H2020/NAP indicator factsheet

Industrial Emissions

Palestine

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Organisation: EEA

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UN environment
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Mediterranean Action Plan
Barcelona Convention

European Environment Agency

Version History

Version	Date	Author	Status and description	Distribution
V1	10/07/2020		Industrial emissions indicators factsheets	SEIS NFPs
	10/7/2020	Sabah Nait		Menouer

Indicator Assessment

H2020 / NAPs Indicators	
Thematic area **Industrial emissions**	**Date** **Author(s):**
Policy theme 6.1 Release of nutrients from industrial sectors	
Indicators: 6.1.1) Total BOD load discharged. 6.1.2) Total Nitrogen load discharged. 6.1.3) Total Phosphorus load discharged.	

Key policy question: *Are the releases of nutrients from industrial sectors treated, monitored and regulated in Gaza strip - Palestine?*

Key messages

- The wastewater treatment plants are highly affected by the daily power cuts which cannot operate continuously in the Gaza strip leading to the release of untreated wastewater to the sea.
- The efficiency of the WWP treatment is also highly affected, during period of time it is functioning, by the energy daily cuts and consequently even the treated wastewater is released with higher nutrient levels than the WHO standard limits to the mediterranean sea.
- The average BOD loads released in the environment are decreasing as the time period of power supply increased since year 2019 after a new diesel power generation station has been installed.
- Industrial wastewater pollution levels are not measured nor estimated at the industrial source points which makes it difficult to assess the pollution level released and the trend over time from industrial activities in Gaza strip considering the domestic wastewater and wastewater from industrial activities are directly dischaged in the same sewage system.
- There is no monitoring programme of pollutant loads releases in Gaza Strip where around 40% of wastewater is not collected and released in the environment. Launching such monitoring programme in Gaza strip on industrial wastewater by sampling and analysing TN; TP; and BOD will provide data for better quality control of pollution and its management by the relevant authorities.

