



TRAINING REPORT

Regional activity ST- 2 Visit to different types of State-of-the-Art Sludge Management Systems

combined with

P2P-2: Sludge Management, focusing on possibilities and conditions for utilization/different applications

**Amarilia Hotel
Athens, Greece
June 25-27, 2018**

SWIM and Horizon2020 Support Mechanism

with the support of the Athens Water Supply and Sewerage Company (EYDAP)

Version	Document Title	Author	Review and Clearance
1	Training Report on “Regional activity ST- 2: Visit to different types of State-of-the-Art Sludge Management Systems”, combined with the Peer-to-Peer exchange (P2P-2) on Sludge Management, focusing on possibilities and conditions for utilization/different applications	Simos Malamis	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 Neighbourhood Instrument (ENI) South/Environment. It ensures the continuation of EU's regional support to ENP South countries in the fields of water management, marine pollution prevention and adds value to other important EU-funded regional programs in related fields, in particular the SWITCH-Med program, and the Clima South program, as well as to projects under the EU bilateral programming, where environment and water are identified as priority sectors for the EU co-operation. It complements and provides operational partnerships and links with the projects labelled by the Union for the Mediterranean, project preparation facilities in particular MESHIP phase II and with the next phase of the ENPI-SEIS project on environmental information systems, whereas its work plan will be coherent with, and supportive of, the Barcelona Convention and its Mediterranean Action Plan.

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



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ABBREVIATIONS

PCs	Partner Countries
P2P	Peer-to-Peer
SBR	Sequencing batch reactor
VOCs	Volatile Organic Compounds
WWTPs	Wastewater treatment plants



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 Work Plan was approved at a first step by the EUDs and the Commission and endorsed at a second step during the Steering Committee meeting held in Brussels (27-28 September 2016). Any adaptations in the meantime were approved/confirmed at the second Steering Committee meeting held at the Dead Sea (31 January 2018).

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 is implemented under the H2020 Component and the “Solid Waste Management” theme and clustered in the Project Work Plan under WP3: Training Activity, ST-2: Study Tour to visit state-of-the-art Sludge Management Systems. It is also combined with the Peer-to-Peer activity (P2P-2) on “Sludge Management, focusing on possibilities and conditions for utilization/different applications” under WP2.

1.1 RATIONALE

This Study Tour on sludge management was intended to inform participants about the state of the art technology, organization and practices of managing sewage sludge generated from wastewater treatment plants of major cities, with emphasis on the recovery of energy by producing alternative fuels and/or recovery of nutrients.

The study tour allowed the participants to visit the sludge management units of the Metropolitan area of Athens, located on the Island of Psytallia, off the Piraeus shore, in Greece. The processes involved consist of gravity thickening of primary sludge, mechanical thickening and thermal hydrolysis of activated sludge, anaerobic digestion, dewatering and drying of mixed primary and activated sludge. The trainees also visited a pilot plant which has been developed for the separate treatment of the sludge reject water produced from the dewatering of digested sludge and the anaerobic digestion process. It consists of a sequencing batch reactor (SBR) which removes nitrogen via nitrite (i.e. nitrification/denitrification process) and accumulates phosphorus in sludge. The trainees also saw how the aforementioned units are integrated within the overall wastewater treatment plant (WWTP).

Furthermore, three more case studies, regarding sewage sludge management, were presented to the trainees. These included the sewage sludge drying system of Thessaloniki (second largest city of



Greece), the low-cost practices of sludge storage and land application of sewage for agricultural production of Komotini and the treatment of sewage sludge by controlled solar drying (Crete).

1.2 REGIONAL CONTEXT - MANAGEMENT OF SLUDGE FROM URBAN WASTE WATER TREATMENT PLANTS IN THE MEDITERRANEAN

Sewage sludge is a residual product from the treatment of urban wastewater/sewage. It is moist or mixed with a liquid component, and, in fact, it is generated during the primary, secondary and tertiary treatment of urban wastewaters. The disposal of this sludge is a major problem for all cities. Its quantity in the Mediterranean is going to increase in the future due to expansion of sewerage networks and WWTPs, connected also to the more rigorous legislation on disposal of wastewater.

There are several types of sewage sludge treatment which include thickening, dewatering, and thermal drying to decrease the water content in sludge. Stabilization and disinfection are used for reducing the organic content, odour generation and the pathogen content of sludge. The process of stabilization includes aerobic or anaerobic digestion, composting, lime treatment, pasteurization, etc. Due to the processes involved in wastewater and sewage sludge treatment, the sludge tends to concentrate heavy metals and poorly biodegradable trace organic compounds as well as potentially pathogenic organisms (viruses, bacteria etc.) present in wastewater. Sludge is, however, rich in nutrients such as nitrogen and phosphorus and contains valuable organic matter that is useful for soils, particularly if they are depleted from nutrients and/or organic matter or they are subject to erosion. The organic matter and nutrients are the two main elements that make suitable the spreading of this kind of “waste” on land as a fertilizer and/or as an organic soil improver.

The main factors that influence sludge management are the following: cost, ease of disposal, availability of land, accessibility of sites, human and animal health concerns, environmental concerns, social and cultural concerns.

The main routes for sludge disposal are: landfilling, use of sludge in agriculture (land spreading), incineration and reclamation of energy.

