Expert Facility Activity No: EFS-EG-1
"Improved Watershed Management (decentralized level), local governance and capacity building"

Report of the closing Workshop "Water demand management, planning and infrastructure development"

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THE SWIM AND H2020 SUPPORT MECHANISM PROJECT (2016-2019)

The SWIM-H2020 SM is a Regional Technical Support Program that includes the following Partner Countries (PCs): Algeria, Egypt, Israel, Jordan, Lebanon, Libya, Morocco, Palestine, [Syria] and Tunisia. However, in order to ensure the coherence and effectiveness of Union financing or to foster regional co-operation, eligibility of specific actions will be extended to the Western Balkan countries (Albania, Bosnia Herzegovina and Montenegro), Turkey and Mauritania. The Program is funded by the European Neighborhood Instrument (ENI) South/Environment. It ensures the continuation of EU's regional support to ENP South countries in the fields of water management, marine pollution prevention and adds value to other important EU-funded regional programs in related fields, in particular the SWITCH-Med program, and the Clima South program, as well as to projects under the EU bilateral programming, where environment and water are identified as priority sectors for the EU co-operation. It complements and provides operational partnerships and links with the projects labelled by the Union for the Mediterranean, project preparation facilities in particular MESHIP phase II and with the next phase of the ENPI-SEIS project on environmental information systems, whereas its work plan will be coherent with, and supportive of, the Barcelona Convention and its Mediterranean Action Plan.

The overall objective of the Program is to contribute to reduced marine pollution and a more sustainable use of scarce water resources. The Technical Assistance services are grouped in 6 work packages: WP1. Expert facility,WP2. Peer-to-peer experience sharing and dialogue, WP3. Training activities, WP4. Communication and visibility, WP5. Capitalizing the lessons learnt, good practices and success stories and WP6. Support activities.

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Disclaimer:

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ABBREVIATIONS

CAPMAS	Central Agency for Public Mobilization and Statistics
DCP	Data Collection Process
HCWW	Holding Company for Water and Wastewater
MALR	Ministry of Agriculture and Land Reclamation
MEE	Ministry of Electricity and Renewable Energy
MoE	Ministry of Environment
MoHP	Ministry of Health and Population
MOHUUC	Ministry of Housing, Utilities and Urban Communities
MoTI	Ministry of Trade and Industry
MWRI	Ministry of Water Resources and Irrigation
NGOs	Non-Governmental Organisations

1 GENERAL INTRODUCTION

Within the scope of the EFS-EG-1 “Improved Watershed Management (decentralized level), local governance and capacity building”, the EU-funded project “Sustainable Water Integrated Management & Horizon 2020 - Support Mechanism (SWIM-H2020 SM)”, in cooperation with Ministry of Water Resources and Irrigation (MWRI) has conducted a full-day workshop on water demand management, planning and infrastructure development on 22/01/2019 in Cairo, Egypt. The purpose of this workshop was to present the outputs of the activities undertaken in relation to the developed classification for water uses and the guidelines for their estimation and assessment, the methods for assessing water balances at the Governorate level and the different demand management options in the domestic sector, and the methods for planning and infrastructure development. The workshop aimed as well to facilitate a participatory discussion on issues related to water use and water balance assessment, constraints, etc., and engage the participants into hands-on collaborative exercises to further build their capacity.

1.1 BACKGROUND OF ACTIVITY

Limited water supply in Egypt is exacerbated by climate change and the fact that the country shares more than 93% of its resources (the Nile River) with ten other countries; all located in the upstream stretches of the River. In order to implement water demand management which is promoted by the National Water Resources Plan (NWRP) 2005-2017, the water sector has to (1) be aware of the different types of water losses and wastage (i.e. inefficient water use), (2) develop knowledge on water conservation and water efficiency methods and water demand management (WDM) tools (economic, technical, regulatory) as they are applied in the different sectors (domestic, touristic, industrial, agricultural), and (3) be informed on the prevailing water use patterns of the key sectors and the potential water use reduction through the application of best practices and best available technologies.

The SWIM-H2020 SM specific activity EFS-EG-1 “Improved Watershed Management (decentralized level), local governance and capacity building” aims to build capacity on methods of classifying and assessing water uses, assessing water balance, analyzing demand management options (including water saving technologies) and planning infrastructure development and conduct a relevant workshop touching on these topics.

2 OBLECTIVES OF ACTIVITY

The general objective of the workshop is to build technical capacity of the MWRI staff on methods of assessing water use and water balance, on potential demand management interventions, and on the principles of planning infrastructure development. The workshop seeks to increase the knowledge and

technical capacity of the participants on how to classify and assess the water use of the main water-consuming sectors, how the methodologically evaluate the water balance at a decentralized level, how to screen through demand management options, and how to take decisions on investing in infrastructures/ water works and interventions. As such, it aims at contributing to drought and water scarcity mitigation and risk management, by educating the MWRI staff on different aspects of the demand management pathways.

To achieve these objectives the workshop has been structured in three parts:

Part 1:

- Presentation on methods for classifying and assessing water uses
- Presentation of the methodological approach for assessing water balances and practical calculation tools
- Participatory discussion on issues related to water use and water balance assessment, constraints, etc.
- Participatory exercise with the MWRI staff on the design of a Data Collection Process (DCP) on water use data.

Part 2:

- Presentation of various demand management options (including water saving technologies) and practical guidelines

Part 3:

- Presentation on methods for planning and infrastructure development (i.e. how to take a decision on investing in infrastructures/ water works and interventions)

3 RESULTS OF THE WORKSHOP

The main outcomes of the workshop are presented below:

1. Participants have gained an improved understanding on how to classify and assess water uses, for the different sectors, and based on international standards
2. Participants gained knowledge on how to perform water balance calculations, and what tools can be used to facilitate this process
3. Participants gained improved knowledge on the different demand management options, water conservation and water use efficiency technologies and practices for the domestic sector, and on practical guidelines to guide their selection
4. Participants have gain improved knowledge on methods for planning and infrastructure development and how to take a decision on investing in infrastructures/ water works and interventions.

5. Participants collaborated hands-on on how to design a Data Collection Process (DCP) on water use data (participatory exercise)

3.1 KEY ELEMENTS OF THE PRESENTATIONS AND DISCUSSION POINTS

3.1.1 METHODS FOR CLASSIFYING AND ASSESSING WATER USES

The objective of this presentation was to create a common understanding on the definitions and typology the various water uses and additionally present internationally accepted methods and proxies for estimating water use in the domestic, industrial, irrigation and thermoelectric power production sectors. The participants have also been presented with relevant indicators for conducting policy-relevant assessments of water use components.