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Key figures/tables

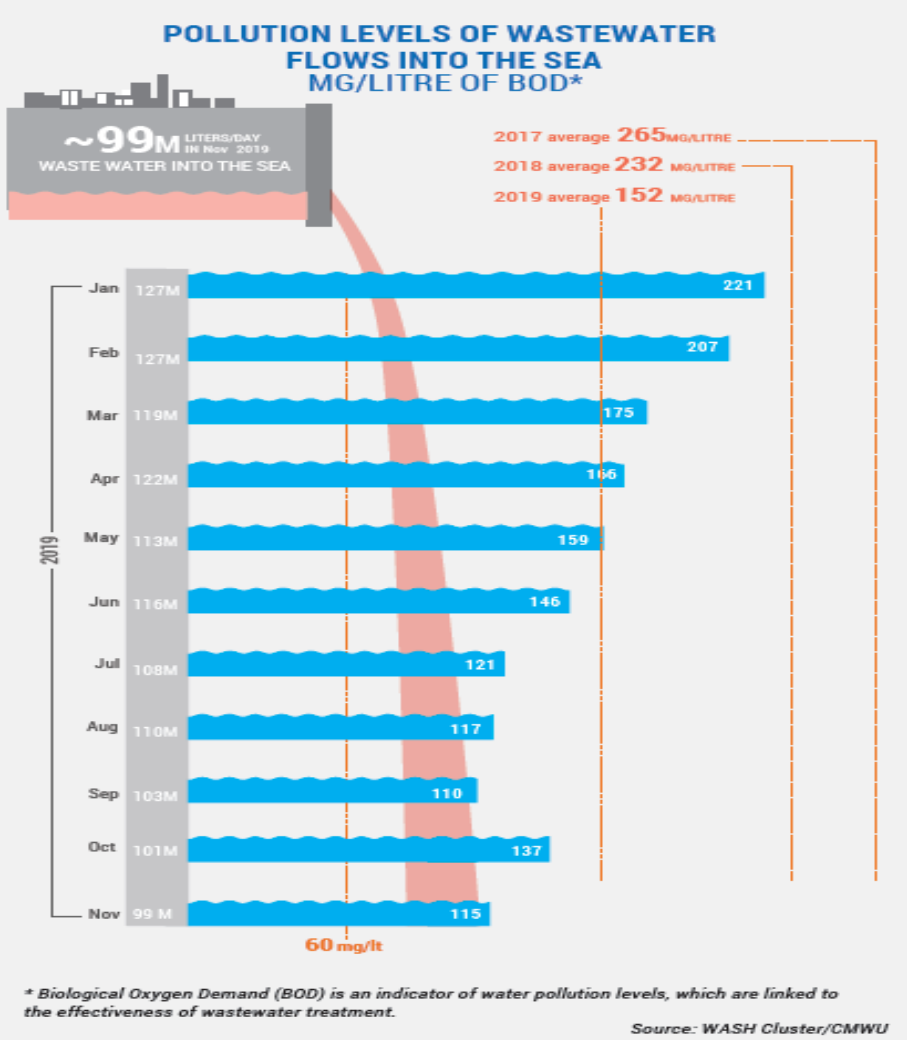

Figure 2: BOD (mg/l) and sewage (Million liter/day) released to the Mediterranean sea in years 2019 from Gaza Strip (source: OCHA, 2019). (https://www.ochaopt.org/data/crossings)

Key assessment text

In Gaza Strip, wastewater emissions loads include both domestic and industrial pollution releases. Due to lack of data from industrial activities, it makes it difficult to split emission loads per sector. However, considering the few number of small industrial plants in Gaza Strip, the nutrients pollution (BOD, Phosphorus and Nitrogen pollution) is more likely to be relased more by domestic uses rather by industrial activities. The wastewater treatment

plants were working only few hours a day (around 4 hours in early 2010) due to power cuts leading to the release of untreated or partially treated waste waters. Since 2019, the WWTP are functioning for around 12 hours a day which increases the wastewater treatment and therefore the total nutrient pollution discharged is decreasing during year 2019 by half that released in previous years. However, pollution loads released are still high more than twice the WHO standard of 60 mgL of DBO. There is a need of more energy supply to operate the WWTPs for 24 hours a day to reduce further more the level of pollution released to the sea from Gaza strip.

The Environmental Quality Authority declared the beaches of Gaza City and in Rafah governorates, as highly polluted where swimming is strongly discouraged. These beaches are the main destination for internal tourism, constitute 75% of all Gaza beaches, which poses serious health and environmental hazards, particularly during the summer when swimming in the sea is one of the few recreational activities available to the population of Gaza.

Due to the level pollution of wastewater even downstream the WWTPs, there is no treated wastewater reuse in Gaza strip despite the need for water in agriculture and for other uses.

Specific policy questions:
What is the progress in the control of the total BOD load discharge from Gaza strip to the Mediterranean Sea?

Specific figure(s)

