H2020/NAP indicator assessment

Waste

Palestine

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Organisation: EEA

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UN environment United Nations Programme

Mediterranean Action Plan Barcelona Convention

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H2020 / NAPs Indicators	
Thematic area Waste	**Date:** 10/07/2020 **Author(s):** Emanuele Bigagli
Policy theme 1. Municipal Waste Generation	
Indicators: 1.1 Total Municipal Solid Waste (MSW) generation 1.A Municipal waste composition 1.B Plastic waste generation per capita 1.C % of population living in Coastal Areas 1.D % of Time of Tourist visitors in Coastal Areas / Population in Coastal Areas	

Key policy question: *What is the status of municipal waste generation in Palestine*?

Key messages

- MSW generation increased during the period 2012-2019 to reach 1.58 million tonnes, driven by the increase of population and of MSW generation rates per capita. MSW generation is higher in urban areas than in rural areas.
- In 2017, a total of 40 kg/year of plastic waste were generated per capita in Palestine, a value that has been estimated as increasing in the last years.
- The fraction of plastic waste has been increasing to reach 17% of total MSW generated, while the fraction of organic waste has been decreasing, due to changing consumption patterns.
- Coastal population in Palestine increased from 1.79 million in 2014 to 1.96 million in 2018, thus exerting increasing environmental pressures. In contrast, due to the political unrest, the limited available data indicate a dramatic decrease of coastal tourism over the past years.

Key figures/Tables

Key assessment text

In 2018, the estimation of the total MSW generated in Palestine is still challenging, due to the lack of available or consistent data. For 2012, GIZ-SWEEPNET (2014) estimated that 1.387 million tonnes of MSW were generated by the Palestinians; given that the national population in 2014 was 4.29 million, the MSW generation per capita was calculated at 0.94 kg/day (or 343.1 kg/year). Based on this calculation, the total amount of MSW generation would be 1.687 million tonnes in 2017 and 1.755 million tonnes in 2018. According to the MoLG-JICA Data book report (2019), an estimated value of 4,333 tonnes/day or 1.58 million tonnes/year were generated in Palestine in 2019. A different estimation based on population data indicates that 2,622 thousand tonnes of MSW were generated in the West Bank (WB) and 1,330 in the Gaza Strip (GS), corresponding to 0.9 kg per capita/day (or 328 kg per capita/year) in the WB and 0.7 kg per capita/day (i.e., 255.5 kg per capita/year) in the GS.

Reports confirmed an increase in MSW generation of 4% per year, driven by the increase in population and in MSW generation rate per capita, posing dramatic pressures on the environment that policy makers should consider in the planning of the national MSW management strategy.
MSW generation usually differs between urban and rural areas. In Palestine, it was estimated that rural areas generate less MSW (about 0.75 kg/day/capita), compared to urban areas such as Ramallah or East Jerusalem, which produce about 1-2 kg/capita/day (MoLG-JICA, 2019). In the GS, on average, the MSW generation rate in urban areas is double than in rural areas (which generate less than 0.5 kg/capita).

References in key assessment text

https://www.pcbs.gov.ps/Portals/_Rainbow/Documents/gover_e.htm.
GIZ-SWEEPNET, 2014, page 15-16.
MoLG-JICA Databook, 2019, page 1.
PCBS Census 2017 final summary. http://pcbs.gov.ps/Downloads/book2383.pdf, page 130.
PCBS Report 2400 (2018). Palestinians at the end of 2018. Estimated figures. http://pcbs.gov.ps/pcbs_2012/Publications.aspx
Thoni, V and Matar, S. 2019, Solid Waste management in Occupied Palestinian territory, CESVI, Over View report.

Methodology for indicators calculation

The methodology followed for indicator calculation is described in the H2020 indicator specification sheets:
https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment

Data issues

Data were partly based on estimations, due to limited data availability and consistency, as some MSW management activities are not systematically tracked or recorded. Most of the values of MSW generation for the Gaza Strip data from 2012.

