



Short-term training program for officials of the African Governments
on

Water Resources Management

at

Department of Hydrology,
Indian Institute of Technology Roorkee, India



OVERVIEW:

Water is an essential resource for all life on the planet. As time advances, water is becoming scarcer and having access to clean, safe, drinking water is limited among countries. At present only about 0.08 percent of all the world's fresh water is exploited by mankind in ever increasing demand for sanitation, drinking, manufacturing, leisure and agriculture. Due to the small percentage of water remaining, optimizing the fresh water we have left from natural resources has been a continuous difficulty in several locations worldwide. Much effort in water resource management is directed at optimizing the use of water and in minimizing the environmental impact of water use on the natural environment. The observation of water as an integral part of the ecosystem is based on integrated water resource management, where the quantity and quality of the ecosystem help to determine the nature of the natural resources.

Successful management of water resources requires accurate knowledge of the resource available, the uses to which it may be put, the competing demands for the resource, measures to and processes to evaluate the significance and worth of competing demands and mechanisms to translate policy decisions into actions on the ground. For water as a resource, this is particularly difficult since sources of water can cross many national boundaries and the uses of water include many that are difficult to assign financial value to and may also be difficult to manage in conventional terms. The task of water managers has been made more difficult given the complexity of demands, the uncertainty of availability and supply, issues of quality and issues of long term planning especially under the climate change scenarios. In this context, the water resources management is a process in which all the stakeholders and resources are considered in a comprehensive manner to maximise the economic and social welfare in a sustainable manner without compromising the sustainability of ecosystems.

Africa has more than 50 important water basins covering almost all African countries. The entire national territories of around fourteen countries fall within shared river basins. About one-third of the world's international river basins are found in Sub-Saharan Africa wherein international river basins are the principal source of water resources. Thirty-five countries in the region share the seventeen major river basins. In this background, as highlighted in a UN report on 'Water in Africa', the key issue is the application of water resources management to the concept of water scarcity in Africa. The report also underline that more than 300 million African people live in water-scarce environment of the estimated 800 million who live on the African continent. Thus, organisation of such programmes is a timely assistance for the well-being of the people of Africa.

OBJECTIVES AND TENTATIVE CONTENTS:

The program primarily aims at imparting training and knowledge in the area of water resources development and management. The training envisages that the participants will use the knowledge gained during this programme in solving their water resources problems and to better manage their water resources. Following are the broad topics covered (details are provided in Annexure - I):

- Introduction to hydrology and water resources
- Planning and management of water resources system
- Techniques for water resources assessment
- Water balance study
- Irrigation water requirement and management
- Economic considerations in water resources
- Flood control and flood management system
- Problems to water resources in the new millennium
- Environmental management of water resources
- Planning and design of distribution system

DURATION AND DATES:

The duration of each programme is three weeks as detailed below:

1. First Program: July 22 – Aug 11, 2018, and
2. Second Program: Nov 25 – Dec 15, 2018.

ELIGIBILITY:

The participants from African countries having engineering/scientific background involved in water resources management/hydrological analysis with the following academic qualifications are more suitable for these programmes:

- Bachelor's degree in Civil/Mechanical/Agricultural Engineering/Hydrology or its equivalent; or
- Diploma in Civil/Mechanical/Agricultural Engineering/Hydrology or its equivalent with at least 2 years' relevant experience; or
- Other master's degree with at least 2 years' relevant experience.

The participants may be from government departments, academic institutions, private sector and NGO etc contributing or intend to contribute in water resources management. Participants should be in good health and proficient in English reading, speaking and listening.

AGE LIMIT: Nil

NUMBER OF SEATS:

There shall be only 25 seats in each course. Accordingly, the participants are advised to send their Nominations at the earliest. The admission will be granted on first cum first basis by giving representation to large number of countries. Women candidates are encouraged to apply.

