



ETHIOPIA

***-GENERAL INFORMATION-***  
*As of May 10, 2006*

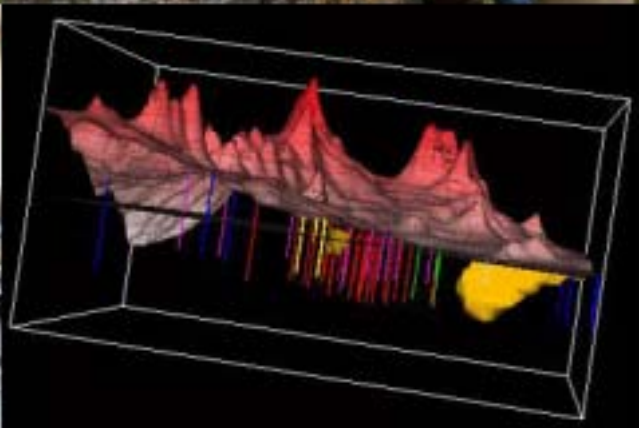


JAPAN

**International Workshop for African Countries  
Series of Training Programs on Groundwater Management**

## *Groundwater Modeling*

**Duration: August 21, 2006 -- September 22, 2006**



*Ministry of Water Resources - Japan International Cooperation Agency  
Ethiopia Water Technology Center (EWTEC)  
Addis Ababa, Federal Democratic Republic of Ethiopia*

# *Invitation*

*Concerned Authority*

*Ghana, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Rwanda, South Africa,  
Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe*

*Groundwater is a vital resource for the source of water supply or irrigation schemes. In Ethiopia more than 90% of its rural water supply and about 80% of urban water supply schemes are depended on groundwater as their sources.*

*In Africa the coverage rates of water supply and sanitation remain much lower than other regions and still a large number of people have no means to access to the safe water. Since the Johannesburg world summit of environment various efforts have been done to attain the MDG (Millennium Development Goal) in which the number of people who can not access to the safe water are supposed to be reduced into half by 2015.*

*In December 2003 Pan-Africa Implementation and Partnership Conference on Water was held in Addis Ababa. During the conference a number of subject were discussed in order to attain the MDG. Among others two important issues to implement development works, i.e. human and institutional development and the sources of funding, were drawn particular attention in the conference.*

*In this context it is our great pleasure to announce that Groundwater Development and Water Supply Training Phase-2 Project (the Project), which has been created by joint efforts of Ministry of Water Resources and Japan International Cooperation Agency, is going to organize the third International Workshop on Groundwater Management. Interested individuals with relevant qualifications are cordially invited to attend the Workshop.*

*The Project provides various training programs in the fields of groundwater development and water supply to respond to the needs of the sector in Ethiopia, and also provides the above-mentioned International Workshop for African countries which is organized regularly every year as a series of workshops on groundwater management.*

*We trust that this training program will help contribute to the human resource development of your organization and eventually to attain the MDG of your country. We are looking forward to seeing eager participants from various countries in Africa.*

*With Best Regards*

*Asfaw Dingamo*

*Minister*

*Ministry of Water Resources*

*Federal Democratic Republic of Ethiopia*

*Naoki Saito*

*Resident Representative*

*JICA Ethiopia Office*

*Japan International Cooperation Agency*

## **I. INTRODUCTION OF THE PROJECT**

The *Groundwater Development and Water Supply Training Phase-2 Project (The Project)* was formulated in March 2005 as the second phase of the previous 7 years Japan-Ethiopia technical cooperation project which was purported to the human resources development in the water supply sub sector. The Ministry of Water Resources of Ethiopia and the Japan International Cooperation Agency (JICA) have jointly established the *Groundwater Development and Water Supply Training Center* in Addis Ababa and provided various training programs in the fields of groundwater development and water supply since 1998. Today, the training center was renamed as the *Ethiopia Water Technology Center (EWTEC)* to be a hub center of the Project. EWTEC provides various training programs in water sector. In addition to that, EWTEC also carries out Research and Development activities together with conducting an international workshop on groundwater management for African countries.

