



## **“REG-14: Refugee Emergency: Fast track project design on water, wastewater and solid waste (focussing on wastewater and solid waste), 26-29 March 2018**

### **Info note - Track 1: “Wastewater Treatment”**

## **1 INTRODUCTION: THE SWIM-H2020 SM**

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The SWIM and H2020 SM is a Regional Technical Support Program, funded by the European Commission, Directorate General (DG) NEAR (Neighbourhood and Enlargement Negotiations), 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.

## **2 BACKGROUND**

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Several partner countries are facing increasing challenges with water scarcity (coupled with limited resources in financing the water and wastewater sector), which is exacerbated by the influx of the refugees from neighboring countries due to the political unrest in the region. Syria's civil war, almost in its seventh year, has driven more than 60 per cent of its pre-war population from their homes. According to UN estimates, 4.8 million Syrians have fled their country as refugees, seeking safety in Jordan, Lebanon, Turkey, Iraq and beyond. Another 8.7 million Syrians are displaced inside Syria, forced by conflict or insecurity to move



homes, villages or even regions, often many times over. The massive exodus of population from Syria has placed enormous pressure on nearby countries.

In Jordan, the addition of more than a million Syrians has skewed demographics to the point where, according to World Bank officials, refugees now constitute a third of the population, which stood at 9.5 million during 2015. In Lebanon, the influx of refugees has resulted in the overpopulation of the camps and cities. According to the UNHCR, there were over a million Syrian refugees who had been registered in Lebanon in 2016. This figure is likely largely underestimated and recent estimates were as high as 1,500,000 people. In Gaza strip of Palestine, cycles of conflict with Israel have required that the Palestinian Water Authority (PWA) and the Coastal Municipalities Water Utility (CMWU) shift funds for development and operations to crisis response. The changes in the demand spurred by the conflict have adversely affected the performance of the water sector in the three countries, and have exerted severe pressure on the existing water and wastewater infrastructure. Several cases exist where recently upgraded/constructed wastewater treatment plants were already overloaded upon their handover and the construction of new plants was required. The challenge is to provide the refugee camps and the hosting communities with adequate water and sanitation services under severe water stress; and/or ensure that water supply networks are rebuilt to new specifications that will accommodate the increased flow.

Management of increased solid waste quantities is also a major challenge that existed even before the crisis. The influx of refugees has markedly lowered the level and quality of solid waste management and municipal services while the disposal sites which are neither sanitary nor sufficient to accommodate the total volume of waste produced on a daily basis, lead to acute practical disposal issues and even greater environmental and hygiene impacts.

As part of its workplan, SWIM-H2020 SM has arranged for the sub regional training “REG-14: Refugee Emergency: Fast track project design on water, waste water and solid waste (focusing on wastewater and solid waste).

### 3 SCOPE & OBJECTIVES

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As part of its project workplan, the EU funded SWIM-H2020 SM project is organizing a sub-regional on-site training workshop (REG-14) on Refugee Emergency titled “Fast track project design on water, waste water and solid waste (**focusing on wastewater and solid waste**)”. The training will focus on the design, **under conditions of emergency**, of wastewater treatment and solid waste systems and will be co-mentored by the Mediterranean Hot Spots Investment Programme II (MeHSIP-II) of the European Investment Bank (EIB), and coordinated by the SWIM component of the project through LDK; the leading company of the SWIM-H2020 SM consortium:

The sub-regional on-site training is split into two training tracks:

1. **Track 1: Four day-training on “Refugee Emergency: Fast track project design on water and wastewater” (focusing on wastewater).**
2. **Track 2: One and a half day training on “Refugee Emergency: Fast track projects design of solid waste management systems” (collection and transfer, landfills, recycling)**



The two tracks will run in parallel and overlap during the last day in plenary sessions that are common to both tracks.

**This concept note is pertinent to the wastewater component of the sub-regional training (i.e. Track 1 and the plenary sessions addressing issues that are common between the trainees of both tracks)**

The overall aim of this specific sub regional training is to bring together the key stakeholders (from four countries: Jordan, Lebanon, Palestine and Tunisia) who are involved in management and design of wastewater treatment facilities, introduce them to the relevant technical concepts and approach for the proper design of wastewater treatment facilities taking also in account the description and requirements for emergency sanitation facilities in response to the influx and displacement of refugees. This topic was part of the communicated priorities for **Jordan, Lebanon and Palestine** during the Fact Finding mission of SWIM-H2020 SM in 2016, while **Tunisia** expressed interest in participation during the steering committee meeting of Sep. 2016.