Specific policy question: *What is the composition of municipal solid waste in Palestine?*

Specific figure(s)

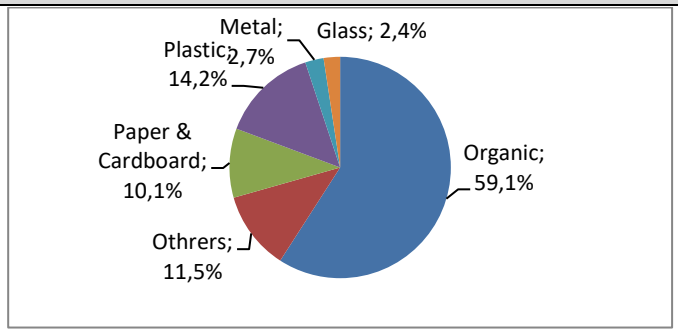

Figure 2. MSW composition in Palestine (GIZ-SWEEPNET, 2014).

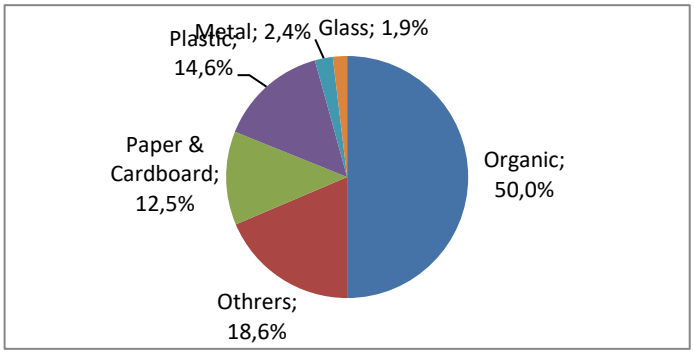

Figure 3. MSW composition in 2016 (MoLG-JICA, 2017a).

Table 1. MSW composition (%) in Palestine (WB in 2017-2018 and GS in 2012) by landfill.

	Landfill			
Waste type (%)	Al-minya (2017)	Zahret alfinjan (2017)	Jericho (2018)	Gaza (2012)
Organic	46	55	45.9	56.6
Plastic	18.3	12	26.4	13.9
Paper/cardboard	10.9	14	11.1	7.6
Glass	2.3	1.5	1.3	1.96
Metal	1.8	2	4.9	2.27
Others (e.g. textile)	20.7	15.5	10.6	17.76

Specific assessment text

Based on the data available it was found that MSW is composed of 59% organic waste (GIZ-SWEEPNET, 2014). The other main components of MSW are paper/cardboard, plastic, metal, glass, and others (see Figure 2, Figure 3, and Table 1).

There has been a slight increase of plastic waste generation from 2012 (Figure 2) to 2017 (Figure 3). Further evidence shows that the organic fraction of MSW decreased significantly from 2012 (59.1%) to 2017 (50%). Among the four landfills shown in Table 1, the highest value of the organic fraction of MSW was in Gaza (56.6% in 2012).

References in specific assessment text

Thoni, V and Matar, S. 2019, Solid Waste management in Occupied Palestinian territory, CESVI, Over View report.

GIZ-SWEEPNET, 2014. Country report on the solid waste management in Occupied Palestinian Territories.

MoLG-JICA. Data Book. 2017a.

MoLG-JICA. Data Book. 2017b.

Methodology for indicators calculation

The methodology followed for indicator calculation is described in the H2020 indicator specification sheets:

https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment
Data issues
Data availability on MSW composition is limited to specific years.

Specific policy question: *Is generation of plastic waste per capita decreasing/ increasing?*
Specific figure(s)
Specific assessment text
Based on the estimation of the plastic fraction of MSW and the amount of MSW generated, the generation of plastic waste per capita in Palestine in 2017 is estimated at 40 kg/year. Based on the available data showing the slight increase of the percentage of plastic in solid waste in recent years (see Figures 2 and 3), it is reasonable to assume that also the generation of plastic waste per capita in Palestine has been increasing.
References in specific assessment text Elaboration by the authors
Methodology for indicators calculation
The methodology followed for indicator calculation is described in the H2020 indicator specification sheets: https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment
Data issues
The data on plastic waste generation are based on an elaboration by the authors; however, the source of the value of plastic waste generation per capita and the method followed to calculate it are not indicated.