### **Basic Courses: 8 – 12 weeks**

Groundwater Management, Drilling Technology, Drilling Machinery Maintenance Technology, Water Supply Engineering (Basic course), Electro-Mechanical maintenance Technology

### **Advance Courses: 4 – 5 weeks**

Groundwater Modeling, GIS for Groundwater Management, Remote Sensing, Water Supply Engineering (Planning & Design / Operation & Maintenance),

### **Supplementary Courses: 2-4 weeks**

Rope Pump Manufacturing, Diagnostic Investigation of Well, Rehabilitation of Well, Artificial Recharge, Appropriate Technology, Project Management, Maintenance Workshop Management, Electro-Mechanical maintenance Technology

### **Research and Development Activities**

#### **1. Butajira – Ziway Areas development study**

- 1) To elucidate groundwater flow mechanism through the type locality of Rift Valley Pediment Slopes to make an appropriate groundwater development and management plan in the areas
- 2) To develop and disseminate various types of appropriate technologies to effectively use the water resources so as to make the communities resilient against chronic drought

#### **2. Dissemination of Rope Pump as an appropriate technology for rural water supply**

- 1) To conduct rope pump manufacturing training course for local artisans
- 2) To distribute 500 rope pumps in various regions

### **Implementation and implementation support for rural water supply scheme**

1. Implementation of pilot project
2. Implementation support for Japan's Grant Aid and other projects in rural water supply scheme (support for human resources development programs)



## **II. SUMMARY OF THE TRAINING COURSE**

### **(1) Outline**

The Ministry of Water Recourses in cooperation with JICA is organizing the Third International Workshop on *Groundwater Modeling for African countries* for hydrogeologists, geologists and in some cases civil engineers who are engaged in groundwater development and management activities in central or regional governmental offices. The workshop will start from August 21 and end on September 22 (five weeks) and this unique training program aims at providing basic knowledge and practical training on groundwater modeling and simulation analysis using state-of-the-art software. The participants can apply the modeling technology for appropriate groundwater development and groundwater management project.

The training program includes the practice of formulation of actual model using various software and applying live data of Akaki Well Field where is the water source of Addis Ababa city. The training program is divided into three modules as follows:

#### **1) Outline of Groundwater Modeling**

- \*Principle of Groundwater Model
- \*History of Groundwater Model
- \*Type of Groundwater Model
- \*Modeling of Groundwater Basin
- \*Application of Groundwater Model

#### **2) Methodology of Groundwater Modeling**

- \*Outline and Flow of Modeling Methodology
- \*Hydrogeological Classification and Boundary Conditions
- \*Estimation of Aquifer Parameters
- \*Groundwater Recharge and Discharge
- \*Model Calibration

#### **3) Practice of Groundwater Modeling**

- \*Establishment of Model Framework
- \*Input of Aquifer Parameters
- \*Input of Recharge and Discharge
- \*Simulation Practice
- \*Output Presentation and Evaluation

To achieve the objectives, JICA will dispatch qualified and highly experienced lecturer, *Prof. Dr. Naoaki Shibasaki*, from Fukushima University in Japan and prepare an appropriate number of personal computers for practical training. The useful textbooks and presentation materials will be also prepared for the participants. The field excursion in Akaki Well Field will be held in the third week prior to practicing the model construction of Akaki Well Field. During the training program, various technical software such as SURFER, Processing MODFLOW Pro, and 3-D Master will be used for processing data, carrying out simulation practice, and preparing output presentation.

*NOTE: Though other usual training courses are conducted at EWTEC, this “Groundwater Modeling” will be held at a hotel, and the participants will also stay in a hotel due to the capacity constraint of EWTEC.*

## (2) Curriculum

Duration of the training program this year will be from *August 21 to September 22, 2006*, and the daily program is scheduled tentatively as follows:

