

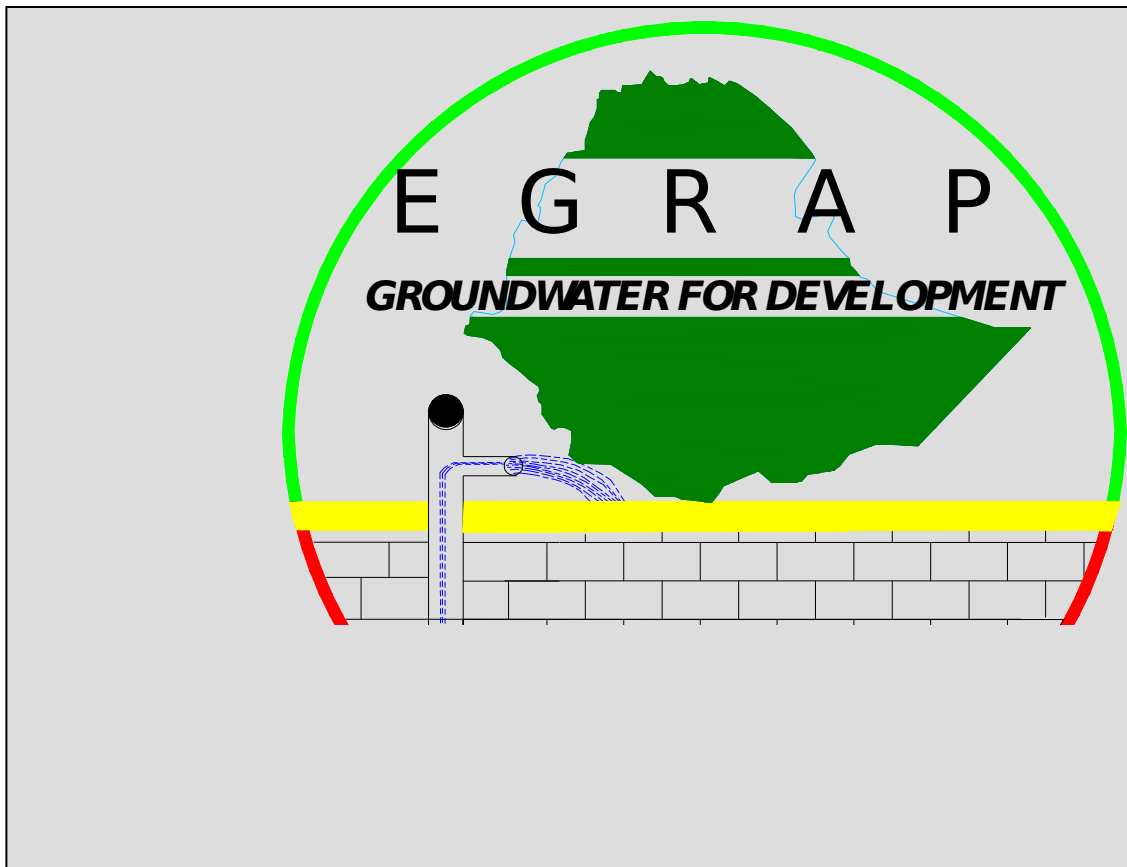


**The Federal Democratic Republic of Ethiopia**



**Ministry of Water Resources**

**Geological Survey of Ethiopia**



**Assessment, Development and Management of  
Groundwater in Ethiopia (EGRAP)**

**VOLUME 1**

**PROGRAM DOCUMENT AND WORKPLAN PHASE 1 (2007-2010)**

**Addis Ababa, Ethiopia, June 2007**

## PREFACE

Development and management of the national groundwater resources are high on the agenda of the Government of Ethiopia (GoE). Accordingly the GoE has launched a national groundwater assessment program (EGRAP) in 2000 with support from the IAEA. The progress of EGRAP 2000 has been slow in the past 5 years for various reasons. In view of the high priority to provide (ground)water to the growing population through national programs like the UAP (Universal Action Plan), the GoE has taken the initiative to look into options to accelerate its implementation. This initiative is again supported by the IAEA and by UNICEF. UNICEF facilitated a fact finding mission by the Vrije Universiteit Amsterdam and the Acacia Institute in October 2005. UNICEF also provided follow up support to the formulation of a modified approach to revive and accelerate the implementation of the EGRAP. The first outline of this approach was presented and discussed in National Consultation Workshop and Donor Meeting on 5 and 6 October 2006.

Following the workshop, a joint Coordination task Force (CTF) was formed to prepare a detailed work plan for implementation of EGRAP+ and to design an effective framework for coordination of project based (and donor sponsored) inputs:

MoWR	Tesfay Tadese	<i>National Coordinator</i>
MME/GSE:	Zenaw Tessema	<i>Program Manager</i>
Addis Ababa Univ.	Dr. Tamiru Alemayehu	
UNICEF	Paulos Semeles	
Vrije Universiteit	Prof. Dr. Han Dolman	
Acacia Institute	Albert Tuinhof	
IAEA	Andy Garner	

This document is the joint output of the Coordination Task Force (CTF) and presents the overall approach (Program Document) and the Work Plan for Phase 1 (2007-2010). The draft document was shared with the DAG-Water TWG and their valuable comments are incorporated in this final EGRAP Program Document and Workplan for Phase 1 (2007-2010).

The purpose of this document is to consult with Donor Agencies on the funding for EGRAP+ Phase 1, to interact with the demand side institutions (WASH sector, agriculture, industry) on the selection of priority areas for groundwater assessment and on development planning. The purpose is also to jointly define the detailed program planning and costing within the broader IWRM framework, including the sustainable establishment of the Ethiopian Groundwater Information Center and National Groundwater Institute.

