MEWINA

مشروع التقييم والمتابعة لقطاع المياه بدول شمال أفريقيا

Monitoring and Evaluation for Water In North Africa

CEDARE

African Water Facility
Facilité africaine de l'eau

Mobilising Resources for Water in Africa

Algeria 2012 State of the Water Report

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سيدارى

N-AMCOW

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Abbreviations and Acronyms

ABH	Agency of Watersheds (Agence de Bassins Hydrographiques)
ADE	Algérienne Des Eaux
AEP	Drinking Water Supply
AGIR	National Agency for Integrated Water Resource Management
ANBT	National Agency of dams and Transfers
ANCC	National Agency on Climate Change
ANRH	National Agency of Hydraulic Resources
ASAL	Algerian Space Agency
BA	Bank of Algeria
CNES	National Economic and Social Council
DAEP	Directorate of Drinking Water Supply
DAPE	Directorate of Sanitation and Protection of the Environment
DHA	Directorate of Agricultural Hydraulic
DPAE	Directorate of Planning and Economic Affairs
DGPC	General Directorate of Civil Protection
DRC	Directorate of Regulation and Litigation
GNI	Global National Income
INSP	National Institute of Public Health
MADR	Ministry of Agriculture and Rural Development
MAE	Ministry of Foreign Affairs
MEM	Ministry of Energy and Mines
MATE	Department of Land and Environment Management
MC	Ministry of Trade
MDIPI	Ministry of Industry Development and Promotion of Investment
MF	Ministry of Finance
MHUV	Ministry of Housing, Urban Planning and of the City
MICL	Ministry of Interior and Local Communities
MRE	Ministry of Water Resources
MSPRH	Ministry of Health, Population and Hospital Reform
MTESS	Ministry of Labor, Employment and Social Security
ONA	National Office of Sanitation
ONID	National Office of Irrigation and Drainage
SEAAL	Société des Eaux et Assainissement d'Alger
SEACO	Société des Eaux et Assainissement de Constantine
SEATA	Société des Eaux et Assainissement de Annaba et Tarf
SEOR	Société des Eaux et Assainissement d'Oran
SPA	Joint-Stock Company

1. Introduction

The investments made in Algeria in the past decade in terms of mobilization, transfer, treatment and conveyance of water resources, have led to tangible results in terms of satisfaction of the needs for water, in quantity and quality required.

However, these efforts remain insufficient, because of the non existence yet in Algeria of a functioning mechanism of "Monitoring and Evaluation" indicators of the water likely:

- To measure the effectiveness of investment and their impact on the peoples' life.
- To elaborate future decisions in planning and investment.

The MEWINA project sets its target to Strengthen the capacities of the N-AMCOW region countries in term of monitoring and evaluation of the water sector by:

- The establishment of a system of M&E, that will enable the achievement of the Millennium Development Goals (MDG)
- The harmonization and standardization of methods for the collection, processing, and data validation, information systems etc.)
- The development of a set of indicators, standards and criteria on the
- Performance of the water resources sector
- The preparation of annual reports on the state of the water sector in North Africa by using harmonized andcomparableinformation

The first component of MEWINA Project has allowed to evaluate existing systems, and has highlighted the strengths and weaknesses of the Sector of water resources in Algeria

Among the points of weakness, it was noted that:

- The data are available but remain dispersed at the level of different institutions,
- The management of the information is not structured, and organized in such a way as to allow its exchange and its use by the different actors,
- A true system of monitoring/evaluation is not yet established on the scale of the sector, which has not yet put in place neither a legal anchor nor a responsible institutional authority for a Monitoring and Evaluation System.
- Little investment has been granted for the realization of a Monitoring and Evaluation System.
- The Universities and Research Institutions are not sufficiently involved in the programs of the Sector

An indicator is an assessment instrument and a tool to help in the decision through which we are going to be able to measure a situation or a trend, in a relatively objective way, at a given moment, in time and space.

The goal of the indicator is to allow driving, adjusting, correcting, comparing and evaluating the achieved progress.

An indicator is meant to be a kind of summary of complex information offering the possibility to different actors (scientists, managers, politicians and citizens) to discuss.

The processing and analysis of data on the indicators should lead to the preparation of an annual report to inform all stakeholders of the program on:

- The state of progress of the Program and the achieved progress
- The degree of achievement of the set targets

This report will also allow to focus the attention on the deficit areas, allocate the necessary resources to cover the deficits, and promote increased investment in the sector

2. National, Continental, and Global Targets

In Algeria, the renewable surface water resources are estimated at 11 billion m3. The renewable groundwater resources contained in the aquifers of the north are estimated to be nearly 2.5 billion m3, while the non-renewable aquifers of the northern Sahara are likely to be exploited up to 5 to 6 billion m3/year. The exploitable resources of the northern Sahara are defined from a modeling of aquifers, taking into account the quantitative and qualitative preservation of the resource, its sustainability and the impacts on the environment.

The rainfall is fairly abundant along the coastal area of the Tell, ranging from 300 to 1400 mm per year, with an increase of precipitation from west to east.

Algeria, a country with an arid and semi-arid trend, is characterized by an high population growth rate, make it essential to increase of agricultural productivity, in order to ensure food safety. Agricultural development is strongly influenced by irrigation. Agriculture has become highly strategic, because water resources are very sensitive to climatic conditions, and that the soils are weakened by the aggressiveness of natural phenomena.

The new water policy is inspired by the spatial planning policy, which have set as a goal the creation of a territory rebalancing dynamic, and in particular the sustainable development of the Highlands and the South.

The achievement of this target requires to perform large transfers, and to make use of non-conventional resources and more particularly to the desalination of sea water, to the reuse of treated waste water, as well as in the implementation of water economy policy.

2.1. National goals

The national targets in mobilization and management of water resources correspond to the targets of the AMCOW and the MDG, and may be stated as follows:

- Ensure the sustainability of the water resource
- Ensure the access to water for all citizens, by the mobilization of the maximum possible of conventional and non-conventional resources,
- Ensure access to sanitation for all
- Support the food security strategy with the mobilization of new water resources enabling the extension of irrigated areas,
- Ensure a territorial equity in access to water, by the implementation of a major transfer program (sustainable development of Highlands and the South),
- Improve the quality of public services in water and sanitation through the rehabilitation and modernization of Drinking Water and Sanitation management systems.
- Protect the water ecosystems through the rehabilitation and extension of sewerage systems and sewage treatment plants,
- Protect the territory against major risks,

2.2. Continental goals

The African Ministers' Council on Water (AMCOW) was created in 2002 by having as a main goal to promote cooperation, security, social and economic development and the eradication of poverty in member States through the effective management of water resources in the continent and the provision of water services.

The heads of State and Government of the African Union have agreed to respect the commitments to accelerate the achievement of the targets for water and sanitation in Africa and mandated AMCOW to develop and monitor an implementation strategy for these commitments.

As for the Millennium Development Goals, it is admitted that the targets of the AMCOW and, in particular, the reduction by half by 2015 of the number of people who do not have access to drinking water and sanitation, are, with the exception of the North African countries, far from being achieved for the majority of African countries.

The attached Table 1 defines in detail the different targets of the AMCOW, and the level of achievement of these targets in Algeria:

Table 1. AMCOW goals

AMCOW goals in the field of water	Target	Level reached in Algeria	Evolution from 2000 to 2012
Water and Energy	Increase the use of the hydro-energy by 10% between 2000 and 2015	A new policy is being put in place, promoting the use of hydraulic turbine stations of surface waters	The installed hydroelectric capacity has been increased from 53 MW in 2000, to 479 MW, in 2012
Water and Agriculture	- Increase the productivity of water for rainfed agriculture and irrigation of 30% between 2000 and 2015, and increase the irrigated area of 50% from 2000 to 2015.	The implementation of the National Plan for the Development of Agriculture has significantly boosted the agricultural sector which has experienced a large growth due to the initiative of farmers particularly private who have benefited from material benefits and considerable subsidized credits	- Water withdrawals for irrigation went from 2.8 billion m^3 in 2000, to 6 billion m^3 in 2010 - The irrigated areas went from 350 000 ha (2000), to 1,053 000 ha in 2012.
Water for multiple use	Increase the water needs satisfaction index (WDSI) by 10% between 2000 and 2015.	Efforts have been made to equip the country with important infrastructure facilities to respond to a demand for water in constant increase.	The total resources mobilized is increased from 4.9 billion m3 in 2000, to 9.34 billion m3 in 2012

AMCOW goals in the field of water	Target	Level reached in Algeria	Evolution from 2000 to 2012
Cross-border river basins and Water Resources Management	Develop a national plan for effective management of transboundary resources by 2015.	The aquifer of the northern Sahara (SASS) is a cross-border basin shared by 3 countries (Algeria, Tunisia, Libya). It is the subject, since 1999, of a concerted management within the framework of a concertation mechanism established by the Sahara and Sahel Observatory (OSS), based on data and modeling tools common to the 3 countries	Actions made from 2000 to 2010: - Development of the monitoring network - Establishment of a management support system - Modeling of the aquifer system - Establishment of a Permanent Concertation Mechanism - Establishment of a management strategy - Study of the socio-economic and environmental aspects - Strategy for a sustainable management
Rainwater	Increase the proportion of use of rainwater in the consumptions of municipal water to 10% by 2015.	In Algeria, the collection of rainwater from rooftops for domestic needs is virtually non-existent in urban areas. In rural areas, it is the practice for the watering of livestock or for limited-scale irrigation of very small parcels of land.	However, an indirect estimate has been carried out on the basis of the following data: - Areas sown: 3 Million ha - Efficiency: 10 quintals t/ha - Production. : 30 Million quintals - Needs: 1 m3/kg= 100 m3/quintal This estimate evaluates to 3 billion m3/ year, the rainwaters withdrawn for cereal production.
Urban Water Supply / Urban Sanitation / Rural Water Supply /Rural Sanitation	Reduce by 50% from 2000 to 2015, the proportion of the population without access to an improved source of water, and the proportion without an improved sanitation infrastructure *(urban/ rural/total).*	Rehabilitation and extension of the urban distribution networks of drinking water and sanitation, Development of the sanitation sector	The rate of access to drinking water has increased from 78% in 2000, to 95 %, in 2012 The rate of access to sanitation has increased from 72 per cent in 2000, to 86 %, in 2012
Adaptation to Climate Change	Develop and implement at least a strategy of adaptation to climate change by 2015.	-Existence of an Action plan for adaptation to climate change: -Existence of an implementation program of the Action plan	
Management of the risks associated with Water	Establish at least a warning system for the prevention of natural disasters at the national level by 2015.	**Drought**: network of rainfall monitoring and early warning **Floods**: - A special weather bulletin is broadcasted in case of heavy rains	

AMCOW goals in the field of water	Target	Level reached in Algeria	Evolution from 2000 to 2012
Institutional Arrangements/ ethics, transparency, and empowerment/ Roles of the public and the private/ Right to Water/ Regulatory Approaches	Establish/update by 2015, political reforms in the water sector which reflect the principles of good governance such as: *(I) commitment to partnership; (ii) ethics-transparency, fairness and justice; (iii) responsibility and accountability (iv) integration, participation, predictability and capacity of response and (v) coherence*	Existence of a policy in the water sector which reflects the principles of good governance	The main legislation relating to water are contained in: - Law n°05-12 of 4 August 2005 relating to water. - Law n° 83-03 of February 05th, 1983, relating to the protection of environment - Law n° 03-10 of July 19th, 2003 relating to the protection of environment in the framework of sustainable development - Law n° 04-20 of December 25th, 2004, relating to the prevention from major hazards, and disaster management in the framework of sustainable development - Law n° 03-01, of February 17th, 2003, relating to the sustainable development of tourism - Law n° 01-11 of July 3rd 2001 relating to fisheries and aquaculture. -The application texts of these laws (executive decrees, joint ministerial decision, interministerial circular... etc.) In the texts on the application of Laws on water: 39 Decrees of application on the 44 planned have already been published
Financing of the sector	Immediately allocate at least 0.5 per cent of GDP to the Hygiene and Sanitation.and immediately allocate 5% of the national budget to Water and Sanitation	Target reached	1.43 Per cent of GDP have been allocated in 2011, to water and sanitation
Pricing Strategies / Financing Strategies of the poorest	Establish by 2015, a tariff structure that reflects the equalization and access to the poor.	Tariff Structure established	The rate of water is set at 6.30 DA/m 3, for the installment of 0 to 25 m3, accessible to the poor
Information	Strengthen by 2016, the systems of Monitoring, Evaluation and Reporting (S-E, &R) to be in phase with the pan-african S-E	System in course of implementation	

The full AMCOW M&E reporting template is shown in Annexes

2.3. Global Goals

It was noted that 884 million people still do not have access to drinking water in the world, while 2.6 billion individuals do not have sanitary facilities, the goal of "sanitation for all" remains out of reach. The trend is bad: 5 Million people die each year from diseases related to unsafe water (cholera, diarrhea, hepatitis, typhoid fever..).

