TRAINING REPORT

Study Visit on Leachate management

(ST-4)

Combined with the:

- National activity for Lebanon "Training on the Management of Leachate" (EH-LB-2).

- Launch and results of the Peer-to-Peer exchange (P2P-6) on leachate management

Gefinor Rotana Hotel
Beirut, Lebanon
June 25-29, 2018

SWIM and Horizon2020 Support Mechanism

Version	Document Title	Author	Review and Clearance
1	Training Report on "Study Visit on Leachate management" (ST-4), combined with the national activity for Lebanon "Training on the Management of Leachate" (EH-LB-2) & the Peer-to-Peer exchange (P2P-6) on leachate management	Ahmed Gaber Stavros Vlachos Abder Maloum	Anis Ismail Michael Scoullos

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.

Acknowledgements:

We would like to express our appreciation to Mr Bassam Sabbagh and his team and colleagues at the Ministry of Environment (Ms. Sabine Ghosn, Mr Ahmad Mroueh) for their valuable support.

Disclaimer:

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the SWIM-H2020 SM Project and do not necessarily reflect the views of the European Union.

TABLE OF CONTENTS

1 GENERAL INTRODUCTION

The selection of the Project themes and activities was made according to the Work Programme of Horizon2020 (2015-2020), developed during phase I of the project Horizon 2020 CB/MEP, the ToRs for SWIM-H2020 SM issued by the European Commission and the views expressed by the countries and stakeholders during the fact finding missions (inception phase). The Project Workplan was approved at a first step by the EUDs and the Commission and endorsed at a second step during the SWIM-H2020 SM's Steering Committee Meeting held in Brussels (27-28 September 2016).

A total of 15 (fifteen) regional on-site training activities and 6 (six) study tours with participants from most/all PCs were incorporated in the Project Work Plan.

This activity was implemented in Beirut on 25-29 June 2018, under the cross-cutting component of the project "ICZM-IWRM" and clustered in the Project Work Plan under WP3: Training Activity, ST-4: Study Tour to visit different types of state-of-the-art Hazardous Waste Management Facilities. It was implemented under the "Industrial Pollution and Hazardous Waste" theme and the topic of focus was "Sustainable Leachate Management". A Peer-to-Peer exchange activity was also launched during the ST-4 which is clustered in the Project Work Plan under WP2, P2P-6: Management of Industrial waste to address the acute problem of hazardous substances disposal (focus on leachate management). This study tour was also linked to the SWIM-H2020 SM national activity for Lebanon "Training on the Management of Leachate" (EFH-LB-2).

1.1 RATIONALE

The environmental risks of leachate generation arise from it escaping into the environment around landfills, particularly to watercourses and groundwater. These risks can be mitigated by properly designed and engineered landfill sites. As the MENA countries are beginning to adopt modern solid waste management practices either through creating new facilities or by upgrading existing dumpsites and unsanitary landfills, leachate management requires special attention dealing with treatment technologies, operation procedures and procurement options.

This set of activities aimed to reinforce the capacities of decision-makers and technical staff on the integrated approach to the sustainable management of leachate based on state-of-the-art technologies and best practices including planning, finance and procurement options. It is expected that they are now better able evaluate the existing situation at legal, institution and technical levels in their countries/regions to upscale them, specifically through interesting case studies from Lebanon (existing, under construction and planned infrastructures).

Lebanon was chosen as the venue of the Study Tour after the Inception mission of activity EFH-LB-2 (December 2017). During the mission, the Non-Key Expert in charge (Dr. Ahmed Gaber) visited various

facilities in Lebanon, some of which he identified as particularly useful as case studies and sites to be visited not just by the Lebanese trainees but also by the trainees of the other partner countries, which are dealing with very similar challenges.

With the support of the Ministry of Environment of Lebanon, visiting access of the trainees was granted to the facilities selected.

1.2 REGIONAL CONTEXT

Despite initiatives for enhanced recycling and waste utilization in the MENA region, landfilling still represents the dominant disposal path for municipal solid waste (MSW). Various types of waste are disposed into unsanitary landfill sites without any separation or classification of hazardous and non-hazardous waste. The constituents of the MSW undergo biological and chemical degradation after disposal, resulting in emissions of landfill gas and discharge of leachate, a highly polluted form of wastewater. The leachate from unsanitary landfills has complex characteristics that are dependent on the composition of solid waste in the landfill. When discharged into the environment, leachate poses serious threats to human health and the ecosystem. Leachate is also generated as a consequence of rainwater percolation through wastes, chemical biological processes in waste and the inherent water content of wastes themselves. Furthermore, landfill leachate generation remains continuous when water comes in contact with the solid waste.

Some examples of the leachate problem in the Mediterranean, and the relevance of ST-4, are as follows: In Tunisia, the largest landfill “Jebel Chakir” receives on a daily basis, 1800 tons of MSW of which 65% are organic matter[1]. The high moisture values in MSW contribute to the production of large quantity of leachate. The leachate is collected with high density polyethylene pipes and stocked in 13 storage basins of total capacity 130,000 m^3. In Jordan, one objective for the “Al Ghabawi landfill” expansion project is to upgrade the landfill and generate electricity while mitigating Green House Gases Emissions. Another key component of the project is to upgrade the leachate treatment system. The call for tenders was published in early 2017 and the project is underway[2]. In Morocco, the public discharge of Kénitra city receives around 120000 tons/year of waste which generate large volumes of leachate. The environmental impacts of landfills and dumpsites depend on several factors, including waste composition, technical barriers, landfill operation and climatic conditions. The characterization of leachate generated by the Kénitra landfill showed that it is conveying an important mineral pollutant load, organic, metallic and microorganisms. These leachates of high pollution load could contaminate groundwater and surface water because the discharge is near the Sebou river and also presents a risk of contamination of bathing waters across the groundwater flow toward the ocean[3].

In Lebanon, the example of Naameh landfill illustrates well the situation and the complexity of the management and treatment of leachate produced from dumpsites and landfills in Lebanon; In the last years, a pre-treatment plant including deposition and treatment by flotation and coagulation basins was constructed for the treatment of leachate at the Naameh landfill in Lebanon. After that, the “leachate” was transferred by tanks to be thrown into the sea through the “Al Ghadir” pipeline that extends into the sea at about 1.5 kilometres.

There are numerous examples similar to Naameh landfill in Lebanon however the counterparts at the Ministry of Environment have explicitly asked to reinforce capacities to evaluate selected technologies that have predominantly been employed and the ways to adapt the proposed technology for the treatment of leachate produced specifically from controlled and sanitary landfills in Lebanon (including existing, under construction or planned infrastructures). This activity therefore addressed the need of Lebanon to better design and choose proven and appropriate technologies for the treatment of leachate.

2 OBJECTIVES

The overall aim of the study tour and training in the framework of the regional activities on Industrial Pollution and Hazardous Waste Management was to bring key stakeholders from the participating countries together with selected experts and provide a high-level learning experience which would include training, exercises and discussions combined with site visits focusing on leachate management.

The specific objectives of the activity were to:

- Enhance the capacities of the trainees on the integrated approach to the sustainable management of leachate based on state-of-the-art technologies and best practices including planning, finance and procurement options;
- More specifically for Lebanon, issue guidelines for leachate management, strengthening the technical capacity of government officers and finally develop institutional and legal instruments in support to the Authorities;
- Provide a hands-on experience by visiting at least two leachate management facilities with particular emphasis on the adaptation of technologies to the context of the region;
- Enable, encourage, and facilitate dialogue and exchange of experiences between public officials (or other key stakeholders) from the partner countries and the development of synergies and complementary activities within the Mediterranean;
- Launch a peer-to-peer process for experience sharing at regional level and knowledge transfer (south-to-south, north-to-south) around Leachate management and technologies for the MENA.

3 EXPECTED RESULTS

- Key stakeholders of the partner countries have strengthened capacity in sustainable leachate management, by improved knowledge on:
  - State of the Art of leachate treatment technologies (different applicable/implemented treatment techniques with their advantages and weaknesses/including financial and economic aspects);
  - Leachate Project Management;
  - Specific case studies;
  - Specific sites visited.
- A peer-to-peer process for experience sharing at regional level and knowledge transfer (south-to-south, north-to-south) around sustainable leachate management is launched or enhanced.

The methods used to assess whether the desired results were achieved are described in section 5. Interaction between key stakeholders of the participating countries was a critical parameter of the concept of the training workshop. The exchange of knowledge, as well as experience between trainees with different technical and professional backgrounds, was achieved by reciprocal involvement in site visits and lectures. The involvement of decision-makers and technical staff from public and local authorities was extended and the participants were supported in developing their capacity to better plan, design and evaluate leachate treatment options for sustainable new waste management infrastructures.

4 PROFILE OF THE PARTICIPANTS

The 11 participants from outside Lebanon (linked to ST-4) were decision-makers and technical staff coming from Algeria, Egypt, Jordan, Morocco, Palestine and Tunisia (see list of participants in Annex 9.2).

The 23 trainees from Lebanon (linked to EFH-LB-2) were competent decision-makers and technical staff from the Ministry of Environment, Office of the Minister of State for Administrative Reform, Municipalities, the private sector, projects, consultants and NGOs.

The project team had a very positive opinion about the group. All participants were involved showing a high interest in the subject and equally high level of engagement. This was translated in their interventions during the training sessions and site visits, as well as in the bilateral interactions among themselves, particularly between the representatives of the public and the private sectors.

5 STRUCTURE OF THE STUDY TOUR

The study tour took place over a period of five days and was comprised of a mix of presentations (lectures) and site visits to solid waste management infrastructures and leachate treatment centres (See agenda in annex 9.1).

The trainers have structured the course into 16 lectures or topics and two study visits as follows:

- Course overview
- Lecture 1: Sanitary landfills - basics
- Lecture 2: Leachate generation and composition
- Lecture 3: Leachate treatment overview
- Lecture 4: Leachate biological treatment
- Lecture 5: Physical/chemical treatment
- Lecture 6: Thermal treatment systems
- Lecture 7: Membrane technology
- Lecture 8: Development of leachate treatment sequence
- Lecture 9: Introducing the three case studies and site visits
- Lecture 10: Lessons learned: open discussion
- Lecture 11: Environmental assessment of leachate treatment projects
- Lecture 12: Leachate projects: procuring the services of consultants
- Lecture 13: Project Delivery Methods
- Lecture 14: Model tender document:
- Lecture 15: Leachate projects critical success factors
- Lecture 16: Course evaluation, follow-up and P2P process
- Concluding remarks and closing session

- Site Visit #1. Costa Brava advanced treatment plant
- Site Visit #2. The treatment scheme applied at Naamah landfill site

Day 5 of the regional training was also dedicated to participants' brainstorming in order to collect feed-back about lessons learnt and recommendations from the Study Tour. A Mentimeter interactive voting tool was applied at the closing session of the workshop.

The study visit and training materials, which constitute the Leachate Management Guidelines are available at: https://www.swim-h2020.eu/25-29-june-2018-beirut-lebanon-swim-h2020-sm-study-visit-to-different-types-of-state-of-the-art-hazardous-waste-management-facilities-leachate-management/

Training course (Gefinor Rotana Hotel)

Site Visit #1. Costa Brava

Site Visit #2. The treatment scheme applied at Naamah landfill site

A Mentimeter, an interactive voting tool, was used at the closing session of the workshop. It included two sets of questions: the purpose of the first set was for the participants to evaluate the overall workshop and the purpose of the second set was to assess the technical knowledge acquired from the training. It also included a part where the participants could ask any question to the trainers. The two latter parts induced an interesting conversation between the trainers and the trainees.

The participants were asked to use their mobiles, enter the mentimeter.com website and enter the code to start the voting.

The participation in this activity (31) was higher than the submission of the evaluation forms (20).

Evaluation of the first set of questions:

- The participants come from the following organizations: 61% came from the public sector, 32% are consultants, 4% come from NGOs and 4% come from the private sector.
- 92% voted that the length of the training was *sufficient*.
- 59% voted that the event covered *all the topics necessary* for a good comprehension on the subject.
- The high majority of the participants voted for this plan to be taken after the training: Prepare a report about the workshop and share the presentations with my colleagues.
- The most valuable things the participants learned from the trainings are: Importance of planning, defining the project success factors and the evaluation methods of the different alternatives.
- On the question: How do you think that this training will assist you in your future work? The answers varied between: will be used in the EIA assessment, will be used in the decision making processes to select the most appropriate technologies, and will help to prepare the tender documents related to the landfills, etc.
- DELPHI method was voted as the most important knowledge the participants gained.

Evaluation of the second set of questions:

- In the exercise where the participants had to assess the relative weight of the criteria for selecting a submersible leachate pump, they voted for the qualification of the manufacturer as priority a criterion, which was commented positively by Dr. Gaber.
- In the second exercise where they had to assess the criteria for the selection of the contractor, the voters voted for the technical approach as the priority criterion, which was also commented positively by Dr. Gaber.
- 75% voted for the correct illustration of the Ultra filtration technique.
- The participants voted that the Reverse osmosis is the technique that produces the most sludge and concentrates, which was as well supported by Dr. Gaber.
- In the quiz part that was composed of 3 questions with 30 seconds for each question: the average of the correct answers was 48%.

Find more details about this exercise in the Annex 9.4.

6 LAUNCH AND RESULTS OF THE P2P-6 PROCESS

As already mentioned, this Study Tour (ST-4) was followed by the launch of a peer-to-peer process for experience sharing at regional level and knowledge transfer around Leachate management and technologies for the MENA.

