Sustainable Water Integrated Management (SWIM) – Support Mechanism
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REVIEW AND ANALYSIS OF STATUS OF IMPLEMENTATION OF WASTEWATER STRATEGIES AND/OR ACTION PLANS

NATIONAL REPORT EGYPT

Executive summary

In North Africa, Egypt has strong features that govern water resources and their use: the country is mostly composed of deserts and only the delta and a narrow strip of land are cultivated along the Nile, the population (mostly rural) is significant and concentrated in the fertile area and two large mega cities, the desert climate does not allow to have renewable territorial water resources and the Nile (whose flow is achieved in the upstream countries) is the essential resource of the country. The country suffered water stress steadily increasing due to the strong growth of the population. Agriculture can only be developed through irrigation. The quality of the Nile waters and other surface waters (drainage systems) undergoes a sharp deterioration due to anthropogenic pressure. This explains the strategies and policies of the State which are primarily oriented to the management and protection of the resource.

The Egyptian Government has displayed a strategy of water management on the basis of demand management and IWRM. However, the water management remains highly centralized, with no real involvement of users ("top - down management") and on very sectorial basis. Four main ministries share responsibility for the management of water and sanitation: the MWRI in charge of the resource (surface and groundwater quantity and irrigation), MSEA in charge of protecting the resource and the environment, MWWU in charge of drinking water and sanitation and MOHPin charge of public health (quality control). Alongside these core ministries, other ministries may be involved according to their specificity. This is particularly the case of the Ministry of Finance managing investments budgets and subsidies paid to companies. With ministries, agencies and organizations have been established to implement government policies (EEAA, EWRA, NOPWASD, CAPW, NWRC). In the sanitation sector creating HCWW and the AC under its responsibility brought together the management of drinking water supply and sanitation in a single entity.

The particular situation in Egypt has prompted the Government to focus for decades on the water resource and its protection. A proactive policy to supply the population with drinking water has been successful in supplying almost all of the population with drinking water, including in rural areas. Protection of the resource has resulted in a policy of development of sanitation in urban areas and most cities are equipped. However, the deficit remains very important in rural areas for the sector (the programs for this sector lagged far behind).

The involvement of Ministries and agencies is through an institutional and regulatory framework well developed although some areas are still deficient as rural sanitation, reuse of treated wastewater and the treatment of industrial waste. Egypt does not have a general law for water but a number of sectorial laws under which fall all decrees governing the sector. Developments in recent decades lead to a restructuring of some of these laws that is underway.

Intervention policies and their implementation are through several plans and programs including strategies for middle or long term. Egypt receives extensive financial support from international donors (EU, ADB, EIB, AFD, KFW, JICA, World Bank ...) for investments, capacity building and studies through various programs (WSRP, IWSP, GIZ Water & Wastewater Management Program …).

However, analysis of the current situation reveals a number of weaknesses and gaps in the sanitation sector for a real integrated water resources management:

- In rural areas, the development of sanitation is a significant delay vis-à-vis the urban environment. This is partly due to the lack of clear institutional framework for sanitation in rural areas, the lack of a National Rural Sanitation program really implemented, defining the types of technical interventions and appropriate financial framework, and secondly the lack of information, training and involvement of users and stakeholders.
- In the sector of TWW reuse, displayed as a priority by Government as new unconventional resource, the current situation does not facilitate its development: institutional situation unclear, very restrictive standards, lack of technical training, additional treatment costs and distribution networks, insufficient information to potential users, uncertainty about the quality of water distributed. The level of effluent treatment and the relatively low performance of the WWTP non constant worse the situation.
- The situation regarding the fate of sewage sludge requires a number of clarifications. While several pilot sites have been implemented, it seems necessary to clarify a number of issues such as the role of institutional managers and users as well as their mutual relations, their fields of action and responsibilities. To be valued sludge require a composition compatible with their use requiring technological constraints and a upstream WWTP policy to control the quality of discharges admitted in collection networks (policy for industrial discharges).
- The problem of industrial discharges, their impact and their treatment is a crucial point in order to make the valuation of wastewater and sludge from WWTP. The institutional framework for industrial WW discharges is currently inadequate (discharge standards by type of activity should be important). On the other hand the polluters – pays principle is not applied. An effective strategy to solve the problem of industrial activities and water management must be developed and put in place as soon as possible so as not to block certain sectors activities (WWTP operation, WW reuse and sludge reuse).
- The complexity of the sanitation sector in terms of investments should require a reconsideration of the governance of the sector and a greater autonomy vis-à-vis the Central Government. This is also true regarding the data acquisition systems

and the management of data bases currently incompatible, inefficient and difficult to be used.

- Participative management is little or not developed in Egypt in the water sector. Ongoing reforms, as well as the situation of post-revolutionary transition, should be an opportunity to develop this approach through decentralization and user participation. The redesign of basic texts (review of laws and new laws in particular) should take this dimension into account, which is a basis for demographic functioning of institutions.
- Other items also have some weaknesses: the tariff on sanitation is insufficient, and does not cover the cost of operation (creating difficulties for HCWW and AC). The possibilities for private sector to participate are relatively limited and should be facilitated. Sanitation multiplicity of Strategies (there is no real National Water strategy), Programs, Action Plans could be simplified for the benefit of horizontal policies which are essential basis for integrated management of water resources.

In conclusion, the analysis of the current situation of the water sector in Egypt, particularly with regard to sanitation, revealed a number of areas where progress can be made:

- - Participative management with users and stakeholders involvement
- - Decentralization of water management and sanitation
- - Sanitation in rural areas
- - The reuse of wastewater and its institutional framework and planning
- - The treatment of industrial waste and its institutional framework
- - Pricing of services
- - The WWTP sludges management and reuse including institutional and technical framework
- - A better governance of the sanitation sector
- - Monitoring strategy, Data collection and data bases management in the water sector
- - Higher level for treatment of WW and rehabilitation of WWTP

