Project Proposal Submitted to the Center for Water Research and Arab Water Security (COFWS)

Project Title:

The Development of Arab Shared Water Resources Database (ASWDB)

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Subject: Proposal for the Development of Arab Shared Water Resources Database

STATEMENT OF CONFIDENTIALITY

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1. INTRODUCTION

1.1. BACKGROUND

In accordance with the Arab Water Ministerial Council in its first meeting on 29th -30th of June of 2009 in Algeria, the Center of Water Studies and Arab Water Security (COFWS) was mandated to develop and manage the Arab Shared Water Database ASWDB. Therefore, COFWS is responsible for the Management of the Database and responsible for the communication with all stakeholders, especially the Arab Water Ministerial Council, Arab Concerned Ministries, governments and non government organizations in the Arab World, throughout the development of this project. Also COFWS is responsible to monitor any developments in the shared water basins, in the international water laws and conventions, give technical and legal advice and support to any negotiations of shared water resources management, with the objective to sustainable management, and to achieve water security of Arab shared water resources. Also the center was mandated to develop capacities of the Arab water ministries cadre in the area of the international water law, negotiation skills, and to put in place qualified human resources to ensure the sustainability of the ASWDB project.

Based on the above mandate, COFWS held an expert group meeting in Damascus during the period of 12-13 January 2010. The UNU-INWEH & EMWIS has participated in the meeting as international expertise and expressed their readiness to partner with COWFS to develop the ASWDB. The UNU-INWEH & EMWIS in partnership with COWFS (Parties) has a considerable knowledge and experience in the fields of *development of tailor-made water related information and data management tools as well as modeling and design of water resources* databases. The Parties have long experience in the implementation of various types of development projects especially in the Knowledge Management field puts the Parties in the position to successfully handle all administrative aspects of project implementation, monitoring and backstopping. On the basis of a sound understanding of current development-related policy issues, and of good working relationships with local as well as international experts, the parties will be able to provide the project with valuable information and guidance throughout the entire project period.

1.2. WHAT THE PROPOSAL IS ABOUT

Most of the Arab countries are classified water scarce countries. Farther, about 65% of the water resources in the Arab countries are shared with neighboring countries. Many water resources basins both surface and ground water is also shared among more than one Arab country. This situation represents a major challenge in the sustainable management of the water resources and leaves the Arab countries venerable to conflicts especially with the increasing demand for water. Countries like Palestine, Syria, and Lebanon, are deprived from their fair share of water resources under occupation. It is

therefore important to establish dialogue among states that share their water resources in order to reach fair agreements to share the water resources based on international laws and conventions. Proper management of shared water resources requires therefore, a knowledge base of technical, political, and legal issues. The existence of comprehensive information system is a key for the integrated management of water resources and its sustainability. Since developing and sustaining water resources is one of the Arab Countries goals, to have systematically organized and reliable information on water resources and water use would be an important success factor.

This is a proposal for the establishment of Shared Water Resources Database (ASWRDB) for Arab Countries that would provide information on the Arab shared water resources within the Arab Countries, the shared water between the Arab Countries and non-Arab Countries, Water under occupation, and their use. This database would comprise key data from all management areas of water resources as well as socio-economic data. To fulfill the aim of informing the concerned specialists and to offer advice to decision makers, this database would put in place a system of regular updating through data submitted by the stakeholders.

The vision of the proposal is to improve the availability of timely, relevant, accurate and actionable information to senior decision makers in the Arab Water Ministries, Research Institutions, and Non-government organizations. This has the potential to produce large benefits through improved planning and decision-making and easier oversight of overall performance.

1.3. ASSUMPTIONS

The UNU-INWEH in partnership with the Center for Water studies and Arab Water Security (COFWS) will closely work together to develop the Arab Shared Water resources Database and to ensure that the products developed fulfill the requirements set forth by the Arab Water Ministerial Council. However, the following assumptions are taken into consideration through the development of this proposal:

- ✓ First of all, it is assumed that sufficient, capable and committed personal from COFWS is available to discuss and approve the proposed measures and to participate in the establishment of the new database and its related tasks.

