animal resources (iv) water resources (v) energy resources and (vi) mineral resources.

The focus of the Programme phase during 1990 - 1993 were (a) soil and water resources conservation and management (b) indigenous African food crops and useful plants and (c) mineral resources.

The Mineral Resources Unit (MRU) of the Institute is located at the University of Zambia's School of Mines. In the area of water resources the emphasis will be on:

Short to Medium-term Programme:

- Continuation and improvement of field surveys extended to countries not covered in the 1992/93 ;
- Identification of collaborating institutions and prospective members of the UNU/INRA College of Research Associates (CRA);
- Data collection and analysis including studies aimed at improving the reliability of data and filling gaps in the fragmentary data;
- Improvement of rainfall data collection extended over a reasonable number of locations and monitoring losses by evaporation, runoff, etc.;
- Carrying out evaluation of current river basin development and management authorities and determining deficiencies in policies, water sharing and transfer strategies and identifying problems on which research should focus; and
- Reviewing of coastal water resources, their management and utilization as a basis for determining future research priorities and strategies in their development.

Medium to Long-term Programme

- Setting up networks for collection of data and for monitoring the quantities and qualities of water; the types, causes of pollution, and the seasonal changes of different sources of water for household use;
- Carrying out studies on "traditional" and "modern" water harvesting and conservation technologies; determining their effectiveness; examining the constraints to development potentials and finding alternative solutions;
- Assessing availability of drinking water sources and identifying the problems encountered in the design or modification of technologies to ensure good quality and sustainable supplies of water for communities;
- Reviewing the factors limiting use of irrigation water in savanna and Sahelian countries and conducting studies to improve and facilitate small- scale irrigation systems; and
- Conducting surveys on the status of aquatic resources to determine management strategies and practices to avert problems of pollution, losses in biodiversity and adverse environmental effects in the planning and execution of future development programmes.

Past activities of the UNU/INRA Programme included Consultative Meetings in Lusaka, Zambia (18 - 22 March 1991) and Accra, Ghana (22 - 26 April 1991). At these meetings issues related to water resources were discussed and an Orientation and Training Course was held to examine the implications of the current concern about environment and sustainable development involving management of natural resources including water resources.

After the orientation/training course, field surveys were conducted: (a) to determine the status of natural resources including water resources (b) to identify the various sources, quantity and quality of water (c) to understand the extent and availability of water to satisfy the demand for various uses (d) to identify gaps in knowledge about water resources and (e) to study the constraints limiting the multiple use of water resources.

In 1992, a survey was launched in 10 countries by institutions and individuals engaged in research, training and dissemination of information on water resources. Reports for more than half of the field surveys were completed and these have been received by the UNU/INRA.

Results of Past Activities Related to Water Resources:

(1) **Consultative Meetings:**

Papers on water resources were presented and were discussed by consultative meetings. This resulted in the selection of priority areas for UNU/INRA in water resources conservation and management, research and training.

(2) **Field Surveys**:

Publications based on the field surveys are now being prepared. On 1 December 1994 at the opening of the UNU/INRA office in Accra, the first publication appeared in the natural resources report series i.e. Soil and Water Resources of Ghana. Future activities of UNU/INRA were also reviewed. Those aspects dealing with water resources development including the progress made in the water sector will from time to time be summarized and forwarded to UNECA for Maji publication.

Recommendations:

Six identified priority areas for water resources activities are:

1. Undertaking a comprehensive review of literature on water resources and related data about on-going development projects. The results and experiences gained from this exercise will be used as a component of diagnostic surveys for planning, policy formulation, determining priorities and designing projects on how to satisfy water needs of individuals, institutions and communities;

2. Conducting research in hydrology and assessment of water resources including: (i) analysis of existing data on water balance components such as rainfall, run-off and evapotranspiration (ii) determining frequency and severity of droughts and their predictability (iii) evaluation of methods of water balance component analysis and determining suitability of their sustainability and adaptability to different ecological zones (iv) collection of data on water quality; types and sources of pollution and finding out ways of prevention or treatment and (v prediction and determination of man's influence (along different pathways) of the hydrological cycle;

3. Collection of data on ground water resources of various countries and analyzing them to delineate hydrological regions. Within each region, the aquifer characteristics in terms of yield, static water levels, depths, thickness of aquifers etc. will be determined and the mode and extent of recharge flow directions as well as the age of aquifer-water will be studied;

4. Reviewing institutional frameworks for policy formulation, planning and management of water resources to rationalize the functions among agencies and thereby avoid over-lapping and duplication by establishing coordination mechanism to give central direction to water resource use. Studies will be conducted (i) to strengthen river and lake basin organizations in order to equip them to assess land and water resources for development planning (ii) to facilitate preparation of water sector plans, waste water plans and integrated land and water development plans (iii) to develop adequate policy and legal instruments for allocation of water, control of pollution and degradation and enforcement of water laws and (iv) to enhance recycling of water in industry and encourage the uses of treated waste water, drainage water and desalinated brackish water;

5 Conducting research for development of appropriate technologies and practices for water conservation and use: (i) to satisfying domestic and industrial uses (ii) to meet irrigation water requirement for over 50% of African land suffering from water shortage during most of the year with adequate drainage to minimize salinity problems and (iii) to give high priority to small-scale irrigation projects in rural areas which have proved more successful than large- scale irrigation;

6. Fostering collaboration and harmonization of activities of regional organizations such as SADC and AGRHYMET and organizations such as ECA and OAU, UNESCO, WMO, UNEP, FAO and IAEA with a view to consolidate their programmes in hydrology, hydrogeology and other water resources development activities including those of river and lake basin development programmes in Africa, so that the full impact of their effort may result in improved socio-economic condition of the population of Africa.

Planned Water Activities in Africa
By Various Agencies and Organizations

ECA	Ad-Hoc Experts Group Meeting on Guidelines for Natural Resources and Energy Development in Africa with emphasis on privatization and deregulation.	1996-1997
	Activities Follow-up for the implementation of the strategy and plan of action to the joint ECA/WMO Conference on Water Resources: Policy and Assessment (20-25 March, 1995, Addis Ababa).	on-going
	- Annual Inter-Agency Group meetings for water in Africa for coordination and harmonization of activities in the sector.	on-going
	Publishing:- - Information bulletin on water resources activities in Africa-MAJI.	Annual Recurrent
	Problems and Prospects for Large-Scale Irrigation Development in Africa.	1996
	Directory of National, Subregional and Regional Water Resources Institutions in African countries with emphasis on specific capabilities for TCDC.	1997
	Promotion of subregional and regional cooperation and providing support to transboundary river basinorganizations and other socio-economic groupings.	1996-1997
UNDP	Assistance to the Lake Chad Basin Development Programme.	1996-1997
	Implementation of RAF/92/007 which has the objective of making water available to the poor in Africa (in collaboration with WB, Norway, SIDA and SDC).	1996-1997

OMVG	Recovery programme called "Minimum Programme" adopted by the VIIth session of The Conference of Heads of States and Government held in Conakry in January 1991.	Ongoing
	The study to update the Gambia river-road bridge project;	-
	The study of a Hydraulic Development Plan for the Gambia river;	1996-1997
	The design of an Energy Master Plan for the entire OMVG member States;	1996-1997
	Basic studies including:-	
	The study of a Master Plan for the integrated development of the Kayanga/Goba and Koliba/corubal river basins.	1996-1997
	A global environmental programme of the sub-region's river basins.	1996-1997
FAO	Assessment of the problem of water hyacinth in Uganda, Sudan and Egypt and introduction of biological control methods.	1996-1997
	Carrying out activities on the Global Water Information System (GWIS) in Africa.	On going
	Implementation of the International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD) in Africa.	On going
	Conducting a series of roving seminars on agro-climatic data for irrigation in Africa in collaboration with WMO.	1996-1997

FAO	**Continuation of:** activities in Lake Chad, Zambezi and Nile river basin	on going
	Lake Victoria (GEF) fresh water resources programme.	''
	Assessment of Southern African Lakes in cooperation with UNHQ.	''
	Activities under the umbrella of AMCEN.	''
UNICEF	**EMRO** has planned Water resources activities in seven African countries namely, Djibouti, Egypt, Libya, Morocco, Sudan, Somalia, and Tunisia	''
UNESCO &UNEP	Collaborative on-going activities in the field of hydrogeology in Africa and the Common Wealth Science Council.	''
IAEA	practical use of isotope, techniques in Water Resources Development in Ethiopia, Morocco, Egypt and Senegal.	1995-1996
	ALG/8/006 Tracer Techniques in Sedimentology Studies.	on going
	ETH/8/003 Isotope Study of Geothermal Fluids in the rift Valley.	''
	GHA/8/006 Evaluation of Groundwater Resources.	''
	INT/8/026 Environmental Redhabilation of Lake Manzala in Egypt.	''
	MAR/8/004 Use of Isotopes and Geochem. Methods in Groundwater Assessment.	''
	ML1/8/003 Sedimentology.	''
	ML1/8/004 Isotope in Hydrology.	''
	NER/8/004 Isotope Techniques in Hydrology (Eastern Niger Basin).	''
	NER/8/006 Hydrochemical and Isotopic	''

UNU-INRA	Research activities with university research centres in Benin, Burkina Faso, Cameroon, Congo, Ethiopia, Ghana, Guinea, Kenya, mali, Niger, Nigeria, Senegal, Tanzania, Uganda, Zambia and Zimbabwe.	1993-1995
	Field Surveys on priorities and strategies for soil and water conservation and management.	1996-1997
	Capacity building activities	1996-1997