LIST of ACRONYMS

AC: Affiliated Company
AFD : Agencefrançaise de développement
ADB : African Bank of Development
BCM:billion of cubic meter
EIB : European Investment Bank
BOT : « Build, Operate, Transfer »
CAPW: Construction Authority for Potable Water and Wastewater
ECP: Egyptian Code of Practice
EEAA: Egyptian Environmental Affairs Agency
EU: European Union
EWRA: Egyptian Water and Wastewater Regulatory Agency
GDP: Gross Domestic Product
GEAP: Governorate Environmental Action Plan
GIS: Geographic Information System
GIZ : GesellschaftfürInternationaleZusammenarbeit
GTZ : GesellschaftfürTechnischeZusammenarbeit
HCW : Higher Committee for Water
HCWW : Holding Company for Water and Wastewater
ISSIP: Integrated Sanitation and Sewerage Infrastructures Project
IWRM: Integrated Water Resources Management
IWSP: Improved Water and Wastewater Services Program
ISEW: Institutional Strengthening to EWRA
JICA : Japan International Cooperation Agency
KFW : KreditanstaltfürWiederaufbau
MALC: Ministry of Agriculture and Land Cultivation
MOHP: Ministry Of Health and Population
MSEA: Ministry of State for Environmental Affairs
MWRI : Ministry of Water Resources and Irrigation
MWWU: Ministry of Water and Wastewater Utilities
NEAP: National Environmental Action Plan
NL: Netherlands
NOPWASD: National Organization for Potable Water and Sanitary Drainage
NWRC: National Water Research Center
NWRP: National Water Resources Plan
SADS: Sustainable Agricultural Development Strategy
SNMP: Strategic National Master Plan
TWW: Treated Wastewater
UN : United Nations
USAID: US Agency for International Development
WB: The World Bank
WRSP: Water Sector Reform Program
WUA: Water Users Association
WW: Wastewater
WWTP: Wastewater Treatment Plant

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I - Introduction

Egypt is located partly on the African continent (desert and Nile Valley) and partly on the Asian continent (Sinaï) separated by the Gulf of Suez and Suez Canalin the Red Sea. Northern Egypt is bounded by the Mediterranean Sea. The western part is borderedby the Libyan Desert (border with Libya), and the southern part by the Nubian Desert (border with Sudan).The Egyptian borders in the Asian part of the country are with the Palestinian Territory of Gaza, Israël, and the Gulf of Aqaba between Egypt and Saudi Arabia. The total area of the country is 1 002 000km², 95% being desert. The population (around 84 000 000 inhabitants in 2012) is concentrated in the narrow Nile Valley and in the Delta of the Nile. No mountains occur in the African part and the Sinaï Peninsula culminates at the mount Catherine (2641 m).
The climate of Egypt is saharian with a rainfall average of 18 mm/y (10 mm/y in Aswan), with a total precipitation of 1,8 billionsm3/y. The water balance of water resources (including non-conventional water resources) and extraction is as follows:

- Nile River: 55,5 billions m3/y
- Rainfall : 1,3 billions m3/y
- Fossil Groundwater extraction : 2,2 billion m3/y
- Desalination: 0,2 billion m3/y
- Renewable Groundwater extraction: 6,2 billions m3/y
- Wastewater : 2,9 billions m3/y Agricultural drainage water Reuse: 13 billions m3/y

More than 70% of the total available water resource is represented by the Nile River (but the whole flow of the river is coming from aboard upstream countries) through the 1959 Nile water treaty between Egypt and Sudan which allocates 55,5 billions m3/y to Egypt and 18,5 billions m3/y to Sudan. The treatydoes not take care of any allocation for the upstream riparians besides Sudan (Blue Nile and White Nile).Despite the Nile Basin Initiative where countries can cooperate, and after decades of discussions, until now, no consensus was found between upstream countries and Egypt and Sudan.Another treaty was signed between upstream countries but out of Egypt and Sudan. Since 2011, Egypt seems ready to have new discussions, to try to find a common solution. As the Nile River represents most of its renewable resource for fresh water, Egypt remains very reactive about this question.Egypt with less than 700 m3/y/capita remains a country with strong water scarcity.
The around 84 000 000 inhabitants are split into 43,5% of urban population (1/4 living in Cairo) and 56,5% of rural population. Egypt is Presidential Republic and a very centralized country without elected assembly except the Shoura's Assembly (consultation). The country is divided into 27 governorates. Each Governorate contains regions (Markazes – 166 in the country) including cities (divided into districts) and villages. There are now no local elected assemblies. A new Constitution has been recently implemented and a possible decentralization is to be discussed (election of people's councils for local administration).
The distribution of the population is a big challenge for water and waste water management: average of 79 hab/km² for the whole country, but 1900 hab/km² for the Nile Valley and the Delta (4% of the surface of the Territory) and 44 000 hab/km² for Cairo.

The GDP of Egypt in December 2011 was around 230 billionUS$ of which agriculture represents 15,5% (32% of which is labor force), Industries 31,1% (17% of which is labor force) and services 52,4% (51% of which is labor force).
Despite an increasing development of cities, agriculture remains an important sector employing 1/3 of the population. Less than 4% of the territory is arable of which 99,9% is irrigated showing the important aspect of water resources management and wastewater treatment and reuse. 3,7 million hectaresare cultivated (out of new oasis management).The main crops in Egypt are: Dates (1st world place), oranges (1st crop exportation) and other citrus, vegetable crops, cereals, rice, sugar cane,cotton and linen. Fishing is an important economic activity (2450 km of sea shores in the Mediterranean Sea and the Red Sea). 86% of the water resources consumption is used in Agriculture (including drainage water and wastewater reuse).
Egypt has some natural resources including phosphates, iron, manganese… Egypt has also some petroleum and gas reserves (Delta, Mediterranean shore and Gulf of Suez).Hydropower represents 11.5% of the energy in the country (Aswan dam).
The industrialsector employs 17% of the labor forcegiving 32,1% of GDP.The industrial production includes agrofood industries, textile industries, chemical industries and building materials industries. All those industrial sectors generate wastewaters which have an important impact on the water resources quality and the management of wastewaters.
The third sector (tradeand services) is well developed and employs 51% of the labor force and produces 52,4% of the GDP. Small businesses are numerous and occupy an important part of the population
Tourism is a very important sector of the Egyptian economy. In 2010, 14,8 million tourists have visited Egypt representing an income of 12,6 billions of US$ (1stforeign currencies income of the country) and 11,5% of GDP. The Arab Spring Revolutions had a very bad impact on tourism and in 2011 less than 10 million people visited Egypt.During the first months of 2012 a resumption of attendance was registered but the last events around the new Constitution have stopped this evolution. Tourism activity needs safe and stable situation in the country to reach again the status of 2010. All the activities of the tourism sector have an important impact on water resources and wastewater management.
The use of water by sectors is as follows: agriculture 86%, domestic 8%, industry6%. Through pumping in drainage systems, the water can be reused several times. Egypt is in a water resources scarce situation and needs to improve the resources by adding non conventional waters (including reusing drainage water and wastewater) and developing a policy for water saving. The potential volume of wastewater discharge is around 6,2 BCM/y.Some wastewater reuse projects are implemented.

