



Algeria Water Sector M&E Rapid Assessment Report



MEWINA

مشروع المراقبة والتقييم لقطاع المياه بدول شمال أفريقيا
Monitoring and Evaluation for Water In North Africa



Algeria Water Sector M&E Rapid Assessment Report



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Executive Summary

a. M&E Assessment Summary

Algeria, with an area of 2.4 million km², is the largest country of Northern Africa. In 2012, Algeria's population is 37.1million inhabitants, among whom 80% live in the urban areas. More than 90% of the population lives in the northern part of the country. The water legal system and hydraulic infrastructures is deeply marked by the public state character. Algeria is actually undertaking deep social and economic reforms. The principal water related legislations are contained in the following; Law 05-12 on the water; Act No. 83-03 of 05 February 1983; Law No. 03-10 of 19 July 2003 on the protection of the environment; and the regulations implementing these laws. Water resources in Algeria are scarce and are distributed unfairly. The country is divided into five basins comprising the 19 watersheds in the country. The renewable surface water resources are estimated to total 11billion m³ for the entire Country; the Sahara, the largest pool in the area, contains only 0.5 billion m³. Renewable groundwater resources contained in aquifers in the north are estimated at nearly 2.5 billion m³. Rainfall is fairly abundant along the coastal part of the Tell, ranging from 300 to 1400mm annually, the amount of precipitation increasing from west to east. Desalination of seawater is already used with 14 desalination plants currently operational supplying 14 coastal cities with 0.54billion m³. With a wastewater production is currently estimated at 1.2 billion m³ year and a treatment capacity of 0.8billion m³, Algeria now that reuses 0.1billion m³ of water per year. The water distribution pipeline networks in Algeria extend to more than 58,000km, with a capacity to transfer 3.3billion m³/year. The capacity of water storage tanks exceeds 0.7billion cubic meters. It is worth noting that most of the water distribution network is old thus causes a high level of wasted potable water. Sewerage networks evolved from 21,000km in 1995 to 41,000km in 2010 with branching ratios/rates of connections increasing from 79% to 86% from 1995 to 2010. In agricultural, the irrigated areas in Algeria have evolved from 905,300ha in 2007 to 1.64million ha in 2014. Algeria, an arid to semi-arid country, is characterized by a high population growth rate, making important increase agricultural productivity to ensure food security. Agricultural development is strongly influenced by irrigation. Agriculture has become highly strategic, because water resources are highly sensitive to climatic conditions, and the soils are weakened by the aggressiveness of natural phenomena.

The new water policy in Algeria is based on the principles of: Integrated management, collaborative, participatory, across the watershed; economic and ecological management; the principle of fairness and security of supply; the principle of sustainability, and good governance. This new policy is based on the policy planning, which has set itself the objective of creating a dynamic rebalancing of the territory, including the sustainable development of the Highlands and the South. Achieving this goal requires the use of large transfers, and to appeal to unconventional resources, especially the desalination of sea water, reuse of treated wastewater, and has implementation a policy of saving water. Algeria has made during the last decade (2001-2011), considerable efforts on investment for the construction of a large number of works of mobilization, transfer, treatment and supply resources water to effectively meet the growing demand of the various uses of water. The importance of investments through various programs has resulted in tangible results in terms of meeting needs for water, both in quantity and quality required. Within the new institutional framework, the Ministry of Water Resources (MRE) will be responsible for water, wastewater and irrigation planning, management, monitoring, and pollution control. One of the important constraints and shortcomings in water sector in Algeria is that data and information systems and analytical tools on water resources have to be implemented, maintained and regularly updated. Towards this end, an effort was initiated at the national level by the Ministry of Water Resources, and at

the regional level, through the Basin Agencies, in order to collect and organize all existing water-related data. Along the same line, simulation tools on water resource assessment, demand and allocation are being implemented by the Basin Agencies.

At present, water management falls solely under the responsibility of the Ministry of Water Resources, established in 2000. The Ministry is responsible for water resource planning, investments on all issues relevant to water resources protection and exploitation, such as hydraulic infrastructure, inter-basin transfers, drinking water supply networks, and sewage treatment plants. It is also responsible for allocating available water among the different uses (agricultural, domestic and industrial), and for controlling all water-related infrastructure (public and private). Additional tasks include the monitoring of water resources, in terms of both quantity and quality; for achieving this task, the Ministry can undertake all the necessary surveys and assessments, and is responsible for data collection on all the above issues. It also has control over; Five national agencies: Agence Nationale des Barrages et des Transferts, Agence Nationale des Ressources Hydrauliques, Office National de l'Irrigation et du, Office National d'Assainissement and the Algérienne des Eaux. These agencies are responsible for collecting information on water and water infrastructure (water cadastre) to management integrated water resources. They are responsible for developing regional master. They are also involved in raising awareness for water conservation and resource protection against any kind of pollution. While some global organizations such as Joint Monitoring Program, JMP and FAO-AQUASTAT publish some information regarding water resources in Algeria; however, they are not really active in M&E of country water resources and depend on weak surveys and sometimes on pre-published old data. In Algeria, several water sectors officials have serious reservations on these published figures. The officials in Sector of Water Resources have not been consulted in the development of system information AQUASTAT, and ignored the origin of the information contained in this system. Thus the Ministry of Water Resources of Algeria does not endorse the information given at all. Moreover, the information published on Algeria in the information system from 2005: this information is therefore largely exceeded and the data presented on water resources are underestimated for both surface and underground resources. It has not been taken into account by the large volumes mobilized desalination program undertaken since the 2005. Information on aspects of institutional, legal and organizational are also widely exceeded, since Law No. 05-12 of 2005 on the water has not been mentioned.

Algeria shares with Tunisia and Libya the North Western Sahara Aquifer System, NWSAS. This aquifer is managed by the Sahara and Sahel Observatory, OSS organization, which is located in Tunisia and active in three transboundary countries. The OSS in collaboration with Algeria has implemented a program that focuses on the scientific stakes in the first place. Thus the OSS is functioning in Algeria through the NWSAS in a consultation mechanism. This program is aimed to; enable significant water resources knowledge improvement for the aquifer system, enable information exchange, reach to joint definitions for working hypotheses among three countries, identify new withdrawal zones; increase the current exploitation, ensure risk control through a consultation framework amongst three countries. The NWSAS project aims to elaborate a common database for integrating and streamlining all the surveyed information, in addition to new data collection, integration and updating. Such an objective requires that the national databases be adapted and homogenized. This implies homogenized data structures and modifications, a GIS interface and the elaboration of an access module with the digital model. The Information System (IS) elaboration included the diagnosis, design and realization of a common database, with the objective of making IS accessible simultaneously in the project's headquarters and in each water

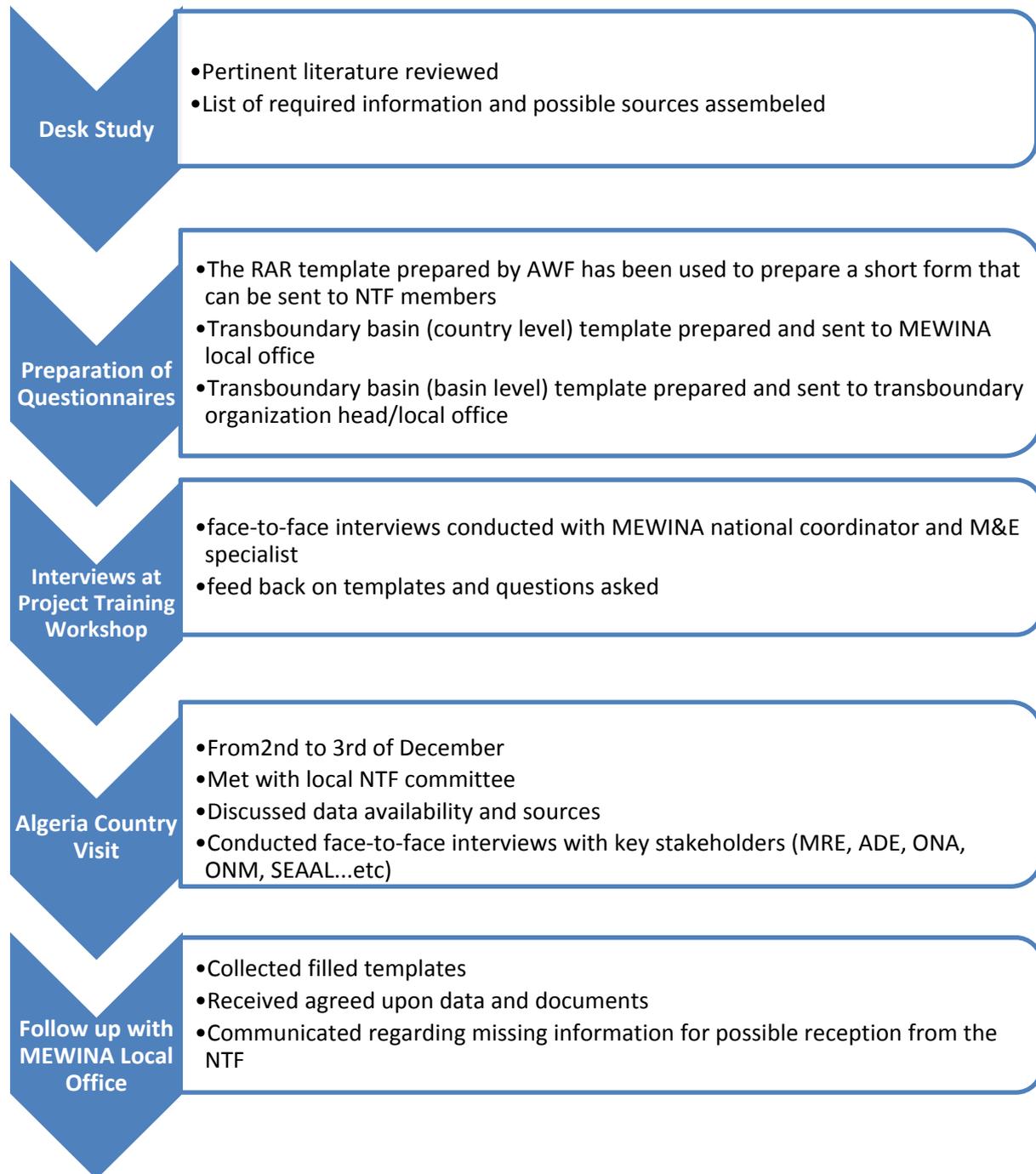
administration of the three countries. The NWSAS has elaborated specific GEOSASS cartographic server to ensure a geo-referenced representation of the available information and a SAGESSE to allow standardizing the hydrogeological data collected, so as to meet the needs for the hydrogeological modeling of SASS. ANRH hosts a group of database management information systems that are built using the access databases. They are in-house database systems and cover all aspects of water resources monitoring data. BASHYD200 is a climatology database; BADGE2000 is a hydrogeology database; and SIQUEAU2000 is a water quality database. It is not available for public access. These databases are connected to a geographical information system and contain 70,000 data point (boreholes, wells and springs) archived. These databases are continuously updated on regular intervals and made available to all institutions working in related areas to water and sanitation in the form of reports and published bulletins. They are used mainly by the ANRH for water resources assessment, management and monitoring in terms of quantity and quality. After being updated, the data is transferred to the MRE Data Center. Moreover, an access database has been developed in the ANRH in 2006 called HYDRACCESS. This access database has a user friendly interface that allows storing various types of hydrological data. It can be used to process data and also has the function of analyzing rainfall data for small and large catchments.

In Algerian Water Sector, a system of monitoring and evaluation exists, but needs to be strengthened and upgraded. It is worth mentioning the existing legislation on integrated management of water information and its various components is governed by legal provisions established by: Decree no. 08-326 of 19 October 2008 on the organization and operation of the integrated management of water information & The decree of 02 February 2011 (OJ 23, April 17, 2011), which regulates the access rights to the data management system integrated water information by distinguishing the free public data and public data paying accessible by contract. While there exists a central data center in the Ministry of Water Resources, it is used mainly for storage and dissemination rather than monitoring and evaluation, but efforts are undertaken by the Ministry of Water Resources to enhance this portal and integrate it within M&E water sector framework. The following weakness points can be stated; The strategy for monitoring of natural resources at the institutional level is not yet implemented in a solid way; Data collection is often not done in a timely manner; The lack of financial resources allocated to the operation of structures for information systems such as GIS; The low capacity of some information system Database available, which limits the optimal use and exchange of data. Monitoring can be considered as a chain of activities in an information system and with the chain closed with the management and control action of the decision maker. Building an accountable information system requires the activities in the chain are designed sequentially starting from the specified information needs. Main problem in water supply data and sanitation management chain is that; the chain is not a closed loop, the chain is not continuous but interrupted at some locations, information handling is in form of excel data sheets. In terms of the rapid assessment undergone for the Algerian M&E in Water Sector; the following recommendations can be stated; Provide funds and institutional resources for implementing and enforcing the policy of integrated water resources management including M&E; Implement a sector wide M&E plan with respect to water supply & Sanitation & water quality; Harmonize methodologies of defining water and sanitation indicators with JMP; Promote information sharing on status of water and sanitation for the GLASS (Global Annual Assessment of Sanitation & Drinking Water); Promote inter-sectoral coordination between Ministry of Health and Ministry of Water resources; Facilitate transparency in the communication and sharing of water and sanitation information amongst related institutions; Allocate financial resources for supporting

existing databases such as BADGE, BASHYD & Data Center of MRE to be the initial step towards a single integrated Management Information System in water sector; and Allocate financial resources to link the existing national database information systems with the geo-database information system of the NWSAS to have a unified information system shared by all water sector institutions.

b. Methodology for Collecting Data

The time frame of the project is very limited for collecting all required data. As such, in order to speed up the data collection phase, MisrConsult has adopted the following methodology for data collection:



c. List of People & Organizations Interviewed

The following is a list of people and organizations interviewed during Algeria country trip;

Date	Organization	Key Persons	Title
2/12/2012	Algeria Water and Sanitation Company (SEAAL)	Abderrazak Karim Abderrazak.krim@seaal.dz	General Secretary
		SophianeAzzizi Azzizi@seaal.dz	Director - Control Center
	National Agency of Hydraulic Resources (ANRH)	TAIBI Rachid anrh@anrh.dz	General Director
		Mohammed Ramadan	Deputy Director
	Department of Planning and Economic Affairs (DPAE)	Kamal Hammady	Deputy Director for Planning
	National Office for Sanitation (ONA)	AmerChouikh achouikh@ona-dz.com	Exploitation Director
		Hamid Lazili h.lazili@onaara-dz.com	Alger Zone Director
Hosni Karim		General Director	
3/12/2012	Algeria National Launching Workshop (ANRH)		
3/12/2012	National Agency of Hydraulic Resources (ANRH)	MesratiTawfik	Director- Ground water Department
		KhayatiJayda	Hydro geologist-Database Officer
		Rashid Jatto	Director- Maps and Models department
	Side Interview: National Office for Irrigation and Drainage (ONID)		Program Officer
Side Interview: Algerian for Waters (ADE)	Khalifi Nadia	Management and Budgetary Control Officer	

d. Data Assessment

Providing this RAR will help raise awareness on the importance of data collection, annual estimation of performance indicators and their use in formulating strategic plans, policies, and action plans. Collected data can be categorized as follows:

- Governance information, including organograms, strategies, policies, action plans, memoranda of understanding, etc...
- Data on budgets, financial plans, and infrastructure financing, etc...
- Data on water resources (withdrawals and sectorial water use)
- Water supply and sanitation coverage
- Water quality information
- Census and demographics data
- Meteorological data, e.g. rainfall

Algeria water sector has an advantage of having a compact clear hierarchy for organization roles in data collection. This lead to having definite governmental bodies collecting data and thus there are no discrepancies in collected data. This has been very obvious in comparing figures with those appearing in many international reports on the country where harmony and consistency dominated. Moreover, the agreement on the definition of indicators is obvious amongst all water sector organizations. Most of the data for preparing the RAR were easily collected during the country visit and interview with related organizations. This was only possible by the sincere help and project endorsement by the Ministry of Water Resources, MRE. The following data has been collected during country visit;

Document	Format	Language	Organization
Water Quality Map 2011	Softcopy	French	ANRH
Presentation			
Monthly Water Quality Bulletin			
ANRH	Brochure		
Bilan 1962-2012 et Perspectives du Secteur des Ressources en Eau	Cover Page		
Echo of Algerian Environment	Magazine	French	M. Taibi
NWSAS Joint management of a Transboundary Water Basin	Synthesis Booklet	English	
Rashid El Taibi: important maps and other documents (water quality-climate change-others...)	Folder Soft Copy	Arabic - French	
Guiding Manual for Integrated Water Planning in Algeria	Book	French	DPAE
SEAAL Info	Magazine		SEAAL
Progress in Delegated Water Management in Alger 2006-2011	Brochure		

Document	Format	Language	Organization
Activity Report for 2011-Indicators	Report		ONA
Table of Contents for October 2012 Report	Cover +TC		
Organization Chart	Paper		
Development Program 2011	Brochure		
Progress Perspective 2001-2011	Magazine		
General-ISO 14001-Central Lab-training Center	Brochures		
BILAN_D'EXPLOITATION_Annuel_2010	Soft Copy		
Bilan annuel final 2011	Soft Copy		
Bilan 2012	Folder Soft Copy		
Statistical Report (Census 2008): RGPH 2008	Folder Soft Copy		
Statistical Reports: Indicator's progress/Wilaya (1998-2008): Wilaya Diff Grand Public	Folder Soft Copy		
Irrigation: Variable Documents	Folder Soft Copy		

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1. Acronyms

ADB	African Development Bank
ABH	Hydrographic Basin Agencies
ABN	Niger Basin Authority
ADE	Algerienne des Eaux
AFD	African French Agency for Development
AGIRE	National Agency for Integrated Management of Water Resources
ANBT	National Agency of dams and transfers
ANRH	Agence Nationale des Ressources Hydrauliques
BASHYD200	Climatology database
BADGE2000	Hydrogeology database
CBLT	Commission of the Lake Chad Basin
DAEP	Direction of potable water
DEAH	Direction of studies and hydraulic development
DHA	Direction of agricultural hydraulics
DHS	Household Surveys
DMRE	Direction for water resources mobilization and planning
DPAE	Direction of Planning & Economical Assessment
EAU II	Programmed'appui au secteur de l'eau et de l'assainissement
EU	European Union
GLASS	Global Annual Assessment of Sanitation & Drinking Water
IAO	l'AgronomicOltremare
INRAA	International Institute of Agronomic Research of Algeria
INSP	National institute of public health
IWRM	Integrated Water Resources Management
JMP	Joint Monitoring Program
MDG	Millennium Development Goals
MEUP	Ministry of Environment and Land Use Planning
MICS	Multi Indicator Cluster Surveys
MRE	Ministry of Water Resources

NGO	Non-Governmental Organizations
NWSAS	Western Sahara Aquifer System
ONA	National sanitation office
ONID	National Office for Irrigation and Drainage
ONM	National Office of Meteorology
ONS	National Office of Statistics
OSS	Sahara and Sahel Observatory
PDARE	Master Plan for Water Resources Management
PSRE	Support Plan for Economic Recovery
SAGESSE	Database
SGIAR	Integrated Management System of Agricultural Information and Rural
SME	Environmental management systems
SORES	Observation System for Underground Water Resources
TAT	Technical assistance team
WSS	Water Supply & sanitation
WWTP	Waste Water Treatment Plant

2. Country Background

Algeria, with an area of 2.4 million km², is the largest country of Northern Africa. Most of this surface is occupied by the Sahara Desert, an area rich in mineral resources. More than 90% of the population lives in the northern part of the country that includes the coastal Mediterranean zone, mountainous areas, plains and highlands. In this part of the country, the annual amount of rainfall varies between 300 and 1400mm/yr., whereas in the Sahara region and southern of the Saharian Atlas, the annual amount of rainfall does not exceed 100 mm (Agence De Bassin Hydrographique, 2009. Institutional Framework and Decision Making Practices for Water Management in Algeria). The country is divided into 17 major hydrographical basins, of which 5 are transboundary; the Medjerda basin is shared with Tunisia, and the Tafna, Draa, Guir and Daoura basins are shared with Morocco.



Figure 1. Map of Algeria

In the last census (April 2008), the complete population of Algeria was estimated at 34million inhabitants, among whom 80% live in the urban areas. In 2012, Algeria's population is 37.1million (Office National des Statistiques ONS, 2012, www.ons.dz). Density reported is 14.6inhabitants/km². Algeria is classified as an upper middle income country by the World Bank. The economy remains dominated by the state, a legacy of the country's socialist post-independence development model. The average annual water crop is estimated at 100billion m³, of which approximately 80% is lost as evapotranspiration. Freshwater resources are equal to 18.5billion m³, of which 11 billion correspond to surface water run-off and 7.5

billion to groundwater (Agence Nationale des Ressources Hydrauliques ANRH, 2011, Algeria Country Report). Of the total surface run-off of 12.4 billion m³, only 6 billion can be exploited by means of dam construction. From the 7.5 billion m³ of groundwater, 5 billion are located in the Sahara. The remaining 2.5 billion m³ are exploited at a rate of 80%, principally through wells and boreholes.