The discussion focused on the current state of estimating, monitoring and reporting the various water use categories in Egypt. It is often a problem that water use cannot be directly measured for all sectors, and thus different proxies and estimates need to be developed. To this extent it is important to have common proxy methodologies which are also based on primary data which are feasible for the Egyptian Governorates and relatively easy to retrieve. It has been identified that:

- The availability, completeness and most recent year of data can vary among sites, Governorates, sectors
- The difficulty of accessing the data for estimating water use can vary (from requesting them from relevant agencies to designing a survey to collect the data)
- Compiling an inventory of all water-use sites is very useful to identify data gaps
- When data are not readily available, water-use estimates may be determined using ancillary data and water-use coefficients. The coefficients represents a unit-use water requirement and number of units such as population served, number of employees, acres of cropland, or number of golf courses, etc.
- If water-use coefficients are not available, coefficients can be developed from a representative sample of typical users that are more pertinent to a specific facility, site, Governorate.
- All data sources must be well documented
- Site-specific water-use data are more commonly available for public-supply, industrial, and thermoelectric-power facilities, ≠ less commonly available for self-supplied domestic, irrigation, aquaculture, livestock, and mining water-use sites.

References have also been made to the merit of having this information available and accessible. The following points have been raised:

- Quantifying water use per sector is an essential component of water management and of any Water Resources Management Plan and an indispensable input for the drafting of the Governorates Water Resources Management Plans

- Water use statistics are important in assessing the sustainability, water efficiency and productivity of the various economic sectors
- The knowledge of water use patterns and trends supports proper water allocation, the design of adequate Programmes of Measures, and helps prioritize water demand management efforts
- Having a common typology of water uses can pave the way towards the development of a National Water Use Information System (NWUIS) where water use data are monitored and estimated at a suitable decentralized scale, following common harmonized definitions and procedures
- The assessment of water uses contributes to better governance at the decentralized water management level, initiating a better coordination between stakeholders at the local level when it comes to the monitoring of water use, the definition of water saving targets, and the design of mitigation measures

3.1.2 METHODOLOGICAL APPROACH FOR ASSESSING WATER BALANCES AND PRACTICAL CALCULATION TOOLS

The objective of this presentation was to assist the MWRI in understanding the basic components of the water budgets (natural and anthropogenic) and showcase different tools that can be used for their estimation. The policy relevance of developing water budgets at the decentralised level has also been explained. The basic definition of the water budget components have been presented, as well the basic underlying equations.

The discussion focused on the current status of development of water budgets at the decentralised level in Egypt, the importance of the water budget estimates in the Governorates Water Resources Management Plans, and the main constraints and challenges in periodically calculating water balances and water budgets. It has been identified that:

- Quantifying the components of water balance is the foundation of effective water management and environmental planning and an indispensable input for the drafting of the Governorates Water Resources Management Plans
- Water balance evaluations are important in assessing the effects of climate variability, the level of pressure that human activity exerts on the natural water resources of a particular territory, water stress conditions, and the sustainability of the various economic activities
- The analysis of water budgets' components supports proper water allocation and the design of adequate Programmes of Measures to mitigate any adverse impacts

The following key elements have also been identified:

- When selecting an accounting unit for developing a water budget, the careful selection of boundaries can greatly facilitate the accounting process
- When developing water budgets there is often a mismatch of scales (i.e. the hydrological boundaries do not coincide with the administrative boundaries)
- Water quality poses additional constraints to water availability since its limits some uses, and thus needs to be considered

- Accurate measurements and/or estimates are important, yet often difficult to obtain (e.g. illegal abstractions)
- All water-budget calculations contain some uncertainty. There are two general sources of this uncertainty: natural variability of the hydrologic cycle and errors associated with measurement techniques

3.1.3 OVERVIEW OF DIFFERENT DEMAND MANAGEMENT OPTIONS AND WATER SAVING TECHNOLOGIES ACROSS DIFFERENT SECTORS, AND PRACTICAL GUIDELINES

The objective of this presentation was to showcase to the participants different demand management measures and options for the urban and agricultural sectors, targeting to introduce water saving or increase water supply, such as water saving fixtures, domestic greywater reuse, rainwater harvesting, increasing irrigation efficiency (both field application and conveyance efficiency), precision agriculture, natural water retention measures (e.g. detention and retention ponds). The importance of water metering was highly emphasized (you can't manage what you don't measure!), while the role of Economic Policy Instruments (EPIs) (e.g. water pricing) as tools that can create incentives and disincentives and change water users' behavior aiming at delivering environmental and economic benefits have also been discussed. Selected international case studies that applied such measures and interventions were presented. The participants were also introduced to a methodological process to be followed when designing demand management options. The methodological process entails the following 5 steps:

- Step 1 – Policy Assessment: Policy relevant assessment of the water balance and unmet demand (per sector) in the area of interest based on the results of detailed water balance models and calculations
- Step 2 – Identify demand management options: Identification of potential demand management (including increase supply) measures for the most important sectors (e.g. urban and agricultural sector)
- Step 3 – Discuss and screen options: First dialogue with the stakeholders: presentation of the measures, discussion on their efficiency and implementability, identification of limitation, agreement on a list of " candidate measures
- Step 4 – Assess costs and benefits: Simulation of the performance "candidate measures" against a physical-based model to assess their cost-benefit
- Step 5 – Prioritize and set targets: Second dialogue with the stakeholders: presentation of the modeled/ simulation outcomes, agreement and prioritization of measures based on specified criteria (PoM), setting of targets

The discussion also focused on the guiding principles when designing demand management schemes, as well as the related challenges. The following guiding principles have been identified:

- Develop a Programme of Measures (PoM) to mitigate the problem of unmet demand at the appropriate spatial scale (e.g. river basin)
- Focus on demand management measures which could benchmark an "alternative policy", and investigate increase supply measures which do not cause adverse environmental impacts

- Design mitigation measures together with stakeholders to safeguard their relevance and acceptability
- Involve locals, promote ownership and responsibility, and facilitate the internalization of the PoM in development framework s
- Link science to the decision-making and policy-making process
- Promote proactive risk management
- Perform cost-benefit ex-ante assessments (water saved vs. investment cost) prior to decision on the selection of measures
- Perform ex-post assessment based on monitored data after their implementation to evaluate their actual effectiveness

The following challenges have been identified:

- Limited knowledge exists on the actual effectiveness of the implemented measures
- Socio-economic factors always come into interplay, such as the readiness of the technological solution, the social acceptability, the equitability, constraints related to the implementation of the measures, etc. which can facilitate or impede the uptake and effectiveness of the measure
- People's behavior is an unpredictable factor, need to increase awareness and motivation

3.1.4 METHODS FOR PLANNING AND INFRASTRUCTURE DEVELOPMENT

The objective of this presentation was to assist Water Service Providers (WSPs) that are currently faced with the need to balance water demands with available supplies under variable settings, to efficiently and objectively prioritize water infrastructure proposals. Projected climate change impacts together with the uncertainty in other future system influences and drivers, such as economic growth, urbanization, demand patters, etc., present an additional significant planning challenge for most WSPs.

