MEWINA

مشروع التقييم والمتابعة لقطاع المياه بدول شمال أفريقيا

Monitoring and Evaluation for Water In North Africa

African Water Facility
Facilité africaine de l'eau
Mobilising Resources for Water in Africa

Mauritania 2012 State of the Water Report

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CEDARE
سـيدارى

N-AMCOW

African Water Facility
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Main Author: Assane Gaye, Mauritania National Project Management Unit (NPMU)
Contributors: Saadou Ebih Ould Mohamed El Hacen, Mauritania NPMU
Supervision & Review: Khaled AbuZeid, Ph.D., P.E.; Mohamed Elrawady, M.Sc., CEDARE
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Abbreviations and Acronyms

BCM:	Billion Cubic Meters
CEDRAE:	Centre of the Environment and Development for the Arab Region & Europe
MC:	Cubic Metres
ONM:	National Meteorology Office
ONS:	National Statistics Office
GIRE:	Water Resources Integrated Management
MCM:	Million Cubic Meters
M&E:	Monitoring and Evaluation
MHA:	Ministry of Water and Sanitation
CNRE:	Water Resources National Centre
DH:	Administration of Water
DA:	Administration of Sanitation
ONAS:	National Office of Sanitation
DAR:	Administration of Rural Development
DPSC:	Administration of Planning, Monitoring and Cooperation
DPSE:	Administration of Monitoring and Evaluation Policy

1. Introduction

Located in the North West of Africa, between the 15th and the 27th Northern altitudes, Mauritania is bordered by the Atlantic Ocean to the West and extends along a coastline of 720 Km. The country covers an area of 1 085 000Km^2. Farmlands are less than 1% of the national territories and the cultivated areas vary according to rainfall. The major part of the country has a recorded rainfall of around 200 mm/year. Water withdrawals are split as follows: 88% for agriculture and cattle breeding, 9% for domestic use, and 3% for industry. Recurrent drought events have contributed to massive rural migration towards the urban centres and an increase of the number of rural communities. This shift caused a heavy pressure on the existing drinking water and sanitation infrastructures. According to the data shown in the 2007 Human Development global report published by the UNDP, the human development index of Mauritania is set at 0.55, which corresponds to the 137th place over the 173 countries ranked in the report.

With the aim of supporting the capacities of the countries in the North Africa region in terms of monitoring and evaluation of the water sector, through the development of a solid and accurate monitoring mechanism, enabling them to draft an annual report drawn from the periodic and accurate observation of the state of the water, using precise indicators and agreed upon coherent data, the monitoring and evaluation project of the water sector and Sanitation of the North African countries (MEWINA) is implemented under the auspices of the African Ministerial Council of Water (AMCOW). It is financed by the African Development Bank (ADB) and applied at the regional level by the Centre of the Environment and Development for the Arab Region and Europe (CEDARE)and at the country level by a national unit of the project.

Appropriate Decision Making require a prior knowledge of the state of the water in Mauritania, taking into account the water specificity, as it is a cross-issue that was not previously linked, neither to one sector, nor to all sectors dealing with the human development.

The term "State of the Water" means the status of water in the different sectors of human development shown in values for the different water indicators, proving that water is cross cutting, and serving as a decision-making tool for decision-makers.

The Regional and National Coordination of the project identified some indicators put together in15 categories. A rigorous data collection process is carried out to inform of the indicators.

With the intent of monitoring the development of such indicators for the coming years, the values of the indicators for 2012 are selected as a baseline for the data.

The main Contents of State of the Water reports are articulated as follows: (I) Introduction; (II) National, continental and global objectives, III) national indicators; (IV) The indicators' value in 2012; (v) Overall analysis of the national state of the water; (VI) Conclusion and recommendations

2. National, Continental and Global Objectives

2.1. National Objectives

In order to stand up to the issues linked to the lack of water availability, the Government has set a main objective to improve the access to drinking water and sanitation in terms of quantity, quality and affordable prices for everyone in a sustainable manner.

On the other hand, as Mauritania adopted thewater MDG which entails reducing to half the population without access to improved water supply and improved sanitation by 2015, the assessment of the current situation of Water Supply and Sanitation Coverage became morerelevant.

As to the access to improved Water Supply; more than half of the population had no access to drinking water in 2009; and there was a 33% population increase between 2009 and 2015. This means that currently, 1.2 million persons have no access to improved Water Supply which is about 30% of the population.

Concerning sanitation, achieving the MDG target relates to a coverage rate of 63% in 2015, versus around 20% in 2004. Therefore, there should be efforts towards providing access to sanitation to around 1,5 million people between 2005 and 2015 (in rural areas and in urban areas), which means an annual pace of around 150 000 persons or rather 25 685 households.

Achieving the overall objective will be sought through the following specific objectives: (i) improve the access to drinking water; (ii) identify alternative water resources; (iii) develop surface water; (iv) improve the sanitation conditions; (v) promote the public-private partnership in the field of water; and (vi) build the capacity of the various stakeholders of the sector.

In terms of access to water, the efforts will be directed towards: (i) improving the production and distribution; (ii) strengthening the quality and service standard at the suburbs and the poor areas through direct access to the public network of drinking water (private connections); (iii) promoting local manufacturing of pipes intended for drinking water and sanitation; (iv) improving the absorption capacity through mastering of drilling techniques and the purchase of equipment materials; (v) purchasing solar drainage equipments instead of environment unfriendly equipments which operational cost is high; and (vi) developing water service in semi-urban and rural areas.

In this respect, and in order to achieve the national and international objectives the country is aiming for developing the following projects: (i) the construction of 200 AEP in the different wilayas of the country; (ii) the supply of drinking water of Aftout Echarghi; (iii) the implementation of the programme for the creation of open air water retention basins; and (iv) the access to drinking water of the communities through which the main pipe of the Aftout Sahli project is passing.

As to the water resources knowledge, the envisaged activities are: (i) promoting water resources integrated management (GIRE); (ii) encouraging transfers of water resources from excess zones to deficit zones through adductions; (iii) realizing new hydro-geological surveys in different zones over the country; (iv) implementing the water resources mapping for each wilaya at appropriate scales; and (v) marking of the

protection perimeters and strategic safeguard perimeters in large cities and secondary cities.

Concerning the surface water development, emphasis will be made to: (i) implementing structural works to mobilize surface water (dams, retention basins, ...); (ii) intensify the investment in the field of surface water mobilization to meet the demand of the different water users; (iii) train human resources on mastering and treatment of surface water; and (iv) design a database and GIS for surface water resources.

At the rural and semi-urban level, the establishment of the National office of water services in rural areas (ONSER) will allow for a better water supply, optimization of resources and will stop the multiplicity of players, which will have a good implication on the population.

In terms of improvement of sanitation conditions, the creation of the National office for sanitation (ONAS) will allow for: (i) the realization of an important sanitation project of the city of Nouakchott; and (ii) the realization of sanitation networks of the cities of Rosso and Nouadhibou.

As to the promotion of the public-private partnership, the main actions to be taken pertain to: (i) the sustainability of the accomplished investments; and (ii) the optimal management of water infrastructures.

Finally, all of these strategies and actions will be supported by an axis of capacity building for the key players that will go through: (i) The development of human, material and financial resources, (ii) strengthening the decentralized departments with qualified personnel; and (iii) the development of the consultancy role provided by the regional departments to the districts for the execution of projects.

2.2. Continental Objectives

The African Ministerial Council of Water (AMCOW) has been established in 2002 with the main objective of promoting cooperation, security, socialand economic development and poverty eradication in Member States by managing the water ressources in the continent and providing water supply services.

The Heads of States and of the Government of the African Union agreed on the obligations to be observed in order to accelerate the accomplishment of the objectives concerning water and sanitation in Africa and mandated the AMCOW àto develop and monitor an implemenetation strategy of such obligations.

Moreover, concerning the Development Millenium Goals, it is acknowledged that the AMCOW objectives, and particularly halving by 2015 the number of persons having access to drinking water and sanitation, are far from being achieved for the majority of the African countries.

Table 1: Details of various AMCOW objectives, and the level of accomplishment of such objectives in Mauritania in 2012.

Table 1. Details of various AMCOW objectives, and the level of accomplishment of such objectives in Mauritania in 2012

Category of performance	Target	Development from 2000 to 2012
Water & Energy	Increase the use of hydroenergy by 10% between 2000 and 2015	The installed hydropower capacity increased from 30MW in 2000 to 70MW in 2012
Water & Agriculture	- Increase Water productivity for rainfed agriculture and irrigation by 30% between 2000 and 2015, and Increase the irrigated areas by 50% between 2000 and 2015	Withdrawals for irrigation increased from 1,45 billion m3 in 2000 to 1.5 billion m3 in 2012 – The irrigated areas increased from 21368 ha (2000) to 31 000 ha in 2012.
Water & Multiple Use	Increase the Water Demand Satisfaction Index (WDSI) by 10% between 2000 and 2015.	Existence of a national development plan for the integrated water ressources management (NDP-IWRM)
Transboundary Basins and Water ressources Management	Develop a National plan for efficient management of transboundary water ressources by 2015.	Actions undertaken from 2000 to 2012 :- Integrated management of TaoudeniIllumeden transboundary basin, - Set up a monitoring strategy in the OMVS as per the table
Rain Water	Increase the proportion of use of rain water in municipal water consumption to %10 by 2015.	No system enabling the use of rain water for the consumption of municipal water
Urban Water Supply/, Urban Sanitation/ Rurale Water Supply/ Rural Sanitation	Reduce by 50%from 1990 to 2015, the proportion of the population without access to an improved water source, and the proportion without improved sanitation infrastructure (Urban/rural/ total).	The rate of access to drinking water increased from 25% in 1990, to 65%, in 2012 with a reduction rate of 44%, The rate of access to sanitation increased from 30 % in 1990, to 46 % in 2012 with a reduction rate of 22.9%
Adaptation to Climate Change	Develop and implement at least an adaptation strategy to climate change by 2015.	Existence of a Water Action Plan for the resilience to climate change:
Management of water-related risks	Establish at least one alarm system, for the prevention of natural disasters nationally by 2015.	Existence of an Alarm System for the prevention of natural disasters and the Year of establishment

Institutional Arrangement/ Ethics, Transparency, and Empowerment/ Roles of the Public and Private Sectors/ Right to Water/ Regulatory Approaches	Establish/updae by 2015, political reforms of the water sector to translate good governance principles such as: (i) partnership obligation; (ii) ethics-transparency, equity and justice; (iii) responsibility and accountability (iv) integration, participation, predicatability and responsiveness and (v) coherence	• - Elements of the legislative and legal environment: • The water code (Order No. 85-144 of 4 July 1986, amended and revoked by the law No. 2005-30 of 2 February 2005 on Water Code) that defines some basic principles namely, particularly, the responsibility of the operator of irrigated areas of rational water use;
		• The order No. 87-289 of 20 October 1986, that establishes the new competences of the municipality, including water infrastructure management;
		• The decree 93-124 of 21 December 1993 defininf the management and operation terms per qui définit les conditions de gestion et
		• The law No. 98-016 of 09 July 1998 on participatory management of application oasis over the 44 planned have been already published

Financing the Sector	ofthe % 0.5 Immediately allocate at least GDP to Hygiene and Sanitation.And of the national %5 immediately allocate budget to Water and Sanitation	• Variation by 0,014% in 2008 compared to 0,065898909 in 2012 of the GDP has been allocated to water and sanitation
Financement du secteur	Allouer immédiatement au moins 0.5 % du PIB à l'Hygiène et Assainissement. et Allouer immédiatement 5% du budget national à l'Eau et l'Assainissement	Variation de 0,014% en 2008 à 0,065898909 en 2012 du PIB à é alloués l'eau et l'assainissement Variation de 1,937 en 2008 à 0,1110 en 2012
Pricing Strategies/ Funding Strategies for the poorest	Establish by 2015, a pricing Strategy that translates the equalization and access to the poor.	For a volume ≤ 20m3 with 99UM/m3, For a volume ≥ 20m3 with 360 UM/m3; €=400 UM
Information	Enhance by 2016, the systems of Monitoring, Evaluation and Reporting (M&E, &R) to be in line with the panafrican M&E	▪ Existence of an M&E, &R Water and Sanitation National System, and the Year of establishment..
		• The existence of a database on groundwater coupled with GIS, managed by the CNRE; since 1998 for the Water Department and transferred to the CNRE in 2001 and a water monitoring system for groundwater through piezometers installed in 18 well fields, out of which 14 supplying to big cities in Mauritania and 4 others installed on the well field of the Oasis of Adrar, the well field of Tasiast , the well field of the SNIM and the well field of the OMVS installed in the Mauritanian side. • The existence of databases for management purposes at the level of the SNDE and the ONSER • The existence of a database on the hydrometrics of the main waterways; managed by the DAR as well as the gauging stations on the Senegal river.
		• The existence of a monitoring mechanism for great retaining structures (Diama, FoumGleita, TamourtNaaje) • The existence of a monitoring and agro-hydro-meteorological system in favor of the development of rainfed crops managed by the DA

AMCOW Water Indicators

In compliance with the objectives of the African ministerial council of water (AMCOW) for the promotion of cooperation, security, social and economic development and poverty eradication in the Member States through the efficient management of water ressources in the continent; the Technical Committee at the African Union adopted 7 performance categories that are evaluated based on several indicators. The basic evaluation report of the indicators is prepared in 2012 . The performance categories are as follows:

Theme 1: Water infrastructure for economic growth

1.1. Water & Energy

This category has the objective of «increasing the use of hydropower by 10% from 2000 to 2015». It establishes a fixed percentage that all African countries should achieve, regardless of the various conditions of each country, and especially without taking into account the situation in transboundary basins, the increase of the use of hydropower in a country may jeopardize the ressources and/or the opportunities of riparian countries.

This category includes four indicators to oversee the progress of such objective, namely:

The hydropower potential (P): the hydropower potential in the country

The hydropower installed capacity (C): the capacity of turbines installed for the production of electrical energy.

The use of hydropower (Hpul=C/P): The rate of increase Rihpul(%)= (Hpuli-Hpul2000) Hpul2000:

For the case of Mauritania, substantially all hydropower is produced by the OMVS

1.2. Water & Agriculture

This category includes the following two objectives:

- Increase the productivity of rainfed and irrigated agriculture by 30% from 2000 to 2015)
- Increase the size of irrigated areas by 50% from 2000 to 2015

The indicators associated with this category are as follows;

Agricultural GDP (109 USD): the GDP of the agricultural sector in dollars

Total water withdrawals for Agriculture (m3) (B): and the total volume of water withdrawals by agriculture.

Water return to the environment (C): being the wastewater drain and the agricultural drainage outflow.

Water productivity (USD/M3) (WP=A/B-C): this indicator has been evaluated irrespective of the volume of water returning to the environment.

The rate of increase Riwp(%)= (wpi-wp2000)/WP2000: accepted and will be applied each time the data of the various years are available.

The irrigated areas (IA): that include the irrigated surface areas

The rate of increase Rila(%)= (IAi-IA2000) /IA2000: will be applied each time the data for the various years are available

1.3 Water & Uses

This category has the objective of «increasing the Water demand satisfaction index (WDSI) by 10 % from 2000 to 2015, the level at which the total demand for water in the country is met.

The water demand satisfaction index (RIWDSI) is (in%) the incremental value of the WDSI of its value in 2000.

This incremental value reflects the country's efforts exerted to mobilize the conventional and non conventional water ressources in order to meet the demand in all sectors.

This category includes four indicators, namely:-

The total need of water for all sectors (A): defined as being the minimum requirements of water demand satisfaction per capita based on the water scarcity limit of 1000m3/cap/year.

The total volume of water supply for all sectors (B): although its parameters will be calculated,

WDSI=B/A : it is the ratio between the total volume of water supply for all sectors (B)/ the total water demand of all sectors (A)

Rate of increase: RIWDSI(%)= (WDSLI-WDSI2000)/WDSI2000):

Theme 2: The management and protection of water resources

2.1. The management transboundary water ressources and the basin

This category has the objective of «preparing a national plan for water management by 2015»,

The panafrican monitoring and the evaluation instructions define the efficiency national plan as being «a national strategy that identifies the priority steps to be taken in order to reform the water management system and meet the IWRM principles.

2.2. Rainwater

This dubious category has the objective of «increasing the share of rainwater use in the municipal water consumption up to 10% in 2015, that apparently supports the collection of rainwater to be directed to the municipal sector.

This rainwater collection is not known to the municipal sector in Mauritania. This category includes the following indicators:

The total municipal water supply (A):

Rainwater (B): The panafrican monitoring and evaluation instructions define this indicateor as being «the total volu;e of rainwater used in the country by businesses and residents».

