

Science for Environment Policy

Innovative and effective landscape design to decontaminate and add value to polluted sites

Transforming public spaces with plants that decontaminate soils can add functional, ecological, economic and social value to derelict areas. A new study calls for consideration of social and environmental factors, as well as remediation needs, to produce effective and innovative landscape design.

Land contaminated by [urbanisation](#) and industrialisation can present substantial [health](#) and environmental problems. There are potentially 3.5 billion such contaminated sites in the EU, and thorough remediation is necessary to prevent pollutants leaching into groundwater or accumulating in food crops. An innovative method of remediation, which could provide a cost-effective and environmentally-friendly solution is 'phytoremediation', the use of plants to decontaminate polluted environments.

Researchers in the Netherlands tested the feasibility of phytoremediation in Buiksloterham, a polluted and deprived industrial area in Amsterdam-North. Plans to transform the site into a mixed residential and commercial centre are currently limited by a high concentration of heavy metal pollutants in the soil.

Combining the need to remediate the area with social and environmental concerns, the researchers produced a landscape design for Buiksloterham. Plants were chosen to transform the public space in a way that would be productive, as well as aesthetically pleasing. A group of plant species were chosen that collectively would break down heavy metal pollutants, trap pollutants in plant tissue and prevent their migration in the soil. Pollutants not broken down by the plants can be removed from the site by harvesting the plant material.

Soil reports and estimated timescales for phytoremediation showed that the time to clean up certain heavily polluted areas of the site *in situ* would conflict with the proposed timescale for urban development. Innovative solutions to this problem included transporting the heavily-polluted soils to canal barges where they would form 'floating gardens', or onto road sides where they would act as lush streetscapes, while undergoing long-term phytoremediation.

Traditional methods of cleaning up polluted sites rely on excavation and disposing of contaminated soil into landfill, treatment on site, or containment using plastics, pavements or layers of clean soil. These methods are expensive and containment has negative environmental effects. By contrast, phytoremediation has low capital and operating costs and the plants can subsequently serve as a bioenergy resource.

However, the researchers highlight that varying concentrations of pollutants make it difficult to estimate a realistic timeframe for phytoremediation. This is further complicated if a mixture of soil pollutants are present. The researchers recommend that polluted sites are assessed on a case-by-case basis, to identify the most effective remediation strategy. They suggest combining phytoremediation with conventional remediation techniques such as soil treatments. This would help make pollutants more easily available to plants and so increase the efficiency of phytoremediation.

As phytoremediation also adds not only ecological but also social value to polluted sites by creating attractive public spaces, it could be an advisable approach for urban renewal projects which are often financially insecure. Such innovative urban design, serving multiple purposes, can help achieve the goals set out in the EC's Eco-innovation Action Plan¹, a comprehensive set of initiatives to improve the EU's uptake of eco-innovation.



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1. http://ec.europa.eu/environme nt/ecoap/about-action-plan/index_en.htm