Date		Lecture Hour			
		09:30 - 10:30	11:00 - 12:00	14:00 - 15:00	15:30 - 16:30
Aug. 20	Sun.	Arrival of Participants			
Aug. 21	Mon.	Registration, Orientation	Opening Ceremony (From 11:30)	Country Report by Foreign Participants	
Aug. 22	Tue.	Basics of GW-1	Basics of GW-2	Basics of GW-3	PC Guidance
Aug. 23	Wed.	Principle of GWM-1	Principle of GWM-2	Principle of GWM-3	Introduction of SURFER
Aug. 24	Thu.	History of GWM	History of GWM	SURFER Practice-1	SURFER Practice-2
Aug. 25	Fri.	Type of GWM	Type of GWM	Introduction of GIS Tools-1	Introduction of GIS Tools-2
Aug. 26	Sat.	Excursion: Addis Ababa City (National Museum, Mt. Entoto, etc.)			
Aug. 27	Sun.				
Aug. 28	Mon.	Modeling of GW Basin-1	Modeling of GW Basin-2	Introduction of PMWIN Pro-1	Introduction of PMWIN Pro-2
Aug. 29	Tue.	Hydrogeological Classification-1	Hydrogeological Classification-2	Practice of PMWIN Pro-1	Practice of PMWIN Pro-2
Aug. 30	Wed.	Boundary Conditions-1	Boundary Conditions-2	Practice of PMWIN Pro-3	Practice of PMWIN Pro-4
Aug. 31	Thu.	Estimation of Aquifer Parameters 1	Estimation of Aquifer Parameters 2	Estimation of Aquifer Parameters 3	Estimation of Aquifer Parameters 4
Sep. 01	Fri.	GW Recharge-1	GW Recharge-2	GW Discharge-1	GW Discharge-2
Sep. 02	Sat.	Excursion: Melka Kunture (Prehistoric site), Tiya (World Heritage site) and Butajira (Hydrogeological condition)			
Sep. 03	Sun.				
Sep. 04	Mon.	Model Calibration-1	Model Calibration-2	Application of GWM 1	Application of GWM 2
Sep. 05	Tue.	Output Presentation-1	Output Presentation-2	Application of GWM 3	Application of GWM 4
Sep. 06	Wed.	Introduction of Akaki Well Field	Map and Topography Review	Field Excursion at Akaki Well Field	
Sep. 07	Thu.	Model Framework-1	Model Framework-2	Model Framework-3	Model Framework-4
Sep. 08	Fri.	Input Aquifer Parameters-1	Input Aquifer Parameters-2	Input Aquifer Parameters-3	Input Aquifer Parameters-4

Sep. 09	Sat.	(Extra classes, if necessary)			
Sep. 10	Sun.				
Sep. 11	Mon.	Ethiopian New Year (Holiday)			
Sep. 12	Tue.	Input Recharge-1	Input Recharge-2	Input Recharge-3	Input Recharge-4
Sep. 13	Wed.	Input Discharge-1	Input Discharge-2	Input Discharge-3	Input Discharge-4
Sep. 14	Thu.	Simulation Practice-1	Simulation Practice-2	Simulation Practice-3	Simulation Practice-4
Sep. 15	Fri.	Model Calibration-1	Model Calibration-2	Model Calibration-3	Model Calibration-4
Sep. 16	Sat.	Excursion: Nazaret and Sodore Hydrogeological Condition			
Sep. 17	Sun.				
Sep. 18	Mon.	Future Simulation-1	Future Simulation-2	Future Simulation-3	Future Simulation-4
Sep. 19	Tue.	Model Improvement & Presentation Preparation		Model Improvement & Presentation Preparation	
Sep. 20	Wed.	Presentation Preparation		Presentation Preparation	
Sep. 21	Thu.	Model Presentation & Evaluation		Model Presentation & Evaluation	
Sep. 22	Fri.		Closing Ceremony		
Sep. 23	Sat.	Departure of Participants			

### **III. GUIDELINE FOR APPLICATION**

#### **(1) Qualification of Participants**

The participant is required to fulfill the following conditions and qualification:

- 1) Not to exceed about forty (40) years old
- 2) BSc degree in geology, hydrogeology and civil engineering, MSc degree in the same fields are favorable
- 3) More than five (5) years working experience in relevant field (groundwater development and management)
- 4) To have knowledge and experience of computer operation (Microsoft Windows XP, MS-Office)
- 5) To be fluent in English language

#### **(2) Invited Countries**

The following 14 countries are invited based on the preliminary survey:

Ghana, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Rwanda, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe

#### **(3) Number of Participant**

Total number of participants to be invited to the training program is *fifteen (15)* from the countries mentioned above. In principle one participant will be accepted from one country, but it is recommended that the invited authorities submit application forms of more than one candidate with priority list. Ten (10) Ethiopian are also invited (total 25 participants).

#### **(4) Submission of Application Forms**

The authority who wants to recommend candidates must submit the following documents at one time to JICA office in his/her country on or before **July 21, 2006**. The authority can submit the application to EWTEC directory if JICA office is not available (by fax first, then send original documents).

- 1) Official nomination letter from the authority (with priority, if more than one candidate)
- 2) Official request form which is called “**A2A3 Form**” (ANNEX-4)
- 3) Country report
- 4) Medical certificate

#### **(5) Important Instructions**

The participant should respect the following instructions:

- 1) To abide by the time table, rules and regulations applied in this training program
- 2) To abide by the laws and regulations applied in Ethiopia
- 3) No to bring any member of his/her family or relatives
- 4) Not to extend or shorten his/her stay in Ethiopia before and/or after the end of the training program

#### **(6) Certificate**

The participant who successfully completed the training program will be awarded a certificate.