The use of water coming from other sources (C): This indicator recounts the quantity of water used by the municipal sector from other sources such as the water official suppliers.

The total consumption of municipal water (%) (TWC = B + C):

The percentage of rainwater use PRU (%) = B / Twc:

Theme 3: The production of water and sanitation (OMD)

This theme has the general objective of «reducing by 50% from 1990 to 2015, the proportion of the population without access to a source of water and the proportion without an improved sanitation infrastructure» that is a silightly reformulated version of the Development Millenium Goal for water announced at the General Assembly of the United Nations in September 2000.

As to the access to water and sanitation, there are four indicators, namely:- urban coverage, rural coverage, total coverage, and the reduction rate of the inaccessibility rate that shows the progress achieved in producing the water DMG in a given year compared to 1990.

Theme 4: The global changes and management of risks

4.1. The Adaptation to climate change

The objective of this category is to «develop and produce» at least 1 Adaptation Strategy to climate change in 2015" with an indicator that comes in the three following shapes:

- The existence of a national strategy of adaptation to climate change and the year of adoption.
- The existence of a water action plan for the resilience to climate change.
- The existence of programs to accomplish the action plans

4.2. Water-related risks

The objective of this category is to «establish at least 1 early alarm system for the prevention of disasters nationally by 2015. With only one indicator, that is «The existence of an early alarm system for the prevention of disasters and the year of establishment»

Theme 5: Governance & Management

The objective that governs this theme is to «produce, before 2015, the reforms of the water sector that would translate the good governance principles of (i) partnership obligation (ii) ethics, transparency, equity and justice (iii) the responsibility and accountability (iv) the inclusion, participation, predictibility and responsiveness, and (v) cohesion. The theme includes five categories that supposedly will be monitored and evaluated by a general indicator.

The five categories are as follows:

1. The institutional arrangements

2. Ethics, transparency, accountability

3. Roles of public and private sectors

4. Right to water

5. The regulatory approaches

Theme 6: Finance

6.1. The financing local body

This category has two objectives, the first one is to «immediately allocate at least 0,5% of the GDP to sanitation and hygiene» and the second one is to «immediately allocate 5% of the national budget to water and sanitation».

6.2. The pricing strategy and the finance strategy

The main objective of this category is to «define in 2015» the water pricing system addressing the water prices taking into account the poorest populations»

Theme 7: Education, knowledge and capacity building

This category has the objective of «enhancing in 2016, the national monitoring of water and sanitation, the evaluation and the reporting (M & E & R), in order to comply with the panafrican Observatory and evaluation. The only indicator for this category is «the existence of a national monitoring system for water and sanitation, and the year of establishment».

Table 2. Mauritania Background Information Sheet

Country Background Information Sheet

Country Name: **Mauritania**

<table>
<tr><th>Title</th><th>Information</th></tr>
<tr><td>1. Population trends for the past 4 years, and GDP</td><td>
<table>
<tr><th>Year</th><th>2000</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th></tr>
<tr><td>Pop. urbaine</td><td>Pop. urbaine</td><td>954 385</td><td>997018</td><td>1044399</td><td>1093690</td></tr>
<tr><td>Pop. Rurale</td><td>Pop. Rurale</td><td>1 553 774</td><td>2065748</td><td>2094857</td><td>2123693</td></tr>
<tr><td>Total pop.</td><td>Total pop.</td><td>2 508 159</td><td>3062766</td><td>3139255</td><td>3217383</td></tr>
<tr><td>GDP (109 USD)</td><td>GDP (109 USD)</td><td>1,29</td><td>4,01</td><td>4,00</td><td>4,95</td></tr>
</table>
</td></tr>
<tr><td>2. The foundations of the current Water Policy / The potential targets and reforms</td><td>Important issues addressed in the existing reform of the water Sector?
a) The strengthening of the entities' capacities
b) Elaboration of precise specifications charges including performance to be achieved (private connections, extensions) to private operators. New forms of contracts will be tested in several centers and lessons in rural and semi-urban areas will be released</td></tr>
<tr><td></td><td>c) The establishment of a transparent and collaborative programming of investments(publication of the annual program of physical implementation)
d) Identification of performance indicators for monitoring operators
e) The implementation of training actions to enhance professionalism in the sector
f) The introduction of means for central departments of the Ministry of Water and Sanitation and municipalities to fulfill their role of project management
g) Implementation of adequate infrastructure at central and decentralized levels to accommodate departmental services
h) Strengthening the decentralized services through a qualified personnel</td></tr>
<tr><td></td><td>i) The improvement of overstaffing and unqualification situation existing in the different structures of the Ministry of Water and Sanitation
j) The development of the role of regional support and advice services to municipalities to enhance project execution
k) Support for decentralized services that are intended to enable the municipalities to implement sustainable management of drinking water supply</td></tr>
<tr><td></td><td>l) Strengthening the national capacity for producing wells
m) Strengthening the capacity of water treatment (including desalination)
n) The capacity to control surface water (Senegal River, reservoir, permanent ponds and lakes, oasis) for better water supply for populations wherever possible
o) Strengthening of capacities for the development and construction of autonomous sanitation facilities</td></tr>
<tr><td>3. Knowledge of international and African targets in the area of water and sanitation</td><td>Which are better known and applied in the country? Specify how they are applied.
1. In 2000, the Islamic Republic of Mauritania has adopted the «Millennium Declaration» and pledged to reduce at its half, "by 2015", the proportion of people without sustainable access to safe drinking water including sanitation.
2. In 2001, a Strategic Framework for the Fight against Poverty (CSLP) is developed and used as a reference for the strategic directions of the sectors including the water sector with the adoption of a multi-sectoral universal access policy to the basic services for the implementation of new mechanisms to ensure greater efficiency of State contribution to the investment. This strategic framework has been updated for the 2006-2010 and 2011-2015 periods.</td></tr>
</table>

	3. Since 2005, a consultation with the various actors involved in the water sector has been initiated to ensure better visibility of the sector and strengthen coordination. A sectorial review of the rural sector was organized in June 2005 followed by a round table of donors in 2006 to mobilize financial resources for the achievement of the Millennium Development Goals (MDGs). In 2007, a review of public sector spending was organized and a National Water Council, established under the Water Code, held its first session in 2009.
	4. The evolution of the sector and the commitments of the Government has made it necessary to revise the «Strategy for Development of the Water Sector and Sanitation» adopted in 2009. This strategy guides the action of the government in Water Sector and Sanitation according to its strategic axis and to the action plan to be implemented. It focuses on improving sector governance, the development of the Integrated Management of Water Resources and access to drinking water and sanitation.
4. Trends of the last 3 updates in policies and national water reform	

Years	Years 11	Year 12
Reasons for the update	**Updating of the Strategic Framework of the_ Action against Poverty (PRSP) from 2006 to 2010 to better adapt it to the new context of the sector.**	**Development Strategy of Water and Sanitation Sector of May 21, 2012.**
Effectiveness of targeted impacts	**New mechanisms to provide better efficiency of the contribution of the State to investment.**	**Improving the access rate to water for people,** **Improvement of knowledge of water resources,** **Increasing funding of the water sector.**

5. Comments on the water sector at the national level in terms of strengths, weaknesses opportunities, threats, and major difficulties	5. **The strengths** 5.1 The strengths of the sector are as follows: 5.2 A regulatory and institutional framework with the roles and missions of the various public and private stakeholders and the creation of a framework for cooperation at central and regional levels; 5.3 Better support for sanitation and surface waters in the sector action; 5.4 A system of delegated management of networks in rural and semi-urban areas nationwide, including the recovery of recurrent costs.
	6. ***The constraints*** Several constraints remain to be overcome despite efforts undertaken: 6.1 Lack of implementation of the regulatory framework and poor coordination among different players in the sector. Many stakeholders are outside the control of the administration. Major water programs are designed and made by external structures of the Ministry of Water and Sanitation without consulting it: a) The Ministry of Rural Development conducts dams and implements projects that perform hydraulic works b) The Commissioner for Human Rights, Humanitarian Action and Relations with Civil Society, which funds and runs some water infrastructure projects; c) The Office of Food Security, which operates through the implementation of water points and bunds; d) The Ministry of Economic Affairs and Development, which supervises the APAUS and PDU running hydraulic and sanitation programs; e) The Ministry of Housing, Urban and Spatial Planning which intervenes through various projects; f) The Ministry of Interior and Decentralization through the implementation of the program ANAIR in hydraulics; g) The interventions of national and international NGOs in the sector.

	6.2 The weak capacity of services is a major constraint to development of the sector of water and sanitation. This constraint is manifested by a lack of qualified staff, lack of training for all key stakeholders (public sector, private sector, NGOs ..). 6.3 Weak national capacity of the private sector in terms of education, work and maintenance; 6.4 The financial equilibrium of the sector is as follows: a) It is tight in urban areas due to the low efficiency and high losses in networks and the high cost of energy; b) In rural and semi urban areas, urban development master plans do not exist, are poorly sized networks, pricing is not homogeneous, the recovery rate is low and the costs of operation and maintenance are not well performed. 6.5 Several major cities face, repeatedly, severe flooding due to the lack of Rainwater treatment infrastructure.

Table 3. Mauritania Water and Sanitation Performances Evaluation Sheet

Country Water and Sanitation Performances Evaluation Sheet

Country Name: **Tunisia**

<table>
<tr><th>Performance Category</th><th>Country Information</th></tr>
<tr><td>Theme 1: Infrastructure of water for economic development.

PC. 1.1. Water and Energy

Target:

Increase the use of hydro-energy by 10% between 2000 and 2015.</td><td>-<u>Specific actions taken to achieve the target</u>: STEG proceeded to achieve the following: (i) renovation and modernization of old hydro power plants by using modern equipment like static excitation, microprocessor based controls, electronic governors, high speed static relays, data logger, vibration monitoring etc; but it is not enough to achieve the target

<table>
<tr><th>Years (i)</th><th>2000</th><th>2008</th><th>2009</th><th>2010</th><th>2012</th><th>2013</th><th>2014</th></tr>
<tr><td>- Hydroelectric potential economically feasible GWh(P)</td><td>217.25</td><td>217.25</td><td>217.25</td><td>217.25</td><td>217.25</td><td>217.3</td><td>217.25</td></tr>
<tr><td>-Hydro-electric capacity installed MWh(C)</td><td>30</td><td>30</td><td>30</td><td>30</td><td>30</td><td>70</td><td>70</td></tr>
<tr><td>-Index of the usage of the hydropower (HpuI = C/P)</td><td>0.138</td><td>0.138</td><td>0.138</td><td>0.138</td><td>0.138</td><td>0.322</td><td>0.322</td></tr>
<tr><td>Growth rate R_iHpuI(%) = $(Hpul_i - Hpul_{2000})/Hpul_{2000}$</td><td>-</td><td>0</td><td>0</td><td>0</td><td>0</td><td>133</td><td>133</td></tr>
</table>
-<u>Sources of verification and specific comments:</u>

Ministry of Petroleum, Energy, and Mining</td></tr>
<tr><td>PC. 1.2. Water and Agriculture

<u>Targets:</u>

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

<u>and</u>

-Increase the size of irrigated areas by 50% from 2000 to 2015</td><td>-<u>Specific actions taken to achieve the target:</u>
Level of achievement for agricultural productivity:
<table>
<tr><th>Years (i)</th><th>2000</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th></tr>
<tr><td>-Agricultural GDP (10^9 USD) (A)</td><td>0.09</td><td>0.13</td><td>0.14</td><td>0.16</td><td>0.10</td><td>0.11</td></tr>
<tr><td>-Total water withdrawn for irrigated and rain fed agriculture (10^9 m^3)(B)</td><td>1.480</td><td>1.495</td><td>1.492</td><td>1.496</td><td>1.499</td><td>1.500</td></tr>
<tr><td>-Water Return to Environment 10^9 m^3 (C)</td><td>1.370</td><td>1.364</td><td>1.363</td><td>1.355</td><td>1.343</td><td>1.467</td></tr>
<tr><td>Water productivity (USD/m^3) Wp=A/(B-C)</td><td>0.82</td><td>0.99</td><td>1.08</td><td>1.1</td><td>0.60</td><td>0.75</td></tr>
<tr><td>Rate of increase R_iWp(%) = $(Wp_i-Wp_{2000})/Wp_{2000}$</td><td>-</td><td>20</td><td>31</td><td>34</td><td>-26</td><td></td></tr>
</table>
- Achievement on irrigated areas:
<table>
<tr><th>Years (i)</th><th>2000</th><th>2008</th><th>2009</th><th>2010</th><th>2011</th><th>2012</th></tr>
<tr><td>-Irrigated areas(IA) in hectares</td><td>21368</td><td>23188</td><td>13428</td><td>26393</td><td>32052</td><td>31 000</td></tr>
<tr><td>Rate of increase R_iIA(%) = $(IA_i-IA_{2000})/IA_{2000}$</td><td>-</td><td>0,085</td><td>-0,371</td><td>0,235</td><td>0,5</td><td>0,451</td></tr>
</table>
-<u>Sources of verification and specific comments:</u>
Department of Planning, Cooperation, and Supervision – Ministry of Rural Development</td></tr>
</table>

PC. 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:
National Plan for the Public Management of Water Resources
Achievement:

Years (i)	**2000**	**2008**	**2009**	**2010**	**2011**	**2012**
- *Total all sectors Water Demand 10^9m^3 (A)	2.508	**3.162**	**3.251**	3.341	3.432	3.450
- **Total all sectors water supply (B)	1.442	**1.462**	**1.496**	1.537	1.570	1.700
- WDSI = B/A	**0.575**	**0.462**	**0.460**	**0.460**	**0.457**	**0.464**
Rate of increase R_i*WDSI* (%) = $(WDSI_i - WDSI_{2000})/ WDSI_{2000})$	**0**	**0.19598**	**0.00444**	**0.00023**	**0.00578**	**0.013848**

-*Sources of verification and specific comments:*

This data was obtained from the National Water Company and the National Office of Water Services in Rural Areas

PC. 2.1:

Transboundary basins and water resources management

Target:

Develop a national Water Efficiency Plan by 2015.

Specific actions taken so far for the milestone:

- Mauritanian Water Law (Law No. 2005-30 issued on February 2, 2005, containing the water law) calls for adopting and implementing a national master plan for the organization and integrated management of water in a public water resources management framework. In the wake of the evaluation of sector status, it was implemented with support of the United Nations Development Programme and the steps were taken in this direction in order to better management of water resources. The implementation of a large project on behalf of the organization and public management of water resources in Mauritania resulted in a comprehensive process of drafting with the support and the help of some partners.

The water resources management action plan is fully consistent with the reform process which began in the water sector in Mauritania more than a decade ago, where Law No. 2005-30 issued on February 2, 2005 remains. It contains the Water Act; a significant achievement within the framework of the reform process. Mauritania has, under this law, chosen the overall management of water resources as an approach to sustainable management of water resources.

In this context, the government has developed a national plan of public management of water resources through the involvement of all actors in the sector (residents, local communities, consumers and professionals).

The national action plan for public administration for water is a tool for priority works pertaining to the water sector, which makes its implementation a must, for the sake of sustainable development and coordinated water management.

Existence of an effective water plan or general authority for water resources plan and the year of approval:
The government has set a national plan for public management of water resources through the involvement of all actors in the sector (residents, local communities, consumers and professionals).

Elements of funding structure:
The UNDP supported the design of the programme and its formulation. The African Bank for Development and the European Commission delegation in Mauritania have expressed their interest in funding the primary stage of the project, while the Spanish Agency for International Development Cooperation and the French Development Agency, as well as other partners, have agreed to support the programme.

Management tools:
-Sources of verification and specific comments:

PC. 2.2. Rainwater

Target:

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

Specific actions taken so far for the milestone:

- Rainwater is not controlled in Mauritania. Sources (B) and (C) are negligible

Achievement:

Years (i)	**2008**	**2009**	**2010**	**2011**
- Total municipal water supply**(A)**	42 588 000	42 984 000	57 492 000	57 840 000
- Rainwater use (Mm^3) **(B)**	-	-	-	-
- Water use from other sources (Mm^3) **(C)**	-	-	-	-
Total municipal water consumption (%) (**Twc = A+B+C**)	-	-	-	-
Percentage of rainwater use*pRu* (%)=*B/ Twc .*	-	-	-	-

-Sources of verification and specific comments:

PC. 3.1. Urban Water Supply

PC. 3.2. Urban Sanitation

PC. 3.3. Rural Water Supply

PC. 3.3. Rural Sanitation and Hygiene

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).*

Specific actions taken so far for the milestone:

The completion of the Aftout coastal projects to supply drinking water to the city of Nouakchott, the eastern Aftout project in the Fom Jlatin area (Hope Triangle), Dar Na'amah project and the PNSIR project in Brakna - Gorgol region are crucial steps towards achieving the Millennium Development Goals as well as orientations and objectives for the fight against poverty.

