# Sustainable Tourism Observatory of Malaga

## Solid waste management

Ciudad de Málaga | STO málaga | UN Tourism INSTO International Network of Sustainable Tourism Observatories | Universidad de Málaga | IATUR Instituto Andaluz de Investigación e Innovación en Turismo

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# Context

## The proper management of municipal solid waste (MSW) is an important aspect of maintaining environmental sustainability and quality of life in urban areas.

Municipal solid waste covers a wide range of materials, from organic matter to other elements such as paper and cardboard, glass, plastics, and ferrous and non-ferrous materials, among others. However, inefficient management of this waste can have negative consequences for the environment, public health and the appearance of the city.

Therefore, through the actions of relevant actors, such as: Limpieza de Málaga (LIMASA) and the Department of Environmental Sustainability of Malaga City Council, effective strategies have been put in place to mitigate waste generation, promote reuse and recycling, and responsibly manage waste in its final phase.

At a local level, initiatives carried out by LIMASA in recent years have led to a set of guidelines being established, through the following actions:

- First Contribution to Sustainable Development report, drafted in 2018, addressing the new challenges identified by the United Nations (UN).
- Reference European cooperation project on “Waste minimisation in large events” (MINEV), as part of the INTERREG EUROPE 2021-2027 programme.

- Adherence to the “Pact for a Circular Economy”, an initiative promoted by the Ministry of Agriculture and Fisheries, Food and Environment and the Ministry of Economy, Industry and Competitiveness, in March 2019.
- Since 2015, the carbon footprint of all municipal solid waste management activities has been calculated and recorded, as part of the environmental commitments.
- In 2015, the Climate Projects were launched, promoted by the Ministry of Ecological Transition, through the Carbon Fund for a Sustainable Economy (FES-CO2), with the aim of reducing Greenhouse Gas (GHG) emissions. The target set for this project was a reduction of 241,436 tCO2e in the 2015-2021 period.

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# Targets

- To meet the targets for municipal waste recycling (65% recycled by 2035) and landfilling (<10% by 2035) set by the European directives that promote the Circular Economy.
- To help to create a Sustainable and Circular Malaga that is close to achieving ZERO waste in the coming years.
- To replace over 12,000 containers with more environmentally friendly and accessible ones.
- To install artificially intelligent machines to record, measure and control food waste.
- To display conscious and sustainable consumption messages/signs to raise awareness and influence customers' behaviour.
- To run communication and/or awareness-raising campaigns that encourage a reduction in single-use plastics.

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# Results

## Management and treatment of municipal solid waste (MSW)

During the from 2015-2021 period, a steady growth trend was observed in the amount of waste collected (tCO2e unit), increasing by 25.8%, except for a 1.40% decrease in the annual percentage from 2017 to 2018.

*"During the 2015-2021 period, a steady growth trend was observed in the amount of waste collected (tCO2e unit), increasing by 25.8%."*

However, in the 2018 period, there was a significant percentage change of 17.70% on the previous year (Figure 1). In 2021, an amount of municipal solid waste (MSW) equivalent to 726 t/day was recorded. Regarding the percentage of segregated waste collected, 68 tonnes of MSW were collected per day.

In terms of the final destination of MSW in 2021, 53% was sent to landfill, 47% underwent some form of treatment (recycling or processing), and, finally, 103,480 tonnes of MSW were treated as compost.

Likewise, with regard to the composition of MSW in the 2021 period (Figure 2), 33% was organic waste, followed by paper and cardboard (15%), plastics (14%) and glass (5%). Ferrous materials accounted for 3% and non-ferrous materials accounted for 1%. However, the Others category accounted for 29% of the total composition. The analysed data shows significant variations in MSW generated per inhabitant over the years, with notable increases and decreases (Figure 3).

In 2021, there was a 4.1% increase in MSW produced per inhabitant per day, rising to 1.28 kg. This increase may be related to the economic recovery and changes in consumer behaviour after the pandemic.

In 2020, a further decrease of 6.1% was observed, falling to 1.23 kg. In 2019, there was a 5.1% decrease down to 1.32 kg. However, in 2017, there was a significant increase of 4.5%, rising to 1.38 kg of MSW.