The proposed title of the program is: **Assessment, Development and Management of Groundwater Resources in Ethiopia**. The work title will be EGRAP+

## Assessment, Development and Management of Groundwater in Ethiopia

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## List of Abbreviations

BGS	British Geological Service
CTA	Chief Technical Advisor
CTF	EGRAP Coordinating Task Force
DAG Water TWG	Donor Assistance Group on Water
EGIC	Ethiopian Groundwater Information Centre
EGRAP	Ethiopian Groundwater Assessment Program
ENGDA	Ethiopian National Groundwater Data Base
ESTA	Ethiopian Science and Technology Agency
EWRI	Ethiopian Water Research Institute (proposed)
EWTEC	Ethiopian Water Technology Centre
GEF	Global Environmental Facility
GoE	Government of Ethiopia
GSE	Geological Survey of Ethiopia
HoA-TF	Horn of Africa - Task Force
IGRAC	International Groundwater Assessment Centre
IAEA	International Atomic Energy Agency
IHE	UNESCO Water Education Institute
ITC	International Training Centre
MARS	management of Aquifer Recharge
MDG	Millennium Development Goals
MME	Ministry of Mining and Energy
MoWR	Ministry of Water Resources
MSF	Multi Stakeholder Forum
M&E	Monitoring and Evaluation
NAB	National Advisory Board
NC	National Coordinator
NGI	National Groundwater Institute
NUFFIC	Netherlands University Fund for International Cooperation
PM	Project Management
PMU	Project Management Unit
RIPPLE	Research Inspired Policy and Practise Learning in Ethiopia
RPC	Research Program Coordinator
SC	Steering Committee
TA	Technical Assistance
TF	Task Force
TOR	Terms of Reference
UAP	Universal Action Plan
USGS	United States Geological Survey
VU	Vrije Universiteit (Amsterdam)
WWDSE	Water Works Design and Supervision Enterprise

### Program Summary

<b>Programme Title</b>	<b>Assessment, Development and Management of Groundwater in Ethiopia</b>
<b>Program sub title</b>	Accelerated implementation of the Ethiopian Groundwater Assessment Program (EGRAP) through partnership and capacity building of Ethiopian institutions
Project acronym	<b>EGRAP+</b>
Main objective	<i>To implement a national plan, institutional framework and human resources capacity for development and management of Ethiopian groundwater resources to support water supply provision through the UAP (and other projects in the water sector and to achieve other benefits (ecosystem protection etc.), while recognizing short and long term resource sustainability and to integrate groundwater resource development and management into overall Ethiopian Integrated Water Resources Management (IWRM).</i>
Key characteristics	Accelerated and cost effective implementation of EGRAP through <ul style="list-style-type: none"> <li>- focusing on groundwater assessment <b>and development</b> in priority areas in consultation with the demand-side institutions.</li> <li>- developing a groundwater management and regulation framework, as well as developing institutional capacity in the broader context of IWRM;</li> <li>- capacity building and training focused to transfer full program responsibility and leadership to Ethiopian Institutions after 3 years through establishment of a National Groundwater Institute</li> <li>- linking research programmes of Universities to support groundwater assessment, development and management</li> <li>- developing a flexible structure to effectively accommodate contributions of different donors into the overall EGRAP framework</li> </ul>
Outputs	<ul style="list-style-type: none"> <li>- groundwater assessment studies and development plans completed for 10-12 water sheds</li> <li>- National Groundwater Institute established and operational</li> <li>- tools and technologies for development of groundwater assessment</li> <li>- groundwater integrated into IWRM approach to maximize benefits for water supply and other ecosystem services etc.</li> <li>- capacity building and training program completed</li> </ul>
Responsible Agency	Ministry of Water Resources / Ministry of Mines and Energy
Starting date	June 2007
Duration	Phase 1: 3 years
Budget Phase 1	€ 13,685 (Birr 160 million)
Contribution GoE	€ 5,142 (Birr 60 million)
Donor funding	€ 8,542 Birr 100 million)
Implementing Agency	Ministry of Water Resources / Geological Survey of Ethiopia
Coordination partnership	Ministry of Water Resources / Geological Survey of Ethiopia, Addis Ababa University, UNICEF, Vrije Universiteit Amsterdam/Acacia

Institute, International Atomic Energy Agency (IAEA)
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## **1. BACKGROUND**

### **1.1 Background**

Groundwater is of paramount importance for Ethiopia to supplement the available surface water resources in providing drinking water to its population and for economic development (agriculture, livestock, industry, tourism). Groundwater is especially important in regions with limited or polluted surface water and in areas affected by recurrent droughts. The use of groundwater is hampered by a lack of understanding and information. This leads not only to missed opportunities for groundwater development but also to failures in groundwater investments. Inadequate well designs, wrong siting of wells and poor drilling practices can lead to low or declining production rates and water quality deterioration. UNICEF estimates that 50% of the wells drilled for rural water supply in the drought prone areas are suffering from serious yield reduction within 5 years due to falling water tables, well failures or water quality degradation.

The GoE has launched a national groundwater assessment program (EGRAP) in 2000 with support from the IAEA (Annex I). The progress of EGRAP has been slow in the past 5 years for various reasons. In view of the high priority to provide (ground)water to the growing population through national programs like the UAP (Universal Action Plan), the GoE has taken the initiative to revive and accelerate the implementation of EGRAP. This initiative is again supported by the IAEA and by UNICEF. The IAEA assists through their ongoing support to groundwater assessment studies in Ethiopia and (with UNDP) through the preparation of a medium sized GEF project for integrating groundwater in overall integrated water resource management. UNICEF facilitated a fact finding mission by the Vrije Universiteit and the Acacia Institute in October 2005 (Annex II) and provided follow-up support on request of the MoWR and UNICEF, to the formulation of an Program Outline to revive and accelerate the implementation of EGRAP (VU/Acacia Institute, 2006)

### **1.2 National Consultative workshop (October 2006)**

The Program Outline formed the basis for a National Consultative Workshop and Donor Meeting on 5-6 October 2006, organized by the MoWR/MME and UNICEF. This workshop was also a follow up of the International Conference and Exhibition on Groundwater in Ethiopia (ICEGE) held in May 2004 by UNICEF and the MoWR (MoWR/UNICEF, 2006). The Workshop and Donor Meeting were successful in sharing the new EGRAP approach with the major stakeholders (Annex III).