EVALUATION QUESTIONNAIRE

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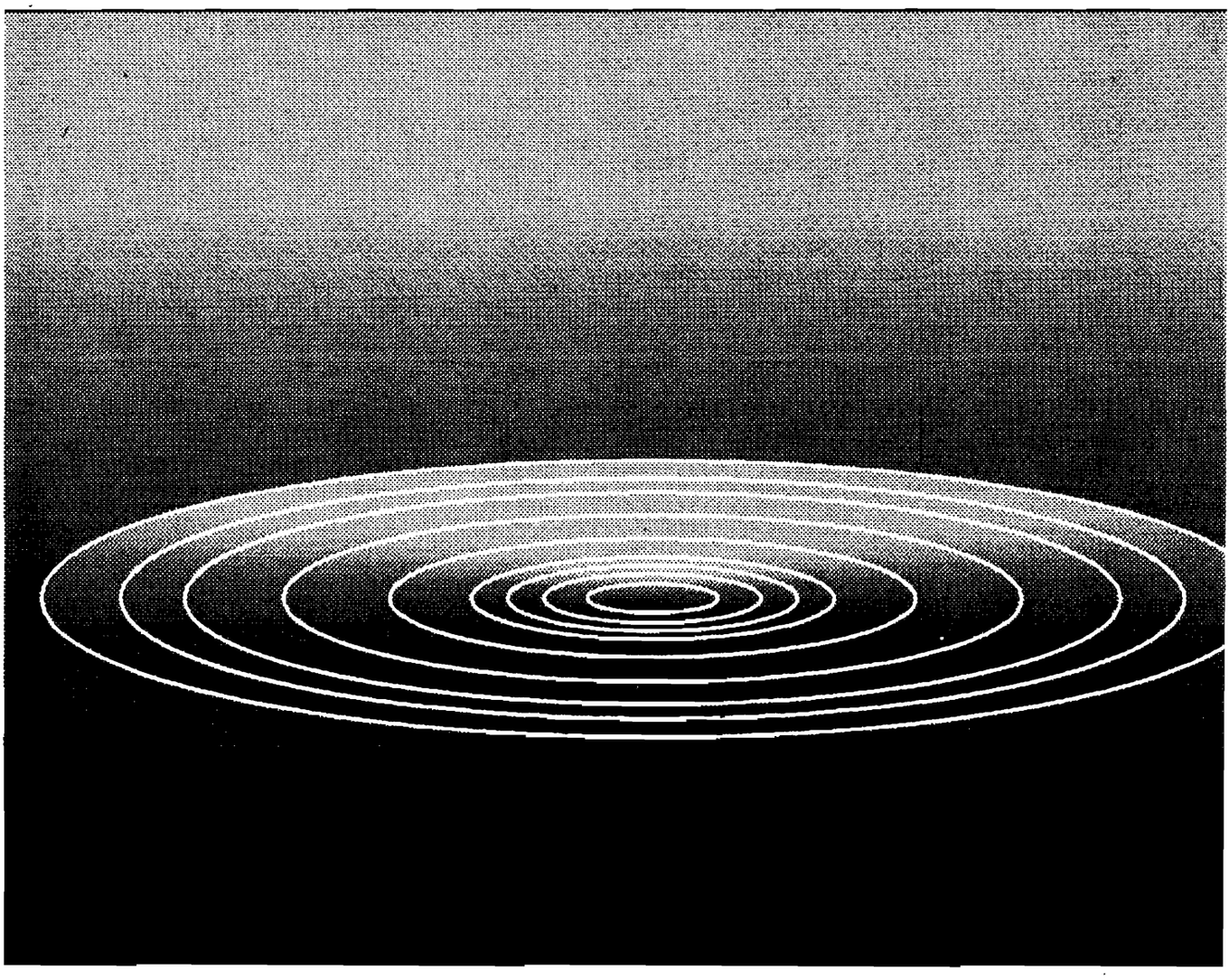


PREMIERE REUNION DE COORDINATION DU PROJET DE L'AGENCE INTERNATIONALE DE L'ENERGIE ATOMIQUE (AIEA) SUR L'UTILISATION DES TECHNIQUES ISOTOPIQUES POUR LA MISE EN VALEUR DES RESSOURCES EN EAU SOUTERRAINE

La première réunion de coordination du projet de l'AIEA sur l'utilisation des techniques isotopiques pour la mise en valeur des ressources en eau souterraine s'est tenue à Addis Abeba du 3 au 7 Avril 1995. Etaient présents à cette réunion quatorze hauts responsables des pays suivants: Egypte, Ethiopie, Maroc et Sénégal. La CEA, représentée par la Division des Ressources Naturelles était invitée comme observateur à cette réunion.

Cette réunion fait suite au séminaire qui s'est tenu à Rabat (Maroc) en Septembre 1993 et dont l'objectif était de définir et de mettre en place le projet de l'AIEA sur l'utilisation des techniques isotopiques pour la mise en valeur des ressources en eau souterraine. A l'issu de ce séminaire, les neuf pays qui ont participé à ce forum ont décidé de collaborer et de participer activement à ce projet. Il s'agit notamment de l'Algérie, de l'Egypte, de l'Ethiopie, de la Libye, du Mali, du Maroc, du Niger, de Sénégal et du Soudan. Dès après ce séminaire, des missions furent alors organisées et envoyées dans ces différents pays avec des termes de référence bien précis (collecte de données, évaluation des aspects techniques, études de faisabilité, contribution des Etats etc...)

Les recommandations et les conclusions des divers rapports ont permis d'établir une programmation et de prévoir la réalisation du projet suivant deux phases:

- La phase I s'étalera de 1995 à 1996 et concernera l'Egypte, l'Ethiopie, le Maroc et le Sénégal.

- La phase II s'étalera de 1997 à 1998 et concernera l'Algérie, la Libye, le Mali, le Niger et le Soudan.

La Première phase prévoit d'une part de mettre en place une structure appropriée pour renforcer les capacités nationales et d'autre part de favoriser la coopération sous-régionale et régionale dans l'utilisation des techniques isotopiques pour la mise en valeur des ressources en eau souterraine. Dans chaque pays des zones pilotes bien définies ont été identifiées pour mener les études en question.

Pour l'Ethiopie, le projet concerne la région de Moyalé qui se situe au sud d'Addis vers la frontière du Kenya. Cette région compte plus de 3 millions d'habitants et l'objectif du projet sera d'étudier et d'évaluer la recharge de la nappe par des méthodes isotopiques pour améliorer les conditions socio-économiques des populations. En effet les essais de pompage conventionnels ont montré une grande dépression de la nappe indiquant ainsi une perte d'infiltration des eaux de pluie pour sa recharge.

En Egypte, la zone d'étude se localise dans l'Ouest de la région désertique de l'Egypte. L'objectif du projet sera d'associer les investigations hydrogéologiques conventionnelles avec les méthodes isotopiques pour d'une part évaluer la recharge du système aquifère de Nile et d'autre part de faire des études pour contrôler et réduire la pollution des eaux souterraines provenant de diverses sources (industries, agriculture et domestiques). Il est également prévu dans le cadre de ce projet, d'établir les relations entre les aquifères profonds et les aquifères peu profonds.

Au Maroc, la zone d'étude se localise dans les nappes au Sud de l'Atlas qui sont notamment la nappe de Tafilalt et le bassin du Ziz Rhéris, les nappes plio-quaternaires de Guelmim et la nappe alluviale d'Afendal Lahjar. Les techniques isotopiques devraient servir au niveau de ces différentes nappes à:

- évaluer les pertes par évapotranspiration,
- expliquer la dégradation chimique que connaît l'eau et à définir l'origine de la salinisation,
- proposer un modèle de circulation souterraine,
- quantifier la drainance de l'aquifère Crétacé vers l'aquifère de Quaternaire en ce qui concerne la nappe de Tafilalt.

En ce qui concerne le Sénégal, les zones d'études se présentent comme suit:

a) La presqu'île de Dakar:
Elle renferme deux aquifère sableux. Le niveau piézométrique de ces nappes s'abaisse régulièrement avec un phénomène salinisation des eaux. Dans ce contexte, les isotopes du milieu pourront contribuer à une meilleure connaissance:

- de l'évolution de la pollution saline;

- des phénomènes de drainance entre aquifères;
- de l'impact de la pollution anthropique.

b) Le littoral Nord (entre Dakar et St. Louis):

Cette zone renferme l'aquifère phréatique des sables du Quaternaire. Dans cette région on note également une grande baisse du niveau de la nappe et les données hydrochimiques montrent une augmentation des nitrates après la saison des pluies. Dans ce cadre, les techniques isotopiques pourront contribuer à:

- définir les contours du biseau salé;
- évaluer la drainance verticale;
- quantifier la pollution anthropique;
- caler les différents modèles de circulation souterraine.

c) Le secteur de Horst de N'DIASS et ses bordures:

Cette zone renferme trois aquifères qui fournissent près de 70% des besoins en eau de la ville de Dakar et de ses environs. L'exploitation intensive de ces nappes depuis plusieurs dizaines d'années a eu pour conséquence une baisse continuelle du niveau piézométrique et une diminution de la qualité chimique des eaux en certains endroits. L'utilisation des isotopes du milieu devra permettre de:

- définir les relations hydrauliques entre les trois aquifères;
- circonscrire les fronts salés;
- formuler un modèle de circulation des eaux souterraines.

La réunion de coordination citée en titre a donc marqué le démarrage effectif de la Première phase du projet de l'AIEA sur l'utilisation des techniques isotopiques pour la mise en valeur des eaux souterraines en ce qui concerne l'Egypte, l'Ethiopie, le Maroc et le Sénégal.

Les points inscrits à l'ordre du jour lors de cette réunion étaient notamment les suivants:

- la revue des différents éléments du projet;
- les aspects spécifiques du plan de travail pour les quatre pays concernés;
- les rapports par pays sur l'état de préparation du projet au niveau national;
- les relations entre le projet et d'autres programmes internationaux (CEA, OMM, etc...)

La participation des cadres spécialisés de haut niveau à cette réunion a permis de rendre les débats très animés et très enrichissants. Les représentants des pays concernés ont présenté des rapports sur l'état de préparation du projet au niveau national. Il a été discuté et en détail au cours de ces quatre journées de concertation les différents aspects du projet, notamment en ce qui concerne:

- le plan spécifique de travail pour chaque pays,
- les aspects socio-économiques du projet,
- la contribution des Etats concernés et des différents intervenants,
- la contribution de l'AIEA (équipements, services de consultation, besoins en formation au niveau des pays, etc...)
- la programmation de la mission du consultant de l'AIEA pour faire l'évaluation technique et financière sur le terrain.

Il a été retenu et recommandé à la fin de cette réunion que:

- le projet devrait être réalisé entièrement par les pays et que les Organisations de Nations Unies, n'auraient qu'un rôle d'assistance par rapport au projet,
- la coordination du travail serait sous responsabilité des pays,
- les responsables du projet au niveau local devraient jouer un rôle primordial pour sa réalisation,
- l'AIEA ne traiterait qu'avec les Gouvernements et non avec les coordonnateurs au niveau national,
- la deuxième phase du projet serait définie selon des critères objectifs qui tiendront compte de la mise en oeuvre et de la réalisation de la Première phase du projet.

TROISIÈME REUNION ANNUELLE DU GROUPE INTERINSTITUTION POUR LA MISE EN VALEUR DES RESSOURCES EN EAU EN AFRIQUE (IGWA) 15-16 Novembre 1994 Nairobi - Kenya

La troisième réunion annuelle du Groupe Interinstitution pour la mise en valeur des Ressources en Eau en Afrique (IGWA) qui a été organisée par la CEA, s'est tenue du 15 au 16 Novembre 1994 siège du PNUE à Nairobi. Etaient présents à cette Réunion les hauts responsables des institutions suivantes: OMS, PNUE, HCR, ONUDI, AIEA, CEA, UNICEF, UNESCO, OMM et l'Autorité du Bassin du Niger (ABN).

