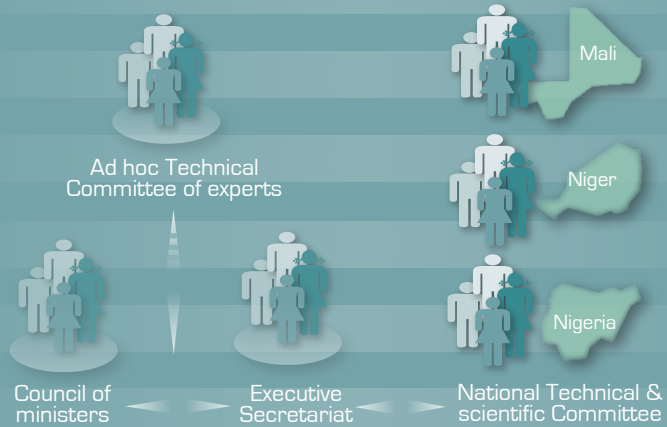


Iullemeden Aquifer System

CONSULTATION FRAMEWORK FOR MANAGING TRANSBOUNDARY RISK



Iullemeden Aquifer System

Mali - Niger - Nigeria

THE CONSULTATIVE FRAMEWORK FOR MANAGING TRANSBOUNDARY RISKS

Tunis, 2011

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List of acronyms

ADT	Analyse diagnostique transfrontalière
AUE	Associations d'usager d'Eau
CCSEA	Comité de coordination du secteur eau et assainissement
CEDEAO	Communauté économique des États de l'Afrique de l'Ouest
CES/DRS	Conservation des eaux et des sols / Défense et restauration des sols
CH	Continental Hamadien
CI	Continental intercalaire
CNCS	Comités nationaux de coordination et de suivi des activités du projet
CT	Continental Terminal
FAO	Organisation des Nations unies pour l'agriculture et l'alimentation
FEM	Fonds pour l'environnement mondial
GIRE	Gestion intégrée des ressources en eau
GIS	Geographic Information System
OMS	Organisation mondiale de la santé
ONG	Organisation non gouvernementale
OSS	Observatoire du Sahara et du Sahel
PANA	Plans d'action nationaux d'adaptation aux changements climatiques

PAS	Programme d'action stratégique
PNUD	Programme des Nations unies pour le développement
SAI	Système aquifère d'Iullemeden
SAP	Système d'alerte précoce
SIG	Système d'information géographique

I. Introduction

lullemeden Aquifer System (SAI) shared by Mali, Niger and Nigeria, is threatened by three major risks: the reduction of water resources, the degradation of water quality, and impacts of climate variability change. These risks have been identified through the GEF TDA/SAP process (Transboundary Diagnostic Analysis/Strategic Action Programme) for International Waters applied to Transboundary groundwater of the Aquifer



FIGURE 1 : map of SAI

System lullemeden. This analysis was reinforced by results from mathematical modelling of the aquifer system.

The model has, among other things, identified and quantified the support of the Niger River flows through the groundwater of the aquifers, and overexploitation of water resources since 1995. The simulation of the impact of the drought during the period 1968-1970 in West Africa highlighted the increase of the influence radius beyond the political borders.

Countries are convinced of the need to adopt a regional approach to managing transboundary waters in order to address these transboundary risks they shared and convinced also that efforts of one country cannot find a sustainable solution. Then, the three countries (Mali, Niger and Nigeria) **committed in a process of concerted water resources management**. Through this process, they plan to mitigate these risks.

Isotopic studies have shown the low recharge of the aquifers particularly the confined and deep aquifers such as the Continental intercalaire which receives a recharge in its outcrop areas bordering the aquifer basin.

The Sahara and Sahel Observatory has sought to support its member countries by emphasising the importance of pursuing a concerted scientific and technical approach. OSS thus aimed to set up, with the stakeholders, solid foundations for the governance of these strategic resources. Tools and instruments for scientific, technical and legal common have been developed to provide countries with mechanisms for data communication and exchange.