- ✓ Furthermore, it is assumed that the Center for Water studies and Water Security is expected to exchange data with the Arab Water Ministries on a regular basis will full cooperation and will be willing to install and to operate the necessary database tools. It is also assumed that the concerned staff of COFWS are given sufficient time to be trained by the UNU-INWEH and to participate in what is required and to undertake regular data preparation activities in future.

- ✓ It is assumed that changes of codes and data structures for data exchange "Data Management Standards" will be discussed and solved mutually between Arab Water Ministries and the Center for Water studies and Arab Water Security.

- ✓ Data integrity is major concern. In order to improve reliability, all departments in the Arab Water Ministries involved in data processing must be willing to co-operate and support all related takes of COFWS.

2. DISCUSSION

2.1. OBJECTIVES

The ASWRD project objectives are:

- ✓ Develop An Arab Shared Water Database that includes; the shared water (surface and groundwater) between Arab Countries, Shared Water (surface and groundwater) between Arab Countries and No-Arab Countries, Water (surface and groundwater) Under Occupation, water conventions, laws, and international agreements.

- ✓ Compile all findings and recommend to COWFS steps to enhance, smooth and harmonize data sharing between the AWDB and the existing NWIS and the future Arab or regional water information system.

- ✓ Overall improvement in management of shared water resources, by make readily available all related information, such as maps, technical reports and studies, statistical data information about the shared water and its utilization;

- ✓ Collect all legal laws, conventions, and examples of different treaties of shared water resources.

- ✓ Contribute to the overall goal of improving the national policies and strategies to achieve sustainable development by ensuring water security.

- ✓ The database will provide the necessary technical, legal and to improve the knowledge management capabilities of the Arab government and non-government concerned authorities.

- ✓ The center via the database will contribute to the capacity development of the Arab cadre in the areas such as sustainable management of shared water resources, negotiation skills on bilateral and multi lateral agreements,

- ✓ The database will help in documenting the Israeli illegal practices towards the un authorized utilization of the Arab Water under occupation;

- ✓ Optimization of related processes for data collection, entry, processing, compilation and reporting.

- ✓ Achieving ranks of excellence and pioneering in applying the international criteria and the best practices as well in managing the Arab Shared Water Database once in place.

The goals of the above objectives are to improve the reliability of collection, analysis, evaluation and dissemination of shared water resources data including the use of indicators to measure the status in each Arab country. Also, they will consolidate the

work done to date by each Arab country, define the methodology, and start the collection of country data according to state of the art techniques.

2.2. INVOLVED INSTITUTIONS

The principles involved institutions in the development of the ASWDB are the Center of Water Studies and Arab Water Security (COFWS), and the UNU-INWEH in association with EMWIS. However, it is agreed that the Center of Water Studies and Arab Water Security will host and manage the database at its premises in Damascus, Syria. The UNU-INWEH & EMWIS will assist the center in the database development and maintenance for three years. Also the UNU-INWEH & EMWIS will train COFWS staff on all aspects of database maintenance to ensure the sustainability of the project.   The following are the potential stakeholders and target groups in this project:

> Arab Ministries concerned with water, the one will commit to COWFS and provide it with the necessary information;

> Arab Ministries concerned with International relations;

> League of Arab States General Secretariat;

> Arab Concerned Organizations;

> Arab Funds and Financial Institutions;

> Arab Concerned Non Government Organizations;

> United Nations Concerned Organizations;

> International and Regional Organizations.

> Universities and Research Institutions;

> Media organizations;

> Environmental Authorities

3. MAIN ACTIVITES

Activities Overview: In the process of building the Arab Shared Water Database, it is important to formulate the working relationship between COFWS and the Arab and International Organization working on similar activities. The project time span would be over three years to achieve the following:

> Establish the project frame work through an Expert Group Meeting that took place on 12, 13 of January 2010;

> **Approval of the frame work by the Executive Bearu of the Arab Water Ministerial Council,** *approved on 24th of Jan, 2010*;

> COWFS would request the UNU-INWEH to prepare the technical and financial proposal February 1st 2010;

- Submittal of the technical and financial proposal to COWFS on May 26th 2010;

- **Upon acceptance of the technical and financial proposal by COFWS (after presenting the proposal to the Arab Water Ministers Council for approval, July 1st -2nd 2010), both parties will enter in to MoU;**