Les points inscrits à l'ordre du jour étaient notamment les suivants:

i. Présentation de la liste des activités menées par les Etats membres dans le domaine des ressources en eau en Afrique en vue de l'identification des domaines possibles de coordination et d'harmonisation.

ii. Présentation par le PNUE des mécanismes et approches ainsi que des autres moyens concrets de coordination et d'harmonisation des activités menées par les institutions dans le secteur des ressources en eau en Afrique.

iii. Proposition par l'UNICEF de rebâptiser l'IGWA de sorte à faire ressortir l'aspect assainissement dans les activités du Groupe.

La participation de cadres techniques de haut niveau aux travaux à contribuer à rendre les débats animés et très enrichissants. Les représentants des Institutions ont présenté un tableau de leurs activités en matière de ressources en eau en Afrique en vue d'identifier les domaines prioritaires de coordination entre Institutions.

La CEA a présenté une étude exhaustive qui a servi comme base de discussion pour la réunion. La CEA, l'UNESCO, l'UNICEF, l'AIEA, l'ABN, l'OMS, le HCR, l'ONUDI, l'OMM et le PNUE ont présenté un tableau de leurs activités dans le secteur des ressources en eau en Afrique. Les discussions ont porté sur les échanges d'informations destinées à assurer la collaboration entre Institutions en matière de mise en valeur des ressources en eau en Afrique ainsi que sur l'identification de nouveaux domaines de coopération.

Le bureau régional du PNUE pour l'Afrique a fait un exposé sur les mécanismes/ modalités/ approches et autres moyens concrets de coordination interinstitution et d'harmonisation des activités menées en Afrique dans le domaine de la mise en valeur des ressources en eau.

Trois grands domaines propres à permettre aux Institutions membres de l'IGWA de coopérer dans un proche avenir ont été identifiés. Il s'agit notamment:

i. de la mise en place d'un programme de formation intégrée,
ii. de la gestion intégrée des bassins fluviaux et lacustres,
iii. de la mise en place d'une base de données sur les ressources en eau de l'Afrique.

Il a été décidé que les membres de l'IGWA devraient mettre en commun leurs ressources en vue de la mise en oeuvre de leurs activités communes.

Concernant les programmes de formation intégrée, il a été suggéré d'entreprendre les actions suivantes:

i. procéder à une évaluation des besoins en formation,
ii. mettre en place un plan d'action pour identifier les domaines prioritaires de formation,
iii. mettre en place une stratégie propre à mobiliser l'appui des bailleurs de fonds.

L'idée d'organiser une conférence régionale sur l'aménagement des bassins fluviaux et lacustres a été également débattue et acceptée après une discussion très approfondie. Il a été fortement recommandé de tenir compte de l'expérience des pays non africains en matière d'aménagement de bassins fluviaux et lacustres au cours de cette conférence. Les membres de l'IGWA devraient également parrainer cette conférence.

Les représentants des membres de plusieurs institutions se sont déclarés favorablement impressionnés par le Bulletin d'information de la CEA sur les activités des ressources en eau en Afrique. C'est en effet un instrument efficace d'information et aussi d'échange d'expériences. A cet égard, le représentant de la CEA a exhorté les membres de l'IGWA à fournir au Secrétariat de la CEA toutes informations relatives aux réunions et à d'autres activités dans le secteur des ressources en eau pour leur publication dans le Bulletin Maji.

CONCLUSIONS ET ACTIONS DE SUIVIS

Conclusions

a. Après des discussions très approfondies, il a été conclu que la collaboration interinstitution devrait être basée sur les objectifs communs du système des Nations Unies en ce qui concerne la gestion des ressources en eau.

b. La CEA, en collaboration avec le PNUE, devrait servir de point focal pour tout ce qui concerne les échanges d'information sur les ressources en eau.

c. Le système des Nations Unies devrait aider les pays de la région africaine à recenser les politiques/programmes et actions mis en oeuvre en vue de l'aménagement des bassins fluviaux et lacustres en particulier.

d. L'IGWA devrait encourager des consultations au niveau des institutions dès les premières phases de programmation de leurs activités dans le secteur des ressources en eau.

e. Des documents de projet sur des activités conjointes des membres du Groupe, devraient également être élaborés et soumis aux bailleurs fonds pour financement.

Recommandation et Actions de Suivi:

a. Une conférence régionale sur la gestion intégrée des bassins fluviaux et lacustres en Afrique devrait être organisée:

- La CEA devrait élaborer un document de base qui, avec les autres rapports des membres du Groupe, servira de document de travail pour la conférence sur la gestion des bassins fluviaux et lacustres en Afrique.

- La conférence devrait être organisée en 1996.

- La CEA et le PNUE devraient conjointement élaborer sur la conférence un aide mémoire qui serait distribué aux membres de l'IGWA et à toutes les institutions concernées aux fins d'information et d'examen lors de la quatrième réunion du Groupe.

- La possibilité d'obtenir des financements pour la conférence à partir du GEF et/ou d'autre sources devrait être explorée.

- Une coordination interinstitution devrait être encouragée dès les premières phases de la programmation de leurs activités.

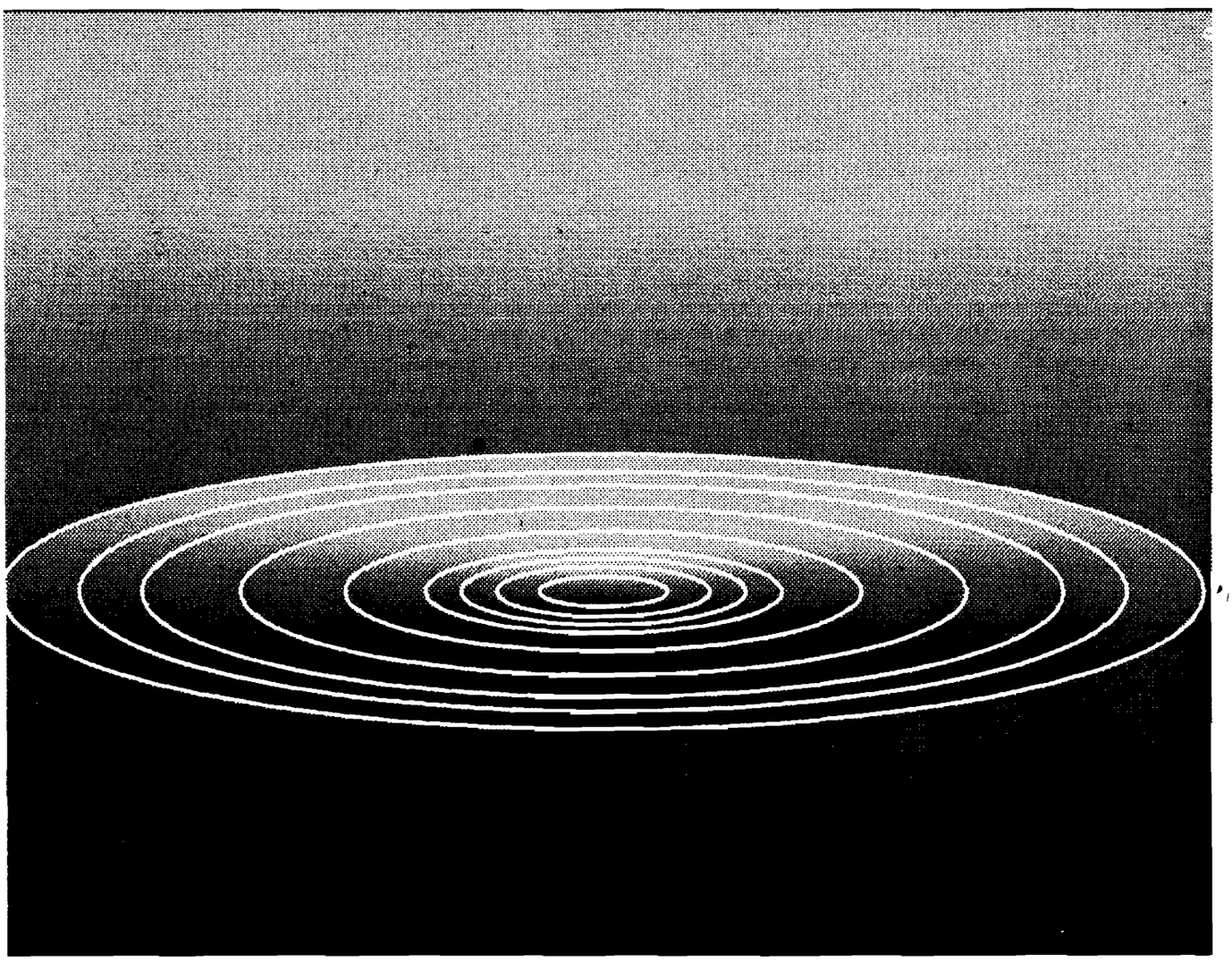
b. Un programme exhaustif de formation en vue de la valorisation des ressources humaines devrait être mis au point pour promouvoir la collaboration entre institutions:

- Il a été demandé à l'UNESCO d'élaborer une étude exhaustive sur la mise en valeur des ressources humaines en ce qui concerne la formation et l'éducation dans le secteur des ressources en eau. Les membres de l'IGWA ont été invité, à cet égard, à fournir une contribution à l'UNESCO pour la préparation de ce document qui devrait être distribué à temps aux membres de l'IGWA aux fins d'information et d'examen de lors de la quatrième réunion de l'IGWA.

c. La mise en place d'une banque de données sur les ressources en eau en Afrique à été identifiée comme l'une des principales priorités dans le secteur.

A cet égard, il a été demandé à l'OMM et au PNUE d'élaborer une étude de faisabilité sur la création de cette banque de données et de la soumettre aux membres de l'IGWA lors de sa quatrième réunion pour examen.

ARTICLES IN ARABIC



Note to the Readers

نبذة للقراء

صدر العدد الأول من مجلة "ماجي" وهى النشرة السنوية لقسم الموارد المائية التابع لقطاع الموارد الطبيعية والطاقة في لجنة الأمم المتحدة الإقتصادية لإفريقيا في عام ١٩٨٨ لتقوم بخدمة القراء في تقديم البيانات والمعلومات الفنية في مجال الموارد المائية. ومنذ صدور العدد الأول وماتلاه من أعداد أخرى، بدأت المجلة تأخذ إهتماما كبيرا في وسط الخبراء الفنيين والأفراد المهتمين بشؤون الموارد المائية في افريقيا، وزاد الإقبال على طلبها عام بعد عام. وقد أشيد بها في أكثر من مناسبة دوليه وبالدور الملموس الذي تعلبه هذه النشره في تبادل المعرفة والحقائق بين الأفراد والمنظمات، مما كان له أثر كبير على القائمين على إصدارها في العمل المكثف لتحسين نوعية المقالات التي تنشر بها. وإنطلاقا من هذا المبدأ قررت اللجنة المختصة بإصدار المجلة. العمل على إصدار هذا العدد لأول مرة متضمن المقالات باللغات الدوليه العربيه والإنجليزيه والفرنسية المعتمده في اللجنة الإقتصادية لإفريقيا لخدمة القراء باللغة العربية واللغة الفرنسية إلى جانب اللغة الإنجليزية، ونأمل أن تحظى هذه التجربة بالنجاح وتحوز على إعجاب وإقبال القراء، كما نرجو من جميع القراء باللغة العربية بإرسال تعليقاتهم، كذلك المشاركة بقدر الإمكان بمقالات علميه وفنيه يمكن نشرها لهم وتكون المكاتبه على عنوان المجلة الآتي:

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فاكس ٥١٤٤١٦ - ١- ٢٥١

ونكرر مرة أخرى أن لجنة تحرير المجلة في خدمتكم وعلى أتم إستعداد لتحقيق رغباتكم والعمل بمقترحاتكم.