Egypt is a Presidential Republic. After the “Arab Spring » revolution, the Constitution of 1971 was suspended in February 2011. A new Constitution has been approved by referendum on the 22nd of December 2012. Since 2011 a new organization for the Government was implemented with some new Ministries and new functions including water and wastewater management. A new Ministry for Drinking Water and Sanitation Utilities shows a strong political will of the new government to consider water a priority.
The President of the Republic is elected by universal suffrage. The Prime Minister is established by the President. A cabinet of 34 ministers forms the Government (only two women are Ministers). Several Ministries are involved in water and wastewater

management including resources management and protection, wastewater management, health protection and water use. The main Ministries involved in water management are the following:

- Ministry of Water Resources and Irrigation.
- Ministry of State for Environmental Affairs.
- Ministry of Water and Wastewater Utilities.
- Ministry Of Health and Population.
- Ministryof Finance.
- Ministry of Interior.
- Ministry of Agriculture and Lands Cultivation.
- Ministry of Local Development.
- Ministry of Industry.

Some other Ministries can be involved in water management concerning planning, investments or local development. Egypt is highly centralized and water users are not involved in water management (out of Water User Association for irrigation), but new reforms are on the way for a better decentralization.
The institutional framework in Egypt is relatively complete with laws, decrees and decisions in the water sector concerning water resources and protection, water use, wastewater management and water reuse, but some sectors present important gaps. Public Agencies, organizations and companies are in charge of the implementation of the water policy for the management of water and wastewater.

- EEAA (Egyptian Environmental Affairs Agency)
- EWRA (Egyptian Water and Wastewater Regulatory Agency)
- HCWW (Holding Company for Water and Wastewater) + 23Affiliated Companies
- NOPWASD (National Organization for Potable Water and Sanitary Drainage)
- **CAPW:** Construction Authority for Potable Water and Wastewater
- National Water Research Center

Egypt has no general law on water management or a water code. A High Committee for Water, under the steering of Ministry of health, involves the main Ministries and organizations dealing with water management. This Committee gives guidance for monitoring strategies, standards, licenses, laws and decrees for drinking water, wastewater and mineral waters.

II –General overview of the status of development and implementation of wastewater strategies / action plans / policies

1 –Institutional framework: Laws, Decrees, Ordinances, Decisions and Standardsfor water management and sanitation.

Egypt has no one general law on integrated water resource management, but several sectorial laws and decrees in three main sectors: Water resources (most of them on the Nile River waterways), Environment and water protection, Wastewater management and wastewater reuse.

The main lawsconcerning the water resources and their protection (including wastewater discharge) are:

- Law 27/1978 for the regulation of water resources and treatment of water.
- Law 48/1982 and Decree 8/1993 regarding the protection of the River Nile and waterways from pollution. This law is the main law for discharging in the river and waterways (concerns also the industrial liquid wastes).

Specific laws for irrigation, law 12/1984 and law 213/1994, define the use and management of public and private sector irrigation and drainage systems.

Concerning the protection of the environment, including water resources, there is an environmental law: law 4/1994, amended by law 9/2009 that governs environmental protection in Egypt. The laws define environmental impact assessment (three categories: A, B, C).

A recent law (law 3318/2009) created the Supreme Council for Protection of River Nile and Waterways from Pollution. Ministries with water management responsibilities participate in this Council.

Few laws concern directly the wastewater management (except, for instance, law 93/1962 on discharge of wastewaters to sewerage networks, amended by decrees 649/1962, 9/1989 and 44/2000), but numerous decrees regulate the wastewater sector:

- Decree 169/1997 Egyptian Code for wastewater treatment works.
- Decree 44/2000 for the condition for discharging in public drains.
- Decree 134/1968 gives specifications of cesspits or septic tanks and evacuation procedures.
- Decree 135/1999 describes sanitation works for small communities and isolated buildings and necessary treatment stages.
- Decree 334/2002 Egyptian Code of practice for sanitary works in buildings, specifications of sanitary works and wastewater disposal in isolated areas, specifications for septic tanks, cesspits and oil/grease traps.

Some other decrees are specifically oriented on the reuse of wastewater:

- Decree 603/2002 Prohibition of use of treated or untreated wastewater in irrigating conventional plants.
- Decree 171/2005 sets standards for the reuse of treated effluents and sludges in agriculture. The standards for reuse in agriculture are defined in the ECP 501/2005.
- Decree 1038/2009 prohibits use of wastewater, treated or untreated, for irrigating all food crops.

Some other decrees concern the Agencies and organizations in charge of water and wastewater management or protection:

- Decree 2703/1966 Establishment of the Water Higher Committee in the Ministry of health.
- Decree 363/1979 setting the Cairo Wastewater Utility.
- Decree 133/1981 setting the Alexandria Wastewater Utility.
- Decree 135/2004 establishing HCWW and 14 subsidary Companies.
- Decree 136/2004 establishing the EWRA: regulating, following up, monitoring all water and wastewater activities.
- Decree 249/2006 transferring control over water and wastewater facilities assets from local Administration Units to the HCWW.
- Decree 117/2010 Transferring control over water and wastewater facilities assets from New Urban Communities Authorities to HCWW.

The references above relate specifically to the area of wastewater and sanitation. The areas of resource management (besides itsprotection) and its use as well as the sector of drinking water and of irrigation are little or not addressed.
All these regulations set the framework within which the management of water and sanitation sector is implemented. Revisions and other texts are in preparation. The texts are quite numerous and generally well designed despite some redundancies and some shortcomings. Their effectiveness depends on their actual implementation on the ground.

2 -Governance for water management and sanitation.

The water management in Egypt is highly centralized and sectorized. Integrated Management of Water Resources is an approach undeveloped and means of coordination and dialogue between institutional actors are insufficient. Many reforms have taken place in recent decades, the latter having emerged after the revolution of 2011. This is particularly the case with the creation of a new Ministry specifically in charge of drinking water and sanitation "Ministry of Water and Wastewater Utilities." Four ministries play a key role in the management of water and sanitation: Ministry of Water Resources and Irrigation, Ministry of State for Environmental Affairs, Ministry of Water and Wastewater Utilities(MWWU), Ministry of Health and Population.

A –Ministry of Water Resources and Irrigation

The Ministry of Water Resources and Irrigation (MWRI) is responsible for all water resources: Nile River, waterways, drains and groundwater. Any intake to use the resource (surface and groundwater) is subject to a licence. The Ministry controls the quantity but also the quality of the resource through its own monitoring networks and laboratories. It has the upper hand in irrigation infrastructure except for the last level, which is managed by Associations of Water Users (WUA).
The Ministry participates in several interministerial committees for planning: Planning Committee for the crops with the Ministry of Agriculture (annual planning), HighCommittee

for Water, Wastewater Treatment Priorities Committee with MWWU, several committees for planning State policies and committees for the implementation of plans and programs.
The Ministry relies on its representations in the governorates to implement its missions.
The Ministryhas a tool for all areas of study and research, the National Water Researches Center and its various institutes(12 institutes).
Also involved in the reuse of drainage water and reuse of wastewater, the Ministry of Water Resources and Irrigation interferes in almost all the water management.