The Peer-to-Peer exchange aims to establish networks of peers of different stakeholders in the region, mobilise knowledge in the field of Industrial and Solid Waste and learn from other parties' experiences and best practices in topics related to Leachate management, enabling structured collaboration between countries/experts. It aims at building on the international and regional successful experience and address the challenges faced by Mediterranean countries and possibly scale up and replicate innovative solutions in this field. It offers virtual connections between participants within the region and will highlight the Leachate management success stories of partner and/or EU countries.

A session of the study tour was dedicated to the presentation of the P2P process and modalities of the Peer-to-Peer activity. The SWIM-H2020 SM team has coordinated the start-up of the activities, and was in charge of the monitoring and the facilitation of the process. The following tentative schedule is proposed:

The project team, together with the Non-Key Experts involved in the ST-4 activity, maintained contacts with a number of participants since the June field visit held in Lebanon. It is to highlight that the workshop received very good appreciation from the participants even later through bilateral communication with the project team. What was missing from the project was to have more tangible echoes about impact at national level and follow-up actions and updates from peers at national level.

The project has approached the Peers on January 2019 to document with them and collect their stories on the developments of leachate issues in their respective countries. The project team also asked about the impact of the Lebanon workshop with some case studies from the countries. This assessment was intended to exchange between all the Peers who participated in the June 2018 workshop in Lebanon. These questions were also addressed to the Project Non-Key Experts.

The following three questions were asked:

- It Peers were aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region and their respective countries?
- If they are aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region?
- Their feed-back about the impact of the June training on their activity and if they had the chance to apply and use the guidance documents provided at the Lebanon workshop?

The project team “Coach” started to receive feedback immediately after the launch of this E-mail exchange.

Several replies were exchanged by copying the whole group. The project continued coaching and moderating this exchange either by answering questions or by responding and directing questions to other peers. Generally, the exchange has been very fruitful and positive. Several participants confirmed that the workshop and the exchanges carried out as part of the Beirut training were very interesting and fruitful. Several have confirmed during this P2P exchange process that they have had the opportunity to use these guidelines in many of their functions. Lebanese Peer has confirmed that the training and the guidance documents provided during the workshop offered guidelines on Leachate treatment and important information on the different technologies for leachate treatment and the advantages and disadvantages of each technology on the different levels (Impact on the Environment, financial level, space availability, etc.). Therefore, they are being continuously applied by the team at the MoE in most of the activities related to the Service/department role. Several peers also provided information on projects that are being developed nationally, such as in Algeria and Egypt. The guidelines and lessons learned will be important for the exchanges that are undertaken at the decision-maker level and especially when designing these new infrastructures.

Other peers mentioned that exchanges are still ongoing across their countries and workshops are being organized to discuss specific technologies for leachate treatment. The Peer from Egypt raised an important issue which is the scientific research on the topic of SWM and particularly leachate treatment.

All these exchanges between peers and coach are indicated in the annex 9.5.

7 EVALUATION OF THE STUDY VISIT

7.1 FEEDBACK FROM THE TRAINEES

Feedback on organizational, administrative and planning issues before and during the event

A set of 10 criteria; A1-A11 (See table below) was 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)

TABLE 1 – TRAINING RATING RESULTS RELATED TO ORGANIZATIONAL, ADMINISTRATIVE AND PLANNING ISSUES

	A. ORGANISATIONAL, ADMINISTRATIVE AND PLANNING ISSUES BEFORE AND DURING THE EVENT	EXCELLENT	GOOD	AVERAGE	POOR	Total Replies	Average Score (max = 4)
A1	Appropriate handling of invitations, visa support, information sharing and smoothing obstacles	11	8	0	0	**19**	3,58
A2	Efficient logistics: accommodation, transportation, location of venue and interpretation	11	9	2	0	**20**	3,55
A3	Provision of support (if requested) for participants' preparation for the event	13	5	0	0	**18**	3,72
A4	Efficient and effective follow-up of preparations and progress towards the event	11	9	0	0	**20**	3,55
A5	Planning for the event: selection and design of methodology, programme/daily agenda and work rules	14	6	0	0	**20**	3,70
A6	Smooth flow of programme, efficient handling of emerging needs and attentiveness to participants concerns	16	3	1	0	**20**	3,75
A7	Presentations correspond and contribute to the planned objectives and are conducive to enhanced shared understanding and participation on addressed topics	13	6	1	0	**20**	3,60
A8	Clarity, coverage and sufficiency of concepts, objectives, anticipated outputs and outcomes	13	6	1	0	**20**	3,60
A9	The materials distributed were helpful	13	7	0	0	**20**	3,65
A10	Efficient and Effective Facilitation	14	5	1	0	**20**	3,65
A11	Overall rating of the event	8	11	0	0	**19**	3,42

See also the corresponding graphs for Table in Annex 9.3.

Feedback by participants:

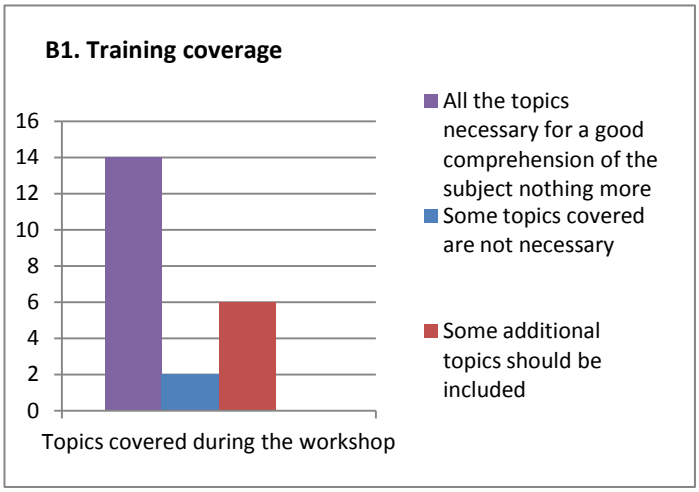
A set of 7 criteria; B1 – B7 were assessed by the participants, using a qualitative description

B.1 Coverage of the event: In your opinion did the event cover (tick one of the following):

- All the topics necessary for a good comprehension of the subject nothing more
- Some topics covered are not necessary
- Some additional topics should be included

Answers provided by participants:

Figure 1- Training coverage

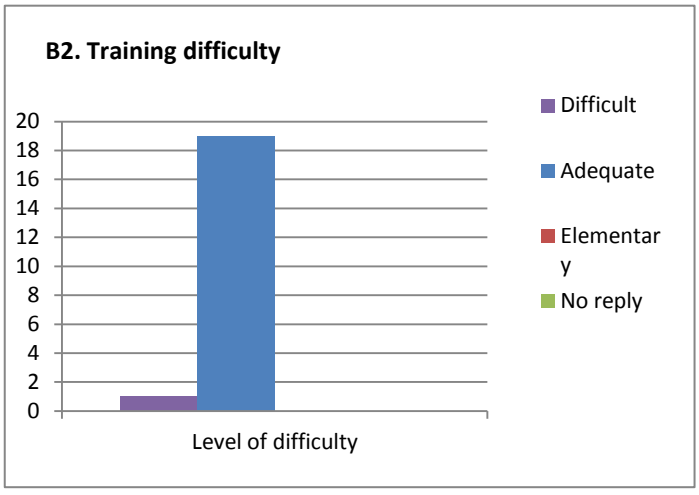


B.2 Level of difficulty (tick one of the following):

- Difficult
- Adequate
- Elementary

Answers provided by participants:

FIGURE 2 – TRAINING DIFFICULTY

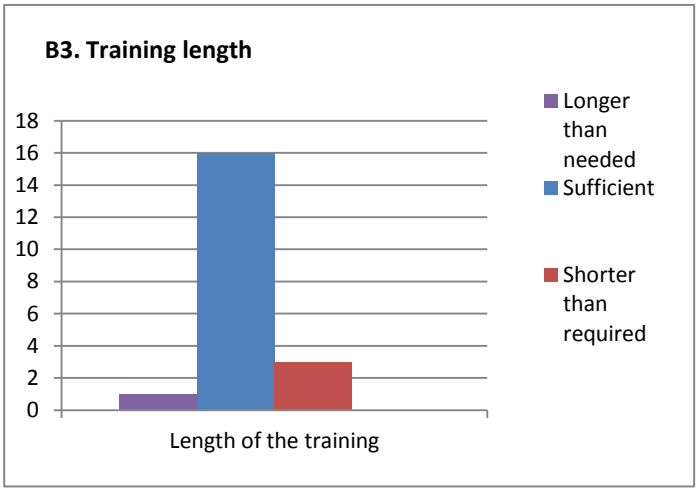


B.3 Length of the training course: In your view the workshop duration (tick one of the following):

- Longer than needed
- Correct
- Shorter than needed

Answers provided by participants:

FIGURE 3 - TRAINING LENGTH



B.4 Open-ended questions

From the open-ended questions presented, several conclusions were drawn. Regarding the most valuable thing learned during the workshop, there was a wide range of replies. Evaluation of various leachate treatment technologies, assessment methodologies and more specific technical aspects such as contracting, PDMs and leachate quantification, are some of the points highlighted.

Regarding the evaluation of the course in further assisting in future work, the answers ranged from networking opportunities, to better understanding of the various techniques and the evaluation of technologies for decision making. Furthermore, EIA, general organizational issues and attention to details are some of the aspects mentioned.

In the question whether the participants would transfer the knowledge of the workshop to colleagues from their countries, the participants suggested that they would by several means. Either by disseminating the PowerPoint presentations and documents, or by organizing similar training workshops in their countries and companies.

What was most favored in the event was the organization, the variety of the material addressed and the communication between the participants.

Needed improvements that were pointed out was the requirement of more interaction in several presentations and in performing group works on practical case studies and finally more adequate FR and ENG translation.

7.2 REMARKS BY THE TRAINERS

A set of 9 criteria; C1-C9 (See table below) are assessed by the trainer(s). Please use either open ended text or the qualitative descriptions used previously: description ranging between “Excellent” to “Poor” (Excellent =4, Good = 3, Average = 2, Poor = 1)

TABLE 2: CRITERIA FOR THE ASSESSMENT BY THE TRAINER

C1	Efficient and effective performance and interaction by participants	4
C2	Efficient and effective cooperation and team spirit	4
C3	Level of achievement of planned objectives	4
C4	Did the event contribute to helping participants practice skills or gain knowledge related to course concepts	4
C5	What worked well during the event	Active participation and site visits
C6	What didn’t work well and why	Even more experience sharing due to lack of time availability
C7	What components/concepts did participants seem to understand well	Various technologies and evaluation methodologies
C8	Were there any components/concepts that participants appeared to not understand	No
C9	What aspects of the event could be improved and what to be kept	More time allocated on site visits and work group excercises.

8 CONCLUSIONS/RECOMMENDATIONS

The training workshop that took place in Lebanon on the 25-29 June 2018 for the purposes of ST-4, EFH-LB-2 and P2P-6, had two major expected outcomes. The first was the improvement of knowledge on the different leachate treatment techniques and second was the strengthening of governmental officers and other trainees on all related levels. The participation was adequate with participants of different backgrounds joining and interacting on a course that contained site visits, as well as lectures,

covering the majority of leachate treatment management aspects. The trainees had the opportunity to see real world scenarios on leachate treatment facilities in Lebanon and speak with experts. From the evaluation of the course, it is evident that the trainees considered the training schedule as thorough and comprehensive. Key issues highlighted by the trainees was the importance of evaluation criteria for the selection of the best available techniques, as well as the very detailed description of the various technologies.

9 ANNEXES

9.1 AGENDA

Day 1: Monday June 25, 2018

Session	Time	Description	Speaker
	08:30 –09.00	**Registration**	
#1	09:00-09:30	Opening session and welcoming remarks Course overview	M. Anis Ismail MoE representativeRep of the MoE (TBN) Dr. Ahmad Gaber
#2	09:30-11:00	Lecture 1: Sanitary landfills - basics	M. Abderrahmane Maloum
#3	11:00 – 12:00	Lecture 2: Leachate generation and composition	M. Abderrahmane Maloum
	12:00 – 13:00	**Lunch Break**	
#4	13:00-14:00	Lecture 3: Leachate treatment overview	M. Abderrahmane Maloum
#5	14:00 – 15:30	Lecture 4: Leachate biological treatment	Dr. Ahmed Gaber
#6	15:30-16:00	Wrap- up	Dr. Ahmad Gaber

Day 2: Tuesday June 26, 2018

Session	Time	Description	Speaker
#7	09:00-09:30	Introduction to day 2	Dr. Ahmad Gaber
#8	09:30-11:00	Lecture 5: Physical/chemical treatment	Dr. Ahmed Gaber
#9	11:00 – 12:00	Lecture 6: Thermal treatment systems	M. Abderrahmane Maloum
	12:00 – 13:00	**Lunch Break**	
#10	13:00-14:00	Lecture 7: Membrane technology	M. Abderrahmane Maloum
#11	14:00 – 15:30	Lecture 8: Development of leachate treatment sequence	M. Abderrahmane Maloum
#12	15:30-16:00	Wrap- up	Dr. Ahmad Gaber

Day 3: Wednesday June 27, 2018

Session	Time	Description	Speaker
#13	09:00-09:15	Introduction to day 3	Dr. Ahmed Gaber
#14	09:15-10:15	Lecture 9: Introducing the three case studies and site visits	Local Consultants
	10:15 – 10:30	**Coffee Break**	

#15	10:30-16:30	Site Visit #1. Costa Brava advanced treatment plant Site Visit #2. The treatment scheme applied at Naamah landfill site	
	16:30 – 17:30	**Coffee Break back at the hotel**	