An EGRAP coordinating partnership was formed between the MoWR, GSE, AAU, IAEA, UNICEF and Vrije Universiteit/Acacia Institute, and a joint Coordinating Task Force (CTF) was established to implement the Inception Phase (Annex III). The draft Program Document and Phase 1 Work Plan (2007-2010) was completed in March 2007 and shared

with DAG-Water TWG. Their valuable comments are incorporated in this final *EGRAP Program Document and Workplan for Phase 1 (2007-2010)*

## 2. APPROACH TO THE PROGRAM

### 2.1 Introduction

The proposed EGRAP+ program largely follows the existing EGRAP approach but has new elements that respond to the GoE priorities to (i) accelerate the implementation (ii) increase the ownership and capacity building of the Ethiopian institutions and (iii) use the assessment studies to address the current water shortage through water supply provision in priority areas. These new elements include the following:

- coupling of assessment and mapping of groundwater to development requests and management needs from the UAP (and other national programs) through the preparation of groundwater development plans;
- integrating groundwater management in the broader context of IWRM;
- involving Universities and linking research to groundwater assessment;
- including capacity building and training focused to transfer full program responsibility and leadership to the Ethiopian Institutions after 3 years;
- designing a flexible structure that can effectively accommodate contributions of different donors into the overall EGRAP+ framework.

### 2.2 Mapping needs and management challenges

EGRAP+ is designed to address the urgency to improve the knowledge of the groundwater resources and to make this information available for groundwater development and management. Development and management are terms that are often misunderstood in terms of their meaning (box 1).

#### Box 1. From Development to Management:

Development: **Exploitation** of groundwater for economic and cost effective use

Management : **Sustainable use** of groundwater to balance (present and future) user demands with groundwater protection and environmental needs

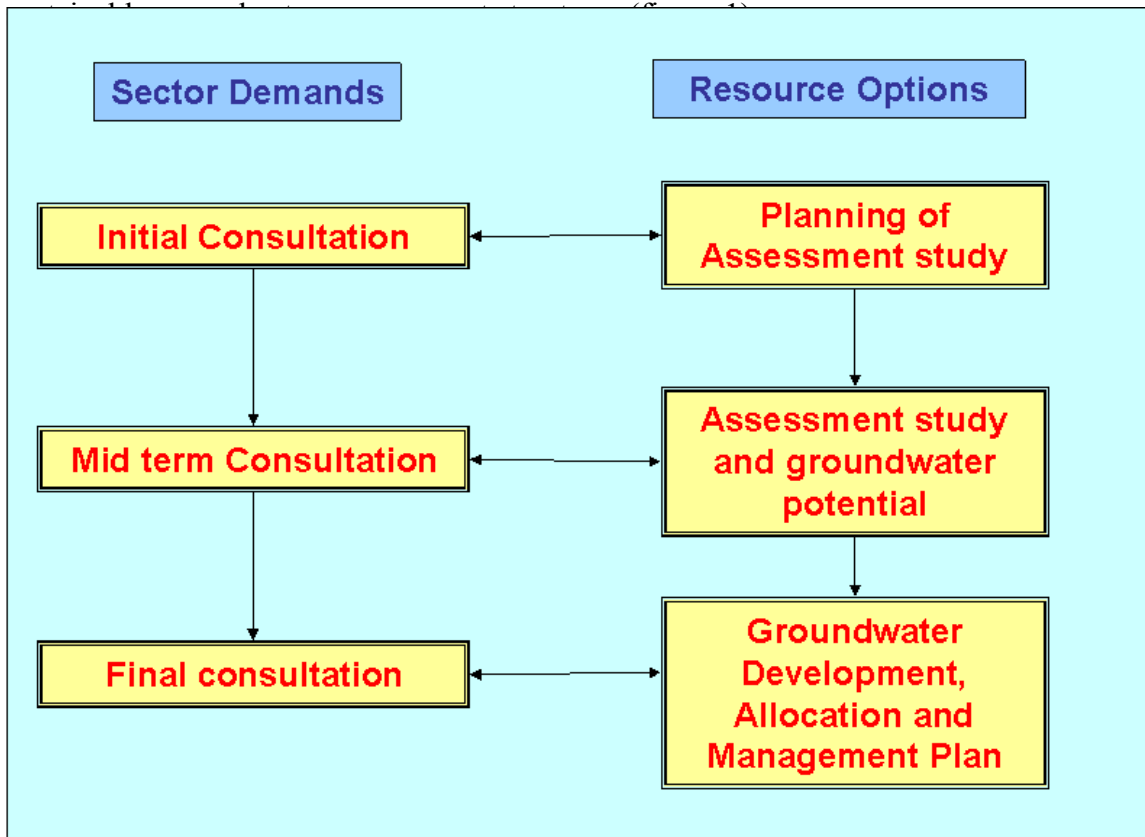
In practical terms we could say that **Development** is geared to maximise the use of groundwater while **Management** is focused to regulate the use of groundwater to serve all functions in a sustainable way.

This seems to be a contradiction as short term investments and interests may be in conflict with long term protection interests and environmental needs. However in the broader sense there is no conflict because degradation of groundwater resources will also affect the groundwater development investments on the longer term, as shown by wells falling dry or groundwater quality to deteriorating below drinking water standards.