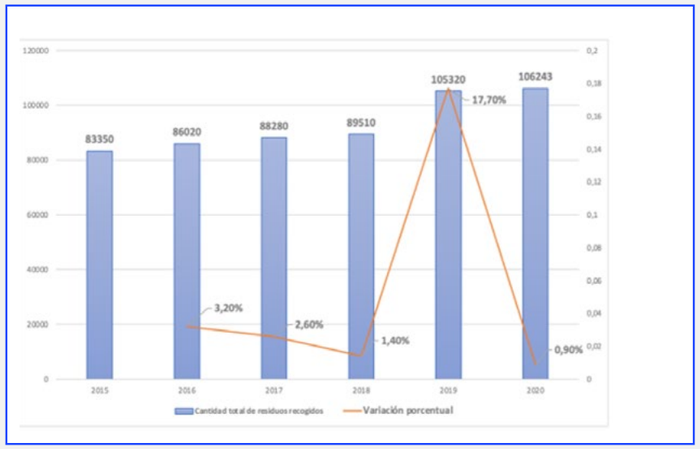
## Waste disposed of by different methods

*"Los **residuos orgánicos suponen el 33%** de los RSU, seguidos del papel y cartón (15%), plásticos (14%) y vidrio (5%)."*

Disposal of MSW in landfills was the main method, with percentages ranging from 52.35% to 61%. The 2021 and 2020 periods saw an increase in this method of waste disposal, with percentages of 61% and 53%, respectively. However, in 2019 and 2018 there was a decrease in the proportion of such waste, with percentages of 0.53% and 0.51%, respectively. For the years 2017, 2016 and 2015, the figures remained constant, with percentages ranging from 52.35% to 54.74%.

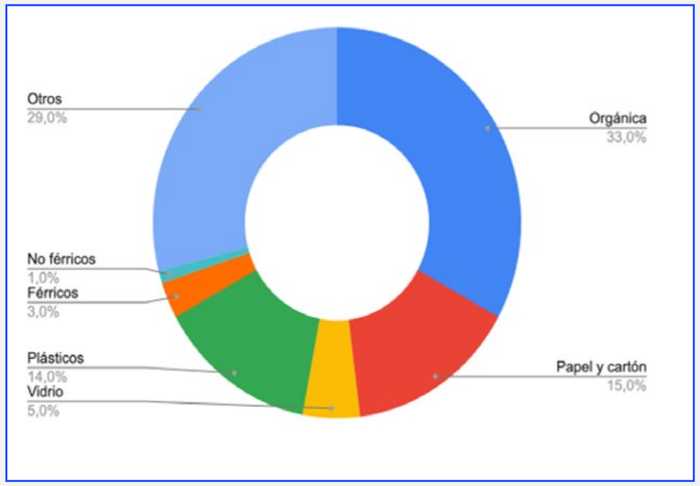


**Figure 1: Total amount (tCO2e unit) and percentage change in waste collected (2015-2020)**




*Source: Urban Environment Observatory (OMAU)*

**Figure 2: Composition of municipal solid waste (MSW), 2021 period**




*Source: Urban Environment Observatory (OMAU)*

In 2021, waste disposed of via the treatment method increased to 47.12%, similar to the level observed in 2015, when it stood at 47.65%. In 2020, there was an increase in the proportion of waste treated, rising to 39.40%. However, there was a drastic fall in 2019 and 2018, with 0.47% in the former year and 0.49% in the latter.

In the period from 2015 to 2017, waste treatment rates were consistent, standing at 47.65% in the first year, decreasing slightly to 45.69% in 2016 and 45.26% in 2017. Throughout the period under analysis, the incineration method was not used.

For the years 2015 to 2021 (Figure 5), a total of 711,189 tonnes of waste were treated as compost (green recycling), with a notable 24% increase in 2021 compared to 2020, when there was a significant decrease of -21% compared to 2019. 2018 saw a notable increase of 10% compared to 2017.