Day 4: Thursday June 28, 2018

Session	Time	Description	Speaker
#16	09:00-09:30	Introduction to day 4	Dr. Ahmad Gaber
#17	09:30-11:00	Lecture 10: Lessons learned: open discussion	Dr. Ahmad Gaber & TBN
#18	11:00 – 12:00	Lecture 10 (Cont.): Lessons learned: open discussion	Dr. Ahmad Gaber & TBN
	12:00 – 13:00	**Lunch Break**	
#19	13:00-14:00	Lecture 11: Environmental assessment of leachate treatment projects	M. Stavros Vlachos
#20	14:00 – 15:30	Lecture 12: Leachate projects: procuring the services of consultants	M. Stavros Vlachos
#21	15:30-16:00	Wrap- up	Dr. Ahmad Gaber

Day 5: Friday June 29, 2018

Session	Time	Description	Speaker
#22	09:00-09:30	Introduction to day 5	Dr. Ahmad Gaber
#23	09:30-11:00	Lecture 13: Project Delivery Methods	M. Stavros Vlachos
#24	11:00 – 12:00	Lecture 14: Model tender document: Monmouth County Project	Dr. Ahmad Gaber
	12:00 – 13:00	**Lunch Break**	
#25	13:00-14:00	Lecture 15: Leachate projects critical success factors	Dr. Ahmad Gaber
#26	14:00 – 15:30	Lecture 16: Course evaluation, follow-up and P2P process	Dr. Ahmad Gaber M. Anis Ismail
#27	15:30-16:00	Concluding remarks and closing session	Dr. Ahmad Gaber M. Anis Ismail Rep of the MoE

9.2 LIST OF PARTICIPANTS (2 SEPARATE SETS: EFH-LB-2 & ST-4)

	Participants from Lebanon							
No.	**COUNTRY**	**TYPE OF INSTITUTION** (please use the options provided*)	**TITLE (Mr/Ms)**	**FIRST NAME**	**LAST NAME**	**POSITION/ FUNCTION**	**ORGANISATION/ INSTITUTION**	**EMAIL**
1	LEBANON	INTERNATIONAL ORGANISATIONS AND PROGRAMMES	Mr.	Tarek	SAMARJI	Solid Waste Management Consultant	ISWMF project/UNDP	tarecksamarji@hotmail.com
2	LEBANON	MEDIA	Ms.	Nada	HADDAD	Communications Expert	SWIM-H2020 SM	nada@april-8.com
	LEBANON	MEDIA	Mr.	Fouad	GEMAYEL	Journalist	Le Commerce du Levant	fouadgemayel@lecommerceduleva nt.com
	LEBANON	MEDIA	Mr.	Gregory	DEMARQUE	Photographer	Executive Magazine	gregdemarque@gmail.com
3	LEBANON	MINISTRY REPRESENTATIVES	Mr.	Bassam	SABBAGH	Head of the Urban Environment Service	Ministry of Environment (MoE)	B.Sabbagh@moe.gov.lb
4	LEBANON	MINISTRY REPRESENTATIVES	Ms.	Sabine	GHOSN	Head of the Urban Environment Pollution Control department	Ministry of Environment (MoE)	s.ghosn@moe.gov.lb
5	LEBANON	MINISTRY REPRESENTATIVES	Ms.	Jamila	AL HADI	Environmental Engineer	Ministry of Environment (MoE)	J.alhadi@moe.gov.lb
6	LEBANON	MINISTRY REPRESENTATIVES	Mr.	Ahmad	DAMAJ	Environmental Specialist	Ministry of Environment (MoE)	a.damaj@moe.gov.lb
7	LEBANON	MINISTRY REPRESENTATIVES	Mr.	Ralph	SALAMEH	Geologist	Ministry of Environment (MoE)	r.salameh@moe.gov.lb

8	LEBANON	MINISTRY REPRESENTATIVES	Ms.	Ebtihaj	ABOU CHAKRA	Environmental Specialist	Ministry of Environment (MoE)	e.abouchakra@moe.gov.lb
9	LEBANON	MINISTRY REPRESENTATIVES	Ms.	Dania	TURJMAN	Environmental Specialist	Ministry of Environment (MoE)	D.Turjman@moe.gov.lb
10	LEBANON	MINISTRY REPRESENTATIVES	Ms.	Mirna	EL-KHESHEN	Environmental Specialist	Ministry of Environment (MoE)	M.ElKheshen@moe.gov.lb
11	LEBANON	GOVERNMENT AGENCIES	Mr.	Karim	HACHACH	Environmental Expert	Office of the Minister of State for Administrative Reform	khashash@omsar.gov.lb
12	LEBANON	GOVERNMENT AGENCIES	Ms.	Patil	MARDIGIAN	Coordination&Monitoring	Office of the Minister of State for Administrative Reform	pmardigian@omsar.gov.lb
13	LEBANON	LOCAL AUTHORITIES	Mr.	Abd El Ghani	AARAJI		Bar Elias Municipality	agkaraji@hotmail.com
14	LEBANON	PRIVATE SECTOR	Mr.	Mazen	SUKHN	Project Manager	ELARD	msokhen@elard-group.com
15	LEBANON	PRIVATE SECTOR	Mr.	Elie	KHOURY	Civil & Environmental Engineer	Geoflint	e.khoury@geoflint.com
16	LEBANON	PRIVATE SECTOR	Mr.	Joseph	EL GHOUL	Project Manager	LACECO	josephelghoul@hotmail.com
17	LEBANON	PRIVATE SECTOR	Mr.	Riad	NASREDDINE	Mechanical Engineer	Dar El Handasah-Nazih Taleb	riad.nasreddine@daralhandasah.com
18	LEBANON	PRIVATE SECTOR	Mr.	Salam	NASSAR	Chemical Engineer	MORES	Salam.nassar@mores.com.lb
19	LEBANON	PRIVATE SECTOR	Mr.	Safwat	SAID	Environmental Expert	Rafik Khoury	Safwat.said@raficelkhoury.com
20	LEBANON	PRIVATE SECTOR	Mr.	Anas	HIJAZI	Environmental Engineer/Specialist	JCC	ahijazi@jcc.com.lb

No.	COUNTRY	TYPE OF INSTITUTION (please use the options provided*)	TITLE (Mr/Ms)	FIRST NAME	LAST NAME	POSITION/ FUNCTION	ORGANISATION/ INSTITUTION	EMAIL
21	ALGERIA	MINISTRY REPRESENTATIVES	Ms.	Yasmina	BOUTABA	Sous directrice	Ministere de l'environnement et des energies renouvelables	y.boutaba@gmail.com
22	ALGERIA	GOVERNMENT AGENCIES	Mr.	Abd Ellah	AICHOUR	Ingénieur d'état	Agence Nationale des Dechets	aichourabdallah@gmail.com, karim.ouamane@and.dz
23	EGYPT	GOVERNMENT AGENCIES	Ms.	Magda	MOSTAFA	Environmental Researcher (Hazardous and solid wastes department)	Egyptian Environmental Affairs Agency	Magda_emu@Yahoo.com
24	EGYPT	GOVERNMENT AGENCIES	Mr.	Eslam	ABDALLA	Chemical Engineering & Hazardous Waste specialist	Naserya-Landfill-Alexandria Government	eslams971@gmail.com
25	JORDAN	MINISTRY REPRESENTATIVES	Mr.	Abdel Razzaq	ELSHEBLI	Site Engineer/ Hazardous Waste	Ministry of Environment	abdalrzaq.sh.86@gmail.com
26	JORDAN	LOCAL AUTHORITIES	Mr.	Faisal	ALADWAN	Head of Hazardous Waste Section	Royal Department of the Environment Protection	rangers.dept@psd.gov.jo
27	MOROCCO	MINISTRY REPRESENTATIVES	Mr.	Hafid	EL OUALJA	Directeur régional de l'Environnement	Secrétariat d'Etat Chargé du Développement Durable	h.oualja@gmail.com
28	MOROCCO	MINISTRY REPRESENTATIVES	Ms.	Hajar	TEMMAR	Cadre au sein de service Déchets Solides	Secrétariat d'Etat Chargé du Développement Durable	hajar.temmar@gmail.com
29	PALESTINE	GOVERNMENT AGENCIES	Mr.	Bahjat H.A.	ALJABARIN	Director of Hebron Regional Office	Environment Quality Authority (EQA)	bahjat76@yahoo.com, b.jabarin@environment.PNA.ps
30	TUNISIA	GOVERNMENT AGENCIES	Mr.	Amine	BARBOUCH	Ingénieur	Agence Nationale de Gestion des Déchets	barbouche.amine@gmail.com
31	TUNISIA	GOVERNMENT AGENCIES	Mr.	Lassaad	BEN LTAIEF	Ingénieur / Sous-Directeur	Agence Nationale de Gestion des Déchets	g.tunis@anged.nat.tn
32	TUNISIA	SWIM-H2020 SM	Mr.	Anis	ISMAIL	Environment Key Expert	SWIM-H2020 SM	a.ismail@swim-h2020.eu
33	FRANCE	SWIM-H2020 SM	Mr.	Abder	MALOUM	Leachate Expert	SWIM-H2020 SM / SUEZ GROUPE - DIPI	abder.maloum@suez.com
34	GREECE	SWIM-H2020 SM	Ms.	Alaa	ABOU DAHER	Event Organiser	SWIM-H2020 SM/MIO-ECSDE	aboudaher@mio-ecsde.org
35	EGYPT	SWIM-H2020 SM	Mr.	Ahmed	GABER	Waste/Leachate Expert	SWIM-H2020 SM / CHEMONIX	agaber.cairo@gmail.com

9.3 DETAILS ON THE RESULTS OF THE EVALUATION FORMS

The following graphs illustrate Table 1: Training rating results related to organizational, administrative and planning issues

