

Managing Construction and Demolition Waste in Insular Communities—The Case of Cyprus

Valentina E. Phinikettou^{1,2}, Florentios Economou^{1,3}, Irene Voukkali¹, Antonis A. Zorpas¹

¹ Laboratory of Chemical Engineering and Engineering Sustainability, Sustainable Environmental Engineering Master, Faculty of Pure and Applied Sciences, Open University of Cyprus, Giannou Kranidioti 89, Latsia, Nicosia, 2231, Cyprus

² V.S.K. Geoanalysis Ltd, Geo Consulting Engineers and Laboratories, Limassol, 3071, Cyprus

³ Science and Technology Driven Policy and Innovation Research Center (STeDI-RC), The Cyprus Institute, Aglantzia 2121, Cyprus

Presenting author email: v.phini@gmail.com

Keywords: Construction and Demolition Waste, Mining Waste, Aggregates, Insular Communities

Abstract

The urban expansion and infrastructure development due to population and economic growth has driven the volume of waste in the construction and mining sector to increase. This puts pressure on the demand side for natural resources, such as aggregates and increases the need for effective waste management solutions, especially in insular communities where land and disposal space are limited.

Infrastructure and mining waste streams are one of the largest waste categories in the EU, estimated to exceed 1,365 million tons per year in 2022, which represents 61% of the total waste from the economic activity of the EU-27 member states in the same year. If excavated soil is included in the calculation of the total waste volume, the generation of construction and demolition waste increases significantly. Cyprus alone generates over one million tons of construction, demolition and mining waste every year according Eurostat.

To address this challenge, the EU, through the European Environment Committee, has created a comprehensive legal framework that requires member states to align their national directives with EU directives to ensure the sustainable management of construction and demolition waste (CDW) and mining waste: the Waste Framework Directive (Directive 2008/98/EC) and the Mining Waste Directive (Directive 2006/21/EC).

This study investigates the management of construction and demolition waste (C&DW) and mining waste in the European Union (EU), focusing on an island region such as Cyprus. Construction and demolition waste includes materials generated during construction, demolition, transportation, land preparation and disasters (Rao A., Kumar N.J. and Misra S., 2007). This includes packaging materials, rubble and materials generated during the construction of residential, commercial and infrastructure buildings (Zhang C. et al., 2022). Mining waste, on the other hand, consists of by-products such as tailings, slag and sludge as well as hazardous chemicals such as cyanide and mercury, which pose significant risks to the environment, especially in terms of soil and water pollution. An examination of the progress made by EU Member States in managing these waste streams, paying particular attention to the challenges faced by insular communities such as Cyprus, is also undergone. This research, also stresses the importance of moving from a linear economic model to a circular economy approach, focusing on resource efficiency, waste reduction and recycling practices. The reuse of processed waste from the mining industry and the construction sector as a new resource in the construction industry can significantly reduce the demand for raw material extraction and decrease the volume of waste disposed of in the environment, which is particularly beneficial, especially for insular communities.

References

European Commission, 2006. Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC - Off. J. EU, 15.03.2006. Available online: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32006L0021> Accessed 02.11.24

European Commission, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing Certain Directives, L 312. Off. J. EU, 19.11.2008. Available online:

<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008L0098-20180705&from=EN>.
Accessed 02.11.24

European Commission. Construction and demolition waste Available online: https://environment.ec.europa.eu/topics/waste-and-recycling/construction-and-demolition-waste_en. Accessed 01.11.24

Eurostat. Waste statistics. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Waste_statistics Accessed 20.10.24

Rao A., Kumar N.J. and Misra S.. 2004. Use of aggregates from recycled construction and demolition waste in concrete. *Resources, Conservation and Recycling*, 50(1), pp.71-81. Doi: <https://doi.org/10.1016/j.resconrec.2006.05.010>

Zhang C. et al., 2022. An overview of the waste hierarchy framework for analyzing the circularity in construction and demolition waste management in Europe. *Science of The Total Environment*, 803. Doi: <https://doi.org/10.1016/j.scitotenv.2021.149892>