A recently proposed method was presented, namely the Infrastructure Prioritization Framework (IPF) method proposed by the World Bank. The IPF framework is differentiated in four ways from other approaches to infrastructure decision-making. First, it incorporates national policy goals, social and environmental sustainability considerations, and long-term development aims alongside financial and economic indicators. Second, it is predicated on parsimony and pragmatism. Third, it makes space for policy debate via criteria identification and the selection of projects from mid-priority categories. Fourth, it provides decision-makers with an intuitive, graphical interface upon which to compare alternative investment scenarios.

The merits of the proposed methodology are as follows:

- Can be adapted to account for policy goals.
- Combines social-environmental and financial-economic variables.
- Accommodate data and resource limitations.
- Includes the sector budget constraint.
- Displays information in a simple visual interface.
- Informs discussion of rebalancing sector allocations.

- Improves data collection processes.

3.2 RESULTS OF THE PARTICIPATORY EXERCISE ON DATA COLLECTION

During the workshop the participants have been divided in groups and have been asked to facilitate the the design of a Data Collection Process (DCP) on water use data for the following water use categories: domestic, manufacturing industry, agriculture, thermoelectric power generation. The results of this participatory exercise are presented below, for each water use category separately.

3.2.1 WATER USE CATEGORY: DOMESTIC

1. What are the main sources of water for this water use, and which public entities are responsible for the distribution of water for that water use?

Distributor ➡ / Source:	Public Water Supply (PWS)	Self-supply	Other
from surface water	YES Whom: HCWW (Holding Company for Water and Wastewater)		
from groundwater			
Saline water			
Reclaimed Wastewater (non-treated)			
Treated Wastewater	YES Whom: HCWW		YES Whom: Private sector
Desalination	YES Whom: HCWW		YES Whom: Private sector/ Tourism
Rainwater harvesting			YES Whom: Private sector/ Tourism
Other source (specify)			

2. Is this water use currently measured (e.g. with water meters) or estimated (e.g. with proxies, coefficients, etc.)?

	Yes/ No	By whom?	How often?	How is it measured or estimated?
Measured	yes	HCWW	monthly	Per building (water meter bills)

Estimated	yes			

3. Select the appropriate/ meaningful scales of the data collection (DCP) that you want to design. These scales must be disaggregated (e.g. monthly, municipality, etc.). Of course, you have to compromise here the high resolutions with the data availability

	Preference 1	Preference 2	Preference 3
Spatial scale	building	Governorate	
Temporal scale	Monthly	annually	

4. What type of data do you need for your DCP?

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) quantity	HCWW	Monthly	HCWW	For the whole city, not for every building
b) quality	HCWW	Monthly	HCWW	For the whole city, not for every building

5. What type of ancillary data (e.g. population, irrigated acres per crop, etc.) do you need for your DCP? These are important in case you want to use proxies to estimate the water use.

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) population	MoHP (Ministry of Health and Population)	Yearly – or more (census data)	CAPMAS (Central Agency for Public Mobilization and Statistics)	Governorate, Urban Area/ Yearly

6. Briefly describe a suggested data collection and reporting schema (*e.g. X entity collects and quality checks the data every month, and sends them to X entity, who aggregates them at X level and sends them to the MWRI, CAPMAS, etc….)*

HCWW collects and send this data to MoHousing who conveys them to the CAPMAS

7. Briefly describe the main constraints, expected problems, etc., that you think you will confront in the Data Collection Process (DCP). List any ideas how to overcome them.

- not accurate data - not available most of the time - not easily accessible

8. Please suggest a pilot area where a pilot Data Collection Process (DCP) could be tested. This area may be a significant water user of this category, or an area where some good infrastructure already exists, or an area with low complexity, etc. Please justify why have you selected this pilot area?

New Cairo City

9. Any remarks, comments?

3.2.2 WATER USE CATEGORY: MANUFACTURING INDUSTRY

1. What are the main sources of water for this water use, and which public entities are responsible for the distribution of water for that water use?

Distributor ➡ / Source:	Public Water Supply (PWS)	Self-supply	Other
from surface water	YES Whom: HCWW (Holding Company for Water and Wastewater) regulates it	YES Whom: MWRI	
from groundwater		YES, in some factories/ industrial zones Whom: MWRI	
Saline water		YES, in some factories/ industrial zones Whom: MWRI	
Reclaimed Wastewater (non-treated)			
Treated Wastewater	YES Whom: HCWW		
Desalination		YES Whom: MWRI	
Rainwater harvesting			
Other source (specify)			

2. Is this water use currently measured (e.g. with water meters) or estimated (e.g. with proxies, coefficients, etc.)?

	Yes/ No	By whom?	How often?	How is it measured or estimated?
Measured	Yes	- Surface water is measured by the HCWW or the MWRI (monthly) - All Groundwater wells are metered and measured on annual basis	- Monthly (surface water) - Yearly (groundwater)	Per building (by water meter bills)
Estimated				

3. Select the appropriate/ meaningful scales of the data collection (DCP) that you want to design. These scales must be disaggregated (e.g. monthly, municipality, etc.). Of course, you have to compromise here the high resolutions with the data availability

	Preference 1	Preference 2	Preference 3
Spatial scale	factory	industrial zone	
Temporal scale	weekly	Monthly, annually	

4. What type of data do you need for your DCP?

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) Volume of water used	MWRI	Yearly	MWRI and CAPMAS (Central Agency for Public Mobilization and Statistics)	Governmental level / Yearly
b) Water quality parameters (Temperature, EC, pH, Hardness, Salinity, etc.)	MWRI	Yearly	MWRI	Governmental level / Yearly
c) Energy use/ Power consumption	MEE (Ministry of Electricity and Renewable Energy)	Monthly	MEE	Governmental level / Yearly

5. What type of ancillary data (e.g. population, irrigated acres per crop, etc.) do you need for your DCP? These are important in case you want to use proxies to estimate the water use.

