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SUPPORT TO THE DEVELOPMENT OF WATER INFORMATION AND KNOWLEDGE MANAGEMENT SYSTEMS IN ETHIOPIA

APPRAISAL REPORT

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AFRICAN WATER FACILITY

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LIST OF ANNEXES

Ethiopia Water Information and Knowledge Management Project: Logical Framework Analysis

HIERARCHY of OBJECTIVES,	EXPECTED RESULTS	REACH BENEFICIARIES	PERFORMANCE INDICATORS, SOURCE, PERIODICITY	INDICATIVE TARGETS and TIMEFRAME	RISKS > MITIGATION STRATEGIES
GOAL : To contribute to economic growth, reduce poverty, and enhance the livelihood of the population through improved planning and management of water resources.	**IMPACT:** • Improved water resources management • Improved water sector services • Increased food security from agricultural water use	• The population at large • Water service providers	**Indicators**: %of population served with WSS % increase in agricultural water use **Source**: National statistics and reports **Periodicity**: Annual review	Achieving the National MDG target for 2008	• Commitment of all stakeholders to the project objectives
OBJECTIVES: • To start the establishment of a national water information and knowledge management system • Support to improve systems for generation, processing, analyzing, storing and disseminating datasets and information in the water sector • To improve water knowledge through the promotion of applied research in the water sector	**OUTCOMES:** • Improved decision making on water issues, enhanced planning and design of water sector activities through the availability of reliable and timely data as well as planning and design models; • Effective implementation of Ethiopian IWRM Plan, through a better coordinated information and knowledge environment.	• The population at large • Water service providers • Water related institutions in the country • Water professionals • Institutions of higher learning • Donors and financing agencies • International organizations	**Indicators**: Water Information system established and operational With % increase in the use of improved data and information system **Source**: National statistics and water sector reports on No. of quality water projects approved Website and water database efficiency reports genrated **Periodicity**: Annual review	Achieving the National MDG target for 2007	National Planning Ministry, water sector firms and agencies, Planners and Engineers utilise data and information generated

ACTIVITIES • Support to the establishment of national Water Information System • Strengthen Water Quality Data Management • Reinforce Water Research and Knowledge Managements • Support to Establish Groundwater Database • Upgrade and expand ICT Infrastructure	**OUTPUTS** • The establishment of national system of water information management started • Water quality monitoring and database strengthened • Groundwater database established • Ministry of Water Resources MIS system established • Water sector research documents archived catalogued and available to users • Essential scientific models developed for planning and design of water schemes • LAN and WAN services for the MoWR procured and installed		**Indicators**: • Establishment of national information system started; • Water quality monitoring and improved database established • Library of research material established **Source**: Project reports Periodicity: quarterly	End of 2007	Government provides its financial , human resources and logistical requirements in a timely manner

EXECUTIVE SUMMARY

1 Though endowed with large amounts of water resources, albeit varying in spatial and temporal distribution, Ethiopia faces recurring floods and drought which negatively impacts on food security. Water resources utilisation is extremely low, with access to water supply only 50%, access to sanitation is very low and only a tiny fraction of the irrigation and hydroelectric potential have been exploited. Water scarcity is in general envisaged to be on the rise and thus expected to be a major limiting factor to Ethiopia's development in the 21st century.

2 These water challenges have negatively impacted the livelihoods, social and economic wellbeing of the country's population. Meeting the food security needs of the population, in particular, the poor and the vulnerable is a central development goal in Ethiopia. Other challenges that need to be met include the management of municipal, agricultural and industrial water needs and wastes, implementation of the National Water Policy, attaining the MDGs, in particular the water and sanitation targets and the need to implement Integrated Water Resources Management (IWRM) principles in all water related developmental projects.

3 In addressing the above-mentioned challenges and related prob1ems in the water sector, the Ministry of Water Resources has formulated policies, strategies and regulations, which have paved the way to integrated water resource management. The Water Sector Development Programme, prepared by the Ministry in 2002 identifies lack of data, information and knowledge as the main constraint in the water resource planning and development in the country.

4 The proposed project is aimed at addressing the water data and information needs of the country to facilitate the planning, implementation, monitoring, sustainable water resources management and development. The project will support Ethiopia to kick-start the establishment of a system of national information management, strengthen existing water quantity and quality data management, reinforce applied research and improve water information ICT infrastructure. The scope of the project was discussed and agreed at a multi-stakeholders forum to which the AWF participated in Addis Ababa in May 2006. The Ethiopian Minister of Water Resources subsequently submitted a formal request to the AWF to support the project

5 Based upon a critical assessment of the relevance, effectiveness, and sustainability of the Project, as well as the credibility and capacity of the Recipient, it is recommended that the AWF approves the support to the Ministry of Water Resources in Ethiopia to implement the proposed Water Information and Knowledge Systems Project in the amount not exceeding Euro 500,000.

1 BACKGROUND

1.1 Project Rationale and Origin

1.1.1 Ethiopia, with a total area of 1.13 million square kilometres, has an estimated total population of 76 million (2005). The rate of population growth is about 3% per annum. Infant mortality and morbidity rates are high with the under 5 years mortality rate 216 per 1000 live births. The estimated mortality rate due to diarrhoea diseases among children accounts 46%. of all hospital cases.

1.1.2 Ethiopia is one of the sub-Saharan African countries with about 46% of the population living below poverty line and earning less than 1 USD/day. Given the significant proportion of arable land and its huge population size, the potential for growth is believed to be immense. However, the current agricultural sector performance is low and based on rain fed and low technology. Agriculture, which accounts for 50% of GDP and provides 85% of the population livelihood, does not meet the food requirement of the country.