In the existing EGRAP there was a focus on the assessment and mapping of the groundwater resources and less attention to the use of this information for groundwater resources development and management. The current approach has a strong focus on a consultative interaction with the water development stakeholders in order to link mapping



and assessment to the information needs for groundwater development and to introduce



**Figure 1 Demand driven preparation of groundwater development plans**

An important tool in the systematic mapping of the groundwater (complementary to necessary collection of field data and hydrogeological analysis) and the preparation of groundwater development plans, will be the use of satellite information and spatial (GIS based) data bases with strong visualization capabilities to facilitate stakeholder consultations. These tools will be accommodated in the existing Ethiopian National Groundwater **Data Base** (ENGDA), and will transfer the ENGDA into a broader Ethiopian Groundwater **Information Centre** (EGIC).

### 2.3 Program dimensions

The project approach is based on the recognition of three dimensions that are interrelated and require the coordination of a large number of agencies and parties who contribute to the implementation of the EGRAP+ (see figure 2):

- planning and management: *dealing with resource management and regulation*
- studies and investigations: *to increase the understanding of the resource*
- development & implementation: *focused on resource exploitation & development*

These levels of groundwater development and management are not yet fully in place in Ethiopia but will be used in the EGRAP+ as a guideline for the organizational and institutional development for (ground)water resource development and management.

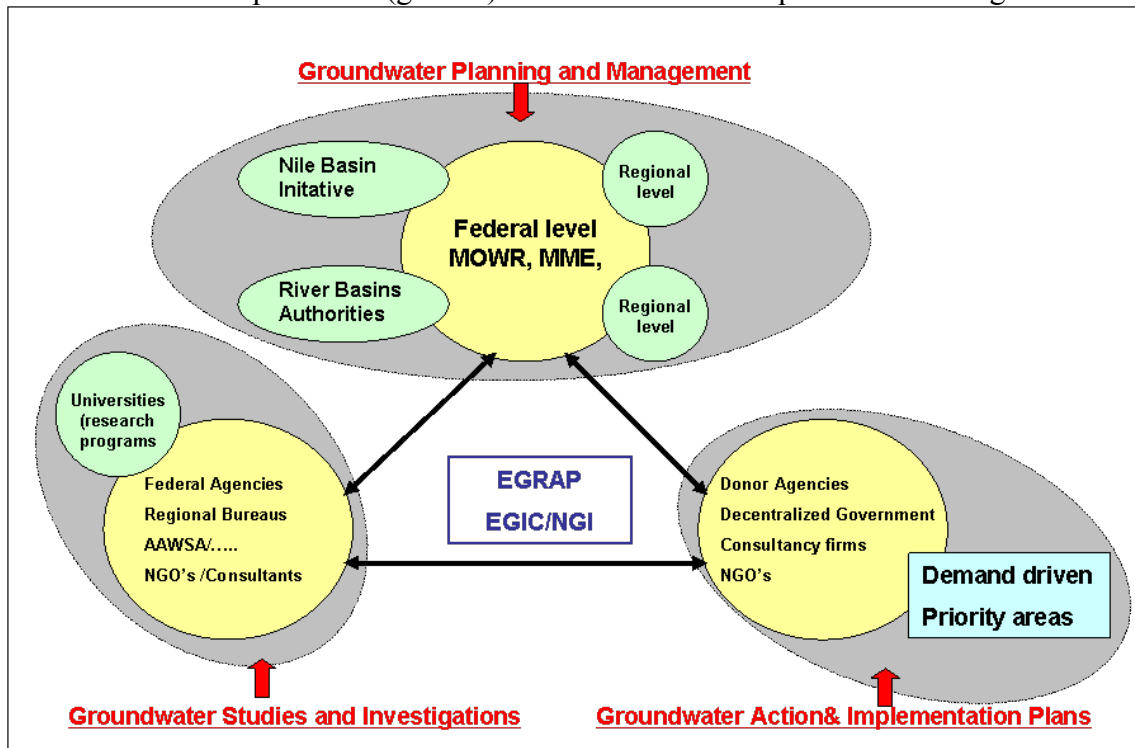


Figure 2. Program environment

On the **planning and management level** there is a need for coordination between the federal agencies (Ministries, national institutions) and the regional agencies (regional bureaus, regional government). There is also a need to interact closely with the new river basin authorities in order to integrate groundwater in the river basin management plans. Other important issues on the planning level are the integration of groundwater management into the broader context of IWRM and to address emerging issues such as climate change adaptation. Effective groundwater management has transboundary implications and can relieve burdens on surface water resources. Resource decisions are important for transboundary water management such as in the Nile Basin Initiative (NBI). Therefore international coordination is required in the frame of existing NBI cooperation.

For **groundwater assessment studies and investigation**, the EGRAP+ will link groundwater assessment studies and related investigations with research programs of the Universities. The Regional Bureaus and their Zonal Hydrogeologists will play a key role in these assessment studies with support from the GSE, the WWDSE's and consultancy firms (or individual consultants).

The **groundwater development and implementation plans** will be designed on the basis of the results of the assessment studies in the respective water shed, accumulated knowledge on the type of schemes that can be constructed (drilled or hand dug wells,

water harvesting techniques, MARS techniques like sand dams). The design and presentation of the plans will largely be based on the needs of the demand-side institutions and civil society in the water sector.

## **2.4 Capacity building and partnership of Ethiopian Institutions**

Groundwater is a valuable resource and its availability is crucial for the public water supply and economic development in large parts of the country and therefore a resource of national importance. The EGRAP+ is designed to pool the available human and institutional resources and maximize the input of the various institutions in the country coupled with an extensive capacity building program through:

- bringing all stakeholders together in a program Steering Committee
- incorporate a continuous capacity building, training and knowledge exchange program in EGRAP+ for all agencies and institutions involved in the program.
- making maximum use of Universities by linking research programs to groundwater assessment studies and preparation of groundwater development plans

### **EGRAP+ Steering Committee**

A Steering Committee is proposed in which all main stakeholders are represented to oversee the whole program, ensure the cooperation between all parties involved and to take key decisions for the implementation. A more detailed description of the Steering Committee is given in chapter 4.