B –Ministry of State for Environmental Affairs / EEAA

The Ministry of State for Environmental Affairs (MSEA) is responsible for the policy formulation and plan preparation for the protection of the environment, the monitoring of water quality and the definition of natural protected areas. EEAA (Egyptian Environmental Affairs Agency) is the executive tool of the Ministry. The EEAA has regional branches in charge of improving the Environmental Affairs Offices in the Governorates.
The Ministry is responsible for the policyof the environment including the policyin terms of water quality (except the underground resources which MWRI is in charge of). It manages a national network of 52 monitoring points including coastal areas and lakes (except the drainage system). It has an important role as inspecting authority to enforce standards and can take legal action in case of infringement. To achieve this mission the Ministry has a central laboratory and 12 laboratories in its regional branches and recently got mobile units.
The data (not in computer labs) are then centralized in Cairo. A national database on GIS environment is being constructed. There is no national database for water.
The Ministry through its various structures controls impact studies obligatory for any new project. It provides guides and implements action plans to improve environmental impacts (e.g. industrial discharges). The Ministryhas also an important role in awareness and information of the public. TheMSEAhas an important roleintheoverall policyof Egyptsince it isresponsible for proposingthepolicyof the State inthe areas ofenvironmental protection, preservation ofnature,promoting thequality of lifeand theimplementation ofsustainable development ingeneral and sectorial policiesof the Statein cooperation with therelevantministries and structuresand to ensureits implementation.

C –Ministry of Water and Wastewater Utilities

The new Ministry of Water and Wastewater Utilities (MWWU) (Ministry of Water supply and Sanitation Facilities on the web site of the Egyptian Government) created in 2012, took over its functions from the Ministry of Housing, Utilities and Urban Communities that had previously been in charge of the sector. The Ministry covers the whole sector of drinking water and wastewater.
The Ministry overall objective is to provide sufficient drinking waterof good quality to all the population and to treat the wastewater in such a way that the effluent discharge does not pose any health or environmental risks.The role of the Ministryisto increase the capacityofwater treatmentand supplycommunities andindustriesas well asto increase thenumber of wastewater treatmentplants and to improveefficiency of the existing plants.
This policyis implementedthrough severalorganizationsunder the supervision ofMWWU: EWRA(EgyptianWaterand Wastewater RegulatoryAgency),HCWW(HoldingCompanyfor Waterand Wastewater) and its23AffiliatedCompanies,NOPWASD(National

OrganizationforPotableWater andSanitary Drainage),CAPW(Construction Authority for Potable Water and Wastewater).

- EWRA

EWRA is in charge of the economic and technical regulation of utilities and of supervising, reviewing and monitoring all water and wastewater activities.EWRA controls the quality of services provided by the companies through specific indicators. EWRA has no regional representation but a new law is currently being prepared with a more decentralized approach. EWRA has a centralized data base.

- HCWW

The HCWW and the Affiliated Companies (AC) are under the status of Public Sector Companies. The mandates of the HCWW and AC are to purify, distillate, transport, distribute and sell drinking water in addition to collecting, treating and safe disposal of wastewater.
HCWW monitors and provides technical assistance and training to the ACs. HCWW insures maintenance, operation and rehabilitation of infrastructures.Each AC works on the basis of five years Master Plans.
HCWW covers the Egyptian territory except the cities of the Suez Canal area where Drinking water is managed by companies and the wastewater by the Governorates (Until issuing this report).
HCWW controls the quality of the drinking water and of the wastewater (auto-control) along the treatment process (including the networks) through its own laboratories (one in each AC with a total of 2 700 000 samples per year). Data are centralized in HCWW using a GIS system. The data are not public and remain in the HCWW. HCWW and each AC have an awareness Department for information of the population.
Several studies, programs and projects are funded by international funders: EU, KfW, AfD, EIB, USAID, GIZ, World Bank…

- NOPWASD, CAPW

NOPWASD (National Organization for Potable Water and Sanitary Drainage) and CAPW (Construction Authority for Potable Water and Wastewater) are two organizations responsible for investments of all water and wastewater sector. CAPW is in charge of Great Cairo and Alexandria and NOPWASD for the rest of Egypt territory except the Suez Canal area.

D –Ministry of Health and Population

The Ministry of Health,through its Environmental Health Department, establishes and enforces the drinking water standards, monitors and protects the quality of surface waters, inspects the wastewater treatment plants and is responsible for the population control programs.
The Higher Committee for Water (HCW) is under the responsibility of the Ministry of Health. The members of the Committee are: MSEA, MWWU, MWRI, Ministry of Defense, representatives of the Water Companies, EWRA, and National Center for Researches. The

Committee is responsible for all strategies of monitoring, criteria for licenses, water standards and preparing laws.
The Ministry of Health has representations in the Governorates. The Ministry monitors the quality of drinking water in the intake, after treatment and in distribution networks (300 000 samples per year). For wastewater control, the Ministry hasa collection system upstream of the WWTP and on the discharging point of treated effluent (only 800 samples per year).
The data are collected on paper and centralized in Cairo. A project of national data base is prepared.

E – Ministry of Agriculture and Land Reclamation

The Ministry of Agriculture and Land Reclamation is involved in improving agricultural activities and land reclamation, including water management at the on-farm level. MWRI and Ministry of Agriculture work in a common Committee for the yearly planning of crops.The challenge for the Ministry of Agriculture is to increase agricultural lands and cropping to answer to demography demand. The management of water, wastewater and reuse is very important in the coming years.

F –Other Ministries

Some other Ministries are involved in water and wastewater management. Concerning investments and subsides to the water and wastewater Companies, the Ministry of Finance, the Ministry of Planning and International Cooperation play an important role. The Ministry of Interior and Ministry of State for Local Development are involved in local development and rural areas. The Ministry of Industry is involved for industrial processes and discharge standards for industrial activities. All those Ministries have to work with the other main Ministries involved in water and wastewater management.

3 -Strategies, PoliciesandAction Plans for water and wastewater management.

Management of water resources in Egypt is highly centralized with a major role played by the Ministry of Water Resources and Irrigation. Although the Government has shown a willingness to manage the resource in an integrated manner based on water demand, most of the programs and action plans are sectorial. Number of strategy documents and planning were prepared with the support of international donors.

A -Strategies

We cannot say, strictly speaking, for the moment, that Egypt is endowed with a National Water Strategy. No contractual General text is in force. However, many studies and approaches have been conducted or are underway to propose a Water Strategy 2050. Several papers have been written in recent years that are more prospective studies than real

strategy papers. These studies received financial support from many international donors and could even be initiated by them.
Only two National Water Resources Plans were applied in Egypt. The second one, currently on the way, will finish in 2017. This National Plan is used as a framework for the sectorial Plans and strategies: water resources, water supplying, wastewater treatments and reuse, agricultural development, local development, protection of the resources etc…
Concerning the national water strategy, the document for the "2050 National Strategy for Development and Management of Water Resources" describes the 6 main political pillars for this strategy:

- 1) Water resources development policies.
- 2) Rationalization of water uses.
- 3) Control the water resources pollution.
- 4) Completion and rehabilitation of the water resource system.
- 5) Adaptation with climatic changes.
- 6) Improve water management.