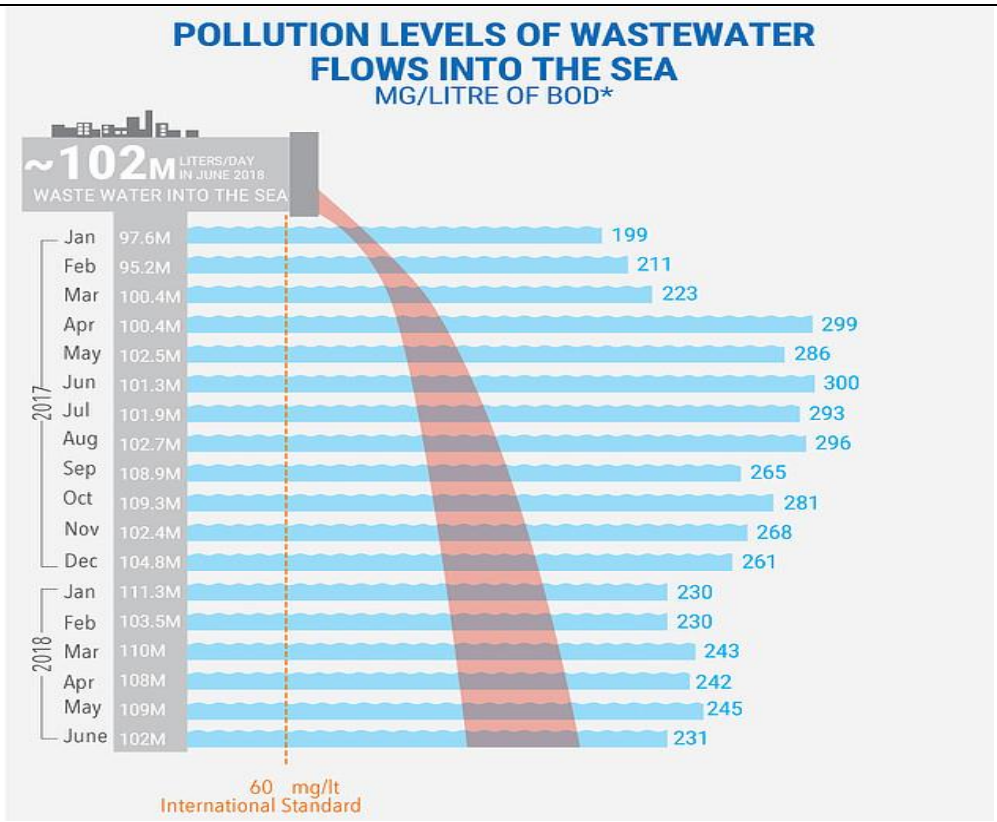

Figure 1: BOD (mg/l) and sewage (Million liter/day) released to the Mediterranean sea in years 2017 and 2018 from Gaza Strip (source: OCHA, 2018).

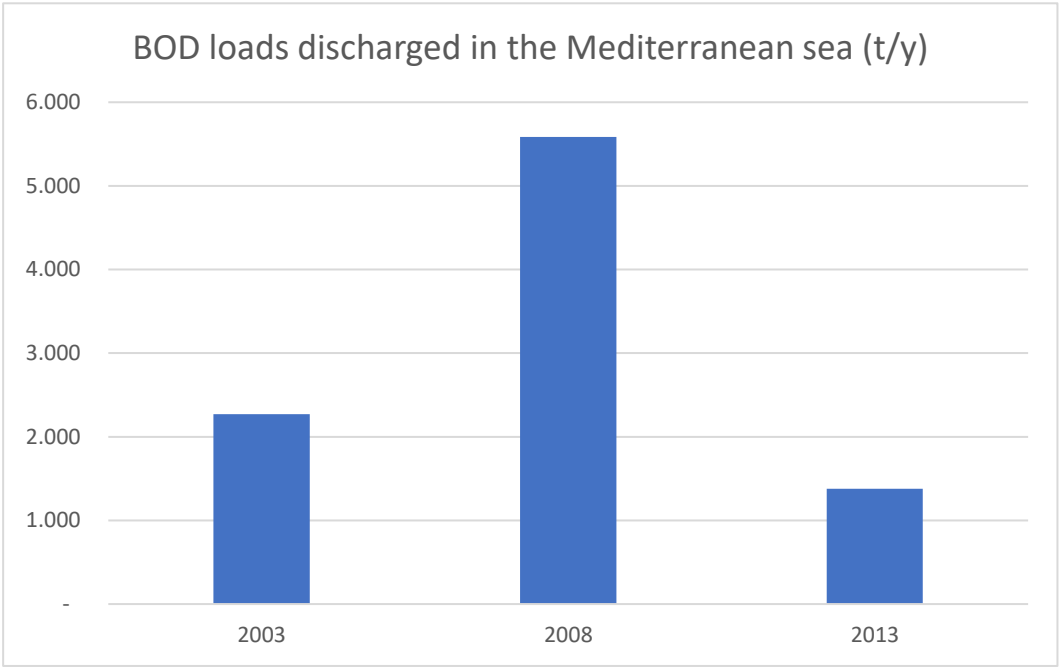

Figure 3: BOD loads discharged in the Mediterranean sea (t/y)

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Specific assessment text
Water pollution released into the Mediterranean Sea for years 2017 and 2018 is nearly four times higher than the international standard of 60 mg BOD/L mainly considering the wastewater treatment plant is operated on a part time operating in Gaza Strip due to lack of power provided on a regulars basis. Despite the use of diesel generators, whenever available, the plant cannot operate at full capacity which leads to high BOD loads discharged. According to data published by OCHA (2020), the BOD daily average concentration shows a decreasing trend during the last three years (2017-2019) down from 221 mg/ in Januray 2019 to 115 mg/ L in november 2019. The average net decrease in 2019 up to 151 mg/l is due to the increase of power supply time to Gaza strip allowing the wastewater treatment plants to operate longer time from a daily average of 5.7 hours in 2017 to 12 hours in 2019.
References in specific assessment text - State of Palestine, Sustainable development Goals, 2018, Palestinian National voluntary review on the implementation of 2030 agenda. - Hossam Adel Zaqoot, Taysir Saleem Hujair, Abdul Khalique Ansari, Shaukat Hayat Khan, Assessment of Land-Based Pollution Sources in the Mediterranean Sea Along Gaza Coast – Palestine, Energy, Environment and Sustainable Development, 2012 - OCHA indicator report, 2018

Specific policy questions:

What is the progress in the control of the total Nitrogen load discharge to the Mediterranean Sea from Gaza strip – Palestine?