### **Capacity building program**

EGRAP+ will develop and implement a broad capacity building and training program to groundwater assessment, development and management. The programs will be based on a training needs and capacity needs assessment and will cover stakeholders at different levels. It will include a variety of courses and training ranging from classroom courses to on the job training in specific skills. The program will encompass and integrate the current training courses offered by the MoWR through the Ethiopian Water Technology Center (JICA supported) and other training offered by donor funded projects.

### **Involving Universities: associated research program.**

EGRAP+ will complement and strengthen the groundwater mapping and assessment through cooperation with Universities and Knowledge Institutes. The Ethiopian Universities will coordinate their research programs with EGRAP+ and will generate key knowledge and methods to enhance process-based understanding of dynamics and vulnerability of water resources in key parts of Ethiopia, both in terms of water quantity and quality. The generic nature of these topics will ensure broad applicability and utility of generated knowledge and enhance the human resources capability in groundwater assessment and development in Ethiopia.

## **2.5 From partnership to ownership**

To secure the continuity and sustainability of EGRAP+ over the 12-15 years of its duration, we envisage that the partnership of Ethiopian agencies develops its full

ownership for the program in 3 years (Phase 1) through the establishment of a National Groundwater Institute.

After the transfer of the program responsibility to the NGI, there will be an intermittent support for at least 2 years (Phase 2) after which the MoWR/NGI will complete the EGRAP during Phase 3.

During Phase 1 (3 years), the program will focus on the **full completion** of a number of groundwater assessment studies in selected water sheds, the preparation of maps and water resources action plans. Also the EGIC should be operational by that time and the National Groundwater Institute should be established and operational. As from year 4, the NGI take over the responsibility with the coverage of new water sheds and receive part time support during a period of two years. As from year 5, the NGI should be capable to take full responsibility for the completion of EGRAP+ and function in its role as focal point for groundwater management and regulation in the broader IWRM context.

## **2.6 Interaction with related projects**

### **(Ground)water resources assessment studies and projects**

The EGRAP+ is the continuation of the EGRAP launched in 2000 and will form a framework to accommodate the ongoing activities that are already being implemented or are under preparation (Annex V). This refers also to the IAEA/GEF project that will focus on integrating groundwater into water resource management in Ethiopia as a model to facilitate transboundary agreements by optimizing natural resources, to make Ethiopia's development climate-proof and help Ethiopia to achieve its MDG's. The GEF project will be formulated in close consultation with the EGRAP+ Task Force of which IAEA is a member. There may be an opportunity to further build on the development of drought preparedness maps that are piloted by BGS in Ethiopia on a national scale.

### **Universal Action Plan (UAP)**

The UAP is a multi donor sponsored national investment program under which the MoWR will address the water supply and sanitation needs of the country as part of its policy to reach the MDG's by 2015. Support to the UAP in providing groundwater development plans and management tools is one of the key objectives on EGRAP+

### **Other water development related projects and plans**

Active coordination and support is also envisaged with the federal policy plans for growth centers, the priorities and impacts as a result of urbanization and the sectoral development plans (agriculture, tourism, industry, and environment). Specific development projects for irrigated agriculture are the Lake Tana Irrigation and Drainage Projects (World Bank) and the Ada and Becho Plain Irrigation Development (MoWR)

### **Related projects**

The EGRAP+ will seek cooperation with other ongoing projects on the broader field of socio-economic development and land and water planning such as the DFID funded RIPPLE project (Research Inspired Policy and Practise Learning in Ethiopia), which

carries out research into water and sanitation that is policy relevant and can be immediately applied.

### 3. PROJECT FRAMEWORK

#### 3.1 Overall objective

Based on the approach of EGRAP+ as described in the previous section, the overall objective of EGRAP+ is formulated as follows:

*To implement a national plan, institutional framework and human resources capacity for development and management of Ethiopian groundwater resources to support water supply provision through the UAP and other national projects and to achieve other benefits (ecosystem protection etc.), while recognizing short and long term resource sustainability and to integrate groundwater resource development and management into overall Ethiopian Integrated Water Resources Management (IWRM).*

#### 3.2 Program set-up: supporting sustainable groundwater development

The EGRAP+ is designed to support sustainable groundwater development for the water supply and sanitation sector. The approach to this is that groundwater assessment and research is designed on the basis of the demands in priority watersheds and that groundwater development plans will be prepared to support the cost effective investments in water supply and sanitation, and to support agricultural development in these areas. (figure 3)