Table1. Basic statistics for Algeria (CIA-The World Factbook.Cia.gov, Nov 2012&DemmakAbdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algerie)

Table 1. Basic statistics for Algeria

Index	GDP (ppp-2011)		GDP (nominal-2011)		HDI (2011)
	Total	Per capita	Total	Per capita	
Value	\$263.661 billion	\$7,333	\$190.709 billion	\$5,304	0.698 (medium)

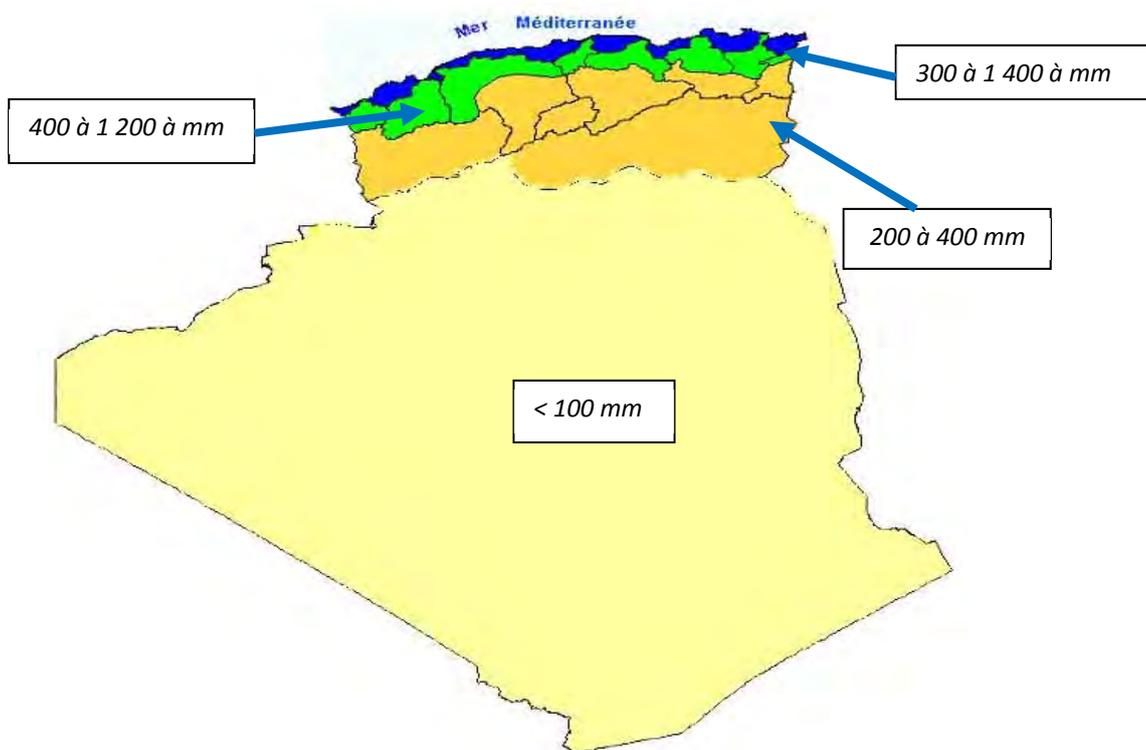


Figure 2. Precipitation Map of Algeria

3. National Water Development Strategies and Policies

The water legal system and hydraulic infrastructures is deeply marked by the public state character. Algeria is actually undertaking deep social and economic reforms. New laws are being implemented to put into action new mechanisms for intended economical management. The principal elements that come out from these laws, compared to the previous ones, are the investment opportunities given to the private sector to participate in the socio economical activities and programs. The new water policy in Algeria is based on the principles of: Integrated management, collaborative, participatory, across the watershed; economic and ecological management; the principle of fairness and security of supply; the principle of sustainability, and good governance. This new policy is based on the policy planning, which has set itself the objective of creating a dynamic rebalancing of the territory, including the sustainable development of the Highlands and the South. Achieving this goal requires the use of large transfers, and to appeal to unconventional resources, especially the desalination of sea water, reuse of treated wastewater, and has implementation a policy of saving water. Algeria has made during the last decade (2001-2011), considerable efforts on investment for the construction of a large number of works of mobilization, transfer, treatment and supply resources water to effectively meet the growing demand of the various uses of water. The importance of investments through various programs has resulted in tangible results in terms of meeting needs for water, both in quantity and quality required. The principal water related legislations are contained in the following; Law 05-12 on the water; Act No. 83-03 of 05 February 1983; Law No. 03-10 of 19 July 2003 on the protection of the environment; and the regulations implementing these laws (SOGESIDE, 2005, Approvisionnement en Eau et Assainissement au Niveau Local, Rapport par Pays Algerie). In the context of law enforcement on the water: 39 decrees of the 44 planned have already been published. Overall, the continuous updating ensures that water-related legislation meets emerging needs and concepts and the increased concern over the environmentally sustainable management of water resources. However, law enforcement, especially with regard to water abstraction and pollution control can possibly be considered insufficient. The following table shows the laws and legislations for water resources and water supply & sanitation.

Table 2. Algerian Water Related Legislations

Focus of Law	Law description and content	Ref.
Distribution of water	Law No. 05-12°: Art. 3. - The principles on which foudent l'utilisation, management and sustainable development Resources Management water are: - The right of access to water and sanitation to meet the basic needs of the population in respect of equity and the rules of this Act relating to public water services and sanitation, and property in urban areas. - The right to use water resources devoted to any natural or legal person in public or private, within the limits of the general interest and in accordance with the obligations laid down by this Act and the regulations adopted for its implementation;	MRE (DRC)
Water quality	Law No. 05-12°: Art. 112.-Any natural or legal person, public or private, providing water for human consumption, is required to ensure that the water meets drinking water standards and / or quality laid down by regulation. Art. 114. The nature, frequency and methods of analysis performed at the works and installations of production, processing, supply, advertisement and distribution of water for human consumption water, and the conditions of accreditation of laboratories to perform these analyzes are set by regulation.	MRE (DRC)

Focus of Law	Law description and content	Ref.
	<p>Executive Decree No. 11-125 of 22/03/2011 relating to the quality of water for human consumption</p> <p>Executive Decree No. 11-219 of 12/06/2011 laying down quality objectives for surface and groundwater for the</p>	
Water Supply and Sanitation	<p>Law No. 05-12 °:</p> <p>Art. 100. - The supply of drinking and industrial water and sanitation are public services.</p> <p>Art. 101. - Public water services under the jurisdiction of the state and municipalities. The State may grant the management of public water and wastewater services to legal entities of public law, based on specifications and regulations approved service regulation. It may also delegate all or part of their management of legal persons under public or private law on the basis of an agreement.</p>	MRE (DRC)
Standards for industrial effluents	<p>Law No. 05-12 ° :</p> <p>Art. 119. - Discharge into a public sewerage system or a sewage treatment plant wastewater other than domestic is subject to the prior approval of the Authority resources eau. Ce spill may be subject to an obligation of pretreatment in the case where, in the rough, this wastewater can affect the proper functioning of the public sewerage or sewage treatment plant.</p> <p>Executive Decree No. 09-209 of 11 / 062009 laying down the procedures for granting permission to discharge wastewater other than domestic in a public sewerage system or a sewage treatment plant.</p> <p>Law No. 03-10 on the Protection of the Environment</p> <p>Art. 10. - The state is monitoring different components of the environment The state must define the limit values, alert thresholds, and quality objectives, including air, water, soil and. basement , as well as monitoring devices , these recipients and the measures to êtreobservées in special situations</p> <p>Executive Decree No. 06-141 of 19/04/2006 defining the limits of industrial liquid effluent discharge values : The purpose of this Order, pursuant to the provisions of Article 10 of Law No. 03-10, to define the limits of the discharge of industrial effluents values. It lays down technical requirements for facilities generating such waste and the methods of control, including self, to ensure compliance with emissions limits specified in the Annex to this Order.</p>	MRE (DRC)
fisheries and freshwater aquaculture	<p>Law No. 01-11 of 3 July 2001 on fishing and aquaculture:</p> <p>Article 17 : Inland fishing is that exerted in inland waters such as dams , lakes, wadis , sabkhas , impounding reservoirs .</p> <p>Article 21: the practice of aquaculture is carried out under a concession granted by the authority responsible for fisheries.</p> <p>Article 38: Conditions governing aquaculture</p> <p>Executive Decree No. 03-481 of 13/12/2003 laying down the conditions and procedures for exercising fishing.</p> <p>Article 34: inland fisheries is that exerted in natural water bodies and artificial, such as dams, lakes, wadis, sebkha and impounding.</p> <p>Executive Decree No. 04-373 of 21/11/2004 laying down the conditions and procedure for granting the concession for the establishment of an aquaculture establishment</p> <p>Executive Decree No. 10-93 of 14/03/2010 amending and supplementing the Executive Decree No. 04-373 of 21/11/2004</p> <p>23/10/2002 framework agreement between the Ministry of Water Resources and the Ministry of Fisheries and Marine Resources , defining the modalities for promotion of natural and artificial water bodies</p> <p>Interministerial Circular No. 06 /254 of 23/04/2006 establishing the conditions for provisional registration and arming vessels for the exercise of inland</p>	Ministère de la pêche MRE (DRC) ANBT

Focus of Law	Law description and content	Ref.
	<p>fisheries .</p> <p>Draft decree laying down the conditions and procedures for exercising the inland fisheries (at the SGG for review and approval).</p> <p>1211/MDB/94 Interministerial Circular No. 30 /10/ 1994 specifying the rules and conditions for the exercise of inland fisheries in the waters of dams</p> <p>Law No. 05-12: Article 77: 7th paragraph:</p> <p>Art. 77. - Are subject to the regime of the concession of use of water resources, transactions include:</p> <ul style="list-style-type: none"> - The establishment of facilities and the implementation of specific operations at surface water reservoirs and lakes, with a view to develop aquaculture and inland fisheries or sports activities and water sports 	
Irrigation and drainage	<p>Law No. 05-12 : TITLE VII OF AGRICULTURAL WATER: Articles 125-136 (11 items) deal with agricultural water</p> <p>The Chapter 1 (Articles 125-131) covers the following topics: definition, sampling conditions, pension concession, authorization for use of water resources for agricultural purposes, owners obligation, prohibition of use of wastewater.</p> <p>Chapter 2 (Articles 131 to 136) deals with irrigation: definition, types, management, concession.</p> <p>Interministerial Decree of 27/12/2004 establishing a coordination committee between the Ministry of Water Resources and the Ministry of Agriculture and Rural Development</p> <ul style="list-style-type: none"> -Interdepartmental Decree establishing a set of standard loads on the management concession for the operation and maintenance of structures and infrastructures PMH -Interministerial Circular of 22/11/2008, concerning the authorization procedures for underground water catchments -Interministerial Circular of 22/11/2008, concerning the development of irrigation pour l'amélioration productivity of cereals - Interministerial Circular of 22/03/2007, on boreholes and wells 	MRE (DRC)
Reuse of treated wastewater in agriculture	<ul style="list-style-type: none"> -Executive Decree No. 07-149 of 20/05/2007 fixant the terms of concession and use of treated wastewater for irrigation, as well as standard specifications relating thereto -Interdepartmental Decree establishing the list of crops that can be irrigated with treated wastewater; -Interdepartmental Decree establishing the specifics of treated wastewater used for irrigation; - Interdepartmental Decree establishing the list of laboratories carrying out analyzes of the quality of treated wastewater used for irrigation. 	MRE (DRC)
Extreme events (floods, droughts, coastal storms)	<p>Law No. 05-12°</p> <p>Art. 53. - To ensure the protection of persons etdes property located downstream reservoirs of surface water and nearby wadis and conforms with the laws in force in the field, devices set by regulation, may, where appropriate, provide instruments descruces forecasting and warning measures and intervention.</p> <p>Art. 91 - . In case of natural calamities and drought situation, the Authority Resources Management water can take measures limitation or temporary suspension of water uses according to the requisitions to mobilize to fight against eauxnécessaires claims and to ensure, priority, the water supply of population and livestock watering</p> <p>Executive Decree No. 09-399 of 29/11/2009 defining instruments of flood forecasting, and in particular Chapter II, on instruments of flood forecasting for</p>	MRE (DRC)

Focus of Law	Law description and content	Ref.
	the prevention of flood risks	
recreational activity	Executive Decree No. 11-340 of 26/09/2011 laying down concession of use of water resources for the establishment of facilities at surface water reservoirs and lakes with a view to develop activities water sports	MRE (DRC) ANBT
Hydropower	Executive Decree No. 11-341 of 26/09/2011 laying down concession of use of water resources for the establishment of facilities at the foot of dams, ponds and diversion structures in order to power hydroelectric plants	MRE (DRC) ANBT
Natural mineral waters and spring waters	Executive Decree No. 12-187 of 25/04/2012 amending and supplementing the Executive Decree No. 04-196 of 15/07/2004 on the exploitation and protection of natural mineral waters and spring waters	MRE (DRC)
thermal waters	Executive Decree No. 07-69 of 19/02/2007 laying down the conditions and procedure for granting the concession for the use and exploitation of thermal waters	Minitère du Tourisme

Strategies influencing M&E: In Algeria, the main strategy of water sector is to ensure access to drinking water, improve service quality and ensure protect ecosystem. Moreover, the objectives of all policies implemented in water sector are to reach a dynamic balance between resources and water requirements for all population. For this purpose, unconventional resources are targeted such as desalination of sea water and reuse of treated wastewater. Inside these strategies and policies; African vision 2025, and MDGs are targeted and similar indicators are used. This vision goes parallel with embedded objectives of poverty reduction and gender equality. A report issued in 2005 by the Algerian Government confirmed that Algeria will be capable of achieving the MDGs by the year 2015 concerning water supply and sanitation (Rapport National sur les Objectifs du Millendair pour le Developpement, Algerie, 2005). Moreover, recent figures for coverage rates of water supply and connection to sanitation confirm achieving MDGs in water sector by 2014. This will be shown in details in latter sections.

4. Water Sector Overview

a. Water Resources

Water resources in Algeria are scarce and are distributed unfairly. During the last 25 years, Algeria has been through a severe drought, characterized by important deficit of country's rainfall; this drought has had a negative impact on social and economic activities in the country. The country is divided into five basins comprising the 19 watersheds in the country. The renewable surface water resources are estimated to total 11 billion m³ (see Table 3.a) for the entire Country; the Sahara, the largest pool in the area, contains only 0.5 billion m³. Renewable groundwater resources contained in aquifers in the north are estimated at nearly 2.5 billion m³. These are mainly fed by rainfall distribution which remains irregular both in time and in space. Rainfall is fairly abundant along the coastal part of the Tell, ranging from 300 to 1400mm annually, the amount of precipitation increasing from west to east. Precipitation is heaviest in the northern part of eastern Algeria, where it reaches as much as 1,000mm in some years. The beneficial uses for rain fed agriculture, pasture, and forest areas which is known as green water, is estimated to be 8 km³/y. Transboundary incoming surface flow (from Tunisia and Morocco) is estimated at 0.4 km³/y and the safe extract of non renewable fossil water is around 3.5 km³/y. The total actual renewable blue water resources is 11.68 km³/y in 2012 where the total population is about 35 million inhabitant, thus generating a per capita share of Renewable blue water resources of 334 m³/y. The potentially available water at the northern part is estimated at 8.1 km³, out of which 1.6 km³ is attributed to groundwater, and 6.5 km³ is surface water which needs regulation by dams. The total annual blue water withdrawal is 4.5 km³/y as of 2008, 60% of which is directed to agriculture, 25% to domestic and 15% to industry. The irrigation potential based on annual renewable blue water resources is estimated at 510,000 ha. The water supply coverage (2006) is assessed as 85% while the sanitation coverage (2006) was 94% (WHO, UNICEF).

Desalination of seawater is already used with 14 desalination plants currently operational supplying 14 coastal cities with 0.54 billion m³. With a wastewater production is currently estimated at 1.2 billion m³ year and a treatment capacity of 0.8 billion m³, Algeria now that reuses 0.1 billion m³ of water per year. Algeria is included in the basins of Lake Chad and Niger River. Algeria is not a member of the Commission of the Lake Chad Basin CBLT, which is concerned only with the conventional basin of Lake Chad, or the Niger Basin Authority, ABN (Agence de Bassin Hydrographique, 2009. Institutional Framework and Decision making Practices for Water Management in Algeria, Ministère des Ressources en Eau 2009 & Demmak Abdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algerie).

Dam reservoir sedimentation is identified as a main environmental problem which reaches more than 95% of siltation at some locations. Soil salinization tends to be of primary concern during the last decade characterized by extended dry periods. Water purification techniques are below standard and poor drinking water is a leading cause of disease and infant mortality. Alarming pollution of the water reserves at Mitjdja, the main supply for the capital, is encountered due to municipal and industrial wastes along with agricultural drainage. Nitrate concentration in some wells reached 100 mg/l in 1988.

Over the last few years, Algeria has achieved huge water transfer projects in several regions. A huge hydraulic infrastructure was built to allow the transfer of ground water from In Saleh to Tamanrasset via pipes of over 1,200 km of total length, an investment worth a reported sum of about US\$2 billion. The In Salah-Tamanrasset water transfer project has a water conveyance capacity of 100,000 cubic meters per day (Algeria Press Service). Algeria has been known to be one of the flood prone countries, a total number of 13 floods have occurred from the period of 2005 to 2009 (Arab Dartmouth flood Report).

Based on the NWSAS RAR report, it looks like Algeria aims to increase the annual abstraction from NWSAS to reach 6.1 BCM by 2050, and from the same report we know that the annual recharge of NWSAS is about 1-1.1 BCM, therefore it is safe to assume that the targeted non-renewable abstraction will be 5 BCM for a period of 50 years (it was originally meant from 2000-2050, but we can assume that it didn't start yet). As for the associated drawdown, the OSS 2004 paper mentions several examples of models for parts of the NWSAS where the expected drawdown ranged from 0.7 to 0.9 meters annually, so it is safe to assume that in Algeria's case the maximum annual drawdown could be 1 m, which means that the maximum allowable drawdown after the end of the 50 years abstraction period (with 5BCM extracted annually) could be 50 m.

Table 3. Mobilization of water resources in Algeria

Water use	2000	2011	2025
Number of barrages	47	68	110
Dams (mobilized capacity)	4.3	6.9	9
Dams (mobilized volume)	1.6	4.3	6
Surface (RC intakes)	0.2	0.4	0.5
Groundwater-North	1.8	2	2.5
Groundwater-North Sahara	1.4	3	4
Desalination	0	0.54	0.84
Reuse	0	0.1	0.9
Total (Billion m ³)	5	10.34	14.74

Table 4. Water use in Algeria (Ministere des Ressources en Eau, MRE, Algerie, <http://www.mre.gov.dz>)

Water use	(2006) Billion m ³ /year	(2030) Billion m ³ /year
Domestic & Industrial	3.1	4.2 – 4.6
Irrigation	3.4	7.8 – 8.2
Total	6.5	12 – 12.8

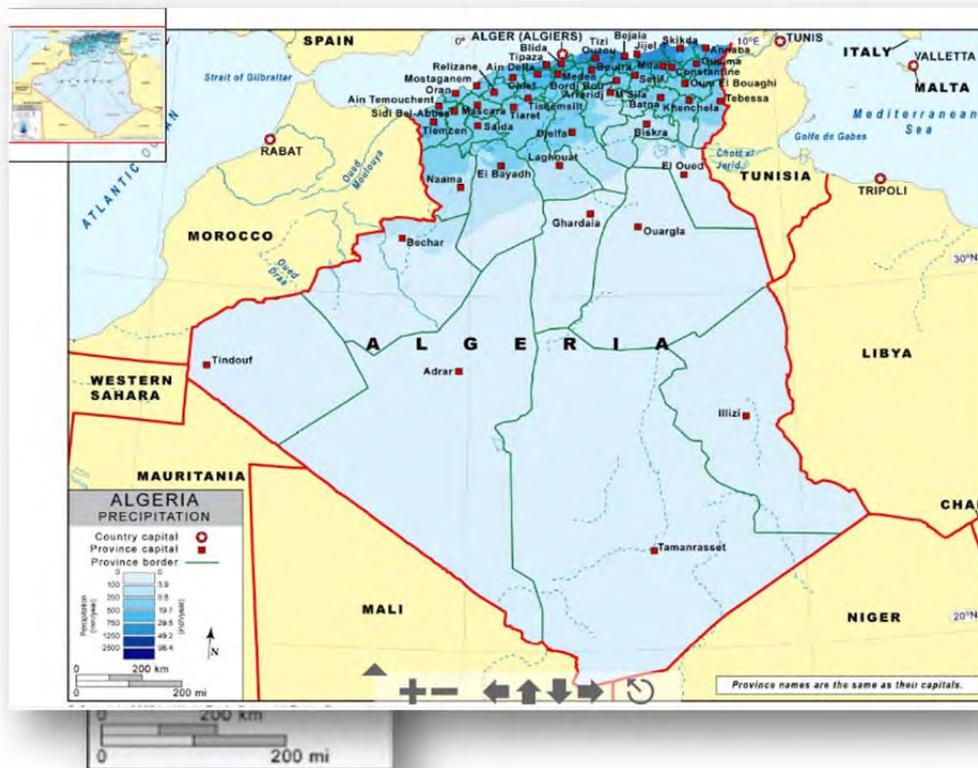


Figure 3. Precipitation Map of Algeria

Carte des évapotranspirations potentielles moyennes annuelles sur l'Algérie du Nord

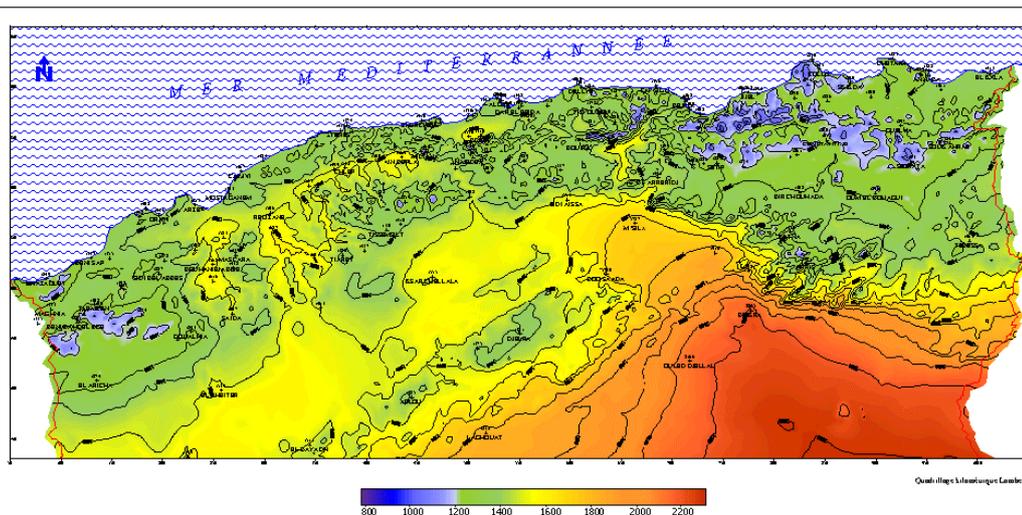


Figure 4. Evapotranspiration Map of Algeria

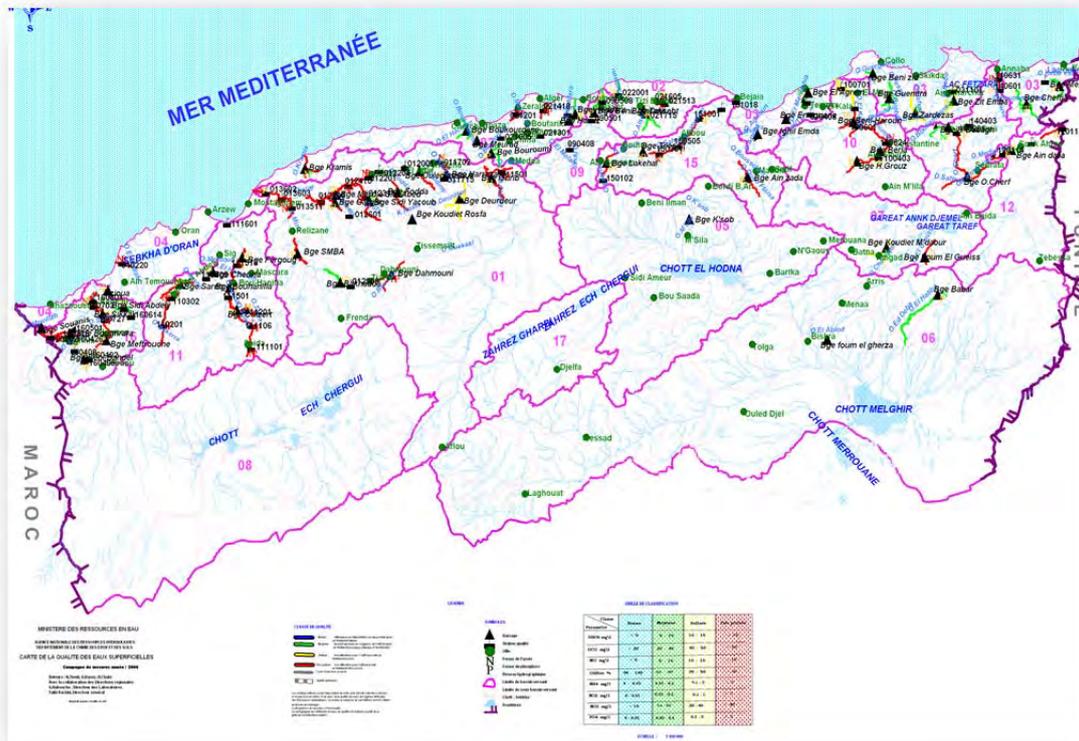


Figure 5. Hydrologic Basins in Algeria

Water Transfer projects: During the decade 2000-2010, five (05) major transfers were made:

1. Transfers North Highlands:

1.1. Beni Haroun transfer to Highlands Constantine:

This system will transfer 451 hm³ to the following destinations:

- AEP Constantine 50Hm³
- AEP Batna / Barika / Khenchela 80 Hm³
- AEP urban areas of the province of Oum El Bouaghi: 21 Hm³/year)
- Irrigation of 41,000 ha (Teleghma, Chemmora, Ain touta): 300 Hm³

1.2. Transfer Koudiat Acerdoune Hauts Plateaux to the center:

This system will provide 178 million m³ annually, from Koudiat Acerdoune Dam, to meet the needs of populations AEP 4 wilaya (Bouira, Tizi Ouzou, M'sila, Medea) and the irrigation of 19,000 hectares (Netherlands Isser, Mitija).