Specific policy question: *What is the percentage of people living by the coast? vs total population in Palestine?*
Specific figure(s)
Table 2. Estimated population of Palestine by region in the last 5 years

Year	Palestine	West Bank	Gaza Strip
2013	4,327,751	2,643,435	1,684,316

2014	4,429,084	2,696,714	1,732,370
2015	4,530,416	2,749,990	1,780,426
2016	4,632,025	2,803,411	1,828,614
2017	4,733,357	2,856,691	1,876,666
2018	4,854,013	2,921,170	1,932,843

Specific assessment text

The coastal zone of Palestine is represented by the GS, which is separated geographically from the WB. The coastal area of GS has a length of 42 km and a width of 6-12 km, and a total area of 365 km^2. Its population increased from 1.73 million in 2014 to 1.93 million in 2018 (see Table 2), while the share of coastal population over total national population has been almost constant at 39%. The increase of population exerts additional pressures on the coastal areas of Palestine.

References in specific assessment text

PCBS, 2015. Palestine in figures 2014. Ramallah, Palestine.
PCBS, 2016. Palestine in figures 2015. Ramallah, Palestine.
PCBS, 2017. Palestine in figures 2016. Ramallah, Palestine.
PCBS, 2018. Palestine in figures 2017. Ramallah, Palestine.
PCBS, 2019. Palestine in figures 2018. Ramallah, Palestine.

Methodology for indicators calculation

The methodology followed for indicator calculation is described in the H2020 indicator specification sheets:
https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment

Data issues

Specific policy question: *Is the number of tourists increasing?*

Specific figure(s)

Specific assessment text

In the GS, there are no available data on tourism, and tourist activity is not recorded since the GS is suffering from political unrest because of the security situation, especially in the last few years. However, according to the Alternative Tourism Journal, published in Palestine by the Alternative Tourism Group Study Center (ATG) in 2018, the total number of tourists that visited the GS was 59,078 in 2013, 42,748 in 2014, and 30,249 in 2015, showing a dramatic decrease over the years. According to the Palestinian Central Bureau of Statistics (PCBS) and the Ministry of Tourism and Antiquities (MOTA), the total number of tourists that visited the WB was 193,745 during the first half of 2016, 259,835 in 2017, and 301,422 in 2018, showing an increasing trend.

References in specific assessment text

http://www.pcbs.gov.ps/post.aspx?lang=en&ItemID=3257
http://atg.ps/en/wp-content/uploads/2018/09/english-book-2018.pdf

Methodology for indicators calculation

The methodology followed for indicator calculation is described in the H2020 indicator specification sheets:
https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment

Data issues

No data availability on tourism for the Gaza Strip (GS), due to the current security situation. There is a discrepancy between the data mentioned in the report and those reported in the context of the ENI SEIS II project.

H2020 / NAPs Indicators	
Thematic area WASTE	**Date:** 10/07/2020 **Author(s):** Emanuele Bigagli
Policy theme 2. "Hardware" of waste management	
Indicators: 2.A Waste collection 2.A.1 Waste Collection Coverage 2.A.2 Waste Captured by the system 2.B Environmental control 2.B.1 % of waste to uncontrolled dumpsites 2.B.2 Uncontrolled dumpsites in Coastal Areas 2.B.3 Waste going to dumpsites in Coastal Areas 2.C Resource recovery 2.C.1 % of plastic waste generated that is recycled	

