

The impact of Covid -19 Pandemic in municipal solid waste production. The case study of Ayia Napa Municipality.

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In early December 2019, the world was affected by a pandemic originated by a novel coronavirus (SARS-CoV-2) responsible for a severe respiratory syndrome known as COVID-19. According to WHO, a pandemic is considered as “*an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people*” (WHO, 2020). As an attempt to prevent the spread of the virus, worldwide have implemented several precautionary measures. Some include partial or total lockdown of cities/regions/ restrictions on social contact and social distance, reduced mobility of goods and passengers, reduced economic activities and businesses to essential supply chains only (Tobias 2020; Agamuthu and Barasarathi, 2021; Loizia et al., 2021). However, what started as a health crisis punctually evolved into an economic, social and environmental threat. With public health being of highest priority, along with close monitoring of economic and social impacts, the implications of COVID-19 in the environment remains largely underestimated (Saadat et al., 2020; Patricio Silva et al., 2021). Up to now, there are limited studies related to the direct effects of COVID-19, especially on waste production, management, and treatment. The lockdown restrictions implemented because of the COVID-19 pandemic not only impacted the volume of waste produced but also its spatial distribution and frequency (Sarmiento et al., 2022).

The literature identifies that waste production can be affected by external factors such as: Gross Domestic Product, population size, the average age, education and household size (Namlis and Komilis, 2019; Diaz-Farina et al., 2020; Sarmiento et al., 2022). An additional factor that has not been widely studied is tourism (Mattar et al., 2018). Indeed, the variations in tourist numbers can be one of the main drivers in waste generation in touristic areas (Diaz-Farina et al 2020; Loizia et al., 2021).

This study examines the impact of Covid -19 pandemic in municipal solid waste production and the comparison of the amount generated the last 3 years in Ayia Napa Municipality, which is the largest tourist resort in Cyprus, with approximately 22000-person-bed capacity and more than 175 hotels and apartments of all sizes. According to the latest statistic data, its permanent population amounts to 3212, while, the population increases dramatically during the summer period (potentially could be doubled).

During March 2020, a total lockdown was also imposed in Cyprus due to the pandemic COVID - 19. Although the lock down was removed by the end of May, the influx of tourists remained at low levels compared to previous years. According to the data of Cyprus Statistical Service in the first eight months (January - August) of 2020, the arrivals of tourists amounted to 424 850 compared to 2 735 839 in the corresponding period of 2019, recording a decrease of 84,5%. In addition, tourist arrivals in August 2020 amounted to 104 261 compared to 553 845 in August 2019, recording a decrease of 81,2%.

The tourist arrivals reduction affects the solid waste production. Table 1 shows that Municipal Solid Waste production in Ayia Napa area, decreased by 62,11% in 2020 related to 2019, while at the same time the collected recycled waste decreased by 56,22% in 2020 related to 2019.

Table 1. Solid Waste Production for Ayia Napa Municipality 2018-2020

MUNICIPAL SOLID WASTE (kg)		
2018	2019	2020
14 590 230	14 771 580	5 478 810
RECYCLED WASTE (Kg)		
2018	2019	2020
1 365 550	1 461 547	639 906

COVID-19 pandemic and the taken prevention measures, impacted the dynamics of cities in many ways worldwide. On one hand COVID-19 pandemic caused multiple health problems resulting more than five million people deaths worldwide, on the other hand seems to be indirectly contributing towards the Sustainable Development Goals by increasing overall health and safety of cities by reducing the greenhouse gas emissions, outdoor air pollution, environmental noise level and waste production.

References

- Agamuthu, P. and Barasarathi, J. (2021). Clinical waste management under COVID-19 scenario in Malaysia. *Waste Management & Research* 39, 18–26
- Diaz-Farina, E., Díaz-Hernandez, J.J., Padron-Fumero, N. (2020). The contribution of tourism to municipal solid waste generation: A mixed demand-supply approach on the island of Tenerife. *Waste Management* 102, 587–597
- Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations Patricio Silva, A., Prata, J., Walker, T., Duarte, A., Ouyang, W., Barceloe, D., Rocha-Santos, T. (2021). *Chemical Engineering Journal* 405, 126683
- Loizia, P., Voukkali, I., Zorpas, A.A., Navarro Pedreño, J., Chatziparaskeva, G., Inglezakis, V., Vardopoulos, I., Doula, M. (2021). Measuring the level of environmental performance in insular areas, through key performed indicators, in the framework of waste strategy development. *Science of the Total Environment*, 753, 141974.
- Mattar, L., Abiad, M.G., Chalak, A., Diab, M., Hassan, H. (2018). Attitudes and behaviors shaping household food waste generation: Lessons from Lebanon. *Journal of Cleaner Production* 198, 1219–1223
- Namlis, K.G. and Komilis, D. (2019). Influence of four socioeconomic indices and the impact of economic crisis on solid waste generation in Europe. *Waste Management* 89, 190–200.
- Saadat, S., Rawtani, D., Hussain, C.M. Environmental perspective of COVID-19. *Sci. Tot. Environ.* 728, 138870.
- Sarmiento, P., Motta, M., Scott, I., Pinheiro, F., Neto, M. (2022). Impact of COVID-19 lockdown measures on waste production behavior in Lisbon. *Waste Management* 138, 189–198
- Tobías, A. (2020) Evaluation of the lockdowns for the SARS-CoV-2 epidemic in Italy and Spain after one month follow up. *Sci. Tot. Environ.* 725, 138539
- WHO. What Is a Pandemic? (2020). Available online: https://www.who.int/csr/disease/swineflu/frequently_asked_questions/pandemic/en/