WORLD DAY FOR WATER IN ETHIOPIA

إحتفالات إثيوبيا باليوم العالمي للمياه

أقرت الجمعية العامة للأمم المتحدة في دورتها السابعة والأربعين عام ١٩٩٢، تخصيص يوم ٢٢ مارس من كل عام للإحتفال به في جميع الدول الأعضاء كيوم عالمي للمياه، وذلك لتوعية الشعوب بأهمية المياه كمصدر أساسي للحياه يجب الحفاظ عليه والعمل على حسن وترشيد استخدامه.

وقد تم اختيار موضوع "المرأة والماء" للإحتفالات هذا العام وذلك اعترافا بالعلاقة الوطيدة بين المرأة والمياه. ففي أغلب دول العالم تقوم المرأة بدور أساسي في الحفاظ على المياه وترشيد استخدامها. فهى المسؤولة عن استخدام المياه في اعداد الطعام وغسيل الملابس وتنظيف المنزل والأولاد. كما أن المرأة تقوم بجمع المياه تقليديا من مصادرها وتحملها لمسافات طويلة حتى تصل بها لأماكن استخدامها، وهذه ظاهرة مألوفة في معظم الدول الناميه. كما أنها أيضا مسؤولة في بعض المجتمعات الزراعية عن توفير المياه اللازمة للمحاصيل وتنمية الثروة الحيوانية. مع كل هذه المسؤوليات الموكله إلى المرأة فإن أهمية العلاقة بين المرأة والمياه لتأمين التنمية المستدامة لم تأخذ الأهمية الكافيه إلا في السنين الأخيرة فقط.

أوضحت الدراسات والأبحاث التي قامت بها المنظمات الدولية والجهات المعنية بشؤون المياه أن مشكلة توافر المياه العذبه في افريقيا بدأت تتفاقم وأنه من المحتمل أن يصل نصيب الفرد في افريقيا من المياه العذبة إلى ٥١٠٠ متر مكعب في السنة مع نهاية القرن الحالي، وتلك هى ربع الكميه تقريبا التي كانت متاحة عام ١٩٥٢. وذلك يوضح مدى تدهور نصيب الفرد من المياه في افريقيا مما يزيد العبء على المرأة في تحمل مسؤولياتها نحو المحافظة على هذا المورد الطبيعى الثمين وترشيد استخدامه.

بدأت بعض الدول الناميه ادراك أهمية دور المرأة في هذا المجال على المستوى الشعبى فقامت بإشراك المرأة في مشروعات وبرامج تنمية الموارد المائية على المستوى المحلي. وقامت كذلك بالتركيز على تقوية قدرات الإدارة للمرأة لتحسين كفاءة واستمرارية استعمال المياه على المستوى المحلي. أما على الصعيد الدولي فإن العلاقة بين المرأة والمياه تحظى الآن بإهتمام كبير من جانب الحكومات والمنظمات الأهلية ومجتمع الدول المانحة. وقد أعطى المؤتمر الدولي للمياه والبيئة المنعقد في دبلن عام ١٩٩٢ اهتماما خاصا لهذه العلاقة حيث ذكرت الوثيقة الخاصة بالمؤتمر أن المرأة إذا إريد لها أن تلعب دورا رئيسيا في مشروعات الإدارة والحفاظ على المياه فإنه يتحتم أن يكون لها دور فعال في المشاركة الإيجابية في التخطيط والتنفيذ. وبناء عليه يجب وضع السياسات التي تعمل على تقوية مركز المرأة وإشراكها في جميع برامج تنمية الموراد المائية على جميع المستويات بما في ذلك صنع القرارات وتنفيذها. وتأكيدا لذلك، دعت الدول المشاركة في مؤتمر الأرض المنعقد في البرازيل عام ١٩٩٢ من خلال جدول الأعمال ٢١ إلى المشاركة الكاملة للمرأة في صنع القرار وتنفيذه في مجال الأنشطة الخاصة بالبيئة والتنمية المستدامة. كذلك من المتوقع أن يقوم المؤتمر العالمي للمرأة الذي سيعقد في بيجينغ هذا العام بتدعيم دور المرأة في الحفاظ على

تنمية الموارد المائيه واصدار بعض التوصيات بهذا الخصوص بالرغم من هذا الدور الكبير والرئيسي الذي تلعبه المرأة في مجال حفظ واستخدام وإدارة المياه على المستوى العائلي ومستوى المجتمعات الصغيرة في بعض الأحيان فإنها تحتل مكانا صغيرا، وتلعب دورا ثانويا في تقييم الموارد المائية والأنشطة المختلفة بالدورة الهيدرولوجية. ويرجع ذلك إلى النقص الكبير في عدد الإناث بين الفنيين في هذا المجال وعدم تدريب وتعليم الفتيات وقلة الإقبال على العمل في هذا المجال من جانب النساء.

وإنطلاقا من هذا الدور الكبير الذي تلعبه المرأة والعلاقة الوطيدة بينها وبين استخدام المياه، قررت حكومة إثيوبيا الإنتقالية الإحتفال هذا العام باليوم العالمي للمياه على مستوى كبير يليق بالموضوع المنوط اليه هذا العام وهو المرأة والمياه. وقد تم التنسيق والإعداد له بعناية كبيرة بالتنسيق مع منظمات أخرى.

وقامت لجنة الأمم المتحدة الإقتصادية لإفريقيا بالتعاون مع منظمة اليونيسيف وكذلك المنظمة العالمية للإرصاد الجوية بتقديم المشورة والمساعدة إلى حكومة إثيوبيا الإنتقالية لإخراج الإحتفال في هذا اليوم بالصورة المشرفة التي أكدت عليها الحكومة في اجتماعات ممثليها مع ممثلى المنظمات المعنية حتى يتحقق الغرض المنشود من الإحتفال في توعية الجماهير بأهمية المياه.

بدأت الإحتفالات في ذلك اليوم بخطاب من الدكتور مسفين ابابي وزير الموارد الطبيعية والبيئة في حكومة اثيوبيا الإنتقالية إذ تعرض في خطابه لأهمية المياه وضرورة الحفاظ عليها والعمل على تنميتها بإعتبارها الشريان الرئيسي لحياة الشعوب. ثم قامت بعد ذلك مجموعة من أطفال بعض المدارس بإلقاء أغاني تعبر عن أهمية المياه. وأعقب ذلك خطاب من الدكتور سار المدير التنفيذي بالإنابة للجنة الإقتصادية لإفريقيا الذي أكد على ضرورة المياه في الحياة ودور المنظمة في مساعدة الدول الإفريقية في التنمية والحفاظ على هذه الموارد الطبيعية. ثم قرأ بعد ذلك مندوب المنظمة العالمية للإرصاد الجوية رسالة الأمين العام. وقام بعد ذلك طفل من المدارس الإبتدائية بإلقاء قصيدة عن المياه أعقبتها قصيدة عن الصرف قامت بالقائها إحدى العاملات في اللجنة الإقتصادية. وأخيرا ألقت ضيفة الشرف السيدة جنات زودى وزيرة التعليم في حكومة إثيوبيا الإنتقالية خطابا هاما أكدت فيه على الدور الحيوى الذي تلعبه المرأة في الحفاظ على الموارد المائيه وضرورة اشراكها بفعالية أكبر في تخطيط وتنفيذ مشروعات التنمية حتى يتسنى الإستفادة من خبراتها على المستوى المحلي. ثم قامت بعد ذلك بتوزيع الجوائز على الطلبة الفائزين في مسابقة الرسومات للحفاظ على الموارد المائيه التي نظمتها وزارة الموارد الطبيعية والبيئة بالتعاون مع الوزارات المعنيه وبمساعدة فنيه من اللجنة الإقتصادية لإفريقيا. ثم قامت بعد ذلك بإفتتاح معرض المياه الذي نظمته وزارة الموارد الطبيعية والبيئة بمساعدة اللجنة الإقتصادية لإفريقيا وتفقدت أرجاء المعرض وأبدت اعجابا شديدا بالمعروضات وطريقة العرض التي تزيد من وعى المواطنين بالمياه.

لقد كان احتفال إثيوبيا هذا العام باليوم العالمي للمياه مثالا جيدا يحتذى به في الدول النامية حيث أن وزارة الموارد الطبيعية والبيئة قامت بمساعدة اللجنة الإقتصادية لإفريقيا بطباعة الملصقات التي تدعو إلى الحفاظ على المياه وتوعية الأفراد بأهميتها وتم تعليقها في بعض أنحاء العاصمة، كذلك

فإن مسابقة الرسوم بين طلبة المدارس استهدفت زيادة الوعى بين الطلبة بأهمية المياه وكذلك معرض المياه الذي قام بتقديم وعرض بعض المعدات المستخدمة في مجال تنمية الموارد المائيه. وكان هناك عرض خاص لبعض الأفلام عن أهمية المياه وطرق ترشيد استخدامها وفي جناح وزارة الموارد الطبيعية والبيئة، تم عرض لخطط ومشروعات الوزارة لتنمية الموارد المائية. وقد تم توزيع النشرات والكتيبات التعليمية الخاصة بالمياه بالمجان على الزائرين وكذلك وزعت الحلوى والمشروبات وبعض مواد الدعاية مما أضفى جوا من البهجة على الإحتفال. وقد قامت أجهزة الإعلام المرئية والصوتية بتغطية هذا الحدث حتى يمكن توجيه الرسالة والغرض من الإحتفال إلى جميع أنحاء المدن في اثيوبيا، وكان ذلك كله نتيجة للمجهود الكبير والتعاون الكامل بين المسؤولين في الحكومة والمنظمات الدولية المعة لدى اثيوبيا

WOM/ ECA CONFERENCE

المؤتمر الدولى للموارد المائية ــ السياسة والتقييم
أديس أبابا ــ ٢٠ ــ ٢٥ مارس ١٩٩٥

قامت المنظمة العالمية للإرصاد الجوية بالتعاون والتنسيق مع اللجنة الإقتصادية لإفريقيا بالدعوة والتنظيم لمؤتمر خاص بالموارد المائية فى إفريقيا تحت عنوان السياسة والتقييم وذلك لمتابعة نتائج وتوصيات الدراسات التى قام بها البنك الدولى وبرنامج الأمم المتحدة للتنمية لتقييم شبكات الرصد الهيدرولوجية فى إفريقيا عام ١٩٩٠ ــ ١٩٩٢.