Through this process, countries have developed scientific,

technical and legal common tools and instruments. Elements of policy and strategy to mitigate these risks have been developed as well as communication tools to develop an early warning system, a participatory approach to better manage risk, a mechanism to monitor transboundary water resources and vulnerability indicators.

Despite the framework documents of sub-regional institutions and regional, basin authorities and agencies, countries proposed legal and institutional solutions to their own specific context. This note summarizes these solutions.



II. The development of the elements of policy for mitigating the transboundary risks

The elements of policy and strategy to mitigate these risks have been designed to help further the countries to formulate their policies and strategies accompanied by an action plan. The elements of policy and strategy to mitigate these risks integrate dimensions policy, socio-economic and environmental.

These strategies include among other things:

- the programs aimed for the reduction of poverty (Strategy of the Reduction of Poverty),
- the water demand management for the suitable and efficient use of water and land,
- the policy of the access right of water and land by taking in account the water price and the landholder aspects,
- the intensification of the human activities in the recharge areas of the aquifers,
- the regulation and monitoring the water points,
- the joint surface water - groundwater use,
- the harmonized policies for prevention (early warning compared to the transboundary risks).

The elements of policy and strategy are developed to mitigate risks by analysing the solutions for each risk according to

three dimensions: 1) hydrogeological and environmental, 2) socio-economic, and 3) legal and institutional (Table 1).

Height of these experiences and gained from the IAS project, countries consider necessary to develop a common policy on management of shared water aquifers. This common policy should be accompanied by a strategy based on principles and axes which should be defined, and also an action plan for the medium and long term. To develop this policy, an inventory and harmonization of national sector policies and laws are needed to ensure the inclusion of the mitigation of the three identified risks.

TABLE 1 : Matrix of problems for "the development of the elements of Policy of reduction of the transboundary risks of the IAS"

Hydrogeology and Environment	Reduction of water resources
	<p>Issues:</p> <ul style="list-style-type: none"> • Ignorance of the water resources and the insufficiency of the monitoring of the resources. • Lower productivity of the works. • Absence of environmental impact study in the programs and the projects of realization of water points • Destruction of ecosystems. • The abstraction of (deep) groundwaters with high contamination. <p>Solutions suggested:</p> <ul style="list-style-type: none"> • Improvement of knowledge of the water resources which result in the installation of a network of regular follow-up of the resources water as well as the determination of the hydrodynamic parameters of the aquifers of the SAI. • The actualization of the data on the resources to allow a better simulation of aquifers by the mathematical model known SAI. • The development of techniques of artificial refills of recharge of the aquifers using no conventional water (treatment and recycling of industrial water) and if possible starting from water of the Niger River. • The realization of environmental impact studies in any programme and project of execution of new water points. • The safeguarding of the wetlands through the plantation of the suitable forest species. • Conservation of the vegetable cover which supports the infiltration of water (CES/DRS). • Rational management of the pastures.

Water quality degradation

Issues:

- Miss of perimeter of protection on the level of certain fields of collecting.
- Miss of purification.
- Pollution of groundwater and soils due to over use of pesticides used by agriculture.
- Solicitation of deep water fossils of bad qualities.

Solutions suggested:

- Management of solid waste and liquids
- Rational use of manures in agriculture and good management of their conservation
- Rational use of manures and pesticides in agriculture.

Impacts of Climate Change/Variability

Issues:

- Reduction of rainfalls generating the recharge of the aquifers.
- Deforestation and degradation of land cover.
- Silting the hydrographic network.

Solutions suggested:

- The development artificial recharge techniques of aquifers using no conventional water (treatments and recycling of industrial water and if possible from Niger River).
- The preservation of the forests through the plantation of the suitable forest species.