Achievement in water supply:

Years (i)	**1990**	**2008**	**2009**	**2010**	**2011**	**2012**
-Urban access (%)	**25**	**30**	**32**	**35**	**56**	**65**
-Rural access (%)	**35**	**51**	**53**	**56**	**59**	**60**
-Total access (%) (W)	**0.00**	**0.19**	**0.21**	**0.21**	**0.37**	**0.44**
Rate of Inaccessibility reduction for water **IRwat (%) =** $(W_i\text{-}W_{1990})/(100\text{-}W_{1990})$	-	-	-	-	-	-

Achievement in improved sanitation:

Years (i)	**1990**	**2008**	**2009**	**2010**	**2011**	**2012**
-Urban access (%)	**35**	**48**	**55**	**60**	**58**	**60**
-Rural access (%)	**25**	**33**	**36**	**40**	**42**	**40**
-Total access (%) (S)	**30**	**38**	**40**	**43**	**45**	**46**
Rate of Inaccessibility reduction for sanitation **IRsan (%) =** $(S_i\text{-}S_{1990})/(100\text{-}S_{1990})$	**0**	**11.4**	**14.3**	**18.6**	**21.4**	**22.9**

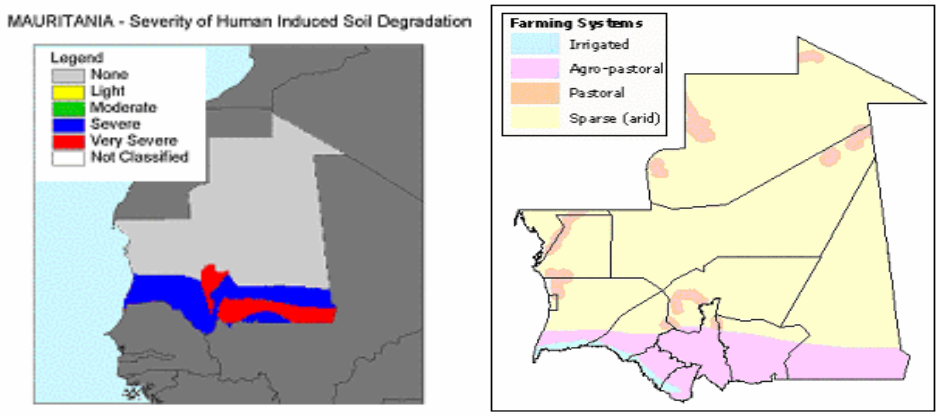
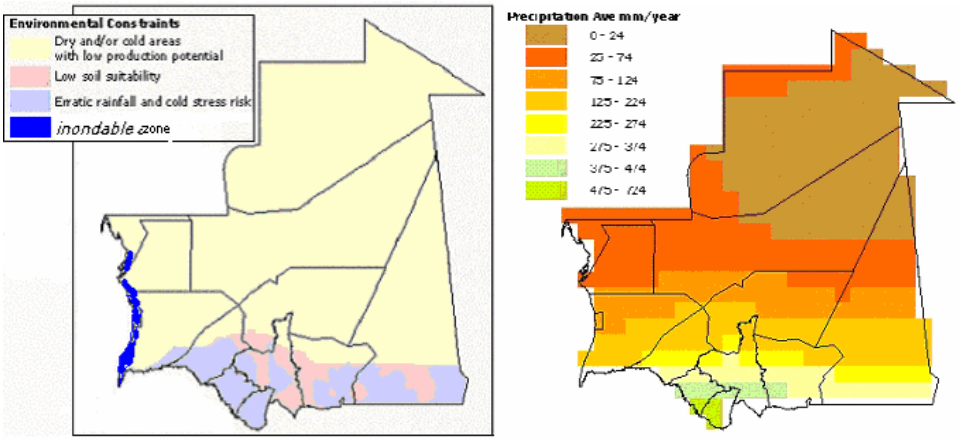
Sources of verification and specific comments: Water and Sanitation Sector Development document – 2012

PC. 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):** - *Mauritania has signed many international agreements and conventions on environmental protection. The most important agreements are: the United Nations Convention to Combat Desertification, the United Nations Convention on Biological Diversity, the United Nations Convention on Climate Change and the Kyoto Protocol, and the Ramsar Convention on Wetlands of International Importance areas.* **The strategy and action plan, which was dependent on five main points, is based on:** - Support institutional and political means for efficient environment and natural resources management; - Encourage and improve the permanent benefit from natural resources (match the third strategic framework of fighting against poverty); - Enhance the overall management and effective use of natural resources; - The local and comprehensive environment management in accordance with the commitments taken within the framework of multilateral environmental conventions. - Establish and enhance strategic financing mechanisms for sustainable development. - Implement these strategic axes through 17 operational axes in the form of specific targets. Effective and orderly implementation of the Environmental National Plan of Action has become imperative if we are to respond, objectively and easily to be evaluated, to the immediate environmental requirements and the challenges. These requirements and challenges are soon to become increasingly important and affects strongly the standard of living and the quality of life as well as the balance of vital macroeconomic. Two evaluations were conducted by the department responsible for the outcome of the environmental national action plan. They announced that the implementation reached 32% of the total operational axes for five strategic axes, but some defects were labeled in the methodology used for the assessments as well as the seriousness of old and ineffective arrangements, all if they are not reviewed and updated as soon as possible.
	Among the opportunities offered by the political environment analysis the following: 1. Establishment of a ministerial department assigned exclusively to environmental management. 2. Technical and financial partners ensure the formation of a lobby in order to achieve these political goals, especially in priority areas. 3. A framework law provides three important tools for management of environment. 4. Inclusion of environment in the strategic framework for fighting poverty and integration of sustainable development as a political dimension in the task entrusted to the ministry **Environmental challenges:** At a time when nothing indicates that the trend towards degradation of natural resources has stopped or rather taking a reverseing direction, we should extract a number of major challenges: - Rapid spread of the desert where the available data shows that in the period between 1974 and 2004, turned out 150,000 square meters or 15% of the national land area to desert areas. - The deterioration of the fisheries resources and the marine environment. - Destruction of biodiversity (desertification, degradation of natural reserves and wetlands) - Poor coordination between institutions involved in the issue of sustainable development and environment. - Lack of planning and processing of land (the sectorial plan, the structural image, the municipal land planning) and occupancy of random spaces. - Rapid and random urban spread, and complete absence of reliable collective systems for the treatment of garbage and household waste. - The incomplete nature of the legal provisions for sustainable development and the environment. - The weakness of civil society participation in the formulation and implementation of public policies for sustainable development and the environment. - The shortcomings of the areas of media, education and communication in issues concerning environmental development.

	The challenges of good governance: General framework for good governance in the country and the coherence of three rules of sustainable development will be emphasized. **The environmental dimension:** National Sustainable Development Strategy emphasizes that achieving sustainability of capital resources is a big challenge for Mauritania in the field of environment and sustainable development. To reach this goal, Mauritania, through programs with priority to the National Action Plan for the environment and other programs, exerted efforts in the environmental field, including: - Comprehensive programs for development of irrigated agriculture in Mauritania. - Draft convention on biodiversity and combating land degradation in arid and semi-arid areas on the border between Mauritania and Senegal. - Management project of natural resources in the rainforest region. - Natural resource management project in the western basin Kede Magha state. - Household energy project.
	Mauritania also has institutionalized environmental impact studies and established specialized structure for this purpose (Environmental Control Department) within the Ministry delegated to the Prime Minister and in charge of environment and sustainable development. On the other hand, Environment strategic planning, which is the gateway to the integration of environmental concerns in the decision-making process, occupy an axial place in the national action plan for the environment. The problem raised at this level is the ineffectiveness of public policies due to attributes of comprehensive good governance. The existence of the plan of action related to water in order to cope with climate change resulting from all previous developments, that since the Rio Conference, Mauritania has achieved important steps in the field of sustainable development. This is translated in particular through substantial development in the areas of economic growth, reduce poverty levels and good governance of the environment. The last point was particularly clear taking into account the environmental aspect in the overall national policies and strengthening the institutional framework and the regulatory sector, which controls the actual translation of international commitments taken by the country. **Among these developments it should be noted that:** - Adoption of the strategic framework to fight poverty in 2011, and implementation of its business plans. The implementation of the two plans is done and the implementation of the third ongoing. - The ratification of the main international conventions concerning the environment and sustainable development. - The establishment of a ministerial department in charge of environmental affairs, which widened its mandate to include sustainable development. - Initiate and develop public policies to link sustainable development processes; - The adoption of national Strategy for Sustainable Development in 2006, the National Action Plan for the Environment, and National work plan for the management of disasters in 2007.

	Prepared National plan to adapt to climate change in 2004, and is updated since 2011. The establishment of the National Council for Environment and Development and its decentralization systems known as regional councils for Environment and Development. The completion of an important business regards legalization, it has been translated through the adoption of a new matching texts of the conventions ratified by Mauritania and review some of the texts of suitability with the requirements of the reform process and to create favorable conditions for the implementation of the national strategy for sustainable development and the texts of other public policies; Comprehensive analysis of the system of good governance of the environment in all ministerial units that have environment-related activities and to propose appropriate reforms. Capacity building of actors on the environmental assessment as a means of re-integrating the environment. The preparation of 21 preliminary work program in 2010 (Aleg, Kiffa, Kinkosh) as a grantee for sustainable development planning activities at the unit level. Declare in the Framework Law of the Environment in 2000 to set up a fund to intervene in favor of the environment and the mobilization of public resources, technical, financial partners. Respect its international commitments fourth phase of framework of the of the operational program for microfinance adopted by International Bank for the Environment, the United Nations Convention on Climate Change, the Convention on Biological Diversity, and the Montreal and Kyoto protocols. In spite of the great progress, the challenges are still continuing. In fact, we face little set back in poverty and an increase in the number of poor people, and this is due to several reasons, including weak economic growth rate and limited benefits got by the poor from this growth. As shown above, this is due to a number of key factors including: - Deficiencies in the process of good governance in general. - The dual nature and poor distribution of the national economy. - The country's dependence on the outside and vulnerability to external shocks. - The lack of competitiveness in the private sector. - Limited ability to attract foreign aid. - Shortcomings in the areas of infrastructure to support the growth and continued deterioration of the environment and natural resources.
	As described in the Action Plan for the year 2011-2015 strategic framework for the fight against poverty, this last factor is executed through the main points: Taking into account the special climatic hazards and sustainable management of land and natural resources in strategies and programs for development focusing on: 1- Valuing natural product capital. 2- Sustainable management of land and natural resources 3- Land reclamation 4- Integrated water resources, fishery resources, forests and ecosystems management through the special care of natural reserves and wetlands. 5- Biodiversity conservation 6- Integration of river beneficiaries in resources management

	Promote good environmental governance: 1. Media, education and communication support in the environmental field, by updated legal pillar, and a renewed institutional system for the sector and environmental action plan fit the national strategy for sustainable development. 2. Equip a national laboratory to monitor and follow up the environment. 3. Assess the risk of Senegal River water pollution in the framework of the project the northern Ovtoot. 4. Establishment of Wetlands observatories in Mauritania 5. Establishment of protected areas in Reshat. 6. Improve the protection of pastures and combat forest fires, especially through the implementation of a permanent structure concerning these two fundamental issues. 7. Rehabilitation and conservation of classified forests along with promotion of the cultivation of arid areas trees, which will benefit Great Green Wall Project 8. Accomplish Coastal Environment Project.
	Follow-up climate change: 1. Follow-up to the leading works for the protection from coastal erosion and protecting the city of Nouakchott from sea level rise and sand encroachment. 2. The inclusion of Risk and natural disaster management in the sectorial policies, 3. Provide the entities concerned by appropriate means to confront issues such as immigration and climate change, and also provide them with renewable energy programs as well as efficiency and power control. Total operating factors mentioned above occupies a central place in the priority themes for the Rio Summit in 2012, which are green economy in the context of poverty eradication and good governance for sustainable development. **References for verification :** Note: The basic documents attached to the text
PC. 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)*:** **Existence of Early Warning Disaster prevention System and Year of establishment:** Mauritania, like other countries, has included disaster management, in overall sustainable development policy. Map of fragile and at risk areas in Mauritania extends to include the Atlantic coastal axis on the Senegal river that interferes and branch from Nouakchott axis. City Tintane is a good example of this and shows how a city can become a partially moist area. Unfortunately, until now, security measures taken is subsequent to the event and when is need it rather than being procedures and policies for risks and disasters avoidance. This sectorial management to prevent acts of interference and reduce the effectiveness of the risk and disasters management policy. These policies are closely linked to measures prepare an emergency plan that includes security and preventive aspect.
	Adapting with climate change: Desertification, agricultural, animal and low productivity. The most obvious climatic changes phenomena in Mauritania is desertification and its consequences. In fact, the disappearance of plants lead to the sand movement and coarse lands according to the nature of textures. The negative effects of climate change (Climate susceptibility) on water resources is linked to agricultural productivity change, shrinkage in areas of pasture and increased competition over natural resources. With respect to production systems, the most fragile are those that depend on rainfed agriculture and harvest of non-timber forest products, on the other hand, the animal fragility linked to the lack of drinking water, and their impact first appears on the cattle, Valognam then goats, and finally to camels. According to the negative effects of the drought, profound changes to production systems appearing in decline in pastoral systems practiced transhumance widely (Camels and sheep) in favor of bets on animals more associated with urban habitaion (like cattle and goats). This has led to the safe pastoral based on agriculture and livestock also encouraged individual and property settlement and dependence on animal species that are used as a guide.

	High water temperature and changing the marine and coastal ecosystems. Sea temperature rise, due to climatic changes, has tremendous results on the composition of marine ecosystems and coastal organisms. So, the marine organisms, which are originally sea creatures, may replace some coastal organisms, and so, for example. In general, global warming will change the life cycle of some races as well as their own environment will result in their disappearance. Fisheries and fish resources will suffer, which represent today more than 12.5% of the national GDP, from damage caused by climate change through some races and environment disorder. It may be translated in the form of economic growth collabse, a big loss in foreign currency (exports) and unemployment rate increase.
	
	

	2.2 The development of deterioration factors **2.2.1. Natural factors** These factors are mainly climatic factors. The climate risk that occurred from the beginning of the seventies one of the main causes of desertification. This kind of factors is devastating because it happens randomly and Mauritania has no control over it. We recall among these factors: - Sparse rainfall. - Broad change in rainfall rate both spatially and chronologically. - Rainfall intensity is the main source of natural deterioration of the soil and it has an increasing rate due to the shrinkage of green cover. - Rising temperatures due to the evaporation issue that happens increasingly. - Hermtan harmful hot winds especially on the surface water, soil moisture, plant sate, the accumulation of sand and wind dynamic. Pollution due to hydrocarbons is caused by the dumping of used oil, gas leaks and oil from wreckage tankers in (in Nouadhibou). The exploration and extraction of oil operations at sea are potential sources of pollution due to hydrocarbons. The sustainable development of the emerging hydrocarbon sector should not only be carried out with respect toward the actors involved to ensure his plan for environmental management, which result from a study of the environmental impacts of their projects. In Mauritania, the accidental pollution at sea could have effects in the sub-region. Indeed, coastal drift (main currents) is heading to the north-south, and leaks in the north of Mauritania (Cape White) will reflect rapidly on the Arguin Bay, and the leaks in the South will undoubtedly affect the economic services of marine ecosystems in the neighboring countries.
PC. 5.1. Institutional arrangements PC. 5.2. Ethics, transparency, empowerment PC. 5.3. Public and private roles PC. 5.4. Right to water PC. 5.5. Regulatory approaches	**Specific actions taken so far for the milestone:** **Existence of policies and reforms of the water, and when the last update:** **Environmental legislation and regulations Elements:** Water Code (Resolution No. 144-85 issued on the fourth of July 1986 and was amended and repealed by Law No. 30-2005 on the second of February 2005 on Water Code) which defines some basic principles, including, in particular, the investor in irrigated areas with responsibility regard to the rational use of water; Resolution No. 289-87 issued on October 20 / October 1986, which sets new terms of competence , including infrastructure and water management;
Target: Institute/update, by 2015, water sector policy reforms that reflect good governance principles of:	Article No. 124-93 issued in December 21 / December 1993, which defines the terms of management and exploitation concession for equipment supply of potable water Law No. 016-98 Issued in July 9, 1998 the private participatory management of oases; Article No. 2008-0187 / PM Issued in 20 first / October 2008 and defines the authority of the Ministry of Water and Sanitation, and the Organization of the central administration; Article No. 19-2002 issued in March 31 / March 2002, which recognized the usefulness of public facilities of the National Agency of safe drinking water and sanitation, and set its tax and customs, as well as article 2010, which established the National Office for water services in the rural areas; Article No. 20-2002 of 31 March / March 2002, which applied the fee of water withdrawal.

