

Bagnoli Urban Regeneration through Phytoremediation

Subjects: Plant Sciences

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The Bagnoli district in Naples has needed urban redevelopment for many years. The area is not only affected by pollution caused by many industries but also by environmental pollutants, according to geognostic surveys that have found numerous contaminants in the subsoil and water. Currently, the combination of an urban rehabilitation process with the phytodepuration technique may represent a successful idea for obtaining both urban regeneration and environmental remediation. Phytoremediation, a biologically based technology, has attracted the attention of both the public and scientists as a low-cost alternative for soil requalification. The use of plants as well as the microorganisms present in their root systems plays an important role in the ecological engineering field in controlling and reducing pollutants present in the air, water and soil. The result is efficient, sustainable and cost-effective environmental recovery compared to conventional chemical–physical techniques. In this way, not only the environmental recovery of SIN Bagnoli-Coroglio can be obtained, but also the regeneration of its landscape.

Keywords: urban regeneration ; phytoremediation ; Bagnoli former area

The alteration of the natural balance of the coastal landscape of the Bagnoli urban district in Naples, caused by urbanization but even more so by industrialization processes (Ilva, Eternit, Cementir and Federconsorzi), will be mitigated by an urban regeneration plan. The Bagnoli district, located along the highly urbanized coast of the Gulf of Pozzuoli, is included in the volcanic system of Campi Flegrei. In 1905, the construction of the Ilva plant (flat rolled and similar industrial products) marked the conversion of Bagnoli-Coroglio from a residential to an industrial center, which lasted until the end of 1990 when the first phase of closure of the industry occurred. In 2018, the Environmental and Urban Regeneration Plan was developed ^[1], which recognizes Bagnoli/Coroglio as a National Interest Site (SIN) and was a variant of the urban planning instruments already in force. In order to plan the environmental rehabilitation and urban regeneration of the site, an international competition of ideas was organized by INVITALIA (National Agency for Inward Investment and Economic Development), the implementing body of the program, which is owned by the Italian Ministry of Economy. The project proposes the realization of integrative environmental characterization, the restoration of bathing facilities, waterfront requalification and reconnection with the city. The decommissioning and reclamation of the steel plants began in 1994, following the decision of the Interministerial Committee for Economic Planning and Sustainable Development. The Italian Government funded the remediation plans via specific laws (N. 582—18 November 1996 and N.388—23 December 2000). The project proposed the utilization of the Ilva and Eternit sites for non-industrial activities. At the Federconsorzi site, the “City of Science” was built, an institute for the dissemination and enhancement of scientific culture (IDIS foundation). INVITALIA has announced the completion of the asbestos remediation at the former Eternit site. The plan provided for the carrying out of the environmental recovery of disused industrial sites by dismantling them and creating a park characterized by botanical species suitable for aiding the reduction in environmental pollution ^[1]. Afforestation will form part of the environmental mitigation and phytoremediation measures intended to respond to the need to reduce the pollution caused by anthropogenic pressures ^[2]. In this regard, it is crucial to design green areas for the Bagnoli district with the introduction of botanical species selected especially for soil depollution. In fact, in the sector in front of the industrial plant, which is now decommissioned, high concentrations of polycyclic aromatic hydrocarbons (PAHs), heavy metals, such as arsenic and beryllium, and trace elements, such as lead, zinc, cadmium, copper and mercury, have been found, even at deep levels ^[3].

References

1. Environmental Rehabilitation and Urban Regeneration Program on the Site of National Interest of Bagnoli—Coroglio. Available online: http://presidenza.governo.it/AmministrazioneTrasparente/Organizzazione/CommissariStraordinari/nastasi/RelazioneConclusiva_Set201 (accessed on 3 September 2018).
2. Zalesny, R.S.; Casler, M.D.; Hallett, R.A.; Lin, C.; Pilipović, A. Chapter 9—Bioremediation and soils. In *Soils and Landscape Restoration*; Stanturf, J.A., Callahan, M.A., Eds.; Academic Press: Cambridge, MA, USA, 2021; pp. 237–273.
3. De Vivo, B.; Lima, A. Characterization and remediation of a brownfield site: The Bagnoli case in Italy. In *Environmental Geochemistry Site Characterization, Data Analysis and Case Histories*; De Vivo, B., Belkin, H.E., Lima, A., Eds.; Elsevier: Amsterdam, The Netherlands, 2008; pp. 355–385.