NOMINATION / APPLICATION PROCEDURE:

The nominations/applications through respective national government agencies are to be submitted to Indian Missions in the host country (<http://www.mea.gov.in/indian-missions-abroad-new.htm>). The participants are also required to submit their application online using the portal of the Department of Hydrology at www.doh.org.in/wrcourses

COURSE FACULTY:

The course faculty would comprise of faculty of Department of Hydrology and other departments of IIT Roorkee, planners, policy makers, and other experts in India and abroad involved in Planning and Management of Water Resources.

VENUE AND ACCOMMODATION:

The programs will be organized at the Department of Hydrology, Indian Institute of Technology Roorkee (Uttarakhand), India. Roorkee is about 180 km Northwest of Delhi and has a number of academic and research Institutions. It is connected by road and rail from Delhi. The nearest international airports in New Delhi.

BOARDING/LODGING & PRAGRAMME FEE:

All the expenses during the programme on accommodation, boarding, field visits and course material will be borne by organizer directly through sponsorship Ministry of External Affairs, Govt. of India. The accommodation is arranged at Officers guest house (Continuing Education/Khosla International House) of Indian Institute of Technology, Roorkee. There is no course fee for attending the programme.

TRAVEL:

The expenses on travel from their home town to New Delhi International Airport and back shall be met by Indian Mission in host country under India-Africa Forum Summit-III. The travel of participants from New Delhi Airport to Roorkee and back to New Delhi airport shall be arranged/met by Department of Hydrology IIT Roorkee host institution on the receipt of the confirmed programme in advance.

MEDICAL INSURANCE:

The organisers would not be hold responsible for risk of illness, accidents and loss of property of the participants. Participants are advised to make necessary insurance for such risks by themselves.

THE SPONSOR, MINISTRY OF EXTERNAL AFFAIRS, GOVT. OF INDIA:

The Ministry of External Affairs (MEA), Government of India has sponsored the training programmes.

CONTACT DETAILS:

For further information and registration, please contact or write to:

Dr. M K Jain, Head of Department
Department of Hydrology,
Indian Institute of Technology
Roorkee - 247 667 (Uttarakhand), I N D I A
e-mail: jain.mkj@gmail.com, mjainfhy@iitr.ac.in
Tel: +91 1332 285845, Cell: +91 94103 71758

DEPARTMENT OF HYDROLOGY, THE HOST INSTITUTE:

The Department of Hydrology (DoH) was setup at the Indian Institute of Technology Roorkee, initially as School of Hydrology in 1972 as International Post Graduate Courses in Hydrology under the UNESCO's International Hydrology Decade. The training and education in Hydrology was one of the main components of this programme. The courses offered by the Department are presently sponsored by the Government of India and international agencies like UNESCO, World Meteorological Organisation (WMO) etc. The Department of Hydrology offers a 4 semester duration master of technology (M. Tech.) and 2 semester PG Diploma course in Hydrology and Ph.D. programmes to national and international candidates. The Department of Hydrology has been recognized as one of the Regional Training Centre of WMO in 2015.

About Indian Institute of Technology Roorkee: Indian Institute of Technology Roorkee has its roots in the Roorkee College established in 1847 as the first engineering college in India, which was rechristened as Thomason College of Civil Engineering in 1854 after its mentor James Thomason. After about 100 years of distinguished services, the college was elevated to University of Roorkee on November 25, 1949 as the first Engineering University of the independent India. On September, 2001, the University was converted into an IIT by the Government of India.