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) number of employees	Owners and Investors	Variable (maybe every 6 months)	many entities	Governmental level
b) Working hours	Owners and Investors	Variable (maybe every 6 months)	many entities	Governmental level
c) Mass production	Owners and Investors	Variable (maybe every 6 months)	many entities	Governmental level
d) Type/ category of industries	Owners and Investors	Once in few years	many entities, MWRI	Governmental level

6. Briefly describe a suggested data collection and reporting schema (e.*g. X entity collects and quality checks the data every month, and sends them to X entity, who aggregates them at X level and sends them to the MWRI, CAPMAS, etc*….)

The entity (factory) will be responsible to collect and quality-check the data, and send it to the MWRI. The MWRI will review the data and aggregate them per industrial sector/ category. The MOHUUC

(Ministry of Housing, Utilities and Urban Communities) could also contribute to the review and aggregation process. It is important here to identify the most water consuming industrial sectors (e.g. textile industry, food & beverage, etc.).

7. Briefly describe the main constraints, expected problems, etc., that you think you will confront in the Data Collection Process (DCP). List any ideas how to overcome them.

Collaboration across entities and Ministries

8. Please suggest a pilot area where a pilot Data Collection Process (DCP) could be tested. This area may be a significant water user of this category, or an area where some good infrastructure already exists, or an area with low complexity, etc. Please justify why have you selected this pilot area?

Badr City (near New Cairo, far from river)

9. Any remarks, comments?

- The pre-paid meters are a new trend now in Egypt. There is an ongoing effort to expand their use in order to eliminate miss-use of water.
- Regarding the industrial surface water abstraction from Nile, this is for the Governmental factories and usually for cooling purposes. There are gates to measure these abstractions.
- It is a necessity to develop, install and implement a system for data collection, since there are factories that take water from the Nile, and a thorough monitoring is essential. It would be beneficial to have thus a national system in this respect.

3.2.3 WATER USE CATEGORY: AGRICULTURE

1. What are the main sources of water for this water use, and which public entities are responsible for the distribution of water for that water use?

Distributor ➡ / Source:	Public Water Supply (PWS)	Self-supply	Other
from surface water	YES (canals and drains) Whom: MWRI		YES Whom: WUAs Water Users' Associations: public water supply but managed (at the meska level) by the WUAs
from groundwater	YES Whom: MWRI	YES (wells) Whom: each farmer	
Saline water	YES Whom: MOHUUC (Ministry of Housing, Utilities and Urban Communities)		
Reclaimed Wastewater	YES (mixing of the water in		

(non-treated)	the canals with agriculture drainage water) Whom: MWRI		
Treated Wastewater	YES Whom: MOHUUC	Yes/No:	
Desalination			
Rainwater harvesting	YES Whom: MWRI		
Other source (specify)			

2. Is this water use currently measured (e.g. with water meters) or estimated (e.g. with proxies, coefficients, etc.)?

	Yes/ No	By whom?	How often?	How is it measured or estimated?
Measured	Yes	MWRI	Weekly, Monthly	With current meters (measuring the water use and discharge) at the main and branch canals
Estimated				

3. Select the appropriate/ meaningful scales of the data collection (DCP) that you want to design. These scales must be disaggregated (e.g. monthly, municipality, etc.). Of course, you have to compromise here the high resolutions with the data availability

	Preference 1	Preference 2	Preference 3
Spatial scale	Branch canal	Main canal	Meska
Temporal scale	Hourly, daily, or weekly (as required by the spatial scale and the remote measurements)		

4. What type of data do you need for your DCP?

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) Water level (in the main and branch canals)	Human and Remote sensing	Hourly, Daily	MWRI	Main canal, branch canal / Daily
b) Water discharge (in the main and branch canals)	Human and Remote sensing	Daily, Weekly, 15-days	MWRI	Main canal, branch canal / Daily
c) Water quality	Human and Remote sensing	Real-time, 5-days	MWRI	Main canal, branch canal / Daily

5. What type of ancillary data (e.g. population, irrigated acres per crop, etc.) do you need for your DCP? These are important in case you want to use proxies to estimate the water use.

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?

a) irrigated hectares per crop	MALR (Ministry of Agriculture and Land Reclamation)	15-days	MALR should be coordinated with MWRI	Irrigation District / 15-days
b) irrigation system/ method	MALR (Ministry of Agriculture and Land Reclamation)	4-months	MALR should be coordinated with MWRI	Irrigation District / 4-months

6. Briefly describe a suggested data collection and reporting schema (*e.g. X entity collects and quality checks the data every month, and sends them to X entity, who aggregates them at X level and sends them to the MWRI, CAPMAS, etc….)*

Data about water levels, discharge and water quality to be measured/collected every week at each district and aggregated by irrigation sectors
The MWRI, MALR and MoHP (Ministry of Health and Population) should coordinate among them and exchange data.

Stakeholders: MWRI + MALR ↔ MoHP

Process: Collect → Aggregate → Exchange → Publicize

7. Briefly describe the main constraints, expected problems, etc., that you think you will confront in the Data Collection Process (DCP). List any ideas how to overcome them.

- Irrigation efficiency differs across areas
- Financial resources limitations

8. Please suggest a pilot area where a pilot Data Collection Process (DCP) could be tested. This area may be a significant water user of this category, or an area where some good infrastructure already exists, or an area with low complexity, etc. Please justify why have you selected this pilot area?

Sinai – El Mahsama Drain (transmits water from MR to Sinai)

9. Any remarks, comments?

General comment:
Very generic and basic exercise. The findings should be reviewed by the MWRI Planning Sector for accuracy purposes. The exercise should also be repeated with multi-sectorial stakeholders and other Ministries/ entities involved in the collection of these data.

3.2.4 WATER USE CATEGORY: THERMOELECTRIC POWER GENERATION

1. What are the main sources of water for this water use, and which public entities are responsible for the distribution of water for that water use?

Distributor ➡ / Source:	Public Water Supply (PWS)	Self-supply	Other
from surface water			YES Whom: different entities (HCWW, MWRI)
from groundwater			
Saline water			
Reclaimed Wastewater (non-treated)			
Treated Wastewater			
Desalination			
Rainwater harvesting			
Other source (specify)			

2. Is this water use currently measured (e.g. with water meters) or estimated (e.g. with proxies, coefficients, etc.)?

	Yes/ No	By whom?	How often?	How is it measured or estimated?
Measured	No			
Estimated	YES	MWRI	annual	Estimated based on the pipe diameter. This is what is licensed for the station. If there is a modification, new licenses must be issued

3. Select the appropriate/ meaningful scales of the data collection (DCP) that you want to design. These scales must be disaggregated (e.g. monthly, municipality, etc.). Of course, you have to compromise here the high resolutions with the data availability

	Preference 1	Preference 2	Preference 3
Spatial scale	Factory (all the openings/ intakes that supply the factory)		
Temporal scale	Once when built, and updated annually		

4. What type of data do you need for your DCP?

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) data related to the license of the water intake	MWRI	Yearly	MWRI	By intake / Yearly or when there is a change in the intake
b) Water quantity	MWRI	Yearly	MWRI	By intake / Yearly or when there is a change in the intake

5. What type of ancillary data (e.g. population, irrigated acres per crop, etc.) do you need for your DCP? These are important in case you want to use proxies to estimate the water use.