## IV. EXPENCES & ALLOWANCES

### 1. International Participants

JICA will provide the following for the participants from neighboring countries:

- 1) Air ticket between the capital of his/her country and Addis Ababa
- 2) Transportation between the hotel and the Bole International Airport in Addis Ababa
- 3) Medical insurance if participants are medically treated in Addis Ababa (costs related to pre-existing illness will not be covered)
- 4) Daily accommodation with breakfast, lunch for working days and daily per diem **one hundred seventy two (172) Birr (equivalent to 20 US Dollars)**
- 5) Stationeries and a bag necessary for the training program according to EWTEC regulation

*NOTE: Participants should arrive at Addis Ababa by the night of August 20, 2006. The most suitable flight will be reserved by EWTEC. Payment of air tickets will be made in Addis Ababa by EWTEC and each air ticket will be issued at Ethiopian Airline Office in each country.*

### 2. Ethiopian Participants

(1) JICA will provide the following for the **participants from the regions:**

- 1) Land transportation cost between his/her region and Addis Ababa according to MoWR regulation (Not airplane)
- 2) Daily transportation between the hotel and the training venue
- 3) Daily accommodation with breakfast, lunch for working days and daily per diem **eighty six (86) Birr**
- 4) Stationeries and a bag necessary for the training program according to EWTEC regulation

(2) JICA will provide the following for the **participants who live in Addis Ababa:**

- 1) Transportation cost for working days **eighty six (86) Birr** per day
- 2) Lunch for working days
- 3) Stationeries and a bag necessary for the training program according to EWTEC regulation

The followings must be covered by the participant or his/her authority:

- 1) Cost for issuing air ticket at the Ethiopian Airline Office in his/her country (if it happens)
- 2) Cost for entry visa to Ethiopia (If the supporting letter is required, please notice that to EWTEC)  
\*If there is no Ethiopian Embassy in his/her country, upon-arrival-visa can be arranged in Addis Ababa.  
(visa fee must be covered by the participant at the airport)
- 3) Extra insurance for travel, medical and/or others such as pregnancy, dental treatment, pre-existing illness, etc.
- 4) Domestic transportation cost in his/her country
- 5) Airport tax in his/her country
- 6) Other costs those are not mentioned in the article above

## **V. MISCELLANEOUS**

### **(1) Clothing in Addis Ababa**

In August and September, it is the rainy season and a shower of rain is expected everyday in Addis Ababa. The climate is cool in the daytime and chilly at night. Therefore some warm clothing such as cardigans or sweaters are recommended to be brought by participants. It is surely necessary to bring umbrella.

### **(2) Health in Addis Ababa**

Addis Ababa is situated on 2,400m highland. This is why a newcomer to Addis Ababa may feel dizzy or slight headache when you do physical exercise. Usually, people adapt to this environment in a few days time.

### **(3) Internet**

The internet café is available in the hotel and its surrounding area. Broadband or ADSL are not popular in Ethiopia so the transmission speed is very slow.

## ANNEX-1: Information Table

Course Title	Groundwater Modeling
Duration	August 21, 2006 to September 22, 2006
Number of Participant	15 international participants and 10 Ethiopian participants
Invited Countries	Ghana, Kenya, Lesotho, Malawi, Mozambique, Nigeria, Rwanda, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe
Language	English
Qualification of Candidate	The candidate must be nominated officially from his/her organization and he/she must have the following background: 1) Less than 40 years old 2) BSc in geology, hydrogeology or civil engineering, MSc holders in the same fields will be given higher priority. 3) More than 5 years working experience in relevant field 4) Knowledge and experience of PC operation (Windows XP, MS-Office) 5) Fluent in English language
Course Objective	To provide basic knowledge and practical training on groundwater modeling and simulation analysis using state-of-the-art software. With the acquired knowledge the participants will be able to apply the modeling technology for appropriate groundwater development and groundwater resources management.
Training Institution	Ethiopia Water Technology Center (EWTEC) Address: P.O.Box 5744, Addis Ababa, ETHIOPIA Tel. (251-11) 4431125 (Operator), 4431126 (Head of the Center), 4431127 (JICA Expert) Fax. (251-11) 4431128 E-mail: ewtec@ethionet.et, HP: <a href="http://homepage.mac.com/shukran/gdwstp/">http://homepage.mac.com/shukran/gdwstp/</a> *Due to the capacity constraint of our training center, this training program will be held at a hotel where the participants stay.
Accommodation	Desalegn Hotel, Addis Ababa Tel. (251-11) 6624524, Fax. (251-11) 6623884
Expenses to be Covered	Air ticket, daily allowance, accommodation and medical insurance will be covered by JICA. For detailed information please refer to the article in the foregoing text.
Documents for Application	Official nomination letter, A2A3 Form, Country report, Medical certificate
Closing Date for Application	On or before <b>July 21, 2006</b> *The application should be submitted to JICA office in his/her country. *If JICA office is not available, fax the application to EWTEC first, then send the original documents to the mailing address mentioned below.
Mailing Address for Application submission	Mr. Shigeki Ishigaki (Project Coordinator) c/o JICA Ethiopia Office, P.O.Box 5384, Addis Ababa, ETHIOPIA Tel. (251-11) 5504755, Fax. (251-11) 5504465

