



**State of Palestine**

***SWIM-H2020\_ST-2 Sludge Management Systems***

**SWIM-H2020 SM STUDY TOUR:  
VISIT TO STATE-OF-THE-ART SLUDGE MANAGEMENT SYSTEMS  
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# Introduction

- The Palestinian experience for handling sludge produced by municipal treatment plants is still very limited.
- Around 11 Wastewater treatment plants are in operation. All of them are activated sludge plants = high sludge production.
- The restricted standard of sludge reuse in Palestine makes it not possible to be applied as fertilizer.
- Nablus Wastewater treatment plant is one of the biggest lead plants in West Bank producing daily 15 tons of sludge of digested sludge which has an approximate dewaterability of 25-30 TS %.

## **Moisture content problem**

- **The sludge quality achieves all the parameters of “class A as fertilizer” in the standard except satisfying one parameter “moisture content“**
- **This condition obliged Nablus Plant to send their sludge with high standard into Zahrat Alfenjan Landfill for dumping**

Item	Results		Comparison with standard of Sludge 50% moisture			Comparison with standard Sludge 70% moisture		
	Sludge 50% moisture	Sludge 70% moisture	1st class	2nd class	3rd class	1st class	2nd class	3rd class
<b>As (ppm)</b>	4.3	3.4	41	75	75	41	75	75
<b>Cd (ppm)</b>	N.D	N.D	40	40	85	40	40	85
<b>Cr (ppm)</b>	18.4	14.6	900	900	3000	900	900	3000
<b>Cu (ppm)</b>	149.1	76.8	1500	3000	4300	1500	3000	4300
<b>Hg (ppm)</b>	1.53	0.99	17	57	57	17	57	57
<b>Mo (ppm)</b>	3.6	3.3	75	75	75	75	75	75
<b>Ni (ppm)</b>	15.8	11.1	300	400	420	300	400	420
<b>Se (ppm)</b>	N.D	N.D	100	100	100	100	100	100
<b>Pb (ppm)</b>	17.8	13.4	300	840	840	300	840	840
<b>Zn (ppm)</b>	598	298.6	2800	4000	7500	280	400	7500
<b>Moisture %</b>	46.2%	67.1%	10%	50%	50%	10%	50%	50%
<b>FC (cfu/g)</b>	27000	100000	1000	2000000	---	1000	2000000	---
<b>Salmonella (cu/g)</b>	1 Present/1g	1 Present/1g	3	----	---	3	----	---
<b>Hel. eggs (cu/g)</b>	Not Available	Not Available	1	---	---	1	---	---
<b>Viruses (cu/4g)</b>	Not Available	Not Available	1	---	---	1	---	---



# The high cost of transportation of dewatered municipal sludge to the landfill



# Cost

**Each Ton of dumped sludge costs the municipality 75  
NIS = 21.5 \$**

**Nablus Plant is producing 15 tons daily**

**Yearly cost of dumping the transferred sludge to the  
landfill  $\approx$  116, 000 \$**

**Is there any safe and feasible alternatives?**

# Inquiries

- **Is moisture content a problem in reuse of sludge?**
- **Is there a technology available to access the required moisture content as required by Palestinian standards while being economically viable?**
- **Are there any restrictions on the reuse of sludge by type of soil, plant, quantities, .....?**





# Thanks any comments

- Thanks for Eng. Mohammad Homeidan
- For his help us in the technical information