Data category	Who collects these data?	How often are these data collected?	Who holds these data? Is it the same entity that collects them?	At what scale (spatial / temporal) are these data currently available?
a) number of factories and their location	MoTI (Ministry of Trade and Industry) ?	?	MoTI ?	?

6. Briefly describe a suggested data collection and reporting schema (*e.g. X entity collects and quality checks the data every month, and sends them to X entity, who aggregates them at X level and sends them to the MWRI, CAPMAS, etc….*)

- The district engineer can collect the data, send it to the General Directorate and then to the MWRI.
- The MOEE (Ministry of Electricity and Renewable Energy) should send information and data about new plans to the MWRI.

7. Briefly describe the main constraints, expected problems, etc., that you think you will confront in the Data Collection Process (DCP). List any ideas how to overcome them.

- Problems with the accuracy of the data
- Limitations in the continuity of the data
- Limited staff for data collection, analysis and aggregation (lack of human resources)
- This type of data collection is not simple and direct, and different entities are involved which need to be adequately coordinated (lack of coordination across stakeholders)
- Pollution related data are lacking

8. Please suggest a pilot area where a pilot Data Collection Process (DCP) could be tested. This area may be a significant water user of this category, or an area where some good infrastructure already exists, or an area with low complexity, etc. Please justify why have you selected this pilot area?

Cairo industrial areas

9. Any remarks, comments?

The installation of pre-paid meters is a new trend in Egypt now, and very important to minimize the miss-use of water.

4 PROFILE OF THE PARTICIPANTS

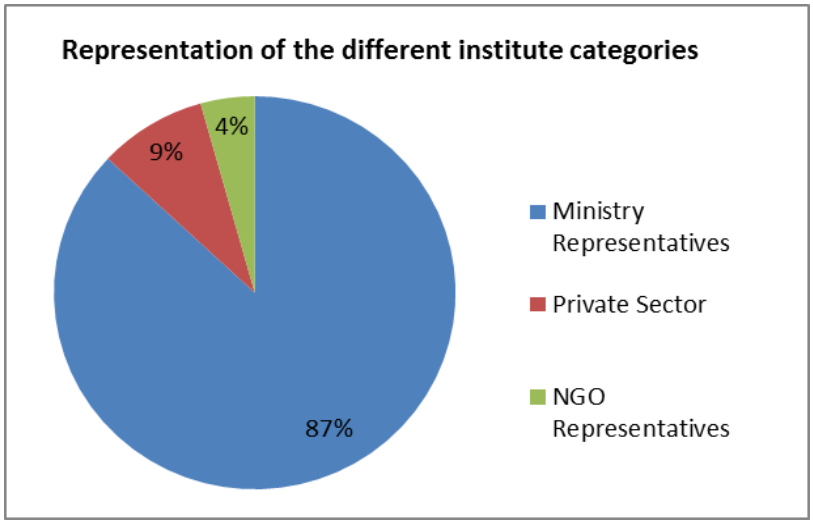
The audience included technical and managerial staff from the MWRI who are involved in either of the following topics: water use and/or water resources monitoring and analysis, water use and demand management, water use efficiency, water management at the decentralized level, water works planning.

More specifically, a total of 20 MWRI staff participated from the following MWRI Sectors and Departments:

- Planning Sector (3 participants)
- Egyptian Public Authority for drainage projects (EPADP) (3 participants)
- Groundwater Sector (4 participants)
- Nile Water Sector (1 participant)
- Reservoirs and Grand Barrages Sector (RGBS) (1 participant)
- Shore Protection Authority (1 participant)
- Central Water Distribution Directorate (1 participant)
- Monitoring and Communication Sector (1 participant)
- Monitoring and Economic Sector (1 participant)
- External Cooperation Department (1 participant)
- Minister Technical Office (1 participant)
- Not-specified sector (2 participants)

Regarding the participants' demographics, a total of 23 participants attended the workshop (for a detailed participants' list refer to Annex 7.2), of which 39% women and 61% men, and with the following institutional mix: 87% from ministries, 9% from the private sector, 4% from NGOs.

Figure 4-1: Representation of the different institute categories in the workshop



5 EVALUATION OF THE EVENT

5.1 RESULTS OF THE EVENT

A. <u>Organisational, administrative and planning issues before and during the event</u>

A set of 11 criteria (A1-A1 see table below) have been assessed by the participants, using a qualitative description ranging between "Excellent" to " Poor", with an opportunity to provide suggestions for improvement. For the sake of comparison, the qualitative descriptions are given Series Numbers as follows:

Excellent = 4 Good = 3 Average = 2 Poor = 1

A1	Appropriate handling of invitations, visa support, information sharing and smoothing obstacles
A2	Efficient logistics: accommodation, transportation, location of venue and interpretation (where applicable)
A3	Provision of support (if requested) for participants' preparation for the event
A4	Efficient and effective follow-up of preparations and progress towards the event
A5	Planning of the event: selection and design of methodology, programme/ daily agenda and work rules
A6	Smooth flow of programme, efficient handling of emerging needs and attentiveness to participants concerns
A7	Presentations correspond and contribute to the planned objectives and are conducive to enhanced shared understanding and participation on addressed topics
A8	Clarity, coverage and sufficiency of concepts, objectives, anticipated outputs and outcomes
A9	The materials distributed were helpful
A10	Efficient and Effective Facilitation
A11	Overall rating of the event

The results of the assessment for each criterion are presented in the table below and in the following graphs (per criterion).