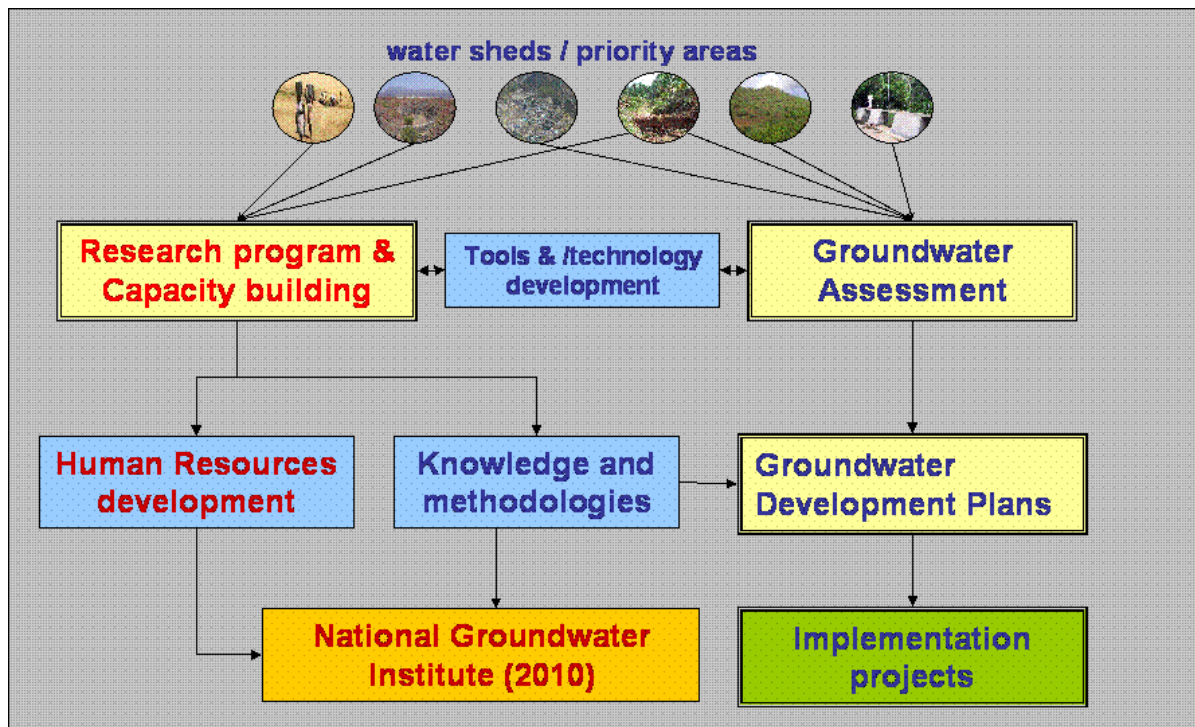


Figure 3: Program set up: main building blocks

*Note: The implementation of plans is not part of the EGRAP but will be done by implementing agencies and private sector parties (consultants, drilling contractors). EGRAP will give guidance through the EGIC and NGI.*

### 3.2 Program components

The EGRAP+ will be implemented through 7 basic components (Figure 4). Component C1-C5 will be implemented during Phase 1 (2007-2010/2011) and will focus on capacity building through preparation of assessment studies and groundwater development plans in selected (priority) areas. As from 2010 the National Groundwater Institute will be operational and become responsible for the groundwater assessment, planning and development in the remaining watersheds and complete the EGRAP in the period 2011-2015 while introducing groundwater management and regulation.

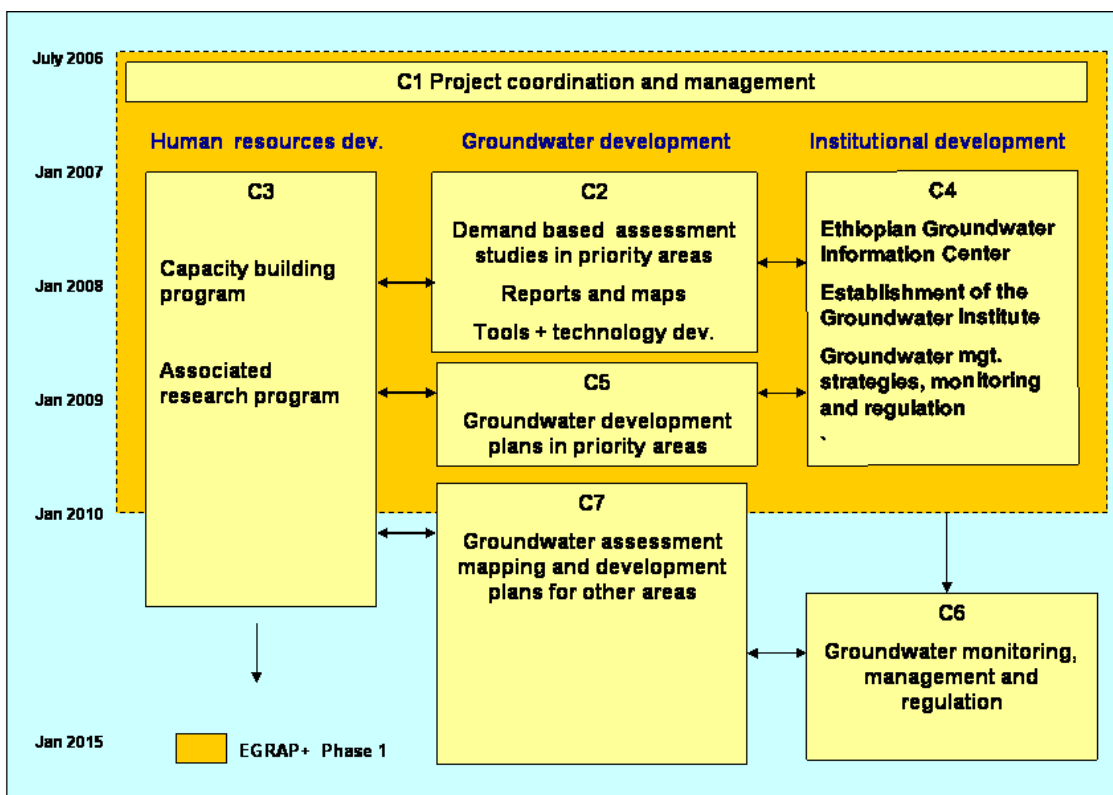


Figure 4. Program Components

### 3.3 Specific objectives, results and activities (log Frame)

This expected outputs and a detailed description of the related activities for the components under Phase 1 are given in Annex VI and summarised in table 1. In response to the comments of the DAG-Water TWG, some key issues are explained in section 3.4

The activities, expected outputs and associated risks will be discussed in detail with the main stakeholders and implementing agencies during the EGRAP+ kick off workshop. The result will be incorporated in a detailed shared log frame for project implementation, which will be reviewed and updated during annual evaluations.