1.3. Transfer Ighil Emda and Erraguène to the High Plains Setif:

The project will transfer from dams Ighil Emda and Erraguène an annual volume of 313 million m³ for:

ASP 1.5 million inhabitants of the cities of Setif and El Ulma and neighboring communities

Irrigation 40,000 hectares of farmland plains of Setif.

2. South- South transfer (IN SALAH - TAMANRASSET)

Transfer potable water capacity of 100 000m³/d of Albian groundwater in the area of In Salah to Tamanrasset, a distance of 740 km, is one of the greatest achievements in the sector of water resources the last ten years in Algeria.

3. South Hauts Plateaux transfer (planned): This project is maturing.

b. Water Supply

The water distribution pipeline networks in Algeria extend to more than 105,000km, with a capacity to transfer 3.3billion m³/year. The capacity of water storage tanks exceeds 0.7billion cubic meters. It is worth noting that most of the water distribution network is old thus causes a high level of wasted potable water. The Government is aware of the need to allocate adequate funding to renew and modernize the distribution systems in the country. The drinking water average connection rate is estimated as 95% (max 100% & min 80%) with per capita share of 175lit/day (max 518lit/day & min 74lit/day), Demmak Abdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algerie.

Water Supply financing: Water sector is managed by public companies. The Algerian Water (Algerienne des Eaux, ADE) is responsible for drinking water provision. The water services are financed by two main means; the State grants for new investments and infrastructure development, user fees paid directly to ADE, which, in turn, distributes it back to the different public companies involved in the water sector to cover operation and maintenance costs. The water pricing is set by the state. A decree (Decree 05-13 of January the 9th, 2005) determines the rules for pricing of public services of water supply and sanitation and related prices. Drinking water pricing are set according to public service costs of water supply and its distribution among different categories of water consumers. Categories of users include: - households (Category I) - the government, artisans and services sector (Category II) - the industrial and tourism units (category III). Price in DA/m³/month for Category I is 6.3 (for up to 25 m³/month), 20.48 (from 26 to 55 m³/month), 34.65 (from 56 to 82m³/month), & 40.95 (more than 82 m³/month), Category II is 34.65, and Category III is 40.95. \$1 US Dollar equals 79 Algerian Dinar, DA.

Investments in Water Supply: Investments programs for water supply-related activities should follow the multiannual approach for investment planning, which was reintroduced by the major program, Support Plan for Economic Recovery, PSRE in 2001 and is regulated by Decree No. 98-227 related to all capital expenditures. This decree defines the procedures for inclusion of programs and projects in the budget according to central, de-concentrated communal levels. Public spending related to water has steadily increased in recent years. Percentage of GDP, the budget authority for investment in the water sector doubled from 1.3% in 1999 to 2.6% in 2006 (Department of Purification & Environmental Protection, 2011. Algeria Country Report, Ministère des Ressources en Eau, MRE Algerie, 2011, presented to the Arab Water Council in Dubai). Budget allocations were equally distributed between the mobilization and other sectors: Dams 43%, the ADE is 29%, sanitation 16% and irrigation accounts for 7%. The total investment for the short, medium and long term was established on the basis of the blueprint of large hydraulic infrastructures. The total investment planned for all projects (including ADE, sanitation facilities and downstream desalination plants) in the short, medium and long term is around 35billion U.S. dollars. This program is expected to significantly reduce deficits in drinking water populations in urban and rural areas, to conserve resources and to expand irrigated areas.

Table 4. Water sector investment plan (2006-2025) (Department of Purification & Environmental Protection, 2011. Algeria Country Report, Ministère des Ressources en Eau, MRE Algerie, 2011, presented to the Arab Water Council in Dubai)

Table 5. Water sector investment plan (2006-2025)

Type of investment (million US\$)	Agriculture	Water Supply	Sanitation	Water resources Mobilization
Short term	1530	7470	1770	15920
Medium term	960	1940	940	2850
Long term	-	330	1470	530

Water Sector reform: Algeria is reforming and restructuring the water sector. The new water policy in Algeria is based on the principles of: Integrated management, collaborative, participatory, across the watershed; economic and ecological management; the principle of fairness and security of supply; the principle of sustainability, and good governance. The semi-arid climate of Algeria and its population growth rate importantly, make important increase agricultural productivity to ensure food security. Agricultural development is strongly influenced by irrigation. Agriculture has become highly strategic, because water resources are highly sensitive to climatic conditions, and the soils are weakened by the aggressiveness of natural phenomena. This new policy is based on the policy planning, which has set itself the objective of creating a dynamic rebalancing of the territory, including the sustainable development of the Highlands and the South. Achieving this goal requires the use of large transfers, and to appeal to unconventional resources, especially the desalination of sea water, reuse of treated wastewater, and has implemented a policy of saving water. Algeria has made during the last decade (2001-2011), considerable efforts on investment for the construction of a large number of works of mobilization, transfer, treatment and supply resources water to effectively meet the growing demand of the various uses of water. The importance of investments through various programs has resulted in tangible results in terms of meeting needs for water, both in quantity and quality required. Within the new institutional framework, the Ministry of Water Resources (MRE) will be responsible for water, wastewater and irrigation planning, management, monitoring, and pollution control.

The national water steering scheme is adapted to fit into the national scheme for the country's development for horizon 2025. Strong inter-sectoral consultations are actually taking place between the concerned ministries to put into action this project that started in early year 2006. It has been pointed out that that water question endows a strategic interest for a sustainable development and lay-out. The main objective of the country's water policy consists on providing sufficient potable water for the population supply. This objective is undertaken by increasing the water resources and availability. The government has put into action a wide program taking into consideration several tasks, as:

- Increase rainfall collect capacity (dams construction)
- Interconnection between dams to overcome spatial variability
- Promote waste water re-use
- Promote seawater desalination
- Restore cities water distribution facilities
- Implement new way of management

- Promote personnel training
- Modernize management facilities

Water Supply Development Programs Underway: Currently the Algerian Government is undertaking a technical assistant program to support water sector in terms of water resources protection and also to contribute to the reduction of water-borne diseases. The current program is following a first UAP program also financed by the EU (2007-2011). The program is registered under the indicative National Plan 2011-2013 and is called “Programmed’appui au secteur de l’eau et de l’assainissement (EAU II)” with a total budget of 40 million EUR, of which 30 million EUR provided by the EU (European Neighbourhood & Partnership Instrument, 2006. Algeria Strategy Paper 2007-2013 & National Indicative Programme 2007-2010). Specific objectives are, on the one hand, to reinforce the strategic WSS framework and, on the other hand, to improve the efficiency of the urban WSS sector and the quality of wastewater effluents. The project objective is to recruit a technical assistance team (TAT) for the water supply and sanitation (WSS) sector and to provide short-term experts in the various fields covered by the program. TAT will provide support to Algerian authorities, and will be responsible for managing the full program including the budget support approach to be implemented for the first time in Algeria. All support is provided in close coordination with the beneficiaries, including the sanitation and environmental protection agency, national planning commission and national sanitation office (ONA). The expected results from the program are assistance to improve the strategic planning and coordination in the WSS sector; assistance to improve the performance and transparency of the budgetary planning in the WSS sector; assistance to technical capacity building and HR support to the local public and private stakeholders in the WSS sector; assistance to increase efficiency of MIS and operation of wastewater systems; assistance to improve the management of collection & treatment of effluents.

MDGs: Algeria has already met the MDGs related to water supply set for the year 2015 and if it continues with this rate, it will also reach the African Vision 2050. In 2012 the actual connection rate/water supply coverage is 95% while the planned for 2015 is 100% covering the MDG target for water supply coverage of 85.5% in 2015, ((European Neighborhood & Partnership Instrument, 2006. Algeria Strategy Paper 2007-2013 & National Indicative Programme 2007-2010).

c. Sanitation

The length of the sanitation national network is experiencing a significant improvement; due to the implementation of the sewerage network program of achievement throughout the country. Sewerage networks evolved from 21,000km in 1995 to 41,000km in 2010 with branching ratios/rates of connections increasing from 79% to 86% from 1995 to 2010. With the achievement of approximately 1,500km of collectors per year, the national total sanitation network by 2020 will be 54,000km. The annual volume of wastewater discharged is estimated at about 1.2 billion m³. The water resources sector has launched a very ambitious program for wastewater treatment plants. Several stations are currently underway or being rehabilitated and others will be launched. Sewage treatment plants are managed for two years by the building operators and by the National Sanitation Office (Office National de l’Assainissement, ONA) with a training program to ensure continuity of service. The Waste Water Treatment Plants and lagoons have laboratories for daily control of water quality at the inlet and outlet works and the quality of sludge (DBO₅, COD, TSS). These laboratories are backed by the central laboratory of the ONA, which provides more analysis of heavy metals on water and sludge treatment plants. While in 2000, the National Park of sewage treatment plants had only 18 WWTP in operation, it reached in April 2011 as follows; 134 sewage

treatment plants, 61 sewage treatment plants (activated sludge), and 73 lagoons (stabilization pond, aerated lagoon, sand filter, reed bed sewage treatment, garden filter) with a total capacity of 800 million m³/year in 2010 for sewage only. The treated volume is correlated with the number and capacity of existing treatment plants in each area: the area of Oran treats 32% of the total volume of 21 stations (including 17 lakes), and the area of Tizi-Ouzoutraets 19% with 13 WWTP, the lowest rate is 0.27% in the Saida area with 01 and 01 WWTP lagoon. The program for 2010-2014, it is projected the achievement of 40WWTP, which would make reach the treatment capacity in 2020 to 1.2billion m³. In the past, sanitation activity was managed by a multiple stakeholders. The year 2001 has witnessed the creation of a national public institution operating in industrial and commercial levels called National Sanitation Office (ONA) under oath of the Ministry of Water Resources to ensure the management and operating sanitation at the national level.

As such, the concession of public service sanitation has been entrusted to the National Office of Sanitation by the Ministry of Water Resources (Section 104). Those entities may delegate all or part of their management to legal persons under public or private on the basis of a convention. Currently, five wilayate (Algiers, Oran, Constantine, Annaba and Tarf) are governed by a management contract established between ONA and ADE in one side and foreign private operators in the other side under the oath of the Ministry of Water Resources. The National Sanitation Office "ONA" manages 68 WWTP and 27561km network. Other WWTP and the rest of the network are managed by local authorities, the building operators and the stock company in major cities (Algiers, Oran, Constantine, Annaba and Tarf).

Sanitation financing: Wastewater sector is managed by public companies. The National Office of Sanitation (Office National de l'Assainissement, ONA) manages wastewater. The wastewater services are financed by two main means; the State grants for new investments and infrastructure development, user fees paid directly to ADE, which, in turn, distributes it back to the different public companies involved in the water sector including ONA to cover operation and maintenance costs. The Sanitation price is set on the basis of public service costs of sanitation and its distribution among different categories of users and water consumption bands corresponding to the volume of water supplied to public service users of drinking water. In general, sanitation is included in water bill as 80% of bill and the basic price in DA/m³ is 6.3 in Algiers, Oran, Constantine, 6.1 in Chlef, and 5.8 in Ouargla, (1 \$Dollar equals 79 Algerian Dinar, DA).

Investments in Sanitation: Investments programs for sanitation-related activities should follow the same previous program PSRE. Percentage of GDP, the budget authority for investment in the water sector doubled from 1.3% in 1999 to 2.6% in 2006. Budget allocations were equally distributed between the mobilization and other sectors: Dams 43%, the ADE is 29%, sanitation 16% and irrigation accounts for 7%. This program is expected to significantly reduce deficits in drinking water populations in urban and rural areas, to conserve resources and to expand irrigated areas, (Department of Purification & Environmental Protection, 2011. Algeria Country Report, Ministère des Ressources en Eau, MRE Algerie, 2011, presented to the Arab Water Council in Dubai).

MDGs: Algeria has already met the MDGs related to sanitations set for the year 2015. The actual rate of connections/sanitation coverage is 86% in 2012 while the planned for 2015 is 95% exceeding the MDG target for sanitation coverage specified as 84.5% in 2015. If it continues with the current progress rate, it is very likely to achieve the African Vision 2050 goals.

d. Agricultural water

In terms of agricultural water, it should be noted that the irrigated area in Algeria have evolved 905,300 ha in 2007 to 1.64 million ha in 2014

It is expected also:

- The modernization and specialization of large irrigated areas:
- Improved profitability and water management in irrigated areas (possibility of specialization of these areas to meet the strategic needs of agricultural products, including security programs seeds
- A specific incentives for the widespread scope for water saving irrigation systems, a direction that will allow a considerable saving of water
- The preservation of irrigation investments, for sanitation and drainage operations
- A pilot program for the use of treated wastewater for irrigation

There perimeters high agricultural potential that must be identified and whose development is conditioned by the availability of the resource, whatever its nature, and in particular the reuse of treated wastewater.

Regarding the reuse of treated wastewater, it may be assigned to different uses, namely:

- Preservation of the environment and water resources
- Irrigation of crops: The perimeter Hennaya (912ha), supplied from treated wastewater Tlemcen sleep is already operational, the perimeter of the M'léta (8000 ha), to be supplied from the treated wastewater to Oran was launched in implementation, the scope of the Sahel of Algiers (1300 ha) to be fed from STEP Hadjout and Tipaza was launched in study
- Industrial use (including the cooling of industrial installations)
- Artificial recharge of groundwater

e. Principal Issues in Water Sector

There are several constraints and shortcomings in water sector in Algeria. Those can be stated as;

- Algeria, due to its climate, is a country with limited water availability and increasing water scarcity. The annual water availability per capita estimated at about 500m³/inhabitant. The mobilization of groundwater (with the exception of the Sahara mineral resources) has been nearly completed.
- Old existing water distribution networks with estimated losses due to leakage for nearly 30% of water distributed (to reach 20% in 2020) an enormous amount when compared to the increasing water scarcity the country is facing. Moreover, there is a lack of technical and economical capacity for efficiently reducing the water leaks and pipe cost recovery, Demmak Abdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algerie.
- Agricultural development, liberated in the 1990s after a long socialist period, has resulted in the significant use of fertilizers, with the aim to further increase agricultural production. This is now clearly manifested in the increasing concentrations of nitrates in both surface and groundwater.

- In the coming years, water pollution will be a major problem, due to two major causes; increasing urbanization has rendered cities major contributors to river pollution (most rivers are of seasonal flow and dry during the summer).
- Over Exploitation of groundwater; a large number of wells and boreholes are being drilled, in many cases without prior authorization or permit. In 2006, authorities decided to develop an inventory of water extraction points; however, this is considered a difficult task as the number of illegal wells or boreholes is at present estimated at several thousands.
- Data and information systems and analytical tools on water resources have to be implemented, maintained and regularly updated. Towards this end, an effort was initiated at the national level by the Ministry of Water Resources, and at the regional level, through the Basin Agencies, in order to collect and organize all existing water-related data. Along the same line, simulation tools on water resource assessment, demand and allocation are being implemented by the Basin Agencies. Several environmental taxes were introduced during the past decade. Basin Agencies are, according to the relevant legislation, in charge of collecting the 2005 tax for industrial and service facilities, but actually lack sufficient human resources to undertake the task, Short form RAR filled by DemmakAbdelmadjid, Ministère des Ressources en Eau, MRE Algerie, 2013.
- Although the pertinent legislation advocates the principle of public participation, the participation of the different actors is rather weak, with all important decisions being taken at the national level. Basin Committees were established in 1996 (at the same time as the Basin Agencies), but are not fully operating for the time being.
- The country is vulnerable to climate change; it experienced more frequent droughts, increased desertification and greater wind and water erosion in recent years. As well as decreased rainfall over the past 30 years has affected dams, groundwater tables and salinization due to aquifer over-exploitation and drought.
- Physio-chemical quality of water in poor regions of the Sahara.
- The Algerian dams are faced with three very serious water problems; intense evaporation, siltation and excessive leakage of water through the banks and the foundation and specifically dry lands are affected by a dry spell since approximately twenty years. This threatens dam and cause a decline in volume of water retained by dams.

f. Water Sector Institutional Framework

i. Water Resources

At present, water management falls solely under the responsibility of the Ministry of Water Resources, established in 2000. The Ministry is responsible for water resource planning, investments on all issues relevant to water resources protection and exploitation, such as hydraulic infrastructure, inter-basin transfers, drinking water supply networks, and sewage treatment plants. It is also responsible for allocating available water among the different uses (agricultural, domestic and industrial), and for controlling all water-related infrastructure (public and private). Additional tasks include the monitoring of water resources, in terms of both quantity and quality; for achieving this task, the Ministry can undertake all the necessary surveys and assessments, and is responsible for data collection on all the above issues. It

also has control over; Five national agencies: Agence Nationale des Barrages et des Transferts (National Dam and Inter-Basin Transfer Agency), Agence Nationale des Ressources Hydrauliques (Hydraulic Resources National Agency), Office National de l'Irrigation et du Drainage (National Office for Irrigation and Drainage), Office National d'Assainissement (National Office for Sanitation) and the Algérienne des Eaux. These agencies are responsible for collecting information on water and water infrastructure (water cadastre) to management integrated water resources. They are responsible for developing regional master. They are also involved in raising awareness for water conservation and resource protection against any kind of pollution. Recently, Algeria Water Sector has new bodies, e.g. Regulatory Authority Utilities Water (2010), the management Agence Nationale ressources Integrated Water (2011), and the implementation branches. The roles and responsibilities of the above institutions are summarized in the following tables. The institutional linkage is observed to be information sharing amongst various levels.

Table 6. Water Resources sector organization

Domain	Ministry of Water Resources	National Agencies	Local Administration
Planning	Direction of Planning & Economical Assessment (DPAE)		Regional Directions at the Wilayas
Large hydraulic infrastructure	Direction for water resources mobilization and planning (DMRE)	National Agency of dams and transfers (ANBT) – Feasibility studies – Implementation and management	
Irrigation	Direction of agricultural hydraulics (DHA)	National Office for Irrigation and Drainage (ONID) – Management of irrigation perimeters	
River Basin Management/ General studies	Direction of studies and hydraulic development (DEAH)	Hydrographic Basin Agencies (ABH) National Agency for Water Resources (ANRH)	

Main tasks of the water sector can be stated as; Knowledge of water resources and needs at different horizons; planning the development of water infrastructure necessary to meet the needs; mobilization and integrated conventional resources (surface water, groundwater) and unconventional (desalination of sea water, reuse of treated wastewater); drinking water supply and industry; irrigation in large areas and facilities for small and medium hydropower; urban sanitation and protection against flooding; and adaptation of the legal and institutional framework. The structure of the water sector falls under three categories; the Central Administration; the Authority devolved ((DREW); and the public trust. The Administration consists of 48 departments of water resources Wilaya (DREW) responsible for project management of water projects decentralized project management and decentralized projects at the municipal level. DREW ensures the protection of public water by the water police and monitoring the application of technical regulations and standards. The public institutions are responsible for implementing the national development of water resources and infrastructure operations carried out by the State or on its behalf. These Institutions are listed below:

- The National Agency for Water Resources (ANRH), whose mission is to inventory water resources and irrigable soils.

- The National Agency for Dams and Transfers (ANBT), whose area of expertise mobilization of surface water resources through dams and transfers as well as the operation and maintenance of these structures for use in food in drinking and industrial water and irrigation.
- The Algerian des Eaux (ADE), responsible for ensuring the implementation of the national policy on drinking water. As such, the ADE is responsible for all activities of production, processing, storage, supply and distribution of drinking water and industrial as well as the renewal and infrastructure development related.
- The National Sanitation Office (ONA) is responsible for the implementation of the national sanitation policy and protection of the water environment. As such, the ONA is responsible for all activities related to the collection, treatment and recovery of waste as well as the renewal and infrastructure development related thereto.
- The National implementation and management of irrigation and drainage infrastructure (ONID) is responsible for the equipment and operation of large irrigation projects.
- The National Office of implementation and management of infrastructure for irrigation and drainage (ONID), whose area of responsibility the equipment and operation of large irrigation schemes.
- Basin agencies (ABH) whose mission is to implement the policy of integrated water management at the scale of large river basins. Committees attached to these agencies comprise representatives of the Administration, local and of water users. These committees are consultative bodies on all matters related to water regionally. The following table gives an overview of the water resources sector institutional planning;

Table 7. Water Resources sector planning

Activity	MRE	ANB	ANRH	ADE	ONA	ONID	ABH
Surface Water							
Use & Storage		Y					
Groundwater recharge		Y					
Quality monitoring		Y	Y				Y
Assessment		Y					
Groundwater							
Use & Storage			Y				
Quality monitoring			Y				Y
Irrigation							
Rehabilitation & Operation						Y	
Reuse							
Drainage Water					Y		
Waste Water					Y		
Desalination				Y			
Water Utilization				Y			

Activity	MRE	ANB	ANRH	ADE	ONA	ONID	ABH
Legislation & Policy setting	Y						
Project financing	Y						
Project design & implementation		Y	Y	Y	Y	Y	Y
Pricing	Y						

Participatory Consultation: In Algeria, the participatory consultation is conducted as follow; National level: through the National Advisory Council on Water Resources, at the regional level, through the basin committees established at five watersheds Agency (ABH), at the wilayas by APWI (People's Wilaya Assemblies), and at the Commons by APC (Popular Assembly communal).

Legislations: Previously described laws constitute the main legislations governing the water resources management and in general they are effectively enforced.

IWRM: In the context of prevailing water crisis during the last decades and after a long succession of droughts, the government decided to build the water issue in priority order first by the creation in 2000 of a Ministry of Water Resources. The new water policy that fits within the scheme of National Planning (Horizons 2015-2025-2040) based on a strategy whose components are contained in the Water Act of August 2005. This law including forty decrees were promulgated can have an updated legal framework creating the conditions for an integrated and modern water resources. It takes into account the definition of public water, unconventional resources, development planning at different time, the principle of integrated management of water resources, the Public Private Partnership and the establishment of institutions specialized audiences covering all water activities and the training system. Others approaches for incorporating the IWRM concept in water sector are the National Plan for Water issued by the Ministry of Water Resources (2003) and the Action Plan for implementation of an IWRM Framework - Ministry of Water Resources (draft 2006-7). These steps takes towards the Integrated Water Resources Management (IWRM) are considered by the African Bank "initial steps" on the right track in 2006. Most recently, in 2011, the National Agency for Integrated Management of Water Resources (AGIRE) was established for carrying out all required actions towards an integrated water resources management framework. All Integrated Water Resources Management, IWRM, is being financed by the Algerian Government.

ii. Water Resources Related Organizations

For the water sector in Algeria, stakeholders are;

Ministry of Transport: The National Office of Meteorology, ONM in Algeria, under the Ministry of Transport is the entity responsible for developing and operating a network of weather observation stations covering all climatic regions of the country. The monitoring stations include; 77 surface observation stations; 12 observation stations in altitude; 3 research stations and special observation (Tamanrasset, TiaretKsarChellala); 5 weather radars (one of them is a radar doplaire) and more than 400 climate stations; 296 climatological stations 117 stations and 179 posts conventional automatic. ONM is responsible for monitoring and collecting continuous daily information about temperature, precipitation and evapotranspiration, all of which are used by the various water sector institutions especially ANRH and ONA.