(i) Partnership commitment; (ii) ethics -transparency, equity and fairness; (iii) responsibility and accountability; (iv) inclusiveness, participation, predictability and responsiveness; and (v) coherence.	*It seems that we are moving towards a future where allocations between the various water usages are optimized economically and the available water resources are used with an integrated manner. The principles and frameworks of management must ensure a transformation towards a sustainable and equitable solution for everyone.* *The long-term strategic study of the water sector in Tunisia is based on the prediction of the resources for future mobilization projects and on the evolution of the demand for some socio-economic indicators...*
Target: Establish at least 1 Early warning System for disaster prevention at national level by 2015.	**Existence of Early Warning Disaster prevention System and Year of establishment:** *For the prevention and management of flood risks, the DGRE has put in place in 2008, a system to collect hydrological measurements in real time and announcements of flood in Tunisian wadis (SYCOHTRAC). This system allows the acquisition, collection, processing and dissemination of information in real time, enabling a quick decision during heavy rainfall and floods. It is a network of operational alert for a good understanding of climatic events, providing early warnings for the protection of property and persons against the devastating effects of extreme events. It includes :(i) a network of 130 automatic observation stations for measuring rainfall and water levels in wadis and dams, powered by solar panels. It is equipped with data acquisition system that stores collected information and transmitting the information via (GSM) modules with capture, storage*
	and transmission of data through the network mobile (GSM) (ii) eleven call centers and data retrieval based on the DGRE, DGBGTH, and the CRDA (iii) and a computer system (WINMONI) for managing the stations, alarming and gathering and validating the data in the data base SYCOHTRAC. The SYCOHTRAC is also a tool for decision support that allows the consultation and data visualization in real time. A software program (PHy) (rainfall, Hydrometry) allows the access to the database through the WEB technology via the intranet network (AGRINET) of MA allowing operators and decision-maker to: (i) check the database under tabular and / or graphical forms, (ii) editing the rainfall or hydrological sheets, (iii) and take immediate and adequate decisions.
	In addition, the AMU countries have established a Maghrebian observatory for the drought, which is a part of the drought early warning system (SMAS) project. The objectives are: the prevention of environmental degradation caused by drought, improving the diagnosis capabilities of the drought crisis and the development of adaptation strategies to reduce the impact of drought using an early warning system (EWS) allowing a regular monitoring of environmental change in the Maghreb countries, and strengthening institutional ability for early warning and drought risk management. The expected results are: (i) the production of indicators of structural and economic vulnerabilities in each country, (ii) the development of structural vulnerability maps, (iii) the integration of EWS products in development plans, (iv) and spreading of EWS products on the Web. The current monitoring tools for measuring the drought impacts, in Tunisia are: (i) meteorological indicators (compared to normal, deciles, or standard precipitation index SPI, reflecting periods of deficit and excess rainfall), agronomic indicators, socio-economic indicators, hydrological, ecological, and socio-economic (ii) remote sensing, (iii) and climate forecasts.
	Similarly, the DHMPE of the Ministry of Health is also working very hard at the prevention and management of health risks associated with water and the environment in case of natural disasters. Regarding the monitoring of the state of drought in different meteorological stations in the country, INM develops cards of Standard Precipitation Index (SPI); the mapping of this index shows the areas that are affected by drought.
	-Elements of risk knowledge are: Sectoral studies, documents and guides exist as guide of the sustainable management of water resources, drought guide, and management of extreme climate change. They clarify the risks and provide appropriate responses and mitigation strategies to address a specific risk. Observation networks and monitoring of specific indicators and early warning systems help to know the risks.
	- Elements of the Monitoring, analysis and prediction of risks: Monitoring, analysis and forecasts of the risks are conducted with a monitoring and information system. *-Elements of the Communication or dissemination of alerts and warnings: Alerts and warnings are communicated or distributed according to an agreed communication strategy on risk management. All channels of monitoring and information can be used.*

	-Elements of local capacity to respond to the warnings received: There are emergency plans and supporting infrastructure at multiple levels. *-Sources of verification and specific comments: national committee to fight against natural disasters and rescue organization and the regional committees in each governorate.*
PC. 5.1. Institutional arrangements PC. 5.2. Ethics, transparency, empowerment	**Specific actions taken so far for the milestone:** *- Restructuring of BPHE, revision of the Water Code, establishment of the national Water Council ,workshop to launch and implement the development project of SINEAU (26/03/2013) ,national consultation workshop on the review and analysis of the state of implementation of strategies and / or action plans for wastewater in Tunisia (05/03/2013), water table on the water local management (25/12/2013), local governance legal framework of water in Tunisia (27/05/2014),consultation workshop on governance and financing of water sector (18/02/2014) ...*
PC. 5.3. Public and private roles PC. 5.4. Right to water PC. 5.5. Regulatory approaches	**Existence of policies and reforms of the water, and when the last update: in reference to the following documents:** *-WATER 21 - Study of the water sector in Tunisia long-term 2030 (MARH 1998)* *- PISEAU project 1 (2001-2007) followed by PISEAU 2 (2008-2014)* *- Study of the sustainable management of water resources (2008)* *- Revision and amendment of the Water Code. Bill revising and implementing decrees (2010-2014)* *- Water Rights in the new constitution (Article 44) (2014)*
Target: Institute/update, by 2015, water sector policy reforms that reflect good governance principles of:	**-Existence of Water sector policy that reflects good governance principles, and Year of latest update:** *-The study of the water sector (1998) established the future strategic direction of the sector and laid the basis and the foundations of integrated water resources management (IWRM)* *The study recommends an integrated approach for the management of water resources and taking into consideration at the same time the management of groundwater and surface water, the management of the quantity and quality of water and the balanced participation between state and users. In addition, it recommends that while pursuing the mobilization of new water resources, a strategy of "demand management" should be conducted in order to reduce losses and protect the quality of water resources, improve the socio-economic effects for the use of water and to minimize environmental damage.*
(i) Partnership commitment; (ii) ethics -transparency, equity and fairness; (iii) responsibility and accountability; (iv) inclusiveness, participation, predictability and responsiveness; and (v) coherence.	*Elements institutional preparations:* *- Ministry of Water and Sanitation which is associated with:* *Water management,* *Sanitation management,* *Hydrology and dam management,* *Programming, follow-up and cooperation management,* *Administrative and Financial Affairs management,* *The National Water Company, a national company with public captial tasked with the production, transfer and distribution of water services in major urban centers (24),* *National cell of the Senegal River Basin Development Organization (Mauritania),* *The National Office for Water Services in Rural Areas, which replaced the National Agency for Safe Drinking Water and Sanitation,* *National Center for Water Resources,* *National Drilling Company,* *National Sanitation Office*

	B. Other departments and, national players in the water sector in Mauritania: *Other departments and national players intervene in the water sector. Among the key players, in particular, are the following parties:* *- The Ministry of Economic Affairs and Development, which searches for sources of financing and manages the debt service of state-funded work programs and projects in water and sanitation. In addition, the ministry also carries out important water programs, by way of the Mauritania Agency for Public Services, and the agency responsible for enhancing access to organized services on a global scale;* *- A multi-sectoral regulatory body that ensures the regulation of the sector, as well as enforcing legal texts and ensuring the effective development of the sector, it also creates a legal context that contributes to the emergence of organizers at the private level in water, electricity and remote telecommunications sectors. Moreover, it allows the agency to improve access to organized services on a global scale by organizing the water sector in rural and semi-urban areas;* *Municipalities are big players in the sector, and help achieve water projects based on private funds or through decentralized cooperation.* *They are also responsible for water quality and specialize in the field of environment, with regards to sanitation;* *Food Security Commission:* *The Humanitarian Action and Human Rights Commission, as well as civil society, sometimes call for the availability of potable water to disadvantaged class (Lihada project, for example). The time has come for the Commission of Human Rights, Fighting Poverty and Integration to play its part through the training and employment of unemployed citizens, who hold a certificate qualifying them for the management of the springs in the surrounding areas of Nouakchott.*
	-Existence of a policy for the water sector reflect the principles of good governance and the year of updating: *In 2000 the Islamic Republic of Mauritania adopted the "Millennium" Declaration and committed to "reducing the proportion of the population deprived of the ability to regularly access safe drinking water and sanitation by half, by the year 2015".* *In 2001, an anti-poverty strategic framework was set as a reference for the strategic directions for different sectors, including the water sector, with the adoption of a strategy for access to basic services at the global level and across multiple sectors, in order to implement several mechanisms that will ensure a better and more effective contribution by the state in the area of investment.* *This strategic framework has been updated and includes the period between 2006-2010 and 2011-2015.* *Since 2005, the various players involved in the water sector have been consulted in order to ensure the best appearance for the sector and to strengthen coordination. A review of the sector in rural areas was organized, at the sector level, in June 2005 and was followed by a round table of donor countries in 2006 in order to mobilize financial resources for achieving the Millennium Development Goals. In 2007, a public expenditure review of the sector was held, and the first session of the National Water Council, which was formed in accordance with the Water Code, was held in 2009.*

	This has made the development of the sector and the obligations of the government of the history of "the development of the water sector and cleansing strategy" imperative. The current strategy directs the government's work towards the water and sanitation sector while following its strategic axes, according to the plan of action that will be implemented. It deals with improving the management of the sector and the development of integrated water resources management and access to safe drinking water and sanitation. *It should be noted that there are a number of achievements in the field of good governance, including, in particular: (1) the establishment of the constitutional institutions and operating them normally; (2) the presidential, legislative and local elections for diversity and transparent organization; (3) political parties working normally; (4) solving the lack of human resources following the events of 1989 and organizing the return of the citizens of Mauritania who had been displaced outside the national borders after these events and their re-integration into society; (5) the adoption of the law criminalizing slavery and suppressing such practices with the implementation of the program to eradicate the legacy of slavery; (6) resuming the drafting of laws and increasing the work put into the justice sector; (7) the establishment of the National Commission for Human Rights; (8) increasing the capabilities of the parliament and the creation of a Supreme Court of justice; (9) the launching of an operation to improve governmental functioning and enhance human resources and electronic dissemination to assess the administrative procedures and gates of public services, as well as the the information management program; (10) de-centralized business regulators, financial controllers and accountants at all central and regional entities; (11) reinforcing of human resources and means of censorship; (12) organizing multiple awareness campaigns against poor management and corruption, and the adoption of a national anti-corruption strategy; (13) adoping a de-centralization and development policy in April 2010; (14) the issuance of the guidance law on land reclamation, and the drafting of legal documents regarding land reclamation in addition to the development of structures stipulated by the law, especially the National Observatory Land Reclamation; (15) Strengthening the capabilities of the civil society,* *Elements of partnership and commitment:*
	Elements of partnership and commitment: *(1) the establishment of the constitutional institutions and operating them normally; (2) holding presidential, legislative and local elections for diversity and transparent organization; (3) political parties working normally; (4) solving the lack of human resources following the events of 1989 and organizing the return of the citizens of Mauritania who had been displaced outside the national borders after these events and their re-integration into society;* *Elements of ethics-transparency, equality and justice:* *(5) the adoption of the law criminalizing slavery and suppressing such practices with the implementation of the program to eradicate the legacy of slavery; (6) resuming the drafting of laws and increasing the work put into the justice sector; (7) the establishment of the National Commission for Human Rights; (8) increasing the capabilities of the parliament and the creation of a Supreme Court of justice; (9) the launching of an operation to improve governmental functioning and enhance human resources and electronic dissemination, to assess the administrative procedures and gates of public services, as well as the the information management program;* *Elements on inclusion and participation, estimates and the ability to respond:* *(1) adoping a de-centralization and development policy in April 2010; (2) the issuance of the guidance law on land reclamation, and the drafting of legal documents regarding land reclamation in addition to the development of structures stipulated by the law, especially the National Observatory Land Reclamation;* *Elements of coherence:*

PC. 6.1. Financing Local Authorities

Targets:

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

and

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

Specific actions taken so far for the milestone:

Years (i)	**2008**	**2009**	**2010**	**2011**	**2012**
- GDP (A_1)	**969728106**	**1050441106**	**1013462104**	**1201355104**	**1206702104**
- Sanitation and Hygiene Budget (B_1)	**141306480**	**276032847**	**781032847**	**661032847**	**795203452**
Percentage of GDP for Sanitation and Hygiene gdpSH (%) = B_1/A_1	**0.014571764**	**0.026277806**	**0.077065825**	**0.055023939**	**0.065898909**

Adopting a sanitation program in rural areas:

Achievement for GDP allocation:

Achievement for national budget allocation:

Years (i)	**2008**	**2009**	**2010**	**2011**	**2012**
- Total National Budget (A_2)	**275110020420**	**233856407550**	**250366154199**	**269153400000**	**346281814020**
- Water and Sanitation Budget (B_2)	**5329311802**	**8217948907**	**6487640329**	**3647868690**	**3845489258**
Percentage of national Budget to Water and Sanitation BdgWS (%) = B_2/A_2	**1.937**	**3.514**	**2.4914072**	**1.3553121**	**10.1**

Sources of verification

-Official documents of the Islamic Republic of Mauritania 2008-2011

-The National Office for Water Services

PC. 6.2. Pricing Strategies

PC. 6.3.Pro-poor financing Strategies

Specific actions taken so far for the milestone:

Describe the Water Tariff Structure:

These criteria vary according to the level of social and economic development of the target areas is as follows:

Villages (from 150 to 500): 20 liters/ person/ day.

Rural centers (500 individual citizen to 1000): 20 liters/ person/ day.

Semi-urban centers (from 100 to 5,000): 30 liters/ person/ day.

Urban centers (which outnumber the local population of 5,000): 45 liters/ person/ day

Pricing

Table 12: The current prices for water according to the organizers:

Organizer	National Water Company	National institute for rural water services	Agent	Others
The price UM/m^3	From 99 to 367	From 100 to 260	From 168-300 to 800	From 70 to 500

Minimum vital (liters / person / day): 20 liter
The minimum income (the local currency-UM): 30000 UM
Rate (euro / local currency) 1 euro per 400 UM

Target:

Set by 2015, water tariff system that addresses cross-subsidy and the need of poor.

Tariff Structure:

The National water company

Consumption categories (m^3)	*Rate (local currency)*
20>	99 UM/m^3
20<	367 UM/m^3
Taxes	6 UM/m^3

Tariff for rural areas and urban centers <5000 citizen
- Water Services National Office in the countryside
Solar power stations: 120 UM / L

<table>
<tr><td></td><td>Price is not specified for thermal stations and the price varies according to the cost of exploitation between 100 UM / m^3 and 260 UM / m^3.
Agent 168 UM / m^3-300 UM / m^3 and up to 800 UM / m^3 according to the cost of consumption
Other (municipalities)
From 70 UM / m^3 to 500 UM / m^3 according to the cost of exploitation.
Description of Sanitation services pricing, if any:
The Fee for the sanitation network is only collected by nation water company with price upto 14 UM / m^3.
Sources verification and observations:
- National Company for water and water services to the national office in the countryside and the organization.</td></tr>
<tr><td>PC. 7.1. Education and capacity development
<u>Target:</u>
To be identified.</td><td>Not to be reported.</td></tr>
<tr><td>PC. 7.2. Information

<u>Target:</u>

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:
The existence national system for monitoring, evaluation and reporting of water and sanitation, and year of implementation. Existence of a data base for groundwater and the associated geographic information system which is administered by the National Center for Water Resources since 1998 for water management, and transfer of the National Center for Water Resources in 2001, in addition to the groundwater monitoring system through fluid pressure units that have been established in 18 fields. These fields includes systems for assembling groundwater, including 14 field feeds some of the major cities in Mauritania, 4 units were put also in the field, which includes groundwater collection systems in an oasis Ordar and field Tasiast and National Company for industry and mining field and the field of the Senegal River Basin Development Organization in Mauritania. Database at the national water company management level and the National Office for water services in the rural areas. The existence of a special database of hydrological measurement unit for the main water streams, and run by the department rural land management in addition to measuring stations on Senegal River. Monitoring mechanism for the major water conservatories (Dyadma, Foam, Geleta, Tamurt Naji).The existence of monitoring system and agricultural, water, aerial information system helps in the development of rain-fed agriculture which is managed by sanitation department. Availability of monitoring network via fluid pressure measurement units in the valley of the Senegal River. Availability of monitoring network of surface waters, and agricultural land management department has database for dams in form of Excel sheets in addition to measuring stations along the Senegal River.
The latest updates in the M&E system:
<table><tr><td>Criteria</td><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>2011</td></tr><tr><td>Newly integrated elements</td><td>___</td><td>___</td><td>___</td><td>___</td></tr><tr><td>Motives</td><td>___</td><td>___</td><td>___</td><td>___</td></tr></table></td></tr>
<tr><td>PC. 7.3. Water and Technologies
<u>Target:</u>
To be identified.</td><td>Not to be reported.</td></tr>
<tr><td>PC. 7.4. Professional Networks/ Associations
<u>Target:</u>
To be identified.</td><td>• Not to be reported.</td></tr>
</table>

2.3. Global Objectives

It was noted that 884 million persons still have no access to drinking water in the world, while 2,6 billion persons are deprived from sanitary facilities and 5 million persons die each year of unsafe water-related diseases (cholera, diarrhea, hepatitis, typhoid..); Achieving by 2015 the millenium development goals that shape the human development policy of the United Nations, is particularly about the water issue.