## Waste attributable (per month or season) to tourism

*"Waste disposal in landfills was the main method of disposal, with percentages ranging from 52.35% to 61% in the 2015-2021 period."*

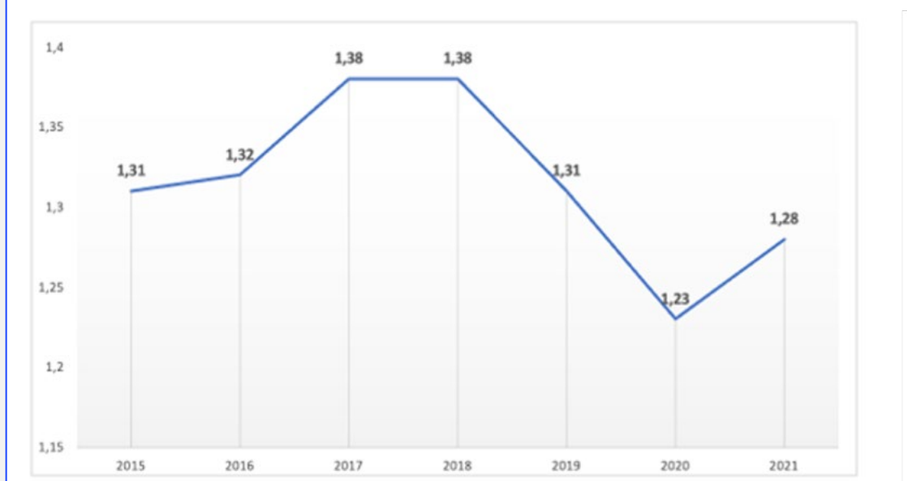
The amount of waste attributable to tourism (Figure 6) covers the geographical areas of the city centre and the beaches. Regarding the city centre, in 2022 there was a 2.3% increase relative to 2021, which in turn had recorded an increase of 3.4% over 2020.

However, in 2020, there was a significant decrease of 6.0% on the previous year, and in 2016 and 2017, the amount of waste collected increased by 1.9%.

In terms of waste collected on beaches (Figure 7), 2022 saw a substantial increase of 28.6%, compared to 2021.



### Figure 3: Quantity of kg of MSW per inhabitant per day (2015-2021)




*Source: Urban Environment Observatory (OMAU)*

### Table 1: Amount of waste and segregated waste collected, 2021

| | | | |
|---|---|---|---|
| Amount of MSW produced | Tonnes of MSW produced | <110 | 1.28 kg/person/day |
| Percentage of segregated waste collected | Tonnes of segregated MSW collected | 100 | 9.30% |
| Destinations of municipal solid waste | Treatment | 47% | |
| | Incineration | 0% | |
| | Landfill | 53% | |
| | Tons treated as compost | 103480 | |

*Source: Urban Environment Observatory (OMAU)*

Likewise, in 2019 there was a sharp fall of 63.5%, with 0.52 million tonnes of waste collected. In the 2018 period, there was a notable decrease of 29.4% compared to 2017. In 2016, there was a significant decrease of 35.5%, reaching 1.96 million.

Average annual proportion of waste collected from households and city centre, from January to December from 2015 to 2022. July and December had the highest proportion with 10.04% and 9.59% respectively, while February had the lowest proportion with 8.60%.

The amount of waste collected on beaches varies throughout the year, reflecting a seasonal variation associated with the influx of visitors. July and December had the highest proportion with 11.36% and 10.35%, respectively, reflecting the high influx of visitors during the summer. The lowest proportion was observed in December, with 5.33% (Figure 8).

In terms of the composition of MSW, the proportion of organic waste remained consistent throughout the period from 2015 to 2021, with 33% from 2017 to 2021, 35% in 2016 and 38% in 2015.

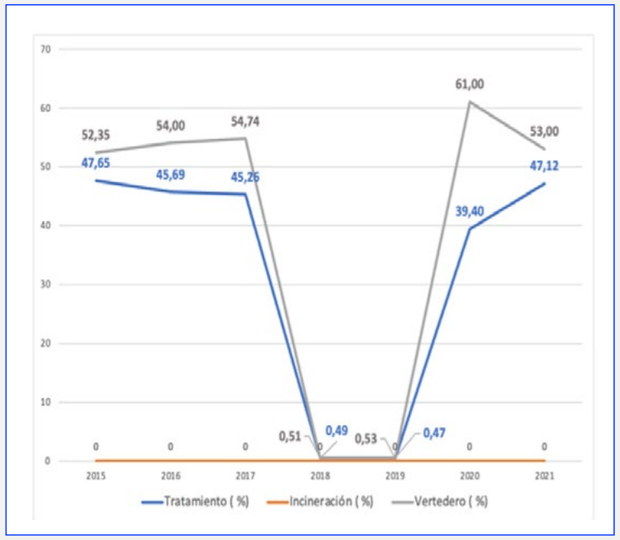
There was a certain degree of variability in the amount of paper and cardboard over this period (2015-2021), accounting for 15% from 2017 to 2021, 12% in 2016 and 15% in 2015.