The EU “Sewage Sludge Directive” 86/278/EEC seeks to encourage the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals and humans. At the EU level (2012), the reuse of sludge accounts for about 45% (agricultural use, composting) of the overall sludge production (of approximately 10 m tons per year). However, landfilling, throughout the Mediterranean is a widely used disposal outlet, despite its environmental drawback.

An overall objective is that landfilling should decrease (despite the low cost of landfilling when there is enough available landfill capacity). In the EU countries, national strategies for the implementation of the



reduction of biodegradable waste going to landfills (Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste), is among the priorities of waste management. Apart from the problems of direct pollution of soils and groundwater through landfilling, it should be remembered that the organic matter which decomposes in a landfill is not available for plant growth. At the same time, more organic matter in landfill means more landfill gas (mostly methane) produced, contributing to global warming because the landfill gas, in general, is not captured and used (although there are technologies for extracting usable biogas from old landfills). In addition, considerable emissions of different Volatile Organic Compounds (VOCs) have been also reported from landfills. Leachate from landfills usually contains several pollutants such as: heavy metals, other ions, a variety of difficult to degrade organic compounds and micro-organisms.

Use of sludge in agriculture: The agricultural sector needs supply of nutrients and organic matter (humus) to compensate for losses through harvest, grazing erosion and runoff. Sewage sludge may serve these purposes, primarily as a supplier of organic matter, but also as a supplier of nutrients such as nitrogen and phosphorus and to a lesser extent, potassium, calcium, sulphur and magnesium.

There are limit values for the concentration of heavy metals in sewage sludge intended for agricultural use and in sludge-treated soils (Annexes IA, IB and IC of the Directive 86/278/EEC). However, there are no limit values for organic pollutants and pathogens. A more uniform and comprehensive approach is needed to regulate the use of sewage sludge in agriculture based on risk assessment. Currently, there is limited use of sludge in the Mediterranean with considerable differences in the related practices and also among risk assessments for agricultural use in sewage sludge in European countries and in the USA. In several multimillion capitals, it is difficult to obtain sewage with very low concentration of heavy metals and organic micropollutants to produce a sludge suitable for agricultural use. So, incineration is considered.

Incineration: Different types of incineration may be considered as sludge disposal routes: mono-incineration; incineration with other wastes; co-incineration, when sludge is used as a fuel in plants whose purpose is the generation of energy or production of material products such as coal power plants or cement plants. Alternative processes are wet oxidation, pyrolysis, gasification, pyrolysis-gasification, pyrolysis-combustion and production of alternative fuel. Taking into account the problem of residues, after incineration which are about 30% of the input mass and its content in heavy metals, the optimal use is the one that can incorporate the residues in the product. This makes the use of dry sludge pellets in cement production an ideal solution.

Reclamation of nutrients: In parallel, there are significant efforts to reclaim nutrients from sludge, particularly phosphorus, throughout the formation of struvite since this element is essential for the production of chemical fertilizers and natural resources, such as phosphorites, are becoming scarce.



2 OBJECTIVES

The overall aim of the visit in the framework of the regional activities on Solid Waste Management was to bring together key stakeholders from the participating countries with selected experts and provide a high-level study visit focusing on sludge management from WWTPs, which included training/brief workshops, (pre-)exercises and discussions.

The specific objectives of the study visit were to:

- Introduce to the participants an integrated approach to the sustainable management of sewage sludge considering the EU standards and different types of best practices;
- Visit a fully operational state-of-the-art sludge management facility and a pilot facility applied for the management of sludge reject water which is often a problem in WWTPs;
- Provide the participants with a complete/comprehensive introduction of the sludge management systems as applied in the Athens Metropolitan Area. It is noteworthy that the plant to be visited is the only one of its kind in the region, and one of the few worldwide (a similar one is in New York, USA) that produces alternative fuel from the sludge;
- Provide participants with other case studies of sewage sludge management in Greece including successful low cost management practices;
- Enable, encourage, and facilitate dialogue and exchange of experiences between public authorities and other key stakeholders from the partner countries with those from Greece (and the utilities/sanitation company);
- Enable presentation by the participants of the situation in their countries and promote sharing of experiences among the trainers on sludge management practices; facilitate exchanges 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 sludge management.

3 EXPECTED RESULTS

The main expected results of the Study Tour were:

- Key stakeholders of the partner countries are introduced: to the EU, Greek and other legislative frameworks related to sewage sludge management (focus on innovation aspects).
- Recent developments and innovative approaches on management of sludge from WWTPs are entrenched, including technical specifications/standards to allow treated sludge to be used addressing any potential risks and dangers.
- A peer-to-peer (P2P) process for experience sharing at the regional level and knowledge transfer (south-to-south, north-to-south) around sustainable management of sludge is launched, and priority themes/areas defined.



- A continuing regional dialogue on sludge management issues is initiated between decision makers, sanitary engineers and other experts, establishing the basis for the development of synergetic activities and regional cooperation.

Overall, the workshop was successful and accomplished its expected targets. Interesting case studies were presented both on the high and low-cost range. This was done in a collaborative and constructive way which instigated extensive discussion. Furthermore, fruitful discussions took place among the participants regarding their current experiences and challenges which should be overcome. This included sewage sludge technologies, legislative and policy issues etc. Peer-to-peer activities initiated with interesting exchange of views among the peers particularly regarding the problems which are met in each country. The methods used to assess whether the desired results were achieved are described in section 5. Overall the assessment of Section 5 shows that the participants found the event very fruitful. The high score of the evaluation shows that the trainees felt that their expectations were met.