The specific objectives of the workshop are:

1. Build the capacity of the relevant staff in the four countries through the provision of in-depth tailored training in the design of wastewater treatment facilities. Consideration will be given to treatment solutions that can be adopted for temporary settlements and refugee camps.
2. Examine long term solutions that can be adopted for permanent refugee camps or long term temporary settlements.
3. Sharing of experiences within the sub-region in dealing with the influx of the refugees as it relates to organisational and financing issues.

## 4 APPROACH TO MEET WORKSHOP OBJECTIVES

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In order to achieve the workshop objectives, a highly dynamic, interactive, facilitated and participatory approach will be adopted, making use of professional learning tools such as:

1. Presentations by trainers and by the participants
2. Facilitated round table discussions
3. Personal and/or National perspectives

The training will also take into account pressing interests that are identified during the sessions.

Design examples as well as a number of Excel spreadsheets to help master the design theory presented in the course will be provided, in addition to references for further readings.

Post training assessment will provide specific feedback on the understanding of wastewater treatment fundamentals and processes.

Copies of the training material will be prepared by the course trainer and provided to all participants on a flash memory and in print-out. A certificate of attendance will be awarded to all participants at the end of the course

The language of the Workshop will be English and Arabic.



## 5 RESOURCES FOR PARTICIPANTS

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Resources that are intended to be provided to participants are:

1. PowerPoint presentations
2. Handouts (since this is a highly technical workshop, it is recommended that presentations are printed, to enable the participants to dedicate their full attention to the speaker while adding relevant explanatory notes)
3. Groups discussions
4. Case studies and group exercises

## 6 INSTRUCTORS OF THE COURSE

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1. Mohammad Sutari, Wastewater Consultant – Environment Expert, European Investment Bank – MEHSIP (Jordan).
2. Invited speakers:
  - Dima Sader: Economic and Social Fund for Development (Lebanon)
  - Feda Ghairabeh: Director of Humanitarian Relief Support; Ministry of Planning (Jordan)
  - Hussain Mhaidat (TBC): Ministry of Municipal affairs (Jordan)
  - Prasad Bhagwan Sevekari: Regional WASH Advisor – MENA. Oxfam International, Amman, (Jordan)
  - Ciara Noon: WASH Technical Coordinator for ACTED (Lebanon)
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## 7 TRAINING CONTENT

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The training course is comprehensive and divided into two parts:

**Part 1 is dedicated for the technical aspects of wastewater treatment and design;** divided into 15 sections, with section 1 on “Wastewater characterization” being considered as prerequisite for process design using simulation modelling.

The material in the slides is prepared in a fashion that can be used as design guidelines for wastewater treatment plants.

The main purpose of the course is to help engineers to master the optimized wastewater treatment plant design procedure for the most commonly used nitrogen removal systems. The course will include as/when applicable special considerations related to wastewater treatment solutions that can be adopted for temporary settlements/camps as they would be for long term temporary settlements and/or permanent settlements. Below are the subjects that will be addressed:

- Wastewater chemistry and Characterisation



- Bacterial metabolism
- Mass balances
- Nitrification & denitrification
- Optimized design of nitrogen removal
- Biological and chemical phosphorus removal
- Final settler design-solids flux theory
- Sludge thickening
- Aerobic & Anaerobic digestion
- Sizing of aeration capacity
- Filtration & Disinfection
- Current practices and main issues related to wastewater treatment.
- Wastewater treatment quality standards with experience sharing from the Partner Countries.
- Adopted sanitation solutions in some of the refugee camps in Jordan.
- Adopted sanitation solutions for long term refugee camps in Jordan and Syria.

**Part 2 is dedicated to presentation of experience from governmental and relief organisations within the sub-region** with a view to both organisational/administrative aspects including procedures for applying for funds for emergency water/wastewater/solid waste projects. Sessions related to this part include:

- The Jordanian experience with the Syrian refugees crisis; introducing the process related to the formulation of Jordan's response plan to the refugees crisis (overall coordination),
- Lessons learned from the response to the Syrian Crisis, in terms of the administrative set up (from the side of the Ministry of Municipal Affairs in Jordan)
- How humanitarian aid works and applying for funds from emergency relief organizations (OXFAM and ACTED)

## 8 TARGET AUDIENCES

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The targeted groups for the wastewater treatment course will be Technical Staff responsible for the preparation of the technical components and the terms of reference and for reviewing the design of wastewater systems, as part of the design and construction of wastewater treatment plants management systems.

Up to five representatives per participating countries from the directorates/departments responsible for performing/overseeing studies and designs of wastewater treatment plants in the water sector, including two from the water/wastewater utilities (if the latter are involved in procuring the design and construction of wastewater treatment plants; as applicable in the country).