Reduction of water resources

Issues:

- Impact of continual increase of the population which increases the demand for drinking water.
- Development of agricultural techniques of productions (irrigation): what increases the abstractions.
- Increase in livestock which exploits the quantity to take.

Solutions suggested:

- Use of suitable techniques and technologies to save water (crop varieties and vegetable consuming little water, use of effective techniques of irrigation),
- rationalization of the use of drinking water.

Water quality degradation

Issues:

- Negative impact of the increase in the population involving the development of the urbanization with for consequence production of solid waste and liquids degrading the quality of water, and generating risks of diseases
- Development of the irrigation involving the use of the chemicals involving the contamination of ground and surface water .

Solutions suggested:

- Waste treatments,
- Use of bio-pesticides,
- Sensitizing of the populations.

Impacts of Climate Change/Variability

Issues:

- The reduction of rainfall and desertification which generate the concentration of the populations at places favourable with their socio-economic activities (agriculture, breeding...).
- Increase in the temperature, the gases (CFC) reduction of rainfall which involve problems of recharge of the aquifers with the increase in water demand .

Solutions suggested:

- Adaptation of the populations to the use of ground space of dwelling, agriculture.
- Use of cultures consuming little water.
- Vulnerability assessment.

Reduction of water resources

Issues:

- Absence of framework of dialogue on the scale of the basin of the IAS.
- Insufficiency of regulations of the management of water.
- Ignorance of the regulation.

Solutions suggested:

- To finalize and approve the project of draft-agreement relating to the mechanism of dialogue between the three countries.
- Drafting of legal texts founding of the authorizations of taking away of water and realization of hydraulic works.

Reduction of water resources (continued)

- To elaborate / finalize and/or implement the policies and strategies regarding transboundary risk management.
- To develop principle of IWRM.

Water quality degradation

Issues:

- Lack and/or not application of legal and institutional instruments relating to discharge and rejection of industrial and domestic waste in the rivers and the groundwater aquifers.

Solutions suggested:

- To found the principle pollutant-payer.
- To take legislative and administrative notes founding authorizations of discharges and rejections of waste.
- Founding suitable measurements of exploitation of the mining careers.

Impacts of Climate Change

Issues:

- Slowness in implementing the three international conventions (CCC, CBD, Desertification).
- Difficulty of application of the legal and institutional instruments related to the climatic risks of variability.
- The national action plans for climate change adaptation (PANA) do not take into account the transboundary risks.

Impacts of Climate Change/Variability (continued)

Solutions suggested:

- To create and/or implement the legal and institutional frameworks relating to the National Action Plans of Adaptation to the climatic changes.
- To develop an early alarm system on the scale of the basin.

III. Mechanism for monitoring transboundary aquifers

Monitoring lullemeden transboundary aquifers aims to characterize the groundwater flow system in the three countries in the way to identify the trend of the risks that threaten these resources. This monitoring focuses on specific objectives:

- studying the interconnection between surface water and groundwater,
- changes in operating so as to facilitate assessment of its impact on reducing the availability of water resources,
- evolution of changes in the chemical quality of water regarding to human activities and climate/variability changes.

Within a national context, monitoring networks generally have two fairly broad categories of objectives: 1) these are basic or reference monitoring networks and, 2) specific purpose monitoring networks.

The objectives of these networks are twofold:

- providing data for characterising the groundwater;
- providing data for detecting long-term trends in groundwater levels (quantity) or groundwater quality.

Within a context for groundwater of transboundary aquifers, statutory monitoring will primarily be linked to agreements

between riparian countries. The following five objectives for monitoring and assessment in transboundary groundwaters arise from the Convention.

In order to set up effectively this monitoring, assessing the state of the current network in each country is the most. It turned out that a reference piezometric network does not exist for the whole IAS basin. This network allows Mali, Niger and Nigeria monitoring and assessing their transboundary groundwater resources in terms of quantitative and qualitative level, to alert the decision makers to control and reduce the risks or the transboundary impacts on their common resources.

