

Science for Environment Policy

New tool to assess the environmental impact of landfill sites

A fast and reliable method to measure the environmental impact of landfill sites has been developed by researchers. Analysis of the chemical composition of gas emissions and water leaching from sites provides a detailed picture of the extent of environmental pollution around landfill sites. Such monitoring is essential in order to manage risks to human health and natural resources.

Despite the general decrease in landfilled waste and improved EU landfill standards, landfill sites still represent one of the most serious environmental threats in several European countries. However, there is currently no standard procedure for monitoring the environmental impact of landfill sites.

The emission of landfill gas, comprising the greenhouse gases CO₂ and methane, is a substantial source of pollution originating from landfill sites. Of equal concern are the toxic biological and radioactive substances which can dissolve into local water sources. It is important to monitor the levels of such pollution, so that steps can be taken to manage and control it, minimising damage to environmental and human health.

The authors of this paper set out to establish a standard procedure for rapid assessment of environmental impacts of landfill sites using two case study sites in Komotini, Greece. The researchers collected and analysed landfill gas emissions at ground level on both sites, one site of which is still active, while the other is closed. They also carried out chemical analysis of water draining through the sites (leachate), and of groundwater nearby, to monitor the impact on local water resources.

Analysis of leachate showed exceptionally high values of contamination. The findings also demonstrated that standard measurements currently taken to assess environmental impact of leachate on groundwater are unsatisfactory, as they do not take into account the background chemical composition of site location, so contamination levels can appear higher or lower than they actually are.

Results of landfill gas analysis demonstrated that methane was the main component at both sites, with recorded concentrations of between 56.7 and 64.9%. The authors point out that reliable quantification of landfill gas emissions is essential, not only to monitor environmental impact, but also in order to design effective collection systems.

The results of this study suggest that the method followed provides a rapid and effective tool to inform on-site and off-site management plans to minimise the environmental impact of landfill sites. The authors argue that it should be considered a first and crucial step in understanding the extent of contamination from landfill sites.



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