Figure 1 – Invitations and support

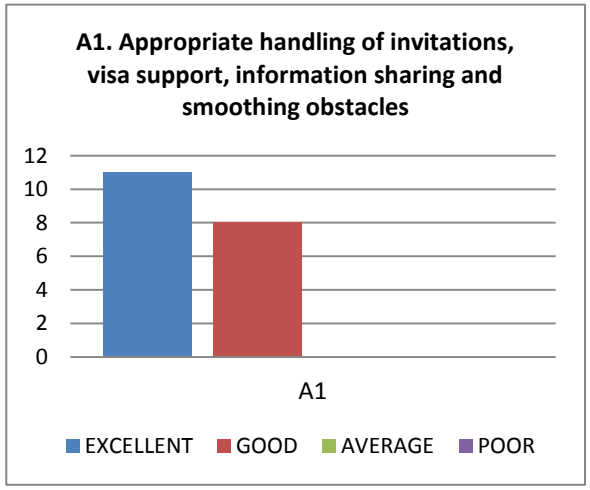


Figure 2 – Logistics

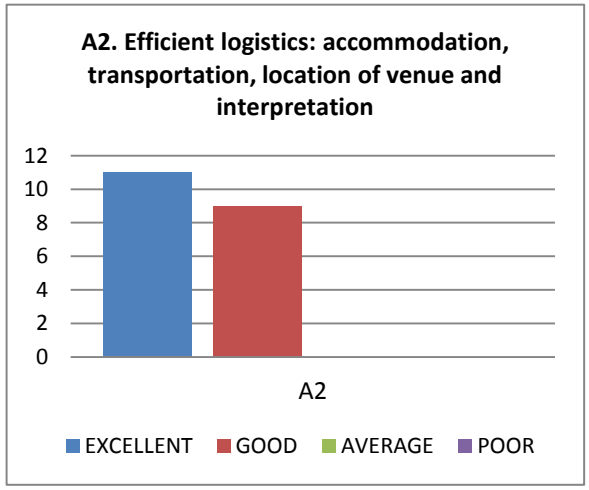


Figure 3 – Participants' preparation

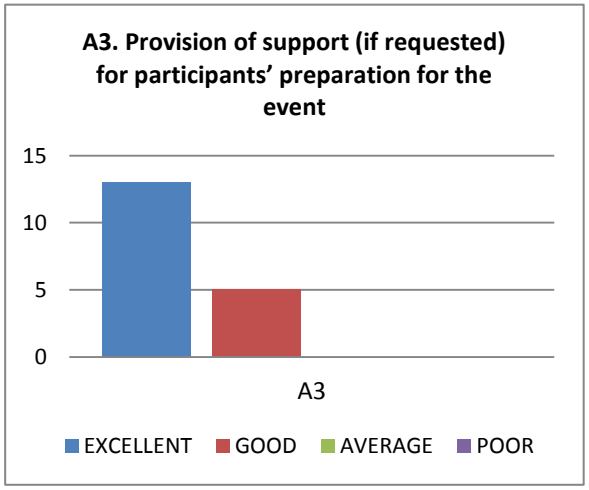


Figure 4 – Progress towards the event

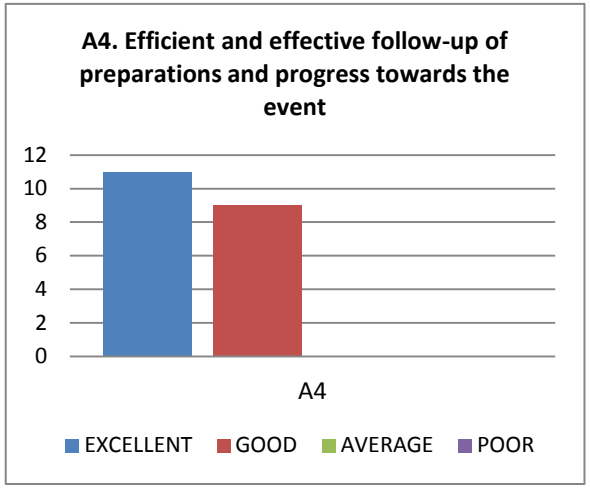


Figure 5 – Planning

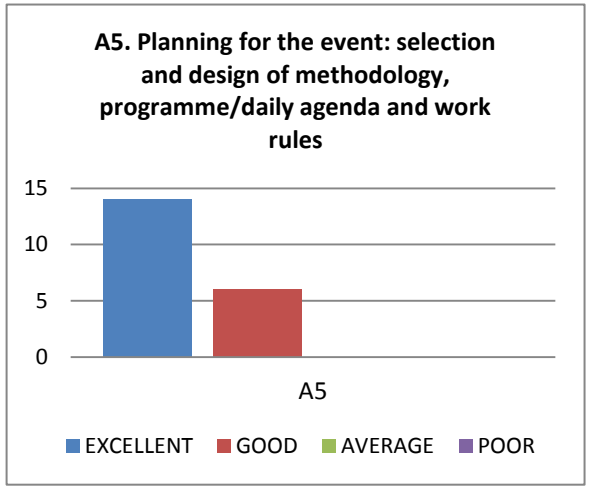


Figure 6 – Flow of programme

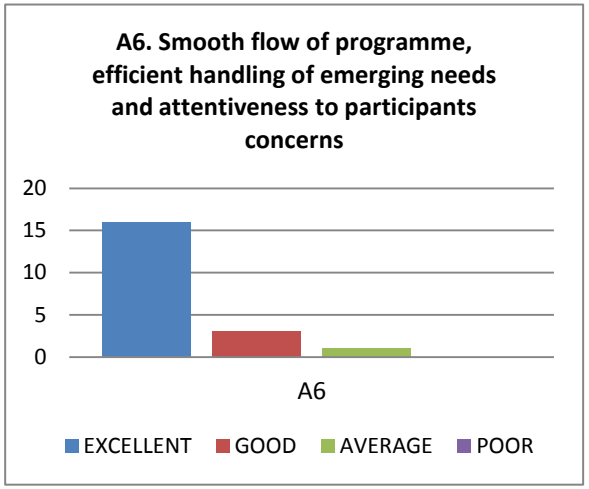


Figure 7 – Presentation and enhanced shared experience

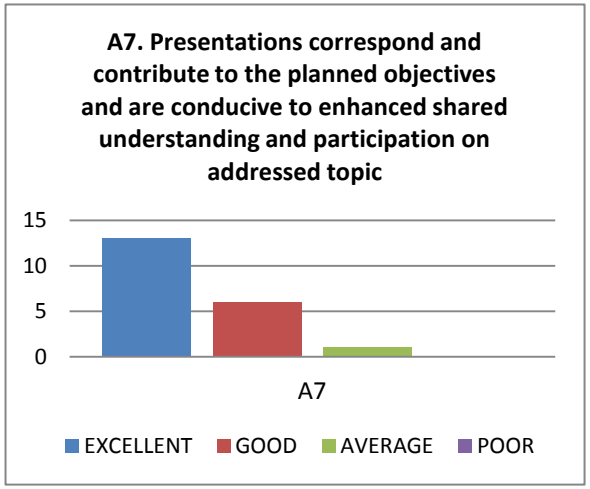


Figure 8 – Clarity and Sufficiency of concepts

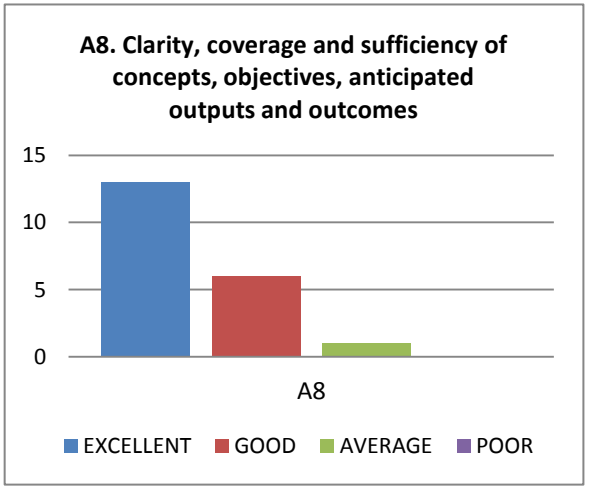


Figure 9 – Quality of materials

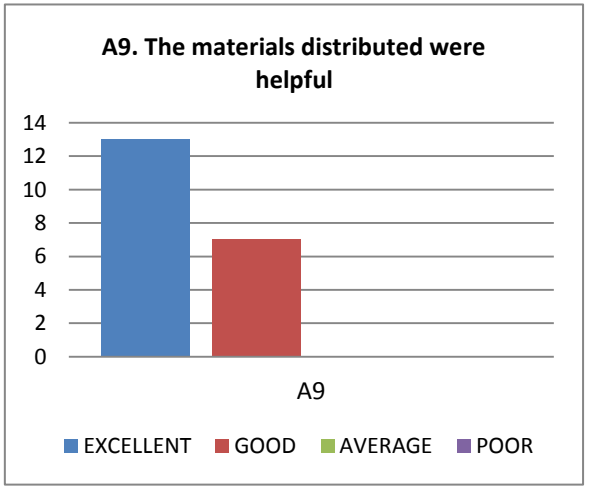


Figure 10 – Facilitation

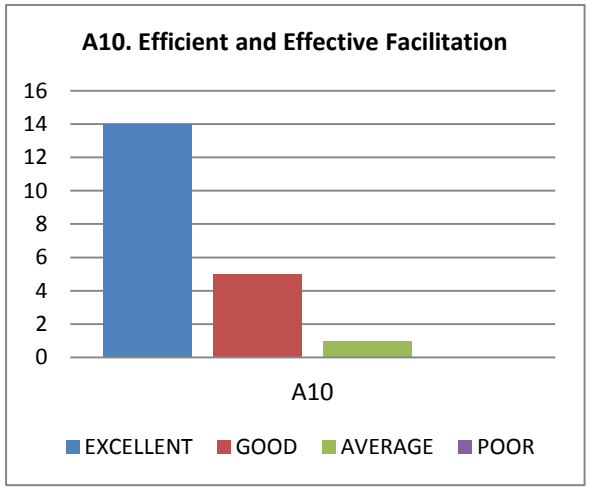
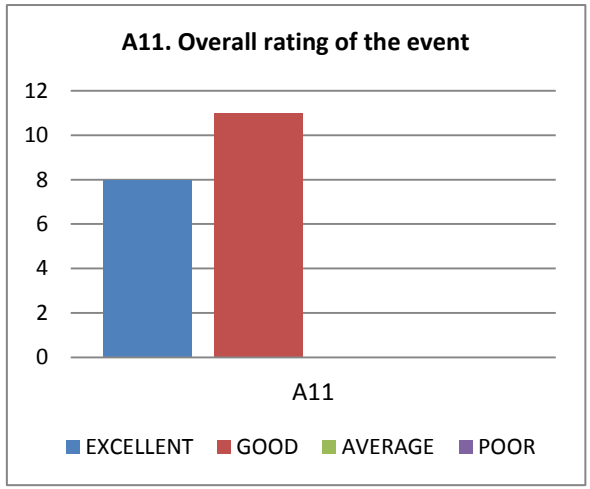


Figure 11 – Overall rating



Participants' feedback on technical aspects of the training

B. FEEDBACK ON TECHNICAL ASPECTS		No. of replies
B1	**Coverage of the event** **In your opinion did the event cover (tick one of the following):**	
	All the topics necessary for a good comprehension of the subject nothing more	14
	Some topics covered are not necessary	2
	Some additional topics should be included	6
	No reply	0
	Total Replies	**22**
B2	**Level of difficulty**	
	Difficult	1
	Adequate	19
	Elementary	0
	No reply	0
	Total Replies	**20**
B3	**Length of the training** **In your view the workshop duration (tick one of the following):**	
	Longer than needed	1
	Sufficient	16
	Shorter than required	3
	No reply	0
	Total Replies	**20**

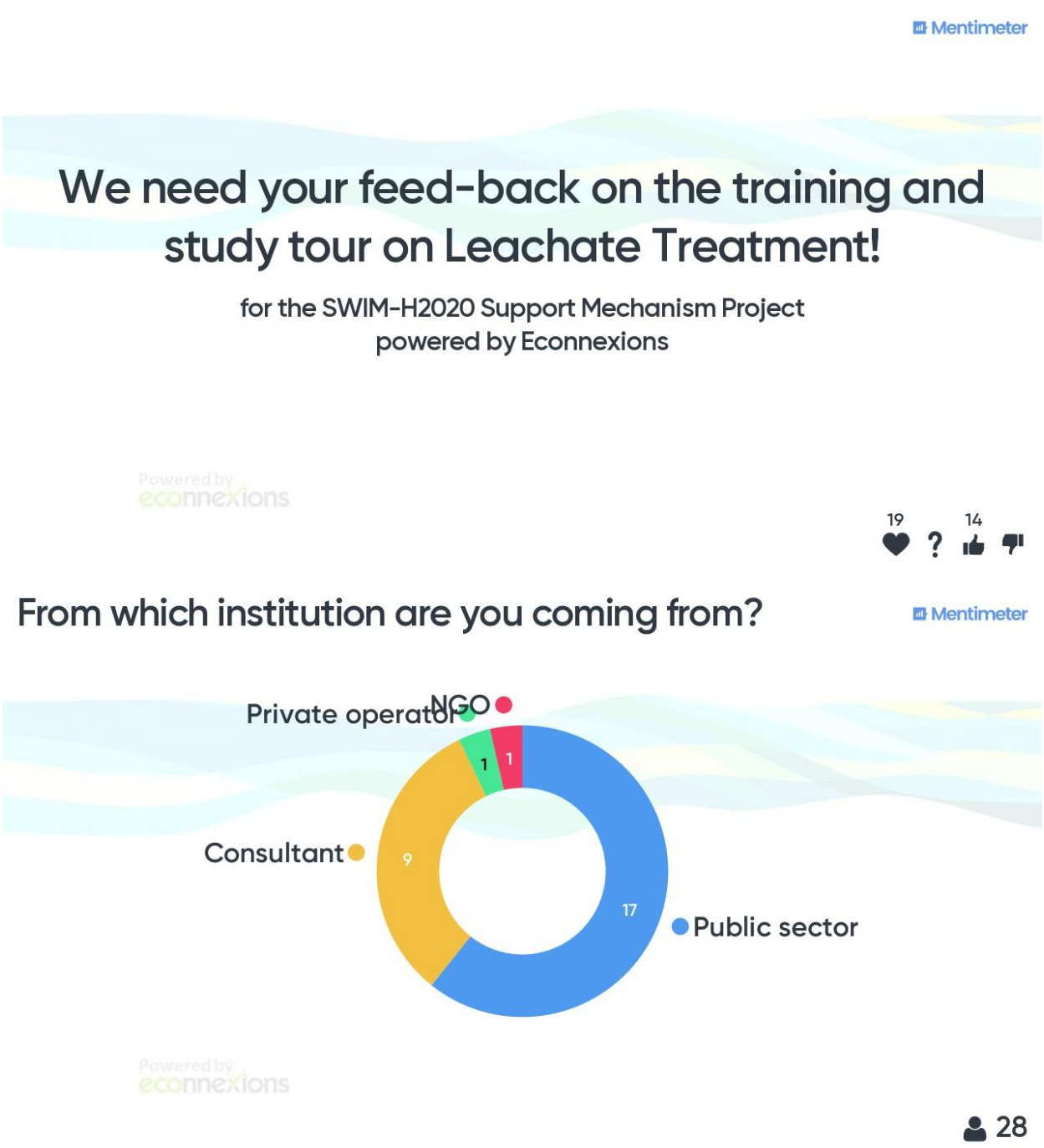
Table 3 - Participants replies to the open-ended questions

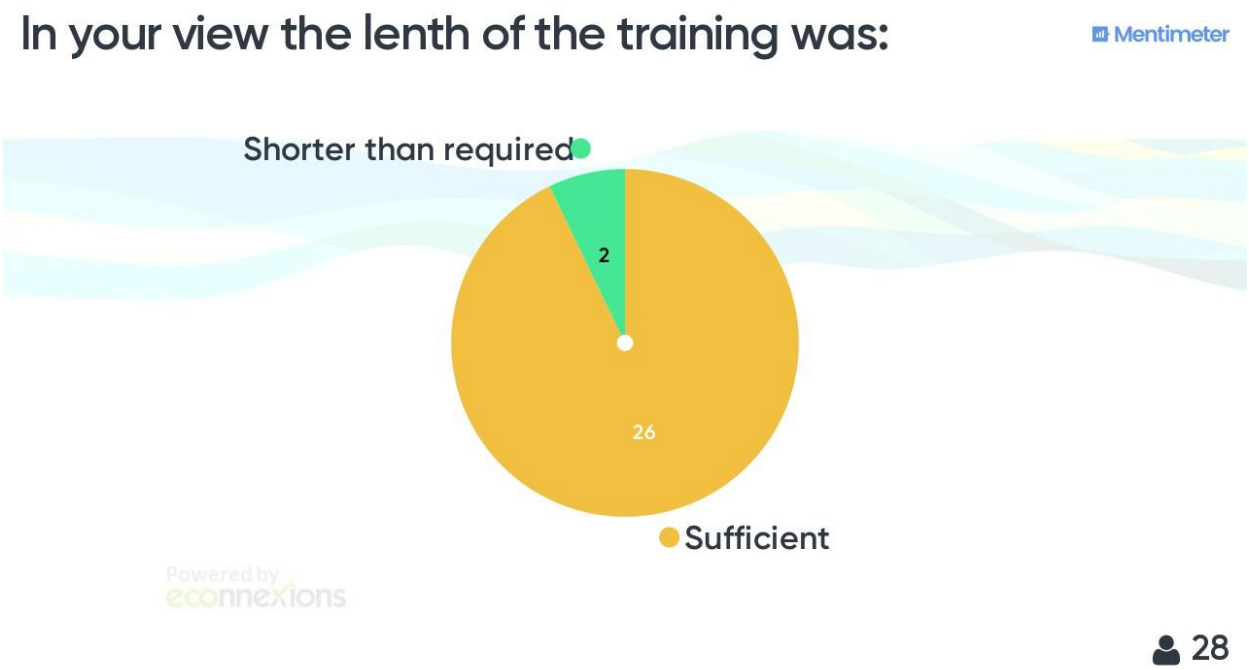
Open-ended questions		Participant's replies
B4	**What is the most valuable thing you learned during the workshop (knowledge or skills)?**	▪ New point of view to assess facilities (1) ▪ New references to facilitate the work (3) ▪ The different types of contracts (1) ▪ Thermal treatment (1), Biological treatment (3) ▪ Leachate treatment is different from water and wastewater treatment (1) ▪ Impacts of lechate of the environment and the importance of its treatment (1) ▪ Leachate quantification (1) ▪ Experience sharing between different countries (1) ▪ Importance of cost in the selection of WW treatment options (1) ▪ Hose pump should be used when dealing with viscous/highly organic material (1) ▪ Project delivery methods (1) ▪ Evaluation of treatment methods (3) ▪ The adequate models of leachate treatment in Lebanon to be used in other countries (1) ▪ Selection and weighing of criteria (3) ▪ The organizational critical flow chart of processes (1)