- Development of a web-based, bilingual, ASWDB based on open interface for ease of integration with Arab National Water Databases when needed. The ASWDB will be integrated within COFWS Web site;

- Implement a capacity development program for COFWS staff to manage and sustain the database;

The content of the ASWDB will be primarily from official information & data provided by the Arab Water Ministries, and other referenced sources;

4. APPROACH AND METHODOLOGY

4.1   ASSESS CONTEXT AND INTENT (INCEPTION)

The purpose of the inception phase is to outline the different tasks and duties of all players, involved in implementing this project. The idea is that after this inception period it is clear for everybody what the project is about and what his/her role will be in the project.

The inception phase is also used to introduce The UNU-INWEH to the Core Parties, to prepare all project activities and to discuss the needs and interest of the Core Parties and to make a detailed work plan on the basis of an assessment of the critical aspects that will determine the most successful way of implementing the project.

Deliverables:

- ✓ Terms of Reference (TOR) for the Water Resources Database (ASWRD) project.

- ✓ A detailed Work Plan for the project.

A.   REVIEW AND VALIDATE DATA FLOWS AND BUSINESS INTERACTIONS

The UNU-INWEH respectfully propose to analyze the processes as first activity, as only this will secure that the entire development of the software tools will lead into the desired direction. The current data flows will be used as a starting point for the review and validation of the current data flow designs and interaction models. Here The UNU-INWEH will identify the gaps and ensure that the revised data flows around the AWSDB will cover them. The review sessions with subject matter experts and stakeholders will validate how well the dataflow diagrams, the interaction model, the performance requirements and application interaction fit together to support the new AWSDB. The

task will validate the dataflow designs and the Interaction Models to ensure that they meet the set performance requirements "Data Management standards". To facilitate the desired outputs the integration of the Data quality checking would be an important procedure.

Deliverables:

- ✓ Data classification and requirement (data collection activities will proceed in parallel);

- ✓ Revised dataflow and data exchange designs with roles and responsibilities.

- ✓ Documentation of the performance targets and the data inputs/outputs of each related business unit.

B. REQUIREMENTS ANALYSIS

This section describes The UNU-INWEH's approach to gathering structure, functional, and/or technical requirements for a technology solution targeting to improve efficiency, transparency, and the effectiveness of a structure process.

Although there are many factors that contribute to project success, The UNU-INWEH believes gathering, understanding, and managing client requirements and needs are the most important factors. Project requirements are gathered through communicating with the client. The UNU-INWEH in partnership with COFWS would conduct face-to-face meetings (if necessary) and would gather related documentation for this purpose.

The following types of requirements are gathered:

1. Functional Requirements.

2. Non-Functional Requirements.

3. Documentation Requirements, including user manual, online help, installation guide, administration guide, user acceptance test plan.

4. Training Requirements.

5. Data Migration Requirements – any requirements for migrating data from existing systems to the proposed system.

Detailed requirements are documented in the Software Requirements Description (SRD) document which is approved by the Center for Water studies and Arab Water Security. The accuracy of the requirements is insured by validating them for achievability, consistency, and testability.

Deliverables:

- ✓ Software Requirements Description (SRD) document.

C. TECHNOLOGY INFRASTRUCTURE DESIGN

The purpose of this activity is to assess the ability of the current technology infrastructure to support the Shared water Database project and the results of this assessment will feed the analysis of reuse options during component selection. Standards surrounding the current technology infrastructure will also be identified.

To avoid a situation where the developed web-applications are perfectly working in a testing environment, but are unacceptable slow in production environment, it is important to analyze the existing network through measurements of server performance, network bandwidth and latency. If necessary, proposals will be elaborated to remove bottlenecks and strengthen critical components.

Since The UNU-INWEH proposes to start the development of new web-applications at the beginning of the entire process chain: The data entry application, data entry can be available with different types of web-applications:

1. A web server may be accessed with any web browser and will provide forms. Retrieved data are transformed and forwarded to the application server.

2. Another kind of web-application can be a regular application which is started over the network and runs directly in the client's machine such as Java Virtual Machine (JVM). In online-mode the client will have a direct connection to the application server. The application server is able to instantly forward the input data to the inspection and validation server which can for example process a statistical data analysis to warn the user if data entered are detected as statistical outliners. Such applications can also visualize the data currently typed in to provide the user with immediate feedback.