In Mali, the piezometric monitoring network is partially insured. This monitoring has been established just after the drought period 1970-1988, within the implementation of projects for setting up water points. The network established specially in the Niger River Basin could not be supported by the administration to ensure the sustainability of the measurements.

In Niger, the piezometric monitoring network is relatively well structured and monitored by the regional services of Hydraulics. This network is characterized by the high rate variability measures. Data interpretation is performed on some studies.

In Nigeria, the network of groundwater monitoring is lacking. The inventory of water points is packed with creative activities of water points within the framework of projects involving several cities and natural areas.

A methodological guideline has been produced by OSS

regarding to the countries concerns. This document is a tool that aims to provide advice countries for better identifying the transboundary issues and highlighting new requirements in data and informations. The document provides an approach on the steps to monitor and assess groundwater transboundary aquifers.

The process for monitoring and assessing transboundary aquifers is a cycle of dependent activities that countries will have to study jointly to determine the specific long-term evolution of aquifers characteristics and behaviour. These steps are as follows (figure 2 next page) :

- Identification of groundwater management issues;
- Information need;
- Strategies for monitoring and assessment;
- Monitoring programmes;
- Data management subdivided in Data collection, Data handling (Data management steps, Data dictionary, Data validation, Data storage and extra data), Data analysis, Assessment and reporting, Information utilisation.

Overall, the IAS has sporadic monitoring that does not provide an accurate assessment of water abstraction, the decline of water table or changes in quality.

One of the main tasks of the consultation mechanism to be established between the three countries is to proceed, as soon as possible, the establishment of a monitoring network to ensure:

- monitoring trends in the evolution of piezometric and water quality,

- periodic quantification of water abstractions to update the model data and the impact of the transboundary risks.

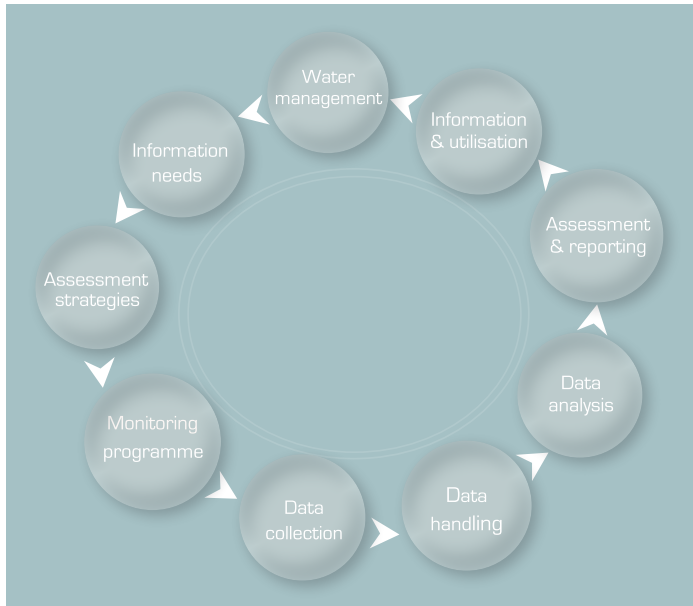


FIGURE 2 : monitoring cycle for transboundary groundwater [by UN/ECE, 2000]

It will be for national teams to make operational these guidelines, adapting them to their realities, through regional workshops and field works.

The harmonization of monitoring networks for surface water and groundwater should be considered to manage and protect effectively transboundary water resources.

For updating and refining the model of the lullemeden aquifers, reinforcing the monitoring of these aquifers is a

need. Thus, it is imperative to ensure a better assessment of the exploitation of each aquifer and classify this exploitation according to the type of aquifers (shallow, confined, unconfined, semi-confined), the type of water points (wells, boreholes, artesian boreholes...) and the water use domains (Drinking water, irrigation, industry...).