Ministry of Health: The National institute of public health, INSP under the Ministère De La Santé, De La Population et De La Réforme Hospitalière is responsible for monitoring the quality of water in Algeria. It is responsible for protecting the health by safeguarding the environment and especially water. Therefore, INSP operates a wide monitoring network of drinking water from the source to supply, regardless of the type (borehole, well, spring, surface water, dam, pipe) or the consumer. There are 15 water quality parameters continuously monitored in all Wilayas. Health professionals of the INSP seconded by local committees are responsible for providing information regarding quality of water consumed by the public in Algeria (attached in an appendix the report of quality of drinking water in 2008).

Ministry of Environment: The Ministry of Environment is involved in the field of sanitation and the fight against pollution through the National Observatory of the Environment and Sustainable Development (ONEDD), and issues related to climate change, through the agency.

Department of Energy: The Department of Energy is involved in the implementation of the program of implementation of desalination plants as well as in the implementation and management of hydropower plants.

Ministry of Fishing: The Ministry fishing occurs in the area of fisheries and freshwater aquaculture has been the subject of Act No. 01-11 of July 3, 2001.

Ministry of Tourism: The Ministry of Tourism is involved in the field of "Natural mineral waters and spring waters, thermal waters."

Interinstitutional relationships amongst stakeholders: While there are clear relations amongst all of these stakeholders and the lead ministry, Ministry of Water Resources. Exchange of information among these stakeholders exists, e.g., between Ministries of agriculture and transport. Most of information sharing activities goes in the upward direction, i.e. from the various stakeholders to the lead ministry and there is minimum or no information flow in horizontal direction between stakeholders. But there exists a clear information flow in horizontal direction between the Ministry of Water Resources and the Ministry of Health through committees and monthly reports on the water quality conducted by various agencies and companies in the Action Area (ANRH, ADE, ONA, and SEAAL ...).

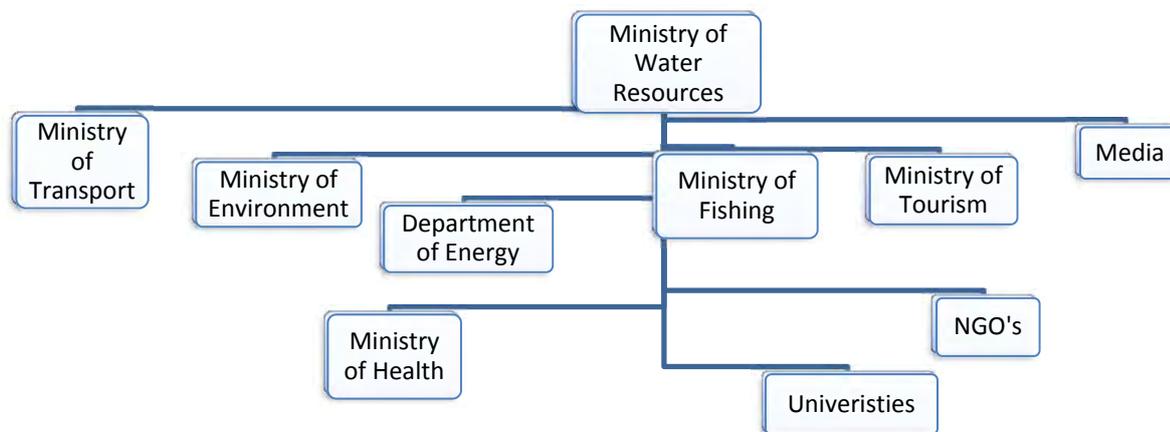


Figure 6. Organization chart for stakeholders in water sector

iii. Water Supply & Sanitation (WSS)

In Algeria, there is no segregation between rural and urban water supply and sanitation. The water supply systems and sanitation are managed by the ADE and ONA both in urban and rural areas. In large cities

(Algiers, Oran, Constantine, Annaba) there is a special status within the framework of delegated management. The following table shows the main organizations working in water and sanitation in Algeria.

Table 8. Water Supply & Sanitation sector organization

Domain	Ministry of Water Resources	National Agencies	Local Administration
Planning	Direction of Planning & Economical Assessment (DPAE)		Regional Directions at the Wilayas
Water Distribution	Direction of potable water (DAEP) Planning and legislation	Algerienne des Eaux (ADE) – Elaboration of feasibility studies – Implementation of water works – Overall management	
Sewage collection and treatment	Direction of sewage (DAPE) Planning and legislation	National Office for Sewerage (ONA) – Feasibility studies – Implementation and management	

- *Ministry of Water Resources*: Lead organization in Water Supply & Sanitation. Its main role is the implementation of the national policies set by the government in fields of Water Supply & sanitation. It is responsible for laying down the infrastructure of water and collection and disposal of sanitary water. Promoting the decentralization and private public sector partnership for development of Water Supply & Sanitation sector.
- *The Algerian Des Eaux (ADE)*: is a national public institution created by Executive Decree No. 01-101 of April 2001. Its role is to ensure throughout national implementation of the national policy on water through support management activities of production operations, transport, treatment, storage, supply, distribution and supply of drinking water and industrial as well as the renewal and infrastructure development related thereto. The responsibilities can be stated as; standardization and quality monitoring of the water supply; initiate any action to save water, including; improving the efficiency of network transfer and distribution; the introduction of any technical water conservation; the fight against waste in developing information campaigns, training, education and awareness towards users; design, with public educational curriculum disseminating the culture of water conservation.
- *The National Office of Sanitation (ONA)*: is a national public institution created by Executive Decree No. 01-102 of April 2001. The office aims at protection of the water environment and the implementation of the national sanitation policy in consultation with local communities. It is responsible for management and operation of sanitation facilities within its field of competence, including; any work for the sanitation of towns and particular, networks of wastewater collection, pumping stations, sewage treatment plants, sea outfalls in urban perimeters and communal areas as well as in industrial and tourism development; developing and implement integrated projects on the treatment of wastewater and stormwater drainage; manage subscribers utility sanitation; establish the cadastre sanitation facilities and ensure its updating; and develop master plans for the development of sanitation infrastructure within its field of activity.
- *Ministry of Health*: The Ministry of Health in Algeria has the main objective of preserving the health of the population. Law No. 85-05 of 16 February 1985 on the protection and promotion of health,

especially Articles 32, 33 and 34 of Chapter II, which insists on safeguards environment and in particular water. Through the National Institute of Public Health (INSP), the ministry provides information on the quality of water consumed by the public. These materials reflect the activities of Monitoring and control of drinking water by health professionals seconded to local governments.

- *NGO's*: Play an important role in the development of the WSS sectors by directly funding or participating with other NGO's and development partners. However, their major role is raising the awareness and understanding of citizens for environmental & water related issues. Examples of major donor NGOs in field of WSS are; EU, UNDP, UNICEF, ADB and AFD.

Strengths of Main WSS institutions:

- The institutional framework already includes many actors with capabilities and on which it will be possible to rely on
- Many laws and regulations related to water supply & sanitation exist
- Real political will exist to initiate the development of the WSS sector
- A good institutional organization with the existence of a dedicated departments to WSS
- WSS staff are qualified
- Many institutions are interested in sector (NGO's, Consultation office, and Universities)
- Many ongoing projects for enhancement of water supply and sanitation exist
- Good performance of sector such that MDGs for water supply & sanitation coverage will be met before 2015

Weakness of Main WSS institutions:

- No clear mechanism for enforcing some existing laws
- A coordination mechanism in the sector with related institutions is not clear
- Ministry of Water & Sanitation and Ministry of Health do not have obvious organized coordination
- No clear criteria are established for targeting WSS sector performance
- The environmental & water awareness is not clear
- Health and environmental situation is degrading
- Modest participation of interest groups In planning & implementation of projects

5. IWRM M&E

a. Institutions and Framework

Global M&E Organizations: While some global organizations such as Joint Monitoring Program, JMP and FAO-AQUASTAT publish some information regarding water resources in Algeria; however, they are not really active in M&E of country water resources and depend on weak surveys and sometimes on pre-published old data. In Algeria, several water sectors officials have serious reservations on these published figures. The officials in Sector of Water Resources has not been consulted in the development of system information AQUASTAT, and ignored the origin of the information contained in this system. Thus the Ministry of Water Resources of Algeria does not endorse the information given at all. Moreover, the information published on Algeria in the information system from 2005: this information is therefore largely exceeded and the data presented on water resources are underestimated for both surface and underground resources. It has not been taken into account by the large volumes mobilized desalination program undertaken since the 2005. Information on aspects of institutional, legal and organizational are also widely exceeded, since Law No. 05-12 of 2005 on the water has not been mentioned.

International Transboundary Organizations: Algeria shares with Tunisia and Libya the North Western Sahara Aquifer System, NWSAS. This aquifer is managed by the Sahara and Sahel Observatory, OSS organization, which is located in Tunisia and active in three transboundary countries. The OSS in collaboration with Algeria has implemented a program that focuses on the scientific stakes in the first place. Thus the OSS is functioning in Algeria through the NWSAS in a consultation mechanism. This program is aimed to; enable significant water resources knowledge improvement for the aquifer system, enable information exchange, reach to joint definitions for working hypotheses among three countries, identify new withdrawal zones; increase the current exploitation, ensure risk control through a consultation framework amongst three countries. In general, the OSS is playing a resource management role amongst the three countries to gradually reach for a formal institutional framework for management of shared water resources.

It is IWRM M&E Framework: While there is no solid structured framework of M&E in the Algerian water sector, there important M&E policies are embedded in the various institutional missions and are already being performed on many aspects. The M&E policies are also included in the tasks of the water resources management committee consisting of several basins representative, where the committee is responsible for developing the information system on water through the establishment and updating of databases and tools of geographic information; establish management plans of water resources and surface and groundwater develop tools for decision in the matter; and managing the data system established under the use of public natural hydraulic entrusted. The relationship between various water sector institutions within an integrated water resources management is not clear within an M&E framework. The following institutions in the Algerian water sector are working in M&E.

- *Agence Nationale des Ressources Hydrauliques (ANRH)*
- *The National Agency for Dams and Transfer (ANBT)*
- *Agence Nationale des Ressources Hydrauliques (ANRH):* ANRH is responsible for designing, installing and managing networks for monitoring groundwater resources, and hydro-climatological conditions and for flood risk forecasting.

- *The National Agency for Dams and Transfer (ANBT):* ANBT is responsible for the production and supply of water to the municipal public institutions and responsible for its distribution. It is also responsible for making make periodic measurements of water quality control, and collecting, processing, storing and disseminating data, information and documentation in statistical, scientific, technical and economic related to its object.
- *Le Agence Nationale De Gestion Intégrée Des Ressources en Eau (AGIRE):* This agency is responsible for all actions contributing to the integrated management of water resources in Algeria as discussed before. In course of M&E tasks, the AGIRE is responsible for; developing and coordinating the integrated management system of water information to national level; monitor and manage actions of saving water and quality of water resources; building a management information system to watershed scale through the establishment and updating of databases and tools of geographic information; and evaluating the master plans on long term for development at watershed scales.
- *Les Agences De Bassins Hydrographiques (ABH):* ABH is under the supervision of AGIRE.
- *MRE-PDARE:* The Ministry of Water Resources in Algeria has launched a program known as Master Plan for Water Resources Management, PDARE. The first two phases are already completed and they concern hydrographic region Algiers -Hodna-Soummam. During these phases, an Observation System for Underground Water Resources, SORES has been established and in 2011, the SORES started having a network of groundwater observation and quality measurements points. Data has been collected from these points by the MRE PDARE SORES. Data included piezometric aquifer heads and groundwater quality. A mobile laboratory has been provided by the Ministry of Water Resources (MRE / DEAH) through the German cooperation agency GIZ in the project.
- *MRE-PNE:* MRE launched the Plan National de l'eau (PNE 2010) in 2009 with the objective of creating a dynamic rebalancing of the national territory for the management of water resources, taking into account the requirements of a national land use and sectoral development plans. Moreover, the PNE aims to; Improved knowledge of resources, Implementation of major projects (mobilization and transfers), Legal and institutional reforms, taking into account significant changes in hydrological regimes, observed in connection with Climate Change, Modification of the physical watershed and the change in flow regime associated with different hydraulic works made since 1993 (twenty new dams built). The PNE2010 paid particular attention to the Training and implementation of an information system and a decision support tool allowing continuous updating of monitoring & evaluation decisions. This tools focused on;
 - Evaluation of resources at different horizons (2015-2030)
 - Evaluation of the application at different horizons
 - Confrontation needs and resources
 - Adequacy and allocation of water resources
 - Definition of hydraulic programs to be undertaken at different horizons 2015-2020-2025-2030
 - Development of an information system and a tool for decision support

	Type of station				Remarks & Recommendations
	River Gauging	Rainfall	Meteorology	Groundwater & Water Quality	
North Western Sahara Aquifer System Consultation Mechanism (NWSAS)	NA	NA	NA	11,166	These stations are water points, drillings, and springs exploits
Algeria (National Agency of Water Resources in the MRE)	124 (quality of streams)	800	220	More than 700	Harvesting structures and information are decentralized they do not always have the means necessary to properly carry out their public service mission. An operation is underway to automate this network and its capacity which will result in an integrated telemetry to ensure the real-time collection of information and sharing it with different users.

- Definition of the new water policy
- Taking into account the economic, financial and institutional aspects of monitoring & evaluation

b. Basic Monitoring Networks

The following table shows the resources, facilities and capabilities of national MRE gauging stations and transboundary OSS consultation mechanism of NWSAS in Algeria.

Table8. Monitoring Network & their status

Strengths of OSS-NWSAS: while strengths of OSS are many, however the strengths mentioned hereinafter are those related to NWSAS & affecting Algeria. These can be stated as;

- Long term established and proven management and fund sharing experience;
- Potential for sustaining the consultation mechanism
- Presence of thousands of monitoring stations for recording groundwater data
- Establishment of Information System (IS) accessible in Ministry of Water Resources
- Solid technical consultation structure including a steering committee and a coordination committee and an Ad hoc scientific committee managed and housed by the OSS

Weakness of OSS-NWSAS: The following can be stated as weakness points or challenge issues facing the OSS in NWSAS consulting framework;

- It is not stated or underlined whether the reasoned management of NWSAS withdrawals is a condition for prolonging the resource exploitation, thus only a better use of irrigation water in return for the improved performance of production techniques is likely to guarantee both the development objective and the preservation of natural resources from all forms of degradation.

- No action plan aimed at alleviating the negative and already established impacts -on sustainability of resources-, on the one hand, and the prevention of very high potential risks, has been designed in each of the involved countries.
- The consultation mechanism has not yet designed and store in line with farming and natural resources exploitation policies in Algeria.
- The NWSAS does not include an environmental tool to monitor and evaluate the natural resources under the impact of exploitation.

Strengths of National Water Agency, MRE: the following points can be stated as points of strength;

- The operating data are collected monthly in the form of canvas (balance unifies formats) that are reported by the units (decentralized structures in each wilaya) and transmitted to the Directorate General for analysis and preparation of a consolidated balance sheet to be submitted to the Ministry of Water Resources.
- The data are analyzed by engineers specialized in different areas related to the water sector and sanitation.
- The balance of the units and the consolidated reports of the Directorate General are stored in different computer media, in addition to a paper copy formats.
- The information contained in the balance sheets are operated by the Regional and central structures of the Directorate General for controlling the operating level in each unit and arrange for the improvement of public service operators, as well as by the Central Directorate of Sanitation at the Ministry of water resources planning and development of the sector.
- Reports and balance sheets are processed and published in the form of reports in Word formats and paper.
- The two organizations have the same organization and the same administrative division, which facilitates the exchange and management of information Cells GIS (Geographical Information System) are being launched at the Directorates General for ADE and ONA, they will be responsible for creating a database and mapping all systems water supply and sanitation.

Weakness of National Water Agency, MRE: the following can be stated as weak points for the National water agency at the Ministry of Water Resources.

- There is no specialized structure in data management.
- Dissemination of data is not used by regional and global organizations interested in the progress and performance of the sector.
- There is no bidirectional flow of information between the central organization and the data collectors and providers. Only the upward flow exists.
- There is no formal framework for HE sub-sector of water supply and sanitation.

- The data collected are disaggregated by gender.

NWSAS & Multiple uses of Water Resources: With about 1billion m³/year system recharge from the NWSAS aquifer, the use of such huge resources has fallen in the traditional water uses in term of domestic, industrial, and agricultural uses. These uses vary from one country to the other and are mostly fragmentary. The NWSAS joint Management first report highlighted some features for this multi-use as shown in the following table, agricultural use has been calculated based on projected irrigation land in the year 2030 and given water consumption per hectare in each country, (Sahara and Sahel Observatory, 2008. The North Western Sahara Aquifer System, Concreted Management of a Transboundary Water Basin, Syntheses Collection No.1).

Table 9. Multiple use of ground water of the NWSAS aquifer

	Water demand in million m ³ /year		
	Domestic	Industrial	Agricultural
Algeria (2025)	260	262	3,314
Libya (2030)	170	325	682
Tunisia (2030)	59	51	1,003

OSS & multi-use conflict: No multi-use conflict has evolved in the past among the three countries sharing the NWSAS aquifer. However, during the last thirty years, the exploitation of NWSAS waters by drilling increased from 0.6 to 2.5billion m³/year and is expected to reach higher rates. Therefore, in order decrease the risk of interferences and thus conflicts between the three countries, the NWSAS project was initiated.

c. Data Analysis, Storage and dissemination

Data Collected: The following data is being collected.

Table 10. Water resources data collection

	Data	Quality & Timeline	Collection	Analysis & dissemination
OSS-NWSAS	Water abstraction, groundwater table piezometric head, drawdown, water quality, water salinity, farming practice, irrigation water consumption (by remote sensing), socio-economic data	Data is of excellent quality since monitoring networks are operational in a good state and data is checked and verified. Data is collected periodically and database is updated and old data is corrected.	National Algerian experts. No data analysis is made at this stage.	The data collected is analyzed and verified by the technical committee of the NWSAS after being provided by national experts. NWSAS is currently building the capacity of national experts to use the tools developed for dissemination of results; databases, GIS, hydrological models, remote-sensing.
ANRH	Rainfall, temperature, evapotranspiration, groundwater withdrawals and recharge, aquifer heads, use of non-renewable water resources in Sahara,	Data is of a very good quality and reliable. Most of the data is measured continuously and on daily basis.	ANRH engineers and experts and station workers	The information collected on field verified by structures called sectors, they are then entered into a database and forwarded to the regional level to control the homogeneity of the information. This information is then transmitted to the central level or

	Data	Quality & Timeline	Collection	Analysis & dissemination
	streamflow, and water quality			they are stored in a national database. This information is used for the needs of specific studies or general across the country.

Water Resources related Indicators: The following table shows the key indicators of water resources used in Algeria.

Table 11. List of indicators for water resources used in Algeria (DemmakAbdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algerie)

Table 11. List of indicators for water resources used in Algeria

Theme	Monitoring Indicator	2011	2014
Water Resources (MRE & NWSAS)	Volume of national water available	17billion m ³ /year	17billion m ³ /year
	Per capita water share	600m ³ /year	600m ³ /year
	Number of dams in operations	68	93
	Mobilization capacity of surface water	7.4 billion m ³ /year	--
	Major irrigated area	227,000ha	270,000ha
	Number of embankments	423	581
	Aridity index**	21.8	--
Water Quality (MRE & NWSAS)	Index of overall water quality (composite index calculated from): - BOD (Biochemical Oxygen Demand) in rivers: River and tributaries - Concentrations of persistent organic pollutants (POPs) in streams: pesticides, organochlorines, dioxins, etc.. - Annual average concentrations of total phosphorus (river and tributaries) - Annual average concentrations of total nitrogen (rivers and tributaries) - Changes in concentrations of O ₂ - Concentration of E. Coli and fecal streptococci (drinking water) - Balance sheet total ionic (drinking water) - Salinity (water + water river) - Rate of siltation of dams	No available measurements	

**the Aridity index is calculated across Algeria as follow (MRE-ANRH);

Region	Precipitation (mm)	Temp (°C)	Index= P/(T+10)
Côtière(Tipaza)	600	17.5	21.8
Tellienne (Médéa)	755	14.7	30.6
HautsPlateaux (Djelfa)	296	13.4	12.6
Sahara (In Salah)	50	30	1.25

Non-renewable Groundwater resources indicators: Depth of the top of the aquifer, Thickness of the Aquifer, Static Water Level, Dynamic Levels (piezometric), Annual Dewatering observed, Water Salinity.

Data Management: Based upon the previous discussion, the following table explains the data management matrix within and across the institutions in Algerian water sector as per the country visits and exploration.

Table 12. Water Resources-Data Management info

Theme	Data Sources	Measurable	Available	Accessible	Reliable
Stream flow	ANRH, ANBT	Y	Y	Y	Y
Water use and exploitation of groundwater	ADE, ONID, DREW	Y	Y	Y	Y
Groundwater recharge	ANRH	Y	Y	Y	Y
Use of non-renewable water resources in Sahara	ANRH, ADE, ONID, DREW	Y	Y	Y	Y
Agricultural water use	ONID	Y	Y	Y	Y
Climatology (Rainfall & Temp & Evapotranspiration)	ANRH, ONM, ANBT	Y	Y	Y	Y
Water Quality	ANRH, SPA, DAEP	Y	Y	Y	Y

Table 13. Water Resources-Data Management Matrix

Level	Directorates of water resources in Wilaya-48-	Public directorates-ANRH, ONM, ANBT, ADE, ONID, ONA, SPA, DREW	Directorates-Basin level-DEAH, DMRE, DAEP, DHA, DPAE	Ministry of Water Resources (MRE)
Method of collection	The data is collected by government employees from gauging stations and monitoring networks	The data is collected by government employees from gauging stations and monitoring networks	Reports sent from public directorates	Reports sent from Directorate of water resources at the basin level, from the directorates in Wilaya & NWSAS National Unit
Information collected	Rainfall, Temp, stream flow, groundwater withdrawal, recharge, aquifer head, evapotranspiration, water use in agriculture & water quality	Rainfall, Temp, stream flow, groundwater withdrawal, recharge, aquifer head, evapotranspiration, water use in agriculture & water quality	Information collection is through its public directorates	Only general information about water resources availability and quality from directorates & NWSAS
Storage	Data available are stored on paper, excel sheets and databases	Data available are stored on paper, excel sheets and databases		Data is stored in MRE on a central access database with online and

Level	Directorates of water resources in Wilaya-48-	Public directorates-ANRH, ONM, ANBT, ADE, ONID, ONA, SPA, DREW	Directorates-Basin level-DEAH, DMRE, DAEP, DHA, DPAE	Ministry of Water Resources (MRE)
				offline data viewing options. In NWSAS, data is stored on online geographical & access databases.
Analyses & Verification	NA	Data is being verified & processed using various software analysis tools BASHYD, SIQUEAU, BADGE, ARCGIS, MODFLOW, GR2M/LOIEAU (calculation and reconstitution monthly flows) MIKE BASIN (Volumes regularized Dams) HYDRO MIKE (resource management) PANDA (dam monitoring) COSWIN (equipment dams)		NA
Dissemination	All elements of water resources and data collected	Important information regarding water resources exploitation and management are reported to the Ministry of Water Resources	Important hydrologic and hydraulic model results with implications on water resources management	General brief lines of country coming plans are disseminated to public through media & internet
Recommendations	Apply data verification tools on the Wilaya level to help Basin Directorates process data more efficiently	NA	NA	Establish a central M&E unit that prepares and follows up the M&E general strategy and be responsible for the coordination amongst all involved institutions and link the M&E database with the NWSAS database

MRE-Data Center: As discussed the MRE hosts a database and central platform for storing various data related to water resources as shown in the following figure. This database is considered the final destination of all info related to water resources. It is an access database and contains 95,000 water point and related data. This data center is frequently updated and information is transferred continuously from small databases at wilaya level till reaching this data center at the MRE. But the information contained in this database is not available to public.