Specific figure(s)

Wastewater treatment Plants	Flow to sea (m^3/day)	BOD5 (mg/L)	COD (mg/L)	Total Nitrogen (mg/L)
Gaza	32,000	33.3	98	50
Rafah	4,200	269.3	652.2	93.1
Deir Elbalah	3000	589	1165	100

Pollution Loads/WWP	BOD5 (t/y)	COD (t/y)	Total Nitrogen (t/y)
Gaza	389.94	1,147.58	685.5
Rafah	414.72	1,004.39	143.37
Deir Elbalah	644.96	1275.68	109.5
Total	1449.62	3427.65	838.37

Table 1: Pollutant Discharges from Wastewater treatment plants to the Sea, 2000/2001

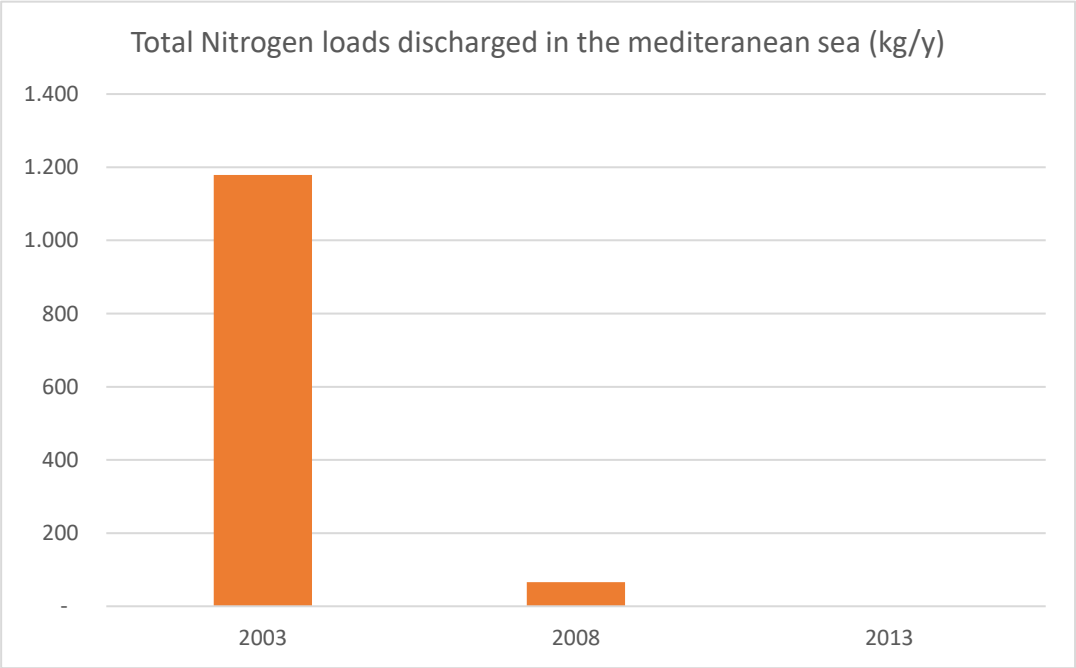

Figure 4: Total Nitrogen loads discharged in the Mediterranean sea (t/y)

Specific assessment text
Total Nitrogen pollution loads are decreasing due to low number of water polluting industrial activities which are mainly food industry oriented besides the increasing operating time of wastewater treatment plants in Gaz Strip.
References in specific assessment text MedPol, 2019

Specific policy questions:
What is the progress in the control of the total Phosphorus load discharge to the Mediterranean Sea from Gaza strip – Palestine?

Specific figure(s)

Wastewater treatment Plants	Flow to sea (m^3/day)	BOD5 (mg/L)	COD (mg/L)	Total phosphorus (mg/L)
Gaza	32,000	33.3	98	5.4
Rafah	4,200	269.3	652.2	4.5
Deir Elbalah	3000	589	1165	5

Pollution Loads/WWP	BOD5 (t/y)	COD (t/y)	Total phosphorus (t/y)
Gaza	389.94	1,147.58	63.23
Rafah	414.72	1,004.39	6.93
Deir Elbalah	644.96	1275.68	5.48
Total	1449.62	3427.65	75.64

Table 2: Pollutant Discharges from Wastewater treatment plants to the Sea, 2000/2001