IV. Consultative Mechanism between countries

For the first time in sub-Saharan Africa, a council of Ministers in charge of water (Mali, Niger and Nigeria) has adopted a Memorandum of Understanding, together with its roadmap for “the establishment of the consultation mechanism for managing Iullemeden Aquifer System”.

This MoU reflects the countries concerns to have a legislative framework that allows the three countries as part of the consultation:

- to improve the state of knowledge on water resources of the IAS in order to develop the key elements of decision-making for planning,
- to take the necessary measures to ensure better management and protection of water resources of IAS through the mitigation of risks that threatened water resources,
- to elaborate harmonized strategies for developing water resources in the basin.

The Mechanism shall have a legal status. It shall be open to the accession of other States which share the IAS water resources. The Consultative Mechanism shall be made up of the following organs (figure 3) :

- the Council of Ministers,
- the ad hoc Technical Committee of Experts,

- the National Technical and Scientific Committees;
- the Executive Secretariat.

The consultative mechanism whose operation is explained in the preliminary draft of the Memorandum of Agreement,

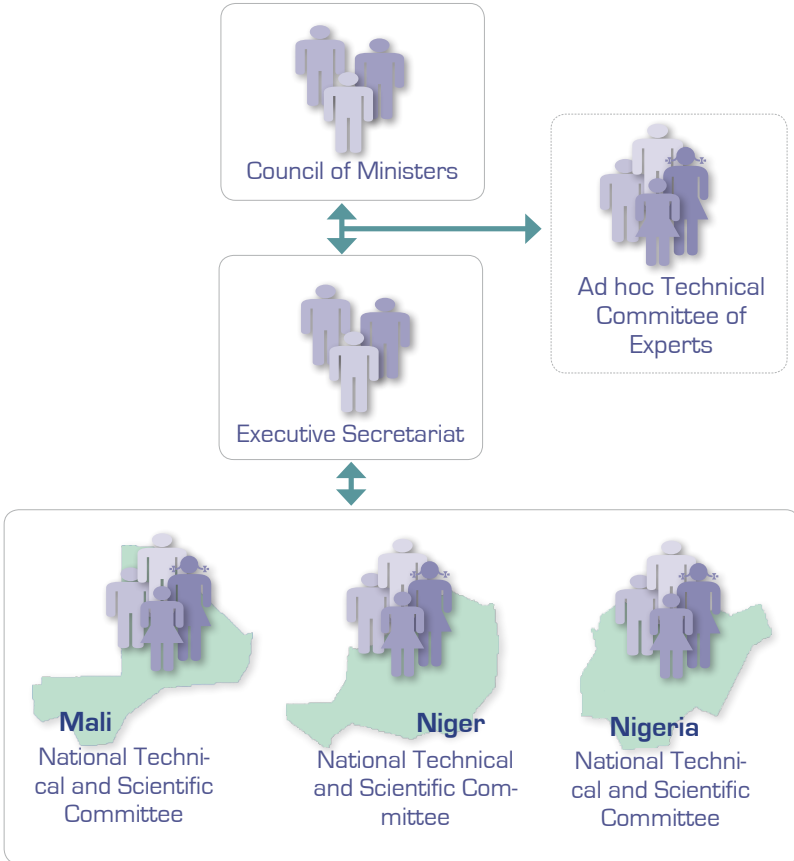


Figure 3 : Flowchart of the IAS consultative mechanism.

must seek to:

- strengthen solidarity and promote cooperation in communication and information in order to facilitate the joint identification of risks to which the IAS resources are exposed;
- facilitate the joint management of these risks;
- facilitate the sustainable development of the IAS resources;
- promote the integrated management of the IAS water resources.

Regarding to the various aspects handled through its 11 chapters, the three countries sharing IAS water resources are well endowed by a legal and institutional framework for concerted management of water resources and the establishment of clear planning for the development of these resources.