The achievement by 2015 of the millennium development goals, which govern human development policy of the United Nations, is particularly related to the issue of water.

Also, the global goals relating to water are:

In terms of access to water and sanitation:

- Ensure access to water for all and the Right to Water
- Improve access to integrated sanitation for all
- Improve the hygiene and health through water and sanitation
- Prevent and respond to risks and crisis linked to water
- Contribute to cooperation and peace through water

In terms of economic development:

- Balancing the various uses of water by the integrated management
- Contribute to food security by the optimum use of water
- Harmonize water and energy
- Promote green growth and enhance ecosystems

With regard to the protection of the environment:

- Improve the quality of water resources and ecosystems
- Adjust the pressures and footprint of human activities on the water
- Deal with global climate change in an urbanizing world

3. The Indicators of Water at the Regional Scale

3.1. Identification and Classification of the Indicators

Table 2, below shows a listing of the reference indicators, usually used at the international level, and proposed by the regional coordination of the MEWINA project.
This listing includes 111 indicators, grouped into 15 categories.

We have also added, at the request of the NTF and the Regional Coordination of the project:

- 5 Representative indicators of the aquaculture and inland fisheries, proposed by the ministry of fisheries and fisheries resources,
- 12 Indicators that are representative of the cross-border system SASS.

Table 2. List of indicators used at the international level:

No	Code	Water Related Indicators	Units
*	1	**Water & Availability**	
1	1-1	Annual Spatially Averaged Precipitation Depth	MM/Year
2	1-2	Annual Precipitation Volume	BCM/Year
*	*	**Blue Water**	
3	1-3	Internal Renewable Surface Water (IRSW)	BCM/Year
4	1-4	Internal Renewable Groundwater (IRG)	BCM/Year
5	1-5	Total Internal Renewable Blue Water Resources (TIRBWR)=(IRSW+IRG)	BCM/Year
6	1-6	External Surface Water Inflow (ESWI)	BCM/Year
7	1-7	External Surface Water Outflow (ESWO)	BCM/Year
8	1-8	External Groundwater Inflow (EGI)	BCM/Year
9	1-9	External Groundwater outflow (EGO)	BCM/Year
10	1-10	Total External Renewable Blue Water Resources Inflow(TERBWR)=(ESWI+EGI)	BCM/Year
11	1-11	Total Renewable Blue Surface Water (TRBSW)=(IRSW)+(ESWI)-(ESWO)	BCM/Year
12	1-12	Total Renewable Blue Groundwater (TRBG)=(IRG)+(EGI)-(EGO)	BCM/Year
13	1-13	Overlap between Surface Water and Groundwater (OSWG)	BCM/Year
14	1-14	Total Renewable Blue Water Resources (TRBWR)=(TRBSW)+(TRBG)-(OSW)	BCM/Year
15	1-15	Total Explitable Non-Renewable Groundwater (TNRG)	BCM/Year
16	1-16	Total Blue Water Resources (TBWR)	BCM/Year
*	*	**Green Water**	
17	1-17	Water for Rain-fed Agricultural Consumption	BCM/Year
18	1-18	Water for Rain-fed Pasture Consumption	BCM/Year
19	1-19	Water for Rain-fed Forest Consumption	BCM/Year
20	1-20	Total Renewable Green Water Resources (TRGWR)	BCM/Year
21	1-21	**Total Renewable Water Resources (TRWR)=(TRBWR+TRGWR)**	BCM/Year
22	1-22	**Total Conventional Water Resources (TCWR)= TRWR+TNRG = TBWR+TRGWR**	BCM/Year
*	*	**Non-Conventional Water**	
23	1-23	Produced Municipal Wastewater (PMW)	BCM/Year
24	1-24	Produced Industrial Wastewater (PIW)	BCM/Year

No	Code	Water Related Indicators	Units
25	1-25	Produced Agricultural Drainage (PAD)	BCM/Year
26	1-26	Produced Desalinated Water (PDW)	BCM/Year
27	1-27	Total Non-Conventional Water Resources (TNCWR)= (PMW)+(PIW)+(PAD)+(PDW)	BCM/Year
28	1-28	**Total Available Water Resources (TAWR) = TCWR+TNCWR**	BCM/Year
*	2	**Water & Uses**	
29	2-1	Withdrawals for Domestic Water Use	BCM/Year
30	2-2	Withdrawals for Industrial Water Use	BCM/Year
31	2-3	Withdrawals for Agricultural Water Use	BCM/Year
32	2-4	Annual Total Water Withdrawals	BCM/Year
33	2-5	Green Water Consumption for Agriculture Water Use	BCM/Year
34	2-6	Total Agricultural Water Uses	BCM/Year
35	2-7	Withdrawals from Blue Surface Water	BCM/Year
36	2-8	Withdrawals from Blue Renewable Groundwater	BCM/Year
37	2-9	Withdrawals from Blue Non-Renewable Groundwater	BCM/Year
38	2-10	Total Withdrawals from Blue Water	BCM/Year
39	2-11	Agricultural Drainage Water Reuse	BCM/Year
40	2-12	Withdrawals from Desalinated Water	BCM/Year
41	2-13	Total Withdrawals from Non-Conventional Water Resources	BCM/Year
42	2-14	Annual Volume of Total Actual Evapotranspiration	BCM/Year
43	2-15	Greenwater Consumption for Livestock Fodder Water Use	BCM/Year
44	2-16	Inland Fisheries & Aquaculture Demands	BCM/Year
45	2-17	Navigation Demands	BCM/Year
46	2-18	Evaporation Losses	BCM/Year
47	2-19	Bottled Water Production	BCM/Year
48	2-20	Water Demand for Environmenatal Uses	BCM/Year
49	2-21	Withdrawals for Oil & Gas Water Use	BCM/Year
*	3	**Water & Land Use Changes**	
50	3-1	Total Irrigated Agricultural Land	ha
51	3-2	Total Rain-fed Agricultural Land	ha
52	3-3	Total Pasture Land	ha
53	3-4	Total Forests Land	ha
54	3-5	Urban Encroachment on Green Cover	ha lost/Year
*	*	**Impact of Urban Encroachment on water Resources (Indicators listed below)**	
55	3-6	Decrease in Groundwater Recharge	BCM/Year
56	3-7	Decrease in Water Consumptions of Green Cover	BCM/Year
57	3-8	Increase in Surface Runoff	BCM/Year
58	3-9	Increase in Domestic Water Withdrawals	BCM/Year
*	4	**Water & Services**	
*	*	**Water Coverage and Accessibility**	
59	4-1	Improved Urban Water Supply Coverage	%
60	4-2	Improved Rural Water Supply Coverage	%
61	4-3	Improved Urban Sanitation Coverage	%

No	Code	Water Related Indicators	Units
62	4-4	Improved Rural Sanitation Coverage	%
63	4-5	Improved Water Supply Coverage	%
64	4-6	Improved Sanitation Coverage	%
*	*	**Water Infrastructure**	
65	4-7	Length of Water Supply Networks	km
66	4-8	Length of Sewage Networks	km
67	4-9	Length of Irrigation Networks	km
68	4-10	Length of Drainage Networks	km
69	4-11	Dam Storage Capacity	BCM
70	4-12	Water Supply Capacity	BCM/Year
71	4-13	Desalination Capacity	BCM/Year
72	4-14	Municipal Wastewater Treatment Capacity	BCM/Year
73	4-15	Industrial Wastewater Treatment Capacity	BCM/Year
74	4-16	Wastewater Collection Capacity	BCM/Year
75	4-17	Maximum Annual Dam Storage Reached	BCM
*	5	**Water & Energy**	
76	5-1	Electricity Generated Using Hydropower	GWh/Year
77	5-2	Hydropower as % of Total Generated Electricity	%
78	5-3	Installed Hydropower Capacity	MW
79	5-4	Water Used to Generate Electricity	BCM/Year
*	6	**Water & Population**	
80	6-1	Total Population	1000 inhabitants
81	6-2	Internal Renewable Water Resources Per Capita	CM/capita/Year
82	6-3	Total Renewable Blue Water Resources Per Capita	CM/capita/Year
83	6-4	Total Renewable Water Resources Per Capita	CM/capita/Year
84	6-5	Total Available Water Resources Per Capita	CM/capita/Year
85	6-6	Blue Water Withdrawal Per Capita	CM/capita/Year
86	6-7	Green Water Use Per Capita	CM/capita/Year
87	6-8	Total Water Consumption Per Capita	CM/capita/Year
88	6-9	Agricultural Water Withdrawal Per Capita	CM/capita/Year
89	6-10	Industrial Water Withdrawal Per Capita	CM/capita/Year
90	6-11	Domestic Water Withdrawal Per Capita	CM/capita/Year
91	6-12	Population Without Improved Water Supply	1000 inhabitants
92	6-13	Population Without Improved Sanitation	1000 inhabitants
*	7	**Water & Health**	
93	7-1	Diarrhea Prevalence	%
94	7-2	Dracunculiasis Reported Cases	%
95	7-3	Open Defecation Practice	Number
96	7-4	Percentage of Open Defecation	%
97	7-5	Cholera Reported Cases	Number/Year
98	7-6	Typhoid Reported Cases	Number/Year
99	7-7	Hepatitis A Reported Cases	Number/Year