ORGANISATION ET CIRCUIT DE L'INFORMATION

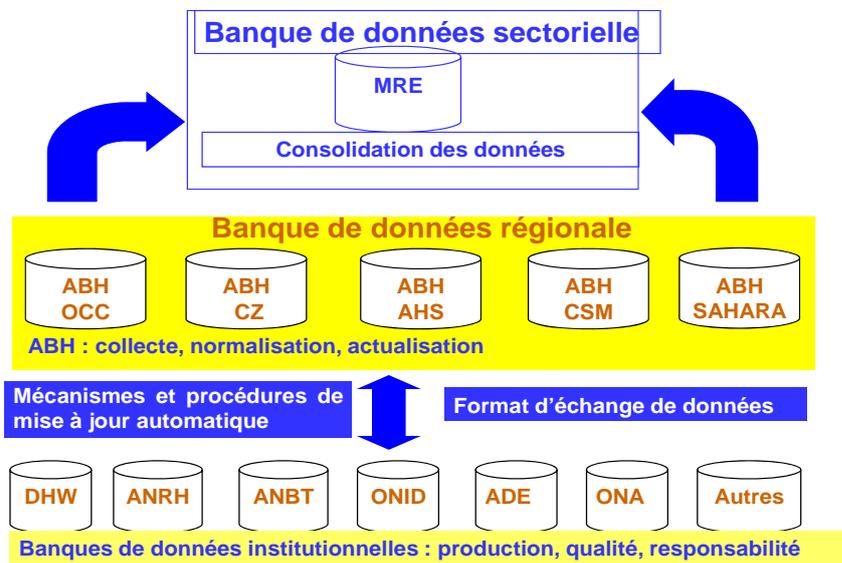


Figure 7. MRE data center

NWSAS-MIS: The NWSAS project aims to elaborate a common database for integrating and streamlining all the surveyed information, in addition to new data collection, integration and updating. Such an objective requires that the national databases be adapted and homogenized. This implies homogenized data structures and modifications, a GIS interface and the elaboration of an access module with the digital model. The Information System (IS) elaboration included the diagnosis, design and realization of a common database, with the objective of making IS accessible simultaneously in the project's headquarters and in each water administration of the three countries. The diversity and multiplicity of operations carried out on 9,000 inventoried water points appraise the amplitude of the task: collection, classification and identification system homogenization, criticism, aberrant data detection, correction, and validation. The obtained information system allows data updating and addition, statistical requests, graphs, and model connections. The system contains all the basic elements to establish the monitoring control panel and basin water exploitation. Now we have a very good quality management tool operating in each administration in the three countries. At the same time, we have elaborated a specific NWSAS cartographic server to ensure a geo-referenced representation of the available information. This multilayer and thematic representation acts as a decision support tool for planners and makes it possible to go beyond the national framework to appreciate better the exploitation development impact. The server is available on the Internet URL: <http://www.oss-online.org/geoaquifer>.

NWSAS-GEOSASS: The GEOSASS Map Server application is a map server intended to present Northern Sahara aquifer zones survey results lead by SASS project partners. These results lead to the publication of geographic and statistical data. The purpose of this site is to present and valorize these results. This site uses Java technologies for statistical results presentation and mapping navigation: Java Applet for navigation, with Javascript components for the toolbar J2EE architecture based on Struts framework Dynamic Javascript elements (tables, trees) for an enhanced browsing experience Advanced graphics (Java Applet) to present results (pie, charts, graphs). This geographical metadata and data server allows a reply to the main question asked day after day by the staff responsible for the management of natural and

agricultural areas: what geographical data exist in the area?, and to the corollary question: what is, on ground, the extension on ground of the data?. Geographical or localized data presented in our server is dedicated to desertification and environmental monitoring and made with datasets including resources. Metadata describes both dataset and their resources. GEO-OSS is dedicated to: Dataset and resources retrieving, within our geocatalogue, according to their extension and main attributes (search page), Check the extension of datasets and their main features and display a preview of datasets (result page), Display the resources of each dataset, if available in the geocatalogue (display page), Display the entire metadata of a dataset and to download its resources, if they are available in the geocatalogue and free of charge.



Figure 8. NWSAS-GeoAqifer portal



Figure 9. NWSAS-GeoCatalogue portal

NWSAS-SAGESSE: The SAGESSE database was created in 2000. It allows standardizing the hydrogeological data collected, so as to meet the needs for the hydrogeological modeling of SASS. It was initially intended to store data on SASS water resources and organize it according to suitable formats. The development of the SASS project, however, revealed the need to transform this database into an integrated information system including the database itself, a suit of mapping tools and the model. The system has been oriented towards the monitoring of the concerted management, both on the technical and political levels. It is updated by data collected periodically by national technical services from a monitoring network. The management of the data is performed by the database administrator based at OSS. Experts from Algeria are responsible for the collection, processing and editing of data supplied by the SASS common monitoring network, in compliance with the required formats. They are also requested to send new data to the database administrator who gathers and harmonizes them. The data sets are subsequently validated through an exchange between the national experts and the central administrator. It is finally up to the OSS scientific managers to analyze the information and to draw the relevant elements, which will then be submitted to the decision makers in Algeria.

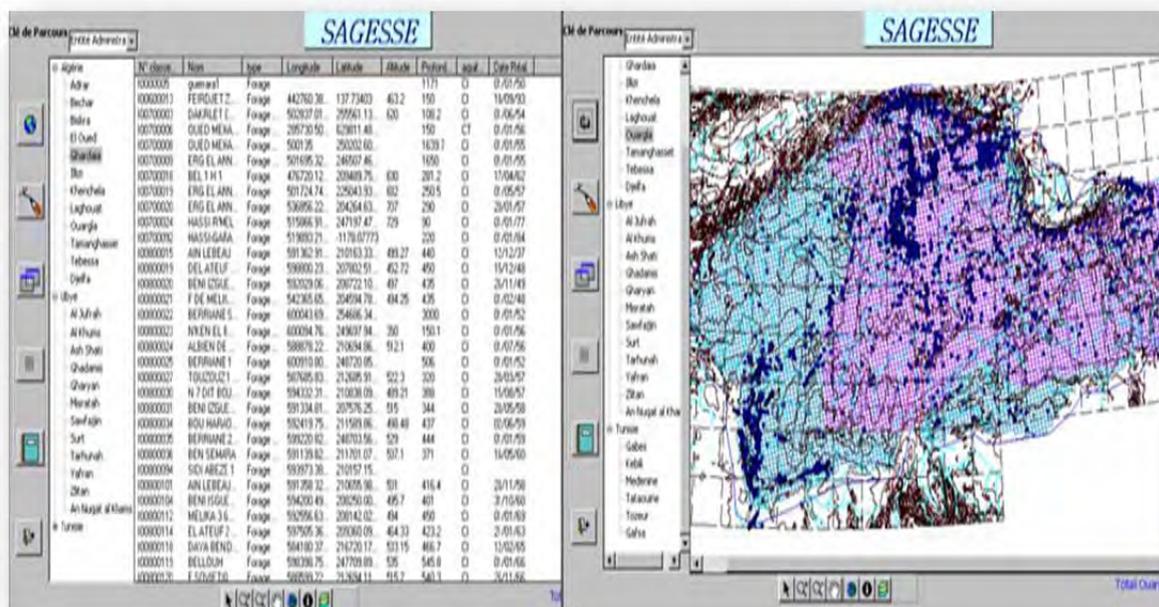


Figure 10. NWSAS-SAGESSE database

MRE-PDARE: As discussed before, the German GTZ has conducted a joint project with the MRE in Algeria and funded the third phase of the PDARE project that included monitoring networks for groundwater hydraulics and quality. The third phase of this project has started to implement the basics for a management information system that can be used for the integration of Algerian water resources. The schematic of the information system is shown in the following figure. It is mainly a dynamic access database information system that is continuously updated with new monitored data. It is dedicated for basin level water resources management and located at the MRE PDARE management unit. It is not available for public access.

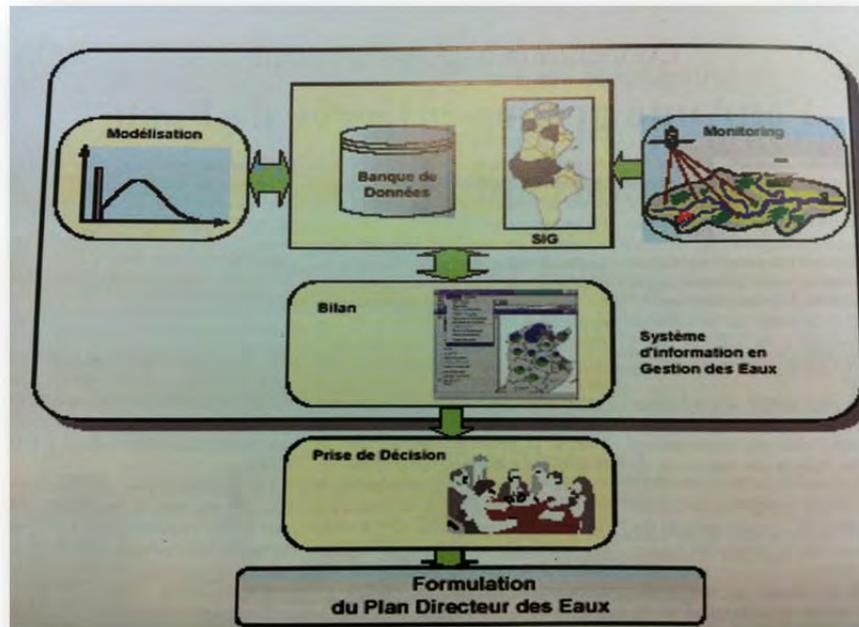


Figure 11. Schematic of PDARE information system

ANRH-Access Databases: ANRH hosts a group of database management information systems that are built using the access databases. They are in-house database systems and cover all aspects of water resources monitoring data. BASHYD200 is a climatology database; BADGE2000 is a hydrogeology database; and SIQUEAU2000 is a water quality database. It is not available for public access. These databases are connected to a geographical information system and contain 70,000 data point (boreholes, wells and springs) archived. These databases are continuously updated on regular intervals and made available to all institutions working in related areas to water and sanitation in the form of reports and published bulletins. They are used mainly by the ANRH for water resources assessment, management and monitoring in terms of quantity and quality. After being updated, the data is transferred to the MRE Data Center. Moreover, an access database has been developed in the ANRH in 2006 called HYDRACCESS. This access database has a user friendly interface that allows storing various types of hydrological data. It can be used to process data and also has the function of analyzing rainfall data for small and large catchments.



Figure 12. User interface of BASHYD database in ANRH

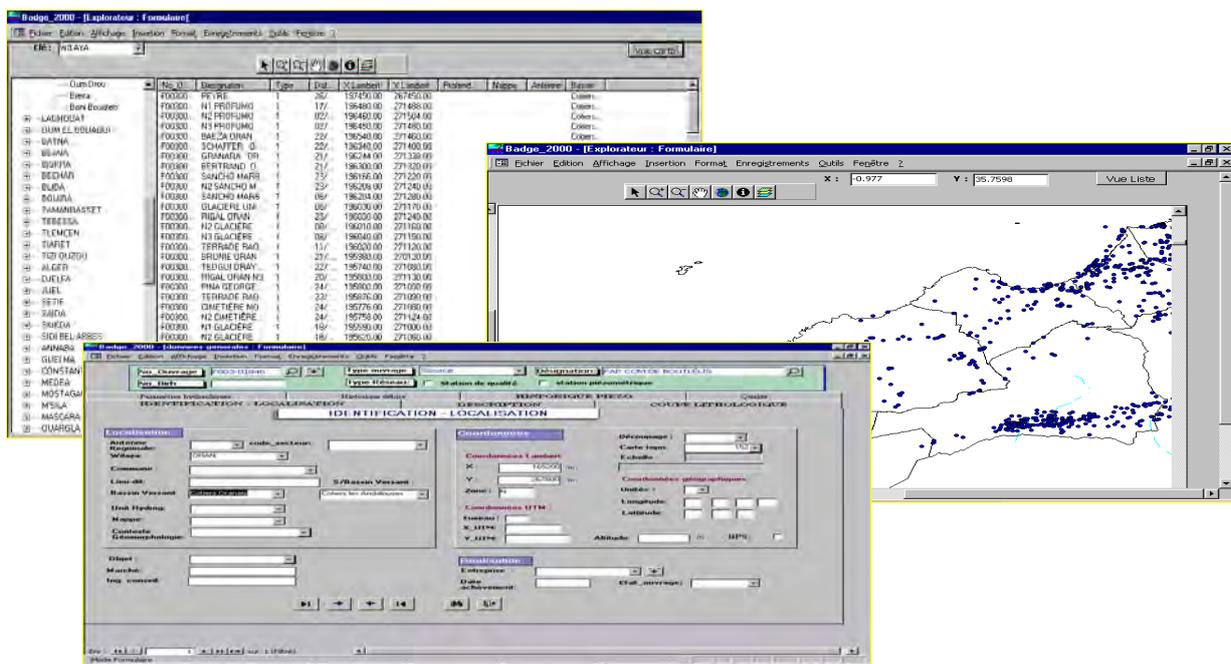


Figure 13. User interface of BADGE database in ANRH

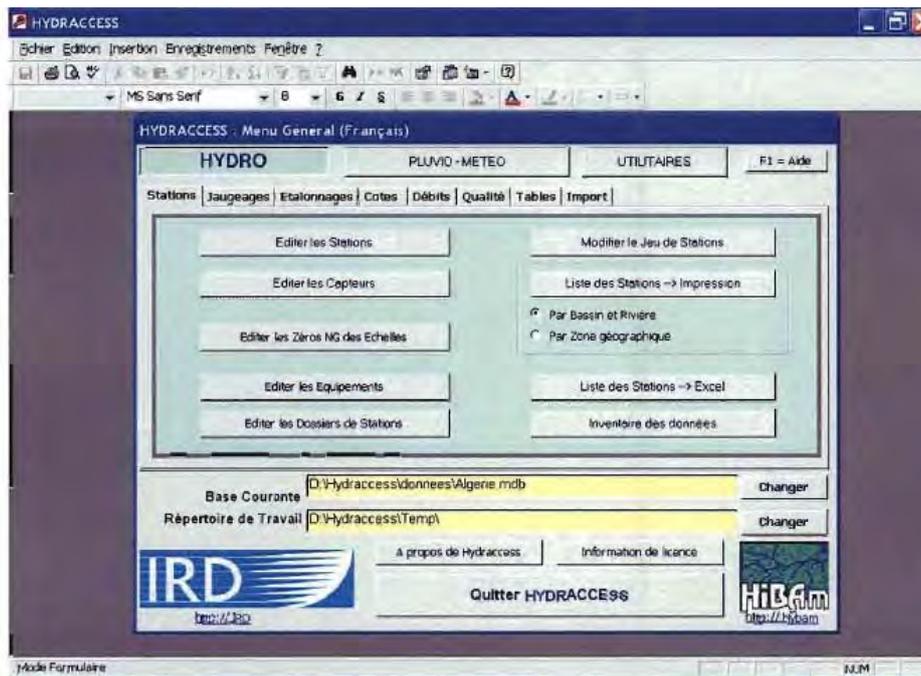


Figure 14. User interface of HYDRACCESS database in ANRH

In Algerian Water Sector, there exists a system of monitoring and evaluation exists, but needs to be strengthened and upgraded. It is worth mentioning the existing legislation on integrated management of water information and its various components is governed by legal provisions established by: Decree n ° 08-326 of 19 October 2008 on the organization and operation of the integrated management of water information & The decree of 02 February 2011 (OJ 23, April 17, 2011), which regulates the access rights to the data management system integrated water information by distinguishing the free public data and public data paying accessible by contract. While there exists a central data center in the Ministry of Water Resources, it is used mainly for storage and dissemination rather than monitoring and evaluation, but efforts are undertaken by the Ministry of Water Resources to enhance this portal and integrate it within M&E water sector framework. The following weakness points can be stated;

At the institutional level:

- The strategy for monitoring of natural resources at the institutional level is not yet implemented in a solid way;
- The dispersion of information within a single institution;
- Overlapping responsibilities in the collection of certain data;

At the human level:

- A culture of information sharing limited

In terms of the quality of the information:

- Data collection is often not done in a timely manner;
- The information currently available is of variable quality;

Technical and financial sustainability:

- The lack of financial resources allocated to the operation of structures for information systems such as GIS;
- The low capacity of some information system Database available, which limits the optimal use and exchange of data;

Resource mapping: NWSAS consultation mechanism since the 2000 has resulted in a complete aquifer water resource mapping through the SAGESSE & GEOSASS. This inventory of water resources has been monitored and recorded through the large number of water points/wells reaching (in 2008) 17,856 for withdrawals, 65,028 for operation, 8,098 for piezometric head and 5,296 for quality.

Information dissemination: The following matrix shows the information dissemination in Algerian water sector.

Table 14. Water Resources-Information Dissemination

Target Groups	Method	Frequency	Responsibility of
Environment (Pollution control)	Reports, Written Case Studies, Briefings, Presentations	Daily, weekly & monthly and event-based	ANRH, ONM, ANBT, ADE, ONID, DREW, ONA
Directorates-Basin level	Reports, Briefings, Letters, institutional committees	Daily and monthly	ANRH, ONM, ANBT, ADE, ONID, DREW, ONA
Ministry of Water Resources	Reports, Letters, webpages	Daily, weekly & monthly and event-based	Directorates-Basin level-DEAH, DMRE, DAEP, DHA, DPAE & NWSAS national unit
Transboundary Consultation Mechanism	Reports, Briefings, Letters, Presentations, institutional committees	Daily, weekly & monthly and event-based	National experts in Directorates at basin level and directorates in Wilayas
Tourism	NA	NA	NA
Agriculture	Informal meetings, letters, reports, internet	Frequent but not stated, when needed	ANRH, ONID, ONM, ANBT
Hydropower	Informal meetings, letters, reports, internet	Frequent but not stated, when needed	Ministry of Water Resources
Industry & Commerce	Informal meetings, letters, reports, internet	Frequent	Ministry of Water Resources
Water Supply & Sewerage	Informal meetings, letters, reports, internet	Frequent	Ministry of Water Resources
Transport/Navigation	Informal meetings, letters, reports, internet	Frequent	Ministry of Water Resources
National Planning	Written project case studies, letters, reports	Frequent	NWSAS, Directorates-Basin level- DEAH, DMRE, DAEP, DHA, DPAE
Media/Civil society	Conferences, Journalists, Internet	Very frequent and can be daily or weekly	Ministry of Water Resources

6. Water Supply M&E

a. Institutions and Monitoring Networks

Institutions collecting data: In Algeria Water Supply sector; ANBT & ADE are the only institutions collecting data on water supply as follows;

- *The National Agency for Dams and Transfer (ANBT):* ANBT is responsible for the production and supply of water to the municipal public institutions and responsible for its distribution. In line with M&E, ANBT is responsible for; making make periodic measurements of water quality control; collecting, processing, storing and disseminating data, information and documentation in statistical, scientific, technical and economic related to its object; monitoring water tariff institutions responsible for the distribution of drinking water.
- *L'Algérienne Des Eaux (ADE):* ADE is the main directorate responsible for production operations, transport, treatment, storage, supply, distribution and supply of drinking water and industrial as well as the renewal and infrastructure development. In the course of M&E, the ADE monitors the quality of the water supply, monitors the efficient of water supply networks.
- *Joint Monitoring Program (JMP):* On the other hand, the Joint Monitoring Program (JMP) is also collecting information about water supply on an independent basis. The JMP has implemented household surveys (DHS) and Multi Indicator Cluster Surveys (MICS) for estimating broad coverage to determine progress towards the MDGs.

The DHS are nationally-representative household surveys with large sample sizes, which provide data on and analysis of the population, health, and nutrition of women and children in developing countries. In addition to providing demographic and health data, DHS aims to increase local capacity in research design and implementation, sampling, data processing, analysis, and dissemination. Additional information about DHS surveys can be found on Measure DHS+ web site, <http://www.measuredhs.com>.

The MICS were developed by UNICEF as a means for countries to fill data gaps in monitoring progress towards the World Summit for Children goals. The surveys furnish data that allow the status of women and children to be assessed, and monitor progress towards the internationally agreed development goals. The MICS also help to improve data and monitoring systems within countries by strengthening the technical expertise associated with the design and implementation of household surveys and their data analysis. For information on using this survey tool and for survey results, see the UNICEF web site for monitoring the situation of children and women, <http://www.childinfo.org>.

Structured M&E framework: As for water resources, there is no structured M&E framework yet fully implemented in the water supply sector.

b. Indicators & Sampling for Data Collection

M&E Data Collection Approaches: As shown in the previous discussion, only ADE collects data regarding water supply. At every network, the water company has an operator who is responsible for supervising networks, collecting water supply data and reporting operation problems to company. These operators are the main source of data used by the water companies in determining the water service coverage percentages and status. This data is used by the water companies for pricing and collecting revenue from

network operation. The following table has been used during Algeria country visit and gives an overview on the data collection for water supply.