Key policy question: *is municipal solid waste management improving?*

Key messages

- MSW collection coverage has been increasing from about 64% in 1994 to 92% in 2011 and 95% in 2015, thanks to the increase in available equipment. Waste collection coverage is higher in urban areas and in camps areas than in rural areas, and is higher in the West Bank than in the Gaza Strip.
- Landfilling and uncontrolled dumping are the main methods of waste treatment and disposal. It is estimated that in 2018 about 65% of MSW was disposed in controlled landfills, about 32% was illegally dumped, and 3% was recovered/recycled. Illegal and spontaneous fires often take place in dumpsites or in containers.
- There is no up-to-date list of all the uncontrolled dumpsites in Palestine. In the last few years, thanks to the opening of sanitary landfills and several rehabilitation efforts, several illegal dumpsites were closed. Depending on the source, the number of uncontrolled dumpsites in the West Bank vary from 57 (EQA) to 83 (MoLG).
- In 2019, it was estimated that about 343 tonnes/day of MSW in the West Bank and 443 tonnes/day in the Gaza Strip were disposed of in dumpsites, corresponding to about 36.4% of the total MSW generated.
- MSW recycling in Palestine was limited to about 1% of total MSW generated throughout the last years (6,400 tonnes/year in 2010), and about 24.5% of all MSW recycled was composed of plastic. There has been a slight increase in the amount of plastic waste recycled at 14.6% of plastic waste generated in 2016.
- The serious environmental problems caused by MSW management in Palestine are further negatively affected by the political situation. There is a lack of accessibility to land use imposed by the Israeli occupation. Moreover, there are illegal imports of solid waste from Israel to the West

Bank. Finally, MSW management in the Gaza strip is especially challenging due to continuous political unrest.

Specific policy question: *what is the progress of municipal solid waste collection? How much solid waste is collected?*

Specific figure(s)

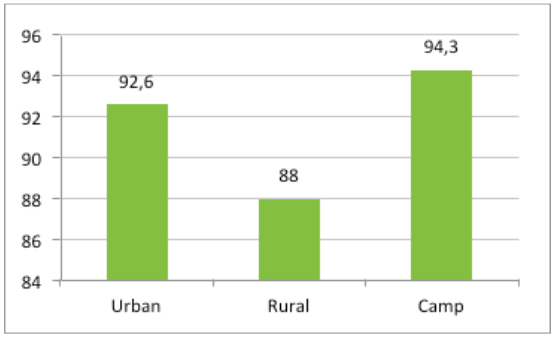

Figure 4. MSW collection coverage as share of population in Palestine by type of locality (2011).

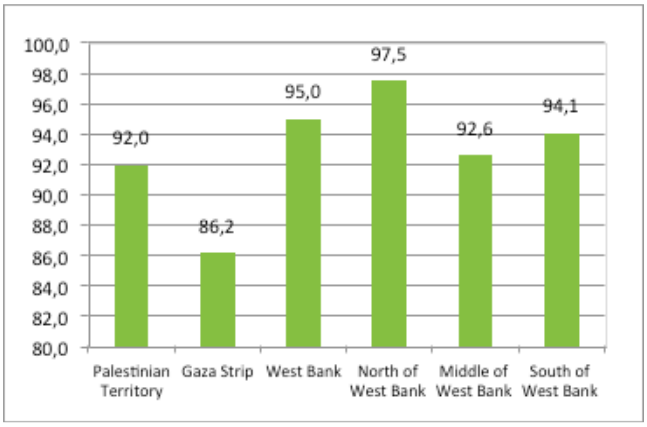

Figure 5. MSW collection coverage as share of population in Palestine by region (2011).

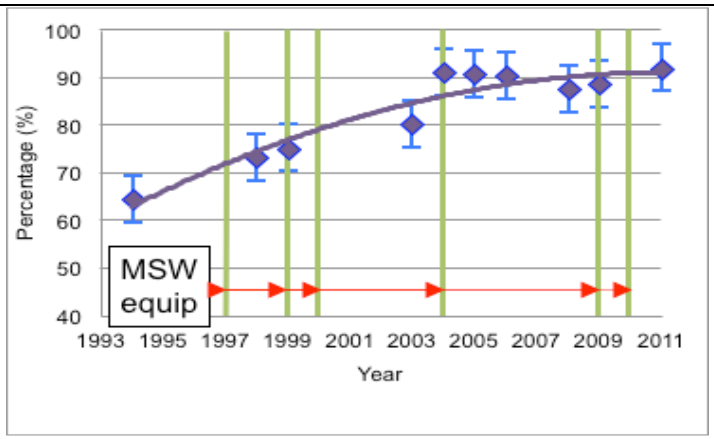

Figure 6. MSW collection coverage in Palestine from 1993 to 2011 (PCBS - various years for household Environmental survey, 2011).