عقد المؤتمر بمقر لجنة الأمم المتحدة الإقتصادية لإفريقيا فى أديس أبابا فى الفترة من ٢٠ الى ٢٥ مارس ١٩٩٥ وقد حضره مندوبون وممثلون عن أربعون دولة إفريقية وكذلك بعض الممثلين للمنظمات الدولية والدول المانحة وكذلك المنظمات الحكومية الإقليمية. إفتتح المؤتمر د.مسفن أبابى وزير الموارد الطبيعية والبيئة فى الحكومة الإنتقالية لأثيوبيا بخطاب ألقى فيه الأضواء على الدور الذى تلعبه المياه فى حياتنا وعلاقة ذلك الدور بمشاكل التنمية المعقدة وقد أشار الى أن حل المشاكل المائية والتنمية فى إفريقيا تعتمد بالكامل على الشعوب ومدى تأديتها لواجباتها وقد تسائل بوضوح هل نحن أقوياء وأكفاء لنعيش كمجتمع ضمن أسرة المجتمع الدولى! وإستطرد موضحا الى أنه ليس هناك أى إستثمار أو تنمية ناجحة بدون تقييم شامل للطاقات الكامنة للموارد المائية وأوضح أن إفريقيا يمكن أن تكون مصدر لتوفير الغذاء والقضاء على الفقر إذا تم رسم سياسات وإستراتيجية مناسبة وتكوين خطط عمل قوية لتنفيذها.

عقب إنتهاء الوزير الأثيوبى من إلقاء خطابه ألقى د.سار القائم بأعمال السكرتير التنفيذى للجنة الإقتصادية لإفريقيا خطاب شامل أوضح فيه أن المؤتمر فرصة جديدة لإختيار مجموعة من الموضوعات الحرجة والخروج بتوصيات وتوجيهات أساسية وخطط وبرامج مفيدة للعمل بها فى المستقبل والتى تساعد على سرعة تنمية الموارد المائية فى إفريقيا وقد أشار الى أنه إذا تم إستغلال الموارد المائية فى القطاعات المختلفة فإن تأثيرها على التنمية الإجتماعية والإقتصادية سيكون له تأثير ملحوظ وذلك يستلزم عمل تقييم شامل للموارد المائية السطحية والجوفية من حيث الكمية والنوعية حيث أن صانعى القرار لم يأخذوا هذا الموضوع بالجدية الكافية وكذلك لم يكن هناك توعية كافية للجماهير عن أهمية المياه ومدى تأثير

إستمرارية الحصول عليها فى التأثير على نظام البشرية وقد أختتم خطابه بالتأكيد بأن اللجنة الإقتصادية لإفريقيا سوف تستمر فى أخذ الدور الريادى فى التنسيق بين جميع أنشطة المياه فى إفريقيا. ألقى بعد ذلك البروفيسور أوباس السكرتير العام لمنظمة الإرصاد الجوية العالمية خطابا شاملا أوضح فيه أن توقيت هذا المؤتمر جاء مناسبا بعد مؤتمر دبلن ومؤتمر الأرض عام ١٩٩٢ وما تبعهم بعد ذلك من مؤتمرات خاصة بالمياه والتنمية وقد أوضح الفارق بين هذا المؤتمر والمؤتمرات الأخرى من حيث الأهداف حيث أن ذلك المؤتمر لم يكن الهدف منه أصدار البيانات والتوصيات كباقى المؤتمرات ولكن كان الهدف الرئيسى منه هو وضع إستراتيجية وخطة عمل تعتمد على القدرات الفعلية والموارد فى المؤسسات الإفريقية وأنه يجب على الدول الإفريقية أن تعتمد أساسا على ما يمكن أن تقدمه قبل إعتمادها على المعونات الخارجية.

بعد الجلسة الإفتتاحية وإنتخاب أعضاء هيئة المؤتمر تم تقديم وعرض خمسة ورقات عمل للمناقشة ولكى يسترشد بالتوصيات التى جاءت بها فى صياغة الإستراتيجية وخطة العمل للمستقبل فى الدول الإفريقية لتقييم وتنمية الموارد المائية وقد تناولت هذه الأوراق موضوعات هامة مختلفة كما يلى:

أولا: الدور الذى تلعبه ندرة وضغط المياه فى التأثير على التحديات الإقتصادية التى تواجه الدول الإفريقية فى مطلع القرن الواحد والعشرون

هذه الورقة تم تحضيرها وتقديمها بمعرفة اللجنة الإقتصادية لإفريقيا حيث تعرضت لمدى توفر المياه ظاهريا على المستوى العالمى ولكن الحقيقة أن المياه العذبة التى تعتبر مصدر أساسى للحياة تمثل جزء بسيط جدا من هذه الكمية ثم تعرضت بعد ذلك الى الدورة الهيدرولوجية لتكوين المياه العذبة وقدمت بعض التعريفات الخاصة بالمصطلحات الفنية للموارد المائية.

وفى العرض أيضا تطرقت الورقة الى تقييم الموارد المائية فى إفريقيا حيث أوضحت أن كمية المياه المتوفرة فى إفريقيا كبيرة ولكنها ليست موزعة جغرافيا بطريقة تسمح لجميع الدول بإستغلالها كما أنها أيضا حتى الآن لم يستغل جزء كبير منها وبالنسبة للمياه الجوفية فإنها أيضا بالرغم من توافرها بكثرة فى إفريقيا إلا انها لم تستغل! ثم تعرضت الورقة بعد ذلك لبعض التحديات التى تؤثر على إستعمالات المياه وتؤدى الى ندرة المياه العذبة مثل الزيادة السكانية والخلافات العرقية والحروب الأهلية والتغيرات المناخية وكذلك الكوارث الطبيعية مثل الفيضانات والجفاف والتصحر وقد أوضحت الورقة أنه مع حلول عام ٢٠٢٥ فإن حوالى نصف شعوب القارة ستواجه مشكلة ندرة المياه العذبة وقد أوصت بعدة توصيات منها ضرورة العمل على تكوين السياسات التى تتلائم مع التغيرات الإقتصادية وتقوية القدرات البشرية والمادية فى مجال الموارد المائية، ويجب إعطاء أولوية الى المظاهر الصحية المتعلقة بالماء وكذلك يجب إنشاء سياسة تسعير للمياه حيث يتم تشجيع المستهلكين على إستخدام المياه بكفاءة عالية. وعلى الصعيد الإقليمى أوصت الورقة بضرورة تشجيع التعاون بين الدول المشاركة فى أحواض الأنهار والبحيرت والمياه الجوفية فى إطار التنمية الشاملة والمستديمة وفى النهاية أوصت بضرورة تنمية القدرات الهائلة الكامنة فى إفريقيا فى مجال الزراعة والطاقة.

ثانيا: التنظيمات والترتيبات الخاصة بالتقييم والإدارة الشاملة للموارد المائية فى إفريقيا

قام بتحضير وعرض هذه الورقة البنك الدولى حيث أفاد مندوبه المشاركين فى المؤتمر بأن البنك الدولى يقوم حاليا بالتحضير لعمل إستراتيجية مكثفة لإدارة الموارد المائية فى إفريقيا جنوب الصحراء ولهذا السبب فإن تقيم الموارد المائية له أهمية كبرى فى تنفيذ مثل هذه الإستراتيجية لما يعكسه من أولويات وإحتياجات الدول الإفريقية. ثم تطرق بعد ذلك لعرض التحديات التى تواجه إفريقيا جنوب الصحراء مثل زيادة السكان وتدهور حالة التربة والتصحر وزيادة العمران فى المدن وأوضح أنه للحصول على حلول وبدائل للإستعمال المستديم للمياه لابد من إيجاد سياسة فعالة لإدارة الموارد المائية ورسم الخطط التى تتضمن مشاركة كل المنتفعين.

ثم تعرض بعد ذلك الى أهداف الخطة التى يعد لها البنك الدولى وأنها ترتكز على دعائم أساسية منها تنمية القدرات المحلية والموارد البشرية ومشاركة جميع المنتفعين وإنشاء آلية للتعاون الإقليمى وتقوية نظم المعلومات والمعرفة. وفى ختام عرضه أوصى بأن مشاكل الموارد المائية يجب أن ينظر لها بعقل متفتح وبطريقة شاملة ورؤية واضحة لبناء القدرات بما فى ذلك تحسين وتقوية قواعد البيانات والمعلومات لمصلحة المنتفعين.

ثالثا: النظم الأساسية لرصد الموارد المائية والقيمة الإقتصادية للمياه والبيانات المائية فى إفريقيا

هذه الورقة تم إعدادها وعرضها بواسطة مندوب جنوب إفريقيا حيث بدأ عرضه بمراجعة التوصيات وتحليل مشروع البنك الدولى وبرنامج الأمم المتحدة للتنمية فى إفريقيا جنوب الصحراء لتقييم شبكات الرصد الهيدرولوجية والتى تم تلخيصها فى أن حالة شبكات الرصد الهيدرولوجية فى تدهور شديد ولا تتلائم مع أدنى معدلات ومواصفات المنظمة العالمية للإرصاد الجوية وأنها فى حاجة الى تقوية وإعادة تعمير كما أن المؤسسات القومية الهيدرولوجية تحتاج أيضا الى تقوية وفى بعض الأحيان الى إنشاء وحدات خدمات جديدة ثم قام بعد ذلك بعرض تجربة جنوب إفريقيا فى إنشاء شبكات الرصد وإدارتها لقياس المياه السطحية والجوفية وكذلك نوعية المياه وتقدير القيمة الإقتصادية للمياه والبيانات المتعلقة بها.

رابعا: بناء القدرات وتنمية الموارد البشرية والإتجاه التكنولوجى ومتطلباته لتقييم الموارد المائية

هذه الورقة تم إعدادها وتقديمها بواسطة مندوب نيجيريا حيث بدأ عرضه بتوضيح معنى تقييم الموارد المائية وهو تحديد المنابع ومدى تبعيتها ونوعية الموارد المائية والتى يترتب عليها تحديد إمكانية إستعمالها والتحكم فيها، قام بعد ذلك بعرض الإحتياجات والمؤثرات على تقييم الموارد المائية وقد أشار فى عرضه الى أن هناك حاجة شديدة الى تقوية المؤسسات والمعاهد المتخصصة وتنمية الموارد البشرية على جميع المستويات حيث أن النقص فى خبراء المياه والفنيين المؤهلين يؤثر على إنتاج البيانات الهيدرولوجية والإدارة السليمة للخدمات الهيدرولوجية وقد أرجع التدهور فى نشاط الخدمة الهيدرولوجية الى الركود الإقتصادى وحث صانعى القرار على ضرورة إدراج مشروعات تقييم الموارد المائية ضمن خطط التنمية الشاملة.