Moreover, the water-related global objectives are:

In terms of access to water and sanitation:

• Guarantee the access to water for all and the Right to Water, enhance the access to integrated sanitation to all:

· Enhance the hygiene and heath thanks to water and sanitation;

· Prevent and respond to the water-related risks and crisis:

· Contribute to the cooperation and peace thanks to water.

In terms of economic development:

· Balance the various water uses through integrated management

· Contribute to food security for an optimal water use

· Harmonize water and energy

· Promote green growth and value ecosystems

In terms of environment protection:

· Improve the quality of water ressources and ecosystems

· Adjust the pressures and footprints of human activities on water

· Combat climate and global changes in an urbanizing world

3. State of the Water Indicators

The Monitoring, Evaluation, and Reporting of the State of the Water require a definition of the relevant indicators that help to understand the complex realities.

The list of regionally adopted indicators account for some hundred indicators divided into 15 categories, the indicators have been associated with particular institutions for assessment and measurement purposes as follows:

1. Water & Availability: This theme is monitored through 28 indicators divided into three sub-themes, namely, blue water, green water, and non-conventional water. The leader establishments to monitor and evaluate this theme are as follows: the National center for water ressources (le Centre National des Ressource en Eau) (CNRE), the Water department (la Direction de l'Hydraulique) (DH), the Agriculture department (la Direction de l'Agriculture) (DA), the Policy, cooperation, monitoring and evaluation department at the Ministry of rural development (la Direction de la politique, de la Coopération, du Suivi et Evaluation au Ministère de Développement Rural) (DPCSE)

2. Water & Usage monitored through 19 indicators, the leader establishments to monitor this theme are as follows: National office for rural water services (Office National des Services des Eaux Rurales) (ONSER), the National water company (La Société Nationale des Eaux) (SNDE), the (DPCSE) and the DA/MDR.

3. Water & Change of land use characterized by 9 indicators that may be monitored by the (DPCSE) and the DA/MDR

4. Water services & Accessibility consisting of 16 indicators mainly monitored by the DA ad the Planning department for monitoring and cooperation at the Ministry of Hydraulics (DPSC

5. Water & Energy consisting of 2 indicators monitored by the Ministry of Petroleum and Energy and Mining (MPEM).

6. Water, demographics and the population with 13 indicators, monitored by the National Statistics Office (Office National des Statistiques) (ONS) with the main leaders in monitoring the first two themes

7. Water & Health: with 7 indicators, this theme is mainly monitored by the Department of Hygiene and Public Health (DHSP)

8. Water & Quality with 7 indicators, this theme is monitored by the Department of Hygiene and Public Health (DHSP)

9. Water & Ecosystem with 14 indicators, the department of the Ministry of Environment, namely the Department of Environmental Control (DCE), the Department of Planning and Environmental Information (DPCIE), the Department of Environmental Protection (DPE)

10. Water & Extreme climate events, with 7 indicators, monitored by the Department of Agriculture (DA) and the National Meteorological Office (ONM)

11. Water & Economics, with 5 indicators, mainly monitored by the DPCS

12. Water & Finance: with 5 indicators, this theme is monitored by the ONS

13. Water & Trade with 2 indicators, this theme is monitored by the ONS

14. Water & Governance with 24 indicators by the DPCS

15. Water & International relations: 4 indicators.

After identifying indicators gathered in 15 categories, the values of 2012 being have been collected and assessed at the national institutions.

The values are recorded in table (4) below:

here below provides a list of the indicators and the structures in charge of monitoring

Table 4. List of the indicators and the structures in charge of monitoring

No	Code	Water Related Indicators	Units	Values	Source	Remarks
*	1	**Water & Availability**				
1	1-1	Annual Spatially Averaged Precipitation Depth	MM/Year	90	National Meteorology	Average value calculated over the period 1995-2005 by the National Meteorology
2	1-2	Annual Precipitation Volume	BCM/Year	94.82	CEDARE/AWC	Volume not estimated at the national level
*	*	**Blue Water**				
3	1-3	Internal Renewable Surface Water (IRSW)	BCM/Year	0.10	MHA, 2012	Estimated volume at the national level
4	1-4	Internal Renewable Groundwater (IRG)	BCM/Year	0.30	Official data	Quite estimated value
5	1-5	Total Internal Renewable Blue Water Resources (TIRBWR)=(IRSW+IRG)	BCM/Year	0.40	FAO AQUASTAT	MEWINA
6	1-6	External Surface Water Inflow (ESWI)	BCM/Year	11.00	PEP 2013 Report	Volume regulated from Manantali dam
7	1-7	External Surface Water Outflow (ESWO)	BCM/Year		FAO AQUASTAT	MEWINA
8	1-8	External Groundwater Inflow (EGI)	BCM/Year			
9	1-9	External Groundwater outflow (EGO)	BCM/Year		FAO AQUASTAT	Present knowledge does not allow for an estimation
10	1-10	Total External Renewable Blue Water Resources Inflow(TERBWR)=(ESWI+EGI)	BCM/Year	11.00	SDAGE OMVS 2009 Report	Volume regulated from Manantali dam
11	1-11	Total Renewable Blue Surface Water (TRBSW)=(IRSW)+(ESWI)-(ESWO)	BCM/Year	11.10	FAO AQUASTAT	Estimated data
12	1-12	Total Renewable Blue Groundwater (TRBG)=(IRG)+(EGI)-(EGO)	BCM/Year	0.30	PEP 2013 Report	Estimated data
13	1-13	Overlap between Surface Water and Groundwater (OSWG)	BCM/Year			CNRE
14	1-14	Total Renewable Blue Water Resources (TRBWR)=(TRBSW)+(TRBG)-(OSW)	BCM/Year	11.40	MHA 2012	Estimated data

15	**1-15**	Total Exploitable Non-Renewable Groundwater (TNRG)	BCM/Year	50-100	AGIRE 2012	CNRE
16	**1-16**	Total Blue Water Resources (TBWR)	BCM/Year	61.40 -111.4	MHA 2012	-Cellule de l'OMVS, La SOGED - Hydrology and Dam Directions, DAR, CNRE
*	*	**Green Water**				
17	**1-17**	Water for Rain-fed Agricultural Consumption	BCM/Year	0.04	Estimated data	Direction Agriculture/ MDR
18	**1-18**	Water for Rain-fed Pasture Consumption	BCM/Year	3.94	Estimated data	Direction Agriculture (DA)/MDR
19	**1-19**	Water for Rain-fed Forest Consumption	BCM/Year	0.02	Estimated data	Direction Agriculture/ MDR
20	**1-20**	Total Renewable Green Water Resources (TRGWR)	BCM/Year	4.00	Estimated data	Direction Agriculture (DA)/MDR
21	**1-21**	Total Renewable Water Resources (TRWR)=(TRBWR+TRGWR)	BCM/Year	15.40	Estimated data	- Directorate of Hydrology and dams - DAR, CNRE, DA
22	**1-22**	Total Conventional Water Resources (TCWR)= TRWR+TNRG = TBWR+TRGWR	BCM/Year	61.40 -111.4	Estimated data	MHA
*	*	**Non-Conventional Water**				
23	**1-23**	Produced Municipal Wastewater (PMW)	BCM/Year	0.08	PEP 2013 Report	Direction Assainissement(DA)/ MHA ONAS
24	**1-24**	Treated Municipal Wastewater	BCM/Year			
25	**1-25**	Reused Treated Municipal Wastewater	BCM/Year			
26	**1-26**	Produced Industrial Wastewater (PIW)	BCM/Year	0.30	ONAS Estimation	
27	**1-27**	Treated Municipal Wastewater	BCM/Year			
28	**1-28**	Reused Treated Municipal Wastewater	BCM/Year			
29	**1-29**	Produced Agricultural Drainage (PAD)	BCM/Year			
30	**1-30**	Reused Agricultural Drainage	BCM/Year			
31	**1-31**	Produced Desalinated Water (PDW)	BCM/Year	0.025	Estimation Regulatory Authority	DH DPCS CNRE
32	**1-32**	Total Non-Conventional Water Resources (TNCWR)= (PMW)+(PIW)+(PAD)+(PDW)	BCM/Year	0.475	Calculated from estimated data	DH DPCS CNRE
33	**1-33**	Total Available Water Resources (TAWR) = TCWR+TNCWR	BCM/Year	111.475	Calculated from estimated data	DH, DPCS, CNRE
*	**2**	**Water & Uses**				
34	**2-1**	Withdrawals for Domestic Water Use	BCM/Year	0.15	PEP 2013 Report	-SNDE, ONSER, delegate

35	**2-2**	Withdrawals for Industrial Water Use	BCM/Year	0.50	PEP 2013 Report	-CNRE, DH
36	**2-3**	Withdrawals for Agricultural Water Use	BCM/Year	1.50	PEP 2013 Report	DA/MDR
37	**2-4**	Annual Total Water Withdrawals	BCM/Year	1.6	PEP 2013 Report	-SNDE, ONSER - Delegates (Regulatory Authority), DA, CNRE, DH
38	**2-5**	Green Water Consumption for Agriculture Water Use	BCM/Year	4		DA/MDR
39	**2-6**	Total Agricultural Water Uses	BCM/Year	5.54	Calculated	DA/MDR
40	**2-7**	Withdrawals from Blue Surface Water	BCM/Year	1.5	Mewina/ Mauritania	-Cellule de l'OMVS - SOGED. DHB, DA/MDR
41	**2-8**	Withdrawals from Blue Renewable Groundwater	BCM/Year	0.1	Mewina/ Mauritania	-SNDE, ONSER -DA R, DA ;-CNRE, DH
42	**2-9**	Withdrawals from Blue Non-Renewable Groundwater	BCM/Year			DA, CNRE, DH
43	**2-10**	Total Withdrawals from Blue Water	BCM/Year	1.6		SNDE, ONSER, Delegates (Regulatory Authority), DA -CNRE, DH
44	**2-11**	Agricultural Drainage Water Reuse	BCM/Year	0.45		DA, NRE, DH
45	**2-12**	Withdrawals from Desalinated Water	BCM/Year			
46	**2-13**	Total Withdrawals from Non-Conventional Water Resources	BCM/Year			DH CNRE
47	**2-14**	Annual Volume of Total Actual Evapotranspiration	BCM/Year			
48	**2-15**	Green water Consumption for Livestock Fodder Water Use	BCM/Year			
49	**2-16**	Inland Fisheries & Aquaculture Demands	BCM/Year			
50	**2-17**	Navigation Demands	BCM/Year			
51	**2-18**	Evaporation Losses	BCM/Year			
52	**2-19**	Bottled Water Production	BCM/Year			CNRE
53	**2-20**	Water Demand for Environmental Uses	BCM/Year			
54	**2-21**	Withdrawals for Oil & Gas Water Use	BCM/Year			
*****	**3**	**Water & Land Use Changes**				
55	**3-1**	Total Irrigated Agricultural Land	ha	137000.00	PEP 2013 Report	DPCSE / MDR
56	**3-2**	Total Rain-fed Agricultural Land	ha	245 000.00	PEP 2013 Report	DPCSE / MDR
57	**3-3**	Total Pasture Land	ha	14 429 800	PEP 2013 Report	DPCSE /MDR
58	**3-4**	Total Forests Land	ha	242 000.00	PEP 2013 Report	DPCSE / MDR
59	**3-5**	Urban Encroachment on Green Cover	ha lost/Year			DA

*	*	**Impact of Urban Encroachment on water Resources (Indicators listed below)**				
60	**3-6**	Decrease in Groundwater Recharge	BCM/Year			CNRE
61	**3-7**	Decrease in Water Consumptions of Green Cover	BCM/Year			DA
62	**3-8**	Increase in Surface Runoff	BCM/Year			DA CNRE
63	**3-9**	Increase in Domestic Water Withdrawals	BCM/Year			SNDE ONSER CNRE
*	4	**Water & Services**				
*	*	**Water Coverage and Accessibility**				
64	**4-1**	Improved Urban Water Supply Coverage	%	65.00	PEP 2013 Report	DH DPSC/ MHA
65	**4-2**	Improved Rural Water Supply Coverage	%	60.00	PEP 2013 Report	DH DPSC/ MHA
66	**4-3**	Improved Urban Sanitation Coverage	%	60.00	Ministry of sector	DA DPSC/ MHA
67	**4-4**	Improved Rural Sanitation Coverage	%	40.00	Ministry of sector	DA DPSC/ MHA
68	**4-5**	Improved Water Supply Coverage	%	62.00	MHA 2012 PEP Report	DH DPSC/ MHA
69	**4-6**	Improved Sanitation Coverage	%	46.00	PEP 2013 Report	DH DPSC/ MHA
*	*	**Water Infrastructure**				
70	**4-7**	Length of Water Supply Networks	km	3700	MHA	ONSR SNDE
71	**4-8**	Length of Sewage Networks	km	133	National Sanitation (ONAS)	DA ONAS
72	**4-9**	Length of Irrigation Networks	km	15000		DPCSE
73	**4-10**	Length of Drainage Networks	km	3000		DPCSE/ MDR
74	**4-11**	Dam Storage Capacity	BCM	65.7	Directorate of Hydrology and Dams and SNDE	DPCSE/ MDR DAR
75	**4-12**	Water Supply Capacity	BCM/Year			
76	**4-13**	Desalination Capacity	BCM/Year	50000	Survey of the Regulatory Authority	DH
77	**4-14**	Municipal Wastewater Treatment Capacity	BCM/Year			DH DPCS, ONAS
78	**4-15**	Industrial Wastewater Treatment Capacity	BCM/Year	0.065.7	Directorate of Hydrology and Dams and SNDE	DH, CNRE
79	**4-16**	Wastewater Collection Capacity	BCM/Year			ONAS

80	**4-17**	Maximum Annual Dam Storage Reached	BCM			
*	**5**	**Water & Energy**				
81	**5-1**	Electricity Generated Using Hydropower	GWh/Year	30.00	MPEM	Oil Ministry of Energy and Mines
82	**5-2**	Hydropower as % of Total Generated Electricity	%			Oil Ministry of Energy and Mines
83	**5-3**	Installed Hydropower Capacity	MW	120	MPEM	Oil Ministry of Energy and Mines
84	**5-4**	Water Used to Generate Electricity	BCM/Year	11.10		OMVS
*	**6**	**Water & Population**				
85	**6-1**	Total Population	1000 inhabitants	3378.254		ONS
86	**6-2**	Internal Renewable Water Resources Per Capita	CM/capita/Year	148,005449		CNRE,DHA ,DPCS ;-Cellule de l'OMVS; La SOGED, Directorate of Hydrology and dams - DAR, DA/MDR
87	**6-3**	Total Renewable Blue Water Resources Per Capita	CM/capita/Year	3374,524236		CNRE,ONS ;DHA; DPCS - Directorate of Hydrology and dams, DAR, DA/MDR
88	**6-4**	Total Renewable Water Resources Per Capita	CM/capita/Year	4558,567828		CNRE,ONS, DHA, DPCS
89	**6-5**	Total Available Water Resources Per Capita	CM/capita/Year	18175,06913		CNRE, ONS, DHA, DPCS
90	**6-6**	Blue Water Withdrawal Per Capita	CM/capita/Year	444,0163469		DHA, DPCS
91	**6-7**	Green Water Use Per Capita	CM/capita/Year	1184,043592		DHA, DPCS
92	**6-8**	Total Water Consumption Per Capita	CM/capita/Year	1657,661028		DHA, DPCS
93	**6-9**	Agricultural Water Withdrawal Per Capita	CM/capita/Year	452,8966738		- DAR - -DA/ MDR DPCSE
94	**6-10**	Industrial Water Withdrawal Per Capita	CM/capita/Year	148,005449		CNRE, DH, ONS
95	**6-11**	Domestic Water Withdrawal Per Capita	CM/capita/Year	44,40163469		CNRE, DH, ONS Reprise
96	**6-12**	Population Without Improved Water Supply	1000 inhabitants	1182.388		DPCS, DH, ONS,
97	**6-13**	Population Without Improved Sanitation	1000 inhabitants	1959.387		DPCS, DH, ONS
*	**7**	**Water & Health**				
98	**7-1**	Diarrhea Prevalence	%	44.12	MS/SNIS	DHPS
99	**7-2**	Dracunculiasis Reported Cases	%	0	MS/SNIS	DHPS
100	**7-3**	Open Defecation Practice	Number	0	MS/SNIS	DHPS
101	**7-4**	Percentage of Open Defecation	%	44.00	Direction Assainissement	DHPS, DA