4 PROFILE OF THE PARTICIPANTS

A total of 40 participants attended this training. Among them, 25 participants were decision-makers and technical staff coming from Algeria, Egypt, Jordan, Morocco, Tunisia, Israel, Lebanon and Palestine from the following types of affiliations: from the National Ministries responsible for sludge management, from local or regional public authorities responsible for on-site sanitation and management of sludge, from companies involved in sewage sludge management and from civil society organisations working in the same field.

From Greece, 15 participants contributed and benefitted from this 3 day training coming from academia and research institutes, the private sector, the Athens Supply and Sewage Company and from the Public Water and Sewerage Company of Komotini. From the Greek participants, 6 were also presenters of the Greek case studies (see list of participants in Section 9.2) in addition to the NKE Prof. S. Malamis and the SWIM-H2020 SM Team Leader Prof. M. Scoullou. 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. Real problems were discussed where the Greek experience could help and serve as a guide for several of the MED countries. This was reflected by the high number of questions which the presenters of the case studies were asked to address.



5 EVALUATION OF THE STUDY VISIT AND TRAINING

5.1 FEEDBACK FROM THE TRAINEES (EVALUATION FORMS)

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

A set of 10 criteria; A1-A10 (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	17	1	0	0	18	3.94
A2	Efficient logistics: accommodation, transportation, location of venue and interpretation	12	7	1	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	14	6	0	0	20	3.70
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	15	5	0	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	4	1	0	18	3.67



A8	Clarity, coverage and sufficiency of concepts, objectives, anticipated outputs and outcomes	12	6	2	0	20	3.50
A9	The materials distributed were helpful	15	5	0	0	20	3.75
A10	Efficient and Effective Facilitation	15	4	1	0	20	3.70
A11	Overall rating of the event	15	3	2	0	20	3.65

See also the corresponding graphs for Table 1 indicating that all ratings are above 3.50 with the bulk of them approaching 4.00 (excellent).

Feedback on technical aspects

Figure 1- Training coverage

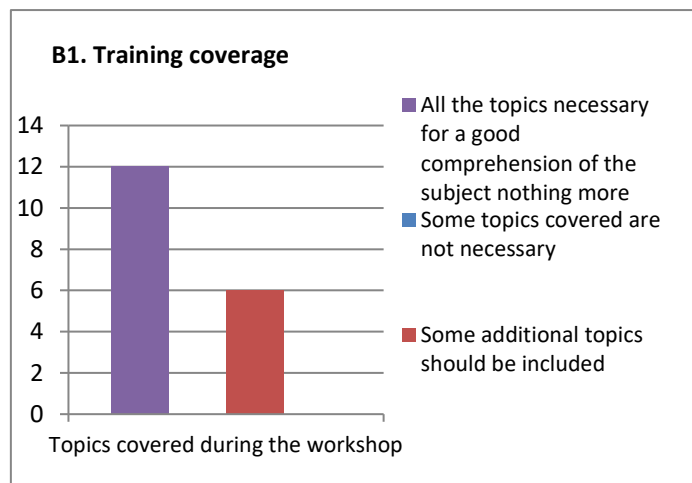




Figure 2 – Training difficulty

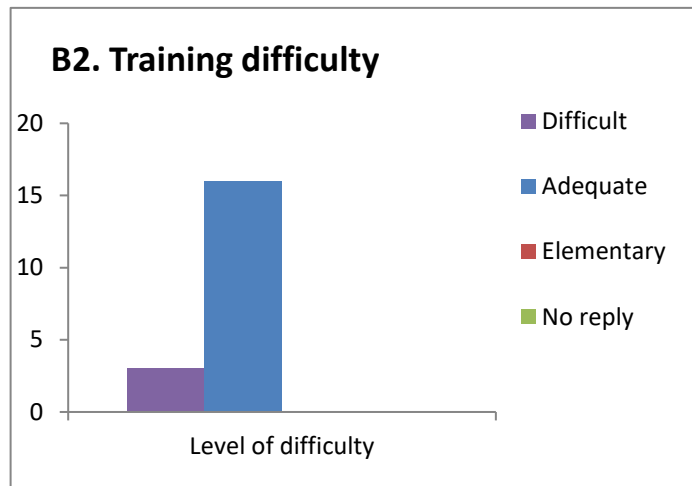
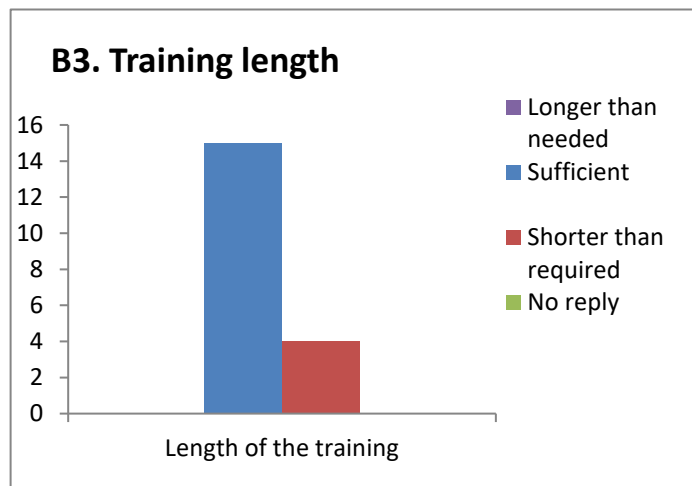


Figure 3- Training length



Participants replies to the open-ended questions

The participants replied to a series of assessment questions regarding the workshop. In total 18-20 replies were collected per question. All ratings were rated above (or at least equal to 3.50) with the bulk of them approaching 4.00 (excellent), showing that the workshop was well evaluated. The overall rating of the event by participants was 3.65/4.00, with 15 participants rating it as excellent and 3 as good. In terms of training coverage, difficulty and length the vast majority of participants noted that these were well planned.