V. Participatory, awareness, communication

V.1. Participatory management of trans-boundary risks

In managing transboundary risks that threaten the natural resources of the Niger River, Mali, Niger and Nigeria jointly participate to control them through the projects implemented by **the Niger Basin Authority** (NBA). This is the case in fighting the Niger River silting, the actions for protecting against the proliferation of aquatic plants, or against the locusts.

However, concerning hydrogeological risks threaten the lullemeden Aquifer System this participatory management takes place gradually as the improvement of the state of knowledge of dynamics groundwater flow. This participatory management provides for the stakeholders a consultation framework for enabling them to take action to prevent or seek appropriate solutions to the risks that may directly or indirectly threaten their common resources.

The Elements of a strategy for the participative management of the countries in reducing or cancelling transboundary risks shall be planned by taking into account:

- interests, importance, influence of each of the stakeholders.
- particular efforts needed, and

- the appropriate forms of participation specially the interactive participation (table 2).

The elements of the long-term participative management strategy will be based on two programs in the short, medium and long terms:

The short and medium term program based on the analysis and needs assessment and capacity stakeholders to contribute to the management of transboundary risks. A set of actions should be taken:

- to develop the information and communication tools (both traditional and modern) focused on the issue of managing major transboundary risks that threaten water resources and land of the IAS;
- to develop the lessons from past experiences of stakeholders on their participation in the preservation, restoration or protection of natural resources (reforestation, land reclamation, shore protection, the fight against invasive plants, etc.);
- to inform and sensitise the stakeholders on the impacts of the three major risks that could jeopardise any effort for the rationalization of water and land management over the long term;
- to inform and sensitise the stakeholders on good management of natural resources learnt from experiences in development projects;
- to establish synergy between development projects and if necessary, direct and adapt them to new projects relating

TABLE 2: Types of participation (from Dalal-Clayton B., Bass S., 2002). 

Type	Characteristics
Manipulated participation	Participation is simply pretension
Passive Participation	People participate after being informed of what has already been decided or produced. The information shared belongs to external professional only ;
Participation through consultation	People participate as consulted or by answering questions. No part is conceded in decision-taking and professionals are not obliged to take into consideration the people's opinions ;
Participation for material incentives	People participate in exchange for food, cash or other material incentives. The autochthonous have no interest in carrying out these practices when the incentives are suspended
Operational Participation	Participation is seen by external agencies as a means to realize the project's objectives, particularly in reducing costs. People may participate by constituting groups to answer predetermined objectives of the project
Interactive Participation	People participate in the common analysis which leads to action plans and to the formation or reinforcement of groups or local institutions which decide how available resources are used. The learning methods are used to collect the multiple points of view.
Self- mobilisation	People participate by taking initiatives independently from external institutions. They develop contacts with external institutions for resources and technical support but keep the upper hand on how these resources are used.

to environmental and hydraulics aspects; and

- to adapt laws and regulations on the water resources management.

The long-term program shall allow **developing the roadmap** to develop the right strategy for the **shared management of transboundary risks**. The main actions are:

- involving the basic communities at various levels : i) identification of problems and needs, ii) fixing priorities, iii) defining measures and actions to be undertaken, iv) implementation of measures and actions, v) monitoring and assessment ;
- taking into account the gender approach on participatory management of risks;
- developing alternative activities affecting natural resources (deforestation, etc ...)
- establishing, through the land codes and rural codes, water resources property modes which encourage communities to manage the environment adequately and invest in these resources
- promoting agro-pastoral good practices that reduce the spread and increase yields and productivity.

V.2. Building intergovernmental communication tools

As to obtaining conclusive results from the implementation of project activities, a scientific and technical partnership has progressively developed between national teams. It contributes to establish conditions for mutual trust through the development of communication tools between the three

countries in order to:

- establish a consistent communication between national institutions in charge of water in Mali, Niger and Nigeria;
- set up and maintain contacts and exchanges with these institutions and sub-regional organizations such as the Unit for Coordination and Integrated Water Resources Management of the Economic Community of West African States Western (WRCU/ECOWAS).