102	**7-5**	Cholera Reported Cases	Number/Year			
103	**7-6**	Typhoid Reported Cases	Number/Year			
104	**7-7**	Hepatitis A Reported Cases	Number/Year			
*	**8**	**Water & Quality**				
105	**8-1**	Dissolved Oxygen (DO)	PPM	6.5	Investigation SNDE	CNRE
106	**8-2**	pH	Dimensionless	7.8	Investigation SNDE	CNRE
107	**8-3**	Electric Conductivity (EC)	1/OHM (S/M)	1	Investigation SNDE	CNRE
108	**8-4**	Nitrogen Concentration	PPM	0.5	Investigation SNDE	CNRE
109	**8-5**	Phosphorous Concentration	PPM			CNRE
110	**8-6**	Total Dissolved Solids	PPM			CNRE
111	**8-7**	Fecal Choliform	Colonies/100ML			
112	**8-8**	Biological Oxygen Demand (BOD)	mg/l			
113	**8-9**	Chemical Oxygen Demand (COD)	mg/l			
114	**8-10**	Chloride Concentration	mg/l			
115	**8-11**	Total Hardness ($CaCo_3$)	mg/l			
*	**9**	**Water & Ecosystems**				
116	**9-1**	Number of Wetlands Sites Acknowledged by RAMSAR	Number	3	Pep 2013	Environmental Control Department
117	**9-2**	Total Wetlands Areas	ha	1746000	BAD 2005 - 2012	DPCIE, DCE, DPE
118	**9-3**	Total Freshwater Species Count	Number			DPCIE, DCE,DPE
119	**9-4**	Number of Endangered Species	Number			DPCIE, DCE, DPE
120	**9-5**	Number of Invasive Species	Number			DPCIE, DCE, DPE
*	**10**	**Water & Climate**				
*	*	**Extreme Weather Events**				
121	**10-1**	Number of Class 1 Flood Events	Number	4.00	The Dartmouth College	DPCIE, DCE, DPE
122	**10-2**	Number of Class 1.5 Flood Events	Number	2.00	The Dartmouth College	DPCIE, DCE, DPE
123	**10-3**	Number of Class 2 Flood Events	Number	0.00		DPCIE, DCE, DPE
124	**10-4**	Average Temperature	C°			
125	**10-5**	Drought Events	Number			DPCIE, DCE, DPE
126	**10-6**	Cost of Annual Damage Caused by Floods	$ - % of GDP			National Commission for Disaster
127	**10-7**	Cost of Annual Damage Caused by Droughts	$ - % of GDP			National Commission for Disaster
128	**10-8**	Annual Human Losses Related to Floods	Number			National Commission for Disaster
129	**10-9**	Annual Human Losses Related to Droughts	Number			National Commission catastrophic events

130	**10-10**	Unusual Weather Events (Snow, Hail,……)	Number/Type			Directorate of Environmental Control
131	**10-11**	National Climate Change Adaptation Plan	Yes/No			DPCIE, DCE, DPE
*	**11**	**Water & Socio-Economics**				
*	*	**Water Productivity**				
132	**11-1**	Industrial Water Productivity	$/CM	74.44	CEDARE/AWC	ONS, DPCS, CNRE
133	**11-2**	Agricultural Water Productivity "Crop Per Drop"	$/CM	1.06	CEDARE/AWC	ONS, DPCSE
134	**11-3**	Employment in Agriculture "Job Per Drop"	Jobs/MCM	285.85	CEDARE/AWC	ONS, DPCSE
135	**11-4**	Employment in Industry "Job Per Drop"	Jobs/MCM	112.3	CEDARE/AWC	Mines
136	**11-5**	GDP	$			
*	*	**Tariffs and Affordability**				
137	**11-6**	Water and Sanitation Charges as % of Average Household Income	%	15		ONS
*	**12**	**Water & Finance**				
138	**12-1**	Percentage of National Budget Directed to Water & Sanitation Sector	%	1.10	Ministère de secteur	DPCSE
139	**12-2**	Percent of GDP Directed to Sanitation & Hygiene	%	86 et 100		DPCSE
140	**12-3**	Foreign Aid for Water & Sanitation	Million US$	1.5		ONS
141	**12-4**	Operation & Maintenance Cost Recovery for Irrigation	%	124		DPCS DH
142	**12-5**	Operation & Maintenance Cost Recovery for Water Supply and Sanitation	%	3		SNDE, ONSER
143	**12-6**	Operation & Maintenance Cost Recovery for Industry	%			
144	**12-7**	Aid to Water & Sanitation in Foreign Countries	Million US$			
145	**12-8**	Total Investment	Million US$			
*	**13**	**Water & Trade**				
146	**13-1**	Agricultural Virtual Water Export	BCM/Year	2.64	Calculée	ONS
147	**13-2**	Agricultural Virtual Water Import	BCM/Year	0.03	Mewina/ Mauritanie	ONS
*	**14**	**Water & Governance**				
148	**14-1**	IWRM Plan	Yes/No	Yes		
149	**14-2**	National Water and Sanitation M&E & R System	Yes/No	Yes but not enforced		CNRE DA
150	**14-3**	Surface Water Permits Issued to Date	Number			MHA

151	**14-4**	Total Volumetric Water Rights Associated with Surface Water Permits	BCM/Year			MHA
152	**14-5**	Total Volumetric Water Rights Associated with Surface Water Permits as a Percent of Annual Blue Surface Water Withdrawals	%			MHA
153	**14-6**	Groundwater Well Permits Issued to Date	Number	12		DH
154	**14-7**	Total Volumetric Water Rights Associated with Well Permits	BCM/Year			MHA
155	**14-8**	Total Volumetric Water Rights Associated with Well Permits as a Percent of Annual Blue Groundwater Abstractions	%			MHA
156	**14-9**	Number of Unlicensed Wells				MHA
157	**14-10**	Irrigation & Drainage Related Complaints as a Percentage of Irrigation Water Users	Number/Year			DH
158	**14-11**	Water Supply and Sanitation Related Complaints as a Percentage of Serviced Households	Number/Year			DH
159	**14-12**	Number of Water Supply Meters Installed as a Percent of Total Number of Covered Households	%			SNDE , ONSER
160	**14-13**	Number of Groundwater Meters Installed as a Percent of Licensed Wells	Number			SNDE , ONSER
161	**14-14**	Number of Surface Irrigation Meters Installed as a % of Surface Irrigation Water Permits	%			Direction Agriculture
162	**14-15**	Physical Domestic Water Losses		50	SNDE	SNDE , ONSER
163	**14-16**	Overall Water Use Efficiency	%	72.19		CNRE
164	**14-17**	Water Sustainability/ Depletion Index	%	26.22		CNRE
165	**14-18**	Wastewater and Drainage Outflows	BCM/Year			DA, ONAS
166	**14-19**	Transboundary Wastewater and Drainage Outflows	BCM/Year			DA, ONAS
167	**14-20**	Commercial Water Losses	BCM/Year			ONSER ET SNDE
168	**14-21**	Physical Irrigation Water Losses	BCM/Year			DA
169	**14-22**	Number of Water related citations (Water Laws Enforcement)	Number			DH
170	**14-23**	Number of Water Users Associations	Number			DPSC

171	**14-24**	Water Users Associations Agricultural Land Coverage	% of Ag. Land			DA
*	**15**	**Water & International Relations**				
172	**15-1**	Transboundary Water Dependency Ratio	%	96.00		CNRE, DH, DHB
173	**15-2**	Shared Waters related Bilateral/ Multilateral Agreements and/ or Memorandums of Understanding and Cooperation Mechanisms	Number	2	MEWINA / Mauritania	DPSC
174	**15-3**	Number of Riparians Sharing all Shared Water Bodies	Number			
175	**15-4**	Number of Shared Water Resources	Number	2	MEWINA / Mauritania	CNRE

Aside from the above regionally standardized and harmonized indicators, he indicators that were added specifically for Mauritania are as follows (arranged according to the above categories):

1. Water & Services:

- Number of networks assigned by the service agents to the Regulatory Authority.

2. Water and Land Use Change:

- Surface areas of the degraded lands due to irrigation and/ or abusive use of fertilizers and pesticides (abandoned developments);
- Surface area of the degraded zones due to erosion;
- Surface area of the degraded forests;
- Surface area of reforestation/ year;
- Surface area of conservation forests.

3. Water and Ecosystems

- Species of protected mammals;
- Species of endangered mammals;
- Species of Protected Birds;
- Species of endangered birds;
- Higher plants;
- Endangered higher plants;
- Number protected areas;
- Total surface area of protected areas,

4. Water & Health

- The Reported cases of bilharziasis

4. Analysis of the State of the Wwater in Mauritania

The analysis of the state of the water in Mauritania shows that for a large part of the indicators, the values have been estimated, especially those pertaining to the category of water availability.

As for groundwater, the country is vast and has several aquifer systems that are currently mostly unknown. Only sediment sheets of Trarza at the Senegalese-mauritanian basin and Dhar of Nema were subject to research because they are important sources of water supply to the city of Nouakchott and the cities of the zone of Nema in the Eastern part of the country. As to the latter, several queries are still standing, such as the width of aquifers, the reserves, etc… In the other parts of the country, aquifers are discontinued; research is currently limited to drilling works for water supply. At the national level, only 16 harnessing fields are monitored by the CNRE; this number should be multiplied by three by 2015, however, given the lack of means, the monitoring itself of these 16 fields is not regular.

Concerning mobilization of surface water, it has just started by the establishment of an Administration of hydrology and dams. It is a new administration without much experience. The tools to estimate or measure surface water are not much developed.

Meteorological stations are managed by the National office of Meteorology, and they exist at the level of residential areas, the immense Sahara zone lacks stations. This status complicates the collection of homogeneous and representative meteorological data of the country.

Concerning the category of "Water & Finance", it could be noticed that the funding is granted over a long time period, exceeding one year from signing the agreement, and it is difficult to know the portion of the funding corresponding to the target year. Moreover, project funding includes several activities without any indication of the amount for each activity; which makes it difficult to know the amount of funding intended to the water sector.

As for "Water & Trade", the quantity of virtual water depends on the imports and exports of the food products. It turns out that many products escape customs control, which is the official source of such data.

Speaking of imported products, a significant amount of fruits and vegetables are imported from bordering countries without registration at the customs. The data obtained for imports are estimated. The same for exports; it is also noted that a large number of livestock and continental fish is exported to bordering countries without registration by the customs or any other department.

Concerning the category of "Water and Governance", there are currently no structures in charge of collecting such data.

The state of the water analysis in Maurtania shows that for the majority of the indicators, the obtined values are estimated, especially those of the category related to the availability and the knowledge of the state of water resources.

In fact, as to underground water, the country is immense and has several acquifer systems that are presently hydrogeological knowledge that are mostly unknown. Only the sediment acquifer of Trarza in the Mauritania-Senegal basin and Dhar in Nema were examined given their water supply potential to the city of Nouakchott and the cities of Nema area to the East of the country. As to the latter, several questions remain unanswered, such as the width of the acquifers, the reserves, etc… In the other parts of the country, the acquifers are interrupted, the researches are punctual and limited to the implantation of borefields for the supply to the population. At the national level, there are only 16 watersheds monitored by the CNRE; this number should increse three fold in 2015 but given the mean shortage, even the monitoring of the 16 watersheds is not regularly ensured.

As to the surface water, the mobilisation thereof just started by estblishing the Department of Hydrology and Dams; it is about a new department without much experience. The tools to estimate or measure the surface water are not much developed.

The meteorological stations are managed by the National Meteorology Office; they exist at the residential areas, the immense desert sahara area in the country is lacking to any stations. This status complicates the collection of homogeneous meteorological data representative of the country.

The monitoring information system at the national level are inefficient, there are several fragmented databases in the various structures operating ni the water sector, but they are rarely updated and often in Excel format, except for the CNRE that has a base of underground points that may serve as a starting point to form a high quality database.

Hence the renewable water ressources in Mauritania are estimated at 15.50 Billion m3 out of which a volume of 11,4 Billion m3 is considered as blue water, with 11.10 Billion m3 surface water and 0.4 Billion m3 coming from groundwater. The volume of green water is estimated at 4 Billion m3 and 0.47 Billion m3 for non-conventional water: These data are shown in figure1 below:

Figure 1. Distribution of renewable water ressources

The volume of water withdrawals in 2012 are estimated at 1.7 Billion m3. Agriculture is using alone 1.5 Billion m3. The distribution per user is shown in fig2 as follows;