1.1.3 Ethiopia has finalized the preparation of its water sector legal and environmental framework for all interventions by preparing the macro framework of sustainable development and poverty reduction strategy, which incorporate the water sector as one vital area to address poverty reduction.

1.1.4 On the average only 50% of the total population of the country has access to potable water out of which the rural and urban coverages are 25 and 85 percents respectively. The very low water supply and sanitation coverage in the country implies that an enormous amount of investment is required to raise the coverage level. In addition to financial constraints for the development of water supply and sanitation services, lack of adequate capacities has compounded the problems in the implementation of development projects.

1.1.5 Ethiopia has a huge irrigation potential, which is estimated at 3.73 million hectares (ha). However, only 186,500 ha (4.3%) is developed and accounts for about 3% of total food production, which includes 86,500 ha of small-scale irrigation and about 100,000 ha under medium and large-scale irrigation. Hydropower potential is estimated to be about 650 billion KWh/yr but only about 2.5% of this potential has been developed

1.1.5 Excessive fluoride is a very serious water quality problem in the Ethiopian Rift Valley, where a significant proportion of the country's population lives, and consequently efforts at its removal will thus contribute a great deal to public health.

1.1.6 Land degradation, deforestation and water quality fouling are serious consequences primarily due to adverse human activities. The undertaking of water quality and sediment transport analysis and the development of integrated watershed management models would undoubtedly contributes to enhancing natural resource conservation and environmental protection.

1.1.7 Water shortages affect the population residing in the arid and semi-arid regions of the country. Studies related to soil conservation and water-harvesting techniques will contribute to poverty alleviation and food security in these regions.

1.1.8 Rain-fed agriculture and existing moisture conservation methods alone cannot lead to national food sufficiency, due to continuous rise in population and variable rainfall patterns.

A comparative study on different irrigation methods will contribute to the country's sustainable development and poverty reduction strategy.

1.1.9 Groundwater resources monitoring, investigation, management and protection through the establishment of a monitoring and a database system is one of the essential elements of the Ethiopian water resources policy and strategy documents. Lack of Groundwater resources database makes the effort of groundwater investigation, utilisation, management and monitoring fragmented and unreliable. The proposed Ethiopian Ground Water Assessment Project (EGRAP) is aimed at comprehensively addressing this challenge. However, this project can only be undertaken if a groundwater resources database is established. This database does not only serve as a basis for EGRAP but also as preliminary baseline information for the rational management of groundwater resources.

1.1.10 In addition to other factors, development of basic services is compounded by lack of sufficient financial resources as well as by the lack of adequate capacity to implement projects. In this regard, a concerted approach involving government, donors, civil society and NGO's would greatly contribute to rationalizing concrete support to the development of water resources in Ethiopia**.**

1.1.11 The African Water Facility initiated a diagnostic study of the existing situation with respect to water information and knowledge management in Ethiopia. The consultant report was validated at a national workshop in May 2006 which led to the identification of the current proposed project aimed at addressing the critical challenges in establishing a robust water information and knowledge management system in Ethiopia.

1.1.12 The Ethiopia Water Information and Knowledge Systems project is a move to systematise and rationalise the management of various aspects of the water information chain by tackling the urgent requirements in that regard. Components have been developed to address the specific critical gaps in the subject area of water information and to kick-start the establishment of an information system through a scoping study and reinforcing existing water information system. The project was submitted to the African Water Facility for financing and an appraisal mission was conducted in May 2006.

1.2 Sector Priorities

1.2.1 The Government of Ethiopia has prepared the Ethiopian Water Resource Management Policy, Ethiopian Water Resource Strategy, Water Sector Development Program and National Water Supply and Sanitation Master Plan in a coherent and comprehensive manner. The implementation of these IWRM principles remains a challenge and is hampered by inadequate human resource capacity and resource constraints. This is exacerbated by lack of reliable water sector data, information and knowledge.

1.2.2 Water is well prioritized in the country's PRSP document as well as in the recently approved national development framework document (PASDEP).

1.3 Problem definition

1.3.1 Data and information is vital for any planning and decision making in the water sector. However, in Ethiopia essential data and information necessary for rational planning is woefully inadequate, inaccurate and often not available. This situation is compounded by low

level of Information, Communication and Telecommunication (ICT) infrastructure to store, analyse and disseminate data and information coupled with poor maintenance, lack of skilled professionals and poor user know-how of this equipment.

1.3.2 There has been little or minimal research in the water sector, consequently there are no state of the art practices adapted to the Ethiopian context such as well researched scientific based models and parameters to support sound engineering design and development planning. Information and knowledge required for water related risk management is minimal. Lack of groundwater resources database makes the efforts at optimal exploitation of groundwater difficult to achieve. Groundwater assessment and mapping has not been undertaken in Ethiopia and is the main objective of the proposed project EGRAP, the implementation of which can be enhanced through the establishment of groundwater resources database.

1.3.3 Inadequate water data and information coupled with the ad hoc manner the data and information is managed, necessitates the rationalisation and systematisation of this vital resource in the country.

1.4 Beneficiaries and Stakeholders

1.4.1 The ultimate primary beneficiaries of the Project will be the people of Ethiopia who will be benefiting from better water management, properly planned and designed capital investments, and improved performance of water related sectors through the availability of relevant information and knowledge and the means to manage them.

1.4.2 The immediate beneficiaries are the Departments of the Ministry of Water Resources, the Regional water Bureaus, institutions of higher learning, other water related ministries and professionals working in the sector. In addition, the project will also benefit directly and indirectly other national stakeholders, the private sector, NGOs, CBOs, national and international organizations and funding agencies.