No	Code	Water Related Indicators	Units
*	8	**Water & Quality**	
100	8-1	Dissolved Oxygen (DO)	PPM
101	8-2	pH	Dimensionless
102	8-3	Electric Conductivity (EC)	1/OHM (S/M)
103	8-4	Nitrogen Concentration	PPM
104	8-5	Phosphorous Concentration	PPM
105	8-6	Total Dissolved Solids	PPM
106	8-7	Fecal Choliform	Colonies/100ML
107	8-8	Biological Oxygen Demand (BOD)	mg/l
108	8-9	Chemical Oxygen Demand (COD)	mg/l
109	8-10	Chloride Concentration	mg/l
110	8-11	Total Hardness ($CaCo_3$)	mg/l
*	9	**Water & Ecosystems**	
111	9-1	Number of Wetlands Sites Acknowledged by RAMSAR	Number
112	9-2	Total Wetlands Areas	ha
113	9-3	Total Freshwater Species Count	Number
114	9-4	Number of Endangered Species	Number
115	9-5	Number of Invasive Species	Number
*	10	**Water & Climate**	
*	*	**Extreme Weather Events**	
116	10-1	Number of Class 1 Flood Events	Number
117	10-2	Number of Class 1.5 Flood Events	Number
118	10-3	Number of Class 2 Flood Events	Number
119	10-4	Average Temperature	C°
120	10-5	Drought Events	Number
121	10-6	Cost of Annual Damage Caused by Floods	$ - % of GDP
122	10-7	Cost of Annual Damage Caused by Droughts	$ - % of GDP
123	10-8	Annual Human Losses Related to Floods	Number
124	10-9	Annual Human Losses Related to Droughts	Number
125	10-10	Unusual Weather Events (Snow, Hail,……)	Number/Type
126	10-11	National Climate Change Adaptation Plan	Yes/No
*	11	**Water & Socio-Economics**	
*	*	**Water Productivity**	
127	11-1	Industrial Water Productivity	$/CM
128	11-2	Agricultural Water Productivity “Crop Per Drop”	$/CM
129	11-3	Employment in Agriculture “Job Per Drop”	Jobs/MCM
129	11-4	Employment in Industry “Job Per Drop”	Jobs/MCM
130	11-4	GDP	$
*	*	**Tariffs and Affordability**	
131	11-5	Water and Sanitation Charges as % of Average Household Income	%
*	12	**Water & Finance**	
132	12-1	Percentage of National Budget Directed to Water & Sanitation Sector	%

No	Code	Water Related Indicators	Units
133	12-2	Percent of GDP Directed to Sanitation & Hygiene	%
134	12-3	Foreign Aid for Water & Sanitation	Million US$
135	12-4	Operation & Maintenance Cost Recovery for Irrigation	%
136	12-5	Operation & Maintenance Cost Recovery for Water Supply and Sanitation	%
137	12-6	Operation & Maintenance Cost Recovery for Industry	%
138	12-7	Aid to Water & Sanitation in Foreign Countries	Million US$
139	12-8	Total Investment	Million US$
*	13	**Water & Trade**	
140	13-1	Agricultural Virtual Water Export	BCM/Year
141	13-2	Agricultural Virtual Water Import	BCM/Year
*	14	**Water & Governance**	
142	14-1	IWRM Plan	Yes/No
143	14-2	National Water and Sanitation M&E & R System	Yes/No
144	14-3	Surface Water Permits Issued to Date	Number
145	14-4	Total Volumetric Water Rights Assosciated with Surface Water Permits	BCM/Year
146	14-5	Total Volumetric Water Rights Assosciated with Surface Water Permits as a Percent of Annual Blue Surface Water Withdrawals	%
147	14-6	Groundwater Well Permits Issued to Date	Number
148	14-7	Total Volumetric Water Rights Associated with Well Permits	BCM/Year
149	14-8	Total Volumetric Water Rights Associated with Well Permits as a Percent of Annual Blue Groundwater Abstractions	%
150	14-9	Number of Unlicensed Wells	
151	14-10	Irrigation & Drainage Related Complaints as a Percentage of Irrigation Water Users	Number/Year
152	14-11	Water Supply and Sanitation Related Complaints as a Percentage of Serviced Households	Number/Year
153	14-12	Number of Water Supply Meters Installed as a Percent of Total Number of Covered Households	%
154	14-13	Number of Groundwater Meters Installed as a Percent of Serviced Households	Number
155	14-14	Number of Surface Irrigation Meters Installed as a % of Surface Irrigation Water Permits	%
156	14-15	Physical Domestic Water Losses	
157	14-16	Overall Water Use Efficiency	%
158	14-17	Water Sustainability/ Depletion Index	%
159	14-18	Wastewater and Drainage Outflows	BCM/Year
160	14-19	Transboundary Wastewater and Drainage Outflows	BCM/Year
161	14-20	Commercial Water Losses	BCM/Year
162	14-21	Physical Irrigation Water Losses	BCM/Year
163	14-22	Number of Water related citations (Water Laws Enforcement)	Number
164	14-23	Number of Water Users Associations	Number
165	14-24	Water Users Associations Agricultural Land Coverage	% of Ag. Land
*	15	**Water & International Relations**	
166	15-1	Transboundary Water Dependency Ratio	%
167	15-2	Shared Waters related Bilateral/ Multilateral Agreements and/or Memorandums of Understanding and Cooperation Mechanisms	Number
168	15-3	Number of Riparians Sharing all Shared Water Bodies	Number
169	15-4	Number of Shared Water Resources	Number

3.2. Indicators of Aquaculture and Inland Fisheries

Table 3. Indicators of aquaculture and inland fisheries

Aquaculture Production of freshwater
Aquaculture Production of continental fishing
Percentage of aquaculture production of fresh water as compared to total production
Percentage of aquaculture production of continental fishing in relation to the total production
Productivity of water surfaces

3.3. Indicators of Aquaculture and Inland Fisheries

The missions and the contributions of the different institutions, having contributed to the assessment of the indicators of water are presented below:

3.3.1. Ministry of Water Resources (DPAE)

The Directorate of Planning and Economic Affairs is responsible for:

- Developing and coordinating the work of investment planning.
- Developing the synthesis of programs proposals from under supervision agencies.
- Mobilizing the internal and external fundings necessary to the realization of the programs.
- Ensuring the monitoring of the programs progress and develop periodic reviews.
- Ensuring the liaison with the concerned services responsible for finance and planning.

It contributes to the determination of indicators relating to the category "Water and Economy"

3.3.2. Ministry of Water Resources (DAEP/ ADE and joint stock water distribution companies)

DAEP is responsible for defining the actions to be implemented to ensure the coverage of the population needs and the needs of the industry (Executive Decree No. 63 of 25 October 2000).

ADE and joint stock companies are responsible for the implementation of the national policy in the area of drinking water through the support of production, transportation, processing, storage, water supply and distribution of drinking and industrial water activities as well as the renewal and development of the infrastructure relating thereto

This Directorate and these agencies contribute to the determination of indicators relating to the category "Water and consumption", "water and services (AEP) ", "water and quality"

3.3.3. Ministry of Water Resources (DAPE/ONA and joint stock water distribution companies)

The DAPE in collaboration with ONA and joint stock companies, is responsible, in the framework of the national development policy to ensure throughout the national territory, the protection of water environment and the implementation of the national sanitation policy in consultation with local communities. They are responsible for all activities related to the collection, treatment of waste water, recycling of waste as well as the development of infrastructure and renewal thereto .

These institutions contribute to the determination of indicators relating to the category "Water and services (sanitation and sewage works) ", "water and quality"

3.3.4. Ministry of Water Resources (DHA/ONID) in collaboration with the Ministry of Agriculture

These institutions are responsible for the execution and management of irrigation and drainage infrastructure. They are responsible for the equipment and the operation of large-scale irrigation projects, as well as the PMH

DHA in collaboration with ONID is responsible for the definition and implementation of the national policy for the management, operation and maintenance of the irrigation and drainage infrastructure, including the transfer of water works used for irrigation that the State and/or local authorities concede to him.

These institutions contribute to the determination of indicators relating to the category:
"Water and modification of the ground occupation", "water and services (irrigation and drainage"

3.3.5. Ministry of Water Resources (IT Branch)

This structure newly created within the MRE, is in charge of the centralization and management of all information on water from the central structures of the MRE, agencies under the supervision of the sector, as well as the Directorates of water resources in the wilayas.

It hosts a central platform for storage and dissemination of information on water, regularly fed as well as an information system, with connections which connect the Department to 48 DREW and to the various agencies.

This platform allows them to acquire, gather, store, organize and communicate the information in different forms (watersheds, rivers, aquatic environments, resources, infrastructure, cities and towns, usages, institutions, regulation, governance, public services, distribution, sanitation, guiding Diagrams etc.)

3.3.6. Ministry of Water Resources (DRC)

This Branch is responsible for conducting all work for the formulation, coordination and synthesis of draft texts initiated by the sector; to ensure the dissemination of laws and regulations texts concerning and affecting the sector and to monitor their implementation as well as to study and follow the contentious cases concerning the sector.

3.3.7. Ministry of Water Resources (ANRH)

The National Agency of the Water Resources (ANRH), mission is to explore and make inventory of soil and water resources of the country.

For this purpose, ANRH features:

- A network of hydro climatological monitoring
- A piezometric network for aquifers monitoring
- A network of water quality monitoring
- Seven laboratories of physico-chemical and bacteriological analysis of waters and soils.

These networks feed the database on the various parameters measured and observed.

This Agency contributes to the determination of indicators relating to the category:
Water and availability, water and modification of the ground occupation, water and quality, water and climate.

ANRH is furthermore responsible for representing Algeria within the steering committee constituting one of the consultation mechanisms of the SASS

3.3.8. Ministry of Water Resources (DMRE/ANBT)

The Directorate of water resources mobilization, in collaboration with the National Agency of Dams and Transfers (ANBT), has for mission the expertise and the mobilization of resources in surface water through the dams and transfers as well as the operation and maintenance of these structures for food purposes in the drinking water and industrial water and irrigation

This Directorate and this Agency contribute to the determination of indicators relating to the category: Water and availability, water and quality, Water and Climate

3.3.9. Ministry of Water Resources (AGIRE and ABHs)

The National Agency for Integrated Water Resources Management (AGIRE), and River Basins Agencies (ABH) have the mission to implement the policy of integrated water management at the scale of large river basins. The Committees attached to these bodies are composed of representatives of the administration, local communities and users of water. These committees are advisory bodies on all matters related to the water at the regional level.

These institutions contribute to the determination of indicators relating to the category "Water and Governance"

The Directorates of Water Resources in the wilayas: Are in charge of:

- To ensure the preservation, conservation and protection of public water resources;
- To ensure the rational use of water resources;
- To ensure the implementation and monitoring the execution of regulation in the field of development, the planning, operation and maintenance of infrastructure for drinking water supply to sanitation and agricultural water;
- Provide project management and monitoring of the execution of projects on the title of the wilaya;
- To collect and analyze data relating to the activities of research, development, production, storage and distribution of water for domestic, agricultural or industrial uses;
- To keep up to date the file of water points located on the territory of the wilaya and follow the studies and surveys contributing to a better knowledge of surface and ground water resources".

3.3.10. Ministry of Agriculture and Rural Development

In the framework of its missions, the minister of agriculture and rural development participated, in conjunction with the Minister of Water Resources, to the definition of the policy on agricultural hydraulic. It defines the conditions of development, valorization and usage of water resources for agricultural use and develops any action to ensure the food security of the country.

In this capacity, it is responsible, inter alia, in the field of hydro agricultural development:

- To define the modalities of development and management of arid and semi-arid zones,
- To define, implement and supervise a national extension program, support and develop irrigation techniques in liaison with the concerned sectoral institutions ,
- To participate and contribute to the research and application programs in the use of alternatives waters resources, for the purpose of irrigation: " desalinated water, brackish water, artificial rain, treated waste water, reuse of drainage water ",
- To ensure a maximum valorization of used irrigation water,
- To generate and oversee the organization of irrigants in professional associations.