Table 15. Indicators & Sampling for water supply Data Collection

Question	Response	Comments
For what purpose is the data being collected?	Data is collected for purpose of ANRH & ADE use; e.g. checking networks working condition, checking number of users, checking quality of water, calculating tariffs, rehabilitation of water supply projects, calculating revenues; preparing future master plans, preparing development projects for water networks	While this data is continuously collected and frequently sent to the data center in the MRE, a clear mechanism is needed to assure the verification of data
Is the data being collected by direct observation (such as through household surveys) or through knowledge of delivery of services by projects (supply side)?	Most of the data are collected by the ADE workers on water networks and sometimes by the knowledge of delivery of service.	A point of strength that ensures good representation of service to reality
Which indicators are being used? How do they compare to the indicators used by the JMP to measure progress towards the MDG?	Find below information about national indicators used and JMP indicators	National indicators have to be harmonized with the JMP indicators
What are the geographic area and/or population being surveyed?	NA	Surveys are rarely made by ADE and thus some of the information might be outdated unless updated data is obtained from the department of statistics
Comment on the survey design and the sample and its representativeness.	No design for surveys is made since ADE does not depend on surveys for data collection.	It is not clear whether ADE & ANRH are able to collect data from operators on all operating networks frequently
Are there quality checks on the data collection? Is the data verified?	It is not clear whether there are quality checks on data collection or verification.	Quality checks are needed maybe through using data of companies providing water service
Is the local definition of coverage the same as that of the MDGs.	NO	Harmonization is needed for coverage rates
Are the coverage rates based on area, or population? If based on area, do they accurately reflect population? If based on population, is the total population up-to-date and accurate or have interpretations been made which are of doubtful quality?	For accessibility of water, the coverage is computed as the number of households connected/number of households in city or town or wilaya. For consumption, the coverage is computed as the total volume of water consumed /population.	Revising coverage rates for accessibility of water is needed according to JMP
Is water quality tested and do the sample collection, indicators and water analysis give a realistic/accurate determination of water safety?	ADE has a central lab for performing quality analysis tests on samples obtained from various parts of water networks. Samples are taken by laboratory technicians visiting water networks. Water quality tests includes tests for	NA

Question	Response	Comments
	temperature, coliform, pH, TDS, Salinity, NO ₂ , NO ₃ , Ca, Mg, SO ₄ , NH ₄ , Fe, KMnO ₄ , and Cl. Local standards of water quality are adopted from European standards. Analyses lab staff are trained for sample analyses and result reporting. Equipment are new and in good condition. Water quality analysis is documented on reports and stored in excel files.	
Data segregated by gender	NO	Water supply data needs to be segregated by gender

Indicators used: The following are those key indicators adopted by Algeria water institutions for water supply. They are targeting the indicators listed in the Declaration on the Millennium Development Goals (MDGs).

Table 16. List of indicators for Water Supply in Algeria (Demmak Abdel madjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algeria)

Table 16. List of indicators for Water Supply in Algeria

Theme	Monitoring Indicator	2011	2014
Accessibility of water	Volume of Drinking Water Produced	2.9billion m ³	3.6billion m ³
	Linear length of drinking water networks	102,000Km	105,000Km
	Connection rate to drinking water networks	94%	98%
	Per capita water consumption	170lit/day	175lit/day
	Distribution frequency of drinking water to main towns of the countries municipalities (daily)	73%	80%
Water Quality	Index of overall water quality (composite index calculated from)	--	--

The following table shows the indicators for water supply and how they are calculated and where these indicators are supposed to go.

Table 17. Definition of key indicators for rural water supply in Algeria

Theme	Definition	Frequency	Institution
Connection rate to drinking water networks	Number of households connected to water network in home/ total number of households	monthly	ADE
Per capita water consumption	Volume of water consumed / population	monthly	ADE

Joint Monitoring Program (JMP): The JMP does not collect primary data itself, but depends on the data from primary source in Algeria, which is censuses and household survey. Lately in 2012, the JMP issued an update for indicator values used for water supply in Algeria using the statistical data from Algeria amongst other international sources (attached in Appendices). However, the indicators published by the JMP are different than those adopted nationally in Algeria mainly because using different definition for indicators

and using estimates or old records for population. The following table shows the differences documented in coverage rates for water supply.

Table 18. Water Supply coverage as calculated by MRE & JMP for Algeria (Joint Monitoring Program, JMP. 2012. Estimates for the use of Improved Drinking Water Sources, Algeria)

Table 18. Water Supply coverage as calculated by MRE & JMP for Algeria

Indicator	Connection rate to drinking water networks	2011	Comments
Ministere des Ressources en Eau, MRE Algerie	Number of households connected to water network in home / total number of households	94%	
Joint Monitoring Program, JMP	Number of people having piped water into dwelling, into yard, public tap or standpipe, tubewell or borehole, dug well, protected spring & rainwater / total number of people	83%	JMP update 2012 is for 2010 coverage rates

c. Data Storage & Analysis

The following table shows a brief overview of data storage and analysis methods related to water supply.

Table 19. Data storage & analysis for water supply in Algeria

Data collected	Method of collection	Frequency of collection	Institution	Quality checks	Storage
Volume of water pumped, condition of pumps, condition of network, number of clients, water quality	ADE Operator collects data	Weekly & monthly	ANRH, ADE	Quality checks are not clear to be performed on collected data	Excel files and reports until they are sent to the central data unit to be stored in a database & GIS

Data Management Chain: Monitoring can be considered as a chain of activities in an information system and with the chain closed with the management and control action of the decision maker. Building an accountable information system requires the activities in the chain shown in the following figure and they are designed sequentially starting from the specified information needs. An “x” is shown beside links that are not found in the water supply data chain in Algeria. Main problem in water supply data management chain is that; the chain is not a closed loop, the chain is not continuous but interrupted at some locations, information handling is mainly in form of excel data sheets. Adriaanse, M., Van de Kraats, J., Stoks, P.G. and Ward, R.C. 1995a Conclusions monitoring tailor-made. In: M. Adriaanse, J. Van de Kraats, P.G. Stoks and R.C. Ward [Eds] *Proceedings of the International Workshop Monitoring Tailor-made*. Institute for Inland Water Management and Waste Water Treatment (RIZA), Lelystad, The Netherlands.

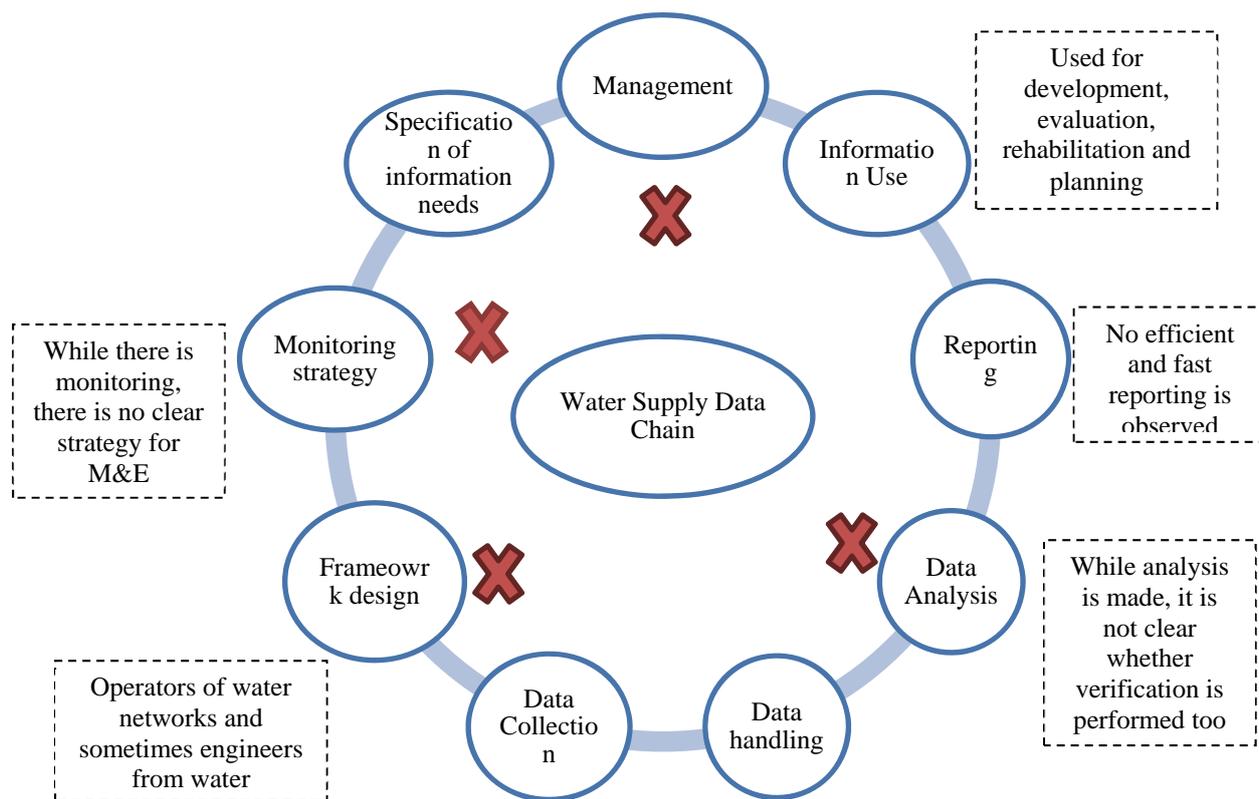


Figure 15. Data management chain of activities for water supply in Algeria

Information System: There is no information system available, only the central database of the ministry of water resources.

d. Information Dissemination & use

Information & regional/global organizations: water supply data produced in the country of Algeria are not used by global organizations, which produce monitoring indicators for water supply such as JMP. Sometimes, this water supply data is used by global donors when planning for a development project in water sector. The following table shows the water supply information dissemination in Algerian water sector.

Information flow: There is no two-way flow of information between related institutions, but all flow is on the vertical level.

Table 20. Water Supply-Information Dissemination

Target Groups	Method	Frequency	Responsibility of	For what purpose
Directorates at basin level	formal meetings, Letters, Reports	Frequently (daily & weekly)	ADE	Monitoring & evaluation for progress towards goals
Ministry of Water Resources	Informal meetings, Letters, Reports, database files	Frequently (daily & weekly)	ADE	Storage, Planning & Development
Media/Civil society	Conferences, Journalists, Internet	Very frequent and can be daily or weekly	Ministry of Water Resources	Dissemination for public

7. Sanitation M&E

a. Institutions and Monitoring Networks

Institutions collecting data: In Algeria sanitation sector; ONA is the only institution collecting data on sanitation as follow;

- *L'Office National de l'Assainissement (ONA):* ONA is the main board responsible for sanitation and protection of the water environment in Algeria.
- *ONA-SME:* The national office of sanitation in Algeria has acquired the ISO14001 certificate for efficient environmental management systems. In this context, the ONA has committed to establish an organization that identify and manage environmental risks and impacts. The ISO14001 certificate requires a plan-do-check-act system implemented, which is the core for the monitoring & information system for sanitation. The following figure shows the components of management system, SME. The figure shows clearly that the activities undertaken by the ONA include; monitoring the quality of water at the entrance of the station and its output by performing analyzes physicochemical (mid receiver); and control of waste sludge from the process of biological wastewater waste.

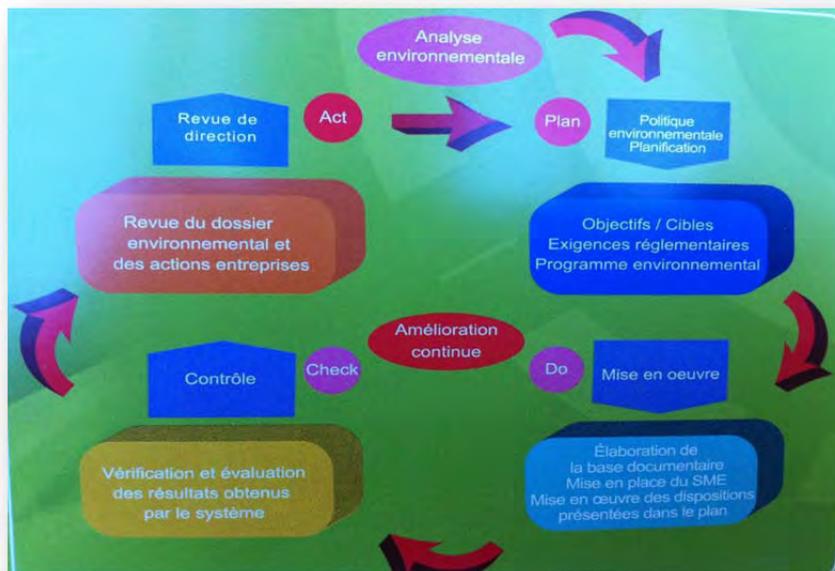


Figure 16. Components of ONA-SME system showing the information system

Joint Monitoring Program (JMP): On the other hand, the Joint Monitoring Program (JMP) is also collecting information about sanitation on an independent basis. The JMP has implemented household surveys (DHS) and Multi Indicator Cluster Surveys (MICS) for estimating broad coverage to determine progress towards the MDGs.

Structured M&E framework: As for water resources, there is no structured M&E framework yet fully implemented in the sanitation sector.

b. Indicators & Sampling for Data Collection

M&E Data Collection Approaches: As shown in the previous discussion, only ONA collects data regarding sanitation in addition to the Ministry of Environment, which collects data on industrial pollution. At every network and treatment plant, the ONA has an operator who is responsible for supervising networks, collecting sanitation data and reporting operation problems to company. These operators are the main source of data used by the ONA in determining the coverage percentages and status. This data is used by the ONA for pricing and collecting revenue from network operation. The following table has been used during Algeria country visit and gives an overview on the data collection for sanitation.

Table 21. Indicators & Sampling for sanitation Data Collection

Question	Response	Comments
For what purpose is the data being collected?	Data is collected for purpose of ONE use; e.g. checking networks working condition, checking number of users, checking quality of wastewater, calculating tariffs, rehabilitation of networks, preparing future master plans, preparing development projects for water networks	While this data is continuously collected and frequently sent to the data center in the MRE, a clear mechanism is needed to assure the verification of data
Is the data being collected by direct observation (such as through household surveys) or through knowledge of delivery of services by projects (supply side)?	Most of the data are collected by the ONA workers on water networks in addition to knowledge of delivery of service. Industrial pollution data are collected by Ministry of Environment.	A point of strength that ensures good representation of service to reality
Which indicators are being used? How do they compare to the indicators used by the JMP to measure progress towards the MDG?	Find below information about national indicators used and JMP indicators	National indicators have to be harmonized with the JMP indicators
What are the geographic area and/or population being surveyed?	NA	Surveys not made by ONA and thus some of the information might be outdated unless updated data is obtained from the department of statistics
Comment on the survey design and the sample and its representativeness.	NA	NA
Are there quality checks on the data collection? Is the data verified?	It is not clear whether there are quality checks on data collection or verification.	A clear mechanism for data quality checks needs to be established
Is the local definition of coverage the same as that of the MDGs.	NO	Definition of coverage rate needs to be revised according to MDG definition
Are the coverage rates based on area, or population? If based on area, do they accurately reflect population? If based on population, is the total population up-to-date and accurate or have interpretations been made which are of doubtful quality?	For accessibility of water, the coverage is computed as the number of households connected/number of households in city or town or wilaya. For consumption, the coverage is computed as the total volume of waste water produced /population.	NA

Question	Response	Comments
Is water quality tested and do the sample collection, indicators and water analysis give a realistic/accurate determination of water safety?	ONA performs quality analysis tests on samples. Samples are taken by laboratory technicians visiting sewage treatment plants and disposal points. Water quality analysis is documented on reports and stored in excel files.	NA
Data segregated by gender	NO	Sanitation data needs to be segregated by gender

Indicators used: The following are those key indicators adopted by Algeria water institutions for Sanitation. They are targeting the indicators listed in the Declaration on the Millennium Development Goals (MDGs).

Table 22. List of indicators for sanitation in Algeria (DemmakAbdelmadjid. 2013, Short form RAR, Ministère des Ressources en Eau, MRE Algeria)

Table 22. List of indicators for sanitation in Algeria

Theme	Monitoring Indicator	2011	2014
Sewerage and wastewater treatment	Volume of wastewater produced annually	750million m ³	--
	Number of wastewater treatment plants	61	132
	Number of stabilization ponds plants	67	107
	Treated waste water volume	600million m ³	1,200million m ³
	Length of sewage & wastewater networks	42,000km	45,000km
	Connection rate to wastewater networks	87%	95%

The following table shows the indicators for sanitation and how they are calculated and where these indicators are supposed to go.

Table 23. Definition of key indicators for sanitation in Algeria

Theme	Definition	Frequency	Institution
Connection rate to waste water networks	Number of households connected to sewage network / total number of households	monthly	ONA

Joint Monitoring Program (JMP): The JMP does not collect primary data itself, but depends on the data from primary source in Algeria, which is censuses and household survey. Lately in 2012, the JMP issued an update for indicator values used for sanitation in Algeria using the statistical data from Algeria amongst other international sources (attached in Appendices). However, the indicators published by the JMP are different than those adopted nationally in Algeria mainly because using different definition for indicators and using estimates or old records for population.

Table 24. Sanitation coverage as calculated by MRE & JMP for Algeria (Joint Monitoring Program, JMP. 2012. Estimates for the use of Improved Drinking Water Sources, Algeria)

Table 24. Sanitation coverage as calculated by MRE & JMP for Algeria

Indicator	Connection rate to sanitation networks	2011	Comments
Ministere des Ressources en Eau, MRE Algerie	Number of households connected to sewage network / total number of households	87%	
Joint Monitoring Program, JMP	Number of people having flush toilet, piped sewer system, flush to pit latrine, ventilated improved pit latrine, pit latrine with slab & composting toilet / total number of people	95%	JMP update 2012 is for 2010 coverage rates

c. Data Storage & Analysis

The following table shows a brief overview of data storage and analysis methods related to sanitation.

Table 25. Data storage & analysis for sanitation in Algeria

Data collected	Method of collection	Frequency of collection	Institution	Quality checks	Storage
Volume of waste water produced, condition of treatment plants, condition of network, number of clients, waste water quality	ONA Operator collects data, and engineers	Daily & weekly	ONA	Quality checks are performed regularly by the ONA according to the ISO14001	Excel files and reports until they are sent to the central data unit to be stored in a database

Data Management Chain: Monitoring can be considered as a chain of activities in an information system and with the chain closed with the management and control action of the decision maker. Building an accountable information system requires the activities in the chain shown in the following figure and they are designed sequentially starting from the specified information needs. An “x” is shown beside links that are not found in the sanitation data chain in Algeria. Main problem in sanitation data management chain is that; the chain is not a closed loop, the chain is not continuous but interrupted at some locations, information handling is mainly in form of excel data sheets. Data chain activities go in clockwise direction. Adriaanse, M., Van de Kraats, J., Stoks, P.G. and Ward, R.C. 1995a Conclusions monitoring tailor-made. In: M. Adriaanse, J. Van de Kraats, P.G. Stoks and R.C. Ward [Eds] *Proceedings of the International Workshop Monitoring Tailor-made*. Institute for Inland Water Management and Waste Water Treatment (RIZA), Lelystad, The Netherlands.

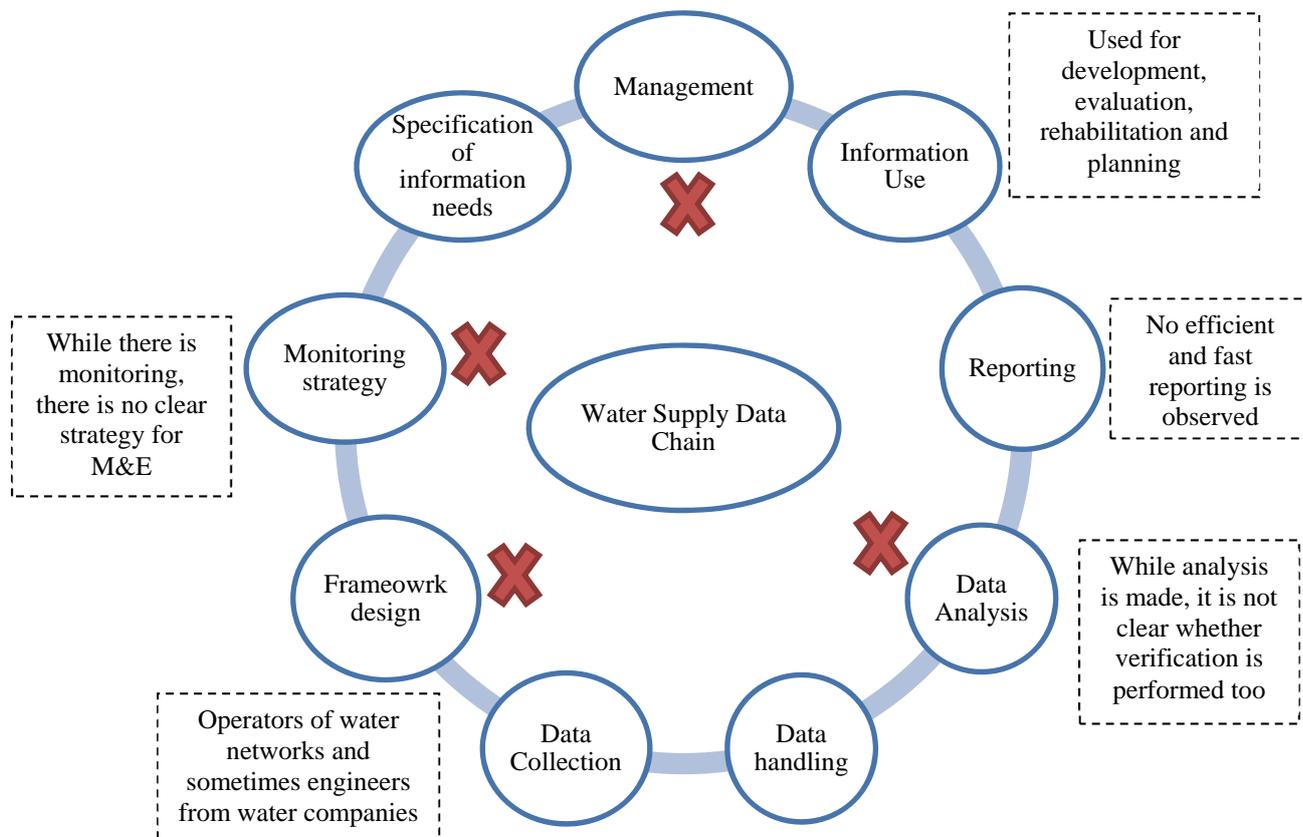


Figure 17. Data management chain of activities for sanitation in Algeria

Information System: There is no sanitation information system available, only the central database of the ministry of water resources.

d. Information Dissemination & use

Information & regional/global organizations: sanitation data produced in the country of Algeria are not used by global organizations, which produce monitoring indicators for sanitation such as JMP. Sometimes, this sanitation data is used by global donors when planning for a development project in water sector. The following table shows the sanitation information dissemination in Algerian water sector.

Information flow: There is no two-way flow of information between related institutions, but all flow is on the vertical level.