2 THE PROJECT

2.1 Purpose

The purpose of the Ethiopia Water Information and Knowledge Management Project include the following:

i. To kick-start the establishment of a comprehensive national system of water information management that links all relevant institutions and stakeholders to improve coordination among them to make information readily available to users;
ii. To start creating a suitable environment to generate, store and archive important datasets on the water sector and ensure all users including the general public gets consistent and high quality water sector information;
iii. To improve and extend water data and information ICT facilities of the Ministry of Water Resources and allied organizations as well as maintain and upgrade the existing database, the ENRAEMED Meta-database software;
iv. To promote applied research of critical areas in the water sector and improve the archiving of water sector information and research products;

v. To improve data generation, processing and analysis in the areas of water quantity, quality, sediment transport, and groundwater resources;
vi. To build capacity of staff for water data and information management through training;
vii. To improve coordination of water sector information generation and management.

2.2 Impacts

The project will contribute to poverty reduction through more efficient water resources planning, management and development with the availability of reliable data and information. The project is consistent with the country's MDG road map, food security programme and provision of water and sanitation services through enhancing the availability of essential data and information for planning and implementing development programmes.

2.3 Outcomes

The outcomes of the project relate to increased availability of reliable data and information to ensure that water resources management and planning decisions are made based on up-to-date, reliable and comprehensive information and knowledge. The main outcomes are the following:

- Improved planning and design of water sector activities through the availability of water database, planning and design models;
- Effective implementation of Ethiopian IWRM Plan, through a better coordinated information and knowledge environment ;

2.4 Outputs

The project outputs include but not limited to the following:

General

- Scoping study report on the needs and perspectives for establishing a robust water information system in Ethiopia;
- National consensus and agreement on a comprehensive plan to establish a national structure of water data and information system with resource requirements, roles and responsibilities clearly delineated among relevant institutions and stakeholders;

Ministry of Water Resources ICT Strengthened

- Accurate information on the requirements of ICT infrastructure for the electronic storage and analysis of data, transmission and diffusion of water information and knowledge;
- Upgraded LAN (Local Area Network) and WAN (Wide Area Network) servers procured and installed;
- WAN Server configuration conducted in 10 regional administrations and 10 regional hydrological offices;
- The leased line upgraded to at least 512 kb capacity;

- New and upgraded ICT for the library and documentation centre use and at least 10 computers for in-house training procured and installed;
- ICT Networking training conducted for regional technical staff;
- Existing ENRAEMED software upgraded (bug fixing devises installed, maintenance of system effected);
- After sales service agreement on ICT infrastructure signed and functional.

Data and Information Generation

- Existing water quantity and quality data from previous work on policy and water resources master plan development collected and entered in national database system;
- National hydrological network for monitoring surface water resources strengthened through extending to critical sites not currently serviced in the national network;
- Sediment transport monitoring strengthened through the provision of new and rehabilitated monitoring equipment;
- Sediment transport and water quality databases for both surface and groundwater strengthened through upgrading existing software;
- Groundwater database established to serve as a basis for storing and monitoring groundwater resources;
- Water Sector MIS software developed and functional.

Research

- The mechanism for bridging the gap between water research and development established;
- Available water sector research documents collected from relevant institutions and properly archived and catalogued;
- Priority applied research conducted and results disseminated in a multi-stakeholder forum;
- Key scientific based models developed for water sector development planning and design of hydraulic infrastructure;

Capacity Building

- Strengthened institutional and human capacity to carry out data generation analysis and management;
- Capacity building in the field of water quality, sediment transport monitoring and ground water monitoring and analysis;
- Increased capacity of staff to utilise ICT in their day-to-day work and to access information stored centrally.

2.5 Activities

2.5.1 The proposed Water Information and Knowledge Project is aimed at improving resource management, water supply services and increasing food security through the rational use of water for agriculture as a result of improvement in water data and information generation and management as well as targeted applied research. The project activities can be grouped into the following five components.

- Component 1: Support to the establishment of National Water Information System;
- Component 2: Strengthen Water Quality Data Generation and Management;

- Component 3: Reinforce Water Research and Knowledge Management;
- Component 4: Support the Establishment of Groundwater Database;
- Component 5: Upgrade and Expand ICT Infrastructure Capacity.

The summary description of each of the components is provided below

Component 1: Support to the Establishment of a National Water Information System

2.5.2 This component involves undertaking a needs assessment study with the view to kick-start the establishment of a comprehensive national water information system that will strengthen the generation, storage, analysis and diffusion of water information and knowledge. The specific activities include the following:

i. Undertake a detailed needs assessment for the establishment of an effective system for the management and diffusion of national water information and knowledge including the architecture of the system, institutional arrangements, ICT requirements, human resource capacity aimed at strengthening the country's capability to manage a robust comprehensive water information system;
ii. Identify all water information and knowledge institutions and stakeholders, their roles and perspectives for a national water information system;
iii. Identify donors and their programmes that support water information development in Ethiopia;
iv. Define a country-wide structure for establishing and operating a national water information and knowledge management system;
v. Identify institutional roles and responsibilities for operating a national water sector information and knowledge management system;
vi. Define mechanisms for coordination, feedback and continuous improvement of the national water information system;
vii. Organise a consensus building forum of relevant stakeholders to adopt and support the establishment of national water information system;
viii. Define an action plan for implementing the establishment of a national water information system.

It is expected that even though the needs assessment study would be conducted under the proposed AWF financing, its implementation will involve funding from other donors and stakeholders operating in the sector.