Only pillars 3, 4 and 6 have an impact on the wastewater management with the objectives of:

- Reducing the pollution in the main drains.
- Expanding the use of water treatment units in the villages.
- Developing industrial waste treatment units.
- Preparing master plans at the governorate level.
- Improving IWRM mechanisms and the water legislation.
- Increasing the participation of beneficiaries in the water management.
- Improving the water media and awareness.

Wastewater reuse is presented in the Strategy as one of the possible solution for increasing water resources. The rest of the strategy is more oriented on water resource management in terms of increasing the quantity and spare water uses (agriculture).
In the framework of the National Water Plan, HCWW has established a Master plan 2007-2037 or Strategic National Water Plan 2037 (National Strategy for water supply and sanitation). Two thirds of the amount of this plan is dedicated to sanitation (20 billion Euros). It includes 23 Regional Master Plans. The Plan has to be implemented in two phases: a medium term one (2007-2012) and a long term one (2012-2037). The implementation is planned on a five years Master Plans system and on yearly Action Plans.
There is a Sustainable Agricultural and Development Strategy (2030) that takes reuse of treated wastewater into account.

B -Programs and Action Plans

Egyptian Government finances allthe plans and programs through the State Budget. In the wastewater sector the HCWW and its ACs cannot equilibrate their budget through cost recovery approach and the State has to grant the HCWW and the ACs. For investments the State finances a part of the investment and requires the support ofexternaldonors.

National Water Resources Plan 2017 (NWRP)

The NWRP describes how Egypt will safeguard its water resources in the future (till 2017 at this stage) with respect to both quantity and quality, and how it will use the resources in the best way from a socio-economic and environmental point of view. Three pillars define the policy of the Plan:

- Measures to develop additional water resources.
- Better use of existing water resources.
- Protecting public health and environment.

On those pillars several programs were defined:

- Nile Protection Program.
- Share protection Program.
- National Drainage Program.
- Great Dams rehabilitation Program.

None of the pillars or of the programs are specifically oriented on wastewater management but the protection of the water resource, protection of public health and additional resources have an impact on the sanitation policy.

Other Programs and Plans :

Several other Programs, Plans and Projects are in progress or in preparation in the different Ministries with sectorial objectives.

A *Project for rural areas* is implemented by the Water Companies with a 2020 objective. This project is under the responsibility of the MWWU, but the project has been delayed.

A *National Water Safety Plan* is in preparation based on the good quality and sustainability of water supply.

Several projects are financed by international donors through specific cooperation programs:

- Water Sector Reform Program (WSRP) Phase 1 and 2 (2011 – 2015) EU and Dutch Cooperation.
- Improved Water and Wastewater Services Program (IWSP) – Phase 1 Lower Egypt (2008-2014) – Phase 2 Upper Egypt (2011-2017) KfW (leader), EU, EIB, AFD.
- Institutional Strengthening to EWRA –Phase 3 (2011-2013) EU.
- Institutional strengthening to HCWW (2011-2013) EU.
- Water and Wastewater Management Program – GIZ. (Ministry of Cooperation, Germany).
- Integrated Sanitation and Sewerage Infrastructure Project (ISSIP) (2015 objective) The World Bank.
- Project for Industrial Waste Treatment – KfW, BIE.

Some other donors have some projects in the water and wastewater management: USAID, JICA, ADB, Swiss, Italian, Spanish development cooperation agencies. Out of investments projects, most of the donors' projects are oriented on institutional strengthening and capacity building.

III –Progress and achievements

The institutional framework for the management of water and wastewater has undergone in recent decades important reforms both at the regulatory level and in terms of water governance with the establishment of specialized management tools. However, many areas remained untreated or poorly supervised and are or have been for the most studied (often with the help of international donors highly involved in Egypt) and are underway to address these gaps.It should be noted that even if the laws or regulations exist, they are not all implemented or partially implemented, often for reasons of availability of funds, causing delays in the implementation of various programs.Egypt has made a major effort in the field of water supply and urban sanitation. However, the rural sector shows a significant delay especially for sanitation. Similarly, the industrial sector remains problematic and industrial waste water treatment policy is a major challenge for the coming years. Despite the great efforts made by the State in terms of funding, they sometimes remain below the amounts needed to achieve despite a very important intervention of international funds.The state of the databases, their design and managementis underdeveloped and uncoordinated. This aspect should be taken into account in planning ahead.
The table below gives an overview of the water sector and sanitation in Egypt at the moment:

	EGYPT
INSTITUTIONAL FRAMEWORK	
Ministries in charge of Water Management	• Ministry of Irrigation and Water Resources. • Ministry of State for Environmental Affairs. • Ministry of Water and Wastewater Utilities. • Ministry of State for Local Development. • Ministry of Health and Population. • Ministry of Finance.
in Agriculture	• Ministry of Agriculture and Land Reclamation. • Ministry of irrigation and Water Resources.
for Drinking Water	• Ministry of Water and Wastewater Utilities. • Ministry of State for Local Development. • Ministry of Health and Population. • HCWW, NOPWASD, CAPW, EWRA, Governorates.

for Sanitation	• Ministry of Water and Wastewater Utilities. • Ministry of Irrigation and Water Resources. • Ministry of State for Environmental Affairs. • Ministry of Agriculture and Land Reclamation. • Ministry of State for Local Development. • HCWW, NOPWASD, CAPW, EWRA, Governorates.
Environment	Ministry of State for Environmental Affairs. EEAA
Water Police	
Water Intakes	MWRI, MOHP
Water Discharge	EWRA, MWRI, MOHP
Quality	EWRA, NWRC, EEAA
Health	Ministry of Health and Population
Law on Water and Environment	
under application	law 93/1962, law 48/1982, law 4/1994, law 9/2009
underpreparation	new law to be adopted
Sanitationlaws and regulations	
Urbansector	Law 93/1962, decree 135/2004, law 38/1967, decree 135/1999, decree 286/1990, decree 168/1997, decree 169/1997, decree 334/2002, law 117/1961,decree 363/1979, decree 133/1981, Law 203/1991, decree 249/2006, decree 117/2010, decree 136/2004,
industrialsector	
agricultural sector	Law 213/1994, law 12/1984,
runoff	
Laws and regulation for wastewater reuse	law 93/1962, Decree 171/2005, ECP 501/2005
Organizations in charge of sanitation	
public and national	HCWW, NOPWASD, CAPW, EWRA
public and decentralized	23 Affiliated Companies in the Governorates, CAPW, NOPWASD.
public and local	None
private	None
Wastewaterreuse	
Texts	law 93/1962, Decree 171/2005, ECP 501/2005
Organizations in charge of drinking water	
Public and national	EWRA, HCWW.
public and decentralized	Water Companies