Table 5-1: Results of the assessment (rating) of the organisational, administration and planning aspects of the workshop

No.	Criterion	Average score

No.	Criterion	Average score
A1	Appropriate handling of invitations, visa support, information sharing and smoothing obstacles	3,50 / 4
A2	Efficient logistics: accommodation, transportation, location of venue and interpretation (where applicable)	3,25 / 4
A3	Provision of support (if requested) for participants' preparation for the event	3,25 / 4
A4	Efficient and effective follow-up of preparations and progress towards the event	3,00 / 4
A5	Planning of the event: selection and design of methodology, programme/ daily agenda and work rules	3,33 / 4
A6	Smooth flow of programme, efficient handling of emerging needs and attentiveness to participants concerns	3,00 / 4
A7	Presentations correspond and contribute to the planned objectives and are conducive to enhanced shared understanding and participation on addressed topics	3,33 / 4
A8	Clarity, coverage and sufficiency of concepts, objectives, anticipated outputs and outcomes	2,83 / 4
A9	The materials distributed were helpful	3,40 / 4
A10	Efficient and Effective Facilitation	3,17 / 4
A11	Overall rating of the event	3,33 / 4

Figure 5-1: Rating of the organizational and administrative aspects on the workshop

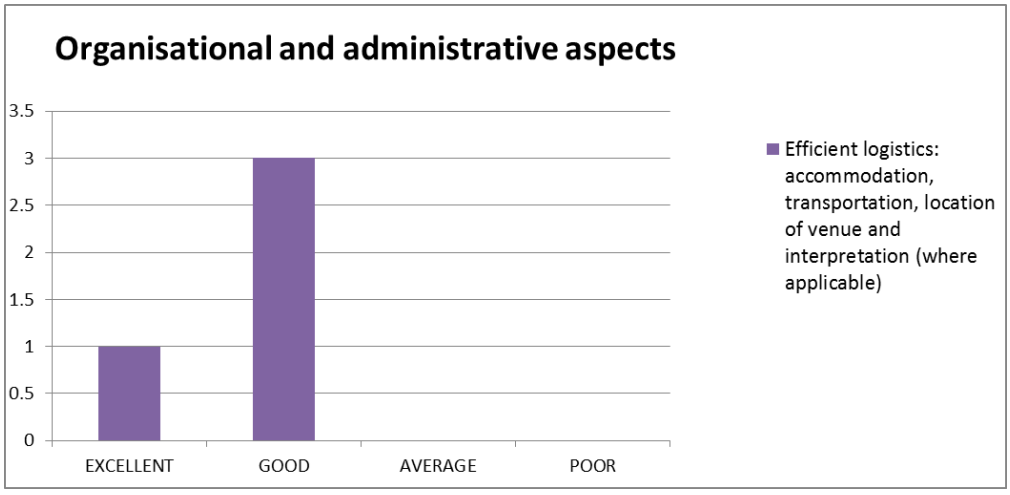


Figure 5-2: Rating of the workshop programme planning and flow

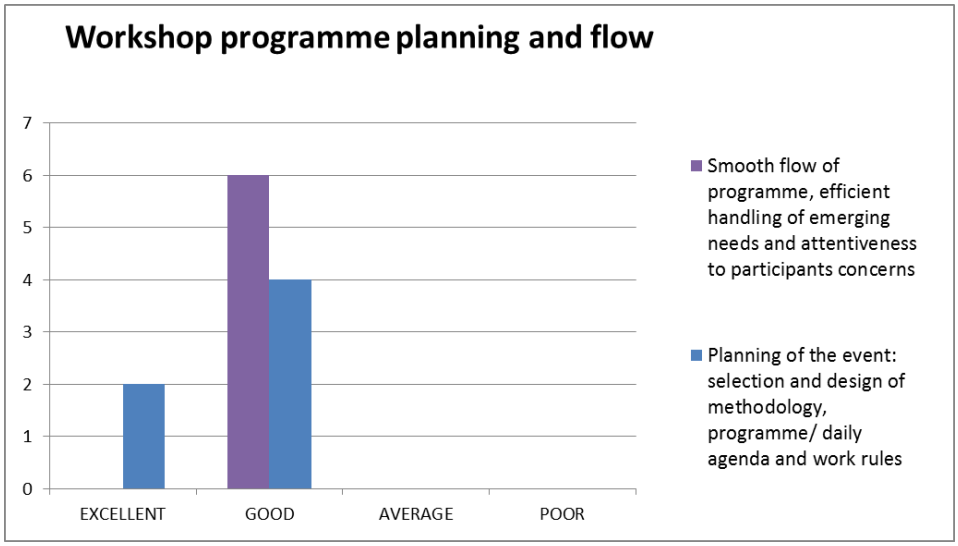
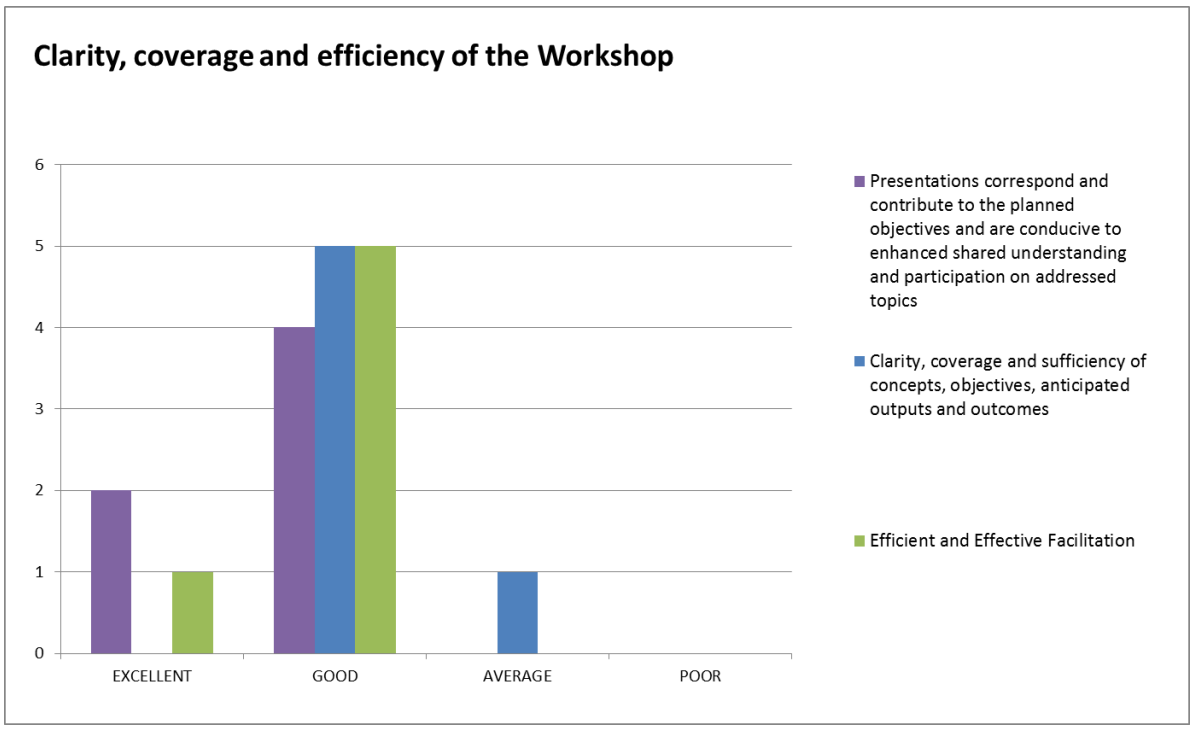