خامسا: السياسة المائية وخطة وبرنامج العمل لتقييم الموارد المائية فى إفريقيا

كانت هذه هى ورقة العمل الأساسية التى أعتبرت كوثيقة للمناقشة والمساعدة فى صياغة خطة عمل لتقييم الموارد المائية فى إفريقيا وقد قام بإعدادها خبير إفريقى بمساعدة منظمة الإرصاد العالمية وقدمها مندوب ساحل العاج بصفته رئيس مجموعة العمل الإفريقية فى الهيدرولوجى بمنظمة الإرصاد العالمية.

فى بداية عرضه أوضح أن الهدف الرئيسى من تقديم هذه الورقة هو تقديم بعض المقترحات الواقعية والتى فى حدود الإمكانيات الإفريقية لتنفيذ توصيات ومقترحات مشروع البنك الدولى وبرنامج الأمم المتحدة للتنمية وقد قام بتحليل وعرض مفصل للمشروع ونتائجه التى أوضحت أن المشروع قام بعمل دراسة شاملة ودقيقة لشبكات الرصد الهيدرولوجية فى أربعون دولة إفريقية جنوب الصحراء وذلك لتقييم الخدمات الهيدرولوجية وحالة شبكات الرصد ولم تشمل الدراسة دول كينيا وأثيوبيا وليبيريا ومدغشقر وجنوب إفريقيا ولكن ناميبيا تمت تكملة الدراسة بها حديثا وبالنسبة لبلاد المغرب فقد تم تحضير ورقة عمل منفصلة حتى يتم تغطية جميع الدول الإفريقية.

وقد إستطرد موضحا أن المشروع قام بتقدير وتحليل أسباب الهبوط فى أنشطة متابعة الموارد المائية فى معظم الدول الإفريقية وأن هناك حوالى ٢٠٠ مشروع محلى وإقليمى تم إقتراحها لعلاج التدهور ولكن لم تتعرض الدراسة الى أسباب التدهور وكيفية حلها والقضاء عليها وقد جاءت الدراسة بتقرير مبدئى لميزانية تقدر بحوالى ٢٠٠ مليون دولار كتكلفة لبعض مشروعات الإصلاح وكان من الواضح أن نصف هذه الميزانية تقريبا يذهب الى الخبراء من الخارج ويلاحظ أن هذا العلاج الباهظ التكلفة إفترض توافر المساعدات الخارجية لتنفيذ هذه المشروعات ولم يأخذ فى الإعتبار علاقة هذه المشروعات بالحالة الإقتصادية فى البلاد ومدى الجدوى الإقتصادية للمشاريع ولم يظهر التقرير مدى أهميتها الإقتصادية وقد أغفل التقرير مدى إمكانية الدول على صيانة وإستمرارية تشغيل شبكات الرصد. بالنسبة لمشكلة بناء القدرات تعرض التقرير لها وقدم الحلول السهلة من خلال تنظيم ورشات العمل والدورات التدريبية ولم يتعرض الى إشراك وإستخدام القدرات البشرية المدربة والموجودة فعلا فى تنفيذ وإدارة المشاريع محليا والتى بدورها تساعد على إيجاد فرص عمل جديدة. ثم أوضح خلال عرضه أن من بين الأسباب الكثيرة والتى أدت الى عدم الحصول على أى قروض أو معونات لتنفيذ المشروعات المقترحة كان الطريقة التى صيغت بها المشاريع والتى لا تشجع المستثمرين وكذلك التحول فى سياسة الدول المانحة لتمويل مشاريع فقط ذات طابع وقيمة إقتصادية ويشترط أن يكون لها عائد إنتاجى يمكن أن يساعد على إستمرارية الصيانة والتشغيل.

وفى نهاية العرض أشار الى أن الهدف الأساسى لمؤتمر الموارد المائية "السياسة والتقييم" هو وضع الخطوط العريضة لسياسة تقوم بتنفيذ إستراتيجية محددة نابعة من الخبراء الأفارقة تعتمد على الموارد المحلية والقدرات الموجودة فى إفريقيا مع بعض المساعدات الأجنبية أن أمكن ولكن يجب أن يكون الإعتماد الأساسى للخطة على القدرات الإفريقية المتاحة.

بعد الإنتهاء من عرض وتقديم ومناقشة أوراق العمل تم توزيع المشاركين فى المؤتمر على مجموعات عمل طبقا للتوزيع الجغرافى والهيدرولوجى للأقاليم لصياغة الإستراتيجية وخطة العمل وقد إستمرت المناقشات داخل مجموعات العمل يومين إنتهت بعدها الى الإتفاق على صياغة الخطة وبرنامج العمل التالى:

جاءت الإستراتيجية بالدعائم الآتية:

"١" يجب أن يكون هناك دليل واضح على المبادرة القومية للحاجة الى أنشطة هادفة.

"٢" يجب تخطيط وتنفيذ مشروعات تقييم الموارد المائية فى إطار إمكانية الإقتصاد القومى.

"٣" يجب أن يكون هناك قرارات فعالة لتقوية الدعم السياسى للتعاون بين منظمات أحواض الأنهار والبحيرات والمياه الجوفية على المستوى المحلى والإقليمى والدولى.

"٤" يجب إنشاء روابط بين هذه الإستراتيجية والبرامج الأخرى التى تم إعدادها حاليا فى الأقليم.

"٥" يجب على المنظمات والمؤسسات العاملة فى مجال الموارد المائية فى الإقليم أن تبدى رغبتها وتبادر فى زيادة فعاليتها وإنتاجيتها فى مجال تنمية الموارد المائية.

"٦" يجب على المنظمات الدولية والدول المانحة العاملة فى مجال المياه أن تقوم بتنسيق أنشطتها فى الإقليم وتحاول بقدر المستطاع أن تقدم المساعدات فى نفس الإتجاه مع هذه الإستراتيجية.

"٧" يجب البدء فى عمل دعاية عالمية لهذه الإستراتيجية للعمل على تعزيزها وإيضاح المشاكل وتنشيط وإظهار برنامج تقييم الموارد المائية الذى تم إعتماده بالدول الإفريقية.

وقد تم وضع خطة عمل مكونة من سبع نقاط لتنفيذ هذه الإستراتيجية كما يلى:

"١" إدارة بناء القدرات.

"٢" التنبيه والتعزيز.

"٣" إستمرارية القاعدة المالية.

"٤" الطريقة المتكاملة لتقييم الموارد المائية.

"٥" تنفيذ المبادرات والإستجابات تحت الإقليمية.

"٦" دور المؤسسات المانحة والمساعدة الخارجية.

"٧" متابعة ما توصل إليه المؤتمر.

ولتنفيذ خطة العمل هذه أتفق على تنفيذ بعض الخطوات منها ما يلى:

"١" إنشاء وتقوية القدرات الضرورية للمؤسسات من أجل تقييم طويل الأمد شامل ومستديم للموارد المائية.

"٢" تعريف دور الحكومة فى تقييم الموارد المائية عن طريق الموازنة فى

المسؤوليات بين المواطنين والقطاع الخاص والمجتمعات المحلية.

"٣" تعزيز وتعريف القيمة الإقتصادية للبيانات المائية.

"٤" التعرف على المنتفعين الحقيقيين ومستعملى بيانات الموارد المائية والمعلومات الخاصة بالمياه ومحاولة الإيفاء بإحتياجاتهم.

"٥" محاولة الحصول على دخل من تسويق وبيع البيانات للمؤسسات الوطنية والدولية التى ترغب فى هذه المعلومات ووضع تعريفة مبسطة لتوزيع هذه البيانات.

"٦" يجب عمل التقييم للموارد المائية وشبكات الرصد والمتابعة طبقا للإحتياجات المطلوبة.

"٧" تقوية وتعزيز التعاون بين دول الأحواض المشتركة من خلال إنشاء آلية خاصة وتعزيز المؤسسات الحالية وإنشاء مؤسسات جديدة فى المناطق التى ليس بها مؤسسات.

بعد إقرار هذه الإستراتيجية وخطة العمل من جانب المشاركين فى المؤتمر أجيزت هذه الخطة وأتفق على تقديمها الى الإجتماع الحادى والعشرون لمجلس وزراء اللجنة الإقتصادية لإفريقيا لإقرارها وكذلك الى مجلس إدارة المنظمة العالمية للإرصاد الجوية لإيجازها وذلك فى جلساتهم خلال شهرى مايو ويونيو ١٩٩٥.

من التوصيات عاليه يتضح مدى الأهمية الخاصة التى حظى بها مؤتمر الموارد المائية حيث أنه جاء بفكر جديد يعتمد أساسا على القدرات الإفريقية وتنمية القدرات البشرية الموجودة فعلا فى القارة والعمل على تعزيزها وتبادل الخبرات والمعلومات والتعاون بين الدول الإفريقية على المستوى الإقليمى وتحت الإقليمى.

IGWA Meetings

إجتماعات فريق الوكالات العاملة فى مجال المياه بإفريقيا

وافقت أمانة فريق المياه التابعة للجنة الأمم المتحدة الإدارية للتنسيق فى دورتها العاشرة والتى عقدت بنيويورك فى أكتوبر عام ١٩٨٩ على إقتراحا بأن تقوم اللجنة الإقتصادية لإفريقيا بمعاونة الوكالات الأخرى بدور قيادى فى تكوين برنامج للهيئات والمنظمات التى تعمل فى إفريقيا لتنفيذ خطة مارا بلاتا فىعقد التسعينات.

بناء على ذلك قامت اللجنة الإقتصادية لإفريقيا بالكتابة إلى المنظمات والمؤسسات المعنية لإنشاء فريق لإفريقيا يتكون من المنظمات الدولية والوكالات الإقليمية العاملة فى مجال الموارد المائية. ويكون ذلك الفريق بمثابة الذراع الإفريقى لأمانة فريق المياه الموجودة فى نيويورك، إتفق على تسمية هذا التجمع فريق الوكالات العاملة فى مجال المياه بإفريقيا وكان الغرض الأساسى من إنشاء هذا الفريق هو العمل على التنسيق بين المنظمات والوكالات العاملة فى مجال المياه فى إفريقيا حتى يتم تفادى أى تكرار فى تنفيذ المشروعات المتشابهة لإفريقيا مما يوفر فى الوقت والأموال . وقد أختيرت اللجنة الإقتصادية لإفريقيا لتتولى مهمة الأمانة لهذا الفريق تقديرا للدور القيادى الذى لعبته فى تكوين هذا الفريق.

عقد الإجتماع الأول للفريق والذى كان بمثابة إجتماع تنظيمى فى الفترة من ٩ - ١٠ يوليو ١٩٩٢ بدعوة من اللجنة الإقتصادية لإفريقيا. التى إستضافت أيضا الإجتماع وقد حضر الإجتماع مندوبون عن الوكالات الدولية العاملة فى مجال المياه فى إفريقيا وتمت الموافقة فى هذا الإجتماع على مايلى:-

(١) أن يكون هذا التجمع غير رسمى ويسمى فريق مابين الوكالات العاملة فى مجال المياه بإفريقيا؛

(٢) يسمح لجميع المنظمات والوكالات والهيئات الدولية والإقليمية العاملة فى مجال المياه فى إفريقيا بالإنضمام للعضوية.