Component 2: Strengthen Water Quality Data Generation and Management

2.5.3 This component is aimed at rehabilitation and upgrading existing system for the generation, storage analysis and diffusion of water quality data operated by the Ministry of Water Resources. The scope of activities of this component comprises the following:

i. Conduct an assessment of water quality data generation storage and management with the view to strengthening the system for collecting water data from both surface and groundwater from the representative sites;
ii. Determine and install the most appropriate system of water quality monitoring and data transfer technology taking into account availability of laboratories and human resource capacity across the country;

iii. Upgrade existing water quality database system to incorporates analysis and interpretation of existing, field and laboratory data by using appropriate methods and software,
iv. Improve or install where applicable appropriate water quality and sediment monitoring stations to optimise data availability;
v. Develop capacity of staff through training and provide the required equipment for water quality and sediment transport monitoring and analysis,
vi. Generate reliable water quality data and information for planning, design, management and resource monitoring purposes.

Component 3: Reinforce Water Research and Knowledge Management

2.5.4 Whereas data can be generated from the field through measurements using instruments or by observation, information on the other hand, needs to be processed and knowledge has to be researched and packaged appropriately. The support for research under this project is aimed at reviewing existing research material, collecting and archiving existing research results. The project will also seek to identify critical research needs of the water sector, undertake priority research and disseminate this information. The component will also establish the linkages between research and development practice in order to bridge the gap between research and development.

2.5.5 The topics for priority research will be selected at a stakeholder's forum between researchers, decision makers and practitioners. The preliminary list of 10 proposed research topics detailed in Annex 2 will be validated and amended at the forum. The specific activities include the following:

i. Undertake a review of existing water sector research material;
ii. Set up an archiving cataloguing and library system for storing existing and future research material;
iii. Organise a stakeholder's forum to validate and prioritise critical water research topics;
iv. Undertake research of prioritised research topics.
v. Organise a workshop to bridge the gap between research and practice and present results of priority research findings.

2.5.6 The Knowledge Management aspects of this component will comprise the following;

- Collection and documentation of existing and current studies and research documents from stakeholders and actors in the sector;
- The formulation of the overall Knowledge Management (KM) system of the Ministry of Water Resources and pilot it at the Research Department.

Component 3: Support to he Establishment a Groundwater Database

2.5.7 The component will provide support to start the establishment of groundwater database system and comprises the following activities:

- Preparation of an agreed data collection format, collection and updating existing data and validate at a stakeholders meeting,
- Finalization of the ENGIDA database software interface and loading on to the website of MoWR, which is under construction and other websites of stakeholder organisations,
- Creating a system in the ENGIDA software to allow authorised updating and loading of new data, etc.

Component 4: Upgrade and Expand ICT Infrastructure Capacity

2.5.8 The storage, processing, retrieval of water data and information utilizes ICT infrastructure. The existing infrastructure of the Ministry of Water Resources will be assessed with the view to strengthening in order to support a more robust water information system management. A rapid assessment of areas of weakness that require upgrading, rehabilitation and capacity expansion include following:

- Upgrade/Replace LAN Server to a higher capacity. (The capacity of the LAN server at present is only 80 GB and is lower than the current data storage requirements);
- Extend WAN Connection to the eight remaining regions without this service and configure all regional WAN connections.
- Undertake training on the use of the WAN and networking system at the central and regional offices,
- Upgrade the capacity of the leased line from 128 KB to at least 512 KB. (There are already more than 130 connections operational and even though users run a shift system it is still too slow and frustrating);
- Create pool system computer access in the Library and Documentation Service of the Ministry of Water Resources encourage internal and external users of the Library and Documentation Service,
- Improve ICT facility utilization of the organization through a systems engineering study to determine the existing level of utilization and developing a programme for improvement;
- Support users through training in areas of applications, use of shared resources and software tools to facilitate core business requirements.
- Undertake software Certification training and ensure sustenance of the utilization of ICT infrastructure in the organization;
- Contract an after sales service agreement with equipment providers for at least three years.

2.5.9 In addition to upgrading and providing new ICT infrastructure, the existing water data software, the ENRAMED system will be upgraded. The ENRAMED Metadata software has been in use for the last 4 years in Ethiopia and now its use has been extended to many other African countries. The Ministry of Water Resources and representatives of UNEP, UNECA, and UN-Water/Africa underlined the need for upgrading of ENRAEMED and to make it bug-free and ISO standard compliant. Following this, a plan of action was prepared but funds were not available to implement the upgrade. The implementation of the ENRAMED action plan will be undertaken under this project.

2.6 Risks and Assumptions

2.6.1 The main risk for this project is institutional and pertains to the capacity of the Ministry of Water Resources, the Executing Agency, to implement a highly technical project. The other institutional risk element relates to possible lack of cooperation by other relevant institutions.

2.6.2 The human resource capacity risk is mitigated by training in the use of new equipment and ICT software that has been installed. The overall strategy in developing the water information system is to building on the existing systems by upgrading, extending or rehabilitating activities commensurate with human resource capacity. The development and operation of a comprehensive water information system will be developed incrementally.

2.6.3 The risk of lack of cooperation and commitment from other institutions are mitigated through the setting up of a national Consultative Committee composed of representatives of specialist institutions dealing with various aspects of water information to provide a broad multi-stakeholder forum to engender ownership among all the relevant institutions. The Consultative Committee will also provide a broad knowledge base for decision making. Technical assistance could also be procured from members of the committee from time to time to deal with highly technical aspects.