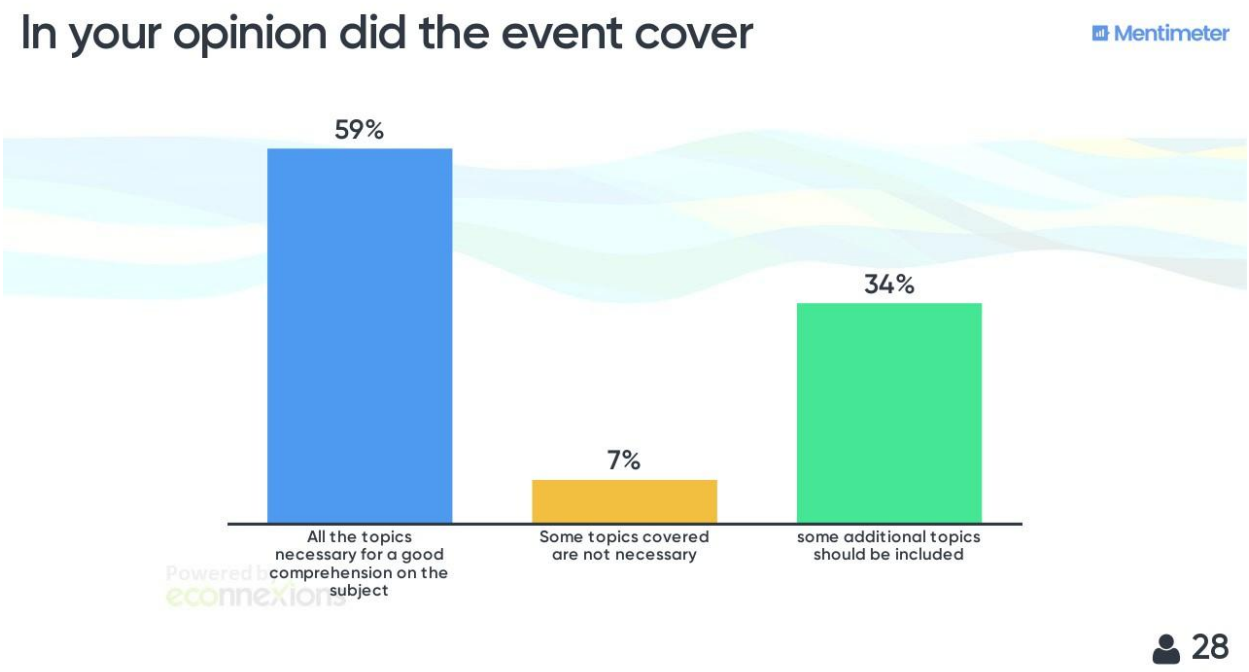
		▪ Critical thinking and judging methods (1) ▪ Reverse osmosis is a separation technique. We can use it alone as a treatment method (1) ▪ Combination of processes is important to obtain a better treatment (1) ▪ Service provision plan schemes (1) ▪ Simplicity is the key to understand any problem (inspired from Dr. Gaber) (1).
	Total Replies	**29**
B5	**How do you think that the current event will assist you in your future work on the subject?**	▪ The training tought them to better plan for any project in the future (3) ▪ Some said that he/she is going to use the knowledge in a pilot project planned (2) ▪ One said that the training gave him more knowledge on treatment designs (1) ▪ One said that he/she doesn't have an action plan yet but this will be discussed (1) ▪ Some said that it will help them in the future to better understand the different leachate treatment techniques and to access and audit the existing and upcoming projects related to leachate treatment (2) ▪ One said that the training and the distributed module will be of great help in EIA and evaluation (1) ▪ Some said that the event introduced them to key professionals in the field (2) ▪ One said that he/she will organize such a training in his/her country with the participation of several ministries (1) ▪ Some said that after beeing exposed to the treatment options and their advantages and disadvantages, it will be easier in the future to choose the adequate technology using the presented methodology for decision making (4), ▪ One said that the training helped him/her to pay more attention to certain details (1).
	Total Replies	**18**
B6	**Please indicate whether (and how) you could transfer part of the experience gained from the event to your colleagues in your country?**	▪ The USB and the book will help him/her to communicate the knowledge gained with his/her colleagues (3) ▪ Through the PPT presentations (6) ▪ Part of the experience would be transferred through a report about this workshop (1) ▪ By conducting a training session for the colleagues in the plant (1) ▪ By inviting representatives from ministries, consultancies and civil society to the plant to explain the process and spread the acquired knowledge (1) ▪ By sharing the given documents and discussions (1) ▪ By organizing a training to the related ministries in his/her country (1) ▪ By transferring the references on the USB (1) ▪ By preparing a summary presentation to the colleagues in UCF and UNDP (1).
	Total Replies	**16**
B7	**What did you like most about this event?**	▪ Everything (1) ▪ Organization (7) ▪ Lectures and the practical part (4) ▪ Dr. Gaber's presentations, skills and knowledge (8) ▪ The enthusiasm, the vast knowledge and the rich communication and interactions among the participants (5) ▪ The instructors and the participants (1) ▪ The fact that the event allowed to know what is being done in the neighboring countries and to share experiences and concerns (1)

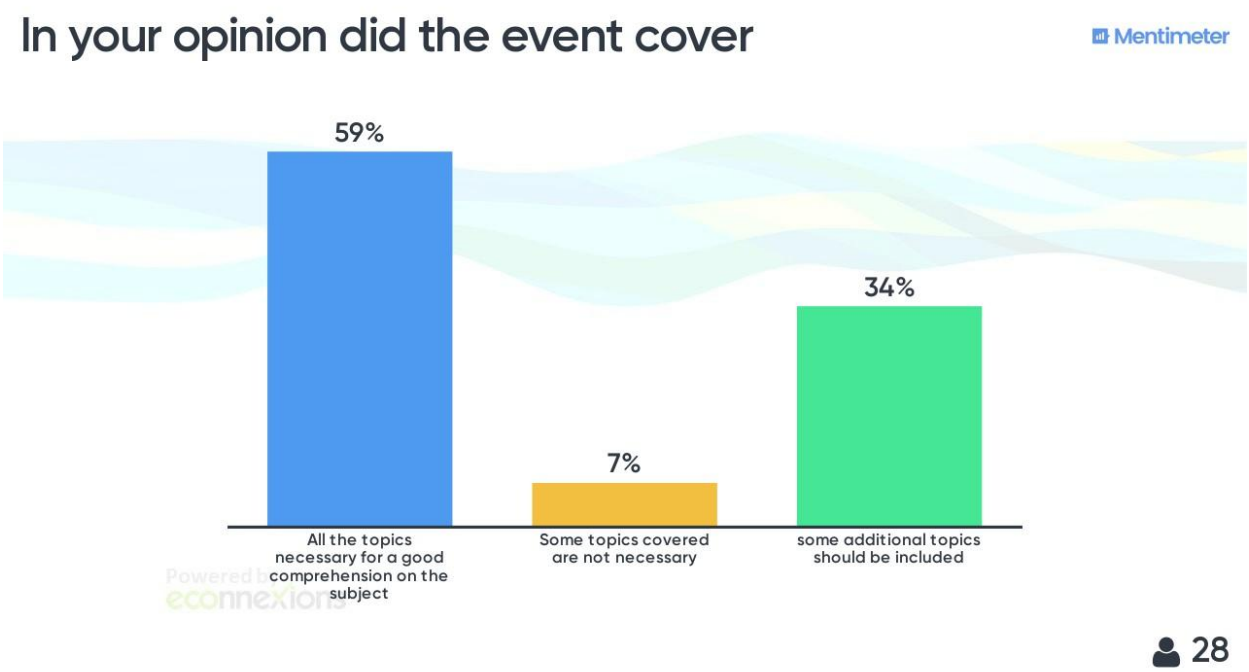
		▪ The variety of material addressed (1)
	Total Replies	**28**
B8	**What needs to be improved?**	▪ Add more technical details about the treatment, the technologies used, the frequency of analysis and more concrete examples and exercises (1) ▪ Provide manuals in French so the francophone participants are able to follow (1) ▪ The transportation airport/hotel (2) ▪ Do more group work and practical case studies to enhance the interactions between the participants (1) ▪ Lectures to be provided in English rather than French (1) ▪ Mr. Vlachos presentation was monotonic, he was reading the lectures with no explanation or interaction (4) ▪ Add more room for experience sharing (1), the training was very technical and the FR and ENG translation lacked consistency (1), add a module on the legal part (1), plan 2 days for site visits: 1 to cover Beirut - Costa Brava, Neemeh and Burj Hamoud- and 1 to cover Bekaa - Zahle and Bar Elias (1) ▪ Nothing (3) ▪ Provide the courses in pre-process (2) ▪ Start the workshop at 10:00 am and enhance the communications and sharing of experiences between the participants (1).
	Total Replies	**20**

9.4 DETAILS ON THE RESULTS OF THE MENTIMETER




In your view the lenth of the training was:
Mentimeter
Shorter than required
2
26
Sufficient
Powered by econnexions
28


In your opinion did the event cover
Mentimeter
59%
7%
34%
All the topics necessary for a good comprehension on the subject
Some topics covered are not necessary
some additional topics should be included
Powered by econnexions
28


In your opinion did the event cover
Mentimeter
59%
7%
34%
All the topics necessary for a good comprehension on the subject
Some topics covered are not necessary
some additional topics should be included
Powered by econnexions
28


What will be the first action that you will make after this training?
Mentimeter
Summary Presentation Leachate plant assessment matrix
Transmettre le savoir faire
Transfer what I learned to my colleagues
Translate my new knowledge for all my friends
Make a report of the workshop
Report to my department and share the presentations
Reporting
Sharin it with my chief
Share acquired information with my collegues
Powered by econnexions
26

What is the most valuable thing you learned from this training?

Mentimeter

How to plan	Thermal treatment	Delphi method
The entire training was valuable. Its hard to pinpoint just one	How to manage projects corectly	Performance Ranking Delphi Method
المعالجه البيولوجيه واعداد الخطه	Leachate management is complicated and needs more attention	Good planning is the key to everything