The proportion of plastics in MSW has remained relatively consistent throughout 2015 to 2021, ranging from 12% to 15%. As for glass, it has remained constant at 5%, although it stood at 6% in 2015.

The proportion of ferrous and non-ferrous waste remained constant, standing at 3% and 1% respectively over the 2015-2021 period. (Figure 9).



## Figure 4: Waste disposed of through treatment, incineration and landfilling in percentage figures (2015-2021)

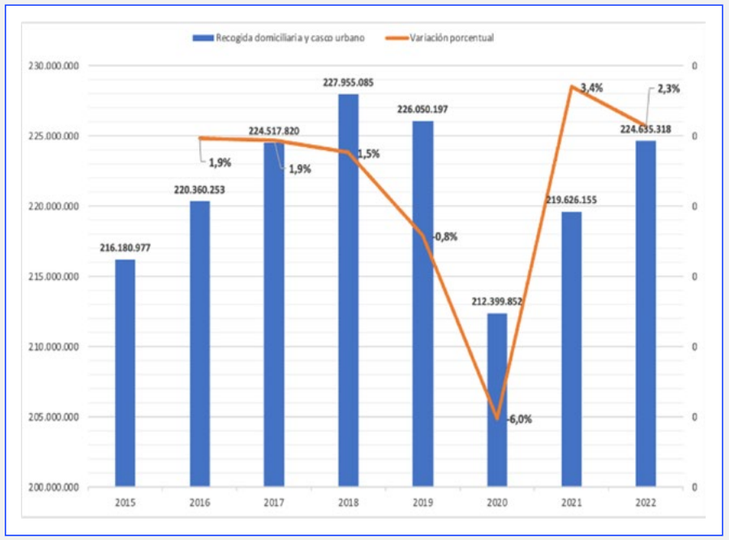



*Source: Urban Environment Observatory (OMAU)*

## Figure 5: MSW treated as compost, in tonnes (2015-2021)

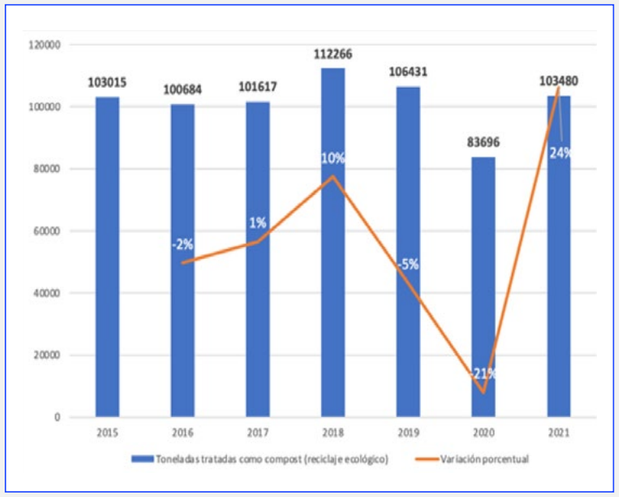

*Source: Urban Environment Observatory (OMAU)*

## Figure 6. Waste collected in the city centre (2015-2022)



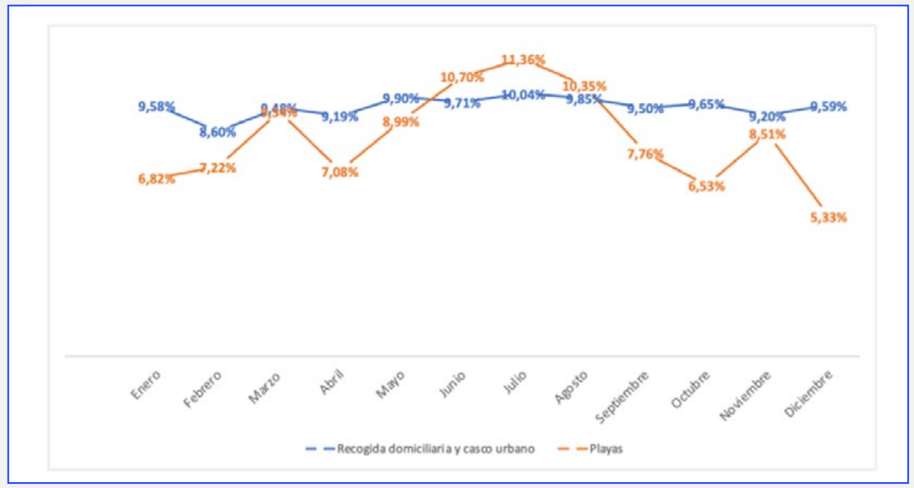

*Source: CIEDES Foundation*

## Figure 7: Waste collected on beaches (2015-2022)



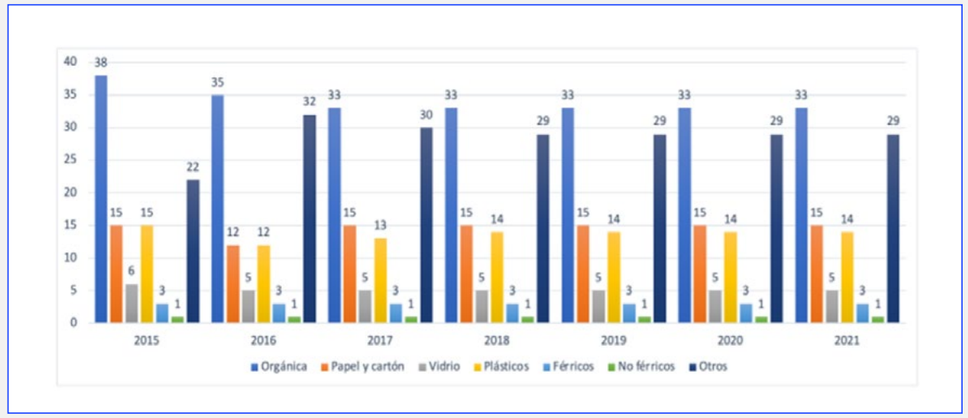

*Source: CIEDES Foundation*

## Figure 8: Average annual proportion of waste collected from households and the city centre and beaches (per month in the 2015-2022 period)




*Source: CIEDES Foundation*

## Figure 9: Analysis of the composition of Municipal Solid Waste (MSW) in different categories for the period from 2015 to 2021




*Source: CIEDES Foundation*

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# Conclusions

**The management of municipal solid waste (MSW) in the city of Malaga has been comprehensively addressed during the 2015-2021 period. The efforts of the entities involved, such as LIMASA and Malaga City Council, are reflected in the guidelines and measures aimed at mitigating waste generation and promoting sustainable practices**

*"It is necessary to promote treatment methods and recycling."*

Data analysis reveals a steady growth trend in the amount of waste collected, with one exception in 2018. The variability in the amount of waste generated per inhabitant over the years is due to economic factors and changes in consumer behaviour, as evidenced in 2021.

Moreover, the composition of municipal solid waste (MSW) is highly diverse, with organic waste accounting for a particularly high proportion of the total. Additionally, incineration is not used, with the emphasis placed on composting, demonstrating a commitment to environmental responsibility on the part of the local waste management bodies.

However, the predominance of waste disposal through landfilling highlights the need to strengthen efforts to promote treatment methods and recycling.

Nonetheless, seasonal variations in waste collected on beaches, linked to the number of tourists, underline the importance of considering the impact of tourism on waste management.

In general terms, this report provides a comprehensive overview of solid waste management in the city of Malaga, identifying areas for improvement and highlighting the importance of the strategies employed as we move towards more sustainable practices. Specific recommendations based on this analysis can offer guidance towards future action plans, optimising waste management to benefit the environment and quality of life in the city.


https://sto.malaga.eu/indicadores/manejo-de-residuos-solidos/

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