The minister of agriculture and rural development contributed to the determination of indicators relating to the category "Water and Agriculture"

This Ministry contributes to the determination of indicators relating to the category "Water and Agriculture"

3.3.11. Ministry of Energy and Mines

This Ministry contributes to the determination of indicators relating to the category "Water and Energy"

3.3.12. Ministry of Health, population and the Hospital Reform

This Ministry contributes to the determination of indicators relating to the category "Water and Health"

3.3.13. Ministry of Trade

This Ministry contributes to the determination of indicators relating to the category "Water and Trade (virtual water) "

3.3.14. Ministry of Fisheries and Fishery Resources

This Ministry contributes to the determination of indicators relating to the category "Water and Aquaculture and Inland Fisheries"

3.3.15. Economic and Social National Council (CNES)

CNES has for mission:

- Ensure the durability of the social dialog and consultation between the various socio-economic partners and the search for consensus in the formulation of proposals of general interest ;
- Evaluate and study the questions of national interest on the economic and social development especially through the referral of CNES by public authorities. It may also refer to itself (self-referral) of all the issues falling within the scope of its powers ;
- Issue notices and make recommendations and proposals to the public authorities. The notices, reports and studies are transmitted to the President of the Republic and the prime minister. The notices and recommendations are published in the official journal.

This Institution contributes to the determination of indicators relating to the category:

- Water and socio-economy, Water and International Relations

3.3.16. National Statistics Office (ONS)

Official Service of statistics in Algeria , ONS collects, processes and disseminates statistics in different areas (census of population, demography, consumer price indexes, industrial and agricultural production, social statistics, health, employment, habitat and education ...
ONS contributes in this project to the determination of indicators relating to the category "Water and people ".

4. Values Assigned to Water Indicators at the Regional and National Level

Table 4. Values of water indicators at the regional and national level

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
Water and Availability							
1	Average depth of annual precipitationAlpha	mm/year	56	56	80	ANRH	North (308 500 km2) P= 300mm South (2 073 241 km2) P= 20 mm
2	Average volume of annual precipitation	Billion m3/ year	134	134	80	ANRH	Contradictory regional value (values displayed in 1 and 2)
3	Volume of internal renewable water (VERI)	Billion m3/ year	11	11	50	ANRH	Regional value corresponds to 2010
4	The internal renewable groundwater (ESRI)	Billion m3/ year	2.5	2.5	50	ANRH	Regional value corresponds to 2010
5	Total resources of internal renewable blue water (TIRBWR)= (IRSW+IRG))	Billion m3/ year	13.5	13.5	50	ANRH	Regional value corresponds to 2010
6	The external water surface entries (ESE)	Billion m3/ year	0.12	0.12		ANRH	Regional value corresponds to 2010
7	The external water surface exits (SESE)	Billion m3/ year	0.3	0.3		ANRH	Regional Value overestimated
8	The external underground inflow (ESE)	Billion m3/ year					
9	The groundwater exits (SEA)	Billion m3/ year					
10	Total external renewable blue water resources (TERBWR)= (ESWI+EGI)	Billion m3/ year					
11	Total of renewable surface blue water (TRBSE) = (IRSE) + (ESEI) - (ESWO)	Billion m3/ year	11	11	50	ANRH	Regional value corresponds to 2010
12	Total renewable blue groundwater (TRBS) = (IRS) + (ESI) - (ESO)	Billion m3/ year	2.5	2.5	50	ANRH	Regional value corresponds to 2010
13	The overlap between surface water and groundwater (CES)	Billion m3/ year					

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
14	Total renewable blue water resources (TRBER) = (TRBSE) + (TRBG) - (CES)	Billion m3/ year	13.5	13.5	50	ANRH	Regional value corresponds to 2010
15	Total of rainfed agriculture withdrawals	Billion m3/ year		3.00	10	MEWINA coordination	Estimated average value ; only affects the rainfed cereal production ; (See paragraph 5-3 -2)
16	Total withdrawals of natural grazing land	Billion m3/ year		6.1		MEWINA coordination	We have an estimate of 33 million ha of grazing land and ranges, identified in Algeria
17	Total withdrawals of the forest	Billion m3/ year		8.9		MEWINA coordination	The forest area is estimated to 2,270,000 ha. The calculation from the formula of Turc (See paragraph 5-3 -3) gives 8.9 billion m 3/year The use of the regional formula gives 0.42 billion of m 3/year
18	Total renewable green water resources	Billion m3/ year		18		MEWINA coordination	
19	Total renewable water resources	Billion m3/ year		31.5		MEWINA coordination	Including green water
20	The production of municipal and industrial wastewater	Billion m3/ year	0.50	1.2	5	DAPE-ONA	Regional value corresponds to 2010
21	The treatment of municipal and industrial wastewater	Billion m3/ year	0.09	0.80	5	DAPE-ONA	Regional value corresponds to 2010
22	The reuse of treated municipal and industrial wastewater	Billion m3/ year	0.00	0.10	5	DAPE-ONA	
23	The production of agricultural drainage	Billion m3/ year					
24	The reuse of agricultural drainage water	Billion m3/ year	0.00	0.00		DHA-ONID MADR	
25	The production of desalinated water	Billion m3/ year	0.00	0.54	5	DAEP-ADE	
26	Total non-conventional water resources	Billion m3/ year	0.00	0.64	5	DAEP-ADE DAPE-ONA	

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
27	Total non-renewable underground water resources	Billion m3/ year	1.3	2.00	10	ANRH	
28	Total conventional water resources	Billion m3/ year					
29	Total available water resources	Billion m3/ year					
Water and Uses							
30	The annual water withdrawal	Billion m3/ year	1.8 +1.8 = 3.6	5+2+2+ 0.54 + 0.1 = 9.65	5	ANRH ANB, ADE, DREW	
31	Withdrawal by the domestic sector (withdrawal by households)	Billion m3/ year	1.347	3	5	ADE	
32	Withdrawal by the industrial sector and tourism	Billion m3/ year	0.65	0.65	5	MDIPI	
33	Withdrawal by the agricultural sector (blue water + non-conventional water)	Billion m3/ year	2.8	6	5	MEWINA coordination	Assessment made by default: 9.65-3-0.65 =6 Billion m3/year
34	The agricultural consumption of green water	Billion m3/ year		3 Only affects cereals farming	10	MEWINA coordination	-Areas sown: 3 Million ha -Yield: 10 quintals /ha Production. : 30 Million quintals -Needs: 1 m3/kg= 100 m3/quintal
35	Total agricultural withdrawals	Billion m3/ year	2, 8	9	10	MRE-MADR	Approximate value/ non-mastery of green water withdrawals for the orchards
36	The surface withdrawals of blue water	Billion m3/ year					
37	Withdrawals of blue groundwater	Billion m3/ year					
38	Withdrawals of non-renewable groundwater	Billion m3/ year	1.4	2	10	ANRH	
39	Withdrawal of non-conventional resources	Billion m3/ year	0	0.64	5	DAEP-ADE	

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
40	Efficiency of water consumption in general	%					
41	The index of water sustainability	%	27	50	5	MRE	We do not take into account the withdrawals from non-renewable and non-conventional resources
42	Wastewater and drainage water exits	Billion m3/ year					
Water and Land Use Changes							
43	Total irrigated agricultural land	ha	350,000	1,053,000	5	DHA-ONID MADR	
44	Total rainfed agricultural land	ha	7,843,740	7,401,630	5	MADR	
45	Total forest land	ha	4,235,000	4,268,110		MADR	
46	The total of natural pasture lands (grazing and ranges)	ha	32,943,690	32,943,690		MADR	
46'	Natural Prairies	ha	24,335	24,335		MADR	
Water and Services							
47	Connection rates to drinking water	%	78	95	5	DAEP-ADE	
48	Connection rates to drinking water in urban areas	%		100.00	5	DAEP-ADE	
49	Connection rates to drinking water in rural areas	%		80.00	5	DAEP-ADE	
50	Connection rates to sanitation network	%	72 %	86.00	5	DAPE-ONA	
51	Connection rate to the sanitation network in urban areas	%		96.64	5	ONS	
52	Connection rate to sanitation network in rural areas	%		84.08	5	ONS	
53	The length of pipeline networks for water supply	Km	50,000	105,000	5	DAEP-ADE-SPA	
54	The length of pipeline networks for wastewater	Km	21,000	43,000	5	DAPE-ONA	
55	The length of irrigation networks	Km		5,381	5	DHA/ONID	



	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
56	The length of drainage networks	Km		2,913	5	DHA/ONID	
57	Total capacity of the stations for the treatment of drinking water	Billion m3/ year	1.347	3	5	DAEP-ADE-SPA	
58	The capacity of dams (installed)	Billion m3/ year	4.3	6.9	50	ANBT	
59	Total combined capacity of desalination stations	Billion m3/ year	0	0.85	5	DAEP-ADE-SPA	
Water and Energy							
60	Installed hydroelectric capacity	MW	53	479		MEM	
61	Produced Hydroelectricity	GWH/year	25,412	48,426		MEM	
Water and Population							
62	Total population	1000 Inhabitants	30,416	37,500	5	ONS	
63	The internal resources of renewable water per capita	M3/inhab.	443.8	360	5	ANRH-ONS	
64	Total renewable blue water resources per capita	M3/inhab.	437.9	355.2	5	ANRH-ONS	
65	Total renewable water resources per capita	M3/inhab.					
66	Blue water withdrawal per capita	M3/inhab.	118	257	5	MRE/ONS	
67	Green water consumption per capita	M3/inhab.					
68	Total water resources available per capita	M3/inhab.					
69	Total of water consumption per capita	M3/inhab.					
70	Agricultural water withdrawal per capita	M3/inhab.					
71	The withdrawal of industrial water per capita	M3/inhab.	21.04	17.3	5	MDIPI/ ONS	
72	The withdrawal of domestic water per capita	M3/inhab.	44.3	80	5	MRE/ONS	




	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
73	The population without improved water supply	1000 Inhabitants					Indicator not supported in Algeria
74	The population without adequate sanitation	1000 Inhabitants					
Water and Quality							
75	The index of quality of water in its natural state (surface and groundwater)	%					
	Ph			8.04			For example, we give the average values of the quality parameters observed during the month of May 2012, at the level of the 48 dams of Algeria
	$O_{2\ diss}$	Mg/l		98.89			
	NH_4	Mg/l		0.24			
	NO_3	Mg/l		4.79			
	NO_2	Mg/l		0.20			
	PO_4	Mg/l		0.12			
	DBO_5	Mg/l		7.06			
	DCO	Mg/l		38.32			
	MO	Mg/l		6.74			
	RS	Mg/l		866.36			
Water and Health							
76	The reported cases of diarrhea	% Of children less than 5 years				MSPRH	This indicator is no longer supported in Algeria
77	The reported cases of dracunculiasis	Number					Disease non-existent in Algeria
78	The reported cases of Cholera	Number	0	0		MSPRH	Disease eradicated since 1996
79	The practice of defecating in open air	%				MSPRH	This indicator has never been supported in Algeria
79'	Typhoid fever	%		0.17%		MSPRH	
79"	Viral Hepatitis A	%		2.74%		MSPRH	
Water and Ecosystems							
80	Number of wetland sites recognized by RAMSAR		50	50	5	MADR-DGF	