(٣) تكون أهداف الفريق كما يلى.

أ - التخطيط والتنسيق بين أعضاء الفريق فى مجال أنشطة الموارد المائية

ب - العمل على تعزيز الأنشطة المشتركة

حـ - تجميع وتوزيع البيانات والمعلومات الخاصة بأنشطة الموارد المائية فى إفريقيا بين الأعضاء.

٤ - يجتمع الفريق مرة كل عام فى المكان الذى يحدده والميعاد المناسب .

٥ - تعمل اللجنة الإقتصادية لإفريقيا كأمانة للفريق.

وقد تم فى الإجتماع الأول تحديد بعض المجالات التى يمكن أن تصلح للتعاون المشترك وأوصى الإجتماع بالتعاون مع المنظمات الإقليمية وتحت الإقليمية المعنية بموضوعات المياه فى إفريقيا وطلب من الأمانة أن تقوم بدعوتهم فى الإجتماعات المقبلة.

عقد الإجتماع الثانى للفريق فى الفترة من ١٠ - ١١ يونيو ١٩٩٣ بدعوة من اللجنة الإقتصادية لإفريقيا والتى إستضافت أيضا الإجتماع فى أديس ابابا وتمت خلال الإجتماع مناقشات مفيدة حول أولويات المشروعات المشتركة ومدى أهمية التنسيق بين أعضاء الفريق وإتفق على الآتى.

أ - تنظيم إجتماع بين الوكالات الأعضاء لتنسيق الأنشطة فى منطقة حوض النيل

ب - يقوم الفريق بعمل نظام للأولويات فى التعاون بينها فى الأنشطة المختلفة فى قطاعات المياه مثل الزراعة والصناعة والشرب والصرف الصحى

جـ - إتفق على أن يقوم برنامج الأمم المتحدة للبيئة بتحضير ورقة عمل عن آلية التعاون بين الأعضاء

د - إتفق على ضرورة إنشاء مركز لتجميع كافة البيانات الخاصة بأنشطة أعضاء الفريق فى مجال الموارد المائية فى إفريقيا.

قام برنامج الأمم المتحدة للبيئة بإستضافة الإجتماع الثالث الذى عقد فى نيروبى فى الفترة من ١٥ - ١٦ نوفمبر ١٩٩٤ وقد حضره ممثلون على مستوى عالى من الوكالات والمنظمات الدولية والإقليمية المختلفة. وقد عرض كل مندوب نشاط منظمته فى مجال المياه فى إفريقيا مع الإشارة إلى المجالات التى يمكن التعاون والتنسيق فيها مع الوكالات الأخرى.

وقدم مندوب اللجنة الإقتصادية لإفريقيا ورقة عمل فى المجالات والأنشطة المختلفة فى مجال المياه فى إفريقيا والتى يمكن التعاون فيها بين الوكالات المختلفة كما حدد مجالات الأولويات للمشروعات المشتركة.

قدم مندوب برنامج الأمم المتحدة للبيئة ورقة عمل عن آلية تنفيذ التعاون المشترك والتنسيق بين الوكالات والمنظمات المختلفة فى مجال المياه فى إفريقيا. دارت المناقشات فى جو تعاونى على مستوى عالى وإنتهت بتوضيح ثلاث مجالات أساسية يمكن لأعضاء الفريق التعاون من خلالها وهى كالاتى:

أ - برامج تدريب متكاملة

ب - الإدارة المتكاملة لأحواض البحيرات والأنهار

جـ - قاعدة بيانات الموارد المائية لإفريقيا

وقد إتفق على أن تعمل المنظمات الأعضاء على تكثيف الجهود ومحاولة تسخير الموارد لتنفيذ الأنشطة المشتركة من خلال التعاون والتنسيق المشترك.

بالنسبة لمجال برامج التدريب المتكاملة اتفق على أن يتم تقييم إحتياجات التدريب وتنمية خطة عمل لمواجهة إحتياجات التدريب مع عمل خطة لطلب المساعدة من الدول والمنظمات المانحة.

دارت مناقشات مطولة ومستفيضة حول تنظيم مؤتمر لأحواض البحيرات والأنهار ضمن خطة الإدارة المتكاملة لأحواض البحيرات والأنهار فى إفريقيا، وقد إتفق الأعضاء على أن تقوم اللجنة الإقتصادية لإفريقيا بالتعاون مع برنامج الأمم المتحدة للبيئة بتجهيز مسودة مشروع لأحواض البحيرات والأنهار فى إفريقيا لمناقشته فى الإجتماع الرابع للفريق، على أن يأخذ فى الإعتبار عقد المؤتمر فى عام ١٩٩٦

أبدى أعضاء اللجنة تقديرهم للنشرة السنوية للجنة الإقتصادية لإفريقيا الخاصة بالموارد المائية وأبدوا اعجابهم بها كوسيلة لتبادل البيانات والمعلومات بين القراء. وقد طلب مندوب اللجنة الإقتصادية من الأعضاء المشاركة فى تحرير المقالات العلمية والفنية.

وقد إنتهى الإجتماع بإصدار التوصيات الآتية:-

١ - ضرورة تنظيم مؤتمر فى الإدارة المتكاملة للمياه العذبة العابرة للحدود فى إفريقيا؛

٢ - تقوم اللجنة الإقتصادية لإفريقيا بالتعاون مع برنامج الأمم المتحدة للبيئة بعمل مسودة مشروع بخصوص المؤتمر عاليه لتقديمها للإجتماع الرابع للفريق فى أكتوبر / نوفمبر ١٩٩٥ لبحث وسائل التمويل والتنفيذ.

٣ - يجب أن يتم عقد مؤتمر الإدارة المتكاملة للمياه العذبة العابرة للحدود فى ١٩٩٦.

٤ - يجب تطوير برنامج شامل ومتكامل للتدريب لتنمية الموارد البشرية ويتم تنفيذه بالتعاون المشترك بين أعضاء الفريق.

٥ - تكليف منظمة اليونسكو بعمل ورقة عمل شاملة ومكثفة عن تنمية الموارد البشرية فى مجال التعليم والتدريب فى الموارد المائية وتقدم هذه الورقة للإجتماع الرابع للفريق لمناقشتها.

٦ - تم تحديد موضوع قاعدة البيانات لتنمية الموارد المائية في إفريقيا كموضوع ذى أهمية يجب إعطائه الأولوية.

٧ - تكليف المنظمة العالمية للإرصاد الجوية وبرنامج الأمم المتحدة للبيئة بعمل دراسة مبدئية عن قاعدة البيانات للموارد المائية فى إفريقيا -لتقديمها كورقة عمل للفريق فى الإجتماع الرابع.

وفى أثناء المناقشات طالب الأعضاء بإعتبار اللجنة الإقتصادية لإفريقيا وبرنامج الأمم المتحدة للبيئة كمركز لتبادل المعلومات بخصوص الأنشطة المختلفة فى مجال المياه وتمت الموافقة من جميع الأعضاء على ضرورة التشاور فى مراحل متقدم عند إعداد الخطط والبرامج الخاصة بوكالاتهم فى مجال أنشطة المياه. وهكذا فإنه من الملاحظ أن تكوين مثل ذلك الفريق هو خطوة إيجابية نحو التعاون والتنسيق بين الوكالات والمنظمات الدولية العاملة فى مجال المياه فى إفريقيا.

Prospects for development of Sub-Saharan Revers

إمكانية التنمية الهائلة للأنهار الإفريقية جنوب الصحراء

إن القارة الإفريقية تذخر بثروة هائلة من المياه فى الأنهار الكبيرة جنوب الصحراء. فبينما يوجد فى العالم حوالى إثنين وخمسون نهرا تتعدى المساحة المغذية لكل منها ١٠٠,٠٠٠ كيلومتر مربع فإن سبعة عشر نهرا منها تقع فى إفريقيا جنوب الصحراء حيث أنه ثلاثة أنهار منها هى زائير والنيل والنيجر تخترق أثناء مجراها تسع دول أو أكثر وهى أعلى نسبة فى العالم بإستثناء نهر الدانوب فى أوروبا وذلك يظهر بوضوح مدى أهمية التعاون بين الدول المشاركة فى أحواض الأنهار المختلفة لضمان التنمية الفعالة والمستدامة لمواردها المائية السطحية.

إن من أهم الخصائص التى تتميز بها الأنهار الإفريقية جنوب الصحراء هى توزيعها الجغرافى العريض وكذلك التغير الموسمى الكبير فى إيراداتها فإنه بخلاف نهر زائير الذى يقع فى المنطقة الرطبة فإن معظم الأنهار الأخرى تستمد مواردها من المرتفعات والهضاب وتمر بعد ذلك بالمناطق القاحلة وبمجرد وصولها إلى السهول والوديان فإن الفروع الصغيرة تمدها بنسبة ضئيلة جدا من المياه علاوة على ذلك فإن طبيعة المناخ تؤثر عليها كثيرا مما يجعل المحصول المائى غالبا فى أكثر من نصف العام غير مناسب للإستغلال الإقتصادى بدون عمل سدود للتخزين. هذه الظواهر الجغرافية والهيدرولوجية تعمل على رفع تكاليف أى مشاريع للتنمية فى مجال الطاقة الكهربائية والرى.

هذا القدر الهائل من التخزين يفسر مدى الحاجة إلى التنمية المتكاملة لحوض النهر الواحد لتوزيع الفوائد على الدول المشاركة حيث أن التنمية المتكاملة لاتستطيع أن تقوم بها دولة واحدة منفردة ولكن التنمية الفعالة المستديمة تحتاج إلى تعاون جميع الدول المشاركة فى الحوض ويلاحظ أن حوالى نصف كمية المياه المتاحة من الأنهار فى إفريقيا جنوب الصحراء موجودة فى حوض نهر الكونغو وحده وحوالى ثلاثة ارباع كمية المياه المتاحة فى القارة موجودة فى ثمانية أحواض أنهار هى الكونغو والنيجر وأوجوجو (غابون) والزمبيزى والنيل وسانجا وشاريا وفولتا (أنظر جدول رقم ١) هذه الأنهار بإستثناء نهرالكونغو تستمد مصادرها المائية من المناطق المرتفعة عند المنبع وبمجرد تركها لهذه التلال فإن كمية بسيطة تضاف إليها من الفروع الصغيرة غير تلك الموجودة

فى المرتفعات أما بالنسبة لنهر الكونغو فإن موسم الأمطار الكثيف وموسم الأمطار الخفيفة يخلق نموذج لتواجد المياه على مدار السنة أما بالنسبة للخاصية الأساسية للأنهار الأخرى وهى الموسم الكبير للإيراد وتنوع الإيراد على باقى مدار السنة فإن الحاجة لإنشاء السدود والخزانات تصبح ضرورية لموازنة هذه الأنهار.