## **ANNEX-2: Items of Country Report**

(1) Name of applicant

(2) Country name

(3) Description of your organization

- 1) Organization chart
- 2) Roles and responsibilities in water sector
- 3) Problems which your organization is facing at present
- 4) Present situation in groundwater resources management affairs
- 5) Description of your department in the organization
- 6) Description of your responsibilities in the department

(4) Expectation from the training program

(5) Address and contact number

- 1) Name of organization
- 2) Postal address of the organization
- 3) Telephone & Fax (Office)
- 4) Telephone & Fax (Home) → preferable to be written
- 4) Mobile phone → preferable to be written
- 5) E-mail → if you have it

### ANNEX-3: List of JICA Office in Africa

Office Name	Addresses
JICA Ghana Office	Millennium Heights Building 4 <sup>th</sup> Floor, 14 Liberation Link, Airport Commercial Area, Accra, GHANA P.O.Box 6402, Accra-North, GHANA Tel. (233-21) 760781, 760782, 766080, Fax. (233-21) 760954
JICA Kenya Office (Rwanda) (Uganda)	The Rahimtulla Tower 10 <sup>th</sup> and 11 <sup>th</sup> Floor, Upper Hill Road, Nairobi, KENYA P.O.Box 50572-00200, Nairobi, KENYA Tel. (254-20) 2724121/22/23/24, 2724877, Fax. (254-20) 2724878
JICA Malawi Office	Raza House, Area 13, Plot No.100, City Center, Lilongwe 3, MALAWI P.O.Box 30321, Capital City, Lilongwe 3, MALAWI Tel. (265-1) 771644, 771554, 771945, Fax. (265-1) 771125
JICA Mozambique Office	Av. 24 de Julho N <sup>o</sup> 7, 5 <sup>o</sup> andar, Escritorio A, B e F, Maputo, MOZAMBIQUE P.O.Box 2650, Maputo, MOZAMBIQUE Tel. (258-1) 486357, 486358, Fax. (258-1) 486356
JICA Nigeria Office	2 <sup>nd</sup> Floor AP Plaza, Adetokunbo, Ademola Crescent, Wuse II, Abuja, NIGERIA P.M.B. 5090, Wuse, Abuja, NIGERIA Tel. (234-9) 5232869, Fax. (234-9) 5235431
JICA South Africa Office (Lesotho) (Swaziland)	Lobby 2, 1 <sup>st</sup> Floor Bank Forum Building, Cnr. Fehrsen & Veale Streets, New Muckleneuk, 0181 Pretoria, SOUTH AFRICA P.O.Box 14068, Hatfield 0028, Pretoria, SOUTH AFRICA Tel. (27-12) 3464493, Fax. (27-12) 3464966
JICA Tanzania Office	3 <sup>rd</sup> Floor, Barclays House, Ohio Street, Dar es Salaam, TANZANIA P.O.Box 9450, Dar es Salaam, TANZANIA Tel. (255-22) 2113727/28/29/30, Fax. (255-22) 2112976
JICA Zambia Office	Plot No.11743A Brentwood Lane, Longacres, Lusaka, ZAMBIA P.O.Box 30027, Lusaka 10101, ZAMBIA Tel. (260-1) 254501, 254508, 254883, Fax. (2601-1) 254935
JICA Zimbabwe Office	8 <sup>th</sup> Floor, Intermarket Life Towers, 77 Jason Moyo Avenue, Harare, ZIMBABWE P.O.Box 4060, Harare, ZIMBABWE Tel. (263-4) 252500/01/02/05, Fax. (263-4) 790635
JICA Ethiopia Office	Woreda 18, Kebele 36, House No.676/05, Addis Ababa, ETHIOPIA P.O.Box 5384, Addis Ababa, ETHIOPIA Tel. (251-11) 5504755, Fax. (251-11) 5504465