**Table 1. EGRAP+ Phase 1: components and outputs**

Component	Objectives	Outputs
1	To create and maintain a working environment for effective coordination and management of EGRAP+ implementation	<ul style="list-style-type: none"> <li>• MoU of Coordination Partnership signed</li> <li>• SC and NAB in place</li> <li>• PM/TA Unit staffed and operational</li> <li>• Financial management and accounting system operational</li> <li>• Communication and dissemination plan</li> <li>• Broadly endorsed Phase 1 workplan and annual plans</li> <li>• Consultation workshops and national workshops held</li> <li>• Interaction with other projects secured</li> <li>• Process management procedures and M&amp;E plan in place</li> </ul>
2	To prepare groundwater assessment plans in selected water sheds to increase the resources knowledge and to provide a basis for sustainable sectoral groundwater development.	<ul style="list-style-type: none"> <li>• priority water sheds selected in consultation with the UAP</li> <li>• equipment and instruments purchased</li> <li>• guideline//protocol for assessment studies</li> <li>• GIS/RS based spatial data base</li> <li>• implementation plan for assessment studies</li> <li>• tools development</li> <li>• groundwater technology development (incl pilot studies)</li> <li>• 12 assessment studies completed</li> </ul>
3	To develop and implement a broad training plan for stakeholders at different levels and support to Ethiopian Universities in coordinating their research programs to the needs and questions for groundwater development and management.	<ul style="list-style-type: none"> <li>• training needs assessment completed and annually updated</li> <li>• training plan (including training offered by different donors)</li> <li>• training courses conducted</li> <li>• MoU with Universities and additional funding secured to streamline research programs to EGRAP+ priorities</li> <li>• integration research plan in EGRAP+ workplan</li> <li>• research plan completed</li> <li>•</li> </ul>
4	To develop an effective EGIC and NGI that can effectively address the assessment, development and management of the groundwater in Ethiopia.	<ul style="list-style-type: none"> <li>• Assessment of current data availability and status of ENGDA</li> <li>• Plan for transformation of ENGDA into EGIC</li> <li>• Implementation of EGIC establishment</li> <li>• Vision on NGI options and consultative decision making</li> <li>• NGI development plan endorsed by SC and NAB</li> <li>• Legal status and mandate of NGI</li> <li>• Implementation of NGI development</li> <li>• NGI operational</li> <li>•</li> </ul>



<b>5</b>	To develop implementation plans that can be used by the different sectors for groundwater development in consultation with the regional bureau's.	<ul style="list-style-type: none"><li>• Consultation with stakeholders</li><li>• Guidelines/protocol for development plans</li><li>• 10 groundwater development plan completed</li><li>• Structure in place for support to implementing agencies</li><li>•</li></ul>
<b>6 and 7</b>	To develop a broadly endorsed plan for EGRAP phase 2.	<ul style="list-style-type: none"><li>• Groundwater management strategies and framework</li><li>• Groundwater legislation and regulatory system</li><li>• Support plan to NGI for Phase 2</li><li>• Broadly endorsed work plan and budget for Phase 2</li><li>•</li></ul>

### 3.4 Key issues for project implementation

#### Stakeholders involvement

The EGRAP+ will have continuous consultations with the main stakeholders through

- representations of main stakeholders in the Steering Committee (see figure 5)
- regular consultation meetings with specific stakeholder groups, such as with the demand –side institutions on groundwater development plans (see figure 1), with Universities and Research Institutes (on groundwater assessment and characterization, on tool and technology development, on the associated research program) and with the donors (on project progress and achievements)
- national workshops (see figure 8) to share overall program progress and main implementation issues. These meetings will be linked to the annual MSF meeting.

A detailed communication plan will be prepared during the kick-off phase and discussed with the stakeholders during the kick-off workshop.

#### Capacity building program

The capacity building program is a main element of the EGRAP. It will involve

- technical training on topics such groundwater assessment and development tools and techniques, groundwater technologies, data handling and management
- training on groundwater management skills
- institutional development for groundwater management
- others (to be defined)

This component will be designed on basis of a capacity needs assessment and on the availability of ongoing training facilities such a programs offered by EWTEC or other agencies and projects. As a national program, EGRAP will make maximum use of existing facilities and design the component in consultation with the various partners and with the Donor agencies that will support this component and may have their specific conditions to take into account. The design of this component will start during the kick-off phase in order to have first plan ready for the kick-off workshop (section 5.3)

#### Role and demarcation of the EGIC/NGI

The EGIC will be established on basis of the ENGDA. The ENGDA is currently installed at the MoWR, GSE and few Water Bureaux, but operated independently. The USGS (through the HoA-TF) will upgrade the ENGDA in the second half of 2007. EGRAP will continue from there and broaden the ENGDA to serve not only as a database, but also an information centre to all stakeholders. An important characteristic of the EGIC is its joint ownership of the technical stakeholders (MoWR, GSE, Water Bureaux) and the open access to the information by both the public and private sector. The EGIC, will eventually be accommodated in the NGI.

The establishment of the NGI is an important element in EGRAP, as it will be the focal point for groundwater monitoring and management in the country. The NGI will be a new Institution in Ethiopia which gives the opportunity to design it on a thorough assessment of its scope and structure in relation to EWTEC, ESTA and the proposed EWRI. Exposure visits to countries where a NGI already exists will help to assess the different options and to have an exchange of views on important issues in the selection of its structure and on

the establishment phase. An important issue to be reviewed is whether the NGI should be linked to a surface water institute as to become a National Water resources Institute.

A position paper will be prepared during the kick-off phase for discussion in the kick-off workshop and for further decision making and approval by the GoE.

**Assessment and mapping studies**

The assessment studies will be carried out under the guidance of the PM/TA unit, in which the GSE as the responsible agency for hydrogeological mapping is fully represented. The studies itself can be implemented by different parties, depending on the financing agency:

- teams from the GSE, Regional Water Bureaux with assistance of the PM/TA Unit.
- contracts with the WWDSE's with consultant support
- consortia of national and international consultants under donor funding

The Quality control and specialist input will be provided by the PM/TA Unit.