It has now 21 academic departments/centres offering various courses like 12 undergraduate courses in engineering and architecture, 3 dual degree programmes and about 48 postgraduate courses in engineering, architecture, sciences, computer applications and business administration besides research programmes at doctoral level. IIT Roorkee has highly qualified and motivated faculty of about 480 members who are engaged in research and consultancy in addition to teaching. The faculty members also offer their expertise through consultancy services to private/public sector agencies as well as to Government agencies. Currently the institute has 4270 undergraduate students, 1690 postgraduates and 1749 research scholars. A number of academic and research centres are engaged in interdisciplinary research, and many collaborative programmes exist with institutions in India and abroad. Several other central facilities exist such as Central Library which has more than 4,00,000 volumes of books and periodicals, Institute Computer Centre, Education Technology Cell with full-fledged television studio, Continuing Education Centre and Institute Instrumentation Centre with highly sophisticated instruments etc. IIT Roorkee is fully residential,

with well-designed hostels both for boys and girls, and family accommodation for married students, sprawling sports ground, a swimming pool, a boat club and a host of students clubs with facilities for different games including tennis, squash, billiards etc.

About Roorkee City: Roorkee, a quiet city of moderate size in the district of Haridwar (Uttarakhand), is located on the banks of the Upper Ganga Canal, which originates at Haridwar. The city is located at Latitude 29°52' N and Longitude 77°53' E above at 268 m from the mean sea level. It is about 30 km south of the Shivalik range of the mighty Himalayas, about 180 km to the north of Delhi and is situated on Amritsar-Howrah main railway line. Roorkee is linked by rail to many important mega cities such as Delhi, Kolkata, Chennai and Mumbai. Roorkee is also well connected by road, being located on the Delhi-Haridwar National Highway (NH 58), and on the Roorkee – Panchkula National Highway (NH 73). Nearest International airport at New Delhi is about 225 km from Roorkee and nearest domestic airport at Jolly Grant, Dehradun is about 70km from Roorkee.

The temperature ranges from 3°C to 20°C during winters (October to March) and from 25°C to 44°C in summers (April to September). The average annual rainfall is 1100 mm and bulk of it occurs during monsoon season starting from mid-June to September.



**Tentative Contents of Training Programmes on
'Water Resources Management'**

(July 22 – Aug 11, 2018 and Nov 25 - Dec 15, 2018)

Module#	Topic	Details
1.	Introduction to hydrology and water resources	<ul style="list-style-type: none">● Historical profile on world water resources development● Water resources and humanities● Development of water science● Global water resources● Hydrologic cycle<ul style="list-style-type: none">● Atmospheric water● Surface water● Groundwater● Interrelation of water resources with other natural resources and the environment
2.	Planning and management of water resources system	<ul style="list-style-type: none">● Necessity of Planning● Steps involved● Classification of water resources projects● Pitfall in water resources planning● Understanding of Hydraulic Process● Why, what and how to manage?● Concept of environmental water management● Concept of Integrated Water Resources Management (IWRM)● Water allocation and water scheduling problem● Equitable manners of water management
3.	Techniques for water resources assessment	<ul style="list-style-type: none">● Rainfall analysis● Soil water content analysis● Evaporation, transpiration and evapotranspiration● Streamflow estimation● Flood frequency analysis● Rainfall-runoff analysis● Reservoir operation study● Energy generation of hydropower● Sediment analysis
4.	Water balance study	<ul style="list-style-type: none">● Water demand and uses● Water supply

5.	Irrigation water requirement	<ul style="list-style-type: none"> ● Crop evapotranspiration and irrigation water requirement ● Planning and design of irrigation methods
6.	Economic considerations in water resources	<ul style="list-style-type: none"> ● Discounting techniques ● Economic efficiency analysis of water resources projects ● Capital Budget
7.	Flood control and flood management system	<ul style="list-style-type: none"> ● Causes of floods ● Estimation of design flood ● Flood control by reservoirs ● Flood routing ● Flood control measures and flood plain management
8.	Problems to water resources in the millennium	<ul style="list-style-type: none"> ● Water quality and water pollution ● Water quantity and water budget ● System thinking to water resources management
9.	Environmental management of water resources	<ul style="list-style-type: none"> ● Concept of EIA study to water resources development ● Concept of sustainable water resources development ● Environmental management plan
10.	Planning and Design of Distribution System	<ul style="list-style-type: none"> ● Components of water distribution system ● System of water supply ● Storage and distribution reservoirs ● Water conveyance system