3. If online-mode is not available the application may be started offline and the input data can be stored to a local file. This file may be sent to the client that is connected to the network. The file can be directly sent from here to the application server for further processing.

In all three scenarios the input data structure for the application server will be the same and processing is done without further modification or transformation of the data.

Up to this point the user has received a feedback through direct visualization and the data can be processed automatically with statistical data analysis. Before data storage in the database a third validation step may be introduced. Data may be sent to an administrator with access to the visualization and the statistical data analysis. If approved, the application server stores the data in connected databases.

For sustainable technology infrastructure serving the SWRD operations, The UNU-INWEH proposes to develop a reporting system indicating the number and address (distinguished between Intranet and external Internet accesses), the type of services (data entry, data analysis, reporting, queries etc.) and the volume of data transfer.

The entire architecture of the web based ASWRDB applications will benefit in several areas:

✓ Data quality will be increased due to multi-level data inspection and validation processes with automatic and semi-automatic user feedback.

✓ Client applications will be web-based with several granularities of extend. Thin-Client applications ("Web browser") will run on every computer with a network connection to the server; Rich-Client-Applications can be operated in online as well as offline mode, but will benefit in online mode from a direct connection to the data validation service with immediate feedback.

✓ The use of the industry standards for data exchange results in an independency of the programming language. There are implementations for such technologies available in nearly all state-of-the-art programming languages.

Deliverables:

✓ Revised Technology Infrastructure Designs for the Operational environment.

✓ Documentation of the initial work environment for the SWRD project consisting of the initial technical environment, initial networking infrastructure, initial communications environment and tools.

3.5. DATABASE LOGICAL DESIGN

This is to have an initial database design which is used to ensure that all data requirements are identified and will be met during application development. In this task the data conversion tools and processes will be identified for the overall migration and roll-out of ASWRDB.

Deliverables:

✓ Logical database design.

✓ Documentation of the data conversion approach and requirements.

3.6. SUPERVISING IMPLEMENTATION

After having the requirements defined, the technology infrastructure identified and the database initial design done; upon the acceptance of the full technical and financial proposal, a road map will be drawn to full fill the financial resources needed. After the fund is secured, The UNU-INWEH role, in partnership with the Center for Water studies and Arab Water Security, will support the entire lifecycle of the project phases.

3.7. FINAL PRESENTATION TO STAKEHOLDERS

The project final stage will summarize all findings and present to the SWRD stakeholders and project working group an outline of the scope of work concluded and actual outcome, recommendations and next steps, updated organization of the project, roles, responsibilities, management process and the project master plan for any remaining stages of building, testing and roll-out of the ASWRDB system.

3.8. ACTIVITIES

Table 1 outlines a tentative timetable of activities. It will be used as a basis for establishment of the Detailed Work Plan. This tool will serve for co-ordination and synchronization of implementing a diverse range of tasks. The structure of the time schedule will follow the order of activities in line with priorities set together with the partners within the framework of this project. It is expected that modifications and adjustments become necessary according to the outcomes of the Inception Phase and the results described in the ASWDB TOR (The initiating of this project is subject to successful fund raising activities that will start upon the signing of the MOU between the COWFS and the UNU-INWEH).

The time schedule will serve as a basis for the measurement of progress in the projects components through indicators of achievements and milestones identified in the Inception Phase (monitoring of interim results and overall project objectives).

Table 1: Activities

(The following table is tentative. Final schedule will be outlined in the work plan)