Table 26. Sanitation-Information Dissemination

Target Groups	Method	Frequency	Responsibility of	For what purpose
Directorates at basin level	formal meetings, Letters, Reports	Frequently (daily & weekly)	ONA	Monitoring & evaluation for progress towards goals
Ministry of Water Resources	Informal meetings, Letters, Reports, database files	Frequently (daily & weekly)	ONA	Storage, Planning & Development
Media/Civil society	Conferences, Journalists, Internet	Not frequent	Ministry of Water Resources	Dissemination for public

8. M&E Subsystems

a. Environment

ONA-SME: The national office of sanitation in Algeria has acquired the ISO14001 certificate for efficient environmental management systems. In this context, the ONA has committed to establish an organization that identify and manage environmental risks and impacts. The ISO14001 certificate requires a plan-do-check-act system implemented, which is the core for the monitoring & information system for sanitation. The activities undertaken by the ONA include; monitoring the quality of water at the entrance of the station and its output by performing analyzes physicochemical (mid receiver); and control of waste sludge from the process of biological wastewater.

b. Physical Surveys

Sanitation-physical surveys: As part of the periodic updating of the inventory of sewerage through the country, the Department of Sanitation and Protection of the Environment has launched an investigation on the evaluation of the linear network existing across the 48 countries of the wilaya. The survey was launched during the year 2006 on the basis of a standard questionnaire sent to all Directorates of Water Resources of Wilaya. The questionnaires were filled and returned to DAPE for processing and consolidation. Among the information requested through the questionnaire included the linear primary and secondary network and the connection rate to sewerage network and for each of the wilaya agglomeration.

c. Census & Socio-economic Surveys

ONS & Census & Soci-economic surveys: The National Office of Statistics (ONS) is responsible for collecting and publishing census and socio-economic data in Algeria. All data is published online (www.ons.dz) and it is the responsibility of every institution to take what it needs from the online database. While census data are used extensively in water and sanitation sector, this data is only published every 10 years depending on physical surveys for population, it was published 1998 and 2008. For census data in any other year, the office provides a projection method that is developed by the US National Census Office for Demographic Analysis, Population Analysis System Using Excel. Therefore, the timeline for the census is not the same as that for water and sanitation monitoring and planning. It is reported that these interpretations might lead to inaccurate figures. One more weakness is that the household surveys performed by the ONS for purpose of population surveying, do not include sufficient questions in relation to accessibility of water and connection to sanitation services. Since the M&E framework in Algeria water and sanitation sector is not yet developed and/or implemented, there is no harmonization for the boundaries used in census and that required to calculate important related water indicators. Moreover, latest information on water and sanitation published by the ONS is 2002 data. (www.ons.dz)

d. Meteorological Surveys

ONM-Meteorological Stations: The National Office of Meteorology, ONM in Algeria, under the Ministry of Transport is the entity responsible for developing and operating a network of weather observation stations covering all climatic regions of the country. The monitoring stations include; 77 surface observation stations; 12 observation stations in altitude; 3 research stations and special observation (Tamanrasset, TiaretKsarChellala); 5 weather radars (one of them is a radar doplaire) and more than 400 climate stations; 296 climatological stations 117 stations and 179 posts conventional automatic (www.meteo.dz). ONM is responsible for monitoring and collecting continuous daily information about temperature, precipitation

and evapotranspiration, all of which are used by the various water sector institutions especially ANRH and ONA. ONM has a high level of scientific and technical capability for carrying out the weather monitoring efficiently using high tech recording stations and equipment. Therefore, the recorded data are considered of very high quality to be utilized in the water sector. The data monitored by the ONM is already being used by ANRH and ONA. Special weather reports, BMS are used by the ONA services through a special device to fight against the floods. These weather reports are published (www.ons.dz) and distributed by the National Office of Meteorology, ONM and integrated into surveillance systems Sector through collaboration agreements between the ONM and the different organizations in the water sector.

e. Agriculture

The Algerian Ministry of Agriculture and Rural Development has no monitoring stations of water resources, but rather uses data from the Ministry of Water Resources.

However, in 2000, the collaboration between the Agricultural Institute Overseas (IAO) and the National Institute of Agronomic Research of Algeria (INRAA) led the SIGIAR project (Integrated System of Information Management agricultural and rural).

The main objective of the project was to have a better quality and better access to different subjects involved in the knowledge of rural development and rural agricultural environment. The area where the project remained at the local level represented by the provinces of Tiaret Tissemsilt Relizane and Mostaganem.

The main result is the creation of a system for the collection, exchange, management and dissemination of information about a geographic and rural agricultural base (SIGIAR). Project into excellent information systems for the control of agricultural resources and water related to agriculture (National Institute of Agronomic Research, 2011. Report prepared by CSI- Piemonte, Algeria, 2011).

These systems can be formulated as pilot GIS system for rural development in Wilaya; access to geo-spatial information service, the national information system on agricultural areas and a network information system research stations.

f. Universities & Research Institutions

There is not much co-operation between the research community and decision makers in water sector. New technologies addressing emerging challenges are easily embraced by water sector in order to increase water availability. These technologies concerns mainly seawater desalination and water re-use processes. There are some cooperation agreements between the ADE and ONA and academic institutions of education and research for the treatment of issues related to water supply and sanitation. No M&E are available by the academic and research institutions to be utilized in the water sector.

g. Transboundary Water

North Western Sahara Aquifer System-NWSAS: The transboundary water in Algeria does not come from a shared river basin; it comes from an underground aquifer, North Western Sahara Aquifer System, NWSAS as explained before. This aquifer is shared amongst Algeria, Libya and Tunisia. The cooperation between the three countries is in the form of consultation mechanism that aims to better manage the related resources with no risk or conflict. The NWSAS consultation project has almost completed its third phase

and national coordination units are created. (Attached in an appendix is the NWSAS Joint Management report no.1).

Transboundary Committees, NWSAS Consultation mechanism: Under the consultation mechanism of the NWSAS, there exist transboundary committees for better management of shared ground water resources such as; the Algero-Tunisian technical committee on water and the environment, created in the 1980s within the “grand committee” dealing with the questions of shared water resource evaluation, the fight against pollution, information exchange on water development programs, follow-up of NWSAS studies, and the consolidation of bilateral cooperation in water management, and the working groups within the Algero-Libyan “grand committee”, established during the 1990s, on shared water between Algeria and Libya. The two countries have decided to create a “common technical committee on water resources”. Moreover, top officials from the ministry of water resources participate in the deliberations of committees and working groups. These committees are considered very active working to enhance the technical and political performance of involved countries. This led to the establishment of NWSAS National Coordination Unit to dynamize the institutional process and ensures efficient management for the available resources.

Monitoring system-NWSAS: the NWSAS consultation mechanism has established wide monitoring water points spread across the aquifer in the three countries. In the perspective of providing decision makers a complete picture for managing resources and identifying related risks, the monitoring networks is used for hydrology, socio-economy and environmental aspects of aquifer water resources. Various types of data are collected through this network; Water abstraction, groundwater table piezometric head, drawdown, water quality, water salinity, farming practice, irrigation water consumption (by remote sensing), socio-economic data. The following tables show the extent of the monitoring network and the recording available by type as of 2008.

Table 27. NWSAS Groundwater Monitoring Network

	Algeria	Libya	Tunisia
2008	1,166	1,152	5,538

Table 28. NWSAS recording by table

	Points	Operation	Piezometric	Quality
2008	11,166	1,152	5,538	5,296

Information shared: The following data is being collected and shared between the three countries. This data is already included in the water sector in Algeria; however due to the embryonic nature of the M&E framework, it is not yet clear whether this data is really used in M&E for Algerian Water sector. However, due to its quality and spread, it would constitute an excellent component in Algeria M&E system provided that the water related institutions in Algeria are linked to all NWSAS tool; databases, hydrologic models and remote sensing.

Table 29. Information shared between Riparian countries

	Data	Quality & Timeline	Collection	Analysis & dissemination
OSS-NWSAS	Water abstraction, groundwater table, piezometric head, drawdown, water quality, water salinity, farming practice, irrigation water consumption (by remote sensing), socio-economic data	Data is of excellent quality since monitoring networks are operational in a good state and data is checked and verified. Data is collected periodically and database is updated and old data is corrected.	National Algerian experts. No data analysis is made at this stage.	The data collected is analyzed and verified by the technical committee of the NWSAS after being provided by national experts. NWSAS is currently building the capacity of national experts to use the tools developed for dissemination of results; databases, GIS, hydrological models, remote-sensing.

h. Climate change

IWRM – Climate change: With more frequent droughts and a decreased rainfall over the past 30 years affecting dams, groundwater and environment; Algeria is considered highly vulnerable to impact of climate change. Algeria adopted an action plan for mitigating the inverse impacts of climate change on environment and water resources in 2003, (Algeria Ministère de l’Amenagement du Territoire et de l’Environnement (AMATE), 2010. Second Communication Nationale de l’Algerie sur les Changements Climatiques a la CCNUCC. Algiers).

It was the responsibility of the Ministry of Development & Environment & Tourism. The Ministry of Water Resources was not involved as an acting institution in the water sector, but “some” of the water related objectives from this action plan were implanted within the framework of the Algerian integrated management of water resources.

Climate change & water resources: Currently, there is no climate change monitoring being undertaken in the water sector. The Algerian government is less engaged in climate change adaptation compared to other North African Countries, e.g. Morocco & Tunisia. While greater adaptation action is required across all sectors, key gaps appear to be absent for projects and programs focused on surface and coastal water. In 2003 action plan and those consequent plans of 2010 & 2012, the Algerian Government sets adaptation measures focused on the vulnerability of water resources and identify setting, operating and enhancing monitoring networks as the most important target for the action plan. These monitoring networks are used to provide officials with measurements on water delivery efficiency, water contamination from various sources, severe floods, climate parameters, hydrology, hydrogeology, volume of water behind dams and water for agriculture. These action plans are managed by the Ministry of Development & Environment & Tourism.

9. M&E Issues, Conclusions and Recommendations

a. Issues

The main issues confronting the development of effective water sector M&E systems can be stated as;

At the institutional level:

- There is no formal framework for M&E sub-sector of water supply and sanitation;
- Lack of strategy monitoring of natural resources at the institutional level;
- Overlapping responsibilities in the collection of certain data;
- There are no specialized structures in data management;
- There is no upward & downward flow of information between the central organization and the data collectors and providers. Only the upward flow exists;
- The data collected are disaggregated by gender;
- Dissemination of data is not used by regional and global organizations interested in the progress and performance of the sector;

Quality of the information:

- The irregular update for existing data is not subject to the procedures;
- The information currently available is of variable quality;

Technical and financial sustainability:

- The lack of financial resources allocated to the operation of structures for information systems such as GIS; despite having allocated more than 35 billion dollars for water sector projects.
- Required high technical expertise for operating and developing computer databases and IS, which limits the optimal use and exchange of data.

b. Recommendations

In terms of the rapid assessment undergone for the Algerian M&E in Water Sector, the following recommendations can be stated:

- Provide funds and institutional resources for implementing and enforcing the policy of integrated water resources management including M&E
- Implement a sector wide M&E plan with respect to water supply & Sanitation & water quality
- Improve water quality monitoring including reconnaissance surveys of the status of water quality and the sources of pollution; identify the country's laboratory requirements; and develop a sustainable cost-effective monitoring program. Algeria made a big step forward, especially in laboratories corporate management of water and sanitation in large cities (Algiers, Oran), who obtained certifications and accreditations nationally and internationally

- Harmonize methodologies of defining water and sanitation indicators with JMP
- Launch monitoring projects for surface water to make good use of the available resources
- Promote information sharing on status of water and sanitation for the GLASS (Global Annual Assessment of Sanitation & Drinking Water)
- Promote inter-sectoral coordination between Ministry of Health and Ministry of Water resources
- Facilitate transparency in the communication and sharing of water and sanitation information amongst related institutions
- Build capacity for implementation of existing plans in terms of water resources and financing
- Include the climate change action plan in the water sector M&E framework
- Engage in regional & global monitoring initiatives
- Allocate financial resources for supporting existing databases such as BADGE, BASHYD & Data Center of MRE to be the initial step towards a single integrated Management Information System in water sector
- Allocate financial resources to link the existing national database information systems with the geo-database information system of the NWSAS to have a unified information system shared by all water sector institutions.

10. Appendices

Country Background Information Sheet

Country Name: **Algeria**

Items	Information																																			
1. Population trends for the last 4 years, and GDP.	<table border="1"> <thead> <tr> <th>Years</th> <th>2000</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2013</th> </tr> </thead> <tbody> <tr> <td>Urban pop.</td> <td>18 250 000</td> <td>24 214 000</td> <td>24 688 000</td> <td>25 185 000</td> <td>25 702 000</td> <td>27 090 000</td> </tr> <tr> <td>Rural pop.</td> <td>12 166 000</td> <td>10 377 000</td> <td>10 581 000</td> <td>10 793 000</td> <td>11 015 000</td> <td>11 610 000</td> </tr> <tr> <td>Total pop.</td> <td>30 416 000</td> <td>34 591 000</td> <td>35 269 000</td> <td>35 978 000</td> <td>36 717 000</td> <td>38 700 000</td> </tr> <tr> <td>GDP (10⁹ USD)</td> <td>54.790</td> <td>170.989</td> <td>138.119</td> <td>161.979</td> <td>188.681</td> <td>277.400</td> </tr> </tbody> </table>	Years	2000	2008	2009	2010	2011	2013	Urban pop.	18 250 000	24 214 000	24 688 000	25 185 000	25 702 000	27 090 000	Rural pop.	12 166 000	10 377 000	10 581 000	10 793 000	11 015 000	11 610 000	Total pop.	30 416 000	34 591 000	35 269 000	35 978 000	36 717 000	38 700 000	GDP (10⁹ USD)	54.790	170.989	138.119	161.979	188.681	277.400
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GDP (10⁹ USD)	54.790	170.989	138.119	161.979	188.681	277.400																														
2. Basis of the existing water sector Policy/ Reform and potential policy targets.	<p>The important questions treated in the existing reformation of Water Sector: In the context of the water crisis prevailing in the last 03 decades and after a long succession of droughts, public authorities decided to set up the question of the water first and foremost of 1st order by the creation in 1999 of a Ministry in charge of Water resources. The new water policy, integrated within the framework of the National Plan of country planning (Horizons 2015-2025-2040) bases on a strategy recorded in the "water law" of August, 2005.</p> <p>This law about which, forty application decrees were promulgated allow to have a legal framework renovated legal framework, creating the conditions of an integrated and modern management of water resources. It considers the definition of the public domain of the water, the not conventional resources, the planning of the arrangements with various terms, the principle of the integrated water resources management, the Public Private Partnership and the implementation of specialized Public institutions covering all the activities of the water as well as the device of training.</p> <p>This priority given to the water sector was translated by a strong impulse of the intervention of the State on two major strategic axes:</p> <p>1st axe: development of the hydraulic infrastructure: to answer the challenges of future, the infrastructural development was supported by a volume of public investments achieving at present 20 billion (over which period?)</p> <p>2nd axe: institutional reform within the framework of the national approach of strengthening the governance</p> <p>The big implemented construction works aim at insuring:</p> <ol style="list-style-type: none"> 1. A greater water resource mobilization of the in under its conventional and not conventional forms and this, to strengthen the offer in water and reduce the vulnerability to the climate change. 2. The rehabilitation and the extension of the drinkable water supply systems, to fight against the losses and adapt networks as the evolution of the urbanization 3. The rehabilitation and the extension of the systems of purification to protect the living environment and the hydric ecosystems and develop the re-use of handled waters. 4. The modernization and the extension of irrigated areas to support the strategy of food safety. 5. The consolidation of the experiences of better governance, in particular regarding management of the public services of the water. 																																			
3. Knowledge of international and African Milestones on Water and Sanitation.	<p><i>Which are the ones well known and used in the county? Specify how it is used.</i></p> <p>- 1- African Convention on the Preservation of the Nature and the Natural Resources (Alger-Sept on 1968): " States contracting parties make a commitment to adopt measures aiming at the preservation, in the use and in the development of the ground, the water, the flora and fauna... "</p> <p>- 2-Conference of United Nations on the water(Mar del Plata-1977): " definition of a platform of discussions on water issues at international level.</p>																																			

- 3-Le 1st Summit of the Earth (Rio of Janeiro-Juin1992)
- 4- The results(profits) of the various World Forums of the water: Casablanca (1997), The Hague (2000), Kyoto (2003), Mexico(Mexico City) (2006), Istanbul (2009), Marseille (2012)
- 5- Objectives of the development of the millennium -55ème AG-Nations Unies-2000
- 6-Le World Summit On the Sustainable Development (Johannesburg September 2002)
- The African Vision of the water for 2025.
- Creation of the AMCOW (Abuja-2002) and the Results of the various Ministerial Councils on the access to the water, the purification, the transboundary Basins , the integrated management, the groundwater resources, the monitoring - evaluation, the good governance, the financing....

Application: *the results and the recommendations of the various conferences allow to deepen the reflection on the water issues, s regarding planning by the implementation of a frame of medium and long-term planning (impact of the climate change of which it is necessary to take care, or on quite different problem which is on the agenda and it besides the water right...)*

4. Trend of the 3 latest reviews in national water Policy and Reforms.

Years

Drivers of the Reviews:

- Have a frame of planning and a legal framework of governance
- Take care of the new needs
- Join the objectives of the Millennium
- Insure a better management and a better governance
- Introduce the use of waste water purified in farming
- operate the program of realization of desalination stations of the sea water
- Introduce the Public - Private Partnership
- define the Hydraulic Public domain
- Introduce the hydrological risk, the management of the perimeters of protection against the
- Define the integrated water resources management
- modernize the administration
- Strengthen the structures of training

Targeted Impacts and effectiveness

1-Mobilization of water resources: of 1999 this day, this effort of mobilization allows to 2012, 78 dams with a total capacity of storage exceeding the 7, 5 billions of m3.

2-Program of Desalination of the sea water: objectives:

- Secure the AEP of big cities and coastal localities
- Reinstate waters of the dams of the "tellienne" region towards high plateaus

Program:

- Realization of 13 desalination plants along all the coast, along the total capacity of pro 2,26 millions of m3 / j.

The biggest station is the one of Oran (500 000 m3 / j)

- Seven factories were already put into service (1 100 000 m3 / day)

3-the drinkable Water supply: the right for the access to the drinking water and to the p recognized by the law on the water. Indicators are:

- Rate of connecting: 1999: 78 %; 2012: 95 %
- Daily Subsidy(Endowment) per capita: 1999: 123 liters/j/hab/j/hab/j/hab. 2012: 170 liters/j/hab/j/hab/j/hab.

4-Assainissement:

- 138 water-treatment plants with a capacity settled by 11 million equivalents inhabitant volume of treatment of 700 million m3 / year.
- The rate of connecting passed of 72 % in 1999, in 87 % in 2012.
- The total shelf space of networks passed of 21 000 km in 1999 in 42 000km in 2012.
- The program of realization of water-treatment plants will allow to develop the irrigati term objectives (horizon 2030) of: 107 400 ha,

5-agricultural Hydraulics and irrigation:

	<p>Over the period 1999-2011, surfaces irrigated in big, average or small hydraulics passed of 420 000 ha in 1999 in 1 160 000 ha is a 176 % increase.</p> <p>6-Governance of the water:</p> <ol style="list-style-type: none"> 1. The revision of the legal framework with a new law relative to the water promulgated in August, 2005, and about forty application decrees, 2. The modernization of the systems of public management (planning and financing of the investments, the management of the information, the normalization and the standardization), 3- The reorganization of the structures of the administration of the water as well as the statutory under guardianship revision of public institutions in the sense(direction) of a strengthening of their financial autonomy, 4- The creation of an authority of regulation of the public services of the water 5- The implementation of a frame(executive) of dialogue between all the actors of the water: <p>- At the central level: a consultative national council for water resources - At the regional level: 5 tripartite committees in about 5 hydrographic basin agencies.</p>	
<p>5. Comments on the national water sector regarding the strengths, weaknesses, opportunities, threats and outstanding problems.</p>	<p>- In Algeria where the resource in water is rare (550 m3 / year / hab.) and undergoes the impacts of climate change, the challenges are enormous because the demand in water remains always strong and it is necessary to produce every day more water for the populations in strong increase, the farming and the industry. This water has to be also good quality what requires efforts supported for the protection of the ecosystems.</p> <p>- In front of water shortages known between 2000-2002, the State operated a policy of the water to endow the country of important infrastructures to satisfy a demand in water in constant increase but anticipate its long-term evolution to strengthen and secure the access to the water and to the purification for all.</p> <p>- the impact of these investments was translated by a doubling of the subsid in drinking water per capita between 1970 and 2012 with a rate of connecting to the public networks which passed of 35 % in 1962 (year of the independence of Algeria) in 95 % in 2012 as a population which quadrupled since the independence.</p> <p>- the challenges remain constant but the granted efforts and the set up institutional frame allow to move forward that the problem of the water in a semi dry country as Algeria, begins to find a solution by the reassurance of the access to the drinking water and to the purification of the populations while clearing surpluses for the producing activities in particular the farming which consumes 65 % of capacities in water of the country.</p>	

Country Water and Sanitation Performances Evaluation Sheet

Country Name: **Algeria**

Performance Category

Country Information

1-1-Water and Energy

Target:
Increase hydropower utilization by 10% from 2000 to 2015.

Specific actions taken so far for the milestone:
- Algeria, situated in dry zone and the availability of which in water is of the order of 500m³ / hab. / year has very reduced capacities regarding hydro energy. That's why the electricity is in its quasi-whole lot produced from fossil resources (gases, hydrocarbons). However, within the framework of the national program of adaptation to climate change, a new policy is being organized, favoring the turbinated surface waters, the use of the solar and wind energy and the biomass.

Achievement:

Years (i)	2000	2008	2009	2010	2011	2015
-Economically feasible hydropower Potential (P)	25 412	40 236	42 769	45 640	48 426	48 426
-Installed hydropower capacity (C)	53	281	342	410	479	479
-Hydropower utilization (Hpul = C/P) (%)	0.21	0.70	0.80	0.90	0.99	0.99
Rate of increase R_iHpul (%) = (Hpul_i - Hpul₂₀₀₀)/Hpul₂₀₀₀	0.00	2.3333	2.8095	3.2857	3.7143	3.7143

Sources of verification and Specific comments:
- Ministry of the Energy and Appearances(Mines) and Assists National Communication of Algeria on Climate change in the CNUCC

Specific Comments:

Algeria is a country of oil and natural gas. The part of the hydraulic capacity in the park of electric production is very weak). This is dû in the insufficient number of the exploitable hydraulic sites and in the irregularity of the flows.
The production of the electricity knew a strong growth in passing from 25 TWh in 2000 to 48 TWh in 2011, reflecting annual increase averages of 6 %. The power settled by the national park of electricity reached 8502 MW in 2008 against 5900 MW in 2000, what corresponds to a 44 % expansion.
The consumption of the electricity registered an average increase of 6 % during this period. This growth includes all the categories of customers. The total number of subscribers reached in December, 2008 is 6, 3 millions. As for the rural electrification, the effort granted by the State during period 2000-2011 allowed more than 1, 3 million homes to be linked with the network. The rate of rural electrification was 1, 8 % a year during this period, what carries the rate of national electrification at the end of 2011 at the threshold of 98 %.
Algeria joined the development of the renewable energies into its energy policy by the adoption of a legal framework favorable to the development of these energies, the realization of important infrastructures in this domain and the planning of important projects.
Solar energy: due to its geographical situation, Algeria has one of the highest solar deposits(fields) to the world, considered at five billions the GWh / YEAR. The duration of sunstroke on laquasi whole lot of the national territory exceeds(overtakes) the 2500 hours annually and can reach(affect) the 3600 hours (high plateaus and Sahara). The received(successful) energy daily on a horizontal surface of 1m² is of the order of 5 kWh on the major part of the national territory, is meadows of 1700 kWh / m² / year in the North and 2 650 kWh / m² / year in the South of the country.
Wind energy: the wind resource in Algeria varies many from the place to another one. This is mainly of for topography and for a climate very diversified. Algeria to a regime of moderate wind (2 - 6 m/s). This energy potential can be exploited for the pumping of the water particularly on

High plateaus.

Geothermal energy: Jurassic limestone of the Algerian North which constitute important geothermal reservoirs, give birth to more than 200 thermal springs located mainly in the regions of the Northeast and the northwest of the country. Further south, the "continental intercalary" constitutes a vast geothermal reservoir which extends over several thousands of km². This reservoir, called collectively «nappe de l'albien» is exploited through drillings in more than 4 m³/s; the water of this table is in an average temperature of 57 °C.