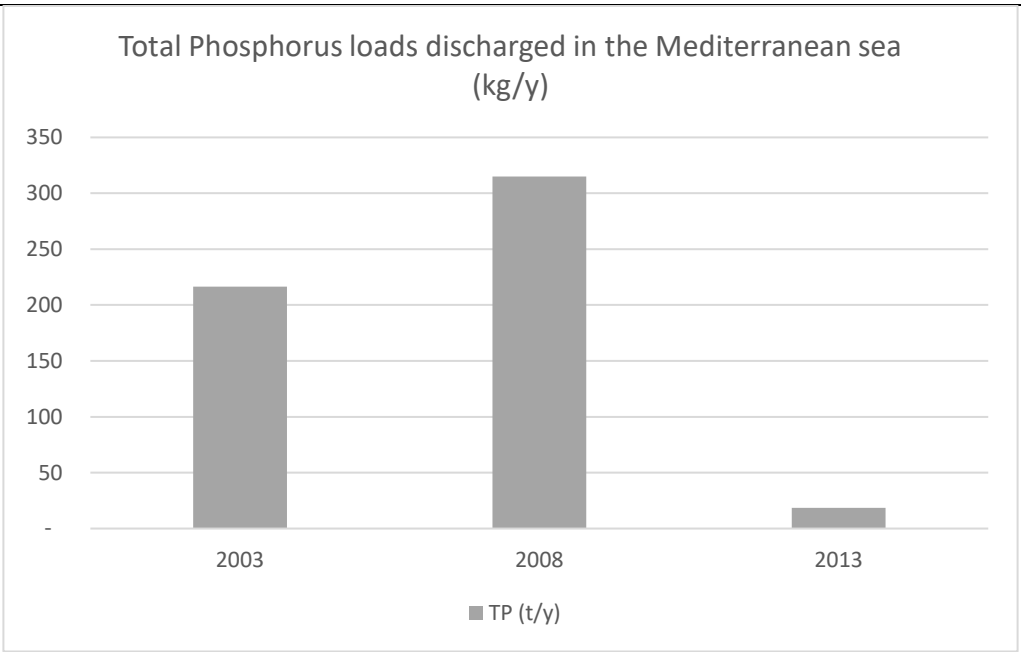

Figure 5: Total Phosphorus loads discharged in the Mediterranean Sea (t/y)

Specific assessment text

Total Phosphorus pollution loads are decreasing due to low number of water polluting industrial activities which are mainly food industry oriented besides the increasing operating time of wastewater treatment plants in Gaz Strip.

Noting that wastewater emissions loads include both domestic and industrial pollution releases. Due to lack of data from industrial activities in Gaza Strip, it makes it difficult to split emission loads per sector. However, considering the few number of small industrial plants in Gaza Strip, the Phosphorus and Nitrogen pollution is more likely to be relased by domestic uses rather from the industrial activities. Total pollution of Phosphorus discharged is decreasing during year 2019 while wastewater treatment plant are operating for 12 hours a day instead half of that during previous years.

References in specific assessment text

MedPol, 2019

Methodology for indicator calculation

The methodology of estimation of pollutant loads releases is based on the measurements of BOD, TN, TP concentrations in the wastewater treatment plants downstream and the flow rates of wastewater relased to the sea which is in line with the H2020 methodology.

For all indicators developed on nutrients, the methodologies are based on the MedPol

methodologies. The methodologies used to estimate BOD by Un Agencies are not reported.
Data issues
Data available are from years 2000/2001 which are not representative of current situation in Gaza strip. Time series data are not available which makes it difficult to assess the trend of pollution released to the sea and to assess any improvement made with time. Updated Data on total Nitrogen and total phosphorus loads from Gaza strip is scarce making the assessment difficult as there is no measurement made and reported in last years. Data used for nutrients are almost from UN agencies and from research studies and scientific papers published in the literature. Therefore, data available are not covering the entire sources of pollution existing in Gaza strip and are not totally related to industrial installations.