No.	Description of milestone	Milestones	Start	Due Date
M1	Fund raising activities		**15/7/2010**	**On going**
M2	Situation is assessed, the different tasks are outlined, duties of all players are identified	*	**15/10/2010**	**25/10/2010**
M3	Detailed Work Plan agreed	*		**30/10/2010**
M4	Agreements on standards for data management, revised dataflow and data exchange designs	*	**30/10/2010**	**15/11/2010**
M5	Technical infrastructure reviewed, analyzed and critical components are identified.	*	**15/11/2010**	**30/11/2010**
M6	Requirements for production environment and network infrastructure are documented.	*	**30/11/2010**	**20/12/2010**
M7	Central database logical data model created	*	**20/12/2010**	**20/1/2011**
M8	Software Development and implementation		**20/1/2011**	**29/2/2011**
M9	Scenarios for data entry and reports tested and approved (parallel activities)	*	**20/1/2011**	**29/2/2011**
M10	Pilot testing & debugging with sample data	*	**29/2/2011**	**6/3/2011**
M11	Software development is done	*		**8/3/2011**

| M12 | New software applications available and rolled-out | * | | **15/9/2011** |
| | Web based tools for data entries are implemented. Multi-level data inspection and validation services are available. Training concept on software applications is available. | | | |

4. CONSIDERATION OF LOCAL RESOURCES

The UNU-INWEH recommends that a full time trained staff relevant to the development and sustainability of the database be hired by COFWS. Therefore, UNU-INWEH will liaise and cooperate with COFWS to allocate the required personal that will implement the projects and maintain it thereafter.

5. COST ESTIMATION

5.1 OVERVIEW It estimated that the project cost including training of the Center for Water studies and Arab Water Security (COWFS) staff, along with three years maintenance plan is approximately US$700,000.00. A joint (UNU-INWEH & COWFS) fund raising program will commence upon the singing of the project agreement. Several potential donors from private, public, and regional funding agencies will be approached for financial support of the project in accordance with the rules and regulations of the Arab League and the UN. However, support letters from the League of Arab States will be needed in order to facilitate the UNU-INWEH and COWFS fund raising efforts.

The above cost includes:
1. Hardware

Hardware	Quantity
Database server	2 x 10000
Application server	2 x 5000
2 Terra Byte SAN Storage	1 x 10000
Security appliance	1 x 7000
UPS	1 x 6000
Personal Computers	7 x 2000
Estimated Total Cost	$67000

2. Software licenses

The Software Licensing cost estimation is $50,000 USD

3. Development Activities: US$ 588,870.00

5.2 BUDGET SUMMARY

Item	Stakeholder	Cost in USD
Hardware	COFWS	$67,000
Software Licensing	COFWS	$50,000
Project Co-Director & Fundraising Campaign	COWES	$30,000
Data Collection *(In Cooperation with UNU-INWEH, EMWIS)*	COWFS	$45,000
Workshops (three)	COFWS	$75,000
Water Law Training (5 person)	COFWS *in cooperation with* UNU-INWEH	$75,000
6 New Staff *for 3Yrs*	COFWS	$150,000
DB Maintenance (two years after building DB)	COFWS *with help of UNU-INWEH and EMWIS*	$60,000
Overhead	COFWS	$15,000
Total COFWS Budget	**COFWS**	**$567,000**
Project Co-Director & Fundraising Campaign	UNU-INWEH	$30,000
Project Planning and Kickoff Meeting	UNU-INWEH	$6500
Develop Spec. Doc.	UNU-INWEH	$2500
Analysis	UNU-INWEH	$8000
DB Design	UNU-INWEH	$16,000
Pilot	UNU-INWEH	$10,000
Environment Set Up	UNU-INWEH	$ 4000
Implementation	UNU-INWEH	$ 6000
Production Environment Testing	UNU-INWEH	$2000
Documentation	UNU-INWEH	$7500
Travel	UNU-INWEH	$13000
Sub-Total Budget	UNU-INWEH	
Overhead	UNU-INWEH	$15000
Total UNU-INWEH Budget	**UNU-INWEH**	**$120,500.00**
Analysis and integration with available third party national databases	EMWIS	
Total Budget	**EMWIS**	**$25,000**
Grand Total	**ASWDB project**	**$712,500.00**

6. ROLES AND RESPONSIBILITIES

Phase	Stakeholder
Administrative and financial	COFWS
Data Collection	COWFS, UNU-INWEH, EMWIS
Requirement Gathering	UNU-INWEH
Analysis	UNU -INWEH
Design	UNU-INWEH
Implementation	UNU-INWEH
Testing	UNU-INWEH
Training	UNU-INWEH
Maintenance	UNU-INWEH, COWFS, EMWIS
Integration with existing National DB	EMWIS