Specific assessment text

MSW collection is higher in urban and camps areas, and lower in rural areas, and is higher in the WB than in the GS (Figure 4).

PCBS collects regularly (every two years) data about the share of households covered by waste collection services. According to the latest household environmental survey in 2013, 8.5% of the households were not covered by MSW collection services (Figure 5). Since the Palestinian National Authority (PNA) took control of MSW collection services in Palestine, the MSW collection rate has increased from about 64% in 1994 to 92% in 2011 and 95% in 2015. This was associated with the increase in equipment for MSW collection at the level of local authorities and Joint Service Councils (JSCs; see Figure 6).

Waste collection and transportation are carried out mainly by municipalities, JSCs, and the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNWRA) for the refugee camps. Collection is primarily done either door-to-door using containers, or through containers located in fixed places. The local government unit (LGU)/JSC and UNRWA vehicles collect the waste into the containers and transfer it to landfills (secondary collection).

References in specific assessment text

Methodology for indicators calculation

The methodology followed for indicator calculation is described in the H2020 indicator specification sheets:
https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment

Data issues

Data on MSW collection are collected by the PCBS every two years. There is a discrepancy between the data on MSW collection mentioned in the report, and those reported in the context of the ENI SEIS II project.

Specific policy question: *Amount of municipal solid waste captured by the management system and delivered to controlled landfills.*
Specific figure(s)
Specific assessment text
The disposal process is one of the challenges of MSW management in Palestine. The main methods of disposal are landfilling and random dumping. In addition, illegal and spontaneous fires often take place in dumpsites or in containers. The quantity of MSW going to landfills reported for 2018 vary from 50% (Di Maria et al., 2017) to 80% (MoLG-JICA, 2019, concerning only JSCs). Taking into account the information available, as well as the tables and data presented in this report, it was estimated that in 2018 about 65% of MSW collected was disposed in controlled landfills, 3% was recovered/recycled, and about 32% was illegally dumped. GIZ-SWEEPNET (2014) estimated that about 33% of MSW was landfilled and 67% was dumped. In the following years, the construction of landfills and the rehabilitation of dumping sites improved the situation. Apart from technical difficulties (shortage of number and efficiency in equipment's, capacity limits of the existing landfills, and the issue of dumpsites), the serious environmental problems caused by MSW management in Palestine are further negatively affected by the political situation. There is a lack of accessibility to land use imposed by the Israeli occupation, in particular in relation to area C of the WB, which is an open countryside area for the establishment of solid waste landfills. The situation is further worsened by the illegal imports of solid waste from Israel to the West Bank. Finally, the status of solid waste management in coastal area of Gaza strip is challenging due to continuous political unrest. The Palestinian authority published and formally adopted the following plans and strategies to manage the solid waste issue: o The National Strategy for Solid Waste Management in the o Palestinian territory 2010-2014, the Palestinian National Authority, May 2010; o The environment Sector Strategy, Environment Quality Authority, March 2010; o Master Plan for Healthcare Waste Management in West Bank and Gaza Strip, MTEAP, 2006; o The Palestinian Environment Strategy 2000-2010, Ministry of Environmental Affairs, 2000; o The development of a National Master Plan for hazardous waste management for the Palestinian National Authority, o UNEP, February 2010. – Draft was never approved; o Palestinian National Strategy to achieve MDGs by 2015. June 2012. o Cross-sectoral strategy for Palestinian local government and o Administration sectors (2011-2013). o National Strategy for Solid Waste Management 2017-2022. o Projects: — Construction of new landfills (e.g. Al-Minya landfill in Bethlehem) — Awareness campaigns carried out by EQA and other Ministries

— Establishment of transfer stations in different areas, saving time and efforts and reducing management costs.
— Closure of several uncontrolled dumpsites.