Thus the SAI website was developed by OSS with IW: LEARN (International Waters: Learning Exchange and Resource Network) assistance of the GEF. The website site was online during the Fourth GEF Biennial Conference held in South Africa in August 2007 (URL: <http://iullemeden.iwlearn.org>). The countries are unanimous in continuously feed the Website that shall be hosted at the OSS meanwhile the establishment of the IAS consultative mechanism.

In fact, managers of institutions in charge of managing water resources in Mali, Niger and Nigeria, are facing:

- the lack of any system or network of exchange information (Internet, Intranet) within and between national institutions;
- the lack of appropriate funds for communication and maintenance of communication tools;
- the inadequate communication facilities (internet, servers...);
- the insufficient capacities of different actors to apply new tools of communication;
- the low valuation data (data not analyzed, not synthesized, localized in different services).

At regional level, the linguistic difficulties are linked to inadequate or lack of communication tools between countries and between sub-regional organizations.

General conclusion

During the period 2006-2008, scientific and technical diagnosis of the lullemeden Aquifer System water resources, identified three transboundary risks: (1) the reduction of the water resource, (2) the degradation of water quality, and (3) the negative impacts of variability/climate change.

The results and outputs offer an opportunity to Mali, Niger and Nigeria, to acquire for the first time, common management tools of relevant decision-making. These include topographic and geologic map digitalized at the basin level, the database recording over 17,200 water points, the Geographic Information System and the mathematical model. These tools allowed, among other things:

- to improve knowledge of the dynamics groundwater flow
- to determine the water balance of the lullemeden Aquifer System
- to confirm and quantify the support of the Niger River flows through the contribution of groundwater from the Continental Terminal and Continental intercalaire, and
- to identify vulnerable areas to additional water abstractions.

These positive results have strongly reinforced the solidarity and mutual confidence between riparian countries, and increased the appetite for a concerted management between national teams. In May 2009, the Ministers in

charge of water of three countries adopted the Agreement and the roadmap for its implementation.



Bibliography

OSS, 2007. Transboundary Diagnostic Analysis of the lullemeden Aquifer System. Tunis. Edited by OSS in 2011 (Volume I).

OSS, 2007. Common Database of the lullemeden Aquifer System. Tunis. Edited by OSS in 2011 (Volume II).

OSS, 2007. Hydrogeological Model of the lullemeden Aquifer System. Tunis. Edited by OSS in 2011 (Volume III).

OSS, 2008. lullemeden Aquifer System: Participatory management of transboundary risks. Tunis. Edited by OSS in 2011 (Volume IV).

OSS, 2008. lullemeden Aquifer System: Monitoring & Evaluation of transboundary aquifers. Tunis. Edited by OSS in 2011 (Volume V).

CONSULTATION FRAMEWORK FOR MANAGING TRANSBOUNDARY RISK

The Transboundary Diagnostic Analysis recommended by the Global Environment Fund has been applied to transboundary waters of the Iullemeden Aquifer System (IAS) shared by Mali, Niger and Nigeria. It allowed identifying three major transboundary risks namely (1) the reduction of resource availability, (2) degradation of water quality, and (3) the impact of variability / climate change.

Recognizing the need for a regional approach for shared groundwater management to face those transboundary risks for which efforts of one country cannot find a sustainable solution, the three countries committed themselves in a process of joint water resources management. Through this process, they plan to mitigate the negative impacts of these risks on their shared groundwater resources.

Through this process, policy and strategy elements for mitigating these risks have been developed as well as communication tools in order to promote an early warning system, a participatory approach to better manage these risks, and finally a mechanism for monitoring transboundary water resources. A Memorandum of Understanding with its roadmap was adopted by the three countries for establishing a consultation mechanism, a legal consultation for a joint management and equitable and rational of their common resources.

Partners



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