5.2 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)

C1	Efficient and effective performance and interaction by participants	The workshop was highly engaging and many issues were discussed. It is considered as high added value for the trainees, extremely effective and efficient
C2	Efficient and effective cooperation and team spirit	Very good team work and collaboration among the participants. In my cases discussion was instigated by one partner and then there were many follow-ups by others. All partners contributed to the discussion. The high overlap of challenges was demonstrated through the interaction as well as the need to address these in a team approach
C3	Level of achievement of planned objectives	The planned objectives were fully met
C4	Did the event contribute to helping participants practice skills or gain knowledge related to course concepts	The event provided high added value to the participants in terms of theoretical background, legislative issues, but also real case studies in the field of sewage sludge management
C5	What worked well during the event	Excellent level of interaction and exchange of views Different case studies were presented from the Greek context
C6	What didn't work well and why	Probably the exercise was difficult to solve and was at a higher standard than expected. However, this was addressed by providing a complete solution during the last session.
C7	What components/concepts did participants seem to understand well	Participants seem to understand well the technologies applied to sewage treatment, legislation and relevant case studies
C8	Were there any components/concepts that participants appeared to not understand	Some participants had difficulty in following calculations of mass balances in the sludge treatment works
C9	What aspects of the event could be	I would change very little as overall it was a very



improved and what to be kept	successful event. We would like to have also a site visit at a low-cost sludge management system. However, this was impossible due to logistics
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6 ANALYSIS OF THE RESULTS OF THE STUDY VISIT AND TRAINING

- Existing sewage sludge treatment technologies were described and analysed:
 - Composting of sewage sludge is an effective degradation process to produce stabilized compost which can be valorised through land application. It is a rather low cost method that has potential in Mediterranean countries
 - Drying process is effective in greatly reducing the moisture level of sludge and producing a stabilized final product easily transported, stored and handled. The technologies vary here from low cost solar drying to complicated and expensive industrial drying processes.
 - Gasification, gasification pyrolysis are thermal treatment processes that can be applied to recover energy and potentially other products. However, the initial capital investment of such processes is rather high.
- Interesting case studies of sewage sludge management were presented and discussed from the Greek context including both low-cost and high-cost management solutions. This included
 - The thermal drying systems of Psyttalia in Athens and Thessaloniki. The participants were very much interested in these systems; however, it was recognized that the cost of such systems could be prohibitive for application in some Mediterranean countries
 - The solar drying process implemented in several European and other Mediterranean countries. This process was recognized as viable and is already applied in some countries such as Tunisia
 - Sewage sludge storage (for drying) and land application in Komotini (North Greece). The participants were very much interested in this low cost application of sewage sludge
- The participants discussed challenges which need to be addressed in different countries. The main problems which are encountered include:
 - Legislative and operational framework gaps which make it difficult to safely implement effective sewage sludge management practices with emphasis on agricultural sludge reuse



- Implementation of high-tech systems which are then not properly maintained due to the lack of resources
- Poor monitoring and control of sewage sludge management practices leading to bad management practices
- Acceptability of sewage sludge reuse in agriculture by farmers
- Bureaucracy problems which need to be resolved in order to facilitate permitting procedures for land application of sewage sludge.

7 LAUNCHING P2P-6

The officially appointed, by the PCs, Peers for ST-2 on Sludge Management are:

For Lebanon: Mr. Rami NASSIF

For Morocco: Ms. Malika EL BAYOUDI,

For Palestine: Mr. Amjad KHARRAZ

EYDAP is the Greek Peer and Dr Malamis is the Coach

Early in the first day of the ST, a meeting took place with the appointed peers to discuss about their interests and challenges to be addressed. The Lebanese peer mentioned that in Lebanon the legislative framework is currently insufficient to address sewage sludge management and that Lebanon needs to consider the existing international standards. Agricultural use of sewage sludge is very important for the country and successful pilot activities could help support this. The Palestinian peer mentioned that their biggest challenge is the high moisture level of sewage sludge which limits the potential valorization. Activities need to be implemented to divert sewage sludge away from landfill and towards agricultural utilization. The Moroccan peer stressed the fact that in Morocco there is a lot of bureaucracy involved in sewage sludge management which is a barrier to sludge valorization. Moroccans are very much interested to learn about successful cases of sewage sludge use in agriculture. The meeting was concluded with reference to the peer-to-peer activities which will take place after the workshop based on the interests and challenges of each country.