References in specific assessment text

CESPI 2019, Solid Waste management in Occupied Palestinian territory, Over View report.
Di Maria, F., Lovat, E. & Caniato, M. (2017). Comparing Waste Management in Developed and Developing Countries: The Case Study of The Umbria Region (Italy) and of West Bank (Palestine). Proceedings Sardinia 2017 / Sixteenth International Waste Management and Landfill Symposium/ 2 - 6 October 2017. S. Margherita di Pula, Cagliari, Italy / CISA Publisher, Italy.
GIZ-SWEEPNET. (2014). Country Report on The Solid Waste Management in Occupied OPT. http://environment.pna.ps/envar/files/Country report on the solid waste management.pdf,
MoLG-JICA Databook 2019,

Methodology for indicator calculation

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Data issues

Data are partly based on estimations, and are available only for a limited temporal range (i.e. 2018).

Specific policy question: *what are the quantities of municipal solid waste going to uncontrolled dumpsites?*

Specific figure(s)

Table 3. List of dumpsites in operation in some WB Northern governorates.

Governorate	# of Dumpsites in operation
Nablus	10
North/North West Jerusalem	4
East/South Jerusalem	1
Salfit	9
Ramallah & Albireh	50

Specific assessment text

It is not possible to have an up-to date list of all the uncontrolled dumpsites. In the last few years, thanks to the opening of sanitary landfills and several rehabilitation efforts, many illegal dumpsites could be closed. In 2013, there were about 160 uncontrolled and 3 controlled dumpsites in the WB, half of which were not in use (GIZ-SWEEPNET, 2014). MoLG-JICA (2017) listed the number of dumpsites in operation in 2017 in some governorates in the WB (Table 3). In 2018, according to the Palestinian Environment Quality Authority (EQA), there were no more uncontrolled dumpsites neither in the southern Governorates, nor in the Tulkarem, Jenin, and

Tubas Governorates. This would mean that there are still about 57 uncontrolled dumpsites in the WB. In 2018, MoLG estimated that there were about 83 dumpsites in the WB. Because of the lack of sanitary disposal areas and the long distance to the existing ones, sensitive areas such as Ramallah, Al Bireh, Salfit, Qalqilya, and Nablus host the majority of non-sanitary dumping sites, whereas the southern Governorates are in a better situation. The JSC of Ramallah confirmed in 2019 the use of 53 random dumpsites in the Governorate. In 2019, it was estimated that about 343 tonnes/day in the WB and 443 tonnes/day in the GS were disposed of in dumpsites (MoLG-JICA, 2019).

References in specific assessment text

MoLG-JICA, Study on Construction and Demolition Waste in West Bank, Palestine, 2017.
MoLG-JICA Databook 2019.
GIZ-SWEEPNET, 2014.
CESPI 2019, Solid Waste management in Occupied Palestinian territory, Over View report.

Methodology for indicators calculation

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Data issues

There is a limited availability of data on the number of dumpsites.

Specific policy question: *how many uncontrolled dumpsites in the coastal area-relevant to Mediterranean?*

Specific figure(s)

Specific assessment text

Th coastal areas of the North Gaza Governorate (Jabalia, Bet Lahya, Bet Hanoun, and Um Al-Nasr), generate about 400 tonnes/day of MSW, most of which is transferred to one of the three dumpsites in Jabalia, Bet Lahya, and Bet Hanon. The accumulated quantity of MSW in dumpsites in North Gaza estimated at 250,000 tonnes. The waste dumped in uncontrolled dumpsites represents about 36.4% of the total MSW generated.

References in specific assessment text

Thoni, V and Matar, S. 2019, Solid Waste management in Occupied Palestinian territory, CESVI, Over View report.

Methodology for indicators calculation

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Data issues
Data partly based on estimates.