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
81	Total area of wetlands	ha	2,991,013	2,991,013	5	MADR-DGF	
Water and Climate							
82	The flood events of the past two decades	Number		44	20	ANRH	Floods resulting in loss of human life or of significant material damage
83	The floods of 1989-2000	Number	22		10	ANRH	
84	The floods of 2000-2011	Number		22	10	ANRH	
85	The existence of an early warning system for disaster prevention	Yes/No	Yes	Yes		ANRH	
86	Existence of a national plan for adaptation to climate change	Yes/No	Non	Yes		ANRH	
Water and Socio-Economy							
87	Productivity of industrial water (GDP/ water use)	$ /CM			5		
88	Productivity of agricultural water	$ /CM			5		
89	Employment in agriculture	Jobs/MCM	872,880 jobs= 311742/ MCM	912,000 jobs= 152 000/ MCM	5	ONS	Problem: If MCM=millions m3 The national and regional figures show a large gap NB: We have only taken into account the withdrawn volumes of blue water
90	Employment in industry		826,060	1,335,000	5	ONS	
91	Price rate of water and sanitation		Basic Rate: 5.80 DA to 6.30 DA, depending on the regions	Basic Rate: 5.80 DA to 6.30 DA, depending on the regions	10	DAEP	For water: a fixed fee of 240 DA/ quarter, For sanitation: a fixed fee of 60 DA/ quarter, To this is added, a royalty for management, a royalty for quality, and a royalty for water economy
92	The load of water and sanitation as % of lower-income groups of the family	%					
93	Subsidy (domestic, industrial and agricultural	%					
94	GNI		ONS	RNB/ capita. = $5020 = 446,208 DA	5	CNES/BM ONS	If we consider that 1US$ = 78.5377 DA, the values of CNES and ONS match

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
Water and Finance							
95	Public expenditure on projects relating to water	Million US$		29,230.00	5	From 2006 to 2012 (DPAE)	
96	Assistance to the development of water foreign affairs (Total 2009-2012)	Million US$					
97	Assistance to the development of water foreign affairs (annual average)	Million US$					
98	The percentage of the national budget allocated to water and sanitation	%		1.43 % of GDP (2011)	5	(DPAE)	
99	Recovery of the operational cost for the water supply and sanitation						
100	Recovery of the cost for Irrigation						
Water and Trade							
101	Imports of virtual water linked to trade in the agricultural sector	Billion m3/ year					
102	Export of virtual water linked to trade in the agricultural sector	Billion m3/ year					
103	The net flow of virtual water linked to trade in the agricultural sector	Billion m3/ year					
Water and Governance							
104	Existence of an IWRM plan	Yes/No	Yes	Yes		MRE	
105	Existence of an S& E system for water and sanitation	Yes/No	No	No		MRE	
106	Rights of access to water	Number					
107	Drilling permits/Year	Number					
108	Complaints related to irrigation	Number/ Year					
109	Complaints related to drinking water and sanitation	Number/ Year					
Water and International Relations							
110	The dependency ratio of cross-border water bodies	%	2, OO	2, OO		ANRH	
111	Status of bilateral and multilateral agreements: Point of view of the 1997 Convention of the United Nations	Ratification / Vote					

	Indicator	Units	National Values 2000	National Values 2013	Number of years available	National Source	Comments
Water -Aquaculture and inland Fisheries							
112	Aquaculture Production of freshwater	Ton	3.690	14.000		MPRH	
113	Aquaculture Production of continental fishing	Ton	317.420	1973.000		MPRH	
114	Percentage of aquaculture production of fresh water as compared to total production	%	1 ,149	0.704		MPRH	
115	Percentage of aquaculture production of continental fishing in relation to the total production	%	98.850	99.295		MPRH	
116	Productivity of water surfaces	Kg /ha	-	-		MPRH	Study in progress

5. Review and Analysis of Water Indicators Table at Regional and National level

A review of table 7 (regional and national values of indicators) shows:

5.1. Analysis of Indicators Table

Of the 111 indicators, chosen initially at the regional scale:

- Only 13 categories of indicators have been identified by the international organizations.
- The categories of "Water and Ecosystem", and "water and governance", have not been processed.
- On the 111 proposed indicators at the regional scale:
  - 87 Indicators have been the subject of an assessment by international organizations (FAO/ AQUASTAT, UNICEF, WHO/JMP, CEDARE, AWC... etc.)
  - 24 Indicators have not been the subject of evaluation:

It is the following indicators:

- The reuse of treated municipal and industrial wastewater
- The withdrawals of surface blue water
- The withdrawals of blue groundwater
- The withdrawals of non-conventional resources
- The length of irrigation networks
- The length of drainage network
- The capacity of desalination of sea water
- The reported cholera cases
- The number of wetland sites recognized by RAMSAR
- Total area of wetlands
- The existence of an early warning system for disaster prevention
- Employment in industry
- The price rates of water and sanitation
- Subsidy (domestic, industrial and agricultural
- GNI
- Recovery of the operational cost for the water supply and
- Sanitation
- Recovery of the cost for Irrigation
- The percentage of the national budget directed to water and sanitation
- The IWRM plan in place
- The existence of S& E, R systems for water and sanitation
- Access Rights to Water
- Drilling permits/Year
- The complaints related to irrigation
- The supply of water and complaints related to sanitation

The Algeria Working Group of the project and the Regional Coordination of the project, have proposed to add:

- The indicators of the category "Water and Ecosystem", and "water and governance"
- The indicators" water -Aquaculture and inland Fisheries".

At the end of this work, 128 indicators were identified in total, among which:

- 78 Indicators have been the subject of a national evaluation
- 59 Indicators have been the subject of a national and regional joint assessment
- 31 Indicators have been the subject of an analysis regarding the progress made in Algeria from 2000 to 2012.

We found:

- Basic data having served in the evaluation of some indicators disseminated by international organizations are not explained,
- Information are not updated,
- Important discrepancies sometimes exist between the national and international values

5.2. National Calculation Methods of a Some Indicators:

5.2.1. Calculation of the Quality Index:

In Algeria, the evaluation of dams and rivers water quality is estimated by using the measurement of certain physico-chemical parameters, pollution indicators (mineral, organic, nitrogen and phosphorus).

It is given by comparing the analysis results at the terminals of the quality grid:

Table 5. Grid of quality for raw water

	Classification			
Parameters Classes	C_1 - GOOD	C_2 - ACCEPTABLE	C_3 - BAD	C_4 - Very Poor
Ph	6.5 - 8.5	6.5 - 8.5	8.5 - 9.0	> 9.0 And < 6.5
$O_{2\ diss}$ %	100 - 90	90 - 50	50 - 30	< 30
NH_4	0 - 0.01	0.01 - 0.1	0.1 - 3	> 3
NO_3	0 - 10	10 - 20	20 - 40	> 40
NO_2	0 - 0.01	0.01 - 0.1	0.1 - 3	> 3
PO_4	0 - 0.01	0.01 - 0.1	0.1 - 3	> 3
DBO_5	5	5 - 10	10 - 15	> 15
DCO	20	20 - 40	40 - 50	> 50
MO	5	5 - 10	10 - 15	> 15
RS	300 - 1000	1000 - 1200	1200 - 1600	> 1600

If the value of one of the parameters strays from the class C1 (Good), or C2 (acceptable), the water is considered of poor quality.

The University Center of Yale for the environment uses a method of calculation of the quality index, based on the 5 following parameters: (Ph, dissolved oxygen, conductivity, total nitrogen, total phosphorus).

A combination of these 5 parameters, weighted with the density of the measurement stations, provides a variable index from 1 to 100, and is an indicator of quality

Since these parameters are available to ANRH, it is therefore now possible to assess this global composite index

5.2.2. The Pricing of Water for Domestic Use

The pricing of water and sanitation is based on the principles of selectivity and progressiveness. It is selective according to the different categories of users and progressive in function of household consumption fractions. The law governing the pricing system currently in force is the executive decree no.05-13 of 12 January 2005.

Thus the first fraction of consumption, between 0 and 25 m3/quarter is meant to favor the category of the poor class. It is invoiced only at 6.30 DA.

This pricing is subject to taxes and charges:

- For water: a fixed fee of 240 DA/ quarter,
- For sanitation: a fixed fee of 60 DA/ quarter,

To this is added, a charges for management, a charges for quality, and a charges for water economy

Table 6. Pricing of water for domestic use

Categories of users		Fractions of Consumption	Coeff. of Multiplicat	Rates Algeria (DA)
Category I:households	1st installment	up to 25 m³/quart	1.0	6.30
	2nd installment	From 26 to 55 m³/quart	3.25	20.48
	3rd installment	From 56 to 82 m³/quart	5.5	34.65
	4th installment	Greater than 82 m³/quart	6.5	40.95
Category II and III: Administrations craftsmen tertiary sector services		Uniform	5.5	34.65
Category IV: Industry and tourism units		Uniform	6.5	40.95

5.3. Assessment's Discrepancies

5.3.1. Estimate of the Average Interannual Rain

The estimate made at the regional scale (89 mm) is overestimated.

The national evaluation gives the following results:

$P=(\sum PiSi)/S=56$ mm

With: For the north of the country: S= 308,500 km2, and P= 300 mm
And for the Sahara region: S= 2,073,241 km2, and P= 20 mm

The details of the calculations for the northern regions of the country are given in the table below:

Table 7. Calculation of the average rain in the northern areas of the country

Basins	Si (km2)	Pmoy (mm)	∑PiSi
Coastal Oran	6054.8	350	2119180
Coastal Dahra	3236.4	549	1776783.6
Coastal Algiers	8604.7	900	7744230
Coastal Constantine region	11219	1000	11219000
Tafna	7248.5	545	3950432.5
Macta	14404.5	400	5761800
Cheliff Ghrib downstream	23044.4	380	8756872
Isser	4156	520	2161120
Soummam	9121	426	3885546
Kebir Rhumel	8814	550	4847700
Seybouse	6476	600	3885600
Medjerda Mellegue	7798	400	3119200
Chott Chergui	49612.4	200	9922480
Cheliff Ghrib upstream	20730.2	220	4560644
Chott Zahrez	9123	250	2280750
Hodna	25835	250	6458750
Highlands. Constantine region	9580	350	3353000
K'sour, Djeb mounts Amour, OuledNaiel	20000	200	4000000
Southern Aurès	8797	300	2639100
Chott Melghir- (southern Aurès)	60000	150	9000000
Total	S=∑Si= 313854,9		∑PiSi =101442188
	Pmoy (mm)=		= 323.2 MM

5.3.2. The Agricultural Consumption of Green Water

The estimate made at the regional scale (1.46 billion m3/year) is under estimated. The national estimate gives a value of 3 billion m3, calculated from the following data

- Areas sown: 3 Million ha
- Efficiency: 10 quintals t/ha
- Production. : 30 Million quintals
- Needs: 1 m3/kg= 100 m3/quintal

5.3.3. The Withdrawals of Rainfed Agriculture: Total Withdrawals by Forests

The estimate made at the regional level concerning the indicator of withdrawals by the forest (0.44 billion m3/ year), is based on a formula involving coefficients α, and K, more or less arbitrary:

Regional Method:
Rain water withdrawal = S (vegetation zone) * R * α * K
With:

- R: reference value, calculated as the ratio between the withdrawals of irrigation and the irrigated area: In Algeria R=(6milliards de m3)/1053000=569 mm
- α: Coefficient (between 0-1) function of the aridity and the vegetation cover (= 0.2 for the hyper arid regions, 0.5 for arid regions, and 0.7 for temperate regions)
- K: coefficient of rainy period for Agriculture (as a function of the annual number of rainy months (=0.25, for 3 rainy months, and = 1 if 12 rainy months during the year)

Table 8. Regional method of calculation of withdrawals by the forests:

Forest Species	S (ha)	R (mm)	A	K	Withdr
Aleppo pine	792.000	569	0.7	0.5	0.1577268
Cork Oak	463.000	569	0.7	0.5	0.09220645
Green Oak	354.000	569	0.7	0.5	049910.07
Juniper of Phoenicia	227.000	569	0.5	0.25	0.01614651
Western Red Cedar	191 .000	569	0.7	0.5	0.03803765
Afares and Zen Oak	65.000	569	0.7	0.5	0.01294475
Cedar of the Atlas	23.000	569	0.7	0.5	0.00458045
Maritime pine	12.000	569	0.7	0.5	0.0023898
MISC.	143.000	569	0.7	0.5	0.02847845
Total	2.270.000				0.42300996

According to this method, the withdrawal of rain water by forest would be of 0.42 billion m3

Proposed Method:
On the basis of information provided by the MADR on the total area of forest land and of the information available in the literature on the distribution of forest species in Algeria, we have tried to evaluate approximately, the withdrawals of forest water, by using:

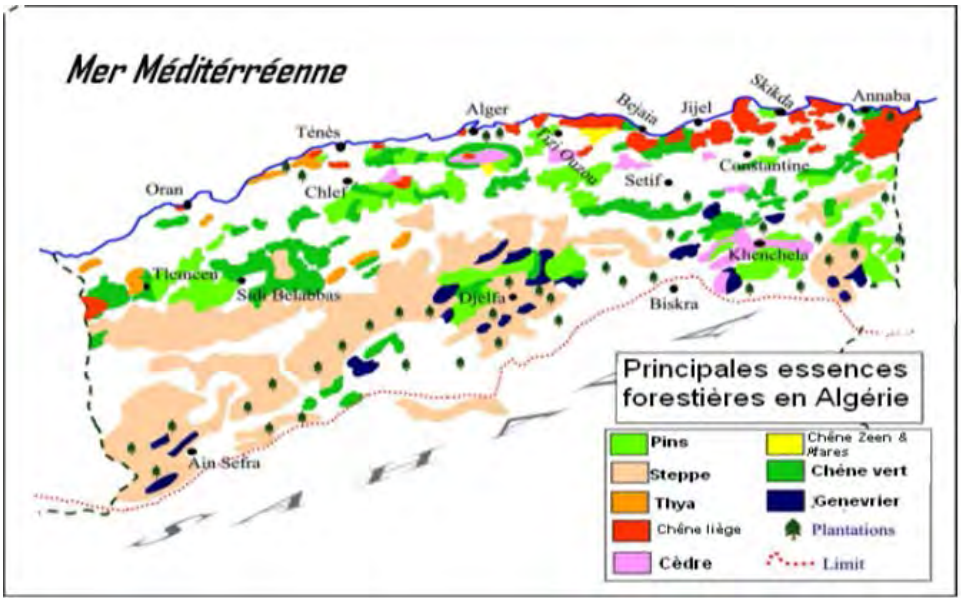


Figure 1. Map of the main forest species in Algeria. (INRF)

Method based on actual evapotranspiration:

The formula of Turc:

Etr = $P/\sqrt{(0,9 + P^2/I^2)}$ with $I=200+25T+0.05T3$

Etr: Actual Evapotranspiration (mm/year)
P: Annual average rain (mm/year)
T: average annual temperature (degrees C)

Table 9. Distribution of forest species

SPECIES	Situation in 1994		Regional Distribution
	Area (ha)	Area (in%)	
Aleppo pine	792.000	34.8	Tlemcen, Chlef, Djelfa, Khenchela
Cork Oak	463.000	20.4	Coastal Constantine region
Green Oak	354.000	15.6	Mascara, SBA
Juniper of Phoenicia	227.000	10	Saharan Atlas
Western Red Cedar	191 .000	8.4	Tlemcen
Afares and Zen Oak	65.000	2.9	Medea, south of Bejaia
Cedar of the Atlas	23.000	1 ,0	Khenchela
Maritime pine	1 2,000	0.5	
MISC.	143.000	6.4	
Total	**2.270.000**	**100**	

For the calculation of the ETR, we used the data of rain and temperatures, observed on representative posts in concerned regions.

Table 10. Assessment of forest withdrawals

SPECIES	Area (in ha)	Regional Distribution	Post represent.	Pmoy Year (mm)	T°moy year	ETP mm	ETR mm	Withdrawals (Billion m3)
Aleppo pine	792.000	Tlemcen, Chlef, Djelfa, Khenchela	Tlemcen, Djelfa Khenchela	513.4 296.2 298.3	16.4 14.7 15.1	1,296 1,372 1389	348.8	2.76
Cork Oak	463.000	Coastal Constan-tine region	Annaba	653.8	18.4	1,350	562.1	2.6
Green Oak	354.000	Mascara,	Mascara,	396.5	17.3	1,402	378.4	1.3
Juniper of Phoenicia	227.000	Saharan Atlas	A fl o u , Djelfa Arris,	263.4 296.2 252.2	12.9 14.7 14.2	1,425 1,372 1492	263.1	0.59
Western Red Cedar	191 .000	Tlemcen	Tlemcen	513.4	16.4	1,296	453.4	0.86
Afares and Zen Oak	65.000	Medea, south of Bejaia	Medea	680.4	14.7	1307	510.3	0.33
Cedar of the Atlas	23.000	Khenchela	Khenchela	298.3	15.1	1389	289.9	0.066
Maritime pine	1 2,000						562.1	0.067*
MISC.	143.000						263.1	0.376*
Total	**2.270.000**							**8.9**

According to these calculations, forests in Algeria withdraw approximately 8 billion m3 of water per year, which seems in contradiction with the estimate made at the regional scale (0.44 billion of m3)

5.3.4. Green Water Evaluation

Table (11) lists the various green water quantities (rainwater directly consumed by forest areas, Agricultural areas and Pasture areas):

Table 11. Evaluation of green waters

Green water cultivation	Surfaces (millions ha)	Useful rain/year	
		Green waters (m^3/ha)	Total green waters (billions m^3)
Rain-fed Agricultural	2.5	1600	4
Rain-fed Forest	4.3	3200	13.7
Rain-fed Pasture	32	1600	52.8
Total	**38.8**	**1820**	**70.5**

The hypothetical consumption of green waters in Algeria is as follows:
Forest areas: 320 mm
Agricultural areas: 160 mm
Pasture areas: 160 mm

According to the table above, green waters are estimated at 70.5 billion m^3 per year, with 53 billion m^3 in waterways covering an area of 32 million hectares and effective precipitation of 160 mm (equivalent to 1600 m^3/an/ha).

5.3.5. Indicator "Water and Climate"

Inventory of flood events observed during the past two decades

The values provided by the University of Dartmouth, regarding the census of floods observed in Algeria, originate the information provided by the media on the floods of huge impact, observed throughout the world. These figures are necessarily vitiated by error and are generally underestimated in comparison with the events actually observed.

How to define an indicator likely to characterize an exceptional flood that generates disasters?
Is it a flood of given return period (10 years, 50 years, 100 years), or rather a floods that caused significant damage (human and material)

There is also a need to distinguish between the water catastrophes caused by exceptional floods, related to phenomena of intense and generalized precipitation, and the floods caused by the shortcomings of public sewerage system.

We have taken into account the widespread flooding, resulting in loss of human life or significant material damage (source ANRH).

In fact, over the past four decades, we witnessed in Algeria the devastating effects of floods that affect both the North and the South of the country. We can recall the floods that hit the south-east of Algeria in 1969, the floods of March 1973 in the eastern regions of the country (Annaba, Tarf), the flood in March 1974 that have devastated the Center region of the country (Algiers- Tizi Ouzou), floods of Jijel, Annaba and Skikda in February 1984, the tragic events of November 2001 in Algiers (Bab El Oued) and more recently the October 02 and the October 28, 2008, floods in Ghardaia and Bechar who have scarred the populations of the Mzab and the Saoura valleys.

The increase of these phenomena can be explained by the observed climate changes on a global scale, which is characterized by a resurgence of extreme events, but also by the antropic causes, related to soil sealing, uncontrolled urbanization in flood zone, and the failures of the sanitation network.

a. Floods observed from 1989 to 2000

Table 12. Floods observed from 1989 to 2000

NO	Date	Wilayas affected
1	September 01, 1989	Biskra
2	September 21, 1989	M'sila
3	October 11, 1989	Tarf
4	October 15, 1989	Ain Defla
5	June 03, 1991	Ghardaia (partial destruction of El Atteuf dike)
6	January 26 - 27, 1992	Regions of the center of the Country Wilayas: Algiers, Blida, Tipaza, Chleff, Ain Defla, Medea.

NO	Date	Wilayas affected
7	October 20 to 22, 1993	Floods in the western region of the country (the most affected region: Oued R'hiou)
8	March 29 and 30, 1994	M'Zab Valley
9	September 23, 1994	Bordj Bou Arréridj, M'Sila, Djelfa, Médéa, Bouira, Ain Defla et Tiaret
10	September 29 to October 02, 1994	Ghardaia, Laghouat, Biskra, Mascara, Tissemsilt, Sidi Bel Abbes
11	October 03, 1994	Constantine
12	October 06, 1994	Oum El Bouaghi
13	February 06, 1996	Ain Defla
14	April 04, 1996	Annaba and Tarf.
15	September 24, 1998	Bouira, Medea
16	October 06, 1998	Djelfa
17	January 14, 1999	Adrar
18	September 28, 2000	Bou Saâda
19	October 14, 2000	Ain Temouchent
20	October 1, 2000	Wilaya of Ghardaia
21	October 23, 2000	Western highlands (Nâama)
22	October 24, 2000	Sidi Bel Abbes, Tissemsilt, Chleff and Ain Defla.