8 CONCLUSIONS/RECOMMENDATIONS

- The workshop was very successful, with high interaction among participants and exchange of knowhow, ideas, experiences, challenges and ways to move forward
- Several countries face similar challenges/barriers in sewage sludge management. So interaction and collaboration can help solve mutual problems. However, there are also problems that are region or country specific which need to be addressed.
- The take home message is that “the treatment of sewage sludge to produce pellets of alternative fuel is an excellent option, particularly if the latter is used in cement factories and is suitable for large cities, where the different waste water streams cannot be controlled to provide sludge with low pollutants levels. Definitely, there is no unique solution in sewage sludge management which can be copied from other countries”. Each country, based on its needs has to develop an appropriate legislative framework if this is lacking or complement the existing one, if needed. The selection of technologies needs to be pragmatic based on efficiency and economics.



9 ANNEXES

9.1 AGENDA

DAY 1:			
Monday 25 June		Venue: Amarilia Hotel, 13 Agiou Nikolaou st., 16671 Vouliagmeni, Athens	
Time	Session	Work programme	Trainers/Speakers
9.30-10.00		Registration of participants	
10.00-11.00	Welcome speech	<ul style="list-style-type: none"> • Welcoming remarks • Brief overview of SWIM-H2020 Support Mechanism • Agenda overview • Tour de Table 	Prof. Michael Scoullou, Team Leader, SWIM-H2020 SM
11.00-11.30	H2020 SM Peer-to-Peer Launching	Peer-to-Peer exercise on Sludge Management, focusing on possibilities and conditions for utilization/different applications: identification of objectives, milestones and expected results	Facilitated discussion
11.30-11.45	<i>Coffee break</i>		
11.45-13.30	Sludge management	Common practices and advanced processes	Dr. Simos Malamis, Sludge Management Expert, SWIM-H2020 SM
13.00-14.00	<i>Lunch break</i>		
14.00-14.30	Sludge management	Open floor for discussion	All
14.30-15.00	Expanding cities	Management of the water and wastewater network of an expanding city through time: The case of Athens Discussion	Dr. Efthymios Lytras Deputy Director of Environment and R&D Dept., EYDAP (Athens Water and Sewerage Company)
15.00-15.15	Sludge management	Introduction to next day's visit & Discussion	Dr. Simos Malamis, Sludge Management Expert, SWIM-H2020 SM
15.15-15.45	Promoting innovative technologies	SMART-Plant Horizon 2020 project: Distinct SMARTechs, stakeholders, communication activities, exploitation of the results. Discussion	Dr. Stelios Samios Head of R&D Dept., EYDAP
15.45-16.00	<i>Coffee break</i>		
16.00-17.00	Exercise	Team work exercise	All



DAY 2:	
Tuesday	26 June
Field visit to Psyttalia WWTP	
Time	Session
7.30	Gathering at the Lobby of Amarilia Hotel
7.40	Departure from the hotel to Psyttalia WWTP
9.00	Arrival to Akrokeramos
9.00-10.00	Welcome by the Director Mr. Dimoulas (WWTP)
	Presentation of the Athens WWTP (EYDAP/ Psyttalia – Dr. Tzouvaras and/or Mr. Karagiannis)
10.00-10.30	Visit to the pre-treatment Unit of the WWTP
10.30-11.00	Coffee Break
11.00– 15.00	Visit to Psyttalia Island WWTP
	<i>Technical tour of the various facilities including the pilot systems for reclamation of nutrients from sludge (SMART-Plant) and of high rate WWT</i>
15.00-16.00	Lunch at the “Limanaki” restaurant
16.00-17.00	Return to the hotel

DAY 3:			
Wednesday	Venue: Amarilia Hotel		
27 June			
Time	Session	Work programme	Trainers/Speakers
9.30-11.00	Country presentations	Each country briefly presents their challenges and experiences on sewage sludge management	All countries
11.00-11.30	<i>Coffee break</i>		
11.30-13.00	Case study	Low-cost sludge management with 100% use in agriculture	Ms. Elisavet Georgiadou, Director of DEYA Kommotini (Public Water and Sewerage Company of Komotini)
	Case study	Thermal Drying Plant for Sludge, Thessaloniki	Ms. Georgia Dinopoulou, CHRISTOPHER D. CONSTANTINIDIS S.A
	Case study	Solar Drying	Mr. Xristos Lioumis, CHEMITEC
13.00-14.00	<i>Lunch break</i>		
14.00-14.45	Exercise	Team work on the solution of the exercise	All
14.45-15.30	Closing of training	Closing reflections Evaluation and certificates award	Prof. M. Scoullou Dr. S. Malamis



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

SWIM-H2020 SM Study Tour: Visit to different types of State-of-the-Art Sludge Management Systems

25-27 June 2018, Athens, Greece

No.	COUNTRY	TYPE OF INSTITUTION (please use the options provided*)	TITLE (Mr/Ms)	FIRST NAME	LAST NAME	POSITION/ FUNCTION	ORGANISATION/ INSTITUTION	EMAIL
1	ALGERIA	MINISTRY REPRESENTATIVE	Ms.	Fatma-Zohra	ABBAD	Directrice Générale du Conservatoire National des Formations à l'Environnement (CNFE) / Point Focal SWIM-H2020	Ministère de l'Environnement et des Energies Renouvelables	abbadz@yahoo.fr
2	ALGERIA	GOVERNMENT AGENCY	Mr.	Zaid	DELIBA	Ingénieur d'état	Agence Nationale des Déchets	delibazaid@gmail.com
3	EGYPT	MINISTRY REPRESENTATIVE	Ms.	Amel	BARAKAT	Hazardous and Solid Wastes Department Manager	Egyptian Environmental Affairs Agency	barakat_amel@yahoo.com
4	EGYPT	GOVERNMENT AGENCY	Mr.	Ahmed	BATIE	Doctor of Biochemistry (researcher and lecturer)	Dakhia Water and Wastewater Company	Ahmed_batea2000@yahoo.com
5	ISRAEL	MINISTRY REPRESENTATIVE	Ms.	Nitzan	EZRA	Coordinator, Department of Industry and Business Licensing	Ministry of Environmental Protection	nitzane@sviva.gov.il