Powered by econnexions

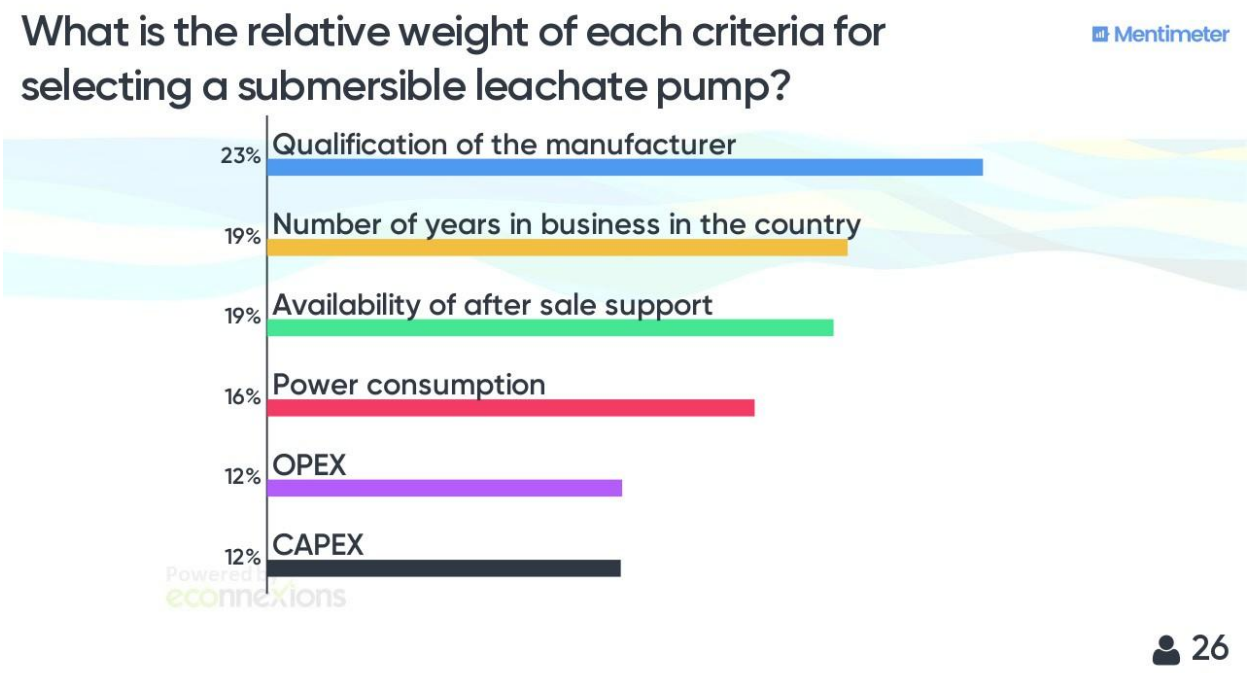
31

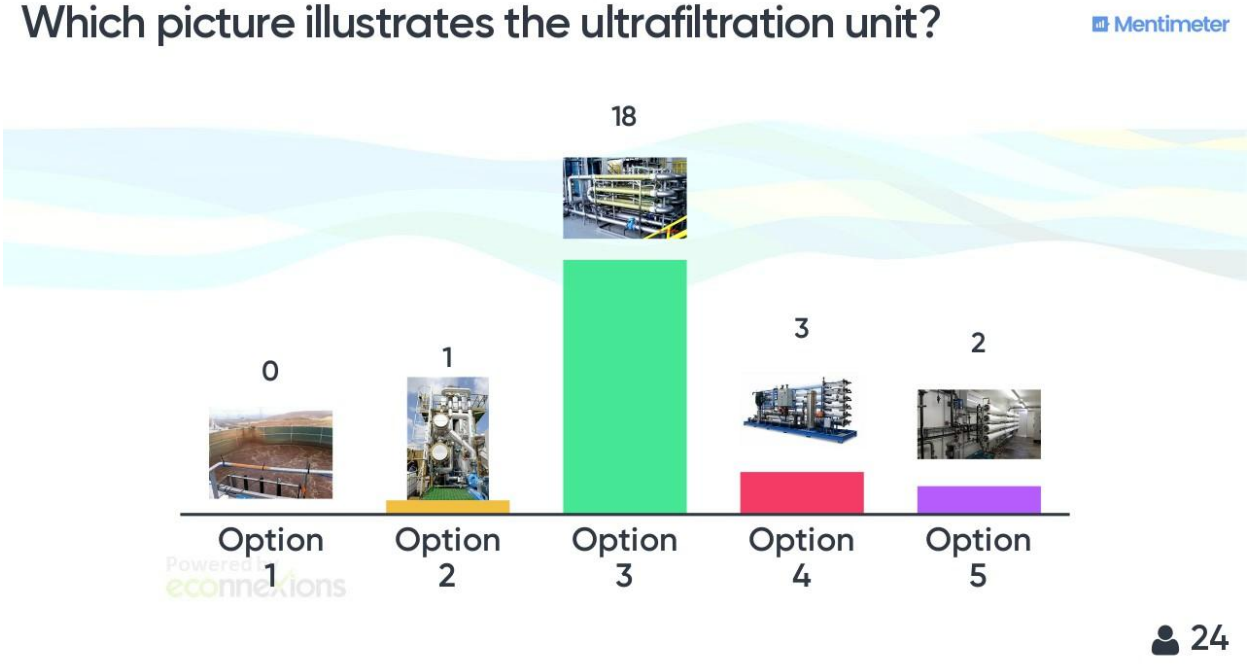
Write down in Key words the most important knowledge you gained?

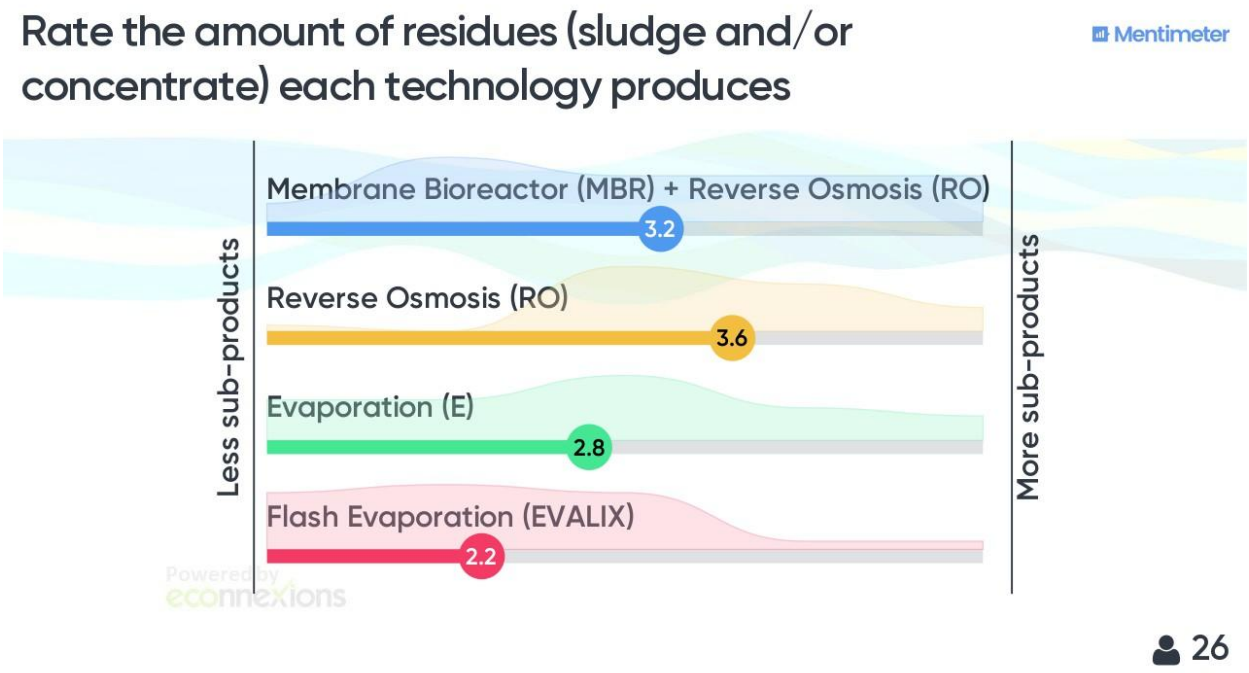
Mentimeter

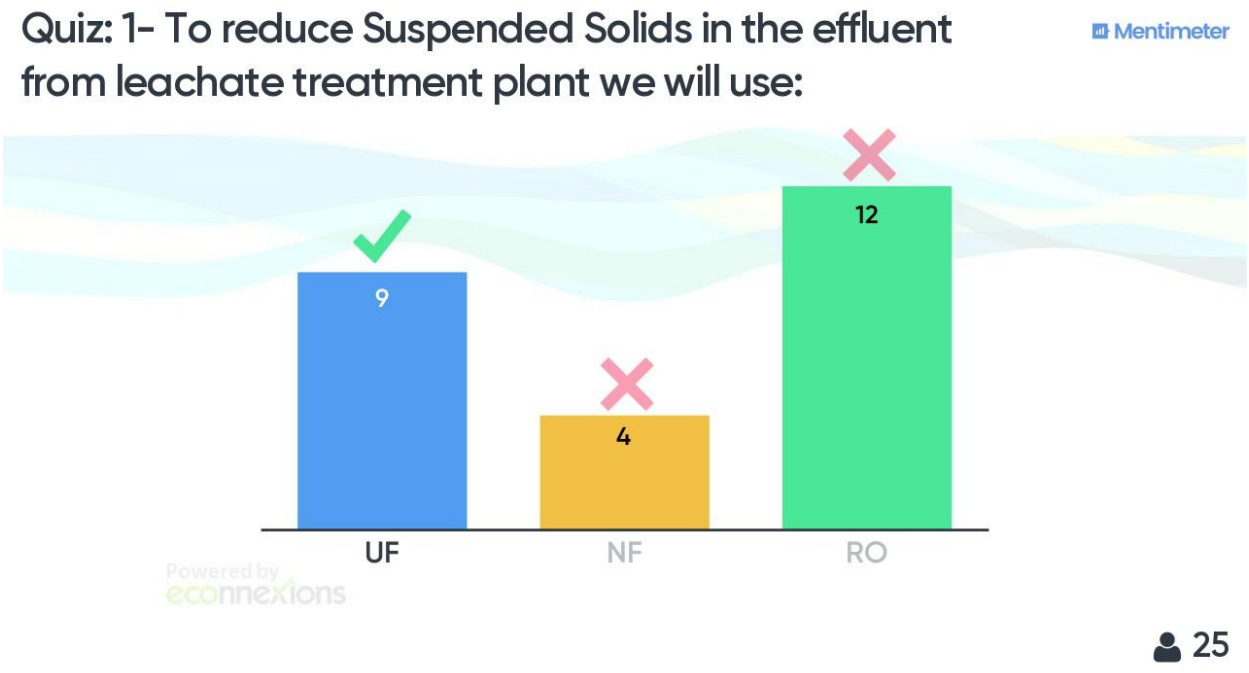
Powered by econnexions

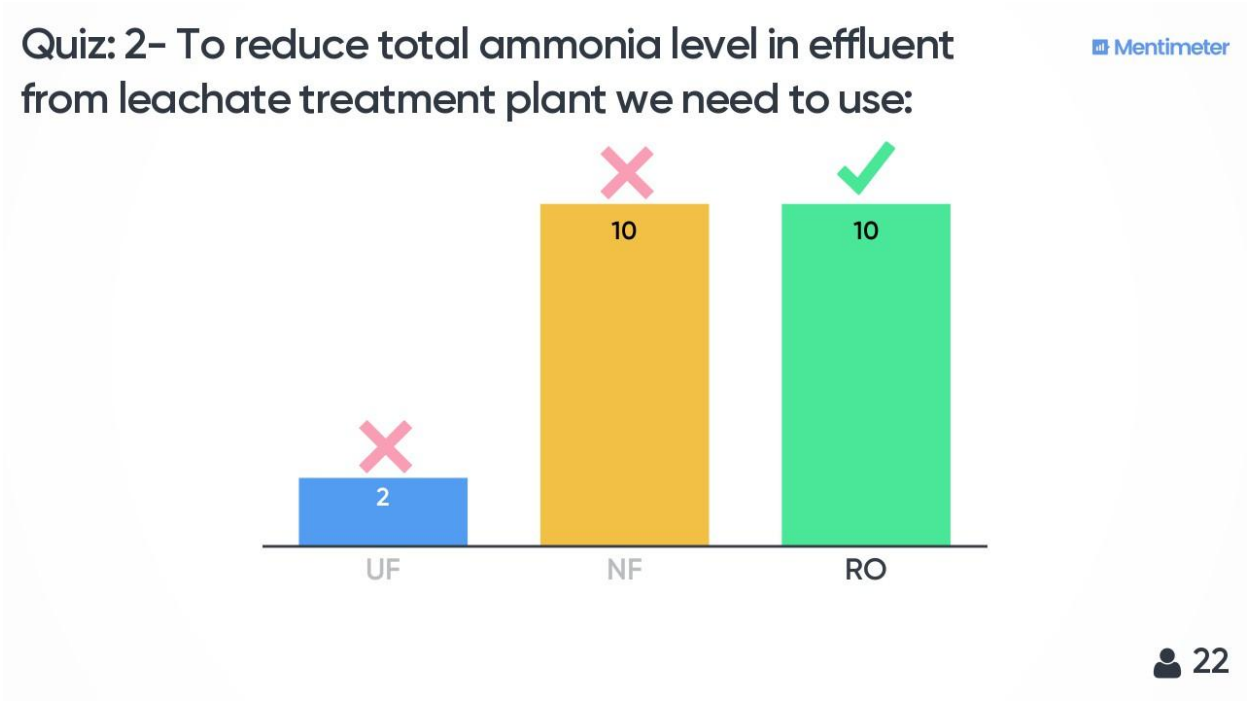
23

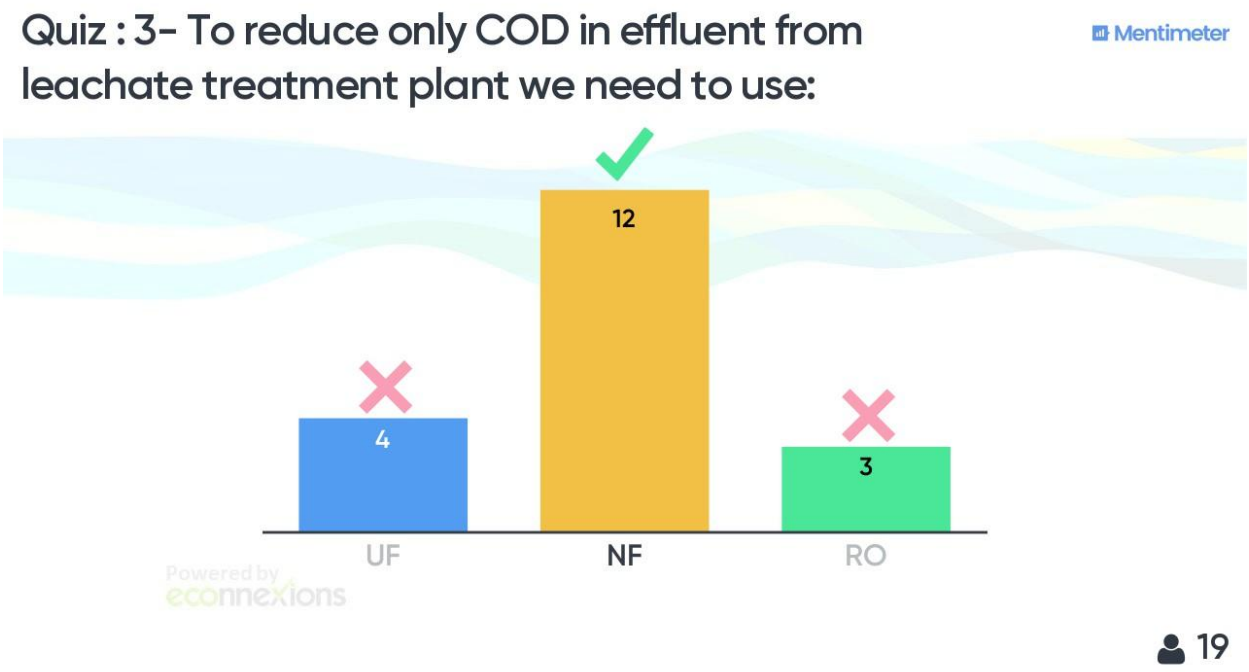

What is the relative weight of each criteria for selecting a submersible leachate pump?
Mentimeter
23% Qualification of the manufacturer
19% Number of years in business in the country
19% Availability of after sale support
16% Power consumption
12% OPEX
12% CAPEX
26