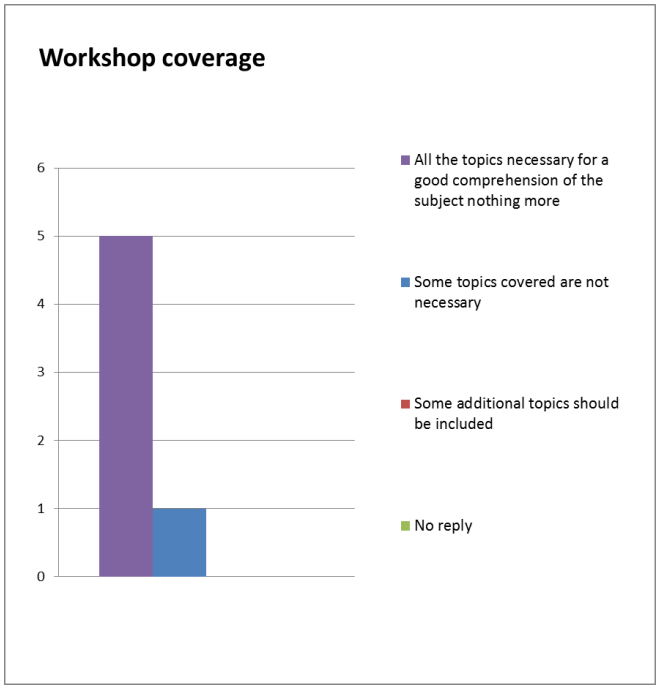
Figure 5-3: Rating of the workshop clarity, coverage and efficiency



B. Feedback by participants on technical aspects:

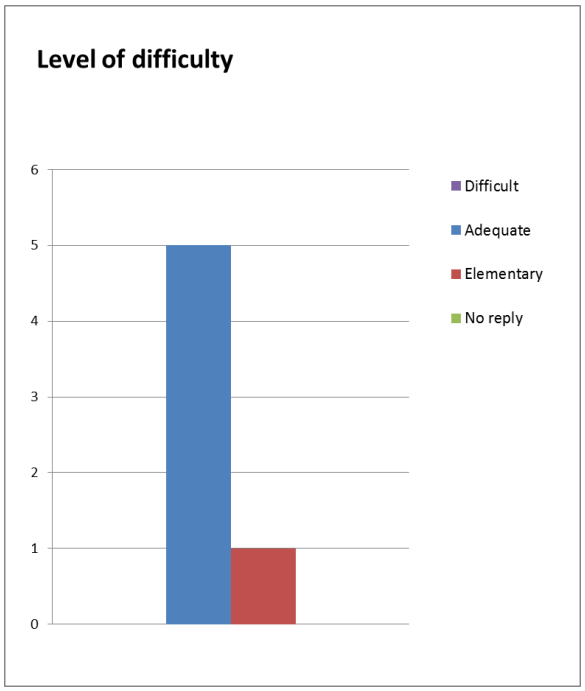
Coverage of the event: Regarding the event coverage evaluation, 83% of the participants felt that all the topics necessary for a good comprehension of the subject (and nothing more) were covered, and 17% felt that some of the topics covered were not necessary.

Figure 5-4: Rating of the workshop coverage



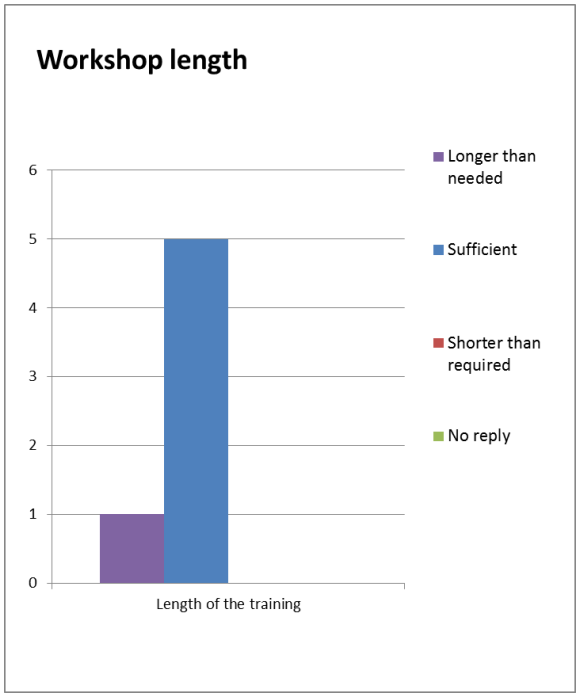
Level of difficulty: Regarding the evaluation of the level of difficulty of the workshop, 83% of the participants reflected it was adequate, and 17% of the participants reflected it was elementary

Figure 5-5: Rating of the level of difficulty of the workshop



Length of the workshop: Regarding the workshop duration, 83% of the participants thought it was sufficient, and 17% thought it was longer than needed.

Figure 5-6: Rating of the workshop length



What is the most valuable thing you learned during the workshop (knowledge or skills)? The following answers have been provided by the participants:

(a) Decentralization of water management and groundwater protection
(b) Overall views and counties experiences
(c) Definitions, water budget

How do you think that the current event will assist you in your future work on the subject? The following answers have been provided by the participants:

(a) In preparing policies for water management
(b) In improving communication (global communication is needed)
(c) Will help in more details of my work

Please indicate whether (and how) you could transfer part of the experience gained from the event to your colleagues in your country. The following answers have been provided by the participants:

(a) By training courses and workshops
(b) By open talk with colleagues
(c) By disseminating the different definitions and methodologies on water budget

What did you like most about this event? The following answers have been provided by the participants:

(a) Experiences' exchange between different countries

(b) Well prepared event
(c) The arrangement, the data

What needs to be improved? The following answers have been provided by the participants:

(a) Other topics dealing with public awareness
(b) Field visits of already working pilot areas
(c) Provide information on the international standards to classify water use efficiency (is it poor, or good, or very good, or excellent from point of view of conveyance?)
(d) Our Country's evaluation and records
(e) Irrigation records of the Nile River
(f) Nothing to be improved

6 CONCLUSIONS & OVERALL ASSESSMENT

The workshop objectives have been met as the participants have gained an improved understanding of how to classify and assess water uses, for the different sectors, based on international standards, and how to analyse the water balance and what tools can be used for this purpose. Furthermore they have improved their knowledge on the different demand management options, water conservation and water use efficiency technologies and practices for the domestic sector, and on how to take decisions on investing in infrastructures/ water works and interventions using multiple criteria.