public and local	None
private	
texts	
Public/privatePartnership	Only one BOT, new BOT in preparation
Status of the decentralization	Few decentralization but new law in preparation
Cooperation Structures, coordination and consultation between organizations	High Committee for Waterand several interministerial committees
Planning structures	High Committee for Water, Ministries
Strategies, Policies and Action Plans	
National Strategy for Water Management	MWRI, NEAP 2002/2017, NWRP 2017, Strategy 2050
Modality and design	HCWW, NOPWASD, Ministries.
Modality for implementation	Plans
National Strategy for Sanitation	National Plan for Egypt 2007/2017
Modality and design	HCWW
Modality for implementation	Water Companies
Policies for Sanitation	Five Year Plan for wastewater Projects, AC Master Plans for Water supply and Sanitation services 2037, Development Policies: Water and Wastewater Sector in Egypt
Modality and design	HCWW, AC Master Plans
Specificpolicies for agriculture	Strategy for Agriculture Development.
Action Plans for Sanitation	
National	HCWW yearly action plans
Regional	GEAP, AC action plans
Local	
Involvement of Stakeholders and Water Users in Strategies and Policies design	No participation

Who?	
How?	
Atwhatlevel?	
Concertation	
Planning	
Role of women	The role of women in water management is low. Only two women in the cabinet of Ministers.
Policies for Urbanization	
Policies for rural development	Ministry of Local Development.
Policies for WastewaterReuse	No national plan. But wastewater reuse is part of the new 2050 strategy. Institutional framework has to be adapted.
Status of IWRM implementation including information and involvement of Water Users	Although IWRM is displayed as a basis for planning by the government, its development is limited, especially in relation to the participation of water users.
ACTION PLANS	
Commitmentat National level	HCWW five years master plans and yearly action plans
Commitmentatregionallevel	AC five years master plans and yearly action plans
Commitmentat local level	None
Moyens institutionnels	HCWW, AC, EWRA
Humanmeans	Employees of the agencies and AC
Financial means	State budget and loans, partly cost recovery
International programs and projects for water and sanitation management	EU, WB, KfW, AfD, JICA, GIZ, USAID, NL, EIB, ADB
Completed	WSRP 1, InstitutionalStrengthening 1 and 2.
in progress	WSRP, IWSP, Institutional Strengthening to EWRA and HCWW, World Bank Program ISSIP, GIZ Water and Wastewater Management Programme…
STATISTIC and DATA BASES	
Population	81 931 242 (2012)
Water consumption	
Total country	Demand77 BCM/Y
Urban	8%
irrigation	86%

industry	6%
Per capita	670 m3/capita
Volume of water discharges	
Urban	6,2 BCM/y (2,4 BCM/y treated)
rural sector	12,2 BCM of agricultural WW in drainage systems
Industries	1,9 BCM of industrial WW
Connection rates of population	
Urbandrinking water	100%
Rural drinking water	98%
Urbansanitation	95%
Rural sanitation	Only 12% of WW treated in villages
Number of urban WWTP	372
Number of industrial WWTP	?
Rural sanitation	75% septic tanks and latrines
Level of treatment of wastewaters	60% primary treatment, 40% secondary treatment no tertiary treatment
Volume of treated wasterwater reused	13 BCM of drainage water are reused in irrigation. 0,7 BCM/y of TWW is reused.
WWTP sludges	
DATA	
Existence and location of the data bases	
National	Ministries and National Organisations
Decentralized	Water Companies, Regional Health Delegations
Local	no data bases
Data base for the quantity	
Environmental	MWRI
drinking water	EWRA, Water Companies
wastewater	EWRA, Water Companies
Data bases for the quality	
environmental	EWRA, MSEA
drinking water	EWRA, Water Companies, Ministry of Health
wastewater	EWRA, Water Companies, Ministry of health
Accessibility of the data bases	
betweenorganizations	On request
water users	No accessibility
Are all data bases centralized?	No
Type and condition of networks measurements and monitoring	
Environment	National network and monitoring for environmental quality. Network of MWRI for the water resources.
Water quality	Networkof the Ministry of Health

Discharges	Network of Ministry of Health
Monitoring programs	No coordination between networks and monitoring of the several agencies.

IV –Challenges, constraints and gaps

The Government of Egypt has decided to manage water on the Integrated Water Resources Management principles including the demand principle approach. Some aspects of the sanitation sector development currently implemented present some gaps or are insufficiently developed.Institutional, planning and technical frameworks can be improved even if strategies and policies of the Government, already existing studies and financial means (from State and donors) are well engaged and seem to be a priority.

1 –The rural sector

During the last decades, important efforts were done by the Government for sanitation in urban areas and most of the wastewaters of the towns are collected and treated (even if the efficiency of the WWTP is not good enough because of the lack of maintenance and rehabilitation). On the contrary of the urban one, the rural sector is very late (only one half of the villages have wastewater treatment). A program was decided (2000 – 2020) for the rural sector. This program is in charge of the MWWU(and must be implemented by the Water Companies) but is very late. All the Ministries (MWRI, MSEA, MOHP) emphasize the pollution risk generated by the wastewater in rural areas (56% of the population is rural)and the impact on water bodies but no clear institutional framework define who is in charge of what for the sector (more no real decentralization is existing). A great disparity exists between the urban sector and the rural sector in terms of wastewater management and it should be important to improve the situation. The rural area wastewater management which includes small towns, villages and scattered settlements needs has to be developed with clear institutional, technical and financial frameworks.
A wastewater strategy for rural areas should include the following points:

- Define a new institutional framework at the administrative level and clarify who has responsibility in this area and what responsibility.
- In the case of villages, small towns and grouped housing: from what size it is relevant and effective to design collection systems and centralized treatment.
- Provide appropriate technologies that are economical in terms of investment and maintenance, rustic (not requiring high technical expertise), effective and easy to operate and maintain.
- Propose, in some cases, semi-collective sanitation solutions limiting the construction and maintenance of networks disproportionate to the number of users collected.
- Provide technical solutions for the scattered settlements, standardizing and disseminating techniques sanitation systems. This involves the development and dissemination of practical guides to users and construction contractors.

- Information, training and participation of stakeholders and users are key requirements necessary for a successful policy of rural sanitation.
- Provide management and become of sludge after treatment as well as treated wastewater discharge (includingthe reuse of wastewater and sludge with local plans for reuse).
- All these aspects should be framed in terms of regulatory and subject to appropriate controls (adapted and updated institutional framework including standards).