Which picture illustrates the ultrafiltration unit?
Mentimeter
0
1
18
3
2
Option 1
Option 2
Option 3
Option 4
Option 5
24


Rate the amount of residues (sludge and/or concentrate) each technology produces
Mentimeter
Membrane Bioreactor (MBR) + Reverse Osmosis (RO)
3.2
Reverse Osmosis (RO)
3.6
Evaporation (E)
2.8
Flash Evaporation (EVALIX)
2.2
Less sub-products
More sub-products
Powered by econnexions
26


Quiz: 1- To reduce Suspended Solids in the effluent from leachate treatment plant we will use:
Mentimeter
9
4
12
UF
NF
RO
Powered by econnexions
25


Quiz: 2- To reduce total ammonia level in effluent from leachate treatment plant we need to use:
Mentimeter
2
10
10
UF
NF
RO
22


Quiz : 3- To reduce only COD in effluent from leachate treatment plant we need to use:
Mentimeter
4
12
3
UF
NF
RO
Powered by econnexions
19

9.5 P2P GROUP EXCHANGE: PROCESS FOR EXPERIENCE SHARING AND KNOWLEDGE TRANSFER

LAUNCH OF P2P:

Sent on : Tuesday 15 January 2019 12:53
To : all

Cc : Project team

Subject: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear all,

I would like to start by wishing you a happy new year 2019!

I hope that you had the opportunity to apply the leachate guide proposed at the June 2018 workshop in Lebanon.

(I hope that people who are about to get married have particularly applied the criteria of Dr. Gaber for the selection of the spouse. People already married only have to use the section of the guide on the maintenance and sustainability of infrastructure J J J) !

Since our last meeting in June 2018, you have returned to your activities and continued to plan or supervise or operate your solid waste facilities. I am approaching you today as Peers from the MENA on issues related to leachate and I am trying to document with you and collect your stories on the developments of leachate issues in your countries and the impact of the Lebanon workshop with some case studies from your countries.

I will appreciate receiving your feed-back and reply **in a few sentences to the following questions**:

- Are you aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region?

- Aer you aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region?

- What was the impact of the June training on your activity? Did you apply the guidance documents provided at the Lebanon workshop? If so, for what purpose?

This assessment is intended to exchange between all the Peers who participated in the June 2018 workshop in Lebanon. These questions are also addressed to our experts Dr. Gaber, Mr. Maaloum and Mr. Stavros whose contribution will certainly be very valuable and important for the rest of the team.

I therefore recommend that you **write without delay preferably by end of January 31, 2019.**

Thank you in advance for your answer and contribution.

Best regards.

Anis and Ahmed

Chers tous,
Je voudrais tout d'abord vous souhaiter une bonne et heureuse année 2019.

J'espère que vous avez eu l'occasion d'appliquer le guide sur le lixiviat proposé lors de l'atelier du mois de juin 2018 au Liban.
(J'espère que les personnes qui se s'apprêtent à se marier ont appliqué particulièrement les critères de Dr Gaber pour la sélection du conjoint. les personnes déjà mariées n'ont qu'à utiliser la rubrique du guide sur l'entretien et durabilité des infrastructures) !

Depuis notre dernière rencontre en juin 2018, vous êtes retournés à vos activités et continué à planifier ou superviser ou exploiter vos installations de gestion des déchets solides.

Je vous approche aujourd'hui en votre position de pairs de la région MENA (MENA Peers) afin de documenter avec vous et collecter vos témoignages sur les développements des questions liées au lixiviat dans vos pays et l'impact de l'atelier du Liban.
Je vous demanderai de répondre par retour de courrier et ***en quelques phrases aux questions suivantes :***

- Avez-vous été informé de la publication d'études, analyses sur le traitement des lixiviat dans votre pays ou ailleurs dans la région ?
- Quel était l'impact de cette formation sur votre activité ? Avez-vous utilisé les documents guides fournis lors de l'atelier de Juin 2018 ? Si oui, dans quel but ?
- Avez-vous été associé ou informé de nouveaux appels d'offres ou nouvelles décisions stratégiques sur des infrastructures existantes ou planifiées de gestion des lixiviat dans votre pays ou ailleurs dans la région ?

Cette réflexion servira à échanger entre tous les Pairs ayant participé à l'atelier de juin 2018 au Liban. Ces questions sont aussi adressées à nos partenaires et experts Dr Gaber, Mr. Maaloum et Mr. Stavros dont la contribution sera surement très valable et importante pour le reste de l'équipe.
Je vous recommande donc d'écrire ou de réagir ***dès aujourd'hui et de préférence avant le 31 janvier 2019****.*
Merci d'avance pour votre réponse.
Anis and Ahmed

FEED-BACK FOM PEERS

De : magda emu [mailto:magda_emu@yahoo.com]
Envoyé : dimanche 3 février 2019 22:11

Dear Coaches,
First, sorry for the delay in participation &I would like to thank all
1-I'am one of the team who's responsible for Solid Waste management at the central Department of Alexandria Branch , my routine work is inspections & auditing conducted on Solid Waste management facilities (as Nahdet Masr for Recent Environmental Services) & and hazardous waste treatment plant (as Nasriya center),There is no new publications on leachate treatment in the country now.
2- Yes, Alex.Govern.constracts a new landfill cell in Nasriya center for the treatment of hazardous industrial waste & EIA take into considrations the leachate management

3-The training gained skills &experiences in designing landfills, advantages of biogas from landfill, different technologies for leachate management and advantages,disadvantsges of each technology and apply the standars in my work and activities.
I hope that all answers are good to answer questions
With my best wishes for all,

Magda Abd El razek Mostafa
Environmental researcher
Ministry of environment
Central department ,Alexa.Branch
Tel:00201223078749

Envoyé : vendredi 1 février 2019 10:17
À : 'eslam sayed' <eslams971@gmail.com>
Cc : all
Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear Eslam,
Thank you so much for your kind contribution to this regional discussion and exchange on the issue of leachate.

@Dear all, I am pleased with the number of responses we have received from our Peers on this subject! With Eslam we covered another important issue which is the scientific research on the topic of SWM and particularly leachate treatment in Egypt. I therefore encourage you Eslam to exchange with us the results of your research even beyond this P2P exercise!
In this regard, I would like to share with you the idea of continuing the discussion through LinkedIn or Facebook, even after the termination of this P2P process of the project! So, any volunteer among you who would like to continue to moderate this discussion and exchange of best practices on leachate in the MENA region?
With my best regards.
Anis and Ahmed

De : eslam sayed [mailto:eslams971@gmail.com]
Envoyé : jeudi 31 janvier 2019 14:40

Dear all
I would like to thank you all for the fruitful cooperation in the development of expertise and information in the field of environmental work. In order to maintain a clean and disease free environment.
- Are you aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region?
: Yes, I started my PhD thesis in the field of environmental studies at the University of Alexandria and finished studying the courses related to waste treatment and industrial pollution control. At the end of each course I compared the leachate produced by the landfill and municipal waste disposal
And effluents from hazardous inorganic industrial wastes
In terms of treatment methods and specifications of each.

-Are you aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region? -
Yes, I have continued and supervised the work of digging and construction of the new landfill cell in Nasiriyah landfill for the treatment of hazardous inorganic industrial waste and you have detected the construction of the masonry in which the leachate will be collected.

- What was the impact of the June training on your activity? Did you apply the guidance documents provided at the Lebanon workshop? If so, for what purpose?

Skills and experiences learned from training;‘
How to design landfills in accordance with different environmental considerations.
The method of comparison and differentiation in the selection of any project or project outlet (contractor) by using different standards of differentiation on the way when choosing anything there must be two basic conditions are the best quality and less cost.
How to take advantage of the biogas from landfill and burying solid waste, which increase the proportion of organic waste by installing a network to collect these gases from the landfill after the closure and pumping gas to a power station of biogas.
Different methods of treatment of wastewater from the landfill
She was as follows:
Method of treatment using the evaporation lakes.
Physiochemical treatment.
thermal processing .
Treatment using reverse osmosis (R O).
Treatment using membrane separation and filtration.
How to combine the previous methods in order to obtain the best results for treatment of water leachate.
Discuss the environmental impacts and considerations of wastewater treatment in order to determine the environmental impact assessment of this activity.
How to take advantage of the leading Lebanese experience in the field of waste As the state at the beginning of the deterioration of the environmental situation because of the waste of the work of a comprehensive inventory and database of all dumps and dumps of any waste, and the location and positioning of the device and the use of GBS, and then gradually developed a solution In accordance with the time plan set by it. Workshops were carried out to disseminate the culture of separation from the source for the waste and also helped in the preparation of some landfills and pestilence. For disposal to be in conformity with environmental standards.
We have visited the sanitary landfill of Naama area and show the accuracy of the work and the technical and environmental standards of the company operating the landfill and also the integrated utilization of all the outputs of the cemetery, whether vital gases or water by running a power station to convert biogas to electricity.
We visited the Costa Brava burial site, which was in the process of establishing a treatment plant for the treatment of water leachate, which was combined with different stages of treatment and physical and chemical treatment and biological treatment and the use of R O.
We evaluated the pros and cons of these projects and the most important advantages that deserve mention are the installation of a unit for the treatment and collection and absorption of odors that come out of these units.

Recommendations submitted to the competent authority

Work on exchange and transfer of experencise in the field of waste management system at the international, regional and local levels through this project in order to achieve sustainability.
Conducting mini-training courses in the scope of work of each person who participated in this training in order to transfer the skills acquired through this work and build the capacity of the professionals in this field.

Continuing communication with the participants and those involved in this work in order to reach the optimal methods to solve any problem related to the field of environment, specifically in the treatment of wastewater from the landfill and integrated management of the waste system.

Thank you all for your cooperation in the field of capacity building for environmental professionals.
Greetings to all

Eslam Sayed Ahmed Harby
Environmental Specialist
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00201026968204
Mail: eslams971@gmail.com

Envoyé : mercredi 30 janvier 2019 11:29
À : 'Bahjat Jabarin' <bahjat76@yahoo.com>
Cc : all
Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear Bahjat,
Thank you so much for this very useful update on the SWM in your country and information on the impact of the activities of the project SWIM-H2020 SM in Palestine.
I am pleased to know that the guidelines on leachate have served you in your daily activities. Thank you also for sharing with us the recommendations of the study "Optimum Leachate treatment options in Palestine" and for the good initiative of distribution of the report to other colleagues.
@Dear all, please continue this interesting exchange, which promises to be informative and interesting. I am still waiting for answers from our other peers and Dr. Gaber's feedback to this information.
With my best regards.
Anis

De : Bahjat Jabarin [mailto:bahjat76@yahoo.com]
Envoyé : mardi 29 janvier 2019 11:55

Dear Coaches,
Thank you for your efforts and follow up on the issues related to leachate Management in participant countries. As a response to your inquiries, kindly note the following:
- Are you aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region?

Since the Environmental Quality Authority (EQA) is the governmental body that regulates environmental work in Palestine, one of its main role in issuing environmental approvals and clearances as well as monitoring and inspections conducted for plants, facilities, solid waste dumps and wastewater treatment plants. We review all strategies and action plans for this purpose, as well as reviewing environmental impact assessment, Environmental Audits ...etc. Finally, we are following up on the environmental impact assessment of the wastewater treatment plant in Hebron City and all the technical reports in order to issuing approval, we have also been finally provided with the study (Optimum Leachate treatment options in Palestine / Feasibility study (Project 2)) for (Al Minya and Zahrat Al Finjan landfill), one of them in northern Palestine, the other in south. Here Under, you find attached word document of the conclusion and recommendations of the study
- Are you aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region?

As mentioned above, as EQA mandate we are highly involved in like issues in order to issuing of approvals and clearances as well as monitoring and inspections conducted to facilities, and EIA review committees, as an obligatory measure according to EIA policy 2000.

- What was the impact of the June training on your activity? Did you apply the guidance documents provided at the Lebanon workshop? If so, for what purpose?

The training and the guidance documents provided during the workshop provides guidelines on Leachate treatment and very important information on the different technologies for leachate treatment and advantages, disadvantages of each technology on the different levels, Therefore, i distribute all the guidelines, documents, information to the related institution like Joint Services Council for Solid Waste Management, in order to take advantage from the course document. In EQA level we apply what we got from the course in the review of the EIA studies, as the reviewing of above mentioned leachate study as well as in monitoring and inspection for the construction of waste water treatment plant and already existing landfills.