1-2-Water and Agriculture

Targets:
-Increase water productivity
Rain fed agriculture & Irrigation by 30% from 2000 to 2015.

and

-Increase the size of irrigated areas by 50% from 2000 to 2015

- Specific actions taken so far for the milestone:
- Achievement on water productivity:

Years (i)	2000	2008	2009	2010	2011	2013
-Agricultural GDP (10 ⁹ USD) (A)	4. 931	11.114	11.050	13. 768	19.434	16. 79
-Total Agri. Water withdrawal (10 ⁹ m ³)(B)	1.4	2.9	3.1	3.3	3.5	6.0
-Water Return to Environment (C)	0.420	0.870	0.930	0.990	1.050	1.8
Water productivity (USD/m³) Wp=A/(B-C)	5.03	5.47	5.09	5.96	7.93	3.9
Rate of increase R_iWp (%) = (Wp_i- Wp₂₀₀₀)/Wp₂₀₀₀	00	1.07%	1.21%	1.357%	1.5%	3.28%

- Achievement on irrigated areas:

Years (i)	2000	2008	2009	2010	2011	2013
-Irrigated areas (IA) (10 ³ ha)	450	900	960	1,050	1,050	1,053
Rate of increase R_i/A (%) = (IA_i-IA₂₀₀₀)/IA₂₀₀₀	00	100%	113%	133%	157%	

- Sources of verification and Specific comments:
 - National plan of the Water
 - Balance assessment 1962-2012 and perspectives of the sector of water resources
 - Ministry of Agriculture and the Rural Development. Ministry of Water resources.

Comments:

The implementation of the National Plan of Agricultural Development considerably boosted the farming sector which knew an important development due to the initiative of the farmers especially private who benefited from considerable material and financial advantages through the National Fund(Collection) of Agricultural Development (loans, state aid, realization of drillings and storage ponds, promotion(class) of the irrigation in the drip to reduce the losses to water, fairs and exhibitions(exposures), agricultural popularization, protection of vegetables). On the other hand, from 2000 till 2012, about 39 dams(roadblocks) are thrown(launched) or current(in class) (25 already ended for a capacity of 3.5 billions of m3). This dynamics allowed to increase appreciably the agricultural production irrigated and the creation and the conservation of agricultural jobs(uses), so limiting the drift from the land and assuring(insuring) the improvement of the living conditions of the population in rural areas.

1-3-Water for multiple Uses

Target:

Increase the Water Demand Satisfaction Index (WDSI) by 10% from 2000 to 2015.

- Specific actions taken so far for the milestone:
 - Greater mobilization of the resource in conventional water.
 - Use of non conventional resource particularly in farming (uncluttered waste water).
 - Realization before 2015 of 13 stations of desalination of the sea water (07 stations already put into service
 - Economy of the water and the governance of the water

Achievement:

Years (i)	2000	2008	2009	2010	2011	2013
- Total all sectors Water Demand (10 ⁹ m ³)(A)	30.416	34.591	35.269	35.978	36.717	37
-Total all sectors water supply (10 ⁹ m ³)(B)	3.25	5.40	5.80	6.10	6.40	9,65
- WDSI =B/A	10.7%	15.6%	16.4%	16.9%	17.4%	26%
Rate of increase $R_i WDSI (\%) = (WDSI_i - WDSI_{2000}) / WDSI_{2000}$	00	45,8%	53,3%	57,9%	62,6%	

- Sources of verification and Specific comments:
 - National plan of the Water
 - Balance assessment 1962-2012 and perspectives of the sector of water resources

Comments:

Algeria is a dry country with low hydric potentialities, however efforts were granted to endow the country of important infrastructures to answer a demand in water in constant increase. The theoretical rate of 1000 m³ / hab. / year is too strong and does not suit inevitably in this kind of statistics. It is shown in certain studies as this rate can be returned unless 500 m³ / year / hab.

- The big construction works operated since the beginning of decade 2000 aim at four strategic objectives:

1. Increase and secure the mobilization of conventional water resources (renewable and non renewable water) and not conventional (desalination and cluttered waste water)
2. Guarantee the access to the water and improve the quality of service through the rehabilitation and the modernization of the management of the systems of the drinkable water supply
3. Insure the access to the purification and protect the hydric ecosystems by means of the rehabilitation and the extension of the systems of purification and purge of waste water
4. To Support the strategy of alimentary security with the extension of the irrigated zones

2.1. Basin and Transboundary water resources management

Target:

Develop a national Water Efficiency Plan by 2015.

Specific actions taken so far for the milestone:

The new implemented policy is inspired by the town and country planning policy, which sets as goal the creation of a dynamics of rebalancing of the territory, in particular the sustainable development of High plateaus and the South.

The achievement of this objective requires to make big transfers, and to appeal to the not conventional resources and more particularly to the desalination of the sea water.

A real political will exists and is translated by the implementation of new strategies of mobilization, transfer and resource management in water, accompanied with considerable financial means, as well as with numerous institutional, legal and organizational reforms, The importance of the investments granted through the various programs, was translated by tangible results, regarding satisfaction of water requirements both in quantity and in required quality.

Availability of Water Efficiency or IWRM Plan and Year of Adoption (1996):

- The law of August 4th, 2005 relative to the water established, for every natural hydrographic unit, a main plan of arrangement of the water resources which will have to determine, on the basis of the offer and of the demand in water, the objectives:
 - Of development of the arrangements of mobilization and transfer of waters between natural hydrographic units, by taking into account economic parameters,
 - Of use of water resources, in a prospect of sustainable management.

It was thus a question of creating at the level of every hydrographic region, a tool of dynamic planning of the water resources which will be updated in a permanent way and can be managed in a autonomous way by the body in charge of integrated water resources management under the authority of the ministry of water resources.

Elements of the policy and legal environment:

- The law n°05-12 of August 04th, 2005 relative to the water

To dedicate the new policy of the water a new law was promulgated in 2005:

Law n°05-12 of August 04th, 2005 relative to the water

The basic principles of the new law are:

The management of the resource

Unitarian, united, joint management, and integrated(joined) on the scale of the Catchment basin
Economic management

Compatibility with the town and country planning policy and of environmental protection.

The regime of the concession:

Opening of the diet(regime) of concession to the moral persons of private law,
gathering(combining) the required qualifications.

The drinkable Water supply:

Strengthening of the systems of quality control.

Waste water:

New capacities(measures) relative to the obligation(bond) of purge of waste water of large cities
and industrial units upstream to dams(roadblocks).

The fight against pollution:

Obligation(Bond) made for the industrial units to proceed to the putting in conformity of their
installations with the standards of rejections(discharges) tells that fixed by the regulations in
force and to proceed to the adequate treatment(processing) of their effluents.

The planning of the mobilization and the use of the resources in waters:

Institution of master plans of arrangement and use of waters

Regarding financial capacities:

Introduction of incentive measures of the State to encourage any arrangement(development)
likely to allow the economy, the valuation and the protection of the resources.

The spending concerned to the purification is covered by the pricing for the water.

Regarding penalties:

Increase of the severity of the penalties in case of violation of statutory provisions.

Extension of the privileges of Wali regarding application of the penalties.

Protection and conservation groundwater water resources:

Institution of the perimeters of protection

Elements of the institutional arrangements:

Within the framework of the institutional reforms, four big national bodies were created (ADE,
ONA, ANBT, ONID) as well as 05 hydrographic basin agencies

The Algerian of Waters (ADE):

This public institution, created with a status of EPIC(INDUSTRIAL AND COMMERCIAL PUBLIC
COMPANY) has for mission to take care Public services of water through all the national
territory.

Strategic objectives fixed to this new Establishment are:

1. Insure a better satisfaction of the drinking water requirements of the users.
2. Insure a more efficient management of the resource by reducing the wasting (fight against the leaks, the illicit pricking), by the rehabilitation of networks, by the professionalization of all the workers.
3. Give to the water its real economic value to cover expenses of functioning and maintenance.

The National office of the sanitation (ONA):

One of the essential missions of this office will consist in insuring a good management of sewer
systems and Water-treatment plants, and in developing a policy of re-use of waste water purified
in the industry, the farming, even later for the artificial refill of ground-water sheets.

The National Agency of Dams and the Big Transfers (ANBT)

This Agency has for mission the project ownership and the project management for all which
concerns the mobilization of waters by dams and the big transfers.

The National office of the Irrigation and the Drainage (ONID):

This Establishment insures the project ownership and the project management for all which concerns agricultural hydraulics " on a national scale.

Hydrographic Basin agencies (ABH):

These Agencies among five, translate in reality, the principle of integrated water management on the scale of the hydraulic basin, held within the framework of the new water policy.

These Agencies have for missions:

- To develop the hydraulic land registry on the scale of the catchment basin,
- To participate in the elaboration of the master plans of arrangement, of mobilization and allocation of water resources
- To participate in the operations of supervision of the state of pollution and definition of the technical specifications relative to the wastewater disposals and to the devices of their purification.
- To lead any actions of information and raising awareness of the domestic, industrial and agricultural users to promote the rational use and the protection of water resources.

At the same time it was create organs of dialogue, in the form of committees of catchment basins constituted by the representatives of the State, the local authorities and the users.

These committees have for mission to discuss and to formulate notices on all the water-related questions, on the scale of the catchment basin.

The institution of the tools of planning (PNE, PEDARE, committees of catchment basins, Information systems), had a beneficial impact on the planning and the management of the projects.

The concept of integrated water resources management introduced on the occasion of these reforms allowed a sensitive improvement of the quality of the public services of the water, the purification and the agricultural hydraulics.

Element of the financial structure:

The financing is in its majority insured by the State which however defined the rules of governance in particular regarding pricing and regarding covering(collection) of the costs of the services(departments) assured(insured) regarding water supply and in purification.

- For the desalination, the units are realized according to the principle of the BOO (Built, Own, Operate).
- For the management of big cities: implementation of the conditions to develop the delegation of management of the public services of the water and the purification with deprived operators (Public Private Partnership)

Management tools: master plans of arrangement and use of waters

▪ **Sources of verification and Specific comments:**

legal texts

- 2.2. Not applicable
- 2.3. Not applicable
- 2.4. Rain water

Target:

Increase the share of rainwater use in total municipal water consumption up to 10% by 2015.

- Specific actions taken so far for the milestone:
 - In Algeria, the collection of rainwater's by roofs for the domestic needs is practically non-existent in urban zones. In rural areas, it is practiced for the abreusement of the livestock or for the small irrigation of much reduced plots of land.

▪ **Achievement:**

Years (i)	2008	2009	2010	2011	2013
-Total municipal water supply(10 ⁹ m ³)(A)	2.1	2.7	2.8	2.9	3.1
- Rainwater use (10 ⁹ m ³)(B)	0	0	0	0	0
-Water use from other sources Desalination (10 ⁹ m ³)(C)	0.105	0.142	0.215	0.405	0.515
-Total municipal water consumption (T _{wc} = A+B+C)	2.205	2.842	3.015	3.305	3.615

Percentage of rainwater use pRu (%) = B/Twc .		0	0	0	0	0																																			
Sources of verification and Specific comments:																																									
- MRE - DAEP(Direction de l'Alimentation en eau potable)																																									
3.1. Urban Water Supply	<ul style="list-style-type: none"> Specific actions taken so far for the milestone: - Algeria committed during decade 2000, a vast program of rehabilitation and extension of the city networks of drinking water distribution and purification, as well as the capacity building of management of the public service of the water. Thanks to these actions, the rate of connecting of the population to the public network of AEP passed from 78 % in 1999, to 94 % in 2011, with an average subsidy of 170 l / hab. / j. 																																								
3.2. Urban Sanitation																																									
3.3. Rural Water Supply	<ul style="list-style-type: none"> - A development policy of the sanitation sector was organized on the other hand with objective: 1. Insure the management, the rational exploitation and the maintenance of sewer systems and STEP: 2. Clarify the respective responsibilities of companies and municipalities 3. Set up financial means necessary for the financing of the operating costs of networks and purge 4. See again the system of pricing for the purification The creation of the National office of the Purification (ONA) 2001s'inscrit registers within the framework of this policy. 																																								
3.4. Rural Sanitation and Hygiene																																									
<p>Target: Reduce by 50% from 1990 to 2015, the proportion of the population without improved drinking water source, and the proportion without improved sanitation facility (Urban/Rural /Total).</p>		<p>Achievement in water supply:</p> <table border="1"> <thead> <tr> <th>Years (i)</th> <th>1990</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2013</th> </tr> </thead> <tbody> <tr> <td>Access rate are not differentiated for the urban and rural</td> <td>78%</td> <td>91%</td> <td>92%</td> <td>93%</td> <td>94%</td> <td>95%</td> </tr> <tr> <td>-Total access (%) (W)</td> <td>78%</td> <td>91%</td> <td>92%</td> <td>93%</td> <td>94%</td> <td>95%</td> </tr> </tbody> </table> <p>Rate of Inaccessibility reduction for water $IR_{wat} (\%) = (W_T - W_{1990}) / (100 - W_{1990})$</p> <table border="1"> <thead> <tr> <th>Years (i)</th> <th>1990</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2013</th> </tr> </thead> <tbody> <tr> <td>Rate of Inaccessibility reduction for water</td> <td>00</td> <td>59%</td> <td>63.6%</td> <td>68%</td> <td>72.7%</td> <td></td> </tr> </tbody> </table>					Years (i)	1990	2008	2009	2010	2011	2013	Access rate are not differentiated for the urban and rural	78%	91%	92%	93%	94%	95%	-Total access (%) (W)	78%	91%	92%	93%	94%	95%	Years (i)	1990	2008	2009	2010	2011	2013	Rate of Inaccessibility reduction for water	00	59%	63.6%	68%	72.7%	
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4.1.
Adaptation to
Climate Change

Target:
Develop and
implement, at
least 1 Climate
Change
Adaptation
Strategy by 2015.

- **Specific actions taken so far for the milestone (New initiatives to improve resilience):**
- **Existence of a National Climate Change Adaptation Strategy and Year of adoption:**
 - the Ministry of the Environment and country planning coordinates the " National Climate Plan " as well as the National plan of country planning in which become integrated all the sectors and into horizons 2025-2040.
 - a national Agency of Climate change was so created.
- **Existence of a Actions Plans on Water for Climate Change resilience:**
 - The National Water Plan was developed by taking care of the impact of climate change on water resources (available Study) as well as of the measures of adaptation
- **Existence of Programs for implementing the Actions plans:**
 - The National Water Plan is the program for implementing the Actions plans for the sector of Water resources.
- **Sources of verification and Specific comments:**
 - ministry of water resources
 - Ministry of the Environment

4.2. Water-
related
Hazards

Target:
Establish at
least 1 Early
warning
System for
disaster
prevention at
national level
by 2015.

- **Specific actions taken so far for the milestone (water disaster prevention initiatives):**
- Hazards connected in:
- **Drought:** network of pluviometric observation and premature alert: the national agency of the hydraulic resources publishes(edits) monthly a bulletin on the evolution of the pluviometry and the hydric deficits.
The National office of the Meteorology publishes(edits) a bulletin of seasonal forecasts
 - when due of 03 months.
 - **floods:** - a special weather report is broadcast(diffused) in case of heavy rain.
 - A mapping(cartography) of the flooded and easily flooded zones is available.
 - Two systems of alert and forecast of floods are operational.
 - An operation of generation of this system is in progress for all the national territory
 - **Water quality:** a network of surveillance(supervision) of the quality of superficial and subterranean waters is operational.
 - **Management of the coast:** an agency under the supervision of the Ministry of the Environment was create in this objective.
 - Wet zones: these are listed, classified (Ramsar Convention) and are the object of follow-up and conservation.
- 9.Existence of Early Warning Disaster prevention System and Year of establishment:**
yes L'Etat has create in 2010 a delegation at the natural risks:
- Elements on Knowledge of risks:
- identified and studied risks Mapping(Cartography), intensity, frequency, duration.
- Elements on Monitoring, analysis and forecasting of the hazards:
- The Monitoring is insured in a regular way. For the floods, the network of observation exists but it requires being totally automated.
- Elements on Communication or dissemination of alerts and warnings:
- broadcasting of bulletin of alert (paper, radio, TV)
- Elements on Local capabilities to respond to the warnings received:
- The local capabilities require to be although strengthened the raising awareness and the mobilization is very strong. There is locally a Scheme to deal with major civil emergencies (organization of the help) which is activated désla alert meadow of level 1.
- **Sources of verification and Specific comments:**
 - Ministries of water resources, and
 - Ministry of environment and country planning, and the Inside.
 - National coordination assure insured by the Ministry of the Interior

5.1. Institutional arrangement s

5.2. Ethics, transparency, empowerment

5.3. Public and private roles

5.4. Right to water

5.5. Regulatory approaches

Target:

Institute/update, by 2015, water sector policy reforms that reflect good governance principles of: (i) partnership commitment; (ii) ethics - transparency, equity and fairness; (iii) responsibility and accountability; (iv) inclusiveness, participation, predictability and responsiveness; and (v) coherence.

- Specific actions taken so far for the milestone:
- Existence of Water sector policy that reflects good governance principles, and Year of latest update:

Elements on Partnership and commitment:

- 05 big cities are managed according to the principle of the Public Private Partnership for the water and the purification
- 13 desalination stations realized according to the BOO.
- Hydraulic works are managed according to the model of the concession (water-treatment plants, or of water treatment)

Elements on Ethics - transparency, equity and fairness:

- Contracts are concluded in the principle of the transparency and the equity. A law carrying (wearing) regulations of procurement contracts (presidential Decree N° 10-236 du 07 Oct. 2010) organizes this approach (initiative). The submissions are the object of a public opening.

Elements on Responsibility and accountability:

The same decree 10-236 clarifies rules and defines the penalties

Elements on Inclusiveness, participation, predictability and responsiveness:

- See the decree 10-236

Elements on Coherence:

- A planning is insured at the level of the ministry of the water resources which appreciates the opportunity of the operation. It is afterward submitted to the Ministry of Finance for examination and approval by the arbitration committee.

Sources of verification and Specific comments:

- ministry of water resources
- The Ministry of Finance
- Newspaper Officiel-Décret 10-236

6.1. Financing Local Authorities

Targets:

-Allocate immediately at least 0.5 % of GDP to sanitation & hygiene.

and

-Allocate immediately 5% of national budget for water & sanitation.

- Specific actions taken so far for the milestone:
-
- Achievement for GDP allocation:

Years (i)	2008	2009	2010	2011	2013
- GDP (A ₁) (10 ⁹ US \$)	170.989	138.119	161.979	188.681	277.400
- Sanitation and Hygiene Budget (B ₁) (10 ⁹ US \$)	0.888	0.514	1.153	1.542	
Percentage of GDP to Sanitation and Hygiene gdpSH (%) = B₁/A₁	0.52	0.37	0.71	0.82	

- Achievement for national budget allocation:

Years (i)	2008	2009	2010	2011	2013
- Total National Budget (A ₂) (10 ⁹ US \$)	2,72	2.57	3,28	2,99	2,61
- Water and Sanitation	1.806	1.265	2.411	2.695	

	<p>Budget (B₂) (10⁹ US \$)</p> <p>Percentage of national Budget to Water and Sanitation BdgWS (%) = B₂/A₂</p> <p>XXXX XXXX XXXX XXXX</p>																						
	<ul style="list-style-type: none"> Sources of verification and Specific comments: Water resources Ministry (Planning and economic affairs Direction) 																						
<p>6.2. Pricing Strategies</p> <p>6.3. Pro-poor financing Strategies</p> <p><u>Target:</u> Set by 2015, water tariff system that addresses cross-subsidy and the need of poor.</p>	<ul style="list-style-type: none"> Specific actions taken so far for the milestone: - Describe the Water Tariff Structure: <ul style="list-style-type: none"> ✓ Lifeline Water (l/ca/day): XX ✓ Minimum salary of the population (local currency-DZD-): 1500 ✓ Rate (USD or EURO/local currency): 1 euro=103 DZD 1 US\$=80 DZD <p><u>Tariff Structure:</u></p> <table border="1"> <thead> <tr> <th>Consumption categories (m³)</th> <th>Rate (local currency)</th> </tr> </thead> <tbody> <tr> <td>< 25 m³</td> <td>1 6.30 DZD / m³</td> </tr> <tr> <td>26 m³ à 55 m³</td> <td>2 20.47 DZD / m³</td> </tr> <tr> <td>56 m³ à 82 m³</td> <td>3 34.65 DZD / m³</td> </tr> <tr> <td>> 82 m³</td> <td>4 40.95 DZD / m³</td> </tr> <tr> <td colspan="2">Any other specific charge: - Pollution - economy of the water - Quality - purification</td> </tr> </tbody> </table> <p><u>Adjustments for cross-subsidy:</u></p> <table border="1"> <thead> <tr> <th>Adjustments</th> <th>Rate</th> </tr> </thead> <tbody> <tr> <td>Industrial</td> <td>40.95 DZD/m³</td> </tr> <tr> <td>Commercial</td> <td>34.65 DZD/m³</td> </tr> <tr> <td>Regional Adjustment</td> <td>Very small</td> </tr> <tr> <td>Other?</td> <td>XXX</td> </tr> </tbody> </table> <p><u>Tariff for rural areas if any:</u> -no</p> <ul style="list-style-type: none"> Describe the sanitation services pricing if there is any: - Included in the water bill: 80 % of the water bill - Sources of verification and Specific comments: - Water resource Ministry - " Algérienne des Eaux " Company 	Consumption categories (m ³)	Rate (local currency)	< 25 m ³	1 6.30 DZD / m ³	26 m ³ à 55 m ³	2 20.47 DZD / m ³	56 m ³ à 82 m ³	3 34.65 DZD / m ³	> 82 m ³	4 40.95 DZD / m ³	Any other specific charge: - Pollution - economy of the water - Quality - purification		Adjustments	Rate	Industrial	40.95 DZD/m ³	Commercial	34.65 DZD/m ³	Regional Adjustment	Very small	Other?	XXX
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<p>7.1. Education and capacity development</p> <p><u>Target:</u> To be identified.</p>	<ul style="list-style-type: none"> Not be reported. 																						

7.2. Information

Target:

Enhance by 2016, the national water and sanitation Monitoring, Evaluation and Reporting (M&E, &R) Systems in a way to be in line with the pan African M&E.

- Specific actions taken so far for the milestone: -
- Existence of national Water and Sanitation M&E, & R System, and Year of Establishment.** Systems of Monitoring and evaluations exist partially at the level of certain bodies of the Sector (SEAL-SEOAR-SEACO) But a real M/E system is not still operational on the scale of the Sector. The System which exists is embryonic and does not obey the usual procedures

Items	Year 1	Year 2	Year 3	2011
-New Elements incorporated	xxxx	xxxx	xxxx	xxxx
-Drivers	xxxx	xxxx	xxxx	xxxx

Elements of the pan African M&E incorporated:

The African Northern Region introduces on financing of the African FAE / BAD and with the support of the AMCOW, a project of Monitoring and Evaluation (MEWINA), that must allow to strengthen in 06 countries the existing systems.

- Sources of verification and Specific comments: -FAE, BAD, AMCOW

7.3. Water and Technologies

Target:

To be identified.

- Not be reported.

7.4. Professional Networks/ Associations

Target:

To be identified.

- Not be reported.

Observations on the Evaluation and other general comments

- Very delicate exercise: the data are not always available and when they are available, they require to be treated with big care.
- The indicators of this system are not exactly the same that those used in countries.
- The understanding is not easy and the definitions are not very clear.

Contacts

MEWINA

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Monitoring and Evaluation for Water In North Africa

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