The participatory exercise on how to design a Data Collection Process (DCP) for water use data has been well received by the participants, who have been seriously engaged in this group hands-on activity. They exchanged knowledge and experiences, and openly discussed various key issues. As an output of this exercise, the current status of water use data availability and accessibility in Egypt for four key sectors (domestic, manufacturing industry, agriculture, thermoelectric power generation) has been discussed and analysed, while suggestions for future data collection and data flow improvements have been proposed.

One of the issues that emerged during the workshop is the weak coordination among institutions that collect and hold water use and water balance data: different data exist among the different stakeholders (mainly Ministries), yet consolidation and exchange of data is poor among them. In some cases, there is even some lack of knowledge among departments of the same institutes. Constructive dialogue, consolidation and strong coordination are thus of paramount importance for data organisation and dissemination which are spread across different institutions.

7 ANNEXES

7.1 AGENDA

SWIM-H2020 SM Closing Workshop on "water demand management, planning and infrastructure development"

Venue: Steigenberger Hotel

Tuesday, January 22nd, 2019

Item	Time	Description	Speaker
9:00 – 09:30		Registration	
#1	09:30 – 10:00	▪ Welcome remarks ▪ Presentation of the workshop objectives and agenda ▪ Tour de table (introduction of the participants)	▪ Dr. Eman Sayed, Head of the Planning Sector, MWRI ▪ Dr. Maggie Kossida (SWIM-H2020 Non-key Expert)
#2	10:00 – 10:30	Methods for classifying and assessing water uses	Dr. Maggie Kossida (SWIM-H2020 Non-key Expert)
#3	10:30 – 11:00	Methodological approach for assessing water balances and practical calculation tools	Dr. Maggie Kossida (SWIM-H2020 Non-key Expert)
	11:00 - 11:15	**Coffee Break**	
#3	11:15 – 12:15	Participatory discussion on issues related to water use and water balance assessment, constraints, etc.	All participants
#4	12:15 – 13:00	Overview of different demand management options and water saving technologies across different sectors, and practical guidelines	Dr. Maggie Kossida (SWIM-H2020 Non-key Expert)
	13:00 – 14:00	**Lunch Break**	
#5	14:00 – 15:00	Methods for planning and infrastructure development (i.e. how to take a decision on investing in infrastructures/ water works and interventions)	Eng. Demetris Zarris (SWIM-H2020 Non-key Expert)
#6	15:00 – 16:00	Participatory exercise with the MWRI staff	All participants
	16:00 – 16:15	**Coffee Break**	
#7	16:15 – 17:00	Reporting back from the participatory exercise	All participants *Facilitator: Dr. Maggie Kossida* *Rapporteur: Eng. Demetris Zarris*

#8	17:00 – 17:30	Closing remarks Workshop Evaluation (Questionnaires)	All participants

7.2 LIST OF PARTICIPANTS

Table 7-1: List of participants

COUNTRY	TYPE OF INSTITUTION (please use the options provided*)	TITLE (Mr/Ms)	FIRST NAME	LAST NAME	POSITION/ FUNCTION	ORGANISATION/ INSTITUTION	EMAIL
EGYPT	MINISTRY REPRESENTATIVES	Mr	Nahed	Sabra	Deputy Manager for Foreign finance	Planning Sector	nahed_sabra@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Ms	Dina	Ali	Technical Office Engineer	EPADP/ MWRI	e.dinaali99@gmail.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Ahmed	Elsayed	Working manager	EPADP/ MWRI	saidahmed603@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Ms	Sally	Ali	Technical Office Engineer	Groundwater sector	ss_sallysally@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Dr	Tahani	Sileev	Head of Central Dpt of Ext. Coop.	Nile water Sector	tsileev@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Ms	Magda	Adbelhady	Manager of contracting		maelhady3110@gmail.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Mohamed	Yahia Hamad			myahia32@yahoo.com
GREECE	PRIVATE SECTOR	Mr	Dimitris	Zarris	NKE	SWIM-H2020 SM	dez@ldk.gr
EGYPT	MINISTRY REPRESENTATIVES	Mr	Mahmoud	Magrass	Technical Office Manager of Head of RGBS	RGBS/ MWRI	magrass@gmail.com
EGYPT	MINISTRY REPRESENTATIVES	Eng	Ebtsam	Hasan	Engineer	Planning Sector/ MWRI	hasanebt@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Ms	Rabab	Abbas	Water Ressources Planner	Planning Sector/ MWRI	rabab1403@hotmail.com
EGYPT	MINISTRY REPRESENTATIVES	Dr	Moamen	Elsharkawy	Head of Central Directorate	Monitoring and Communication sector	msharkawi@mwri.gov.eg
EGYPT	MINISTRY REPRESENTATIVES	Dr	Ayman	Ibrahim	Sector Head	Monitoring and Econom. sector	ayman16@hotmail.com
EGYPT	MINISTRY REPRESENTATIVES	Eng	Nabil	Mechail	Head of Central Water Distribution Directorate	MWRI	Nabil_Nassis@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Ahmed	Abed	Water Ressources Engineer	External Cooperation dpt	eng.yassim_2022@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Ahmed	Abdelwahab	GWS Head Assiss	GWS	a_aw_2005@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Ahmed	Omar	Minister Technical office		a.omar5589@gmail.com
EGYPT	MINISTRY REPRESENTATIVES	Eng	Ashraf	Freeg	Technical office GWS	GWS	eng.a_freeg@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Mr	Ashraf	El-shaer	General Director of Planning	Shore Protection Authority/ MWRI	ashraf_el_shaer@hotmail.com

COUNTRY	TYPE OF INSTITUTION (please use the options provided*)	TITLE (Mr/Ms)	FIRST NAME	LAST NAME	POSITION/ FUNCTION	ORGANISATION/ INSTITUTION	EMAIL
EGYPT	NGOs REPRESENTATIVES	Mr	Essam	Nada	NKE	SWIM-H2020 SM	enada2013g@gmail.com
EGYPT	MINISTRY REPRESENTATIVES	Eng	Rasha	Hamed	Technical office GWS	GWS	rashahamed888@yahoo.com
EGYPT	MINISTRY REPRESENTATIVES	Eng	Abeer	Mbrook	Technical office engineer	EPADP	beero73@hotmail.com
GREECE	PRIVATE SECTOR	Ms	Maggie	Kossida	NKE	SWIM-H2020 SM	maggie@ldk.gr