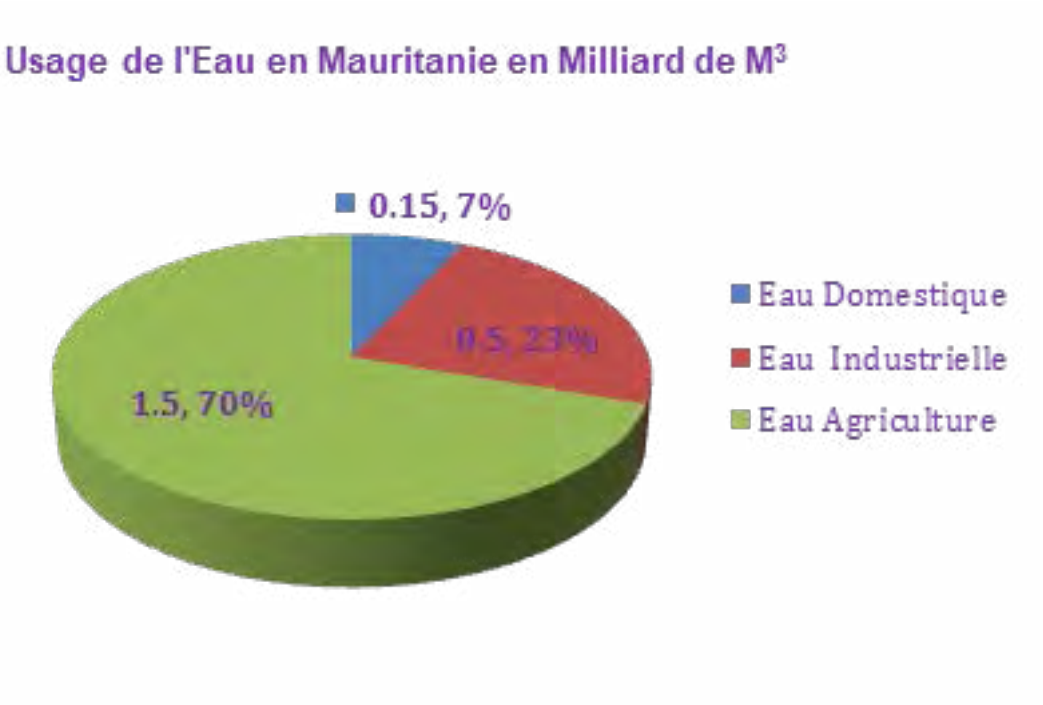


Figure 2. Water usage in Mauritania

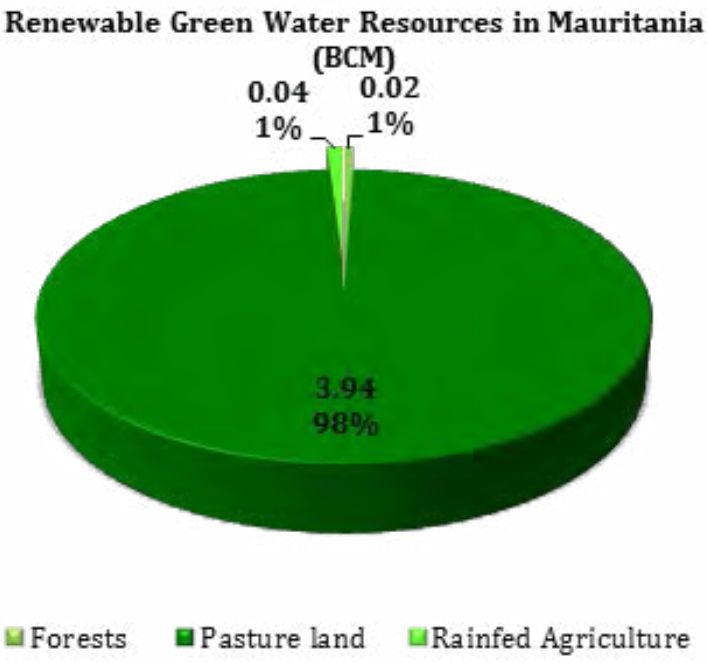


Figure 3. Renewable Water Resources in Mauritania

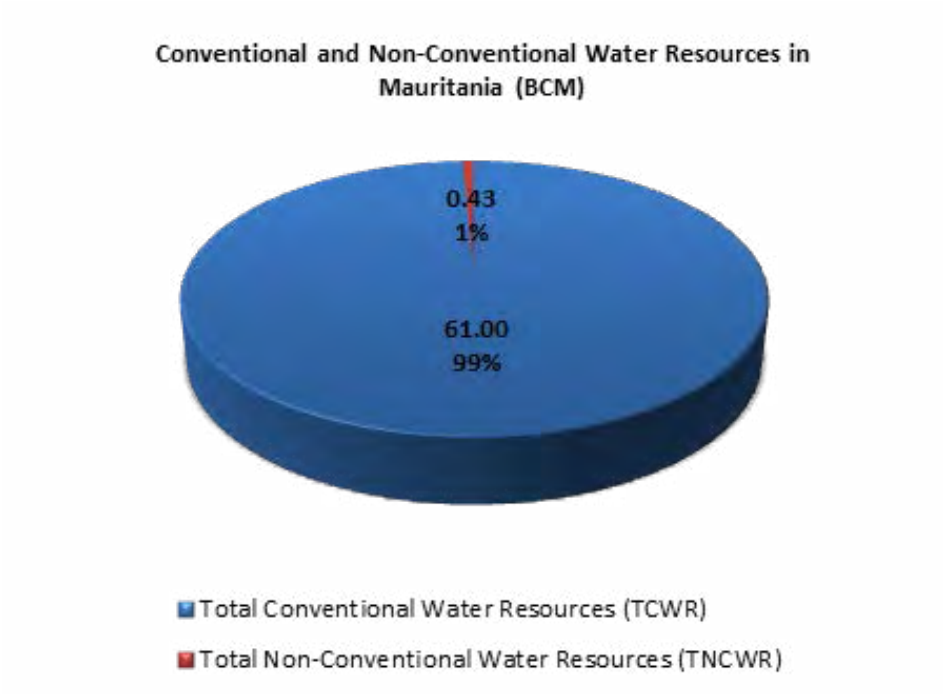


Figure 4. Conventional and Non-Conventional Resources in Mauritania

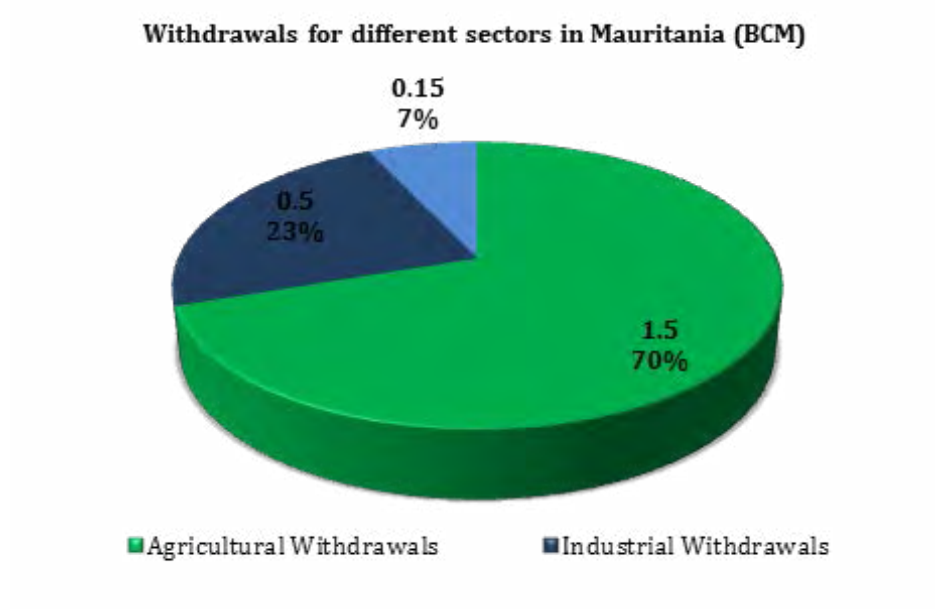


Figure 5. Withdrawals for different sectors in Meuritania



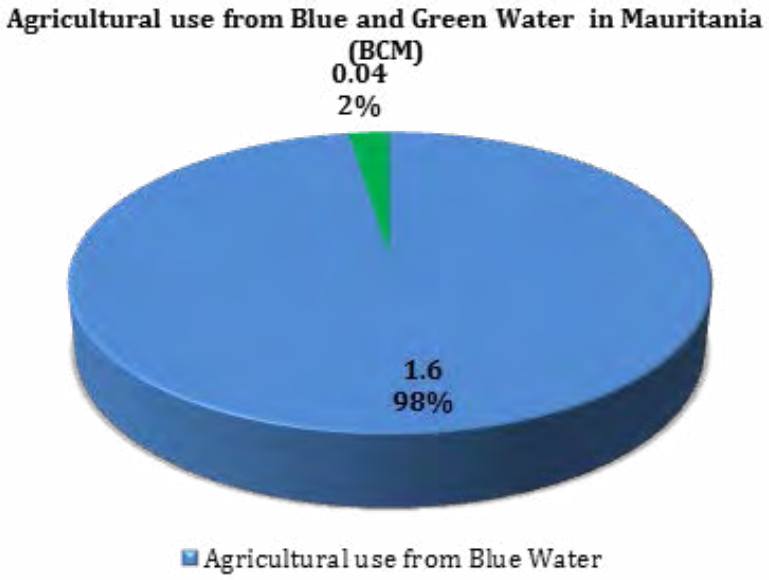



Figure 6. Agricultural use from Blue and Green Water in Mauritania

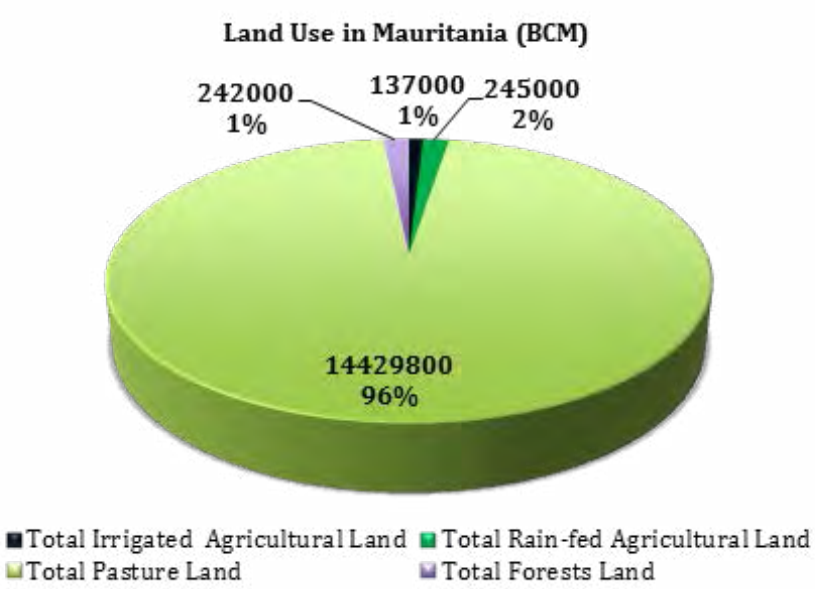


Figure 7. Land Use in Mauritania

The overall access to improved water in Mauritania in 2012 is estimated at 62%. The highest rate is registered at urban areas: 65% versus 60% in rural areas. Figure3 shows water access in Mauritania.

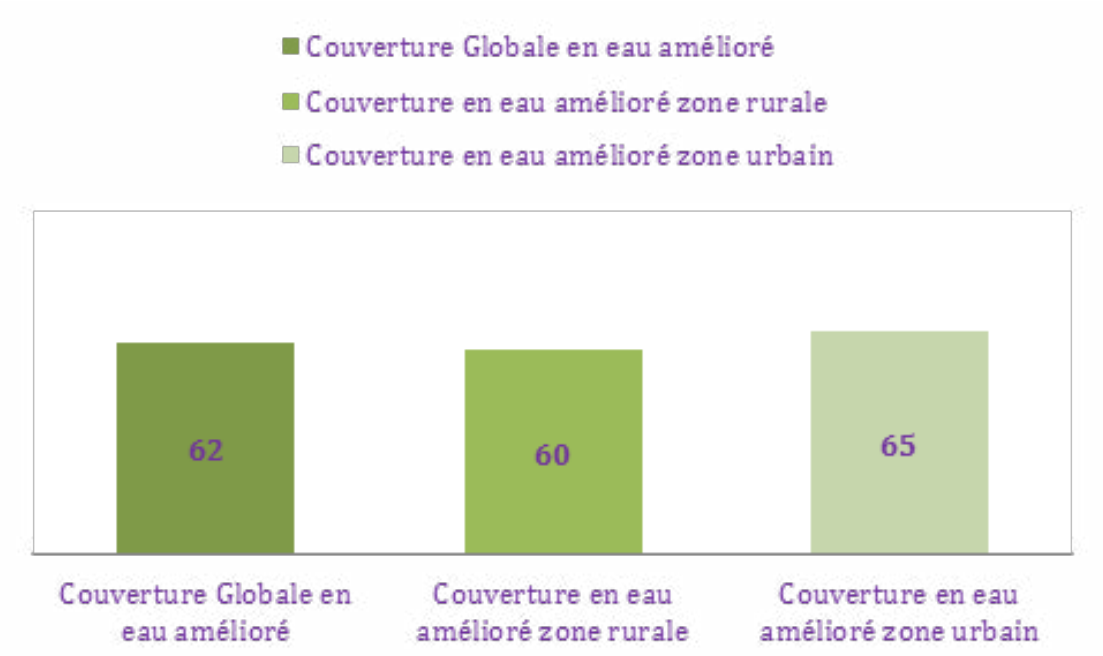


Figure 8. Water access rate in 2012

The overall improved sanitation coverage rate is 46%. The highest rate is registered in urban areas with 60%, versus 40% in rural areas (see fig4) as follows:



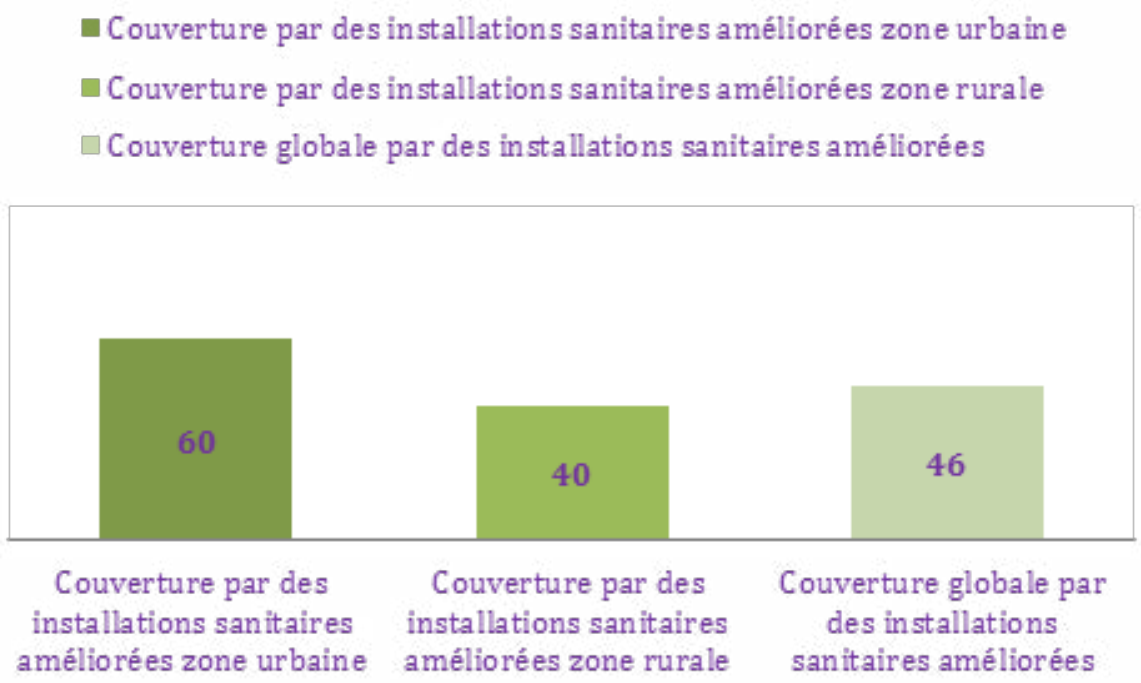



Figure 9. The sanitation access rate in 2012

As to the performance of water and finance category, we notice that the financing is provided over long periods exceeding the year of signing the agreement, and it is difficult to know the part of the financing that concerns the targeted year. Project funding also includes several activities without mentioning the amount for each activity, which makes it difficult to inform about the financing provided for the water sector. However, foreign aid for water and sanitation in 2012 amounts to 124 Billion Dollars, and the percentage of GDP allocated to sanitation & hygiene sector is at the rate of 0.13%

Concerning water & trade, the quantity of virtual water depends on the imports and exports of food products. It shows that several products escape from customs control, the official source of these data.

Hence, a significant amount of fruits and vegetables is imported from bordering countries without being registered at the customs authority. The received data on imports are estimated.

Also for exports, we also note exporting of a great number of livestock and continental fish to transboundary counries without registration by the customs authority or any other department.

Concerning the category of water & governance, conflicts-related indicators; there are no structures entrusted with data collection and the number of permits.