B. Floods observed from 2001 to 2011 (to be completed with the assistance of ANRH)

Table 13. Floods observed from 2001 to 2011

NO.	Date	Wilayas affected
1	April 2001	Constantine
2	November 11, 2001	Deadly and catastrophic flood of Bab El Oued (Algiers),
3	September 04, 2002	Flooding in the east of the country (Khenchella, Tebessa, Mila, Oum El bouaghi, Guelma, Annaba and Souk Ahras),
4	January 06, 2003	Mila, Oum El Bouaghi, Batna
5	January 10, 2003	Oran
6	January 11, 2003	Bejaia
7	January 12, 2003	Annaba-Tarf (flooding of agricultural land)
8	February March 2003	Constantine
9	April from 04 to 06, 2003	Annaba-Tarf
10	February/March 2003	Constantine
11	November 13, 2004	Wilayas of the Algerian North-East (Constantine- Skikda- Annaba-Tarf)
12	2005	Annaba-Tarf
13	May 06, 2006	Torrential rains affecting several wilayas Algiers (Bab El Oued) Ain Defla, Batna, Djelfa, Biskra, Oum El Bouaghi, Bordj Bou Arreridj, Biskra, Batna, Medea, Kasr El Boukhari and Berrouaghia generating floods
14	18-19/04/2007	Wilaya of Tiaret: overflow of the Oued M'lidi: losses in human life and property damage

NO.	Date	Wilayas affected
15	18-19/10/2007	Floods affecting wilayas in the west: - Wilaya of Chleff: 'collapse of the bridge/ Landslide - Wilaya of Naama (Ain Sefra): losses in human life; rupture of the RN6 - Wilaya of Tlemcen
16	November from 24 to 27, 2007	Floods affecting wilayas in the Center: - Algiers, Boumerdes (Dellys): loss in human life, property damage - Blida: property damage - Ténès : property damage
17	May 10- 11, 2008	Ain Azel
18	August 26, 2008	Widespread floods and floodings in several wilayas in the country: Mila, Oum El Bouaghi, Khenchella, Tiaret, Djelfa, Naama (losses in human life)
19	October 01 and 02, 2008	Wilaya of Ghardaia (losses in human life, significant property damage)
20	October 10, 2008	Region of Algiers
21	October 28, 2008	Bechar, Naama
22	December 17, 2008	Sour El Ghozlane
23	September 2009	Annaba-Tarf
24	November 02, 2010	Jijel
25	May 22, 2011	All the wilayas in the north of the country, and the wilayas of Bechar and Adrar
26	October 01 and 02, 2011	El Bayadh, M'sila, Gherdaia
27	March 08 and 09, 2012	Wilaya of El Tarf: flooding of the national road RN 84
28	21 /09/ 2013	Wilayas of Batna Biskra: flooding of several national roads
29	11 /10/ 2013	Wilayas of Djelfa and M'sila (overflow of Ettarous, El Fercha and Soubella wadis, losses in human life)

6. Virtual Water

Virtual water is defined as the fresh water equivalent required for the production of food stuff, animal consumption and industrial products imported or exported by any country.

Basic available information on Algeria is about agricultural virtual water, which is an important part of imported virtual water.

Agricultural virtual water of a country is represented by the equivalent fresh water quantity used to produce imported agricultural products and consumed by the importing country.

Agricultural virtual water calculations require the following data:

- A list compiling various cultivated products and the surface area of each,
- Total production (tons) and the yield of each cultivation (tons/hectare)
- The content of virtual water or the water consumption of each cultivated product in m^3/ton taking into account:
    - o Useful or effective rain water,
    - o Amount(s) of effective irrigation water

Table 14 below, compiled based on the Statistical Report of the Ministry of Agriculture and Rural Development (MADR-2012), includes related information on imported agricultural virtual water in Algeria:

Table 14. Total virtual water

Imported products (2012)	Import-export (millions of T)		Virtual water (millions of m^3)		
	Import	Export	Imported	Exported	Balance
Food stuff	10 702	107	19 909	202	19 707
Non-food stuff	6 010	11	23 682	156	23 526
Total imports	**16 712**	**118**	**43 591**	**358**	**43 233**

Tableau 14 above showcases the huge deficit gap between imports and exports of agricultural products virtual water, exceeding 43 billion m^3 for imports with exports remaining below 0.5 billion m^3 at 0.8%.

7. Analysis and Trends

During the period from 2000 to 2012, progress has been made in Algeria, in the area of the mobilization of water resources (conventional and non-conventional resources), as well as in the area of the supply of drinking water, sanitation and agricultural water.

In the field of desalination, Algeria has engaged the realization of 13 major stations of desalination of sea water, of a total production capacity of 2.3 Hm3/day.

Currently, 9 major stations with a capacity of 1.4 Hm3/day (0.54 billion m3/year) have been put in service, 2 other stations will be operational by end of 2014.

With a production of wastewater currently estimated to 1.2 billion m3 year and a processing capacity of 0.8 billion m3 , Algeria reuses today 0.1 billion m3 of water per year.

In 2012, the drinking water network is over 105,000 km and the volumes produced and distributed are estimated to 2.9 billion m3/year. The current capacity of storage is 7 hm3.

It is to be noted that the water distribution networks are partly obsolete and cause a high level of leakage in the networks. Also the sector has undertaken a vast program of networks rehabilitation.

The sanitation networks have evolved from 21000 km in 1995 to 41,000 km in 2010 with connection rates from 79% to 86% between 1995 and 2010.
In respect of agricultural hydraulic, the irrigated area in Algeria have evolved from 350,000 ha in 2000 to 1,053,000 ha in 2012.

For some indicators, information exist on the situation in 2000 and 2012

Table 15. Evolution of indicators from 2000 to 2012

INDICATORS	2000	2013
Mobilized Ressources		
Number of dams in operation	47	70
Capacity mobilized by large dams (billion m3)	4.3	7
Superficial resources mobilized by large dams (billion m3)	1.6	4.5
Superficial resources mobilized (billion m3)	0.2	0.4
North Groundwater Resources (billion m3)	1.8	2
Northern Sahara Groundwater Resources (billion m3)	1.3	2
Desalination (billion m3)	0	0.54
REUE (billion m3)	0	0.1
Total resources mobilized (billion m3)	4.9	9.34
Drinking Water Supply		
Average endowment in Water Supply and Sanitation (L/day/inhab.)	123	175
Requirment in Water Supply and Sanitation (Hm3/year)	2,400	3,300
Total linear networks (km)	50,000	105,000

INDICATORS	2000	2013
Connection Rates (national average)	78%	95%
Current average production (Hm3/year)	1,347	3000
Overall Losses	40%	30%
Sanitation		
The linear network (km)	21,000	43,000
Connection Rates	72%	87%
Discharged volumes (Hm3/year)	500	1,200
Number of STEP in operation	28	134 (61 STEP, 73 lagoons)
Theoretical capacity of purification (Hm3/year)	90	800
Purification Capacity in Million Equivalent-Inhabitant	4	12
% Sewage treatment capacity / discharges	46 %	67%
Agricultural Hydraulic		
Useful agricultural area (ha)	8,666 715	8,666 715
Agricultural land area suitable for irrigation (ha)	2,200 000	2,200 000
Equipped Area (ha)	157,000	227,000
Total irrigated area (ha)	350,000	1,053,000
Volumes of water allocated to irrigation (billion m3)	1.8	6
Total area equipped with irrigation water saving systems (ha)	75,000	550,000
Irrigated area at the level of GPI's (ha)		68,000
Water And Energy		
Installed hydroelectric capacity	53	479
Produced Hydroelectricity	25,412	48,426

A review of table 10, highlights the progress made in Algeria during the period from 2000 to 2012, in the area of water resources mobilization (conventional and non-conventional resources, as well as in the area of drinking water supply, sanitation and agricultural hydraulic.

- The linear of the drinking water network and the volumes distributed has been multiplied by 2
- The linear of the sewerage network has been multiplied by 2)
- The theoretical capacity of treatment plants have seen an increase of 800%
- The irrigated area increased from 350,000 , to 1,053,000 ha
- The volumes allocated and withdrawn for irrigation have increased by 200 %.

8. Conclusion and Recommendations

Algeria has consented during the decade 2000-2012, considerable efforts in investment for planning, mobilization, transfer, treatment and management of water resources in order to respond to the ever-increasing demand from the various uses of water.

The importance of investments has given tangible results, for satisfaction of needs in water in both required quantity and quality.
These efforts must be continued and intensified during the next few decades, by the following actions:

8.1. In Terms of Knowledge of the Resource

- Continue the programs for development and modernization of observation and monitoring networks, and put in place the appropriate means of management of these networks
- Continue the programs of study and modeling of groundwater, particularly in the wilayas of Laghouat, Djelfa and M'sila, as well as general studies of cartographic synthesis

8.2. In Terms of Planning

- Ensure an institutional anchor of the NEP in order to allow support continuous updating of the planning instruments of the sectoral development (NEP/PDARE - medium-term plans)
- Develop an informational database to meet the standards of quality to feed the process of planning of sectoral development
- Strengthen the capacity of structures dedicated to the sectoral planning
- Integrate the intersectoral coordination in the planning process, in terms of goals and strategic axis of development
- Promote the participatory management of agricultural water in coherence with the changes in collective systems of access to water resources and irrigation.

8.3. In Terms of Mobilization

- Continuation of conventional and non-conventional water resources mobilization programs, aiming for a triple strategic goal:
- Secure the supply of drinking water of large coastal cities, with the desalination of sea water
- Constitute the strategic reserves at regional level of large capacity dams
- Strengthen the irrigation by allocating to this use 65% of the mobilized resources, including the treated sewage water.
- Continue the programs of dams silting up control, on the basis of carried out and ongoing studies of dams watershed protection.

With regard to the South-Highlands transfer project, it would be desirable to deepen the impact studies in the medium term for the withdrawals intensification on the aquifers behavior (drawdown, disappearance of the artesianism, risk of water quality deterioration, likely to undermine the projects sustainability and the resource in general).

With regarding to the program of "hillside reservoirs", the current program is proving very positive on the local populations by improving their standard of living, and increasing the capacity of irrigation and local productivity. In addition, these hillside reservoirs are perceived as a stabilizing factor of the local population, and a brake on the rural exodus.

However the success of this program requires deep technical investigations as well as the active involvement of the beneficiaries and of the local populations.

8.4. In Terms of Management and Protection of the Resource

what has to be done is

- Intensify the programs aimed at the saving and protection of water resources
- Rehabilitate the irrigation and Water Supply and Sanitation systems in addition to raise awareness among users on the economy of water
- Rehabilitate sanitation systems and develop the sewage treatment plants of urban wastewater
- Implement a dynamic management for dams

8.5. In Terms of Follow-up/Assessment

The set up of an efficient system of "Follow-up/Assessment", and a process of water reporting that requires:

- A Coordination of the system
- A procedure for data collection
- A procedure for processing, analysis and validation of data
- A procedure for the preparation of reports and presentation of results
- A precise definition of tasks and responsibilities

8.5.1. Institutional Strengthening

The creation of "Follow-up/Assessment" structure, will allow:

- The strengthening of the country's capacities in order to improve the existing M&E water system, and lead to specific reports on the state of the resource developed in adequate time from a minimum set of indicators.
- Facilitating the interactions between various structures, institutions and national organizations.
- Ensuring the availability of information relating to programs and their accessibility to all stakeholders.
- Permanently and regularly supplying a water information system on the basis of which the decision makers will be able to effectively follow the development programs and take informed decisions.

8.5.2. Capacity Building

The indicators of water which are not measured currently in Algeria in a precise manner, and which require a strengthening of capabilities through a training program can be summarized in the following table:

Table 16. Indicators requiring further training

Indicators	Method of assessment
Green water /rainfed consumption	The advocated calculation method (green water= Vegetation Zone * (R) * (0.7) * (0.25), is not practiced in Algeria Instead they use the ETP data Need to deepen this issue
Non-renewable groundwater	Quantities of groundwater likely to be exploited reasonably from a fossil, exhaustible aquifer by preserving its sustainability for future generations and in considering the impacts of a possible overexploitation Need to deepen this issue
Overlap "surface water-groundwater"	An interesting indicator Describes the relationship aquifer-river but complex, very variable, difficult to determine
Reuse of treated waste water and drainage water	Considering the impact of this reuse, on the hydro agricultural development and on public health, the indicators related to reuse standards for these waters require enhanced capabilities
Index of water sustainability	Divergence of definitions: **National Definition:** Relation between the volumes sampled and the overall potentialities **Definition MEWINA:** includes the green water In Algeria this index is known under the title: "Index of exploitation", but does not include the green water
Quality Index	Composite Index, measuring the quality of water using data on dissolved oxygen, pH, conductivity, total nitrogen and total phosphorous. It is not calculated in Algeria
Knowledge of networks (Water supply-Sanitation-irrigation)	The establishment and management of GIS representing the networks, requires a program of training to be defined
Efficiency of networks	Detection of leaks in the networks
Connection Rates	Definition of a rigorous and standardized scientific method for the assessment of the connection rates
Water resource protection index	Definition and implementation of the protection perimeters
Virtual Water	The evaluation of this parameter requires knowledge of the quantities of water necessary for the production of a given product, animal agri-food or industrial

Annex

Algeria AMCOW Pan African M&E Performance Sheet

Country Background Information Sheet

Country Name: **Algeria**

Items | **Information**

1. Population trends for the last 4 years, and GDP.

Years	2000	2008	2009	2010	2011	2013
Urban pop.	*18 250 000*	*000 214 24*	*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***	*000 700 38*
GDP (10^9 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.