Sustainable Water Integrated Management and Horizon 2020 Support Mechanism

This Project is funded by the European Union

6	ISRAEL	GOVERNMENT AGENCY	Ms.	Karina	DROT	Project Coordinator	Israeli Water Authority	karinad@water.gov.il
7	ISRAEL	OTHER (including Diplomats, Consultants, Members of Parliament etc)	Mr.	Vyacheslav	SHMULEVICH	Process Engineer	Mekorot – Israeli National Water Company	slavash@mekorot.co.il
8	JORDAN	MINISTRY REPRESENTATIVE	Mr.	Hisham	ALKHALAFAT	Director	Environmental Protection Directorate in Tafelah Governorate	hisham.kh64@yahoo.com
9	JORDAN	GOVERNMENT AGENCY	Mr.	Tayseer	ALZU'BI	Public Security Directorate	The Royal Department for Environmental Protection	seeryseer@yahoo.com
10	JORDAN	NGOs REPRESENTATIVE	Mr.	Omar	ALSHOSHAN	President	Jordan Environmental Union	omar.shoshan11@gmail.com
11	JORDAN	NGOs REPRESENTATIVE	Mr.	Jalal	AL-IMEISHAT	President	Al-Noor Cooperative Society	alnoorjl@yahoo.com
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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