Specific policy question: *Are recycling rates of municipal solid waste in your country increasing?*
Specific figure(s)
Specific assessment text
In general, the reuse and recycling market for paper, glass, metal, and plastic waste remains very small and informal. In fact, MSW recycling in Palestine was limited to about 1% of total MSW generated throughout the last years. More into detail, a unique study conducted in 2010 showed that the amount of recycled waste in the WB was about 6,400 tonnes/year (1%). In the GS, recycling is highly dependent on the availability of raw materials, which is in turn affected by the siege and the ability to import raw materials legally or illegally.
References in specific assessment text Thoni, V and Matar, S. 2019, Solid Waste management in Occupied Palestinian territory, CESVI, Over View report. Musleh, R. Al Khatib, A. (2010). An assessment of solid waste sorting and recycling in the northern and southern West Bank, and identification of suitable pilot projects for implementation in Hebron and Bethlehem Governorates. IMG
Methodology for indicators calculation
The methodology followed for indicator calculation is described in the H2020 indicator specification sheets: https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment
Data issues
No data availability on recycling in Palestine since 2010.

Specific policy question: *what is the progress in plastic waste generated and that is recycled (formal and informal)?*
Specific figure(s)
Specific assessment text
Plastic waste recycling in Palestine was reported to increase from 12% in 2009 to 14.2% in 2014 and 14.6% in 2016. In 2010, the plastic that was recycled represented 24.5% of the total MSW recycled.

References in specific assessment text Musleh, R. Al Khatib, A. (2010). An assessment of solid waste sorting and recycling in the northern and southern West Bank, and identification of suitable pilot projects for implementation in Hebron and Bethlehem Governorates. IMG Applied Research Institute- Jerusalem (ARIJ), 2009a. Sector Overview in Sustainable Urban Development, Solid Waste Management. Bethlehem, Palestine.
Methodology for indicators calculation
The methodology followed for indicator calculation is described in the H2020 indicator specification sheets: https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment
Data issues
There are no fixed and published data on the amount of plastic waste generated in Palestine.

H2020 / NAPs Indicators	
Thematic area WASTE	**Date:** 10/07/2020 **Author(s):** Emanuele Bigagli
Policy theme IND Q "Software of waste management" (Policies)	
Questions: IND Q.A Marine Litter and Waste Management Framework IND Q.B Resource Recovery IND Q.C Sustainable Consumption and Production	

IND Q.A MARINE LITTER & WASTE MANAGEMENT FRAMEWORK	
Question	**Answer (Yes / No)**
***IND Q.A.1.**: Is there a National Assessment for ML and its impacts?*	NO
***IND Q.A.2.**: Is there a National plan or strategy for ML?*	NO
***IND Q.A.3.**: Is there a National plan or strategy for waste management?*	YES
***IND Q.A.4.**: Is there a National law on waste?*	YES
There is a draft law.	
***IND Q.A.5.**: Is there a National plan or target to close the dumpsites before 2030?*	YES
***IND Q.A.6.**: Is there a National information system for waste management in place?*	NO
There is only a database available.	
IND Q.B RESOURCE RECOVERY	
***IND Q.B.1.**: Is there a National plan or strategy for waste prevention?*	NO
***IND Q.B.2.**: Are there mandatory targets for recycling-recovery of packaging waste?*	NO
A target has been set of 11% of waste to be recycled, as mentioned in the national strategy.	

***IND Q.B.3.**: Are there EPR or deposit-return schemes for packaging waste?*	NO
***IND Q.B.4.**: Are there national policies to eliminate or reduce single-use plastics?*	NO
***IND Q.B.5.**: Are there financial recovery activities?*	NO
IND Q.C SUSTAINABLE CONSUMPTION AND PRODUCTION	
***IND Q.C.1.**: Are there sustainable consumption and production plans or strategies?*	Not reported
***IND Q.C.2.**: Are there green procurement rules for the public sector in place?*	Not reported
***IND Q.C.3.**: Are there policies to support sustainable tourism?*	Not reported
***IND Q.C.4.**: Are there policies to support eco-labelling and eco-design?*	Not reported

Methodology for indicators calculation
The methodology followed for indicator calculation is described in the H2020 indicator specification sheets: https://eni-seis.eionet.europa.eu/south/areas-of-work/indicators-and-assessment
Data issues
Information for indicators Q.C was not reported.