## 9 LEARNING OUTCOMES

- The nominated technical staff will be provided with in depth training in the design of wastewater treatment plants.
- Understanding the requirements for sanitation facilities and solutions that can be adopted for temporary settlements/camps as they would be for long term temporary settlements and/or permanent settlements.
- Understanding and comparison of the specific wastewater treatment standard for each partner country.
- Lessons learnt in wastewater treatment and solid waste management schemes / facilities under emergency, based on the accumulated hands-on experience as a result of dealing with temporary settlements related to refugees in the sub-region.

## 10 TRAINING AGENDA

Item	Time	Description	Speaker
<b>26 March</b>			
1	09:00-09:10	Welcome Remarks	Suzan Taha
2	09:10-09:30	Pre training test	Mohammad Sutari
3	09:30-11:00	Wastewater Constituents, Chemistry, Characterization & Microorganisms	Mohammad Sutari
	<b>11:00-11:20</b>	<b>Coffee Break</b>	
4	11:20-13:00	Flow, Loads & Discharge Standards & Lessons Learnt Under Emergency	Mohammad Sutari
	<b>13:00-14:00</b>	<b>Lunch Break</b>	
5	14:00-15:00	Preliminary & Primary Treatment	Mohammad Sutari
6	15:00-16:30	Water & Sanitation Facilities for Refugee Camps Under Emergency	Mohammad Sutari
<b>27 March</b>			
7	09:00-11:00	Activated Sludge Process -Session 1	Mohammad Sutari
	<b>11:00-11:20</b>	<b>Coffee Break</b>	
8	11:20-13:00	Activated Sludge Process - Session 2	Mohammad Sutari



	13:00-14:00	Lunch Break	
9	14:00-15:00	Secondary Clarifiers	Mohammad Sutari
10	15:00-16:00	Chemicals Addition & Biological & Chemical Phosphorus Removal	Mohammad Sutari
<b>28 March</b>			
11	09:00-10:00	Aeration & Mixing Systems	Mohammad Sutari
12	10:00-11:00	Sludge Treatment and Possible Energy Generation	Mohammad Sutari
	11:00-11:20	Coffee Break	
13	11:20-12:20	Tertiary Treatment - Filtration & Disinfection	Mohammad Sutari
14	12:20-13:00	Configuration, Layout & Overview of Other Treatment Processes	Mohammad Sutari
	13:00-14:00	Lunch Break	
15	14:00-14:30	Example of Water & Sanitation Systems for Permanente Refugee Camps	Mohammad Sutari
16	14:30-16:00	Closing of Training and Post training test and assessment	Mohammad Sutari

<b>29 March: Plenary sessions</b>			
1	09:00-09:40	<b>Jordan response to the Syrian Crisis: moving from crisis management to planned response:</b> <ul style="list-style-type: none"> <li>- Process/Procedures for the development of Jordan Response Plan (JRP)</li> <li>- Q&amp;A</li> </ul>	Ammar Abu-Drais, Solid Waste Consultant (Short term solutions - the case of Jordan); SWIM-H2020 SM
2	09:40-10:20	<b>Lessons learned from the response to the Syrian Crisis (Case of Lebanon): ESFD's approach</b> <ul style="list-style-type: none"> <li>- Presentation by the Economic and Social Fund for Development</li> <li>- Q&amp;A</li> </ul>	Dima Sader, Community Development and Infrastructure Manager, Economic and Social Fund for Development (Lebanon Office)
3	10:20-11:00	<b>How humanitarian aid works and applying for funds</b> <ul style="list-style-type: none"> <li>- Presentation by Oxfam International</li> <li>- Q&amp;A</li> </ul>	Prasad Bhagwan Sevekari - Oxfam International Regional WASH Advisor – MENA (Jordan office)
	11:00-11:30	Coffee Break	



4	11:30--12:00	<b>Municipal peer to peer learning: how best practices in solid waste and wastewater management can be replicated through on the job coaching between municipalities</b> <ul style="list-style-type: none"><li>- Presentation by ACTED</li><li>- Q&amp;A</li></ul>	Ciara Noon: WASH Technical Coordinator for ACTED (Lebanon)
5	12:00-12:30	<b>Solid Waste Management plans of the Greater Amman Municipality / The impact of the Syrian crisis</b> <ul style="list-style-type: none"><li>- Presentation by Greater Amman Municipality (GAM)</li><li>- Q&amp;A</li></ul>	Omar Arabiyat: Manager of Env. Studies and Planning Department Greater Amman Municipality (GAM)
#6	12:30-13:00	<b>Guidelines for waste management in refugee camps</b> <b>Case study in Lebanon</b> <ul style="list-style-type: none"><li>- Presentation by Arcenciel</li></ul> Q&A	Arcenciel
	12:30-13:30	<b>Lunch</b>	