Indicator Assessment

H2020 / NAPs Indicators	
Thematic area **Industrial emissions**	**Date** **Author(s):**
Policy theme 6.2. Release of toxic substances from industrial sectors	
Indicators: 6.2.1) Total heavy metals load discharged 6.2.2) Furans and dioxins load discharged 6.2.3) Polycyclic aromatic hydrocarbons (PAH) load discharged 6.2.4) Volatile organic compounds (VOC) load discharged	

Key policy question: *Are releases of toxic substances from industrial sectors monitored and controlled in Gaza strip - Palestine?*

Key messages

- The Heavy metals concentration in the marine water and sediments is rather high and exceeds the allowable international standards. This could be allocated to pollutant loads discharge for decades which are cumulated in the sediments and do not reflect the actual releases from industrial activities in Gaza strip. Additionnally, wasterwater treatment plants are not operated full time because of power cuts and are receiving combined domestic and industrial wastewater released at the same time without any preatreatment at different sources. This requires to identify the industrial sources and to monitor the heavy metals relaesed in their wastewater in order to take the appropriate mitigation measures.
- There is no available data on Furan, dioxins, polycyclic aromatic hydrocarbons (PAH) and Volatile organic compounds (VOC) from industrial activities in Gaza strip. There is no heavy chemical industries that discharge such pollutants to the sea in Gaza.

Key figures/tables

No data is available

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Key assessment text

There is no data reported on toxic sustances from the industrail activities occuring in Gaza strip. It is likely there is no indutrail activities using toxics in Gaza strip where activities are mainly related to small food industry.

References in key assessment text

Environment Quality Authority (EQA), Palestine

Specific policy questions: Are *total heavy metals load discharged to the Mediterranean sea monitored in Gaza strip – Palestine ?*

Specific figure(s)

Table 2: Statistical summary of heavy metals concentrations in seawater of Gaza fishing harbour and surrounding area

Item	Mn mg/L	Cu mg/L	Zn mg/L	Ni mg/L	Co mg/L	Pb mg/L	Cd mg/L	Reference
Min	0.006	0.038	0.028	0.199	0.0712	0.159	0.0746	This study
Max	0.128	0.695	0.373	0.296	0.1408	0.5888	0.949	
Mean	0.067	0.094	0.066	0.25	0.11	0.29	0.23	
RSD%	45.65	138.93	77.77	9.57	19.80	29.47	114.03	
EPA Std.	-	0.045	1.18	0.12	-	0.05	0.01	USEPA 2000
WHO Std.	-	10	30	10	-	0.05	0.01	FAO/WHO 1984

There is no data on heavy metals loads from industrial activities which are released to the mediterranean sea. All available heavy metal pollution data are related to the water pollution concentration measured in the sea produced by scientists while conducting research on pollution in the region. These results do not correspond to the level of pollution loads released by the industrial activities for a given time considering the pollution accumulation from all sources deversing in the sea.

Specific assessment text

The data availabe are related to the concentration of some heavy metals in the marine sediments which could be cumulated for years and are not representative of current loads released from the limited number of small industrial activities still occuring in Gaza strip. Even if Gaza coast is one of the most polluted areas of heavy metals in the Mediterranean Sea cumulatated for many years, due to the polluted effluents coming from land-based sources.

The concentration of heavy metals in Gaza marine water and sediment is higher than the allowable international standards (WHO and EPA) as shown in Table 2. There was no data published on the quantity of heavy metals discharged to the Mediterranean sea.

Pollution loads of heavy metals discharged from industrial activities are not monitored in the Gaza strip. There is no data available on the control of the heavy metals.

References in specific assessment text

Zaqoot, H, Aish, A, Wafi, H. 2018. Study on heavy metal pollution in Gaza fishing harbour along the Mediterranean Sea-Gaza beach, Palestine. Journal of Aquatic Science and Marine Biology Volume 1, Issue 1, PP 24-34.

Methodology for indicator calculation

All methodologies used for estimation of toxics from industries are developed by scientists while conducting their research on wastewater in Gaza which are included in their references.

Data issues

Data are missing for all industrial activities even if there are only very small industrial activities in the Gaza strip.

There is no data available realed to the furans and dioxins emissions in Gaza. Based on the expert assessment made on the industrial activities in Gaza, it is likely there is no source of emissions of furans and dioxins from industrial activities occuring in Gaza strip.

There is no data available for the PAH loads discharged from industrial activities in Gaza strip to the mediterranean sea. Palestine doesn't have heavy chemical industries that discharge such pollutants.

There is no data reported on any hazardous waste generated and managed or disposed in Gaza strip as there is no infrastructure and landfills for hazardous waste in Gaza strip - Palestine

There is no information reported or data provided on the implementation of the regulations in Gaza strip Palestine to ensure pollution releases control.

- Local authorities need capacity building to record all types of pollutants and to estimate loads released from industrial activities located in Gaza strip
- Human resources ae needed to conduct inspections and control of pollutant releases from industrial activities and to report breach of laws and regulations
- Local authorities need support to identify hotspots and report on their development on a regular basis.