2.7 Costs and Financing

2.7.1 The final cost of the project will only be known after the detailed needs assessment has been conducted, in particular ICT equipment requirements. The cost of research and knowledge management aspects will be finalised after the stakeholder workshop where the topics to be researched will be selected and agreed by the stakeholders' forum. These needs assessment notwithstanding, preliminary cost estimates have been developed for all components based on existing knowledge of the requirements of the project. The overall estimated budget for the AWF funded Project in shown in the table below. The AWF is to contribute a total of Euro 500,000 to finance foreign currency costs. Annex 2 provides details of preliminary cost estimates for each component.

Table 2.1 Costs Estimate for the AFW Grant in 1000 Euro

Component	**Activities**	**Local Currency (Equiv in Euro)**	**Foreign currency (Euro)**	**Total (Euro)**
1	Support to establishment of National Water Information System		50	50
2	Strengthen Water Quality Data Generation and Management	37	103	140
3	Reinforce Water Research and Knowledge Management		218	218
4	Support to Establish Groundwater Database	72	100	172
5	Upgrade and Expand ICT Infrastructure Capacity		156	156
	Total	**109**	**627**	**736**
	AWF Contribution	0	500	500 (70%)

	Government of Ethiopia contribution	109	127	236 (30%)

2.7.2 The envisaged contribution from the Ethiopian Government includes the following:

- Euro 127,000 of Foreign currency costs representing 20%
- Euro 109,000 of Local currency costs representing 100%

2.7.3 A number of donors, including UNICEF, UNECA, World Bank Water and Sanitation Program (WSP) have given indications that they will support certain activities under the project or additional activities that emanate from this project.

3 PROJECT IMPLEMENTATION

3.1 The Recipient/Executing Agency

3.1.1 The Ministry of Water Resources of Ethiopia (MoWR) will be the Recipient of the grant funds from the AWF and be responsible for executing the project and managing the funds. The MoWR has rich experience in undertaking development projects financed by international financial institutions.

3.2 Implementation Arrangements

3.2.1 The Execution Agency, Ministry of Water Resources of Ethiopia will be responsible for meeting the obligations laid down in the project as well as fulfillment of conditions precedent to disbursement. A Project Consultative Committee (PCC) will be established from key stakeholder organisations to provide guidance and general policy direction to the project. The setting-up of the PCC will be a condition precedent to first disbursement. Tentatively the representatives of the Project Consultative Committee will come from the following stakeholder institutions:

- Ministry of Water Resources;
- Ministry of Agriculture and Rural Development;
- Ethiopian Mapping Agency;
- National Meteorological Agency;
- Geological Survey of Ethiopia;
- Universities: (Addis Ababa University, Arba Minich University);
- Ethiopian Agricultural Research Agency;
- Central Statistics Agency;
- Environmental Protection Agency;
- Disaster Prevention and Preparedness Agency;
- Ethiopian Information and Communication Development Agency;
- Addis Ababa Water Supply and Sewerage Agency.

There will be donors and private sector representation on the Consultative Committee. The MoWR will assign a project coordinator from the Ministry, who will be responsible for the

overall execution, follow-up and implementation. The Project Coordinator will serve as secretary to the PCC, as well as overall responsibility for managing the project.

3.2.1 Component coordinators will be appointed to manage the individual components of the projects. A Project Management Team will also be formed composed of the Project Coordinator as a chair and component coordinators as members. The Project Coordinator will also plan, coordinate and monitor the implementation of the various components. In addition to nominated coordinators, experts who have skills related to the project activity will be seconded to give inputs as and when their services are required in order to minimize costs and ensure optimal contribution by the Executing Agency to the project. The Ministry through its relevant Departments will make available logistical support including local transport and office space.

3.3 Implementation Schedule

The overall estimated duration of the Project is about 18 months. The schedule for each of the components is shown in the Annex 3.

3.4 Procurement and Execution

3.6.1 All procurement of goods, and acquisition of consulting services financed by the AWF will be in accordance with the Bank *Rules of Procedure for Procurement of Goods and Works*, or as appropriate, *Rules of Procedure for the Use of Consultants*, using the relevant Bank Standard Bidding Documents, as enshrined in the AWF Operational Procedures (November 2005). Adherence to Bank procedures will be stipulated in the Project Implementation Manual (PIM), which will be based on the Bank's *Guidelines for Procurement under Community-Based Investment Projects* (CBIP). Procurement arrangements are summarized in the Table 2 below.

Table 2: Summary Procurement Thresholds

Category	NCB	Short List	Other
Goods	> Euro 100,000		National Shopping: < Euro 100,000
Services		Local: Between Euro 50,000 and 100,000; International > Euro 100,000	Direct Negotiations: < Euro 50,000
Miscellaneous			Direct Purchase

Goods

3.6.2 Goods and ancillary items required for water quality monitoring, hydrological hydrogeological measurements, computers and related facilities for improving ICT infrastructure [Euro 250,000, in aggregate] will be procured through National Shopping. This is because the goods to be procured are readily available off-the-shelf items or standard specification commodities, which can be purchased locally.

Consulting Services and Training

3.6.3 Consulting services relating to the conduct of initial needs assessment of information system requirements, research into various topics etc. [Euro 150,000 in aggregate] will be procured on the basis of shortlists. The selection procedure will be based on the comparability of technical proposals and selection of the lowest financial offer. For contracts with value below Euro 20,000, including organisation of workshops and seminars and training, Direct Negotiation procedures will be applied, using the services of specialized national institutions, etc. This is because such service providers have adequate knowledge of the specialised subject matter of water data and information systems and ICT i.e. limited sources of expertise.