The priority areas for groundwater assessment (Figure 5) will be updated during the kick-off phase and a first guideline will be prepared for the implementation of the studies, including a mix of indirect data (remote sensing, spatial data base) and field studies (geological mapping, geophysics, test drilling etc).

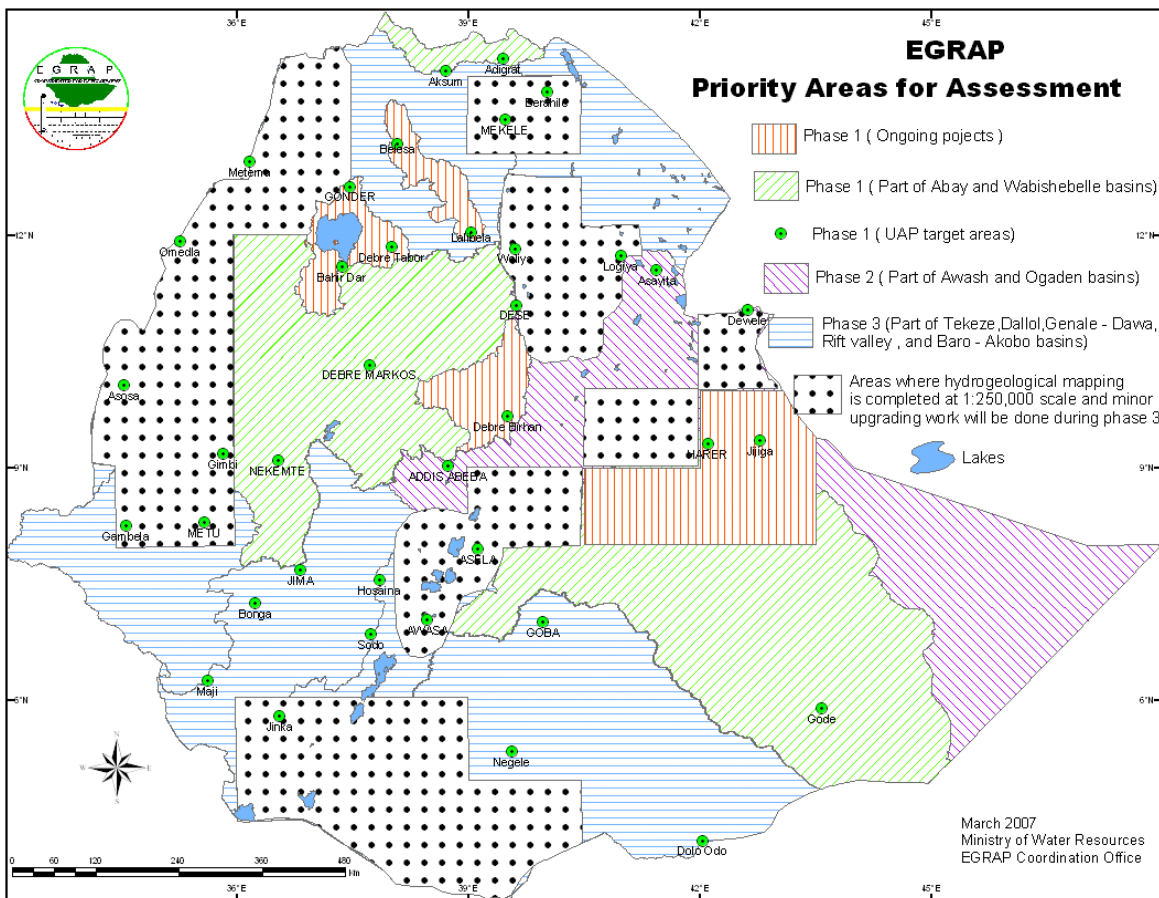


Figure 5. Priority areas for assessment

## 4. PROGRAM ORGANIZATION AND STAFFING

### 4.1 Program coordination partnership

EGRAP+ will involve the input of a large number of organizations both for both funding and for the implementation. To facilitate and coordinate these inputs and contributions, the MoWR, GSE, UNICEF, AAU, IAEA and VU/ Acacia Institute will establish a Coordination Partnership (table 2). The members of this core partnership represent the broad array of EGRAP+ partners, and will coordinate the (financial, physical and human resource) contributions. The task and duties of the partnership members will be elaborated in a MoU (Annex VII).

**Table 2. EGRAP+ coordination /partnership**

Agency	Representing /Coordinating	Contribution		
		Human resources	Physical	Financial
Ethiopian public and private sector MoWR/GSE Agencies		Yes	Yes	Yes
Addis Ababa University	Ethiopian Universities and Knowledge Institutes	Yes	Yes	No
VU/ Acacia Institute /IAEA	International Universities and Education Institutes such as IHE, IGRAC and other international TA agencies	Yes	No	Yes
UNICEF	Donor Agencies and International NGO's	No	No	Yes

The **Ministry of Water Resources** and **Ministry of Mines and Energy** (through the Geological Survey of Ethiopia) will take the ownership and leadership for the EGRAP on behalf of the GoE

The **Vrije Universiteit** through the **Faculty of Earth and Life Sciences (FALW)** will coordinate and support the EGRAP+ related research programs of the Ethiopian Universities.

The **Acacia Institute** is a self-supporting foundation under the Vrije Universiteit Amsterdam (Faculty of Earth and Life Sciences) and will provide support to project and process management during the preparation and implementation of the EGRAP+

The **IAEA** has supported groundwater assessment as a founding and initiating partner of EGRAP in 2000 and through successive groundwater assessment activities from 2000 to 2006. The IAEA has given its commitment to support further groundwater assessment in the future.