I hope that all answers have been replied .

On behalf of the Environment Quality Authority of Palestine, I would like to thank and appreciate all efforts for the success of June training which was informative and fruitful.

- **Eng. Bahjat H. Aljabarin**

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De : Anis ISMAIL(H2020-SWIM SM) [mailto:a.ismail@swim-h2020.eu]
Envoyé : vendredi 25 janvier 2019 12:05
À : h.oualja@gmail.com
Cc : all
Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear all,
We have received a feedback from Mr. Hafidh (Morocco) on the issue of leachate with very interesting information in Morocco.
I invite you to react on the information communicated by Hafidh, in particular on the technologies proposed by France Evaporation at the level of Oum Azza landfill.
I will be interested in the results of the Workshop organised during Pollutec-Morocco in October and also about the five research projects on leachate in Morocco.
So far I have not received a feedback from our Algerian Peers on the new projects in Algeria?
I encourage all of you to continue this interesting exchange.
With my best regards.
Anis and Ahmed

De : Hafid EL OUALJA [mailto:h.oualja@gmail.com]
Envoyé : jeudi 24 janvier 2019 14:44

bonjour, veuillez trouver réponse à vos questions ci-dessous:

Avez-vous été informé de la publication d'études, analyses sur le traitement des lixiviat dans votre pays ou ailleurs dans la région ?
La problématique du traitement du lixiviat généré au niveau des décharges au Maroc est devenue une réelle préoccupation majeure de l'autorité gouvernementale chargée de l'environnement et des collectivités territoriales, étant donné l'impact négatifque ce lixiviat peut générer à court, moyen ou long terme lorsqu'il ne trouve pas un débouché ou une destination économiquement faisable et écologiquement durable. Ainsi de grands efforts sont menés pour trouver des solutions adaptables et durables, à travers le lancement et l'appui de plusieurs projets de recherches et de développement avec les universités, ainsi que l'organisation de rencontres et ateliers de réflexion sur cette thématique, notamment la rencontre organisée sous le thème « **Quelles solutions pour la problématique du lixiviat** », en **octobre 2018** à l'occasion de la 10ème édition du Salon International Pollutec Maroc organisé du 02 au 05 octobre 2018 à la Foire Internationale de Casablanca.
Cette rencontre avait pour objectif de réunir tous les acteurs concernés du secteur public et privé, notamment les départements ministériels, les collectivités territoriales, les sociétés privées spécialistes en traitement du lixiviat, les opérateurs/exploitants des décharges et les universités qui ont conduit les projets de recherche,dans le but d'échanger et de partager les expériences et les idées, débattre sur les solutions possibles et faisables et ressortir avec des recommandations et/ou une feuille de route à suivre pour résoudre la problématique du lixiviat au niveau des décharges actuelles et celles prévues dans le futur.
Les projets de recherches et développement sur la problématique du traitement du lixiviatsont les suivants:

- Projet DE-Lix : Mise en place d'un procédé hybride appliqué au traitement du lixiviat.
- Projet PRINT-LIX.
- Projet LIX : Traitement et valorisation du lixiviat.
- Projet KEN-CFSBR : Traitement combiné du lixiviat.
- Projet OSMO-LIX : Couplage de l'osmose inverse et de la bio-méthanisation pour le traitement et la valorisation du lixiviat.

Concernant les expériences nationales en matière de traitement du lixiviat au niveau des décharges contrôlées, les différents modes de traitement actuels au Maroc sont les suivants :

- Prétraitement par coagulation-floculation ; filtration oxygénée puis traitement des boues par essorage.
- Procédé associant un traitement biologique (bioréacteur à membranes) à une ultrafiltration et l'osmose inverse, avec traitement thermique du concentrât (procédé Evalix) et déshydratation des boues.
- Traitement par osmose inverse à rendement très faible et essai de l'évaporation « naturelle+forcée ».
- Traitement biologique par aération et traitement par coagulation-floculation puis l'effluent rejoint les filtres de plantation.

- Quel était l'impact de cette formation sur votre activité ? Avez-vous utilisé les documents guides fournis lors de l'atelier de Juin 2018 ? Si oui, dans quel but ?
La formation a été très intéressante et riche en informations qui représentent un référentiel des plus importants en termes de techniques de traitement du lixiviat et des critères à prendre en compte pour le bon choix du procédé adaptable au contexte et capacité de chaque pays.
Ce référentiel reste toujours utilisé comme documents de référence lors des procédures d'examen des études et /ou des projets ou des réunions de concertation relatives à la problématique du lixiviat :

- Examen des Etudes d'impact sur l'Environnement des projets de construction des décharges contrôlées ou des unités de traitement du lixiviat.
- Projets de traitement du lixiviat (examen des TdRs, études de faisabilité, etc.).
- Examen des plans de développement régionaux, plans directeurs de gestion des déchets, …etc.

- Avez-vous été associé ou informé de nouveaux appels d'offres ou nouvelles décisions stratégiques sur des infrastructures existantes ou planifiées de gestion des lixiviat dans votre pays ou ailleurs dans la région ?

Dans le cadre de l'amélioration de la gestion des déchets des villes de Rabat, Salé et Témara au niveau du Centre d'Enfouissement Technique d'Oum Azza, un appel à projets a été lancé pour le choix de la technologie de traitement du lixiviat la plus adaptable. L'offre technique et commerciale de la société France Evaporation propose la station de traitement du lixiviat par évapo-concentration suivie d'une osmose inverse d'une capacité de traitement de 552 t/j de lixiviat entrant avec un taux de disponibilité de 90%. Cette station comporte les différentes technologies indiquées ci-après :

- Ø Une unité de concentration pouvant assurer la concentration du lixiviat afin d'atteindre une siccité finale de 30% de matière sèche ;
- Ø Une unité de traitement des condensats (stripping) provenant de la phase d'évaporation couplé à son système d'économie d'énergie. Elle permet d'abattre la charge ammoniacale encore présente dans les condensats ;
- Ø Une unité de polish des condensats en sortie du stripping afin de se conformer auxnormes nationales de rejet en vigueur ;
- Ø Une unité d'oxydation pour détruire la charge ammoniacale ainsi que certains composés aromatiques volatils, couplée à une chaudière vapeur basse pression fonctionnant avec le biogaz du site.

Envoyé : jeudi 17 janvier 2019 17:00
À : 'Sabine Ghosn' <S.Ghosn@moe.gov.lb>
Cc : all
Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear Sabine,
Thank you so much for this very useful reply and information especially as it gives concrete elements of impact of the activities of the project SWIM-H2020 SM in Lebanon.
First of all, I would like to congratulate you on the approval of the ISWM Law by the Parliament. This is a great achievement for the waste sector in Lebanon, after many years of preparation and waiting by all stakeholders in the Environment and SW sectors.
I am also pleased to know that the guidelines on leachate have served you in your daily activities and especially in the three areas that you mentioned.

@Dear all, please continue this interesting exchange, which promises to be informative and interesting. You can give your feedback on the three questions asked or react to the information provided by Sabine and Si Maloum.
With my best regards.
Anis and Ahmed

De : Sabine Ghosn [mailto:S.Ghosn@moe.gov.lb]
Envoyé : jeudi 17 janvier 2019 14:03

Dear Coaches,

Thank you for your e-mail and for your continuous follow up on the issues related to leachate Management in Lebanon and in the region. As a response to your questions, kindly note the following:

- Are you aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region?

Our team who's responsible for Solid Waste management at the Ministry is always keen on acquiring the latest information with respect to Solid Waste Management in general, and leachate management in specific. This information would be very helpful in our routine work such as inspections conducted on Solid Waste Management Facilities, also in the review of Environmental studies (EIAs, Environmental Audits…), policies, strategies, Master Plans… pertaining to the SW sector. Recently, and based on the new ISWM Law approved by the Lebanese parliament in October 2018, the Ministry of Environment is preparing the National Integrated Solid waste management strategy, Master Plans, and draft SW legal texts (application decrees and environmental decisions) which will be addressing leachate treatment as an integral part of Solid Waste Management. As for new publications, we did not receive any recent ones on leachate treatment in the region.

- Are you aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region?

As mentioned above, and on a strategic level, the national strategy, plans and legal documents will be addressing existing or planned leachate management infrastructure as part of existing and planned/proposed SW Management facilities, in addition to environmental guidelines pertaining to the subject.

As for new projects, the team is highly involved in Environmental Impact Assessments as members in the EIA review committees, and leachate treatment is being considered as an obligatory measure, where relevant, in the reviewed EIAs. We also request that The EIAs detail different alternatives for leachate treatment in order for the project proponent to adopt the best available technique according to the approved Environmental Management Plan in the EIA.

- What was the impact of the June training on your activity? Did you apply the guidance documents provided at the Lebanon workshop? If so, for what purpose?

The training and the guidance documents provided during the workshop offered guidelines on Leachate treatment and important info on the different technologies for leachate treatment and the advantages and disadvantages of each technology on the different levels (Impact on the Environment, financial level, space availability…). Therefore, they are being continuously applied by the team in most of the activities related to the Service/department role and detailed in the answers above, such as the following:

- Review and approval of the Environmental Management Plans for the projects that require Leachate Treatment in their activities
- Examination of the Environmental Performance of Solid Waste Management Facilities
- Drafting/Review of guidelines, Strategies, plans… related to the SW sector

I hope that the information provided above answers all your questions.

On behalf of the Urban Environment Service team at the Ministry of Environment, I would like to reiterate our gratitude for the June training which was considered by all the team highly informative and fruitful.

All the best,

Sabine Ghosn

Head of Department
Department of Urban Environment Pollution Control
Service of Urban Environment
Ministry of Environment

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De : Anis ISMAIL(H2020-SWIM SM) [mailto:a.ismail@swim-h2020.eu]
Envoyé : jeudi 17 janvier 2019 17:33
À : 'Maloum, Abder' <abder.maloum@suez.com>
Cc : all

Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear Maloum,
Thank you very much for your swift and informative feed-back. I wish you all the success in your new job!
Yes indeed, and as discussed also in Lebanon, it will be necessary to give great importance to the operation techniques in landfills and dumpsites to reduce the production of leachate.

And, since you are also from Algeria, I would like to share with you and the other Peers the information recently communicated by the Algerian Minister of Environment and Renewable Energies, about the construction in the near future of leachate treatment stations in 33 Governorates in Algeria (See article here). Do you have any information on the proposed technologies? I hope that our Algerian Peers will also have the opportunity to promote the recommendations and criteria for the selection of technologies discussed in Lebanon. What do you think ?
Best regards.
Anis

De : Maloum, Abder [mailto:abder.maloum@suez.com]
Envoyé : mercredi 16 janvier 2019 11:50

Hello everyone,
First I would like to wish to everyone a happy new year and all the best for you.

I will thank Anis to give us another moment to share our feedback about Lebanon workshop and our experiences.

Since these latest months I have participated to some project in Mediterranean area and I can confirm that the leachate is one of the most important issue these next years.
In some sites the leachate stored volume is between 300 000 and 500 000m3, and some times these stored volumes are RO concentrate.

As discussed during our workshop, the main reason is that the Landfill's operating conditions are not optimized and this is the main reason for leachate production.
The second reason, is that the Leachate treatment solution is not always adapted for some site. The main leachate treatment in some countries is RO filtration.
As discussed, RO filtration can be a part of treatment but not a complete treatment. In a lot of countries, we have no obligation to stop the chloride for sites near the sea.
So be aware about your treatment choice according to your site and remember that the best treatment is " TO REDUCE THE LEACHATE PRODUCTION ".

I take this opportunity to inform you that I will leave SUEZ GROUP at the end of March.
I join a French company and will continue to develop Leachate and biogas treatment solutions.
I remain at your disposal for any help or advising.

You can join me on LINKEDIN if need any Help.
Good luck for all.

Best regards.

Abder MALOUM
Responsable Ingénierie procédés de traitement
Lixiviats et Biogaz
Centre Technique Stockage

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Envoyé : mercredi 16 janvier 2019 11:16
À : 'Daniah Turjman' <D.Turjman@moe.gov.lb>
Objet : RE: SWIM-H2020 SM: P2P-6 peer-to-peer process for experience sharing and knowledge transfer on leachate management and treatment

Dear Daniah, Thank you so much for your swif reply and for your contribution to P2P exercise. Can you please send once again your message and (copy all mail group) so that we start with this group exchange. Very much appreciated!
Best regards.
Anis and Ahmed

De : Daniah Turjman [mailto:D.Turjman@moe.gov.lb]
Envoyé : mercredi 16 janvier 2019 11:12

Dear Coaches,

Thank you for your email.

The workshop was particularly interesting because of Dr. Gaber's peculiar style of delivering information and presentation. His presentations were super useful and tailored to our needs at the MoE. As for the follow up questions:

I will appreciate receiving your feed-back and reply **in a few sentences to the following questions**:

- Are you aware of new publications, studies or policy notes on leachate treatment in your country or elsewhere in the region?
Not really

- Are you aware of new projects, calls for tenders or strategic decisions on existing or planned leachate management infrastructure in your country or elsewhere in the region?
No
- What was the impact of the June training on your activity? Did you apply the guidance documents provided at the Lebanon workshop? If so, for what purpose?
The material were used as guidance in reviewing EIAs of landfills and WWTP.

Best Regards,

Daniah

Daniah Turjman
Environmental Specialist
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P ***Protect our planet: do not print this email unless necessary.***