3.6.4 Services for continuous project auditing will be procured through a shortlist. The selection procedure will be based on the comparability of technical proposals and selection of the lowest financial offer. For contracts of values below Euro 5,000, Direct Negotiation procedures will apply.

National Procedures and Regulations

3.6.5 The national procurement laws and regulations have been reviewed and determined to be acceptable.

Executing Agency

3.6.6 The Ministry of Water Resources of Ethiopia will be the Executing Agency for the project. The Ministry has the capacity, experience, expertise and track record to manage procurement.

Review Procedures

3.6.7 Given the numerous contracts of small value all agreements below Euro 100,000 will be subject to Post Review procedures. Procurement documents, including solicitations of price quotations, evaluation sheets and contract awards will be kept at the MoWR for periodic review by Bank supervision missions and the project Auditor.

3.5 Disbursement Arrangements

The funds will be channelled through the Ministry of Water Resources, which will open a Special Account denominated in foreign currency in a Bank acceptable to the AfDB. The operation of the account will be the sole responsibility of the Ministry of Water Resources. Disbursements of funds will be made on revolving method basis whereby funds will be deposited in the special account, which will be replenished quarterly periodically based on the reports on previous expenditures and work plan for the following quarter.

3.6 Accounting and Audit Arrangements

3.6.1 The Grant Agreement will include the specific accounting arrangements and requirements for the Recipient opening of a Special Account with a Bank acceptable to AfDB from which all eligible payments will be made. The account should allow instalments in Euro and Birr on an interchangeable basis.

3.6.2 In the interest of fast tracking the implementation of the Project actions, the AWF will recruit and retain an auditor to perform ex post evaluation or supporting documents review and audit the project. The AWF will require that a statement of expenditure and supporting documents review be performed and certified by the independent auditor at predetermined intervals to ensure that funds have been utilized in line with the grant agreement. The costs of such audit shall be at the charged of the AWF and not part of this grant.

3.7 Monitoring Evaluation and Reporting Arrangement

3.7.1 The plan for monitoring of this Project is to check if the anticipated activities have taken place, if the outputs have been delivered with the required quality and if the expenditures are in keeping with the budget. The LFA matrix included in this report shall serve as a basis for the result based assessment of the outcomes of the Project during implementation supervision and after completion. AWF's oversight and supervision of the Project interventions will include regular correspondence with the Recipient, as well as review of the Recipient's Quarterly Progress Reports (QPR). AWF will consider at any time the need for undertaking field supervision missions. A Project Completion Report on the activities and the financial situation shall be produced after completion of the project.

4 EFFECTIVENESS, EFFICIENCY AND SUSTAINABILITY

4.0.1 The creation of a Project Consultative Committee (PCC) will enable effective monitoring, supervision, and provide the requisite policy direction to ensure ownership of all stakeholders who will be involved in the project execution.

4.0.2 The Project Management Team arrangement will ensure high level professional inputs and provides collective decision making at the implementation level. The institutional structure for project execution will ensure that activities are undertaken by concerned Departments and will internalize the component for subsequent operation after project completion.

4.0.3 The scoping study to be undertaken at the beginning of the project would identify other donors operating in the area of water information and propose areas of cooperation and synergy in a bid to complement the AWF support. This will ensure continuity of support to the water information and knowledge system started in order to sustain the initial gains.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 Ethiopia lacks a comprehensive system of water data and information collection, storage, analysis and dissemination. Research into critical aspects of water resources development is ad hoc and results are not shared or properly archived. This state of affairs is adversely affecting overall national planning and development efforts in the water sector. It is also making it difficult to implement the IWRM principles the country has adopted. Consequently the establishment of a water information and knowledge management system that has national consensus will contribute to national development planning and management of Ethiopia's water resources.

5.1.2 Improving ICT infrastructure as well as upgrading the existing ENRAEMED meta-database, the heart of the national information and knowledge management system will enable Ethiopia to share water data and information among national stakeholders as well as with other countries. This activity is high priority and considered by various partners as a strategic issue of the water sector.

5.1.3 The project would have a multiplier effects by laying the foundation for future development of various aspects of water information with support by other donors and partners.

5.1.4 The realisation of the project will undoubtedly impact positively on the implementation of the overall IWRM Plan for Ethiopia.

5.2 Recommendations and Conditions

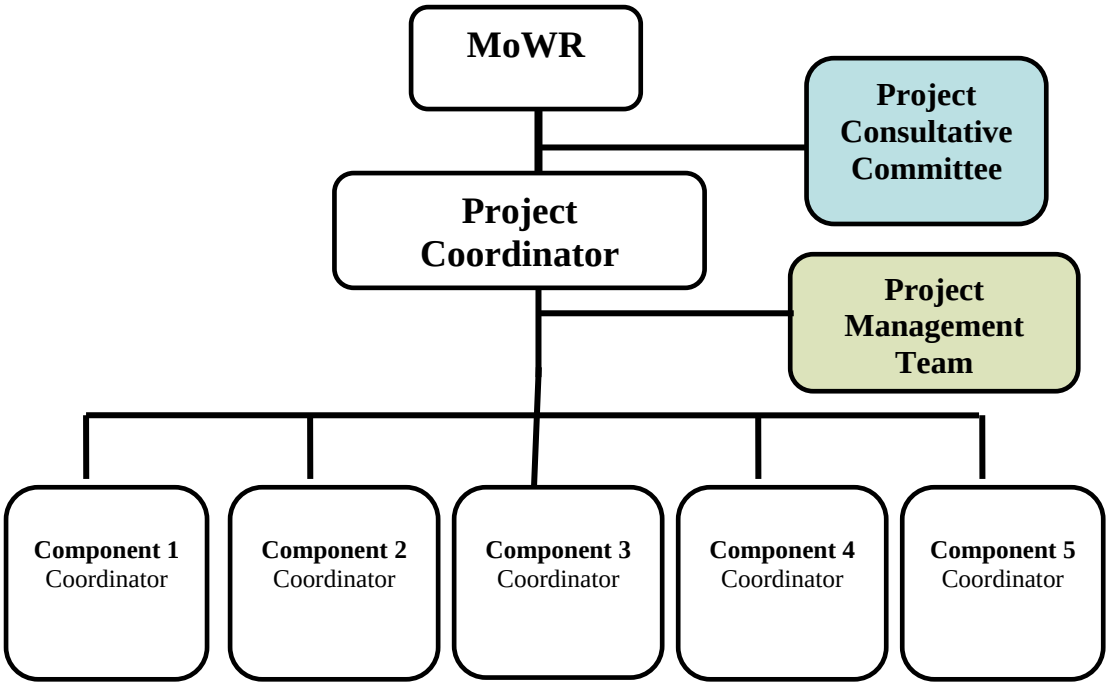
5.2.1 In view of the many benefits to Ethiopia from embarking on the proposed water information project, it is recommended that the African Water Facility approves a grant not exceeding EURO 500,000 to the Ministry of Water Resources of Ethiopia to execute the Ethiopia Water Information and Knowledge Management Project.