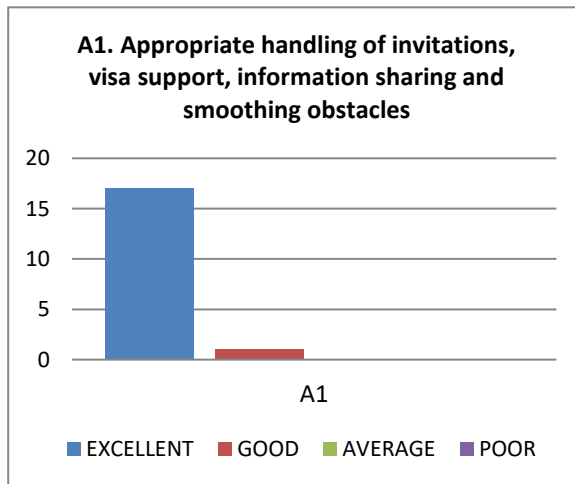


Figure 2 – Logistics

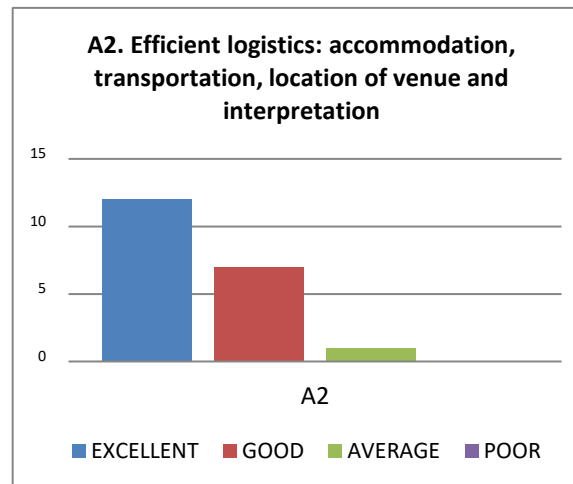


Figure 3 – Participants' preparation

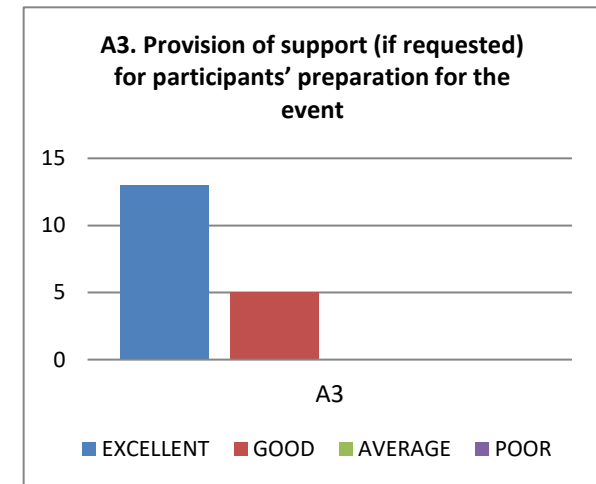




Figure 4 – Progress towards the event

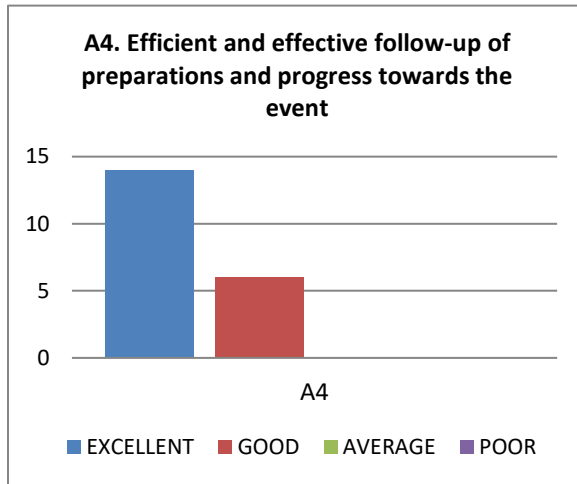


Figure 5 – Planning

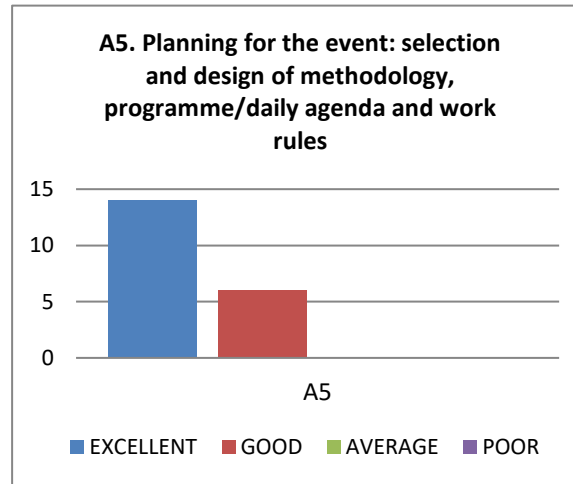


Figure 6 – Flow of programme

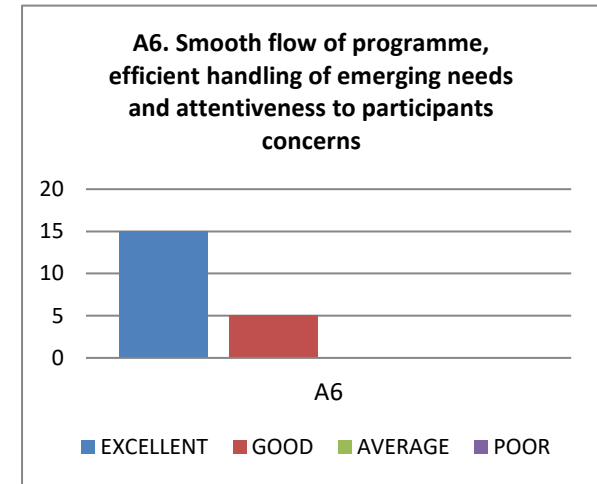




Figure 7 – Presentation and enhanced shared experience

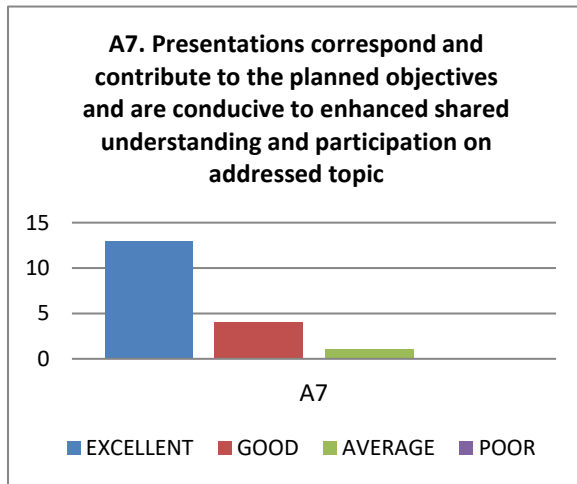


Figure 8 – Clarity and Sufficiency of concepts

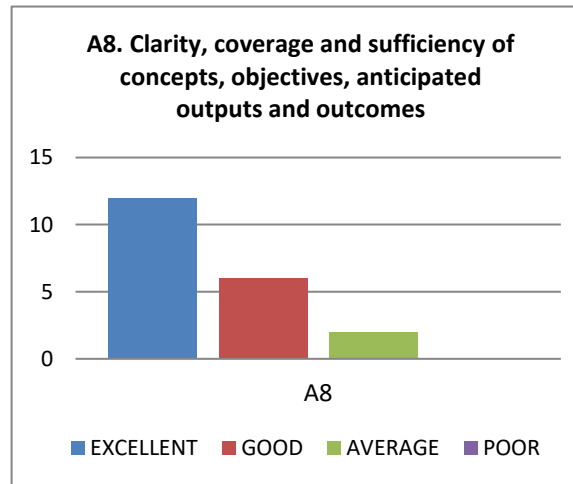


Figure 9 – Quality of materials

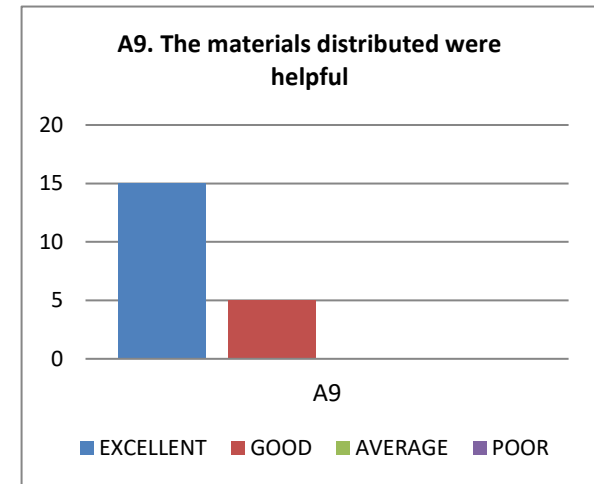




Figure 10 – Facilitation

Figure 11 – Overall rating

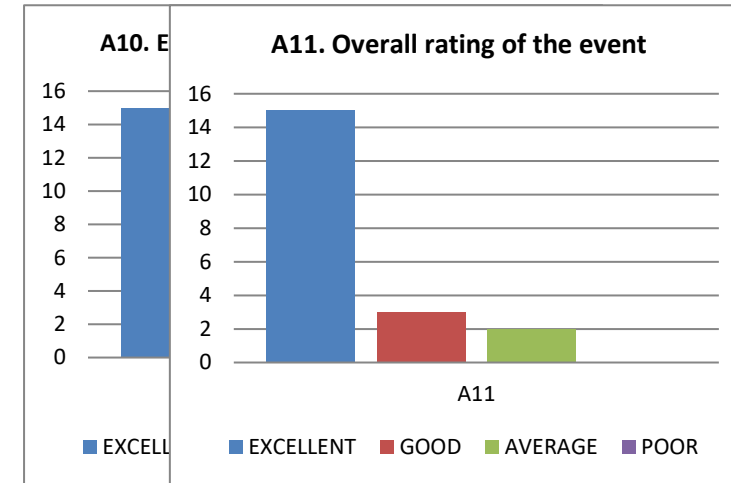




Table 2 - Participants' feedback on technical aspects of the training

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	12
	Some topics covered are not necessary	0
	Some additional topics should be included	6
	No reply	0
	Total Replies	18
B2	Level of difficulty	
	Difficult	3
	Adequate	16
	Elementary	0
	No reply	0
	Total Replies	19
B3	Length of the training In your view the workshop duration (tick one of the following):	
	Longer than needed	0
	Sufficient	15
	Shorter than required	4
	No reply	0
	Total Replies	19

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)?	<ul style="list-style-type: none"> ▪ The learning process (1); ▪ Sludge management in Europe, composting manufacturer, biogas production standards, incineration technique (2); ▪ Methods for sludge treatment (3); ▪ The experience of different countries, especially Greece (4); ▪ The visit to Psyttalia was important (3); ▪ Sludge management process in other countries (2); ▪ The technology for sludge management (1); ▪ New methods to get rid of impurities before water treatment (1); ▪ Detailed sludge treatment method (1); ▪ The sludge management systems must be adopted according to the needs of each country (1); ▪ Institutional support will have to be provided to guarantee the



		<ul style="list-style-type: none"> destination of the sludge (1); ▪ Several possibilities to valorize sludge residues (1); ▪ Sludge Management lectures by Prof. Scoullou and Dr. Malamis as well as the case study by Ms. Elisavet Georgiadou (1) 	
	Total Replies		18