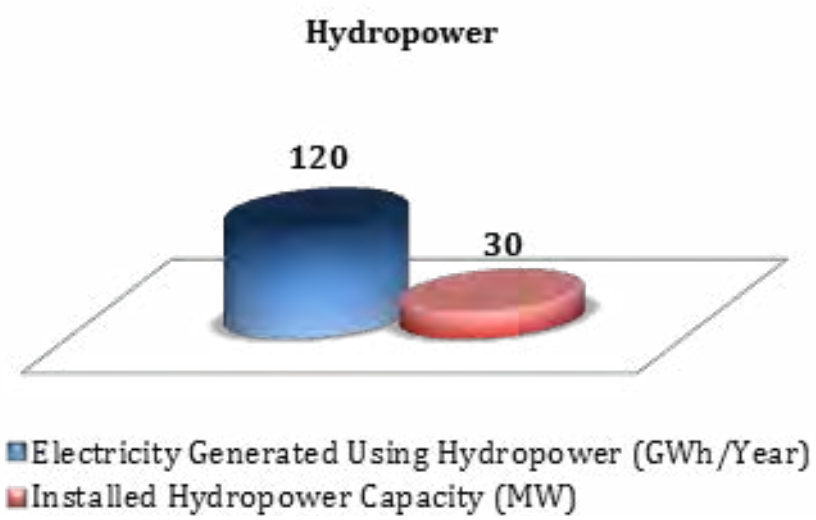


Figure 10. Hydropower

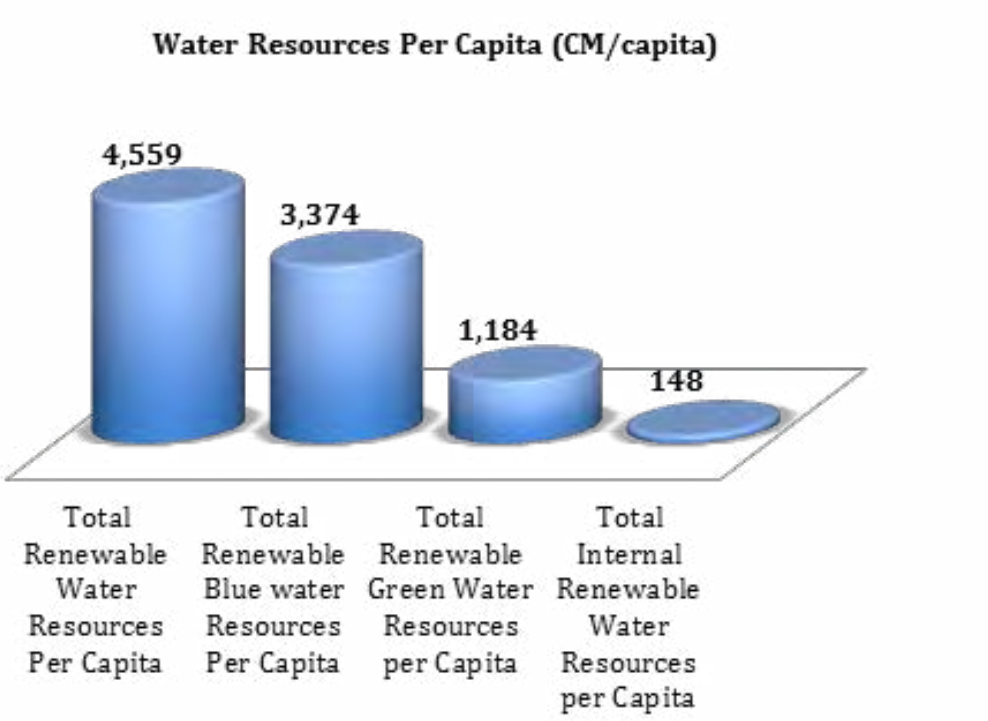


Figure 11. Water Resourecs per Capita



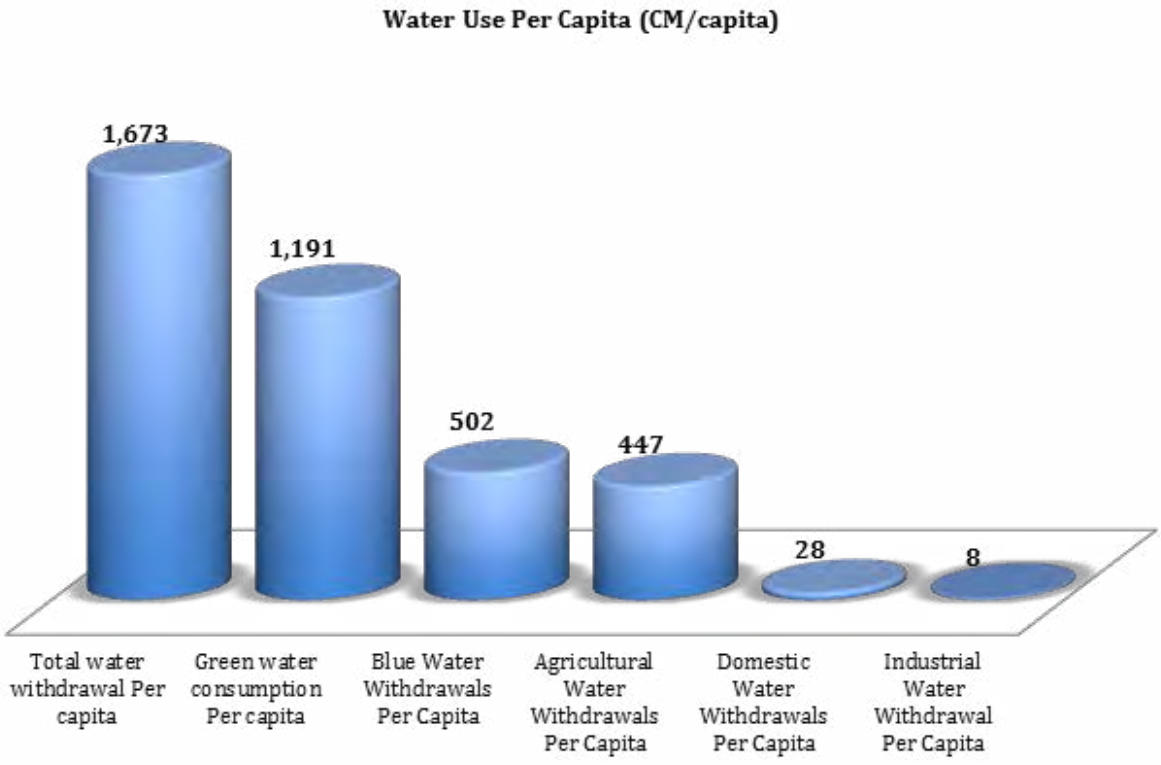



Figure 12. Water Use Per Capita

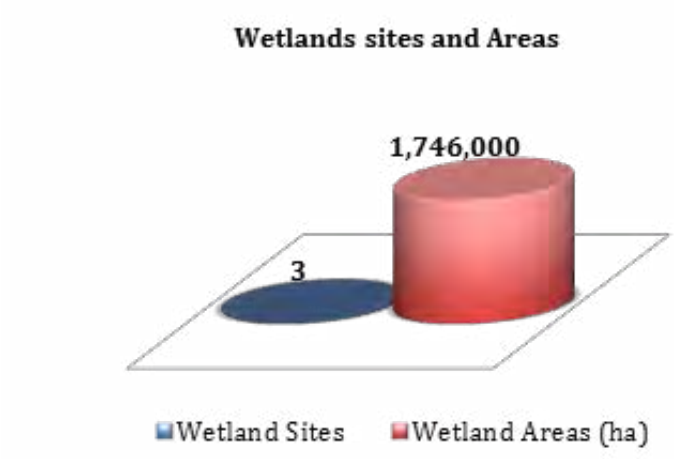


Figure 13. Wetlands sites and Areas



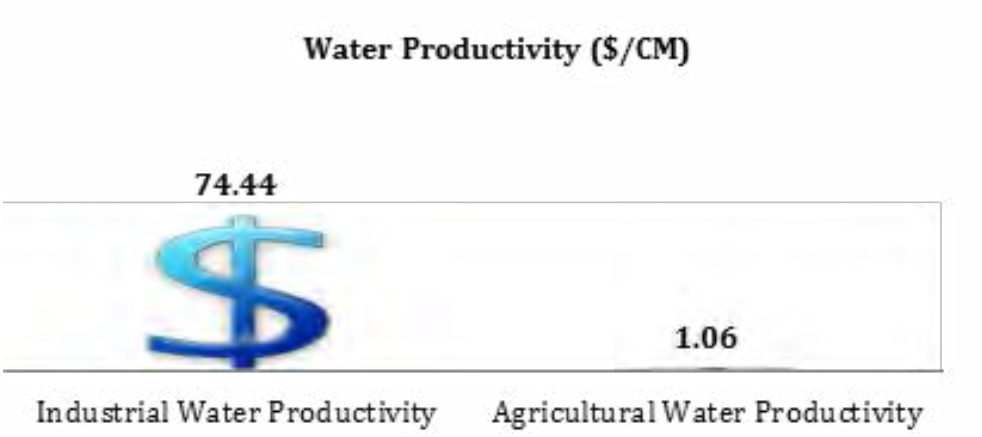



Figure 14. Water Productivity

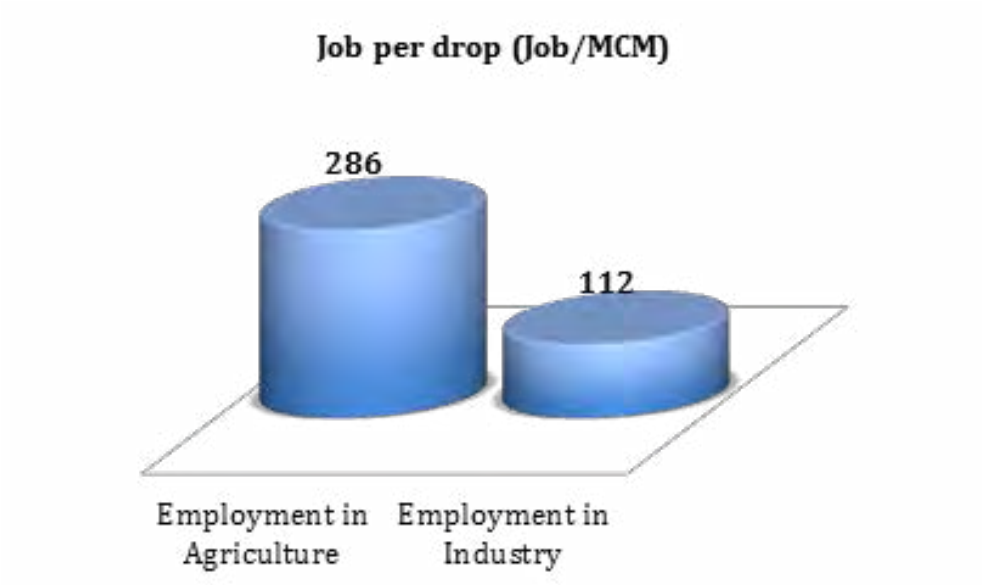


Figure 15. Job per drop

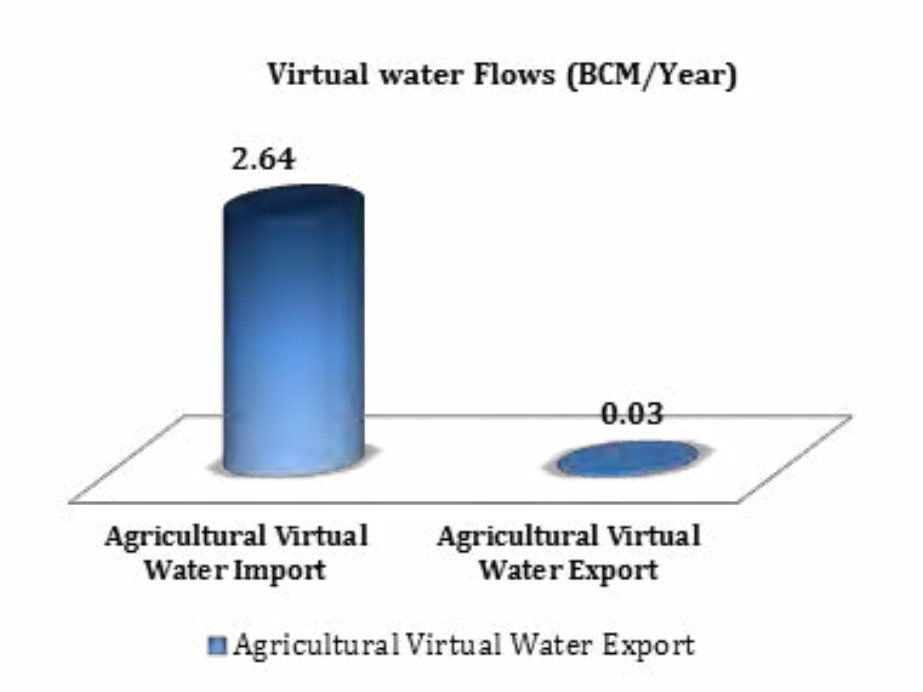


Figure 16. Virtual Water Flows

5. Conclusion and Recommendations

In this report, a group of categories of indicators has been suggested to describe the state of the water at the national level. Each category of indicators includes a set of indicators to be monitored and evaluated. In addition, for some categories of indicators, some specific parameters of Mauritania have been added.

As for the category of "Water & Availability", the total volume of renewable blue water resources of Mauritania amounts to almost 11,4 billion m3, including a volume of 11 billion m3 consisting of external blue surface water drained by the Senegal River, the green water resources are evaluated at almost 4 billion m3 (CEDARE/AWC).

Agricultural withdrawals of Mauritania amount to 1.5 billion m3, while the domestic and industrial withdrawals are 0.15 billion m3 and 0.5 billion m3, respectively.

The water effectiveness shows the ratio of wastewater and agricultural drainage to the withdrawal from original sources (blue and green water). As the water treatment in Mauritania is not common, the water effectiveness is very poor.

As for the water sustainability index that shows the ratio of withdrawals from origin sources and the renewable water resources; this index amounts to 26%. This result also shows that the water resources likely to be mobilized largely exceed such withdrawals.

This report also touches upon the economic aspects of the water use; it emphasized the enormous difference between industrial water productivity and Agricultural water productivity. The comparison is clearly in favour of the industry over agriculture when it comes to contribution to national economy. However, the Agricultural sector simply attracts a large part of the manpower in the rural areas.

The country has a large dependence on the shared Senegal River in terms of water resources and hydro-power.

It is noted that for the larger part of the indicators, the values obtained are estimated, such as the case of water and availability, as well as groundwater and surface water, rainfall, and the others are not monitored by national structures.

Capacity development is recommended to improve the knowledge of water resources, coupled with the acquisition of performing tools and equipment. An institutional framework must be examined to enable monitoring of the indicators that are still not monitored, particularly those related to governance.

Compte tenu des lacunes identifiées aussi bien dans le domaine institutionnel que technique, il sera nécessaire de mettre en œuvre un projet Mewina2 qui se portera sur les aspects liés aux renforcements des capacités institutionnelles et technique appropriée du secteur de l'eau en Mauritanie appropriée pour faire face aux défis de la collecte des données ; de l'élaboration et vulgarisation des rapports de l'analyse, du suivi et d'évaluation du secteur.

Ce plan d'action de Mewina2 devra mettre sur pied un cadre institutionnel et technique permettant le suivi de l'ensemble des données des indicateurs retenus par la mise en place des équipements de mesure hydrométriques ; des bases et systèmes d'informations de qualité qui permettra d'élaborer des rapports réguliers sur l'état de l'eau.

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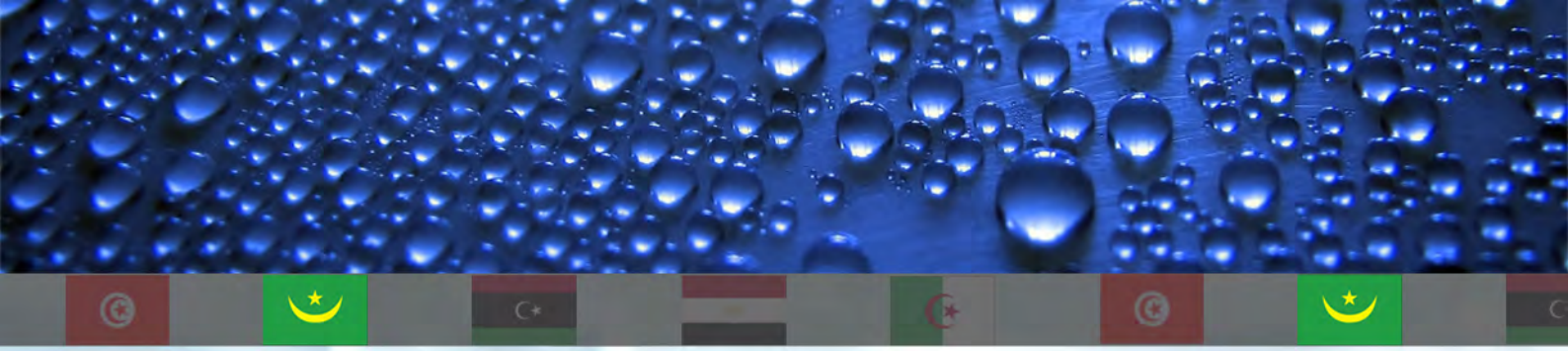
2002	PHY	Etude des ressources en eau du Dhar de Néma et de Oualata (rapport fin de la phase 3)
1990	PNUD	Ressources en eau de surface non pérenne
1990	PNUD	Les eaux souterraines de Mauritanie
1981	DH	Atlas Hydrologique de la Mauritanie
1975	BRGM	Notice explicative de la carte géologique au 1 /1000 000e de la Mauritanie
1992	ORSTOM	Evaluation hydrologique de l 'Afrique sub- saharienne des pays (Pays de l'Afrique de l'Ouest)
1991	DH	Ressources en eau des nappes alluviales de l'Adrar (Volet hydraulique du projet Oasis)

BASE DE DONNEES CONSULTEES

- Base de données de la DAR,
- Base de données de l'ONM,
- Base de données du CNRE.



MEWINA

مشروع التقييم والمتابعة لقطاع المياه بدول شمال أفريقيا

Monitoring and Evaluation for Water In North Africa

Monitoring &Evaluation of the Water Sector In North Africa (MEWINA) Project
North - African Ministers Council On Water (N-AMCOW), Technical Secretariat
c/o CEDARE, 2 ElHegaz Street, Heliopolis, Cairo, Egypt
Phone: (202) 2451-3921 / 2 / 3 / 4, Extension: 656
Fax: (202) 2259-5673, (202) 2451-3918
E-Mail: namcow@cedare.int
Web Site: namcow.cedare.int/mewina