Conditions Precedent to First Disbursement of the Grant

5.2.2 Obligations of the AWF to make the first disbursement of the Grant shall be conditional upon the Ethiopian Ministry of Water Resources establishing the multi-stakeholder Project Consultative Committee and appointing a Project Coordinator.

ANNEX 1

PROJECT EXECUTION ORGANOGRAM



Project Organizational Structure

ANNEX 2

Preliminary Cost Estimates and Financing by Component

Component 1: Support the Establishment of a National Water Information System Budget in EUROS

No.	Description	AWF Contribution
1	Needs assessment study on national water information system, to define overall architecture, institutional roles and perspectives etc	30,000
2	Organization of consensus Building Workshop on the structure of national Water information system	20.00
Total		**50.00**

Component 2: Strengthen Water Quality Data Generation and Management

Total cost items includes studies, training and equipment. The total estimated cost for this component is EURO 140,209.00

Detailed Component Costs Estimates

No	Activities Description	Total Cost Required			AWF	Government Contribution
		Foreign Cost (Birr)	Local Cost (Birr)	Total Cost (EURO)	(EURO)	(EURO)
1	**Cost of needs assessment for strengthening water quality monitoring**	0	349040	34904	0	34904
2	**Cost for Installation of new, upgrading Water Quality Stations**	0	20000	2000	2000	0
3	**Cost for procurement**					
3.1	Procurement of water quality equipment	795000	0	79500	79500	0
3.2	Procurement of office equipment and computers	0	99800	9980	9980	0
4	**Local and foreign training**	100000	15000	11500	11500	0
5	**Operation and maintenance of vehicles**	0	23250	2325	0	2325
	Total	**895000**	**507090**	**140209**	**102980**	**37229**

Envisaged financing arrangement: –The total component cost is EURO 140,209.00 out of this Government contribution is EURO 37,229.00 and AWF contribution is EURO 102,980.00.

Component 3: Reinforce Water Research and Knowledge Management

3.1: Subcomponent on Research

Sr. No.	Research proposals	Cost (Euro)
1	Integrated Research in Rural Water Supply development	
2	Recycling Option of Textile Industry Wastewater and Useful Chemicals Using Membrane Separation Technology	
3	Studies on the Quality of Ambo Regional Water Resources	
4	Estimation of Groundwater Recharge in the Lake Alemaya Basin	
5	Monitoring of Sub-surface Water Quality in Gamo Gofa Zone, South Omo, and Modeling with M3 Supplemented with GIS	
6	Evaluation of In-field Water Harvesting Technique for Crop Production in the Semi-arid Areas of Eastern Ethiopia	
7	Removal of Fluoride Using Iron oxide Coated Sands	
8	GIS Based Water Balance Model for Lake Tana	
9	An Integrated Watershed Management: Conservation of Water for Sustainable Use	
10	Comparative Performance of Irrigation in Ethiopia: Case Study on Godino and Markos Irrigation Schemes	
	Total Envelope for Research (Covering coordination activities including monitoring & evaluation, publication, preparation of workshops/seminars, and contingency)	**127,433**

3.2: Subcomponent on Knowledge Managements

No.	Cost category	Grant in '000 Euro
1	Phase 1:Collection and documentation of studies and research outputs	5.400
2	Phase 2: • Consultancy service • Organizing Knowledge Management (KM) System (Procurement of materials, promotion service etc.) • Training	 20.00 60.00 5.00
	Total	**90.400**

Component 4: Support to the Establishment of a Groundwater Database

I/No.	Activities	Cost in '000 Euros
1	Selection of important hydro geological and water quality parameters through national consensus	1.00
2	Collection and transfer of existing data to a central storage	10.00
3	Updating of existing data by incorporating possible missing parameters such as GPS position, safe yield etc.	40.00
4	Finalize the ENGIDA database soft ware interface and load on the website of MoWR under construction and other websites of stakeholder organisations,	5.00
5	Create linkage between the websites	5.00
6	Create a system in the ENGIDA soft ware that allows authorised updating and loading of new data.	3.00
7	Prepare a manual of the database	2.00
8	Procurement of computers and accessories	14.00
9	Procurement of portable water quality kits for Groundwater Department of the MoWR	20.00
	Total	**100.00**

A total of 100,000 Euro is required from the African Water Facility.