إن الطبيعة الجغرافية لهذه الأنهار الموسمية والتى أحدها إتساع المجرى والطبيعة الجبلية نتج عنه تواجد مناطق قليلة ومحدودة لإستغلال الطاقة الكهربائية وإقامة مشاريع الرى وعلى الرغم من ذلك فإن المشاريع المقامة حاليا بها قدرات تفوق الإحتياجات المحلية وذلك يدفعنا إلى ذكر بعض السدود الكبيرةمثل سد كاريبا والسد العالى واكوسومبو ومناتالى والتى لها بعض الإرتباطات الدولية من حيث إستعمال المياه وتوزيع المنافع بين الدول المشتركة.

إن الطاقة الكهربائية الكامنة فى إفريقيا جنوب الصحراء تم تقديرها بحوالى ٣٠٠,٠٠٠ ميجاوات بإستثناء جنوب إفريقيا منها حوالى ٤٠ فى المائة تقع فى غرب إفريقيا ولكن يلاحظ أن الكمية التى إستخدمت حتى الآن هى فقط حوالى ١٥,٠٠٠ ميجاوات أى ما يعادل حوالى ٥ فى المائة فقط من الطاقة المتاحة (أنظر جدول رقم ٢)ويلاحظ أن معظم مشاريع السدود الرئيسية فى إفريقيا جنوب الصحراء كانت بغرض توليد الطاقة الكهربائية بإستثناء بعض دول الجنوب الإفريقى والسودان والتى كان الغرض منها للرى. من ذلك يتضح أن إستغلال الطاقة الكهربائية من المساقط المائية يمثل عنصر أساسى للتنمية فى خطط التنمية لأحواض الأنهار.

أما بالنسبة للرى فإن فرصة التنمية الموسعة والشاملة للرى فى القارة الإفريقية جنوب الصحراء محدودة للغاية فيما عدا السودان ويتضح ذلك من جدول رقم ٣ الذى يظهر أنه هناك حوالى واحد وعشرون مليون هكتار فقط وهذه المساحة تم تنمية فقط حوالى ٢٥ فى المائة بدرجات متباينة بين الدول وبالرغم من ضآلة حجم المساحة المتاحة للرى فإن الرى سيظل دائما ذو أهمية خاصة فى موضوع حصص المياه خاصة أنه يمثل المستهلك الرئيسى للمياه.

إن التنمية المتكاملة والمستديمة لأحواض الأنهار والبحيرات فى إفريقيا جنوب الصحراء تحتاج إلى تواجد هيئات ومؤسسات قوية مدعمة بالرغبة السياسية فى مساندتها ومساعدتها وقد أظهرت التجربة فى منظمات أحواض الأنهار والبحيرات فى إفريقيا جنوب الصحراء نتائج متباينة مابين النجاح والفشل فبينما نجد أن منظمة حوض نهر السنغال أثبتت نجاحا كبيراً وتعتبر مثالا يحتذى به بين المنظمات الأخرى، وكذلك إتفاقية نهر كريبا قد قابلت النجاح فى تنفيذها فإنه على العكس نجد أن منظمة نهر النيجر لم تحقق النجاح المرجو منها، وفى بعض المناطق الأخرى مثل النيل وزائير فإن الدول المشتركة فى النهر لم تتوصل حتى الآن إلى إتفاق شامل للتنمية.

إن تكوين وأنشاء منظمات أحواض الأنهار والبحيرات هى الخطوة الأولى على طريق تنشيط وتقوية التعاون بين الدول ويجب أن تكون محددة الأنشطة فى المجالات الآتية.

١ - جمع وتحليل البيانات

٢ - التخطيط

٣ - تحديد حصص المياه للقطاعات المختلفة

٤ - الحصول على التمويل للمشروعات والدراسات

٥ - تنفيذ بعض المشروعات

٦ - إدارة وصيانة بعض المشروعات

٧ - متابعة إستعمالات المياه والتحكم فى التلوث والحفاظ على البيئة

ويجب التركيز على الموارد المائية السطحية حيث أنها ذات شأن كبير بين الدول المتجاورة.

إن المشاكل والعقبات التى تواجه المنظمات فى أحواض الأنهر والبحيرات فى إفريقيا جنوب الصحراء يمكن تلخيصها فى الآتى:-

١ - المجالات العريضة للأنشطة التى لاتتوافق مع الموارد البشرية والمالية المتاحة؛

٢ - عدم إستقلالية المنظمات عن الدول الأعضاء مما يحد من نشاطها ويقلل من فاعلية تحركاتها؛

٣ - عدم الإيفاء بالالتزامات المالية وعدم دفع الحصص المقررة للميزانية من جانب الدول الأعضاء؛

٤ - عدم تواجد الكوادر الفنية المدربة والأشخاص الفنيين وفى بعض الأحيان توجد زيادة فى العمالة غير مدربة وغير فنية

٥- الإعتماد الكامل على المساعدات الخارجية والتى تؤدى فى غياب الكوادر الفنية إلى الضعف الشديد فى نقل التقنيات الحديثة .

من ذلك يتضح أنه عند انشاء أو تقوية منظمات أحواض الأنهار يجب أن تكون هناك المقومات الأساسية الآتية:

١ - الإرتباط السياسى من جهة الدول الأعضاء

٢ - تحديد الإجراءات لضمان تفاعل بين المنظمات والقطاعات المختلفة المعنية

٣ - إنشاء هيكل تنظيمى وهيكل للحوافز والحصول على الأفراد المؤهلين والمدربين لتحمل مسؤولياتهم .

٤ - الإيفاء بالالتزامات المالية من جانب الدول الأعضاء.

إذا توافرت هذه المقومات فإن ضمان نجاح منظمات أحواض الأنهار والبحيرات فى تنمية الموارد المائية ورفع المستوى الإقتصادى والإجتماعى يكون مؤكداً بين الدول المشاركة فى النهر الواحد.

جدول رقم (١)
الأحواض الدولية للأنهار والبحيرات فى إفريقيا جنوب الصحراء
(التى تزيد المساحات المغذية لها عن ١٠٠,٠٠٠ كيلومتر مربع)

اسم الحوض	المساحة المغذية (١٠٠٠ متر مربع) أوأكثر	التصرف السنوى المتوسط مليار متر مكعب	عدد الدول	الدول المشاركة
زائير (الكونغو)	٣٦٩٠	١٢٥٠	٩	زائير-جمهورية إفريقيا الوسطى -الكنغو- انغولا - كاميرون- بوروندى-رواندا - تنزانيا - زامبيا
النيل	٢٨٥٠	٨٤	١٠	مصر-السودان-اثيوبيا-ارتريا -أوغندا- كينيا- تنزانيا-رواندا -بوروندى-زائير
النيجر-بنيو	١٩٠٠	١٨٠	٩	النيجر-نيجيريا- مالى-غينيا- بوركينافاصو- ساحل العاج-بنين-كاميرون- تشاد.
الزمبيزى	١٢٩٠	٢٣٠	٦	زمبابوى- زامبيا- موزمبيق- انغولا- ملاوى تنزانيا
فولتا	٣٩٠	٣٧	٦	غانا- بوركينافاصو- ساحل العاج- توغو-بنين -مالى
بحيرة تشاد	٢٣٧٠	-	٦	تشاد- كاميرون-نيجر-جمهورية إفريقيا الوسطى- نيجيريا- السودان
بحيرة رودولف	٥٠٠	-	٤	اثيوبيا-كينيا-السودان- أوغندا
السنغال	٤٩٠	٢٥	٤	السنغال-موريتانيا-مالى-غينيا
ليمبوبو	٤٠٠	-	٤	بوتسوانا-زمبابوى-جمهورية جنوب إفريقيا موزمبيق
اوجوى	٢٢٠	-	٤	غابون-الكونغو-كاميرون -غينيا الإستوائية
اوكاننجو	٣٢٠	٨	٤	بوتسوانا-انغولا-زمبابوى-زامبيا
اورانجى	٨٠٠	٩	٣	الصومال- اثيوبيا-كينيا
جوباشيبلى	٨٢٧	٩	٢	ناميبيا - انغولا
روفوما	١٤٠	-	٣	تنزانيا-موزمبيق-ملاوى
كيونينى	١٠٠	-	٢	ناميبيا- انغولا
اواش	١٢٠	٣	٢	اثيوبيا- جيبوتى
سابى	١٠٣	-	٢	موزمبيق -زمبابوى

جدول رقم (٢)
الإمكانيات المتاحة للطاقة الكهربائية من المساقط المائية فى إفريقيا

البلد	الطاقة المتاحة ١٠٠٠ ميجاوات	البلد	الطاقة المتاحة ١٠٠٠ ميجاوات
زائير	١٢٠	ساحل العاج	٣
انغولا	٢٣	السودان	٣
كاميرون	٢٣	مصر	٣
غابون	١٨	إفريقيا الوسطى	٢
موزمبيق	١٥	غينيا الإستوائية	٥
نيجيريا	١٣	غانا	٢
اثيوبيا	١٢	ليبيريا	٢
الكونغو	١١	مالى	٢
تنزانيا	١٠	سيراليون	١
مدغشقر	٨	أوغندا	١
كينيا	٦	ملاوى	١
غينيا	٥	بوروندى	١
زمبابوى	٤		
		المجموع	٢٩٤

جدول رقم (٣)
الإمكانيات المتاحة للرى فى إفريقيا

البلد	المساحة ١٠٠٠ هكتار	البلد	المساحة ١٠٠٠هكتار
انغولا	١٠٠٠	مالى	٣٥٠
بنين	٩٠	موريتانيا	١٥٠
بوتسوانا	١٠٠	موريشيس	١٠٠
بوركينافاصو	٥٠	موزمبيق	١٠٠
بوروندى	٥٠	ناميبيا	١٠٠
كاميرون	٢٥٠	النيجر	١٢٠
إفريقيا الوسطى	١٠٠	نيجيريا	٢٠٠٠
تشاد	٦٠٠	رواندا	٥٠
الكونغو	٣٥٠	السنغال	٣٥٠
اثيوبيا	٦٥٠	سيراليون	١٠٠
غابون	١٠٠	الصومال	٢٠٠
غامبيا	٧٠	جنوب إفريقيا	٢٠٠٠
غانا	١٢٠	السودان	٣٣٠٠
غينيا	١٠٠	سوازيلاند	٩٠
غينيا بيساو	٧٠	تنزانيا	١٥٠٠
ساحل العاج	١٥٠	توغو	٩٠
كينيا	٣٥٠	أوغندا	٤٠٠
ليسوتو	١٠	زائير	١٠٠٠
		زامبيا	٢٠٠٠
مدغشقر	١٢٠٠	زمبابوى	٤٠٠
ملاوى	٣٠٠		
		المجموع	٢١,٠١٠