B5	How do you think that the current event will assist you in your future work on the subject?	<ul style="list-style-type: none"> ▪ Better management of sludge in our countries (3); ▪ Exchange knowledge with stakeholders about sludge treatment as we are facing problems with the treatment and uses of sludge (2); ▪ I gained knowledge (2); ▪ Enrich my knowledge about sludge management process (3); ▪ Built my capacity in sludge management (4); ▪ Exchange ideas with other participants (1); ▪ Use of new technology in our country (1) 	
	Total Replies		14
B6	Please indicate whether (and how) you could transfer part of the experience gained from the event to your colleagues in your country?	<ul style="list-style-type: none"> ▪ Discuss the experience with colleagues (4); ▪ Organize a workshop for assessing the method of sludge management in Athens and the method of biogas production (1); ▪ I will give to my colleagues the presentations (3); ▪ Share the training material (4); ▪ I will do a summary of the training to my colleagues (1); ▪ Organize workshops to transfer knowledge and experiences (2); ▪ Explain to my colleagues the process (1); ▪ I will do a report (1); ▪ Training programme for Sludge Management in our organization (1); ▪ Make presentations and report (1) 	
	Total Replies		16
B7	What did you like most about this event?	<ul style="list-style-type: none"> ▪ The sequence of the 3 days learning process: 1st day (Theory), 2nd day (Visit), 3rd day (Questions) and the exercise (1); ▪ The visit to WWTP in Akrokeramos and Psyttalia (8); ▪ The case studies (3); ▪ I learned about the sewage sludge treatment of other countries (2); ▪ Knowledge and rich information (1); ▪ Everything (1); ▪ The relevance of the subject (1); ▪ The different sludge management systems developed by Greece (1); ▪ The country hosting the seminar (1); ▪ The efforts of the team to build a collaborative and successful environment between participants (1) 	
	Total Replies		16
B8	What needs to be improved?	<ul style="list-style-type: none"> ▪ Some presentations were less appropriate for the topic (1); ▪ The location of the hotel (1); ▪ To have Arabic interpretation (1); ▪ More case studies (1); ▪ Visit the farmers who used outcomes of sludge after treatment (1); ▪ Additional peer-to-peer time (1); ▪ Add presentations related to the usage of mud in agriculture: research results (1); ▪ More motivated participants (1); ▪ Economic comparison of different techniques (1); ▪ All Mediterranean countries should have been participated (1) 	
	Total Replies		10



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