Contribution of the Ethiopian Government amounts to Euro 72,000 as shown in table below:

I/No.	activities	Cost in '000 Euros
1	Office rent for one year	6,000
2	National counterpart staff	24,000
3	Regional counterpart staff	27,000
4	Vehicle running costs for national office	6,000
5	Vehicle running costs for Regional water bureaus	9,000
	Total	**72,000**

Component 5: Upgrade and Expand ICT Infrastructure Capacity

5.1 ICT Infrastructure

Description of activity	Total Cost (EURO)
I Upgrading/Replacing LAN Server + additional 1 for GIS and RS	**26,378.00**
1. Prepare tender documents and specification and launch procurement	**25,197.00**
4. Installation, configuration and testing	**0.00**
II. Extend WAN Connection	**23622.00**
1. WAN Server Hard disc upgrade	1574.80
2. Procurement of 10 computers for the regions	11811
3. Installation, configuration and testing in regions and hydrology units	2362
5. End user training for regions	3937

6. Upgrading the leased line from 128 kb to at least 256 kb	3937
III. Improving IT Facility Usage	9448
1. System Study	787
2. System/ Program Development	1575
3. System Implementation	7870
4. Computer System Maintenance	2362
5. **P**rocuring operating and maintenance items: drives, hard disc, ram etc,	39371
IV. Procuring Computer & accessories for staff training (10)	**11811**
1. Prepare Specification,	0
2. Evaluate and Procure	11811
3. Install and Configure	0
V. Employee IT trainer for about 5 months	**39371**
1. Logistics for training	**787**
VII. Specialist Training	**9448**
1. Upgrading the leased line to at least 512KB	**3937**
VIII. Procure 5 Computers for Library and Documentation centre (Pool)	**5905**
1. Installation and cabling of same	**787**
IX. Procuring IT based reference materials	**1574**
Total Estimated Cost	**97,638**

4.1 ENRAEMED Metadata base Maintenance and Upgrading

Two options for undertaking the assignment is proposed i.e. Use of local expertise and the use of foreign expertise (the local expertise is preferred)

Project Phase	
Phase 0 (Preparatory activities)	4.000
Phase 1 (Fix all incidents)	2.000
Phase 2 (ISO upgrade)	5.000
Phase 3 (Meet all priority 1 requests)	19.000
Other related activities	2.000
Fixed costs	28.000
Total:	**60.000**

ANNEX 3

IMPLEMENTATION SCHEDULES

Component 1: Establish national Water Information System

I/No.	Outputs of the project	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
1	Prepare TOR, tender and Procure consultant							
2	Conduct study and undertake consultation							
3	Organise consensus building workshop							
4	Implement recommendations							

Component 2: Strengthen Water Quality Data Management

Activities	Schedule of Activities (Month)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Processing procurement activities															
Selection of hydrological stations and existing reservoirs in the watershed area of the project															
Installation of new stations and upgrading and maintenance of existing stations for monitoring purpose															
Sediment data monitoring from rivers and reservoirs and water quality data collection of surface and ground water															
Analysis and data base management for sediment and water quality data.															
Report Preparation															

Component 2: Reinforce Research and Knowledge Managements
Sub-component: Knowledge Management

No.	Planned Activities	Month 1	Month 2	Month 3	Month 4	Month 5	Month 5
	1. Phase one						
1.1	Organise stakeholders forum and finalize discussions on selection of research topics						
1.2	Planning and Organizing Services						
1.3	Collect Studies and Research Documents (Document collection to processing and archiving)						
	2. Phase Two						
2.1	Formation of taskforce and preparation of TOR for comprehensive Knowledge Mgt Study by a consultant						
2.2	Announcement of Bid for KM study						
2.3	Screening, selection and award of contract to a consultant						
2.4	Receipt of draft document						
2.5	Procurement of proposed equipment, materials, promotion services (web-site, group-ware, demonstrations, workshops) etc.						
2.6	Training on handling and utilization of the established Knowledge Management system						

Component 3: Support to the Establishment of a Groundwater Database (Time in Quarters)

I/No.	Activity	Q 1	Q 2	Q 3	Q 4
1	Prepare data collection format (with at least 15 parameters that are important for ground water utilisation, management and monitoring)				
2	Collect existing data				
3	Update existing data (include GPS position and safe yield)				
4	Procure computers and accessories				
5	Load Website data base format by Authorised database experts				
6	Link loaded websites				
7	Data entry system in the automated database format				
8	Develop database manual and train users				

Component 4: Upgrading and Expanding ICT Infrastructure Capacity

Description of activity	Time Required in (Quarter)					
	1	2	3	4	5	6
I. Upgrading/Replacing LAN Server						
1. Prepare Specification, collect pro-forma, Evaluate and Procure (1 for central and 1 for GIS & RS)						
2. Installation, configuration and testing						
II. Extend WAN Connection						
1. WAN Server Hard disc Procurement						
2. WAN, installation, configuration and testing for 10 Regional						
Water Resources Development Burros and 10 regional hydrology offices						
3. End User training for Regions						
III. Improving IT Facility Usage (MoWR)						
1. System Study by outsourcing local expert						
2. System / Program Development						
3. System Implementation						
4. Computer System Maintenance (local expert)						
5. Procuring computer & accessories for staff training (10)						
5.1 Prepare specification						
5.3 Evaluate and Procure						
5.4 Installation, configuration and Testing						
6. Employee IT trainer						
7. Conduct User Training						
8. Conduct Specialist Training						
9. Procuring IT based reference materials						

ORGANIZATIONAL CHART (MoWR)