The delay in the rural sanitation sector is very important and appropriate financial means and incentives that allow to reduce the imbalance that may exist between rural and urban areas should be established.

2 –Wastewater Reuse

Reuse of wastewater is presented by the Government as a necessity as unconventional resource and is taken into account in the forecast balance of water resources in the country. Currently a number of experiments and projects are underway. However, the reuse of wastewater requires a clear framework and a number of well-established rules and technologies in order to limit the risks of this resource and its exploitation:

- The status of this resource must be precisely defined as well as its owner and its manager. The current institutional framework does not clearly answer these questions. The responsible for the utilization of this resource must be identified as well as the conditions of implementation of the projects.
- The different types of reuse and the qualities necessary for each type of reuse should be established through realistic standards and integrating the results of experiences and knowledge gained in the various experiments and other Mediterranean countries.
- The technical and administrative constraints to protect users, riparians(in the case of irrigation)and consumers of the crops produced by irrigation with wastewater has to be defined and taken into account for each project.
- Rules for TWW reuse project design have to be fixed (including the additional treatment required depending on the use, networks, irrigation constraints, management governance, sanitary constraints and cultivation planning). As well, control processes and monitoring have to be included.
- Financial means have to be clarified for investments (networks from WWTP to irrigation area, complementary treatment, storage, maintenance, energy and operation).
- It is necessary to define who is in charge of the project and how the project is implemented (WUA??). Water users have to be involved in the project and the management.
- For a good designing, management and implementation of WW reuse projects technical capacity building has to be provided at all levels.

However, the current framework, both institutionally and technically is inadequate or unsuitable (e.g. reuse standards in agriculture are very restrictive and should be clarified based on the experiences made in many of other countries, including Mediterranean).

The establishment of a training policy is needed at all levels from design to implementation and management of projects. Also a policy of information, consultation and involvement of users should be implemented and developed.
The current situation of the quality of wastewater poses a problem for the development of WW reuse. First only 40% of TWW undergo secondary treatment (the rest is in primary treatment) which limits significantly the possibilities for irrigation.The reliability of the quality of TWW is not guaranteed which is a hindrance to the REU major in agriculture. This problem can have several causes: poor design of the station, poor maintenance of the station, presence of untreated industrial discharges, significant fluctuations in flow and salinity. Securing a proper operation of the station is required (sustainable management of wastewater). To create a growing demand it is necessary that there is trust between the provider and the user. Contracts between the different actors in the chain (supplier of TWW, distributor and users) are imperative.
It is obvious that the water users regardless of their use (agriculture, industry, domestic) do not pay water covering the actual cost of investments, provision, operation, maintenance, resource protection, but only part of the service (part more or less important depending on usage and policy decisions), the rest of the cost is financed by the national community as a whole through various taxes.
It is necessary, in view of the political will to develop the reuse of TWW, to elaborate a National Plan of Wastewater Reuse taking into account the elements described above.

3 –WWTP sludges management

Sludges from WWTP are a significant problem. Reuse of sewage sludge is under a decree with very restrictive limits. This can be justified in part by the potential presence of toxic elements related to the presence of industrial effluents and in other part by health risk linked with insufficient treatment of the WWTP. In this sector institutional and technical strengthening have to be implemented. It is possible, in each governorate to develop plans for WWTP sludge management. Technical recommendations will then be made available to designers and operators of WWTP as well as to potential users.
In the case of sludge reuse, the role of manager and users and their relationships, fields of action and responsibilities must be clearly defined.

4 –Industrial Wastewaters

Industrial WW, whether in the environment or in collection networks discharge, represents a risk of environmental pollution and a handicap for WWTP that in general are not able to process some pollutants and may therefore see their functioning disturbed (with a significant impact on the TWW reuse or on sludge which may have significant toxicity making their reuse difficult).
Only general institutional framework exists for industrial wastewater discharge (specifically in the drainage system). A more precise framework has to be established with a sector approach for each type of industrial processes.
No efficient financial incentive programs are in place for the depollution of industrial discharge sector. More the polluter / payer principle registered in law is not applied.

A policy promoting industry clusters in the same sector of activity, and a proactive policy vis-à-vis the pretreatment of industrial effluents before discharging into the urban network should be implemented.
This industrial sanitation sector should be developed with stronger constraints. Informative and educational approach with industrials is necessary for awareness and efficiency.A strategy for industrial discharges should include the following:

- Improvement of industrial processes to save water (and therefore discharge).
- Encouragement to use the recycling of wastewater within the plant.
- Specific pretreatment of the effluent before discharging into anurban collection network or into the natural environment.
- Grouping plants in industrial areas to provide a specialized WW treatment specific to the sector-specific activity.
- Develop a communication and information strategy for industrial training.
- Obligation for manufacturers to self-control their discharges in terms of quantity and quality and to communicate results to EEAA and managers of WWTP if they discharge in an urban network.

Some of these points are already partially implemented but this policy should be supplemented and strengthened.

5 –MWWU, EWRA, HCWW, NOPWSAD, CAPWGovernance

The water and sanitation sector has been the subject in recent decades of many developments in Egypt to reach the current schema. The last important change occurred after the "Arab Spring" by creating a specialized ministry, "the Ministry of Water and Wastewater Utilities", which now isin charge of the entire sector (which was previously supervisedby the Ministry of Housing).The Ministry relies on several agencies and organizations under its supervision (EWRA, NOPWSAD, CAPW). It also has control over the activities of the HCWW and its ACs.
Regarding wastewater, it is clear that the HCWW and ACs are in charge of the operation and maintenance of networks and WWTP, planning and infrastructure investment are less obvious.The geographical distribution of competences for the investments between the two major Megacities (Cairo and Alexandria) through CAPW and the rest of the territory through the NOPWSAD can pose a number of problems in relation to the activities of the HCWW particularly in terms of priorities for planning. This can lead to overlapping jurisdictions between agencies if a perfect coordination is not assured (which is always difficult for organizations independent of the other).The current situation, with a strong centralization, certainly limits the risk but introduction of decentralization (role and competence of governorates?), which is desirable and seems to be in the current general policy objectives, should be accompanied by an overhaul of the current system.That will be also the opportunity to redefine the place of the WW management of rural areas.

6 –Participation of stakeholders and users

There are quite a few Egyptian NGOs, but they do not participate in the management of sanitation. Their interventions are largely restricted to projects submitted to the Ministry of Environment in impact studies. They also participate for the management of solid wastes.