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.
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.

This priority given to the water sector was translated by a strong impulse of the intervention of the State on two major strategic axes:
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?)
2nd axe: institutional reform within the framework of the national approach of strengthening the governance

The big implemented construction works aim at insuring:
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.

Which are the ones well known and used in the county? Specify how it is used.
- 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... "

- 2-Conference of United Nations on the water(Mar del Plata-1977): " definition of a platform of discussions on water issues at international level.

- 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.	**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 pollution and and the alert in the floods - 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 have, in 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 production of 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 purification is 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 inhabitants and a 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 irrigation with long-term objectives (horizon 2030) of: 107 400 ha,
	5-agricultural Hydraulics and irrigation: 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.

	6-Governance of the water: 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: - At the central level: a consultative national council for water resources - At the regional level: 5 tripartite committees in about 5 hydrographic basin agencies.
5. Comments on the national water sector regarding the strengths, weaknesses, opportunities, threats and outstanding problems.	- 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. - 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. - the impact of these investments was translated by a doubling of the subsid in drinking water per capita between1970 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.
	- 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.

Country Water and Sanitation Performances Evaluation Sheet

Country Name: **Algeria**

<table>
<tr><th>Performance Category</th><th>Country Information</th></tr>
<tr><td>1-1-Water and Energy

<u>Target:</u>
Increase hydropower utilization by 10% from 2000 to 2015.</td><td>
▪ 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:
<table>
<tr><td>Years (i)</td><td>2000</td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2013</td></tr>
<tr><td>-Economically feasible hydropower Potential (P)</td><td>25 412</td><td>40 236</td><td>42 769</td><td>45 640</td><td>48 426</td><td>48 426</td></tr>
<tr><td>-Installed hydropower capacity (C)</td><td>53</td><td>281</td><td>342</td><td>410</td><td>479</td><td>479</td></tr>
<tr><td>-Hydropower utilization (HpuI = C/P) (%)</td><td>0.21</td><td>0.70</td><td>0.80</td><td>090</td><td>0.99</td><td>0.99</td></tr>
<tr><td>Rate of increase $R_i HpuI$ (%) = $(HpuI_i - HpuI_{2000})/HpuI_{2000}$</td><td>0.00</td><td>2.3333</td><td>2.8095</td><td>3.2857</td><td>3.7143</td><td>3.7143</td></tr>
</table>
▪ 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
</td></tr>
<tr><td></td><td>
▪ 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 %.
</td></tr>
<tr><td></td><td>
▪ 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.
</td></tr>
<tr><td></td><td>
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.
</td></tr>
</table>

1-2-Water and Agriculture

Targets:
-Increase water productivity Rain fed agriculture & Irrigation by 30% 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. 793
-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/m^3) **Wp=A/(B-C)**	5.03	5.47	5.09	5.96	7.93	3.9
Rate of increase R_iWp (%) = $(Wp_i - Wp_{2000})/Wp_{2000}$	00	1.07%	1.21%	1.357%	1.5%	3.28%

and

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

- 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_iIA (%) = $(IA_i - IA_{2000})/IA_{2000}$	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_iWDSI (%) = $(WDSI_i - WDSI_{2000})/ WDSI_{2000}$	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 theorical 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.

<table>
<tr><td></td><td>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.</td></tr>
<tr><td></td><td><u>Element of the financial structure</u>:

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)</td></tr>
<tr><td></td><td><u>Management tools</u>: master plans of arrangement and use of waters

▪ Sources of verification and Specific comments:
legal texts</td></tr>
<tr><td>2.2. Not applicable
2.3. Not applicable
2.4. Rain water

<u>Target:</u>
Increase the share of rainwater use in total municipal water consumption up to 10% by 2015.</td><td>▪ 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 abreuvement of the livestock or for the small irrigation of much reduced plots of land.

▪ Achievement:
<table>
<tr><td>Years (i)</td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2013</td></tr>
<tr><td>-Total municipal water supply(10^9 m^3)((A)</td><td>2.1</td><td>2.7</td><td>2.8</td><td>2.9</td><td>3.1</td></tr>
<tr><td>- Rainwater use (10^9 m^3)((B)</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>-Water use from other sources Desalination (10^9 m^3)((C)</td><td>0.105</td><td>0.142</td><td>0.215</td><td>0.405</td><td>0.515</td></tr>
<tr><td>-Total municipal water consumption (Twc = A+B+C)</td><td>2.205</td><td>2.842</td><td>3.015</td><td>3.305</td><td>3.615</td></tr>
<tr><td>Percentage of rainwater use pRu (%) = B/Twc .</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
▪ Sources of verification and Specific comments:
- MRE - DAEP(Direction de l'Alimentation en eau potable</td></tr>
<tr><td>3.1. Urban Water Supply

3.2. Urban Sanitation

3.3. Rural Water Supply

3.4. Rural Sanitation and Hygiene</td><td>▪ 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.

- 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.</td></tr>
</table>

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).*

Achievement in water supply:

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%**
Rate of Inaccessibility reduction for water IRwat (%) = $(W_i\text{-}W_{1990})/(100\text{-}W_{1990})$	00	59%	63.6%	68%	72.7%	

- Achievement in improved sanitation:

Years (i)	1990	2008	2009	2010	2011	2013
Access rate are not differentiated for the urban and rural	**72%**	**84%**	**85%**	**86%**	**86%**	**87%**
-Total access (%) (S)	**72%**	**84%**	**85%**	**86%**	**86%**	**87%**
Rate of Inaccessibility reduction for sanitation IRsan (%) = $(S_i\text{-}S_{1990})/(100\text{-}S_{1990})$	00	42.8%	46.4%	50%	50%	53%

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

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 arrangements	▪ **Specific actions taken so far for the milestone:** ▪ **Existence of Water sector policy that reflects good governance principles, and Year of latest update:**
5.2. Ethics, transparency, empowerment 5.3. Public and private roles	**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)
5.4. Right to water 5.5. Regulatory approaches *Target:* Institute/update, by 2015, water sector policy reforms that reflect good governance principles of:	**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 du07 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.

(i) partnership commitment; (ii) ethics -transparency, equity and fairness; (iii) responsibility and accountability; (iv) inclusiveness, participation, predictability and responsiveness; and (v) coherence.

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.

- 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 (%) = B_1/A_1	0.52	0.37	0.71	0.82	

and

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

- 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 Budget (B_2) (10^9 US $)	1.806	1.265	2.411	2.695	
Percentage of national Budget to Water and Sanitation BdgWS (%) = B_2/A_2	xxxx	xxxx	xxxx	xxxx	

- Sources of verification and Specific comments:

Water resources Ministry (Planning and economic affairs Direction)

6.2. Pricing Strategies

6.3. Pro-poor financing Strategies

Target:
Set by 2015, water tariff system that addresses

- Specific actions taken so far for the milestone:
-
- Describe the Water Tariff Structure:

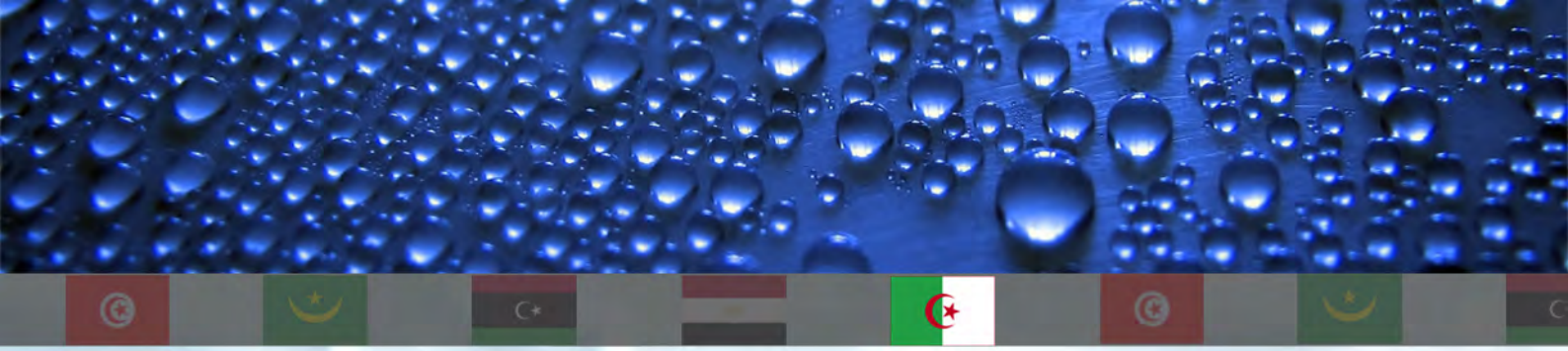
✓ *Lifeline Water (l/ca/day):* *XX*
✓ *Minimum salary of the population (local currency-DZD-):* *1500*
✓ *Rate (USD or EURO/local currency):* *1 euro=103 DZD*
1 US$=80 DZD

Tariff Structure:

Consumption categories (m³)	***Rate (local currency)***
< 25 m³	1 *6.30 DZD / m³*
26 m³ à 55 m³	2 *20.47 DZD / m³*
56 m³ à 82 m³	3 *34.65 DZD/ m³*
> 82 m³	4 40.95 *DZD / m³*
Any other specific charge: *- Pollution* *- economy of the water* *- Quality* *- purification*	

<table>
<tr><td></td><td>Adjustments for cross-subsidy:
<table><tr><th>Adjustments</th><th>Rate</th></tr><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></table>Tariff for rural areas if any:
-no
▪ 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</td></tr>
<tr><td>cross-subsidy and the need of poor.</td><td></td></tr>
<tr><td>7.1. Education and capacity development
Target:
To be identified.</td><td>▪ Not be reported.</td></tr>
<tr><td>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.</td><td>▪ 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 (SEAAL-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
<table><tr><th>Items</th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>2011</th></tr><tr><td>-New Elements incorporated</td><td>xxxx</td><td>xxxx</td><td>xxxx</td><td>xxxx</td></tr><tr><td>-Drivers</td><td>xxxx</td><td>xxxx</td><td>xxxx</td><td>xxxx</td></tr></table>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</td></tr>
<tr><td>7.3. Water and Technologies
Target:
To be identified.</td><td>▪ Not be reported.</td></tr>
<tr><td>7.4. Professional Networks/ Associations
Target:
To be identified.</td><td>▪ Not be reported.</td></tr>
</table>



MEWINA

مشروع التقييم والمتابعة لقطاع المياه بدول شمال أفريقيا

Monitoring and Evaluation for Water In North Africa

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