Users are not actually involved in the management of water and sanitation out of WUA for irrigation. Although the Government has shown willingness to manage the water according to the IWRM principles,one of them being the participative management, it is not implemented in Egypt. The sanitation sector seems particularly devoid of participative structures,however the modern management of water highlights the need for a participative approach and a "bottom up" management.
Relationship with users is limited mainly to a collection of grievances (HCWW) or information campaigns (EEAA). If it is needful, it is not enough.It is necessary to promote information and awareness training for users.Planning and implementation of programs and plans of action have to be madeseamless. Egypt, in the water sector and more particularly in the wastewater sector must improve its participatory approaches and create more spaces for dialogue between institutions and users.
Some funders in their intervention programs have highlighted the need for user participation and the establishment of dialogue.

7 –Pricing and Cost Recovery

Companies in charge of drinking water and sanitation (HCWW and ACs) are not free to fix tariffs for services they provide. It is the State which approves rates in functions of socioeconomic and political criteria. This results in low prices that do not cover the cost of the service or the operation of these organizations in the majority of cases (only one company balances its budget). This situation causes a significant dependence of the companies vis-à-vis the State and often financial difficulties related to insufficient contribution of the State. This situation is sometimes aggravated by the rate of bill collection which is low (this phenomenon has worsened after the "Arab Spring").
The pricing problem for drinking water and sanitation is still important and sensitive issue in countries where centralized management is strong. However, it is logical that at least the user pays for the service (provision of drinking water, water for industrial processes or to produce crops in agriculture and wastewater treatment necessary for the protection of the resource).The majority of investments are supported by the State and international donors. It is fair to cover the cost of provision of the resource. This should be done for the sake of social equity, including an equalization system between consumers and respecting the principle that "every human Being has the right to access to safe drinking water and sanitation."
The non-application of the polluter - pays principle aggravates the situation especially in relation to the discharges and treatment of industrial wastewater.
The current prices charged are clearly insufficient to allow normal operation of the companies in charge of water and sanitation in Egypt. Prices should be adjusted gradually and in accordance with the socio-economic situation of users. These prices should be regularly revised based on the general economic environment.

8 –Participation of Private Sector

Although the private sector participation is encouraged by the Egyptian Government, few operations have been implemented in the sanitation sector. Only one BOT is underway although several projects exist.
Opportunities for private sector interests are however important in the wastewater sector and could be related to: the management of networks and WWTP, sludge management, reuse of wastewater ...
Policy in this direction should be further developed as long as the institutional framework is clear and precise for the technical implementation and the financial aspects. Generally the private sector is always prudent to intervene if safeguards are not provided to him.

9 –Data Bases and Monitoring networks

In Egypt there is National water data base (resources, drinking water, wastewater, irrigation, environment). Each Ministry involved in water management, each National Agency, each company has its own measuring stations network, its own sampling programs,its owndatabase and its own management criteria without real consultation between operators.
The tools used for the databases are very different from the data on paper to the use of GIS. The result is a significant challenge for an overview of the situation. An effort should be made by the various ministries, agencies and companies to update their databases and improve the management these databases.
Coordination has to be created between the data managers to structure effective monitoring networks and data acquisition, to maximize information and avoid duplication and optimize costs.
At the moment the multiplication of the databases, the differences in format and geographical dispersion does not allow easy communication of data between organizations. Some of these data are only accessible within the organization itself and are not public.

10 –Remarks on Water and Sanitation Management in Egypt

State clearly displays a willingness to manage water resources based on demand and on the basis of IWRM. But the current organization of the sector does not seem to facilitate the implementation of these advanced principles.The water management in Egypt is very centralized and participative management is absent inthe current schema. The national policy is strongly focused on water resource exploitation and protection through heavy investment in urban sanitation and drinking water supply. This is a real success in terms of accessibility to drinking water for almost all of the population but more mitigated regarding sanitation (treatment level and effectiveness of WWTP, lack of capacity building), especially in rural areas, which displays a delay. This policy is a policy of supplying since users and stakeholders are not involved in the process.
Relatively tight separation between the management of the resources (MWRI), focused on the quantity, and the protection of this resource (MESA), focused on the quality and the responsibility of MWWU for drinking water and sanitation do not facilitate the integrated

management of the water resource. On the other side the grouping of drinking water supply and sanitation management within a single entity is an asset.
This current situationresults in a multiplicity of strategies, programs, plans, which often could be grouped under the same larger thematic. This highly sectorial and vertical planning goes against the IWRM principle which aims essentially horizontal and integrating components other than technical know-how (social among others). Sometimes laws and decrees exist but are not well applied or not applied at all. In some sectors he situation could be improved only by updating some laws, decrees, guide lines or standards.

V - Opportunities

The current political context following the "Arab Spring", although the situation is not stabilized, supports the commitment of significant reforms. Ongoing reforms could focus on issues that would permit fundamental reforms that seem necessary for the future of the environment and protection of natural resources, such as decentralization, participation of people in decisions, transparency. The current revision of the institutional framework for the management of water and sanitation (revision of the current law), adjustments to plans and programs implemented and the preparation of new plans and programs in areas previously forsaken, are significant opportunities which all support should be provided.

VI –Proposed options and recommendations

- The institutional framework of the WW reuse must be updated and completed. Strengthening of technical expertise and training of staff in charge of its implementation and its management should be undertaken. Information should be disseminated to the public, whilst training and user participation should be developed. Sustainability of the quality of TWW should be sought through increasing the level of treatment and securing the good functioning of the WWTP. In addition, a strong policy on industrial discharges has to be established.
- The rural sanitation sector presents a large deficit in strategies (although actions have been initiated) and in the technical and institutional framework. Strengthening of this sector is a priority and certainly requires further studies for their definition (e.g. set thresholds on the size of groups of habitats where collective sanitation is to be avoided). Users training and information are priorities.
- As part of the Rural Sanitation development, suitable and inexpensive technical solutions for autonomous or collective sanitation should be strengthened (it will be necessary to avoid standardized answers that might not meet the environmental, societal and economic context). The information and the provision of practical guides, including autonomous sanitation, should be implemented.
- An effort is needed by all databases managers to improve compatibility between the databases and in the long term to have the possibility of developing a national database for water. Transparency between the data bases is a necessity.

Coordination between all the stakeholders (Ministries, Agencies, Companies …), including measurement networks and analytical monitoring, is an important challenge.

- Information extension, education and training programs and broad participation of users and the public must be implemented. This area is currently undeveloped especially upstream of the definition of strategies, policies, plans, programs and actions to be involved.
- An effort should be focused on the prices charged for water and sanitation to enable companies to achieve financial independence. This approach would certainly boost the private sector participation in these activities. Socio-economic studies should be undertaken to reflect realities on the ground and to be realistic in the proposals.
- It seems important to define and implement a policy for management and valorization of WWTP sludge including an updated institutional framework.

A reform of the administrative framework (capacity building, governance) of the water sector seems essential in order to implement the principles of demand management and IWRM, displayed by the government.

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